United States Environmental Protection Agency
Region 10, Office of Air, Waste and Toxics
AWT-107
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101

Permit Number: R10NT502000
Issued: December 16, 2013
AFS Plant I.D. Number: 16-777-00225

Non - Title V Air Quality Operating Permit

This permit is issued in accordance with the provisions of 40 CFR § 49.139 and applicable rules and regulations, to

Ende Machine & Foundry LLC

for operations in accordance with the conditions listed in this permit, at the following location:

Nez Perce Reservation
510 North 5th Avenue
Craigmont, ID 83523

Person Responsible for Compliance: Ed Endebrock
Owner

1224 Grelle Avenue
Lewiston, ID 83501
Phone: 208-746-2174

OR

0121 9th Street
Lewiston, ID 83501
Phone: 208-743-7058

Fax: 208-746-5518
Email: ed@hydwarehouse.com

A technical support document that describes the bases for conditions contained in this permit is also available.

Kate Kelly, Director
Office of Air, Waste and Toxics
U.S. Environmental Protection Agency, Region 10

12/16/13
Date

1. General Conditions

1.1. For purposes of this permit, the permitted source consists of the following equipment and/or activities:

Emission Unit ID	Description	Maximum Operation	Control Device
EMF-01	Steam Boiler, Fulton ICS/FB-A	1.004 MMBtu/hr	None
EMF-02	Iron Side Activities, Inductotherm electric induction furnace	3153.0 tons/year	Donaldson Torit dust collector with NX filter from TDC Filter
EMF-03	Aluminum Side Activities, Inductotherm electric induction furnace	525.0 tons/year	Donaldson Torit dust collector with NX filter from TDC Filter
EMF-04	Bronze Side Activities, Inductotherm electric induction furnace	1576.0 tons/year	Donaldson Torit dust collector with NX filter from TDC Filter
EMF-05	Sand Handling, Vulcan Engineering	30,766 tons/year	Donaldson Torit dust collector with NX filter from TDC Filter
EMF-06	Shot Blasting, Bronco Tumble Blaster	91,980 tons/year	Donaldson Torit dust collector with NX filter from TDC Filter
EMF-07	Cooling Tower, Marley 4871	480.0 gallons/minute	Integral Drift Eliminators
EMF-08	Foam Use, Clear Cast Foam	20.56 tons/year	None

1.2. Ende Machine & Foundry LLC (permittee) shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Air Act.

1.3. Compliance with the terms of this permit does not relieve or exempt the permittee from compliance with other applicable Clean Air Act requirements or other applicable federal requirements, tribal, state or local laws or regulations.

1.4. At such time as this source or modification becomes a major stationary source or major modification solely by virtue of a relaxation in any of Conditions 2.1 through 2.8, then the requirements of 40 CFR 52.21(j) through (s) shall apply to the source or modification as though construction had not yet commenced on the source or modification.

1.5. At all times, including periods of startup, shutdown, maintenance and malfunction, the permittee shall, to the extent practicable, maintain and operate each emission unit, including any associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions and considering the manufacturer's recommended operating procedures. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the EPA, which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

2. Emission Limits and Work Practice Requirements

2.1. Emissions of particulate matter (PM) from this facility shall not exceed 17.52 tons per year as determined on a rolling, 12-month basis, which shall be determined by calculating the emissions (tons) for each month and adding the emissions (tons) for the previous eleven months.

2.1.1. For compliance with Condition 2.1, measurement of PM shall be determined using EPA Method 5.

2.2. Emissions of particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) from this facility shall not exceed 73.68 tons per year as determined on a rolling, 12-month basis, which shall be determined by calculating the emissions (tons) for each month and adding the emissions (tons) for the previous eleven months.

2.2.1. For compliance with Condition 2.2, measurement of $PM_{2.5}$ shall be determined using EPA Methods 201A and 202.

2.3. Emissions of particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}) from this facility shall not exceed 73.68 tons per year as determined on a rolling, 12-month basis, which shall be determined by calculating the emissions (tons) for each month and adding the emissions (tons) for the previous eleven months.

2.3.1. For compliance with Condition 2.3, measurement of PM_{10} shall be determined using EPA Methods 201/201A and 202.

2.4. Emissions of volatile organic compounds (VOC) from this facility shall not exceed 20.61 tons per year as determined on a rolling, 12-month basis, which shall be determined by calculating the emissions (tons) for each month and adding the emissions (tons) for the previous eleven months.

2.4.1. For compliance with Condition 2.4, measurement of VOC shall be determined using EPA Method 25A.

2.5. Melting and production of iron products, including iron side feedstocks that end up as scrap or waste, at the facility shall be limited to 3153.00 tons per year.

2.6. Melting and production of aluminum products, including aluminum side feedstocks that end up as scrap or waste, at the facility shall be limited to 525.00 tons per year.

2.7. Melting and production of bronze products, including bronze side feedstocks that end up as scrap or waste, at the facility shall be limited to 1576.00 tons per year.

2.8. Operation of emission unit EMF-06 shall be limited to 4380 hours during any rolling, 12-month period, which shall be determined by recording the hours of operation for each month and adding the hours of operation for the previous eleven months.

2.9. The permittee shall equip emission unit EMF-06 with a non-resettable, totalizing hours meter to record the hours of operation.

2.10. At all times that one or more of emission units EMF-02, EMF-03, EMF-04, EMF-05 and/or EMF-06 is operating, the exhaust from these units shall be collected and directed to the Donaldson Torit dust collector, which shall be equipped with an NX filter from TDC Filters, and which is also in full operation.

2.11. At all times, the permittee shall maintain and operate each emission unit, including any associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

3. Monitoring and Recordkeeping Requirements

3.1. Each month, the permittee shall calculate and record facility-wide monthly and rolling 12-month total emissions (tons) for all emission units and pollutant-emitting activities that emit PM, $PM_{2.5}$, PM_{10} and/or VOC.

3.2. The permittee shall track and record the operations and production for all emission units and pollutant-emitting activities at the facility, such that facility-wide emissions can be calculated on a monthly and 12-month basis. Records shall include, but not be limited to:

3.2.1. Material purchase records;
3.2.2. Monthly propane usage;
3.2.3. Monthly quantity of iron side feedstocks melted;
3.2.4. Monthly quantity of aluminum side feedstocks melted;
3.2.5. Monthly quantity of bronze side feedstocks melted;
3.2.6. Number of batches of each metal alloy produced each month;
3.2.7. Monthly hours of operation of emission unit EMF-06
3.2.8. Monthly foam usage;
3.2.9. Emission factors used;
3.2.10. Any other information used to determine monthly facility emissions of VOC.

3.3. The permittee shall maintain records of emission calculations and parameters used to calculate emissions for at least five years.

4. Reporting Requirements

4.1. Once each year, the permittee shall, along with the annual registration required by 40 CFR § 49.138(e)(2), due by February 15, submit to the EPA a report containing the twelve monthly rolling 12-month emissions calculations for the previous calendar year.

4.2. The report required under Condition 4.1 shall contain a description of all emissions estimating methods used, including emission factors and their sources, a summary of materials usage, assumptions made and production data.

4.3. All submittals, notifications and reports to the EPA shall be sent to:

Original documents go to the EPA at:

Tribal Air Permits Coordinator
U.S. EPA, Region 10, AWT-107
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

Copies go to Tribal Environmental Contact at:

Air Quality Program Coordinator
Environmental Restoration and Waste Management Division
Department of Natural Resources
Nez Perce Tribe
P.O. Box 365
Lapwai, ID 83540

United States Environmental Protection Agency
Region 10, Office of Air, Waste and Toxics
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Technical Support Document
Non-Title V Air Quality Operating Permit

Permit Engineer: Pat Nair

Ende Machine & Foundry LLC

Nez Perce Reservation
Craigmont, Idaho

Purpose of Owner-Requested Non-Title V Operating Permit and Technical Support Document

Title 40 Code of Federal Regulations (CFR) Section 49.139 establishes a permitting program to provide for the establishment of Federally-enforceable requirements for air pollution sources located within Indian reservations in Idaho, Oregon and Washington. The owner or operator of an air pollution source who wishes to obtain a Federally-enforceable limitation on the source's actual emissions or potential to emit must submit an application to the Regional Administrator requesting such limitation.

The United States Environmental Protection Agency (EPA) then develops the permit via a public process. The permit remains in effect until it is modified, revoked or terminated by the EPA in writing.

This document, the technical support document, fulfils the requirement of 40 CFR § 49.139(c)(3) by describing the proposed limitation and its effect on the actual emissions and/or potential to emit of the air pollution source. Unlike the air quality operating permit, this document is not legally enforceable. The permittee is obligated to follow the terms of the permit. Any errors or omissions in the summaries provided here do not excuse the permittee from the requirements of the permit.

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Appendix A: Emission Inventory

1. EPA Authority to Issue Non-Title V Permits

On April 8, 2005, the EPA adopted regulations (70 FR 18074) codified at 40 CFR Parts 9 and 49, establishing Federal Implementation Plans (FIPs) under the Clean Air Act for Indian reservations in Idaho, Oregon and Washington. The FIPs, commonly referred to as the Federal Air Rules for Reservations (FARR), put in place basic air quality regulations to protect health and welfare on Indian reservations located in the Pacific Northwest. 40 CFR § 49.139 creates a permitting program for establishing Federally-enforceable requirements for air pollution sources on Indian reservations. This permit has been developed pursuant to 40 CFR § 49.139.

2. Facility Information

2.1 Location

The Ende Machine and Foundry LLC (Ende or permittee) facility is located in Craigmont, Idaho, within the exterior boundaries of the 1863 Nez Perce Reservation.

Tribal Contact: Julie Simpson, Air Quality Program Coordinator
Environmental Restoration and Waste Management Division
Department of Natural Resources
Nez Perce Tribe
P. O. Box 365
109 Lolo Street
Lapwai, Idaho 83540
Phone: 208-621-3818
Email: julies@nezperce.org

2.2 Local Air Quality and Attainment Status

The Nez Perce Reservation is in attainment with the national ambient air quality standards or is unclassifiable. The subject facility is not located in a designated nonattainment area. With respect to prevention of significant deterioration (PSD) impact evaluation, the majority of the reservation is classified as Class II lands.

2.3 General Description of Operations and Products

The Ende facility produces metal castings using the "lost foam" process. Castings are made of iron, aluminum or bronze. The operations are divided into two distinct operations – the "white side" and the metal side (i.e., "iron side," "aluminum side" and "bronze side"). Foam parts are manufactured in the "white side," while the metals are melted, poured into molds and finished in the three metal sides.

In the "white side," Clear Cast beads arrive in sealed drums. The beads are vacuum fed into a pre-expander in a batch process where the beads are partially expanded to a specific density. Steam from a propane-fired boiler is used to heat the beads, releasing pentane that is encapsulated within the beads. The expanded beads are stored in a prepuffed storage area for a period between 2 and 12 hours to allow the prepuffed beads to stabilize. The material is then transferred into two-sided aluminum molds where, using steam induced into the mold cavity through small holes, the beads are further expanded and fused together into the desired shape. Water is used to cool the fused shape and parts are ejected from the separated mold halves using compressed air.

The molded shapes are aged once more to stabilize the product. Once the parts are stabilized, they are glued onto sprues – sprues are the center column, where the molten metal flows as a feeder device into the cavity areas. After the cluster (consisting of multiple molded forms glued to sprues) is formed, the entire cluster is immersed into a water-based ceramic coating. The coated clusters are then placed into a warm, low-humidity room so that all of the water can evaporate from the coating. When clusters have dried, they are placed into a flask (a steel vessel). A predetermined amount of cool olivine sand is placed into the bottom of the flask for the cluster to rest upon. Cool olivine sand is then rained down into the flask while it is vibrated so that the top layer of sand is fluidized and packs tightly against the cluster and fills all the voids. The flask with the cluster firmly embedded in the sand is then transferred to the iron side, aluminum side or bronze side.

In the "iron side," the process starts with the delivery of pig iron and clean steel scraps. Then, 500 pounds of pig iron and steel scrap are loaded into an electric induction furnace and are melted together. The carbon level is monitored during the melting process. Once the carbon level reaches a specific point, which determines the physical characteristics of the iron, the iron is ready to pour. The molten iron is poured into the top of the sprue. The molten iron vaporizes the foam and replaces it, with the foam vapors escaping through the coating pores. The pouring is conducted under a hood and all smoke, fumes and vapors are vented to a baghouse. The flask is then moved from the pour area and is left to cool so that the iron solidifies. Flasks with solidified iron parts are then dumped into the shaker – a mechanical vibrating conveyor that separates the sand and the molded clusters.

The sand is then transported up a bucket conveyor to the cooling station. Cooling of the sand is accomplished by water-cooled pipes, served by a cooling tower. The cool sand is then transferred by elevator to the storage container located above the filling stations. Sand handling operations are vented to the baghouse – including the pre-fill station, flask-filling station, bucket elevator, sand elevator and the shaker table. The clusters are then taken to the grinding and cleaning area where the sprue and gates are cut off and the gating area on the casting is ground to conform to the contour of the part. The castings are then placed in a shot blaster machine where the ceramic coating is removed by raining round steel shot around the parts. After shot blasting, the parts are ready to ship. The aluminum and bronze side operations parallel those on the iron side, and use the same equipment.

The Ende facility currently comprises the following activities:

1. EMF-01: Steam boiler, Fulton ICS/FB-A, 1.004 MMBtu/hr, uncontrolled;
2. EMF-02: Iron side activities, Inductotherm electric induction furnace, 3153.0 tons/year, equipped with Donaldson Torit dust collector with NX filter from TDC Filter;
3. EMF-03: Aluminum side activities, Inductotherm electric induction furnace, 525.0 tons/year, equipped with Donaldson Torit dust collector with NX filter from TDC Filter;
4. EMF-04 Bronze side activities, Inductotherm electric induction furnace, 1576.0 tons/year, equipped with Donaldson Torit dust collector with NX filter from TDC Filter;
5. EMF-05 Sand handling, Vulcan Engineering, 30,766 tons/year, equipped with Donaldson Torit dust collector with NX filter from TDC Filter;
6. EMF-06 Shot Blasting, Bronco Tumble Blaster, 91,980 tons/year, equipped with Donaldson Torit dust collector with NX filter from TDC Filter;
7. EMF-07: Cooling tower, Marley 4871, 480.00 gallons/minute, equipped with integral drift eliminators; and,
8. EMF-08: Foam use, Clear Cast foam, 20.56 tons/year, uncontrolled.

The facility SIC code is: 3321, Gray and Ductile Iron Foundries

3. Project Description

On April 12, 2010, the EPA received an application from Ende regarding their Craigmont facility. In the application, Ende requested that the EPA confirm the need for a synthetic minor emission limit, to avoid the requirements of the Title V and Prevention of Significant Deterioration (PSD) programs, before proceeding with a review of the application materials.

4. Regulatory Analysis and Permit Content

4.1 Evaluation of Synthetic Minor Emission Limit Request

As requested by the permittee, the EPA assessed whether synthetic minor emission limits were necessary to ensure that Ende was not considered a PSD or Title V major source for pollutants under those programs. A cursory estimation of potential to emit (PTE) emissions indicated that emission limits would be needed to establish this facility as a synthetic minor facility.

A detailed PTE emission inventory was developed based on maximum production levels requested by the permittee (see Appendix A). The emission inventory reflects emissions predicted from the facility operations based on these production levels:

Carbon monoxide (CO):	0.36 tons/year
Nitrogen oxides (NOx):	0.62 tons/year
Particulate matter (PM):	17.52 tons/year
Particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}):	73.68 tons/year
Particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$):	73.68 tons/year
Sulfur dioxide (SO_2):	0.07 tons/year
Volatile organic compounds (VOC):	20.61 tons/year
Lead:	0.18 tons/year
Greenhouse gases[1] (GHG), CO_2e basis:	64.0 tons/year

Footnotes:

[1] Only known emissions of GHG are from the boiler – emission factors from 40 CFR part 60, subparts A and C, Tables A-1, C-1 and C-2.

Based on conflicting EPA memoranda, it is not clear if the operations at Ende are in one of the source categories named in 40 CFR § 52.21(b)(1)(i)(a) – if they are, then Ende would be considered a major stationary source for purposes of the PSD program if it has a PTE of at least 100 tons per year of any single PSD regulated air pollutant. Otherwise, Ende would be subject to PSD only if its PTE is at least 250 tons per year. In this instance, since the permittee is seeking to avoid the Title V program, it is accepting practically enforceable emission limits at below the 100 ton-per-year threshold. Consequently, Ende is also able to avoid the PSD program without having to determine whether it is in a listed source category.

Based on the PTE values listed above, emission limits are indicated for emissions of PM, PM_{10}, $PM_{2.5}$ and VOC (see Permit Conditions 2.1 through 2.4). The emission limits will be accompanied by the operation and production limits proposed by Ende in order to ensure that the emission limits are practically enforceable (see Permit Conditions 2.5 through 2.11). These production limits will, in turn, ensure that the PTE of the other pollutants remains well below major source thresholds.

PSD and PSD-avoidance limits require compliance assurance on a rolling 12-month basis. The

monitoring, recordkeeping and reporting for this permit will require the estimation of emissions from all of the above activities at least once a month. Details on the compliance assurance process are discussed in Section 4.4.3.

4.2 Evaluation of Hazardous Air Pollutant (HAP) Emission Limit Request

As requested by the permittee, the EPA assessed whether synthetic minor emission limits were necessary to ensure that Ende was not considered a HAP major source. In their application, the permittee did not provide HAP emission estimates. The EPA conducted an independent search to identify possible emissions of HAPs from similar processes. Based on information available at the time of review of this permit application, the EPA is not able to identify any HAP emissions from the lost foam process. Consequently, this permit does not contain emission limits on HAPs.

4.3 Other Federal Regulations

Endangered Species Act (ESA) Impacts - EPA is obligated to consider the impact that a federal project may have on listed species or critical habitats. Based on the fact that the permit contains a voluntarily-requested emission limit, it is EPA's conclusion that the issuance of this permit to the permittee will not affect a listed specie or critical habitat. Therefore, no additional requirements will be added to this permit for ESA reasons. The EPA's "no-effect" determination concludes the EPA's obligations under Section 7 of the ESA. (See Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act, FWS and NMFS, March 1998, at Figure 1).

National Environmental Policy Act (NEPA) Review - Under Section 793(c) of the Energy Supply and Environmental Coordination Act of 1974, no action taken under the Clean Air Act shall be deemed a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. This permit is an action taken under regulations implementing the Clean Air Act and is therefore exempt from NEPA.

National Historic Preservation Act (NHPA) – No part of the Ende facility is listed in the National Register. Consequently, no adverse effects are expected, and further review under NHPA is not indicated.

Environmental Justice (EJ) - The proposed facility is located in the town of Craigmont. Links to maps that show environmental justice indicators for poverty and people of color are available on the EPA's air permits website at this address: http://yosemite.epa.gov/R10/ocrej.nsf/environmental+justice/maps. For this permit action, the EPA is seeking input regarding possible EJ concerns and whether the permittee's operation might cause a disproportionately high environmental or public health impact on a low income or minority population.

4.4 Permit Content

The permit includes the requested production limits (with their related emission limits) as well as monitoring, recordkeeping and reporting requirements necessary to assure compliance with the limits. Each section of the permit is discussed below. The permit is organized into four sections as follow:

4.4.1 Permit Section 1: General Conditions

This section of the permit contains conditions of a general nature that apply to the facility. Permit

Condition 1.1 identifies the emission units authorized at the facility. Condition 1.2 requires the permittee to comply with the conditions in the permit.

This permit establishes owner-requested limits and related, compliance-assurance provisions to restrict the facility's potential to emit. It does not contain other Clean Air Act requirements to which the facility is or may be subject, such as the FARR; New Source Performance Standards, 40 CFR Part 60; and National Emissions Standards for Hazardous Air Pollutants, 40 CFR Part 61 and 63. As specified in Permit Condition 1.3, compliance with the terms of this permit in no way relieves or exempts the permittee from compliance with other applicable Clean Air Act requirements or of any other applicable federal, tribal, state, or local law or regulation.

Permit Condition 1.4 addresses a provision (40 CFR § 52.21(r)(4)) of the PSD regulations regarding emission limits established to avoid PSD requirements. If in the future, the permittee obtains a relaxation of the limits in Permit Condition 2.1 through 2.8, and the facility construction addressed in this permit action is later found to be a new major stationary source solely due to the relaxation of the emission limit, then the PSD provisions of 40 CFR § 52.21(j) through (s) would apply to this facility as though the initial facility construction had never taken place. This could result in the imposition of Best Available Control Technology. Consequently, if in the future, any relaxation to the limits in Permit Conditions 2.1 through 2.8 is being contemplated, it is recommended that the permittee thoroughly evaluate any potential PSD applicability.

Permit Condition 1.5 requires the permittee to maintain and operate all emission units and associated control equipment in a manner to minimize air emissions.

4.4.2 Permit Section 2: Emission Limits and Work Practice Requirements

This section of the permit contains any emission limits or work practice requirements that have been established as a result of the subject permit action. As discussed earlier in this document, for this permit action, the only limits established are the emission limits in Permit Conditions 2.1 through 2.4, the production limits in Permit Conditions 2.5 through 2.7, the operating limit in Permit Condition 2.8, and the work practice requirements in Permit Conditions 2.9 through 2.11.

4.4.3 Permit Section 3: Monitoring and Recordkeeping Requirements

Permit Condition 3.1 requires the permittee to calculate total monthly emissions every month. The rolling 12-month emissions must be determined by adding the emissions calculated for the most recent month with the emissions for the immediately preceding 11 months. Emissions are to be calculated from the entire facility, including, but not limited to, the activities listed in Section 2.3. The accepted emissions calculation methods for the emission units discussed in Section 2.3 are contained in Appendix A. It is the EPA's expectation that the permittee will use the emission estimating techniques set forth in this section unless the permittee has other information showing why another technique more accurately represents its emissions.

Pursuant to Permit Condition 3.2, the permittee is required to maintain records adequate to enable the calculation of monthly emissions. Further, under Permit Condition 3.3, the permittee is required to maintain copies of emissions calculations and all supporting documentation for a period of five years.

4.4.4 Permit Section 4: Reporting Requirements

Condition 4.1 requires the permittee to annually submit to the EPA a record of the twelve, monthly, 12-

month emissions calculations for the previous calendar year. For ease in coordinating submittals, this report is required to be submitted concurrently with the annual FARR registration submittal due by February 15 each year.

Condition 4.2 requires that the annual report must include details on how the emissions were calculated as well as identify the sources for various data elements.

5. *Permit Procedures*

5.1 Public Notice and Comment

As required under 40 CFR § 49.139(c), all draft owner-requested operating permits must be publicly noticed and made available for public comment. For this permit action, the requirements of 40 CFR § 49.139(c)(5) are as follow:

1. Make available for public inspection, in at least one location in the area affected by the air pollution source, a copy of the draft operating permit prepared by the EPA, the technical support document for the draft permit, the application, and all supporting materials (see 40 CFR 49.139(c)(5)(i));
2. Publish public notice for this draft permit, by prominent advertisement in a newspaper of general circulation in the area affected by this source, of the availability of the draft permit to operate and supporting materials and of the opportunity to comment. Where possible, notices will also be made in the Tribal newspaper (see 40 CFR 49.139(c)(5)(ii));
3. Provide copies of the notice to the owner or operator of the air pollution source, the Tribal governing body, and the Tribal, State and local air pollution authorities having jurisdiction in areas outside of the Indian reservation potentially impacted by the air pollution source (see 40 CFR 49.139(c)(5)(iii)); and
4. Provide for a 30-day period for submittal of public comments, starting upon the date of publication of the notice. If requested, the Regional Administrator may hold a public hearing and/or extend the public comment period for up to an additional 30 days (see 40 CFR 49.139(c)(5)(iv)).

40 CFR § 49.139(c) also contains requirements that apply after the draft permit is made available for public comment. These additional requirements must be satisfied prior to issuance of the final permit:

1. The EPA will accept comments on the draft permit, during the 30 day public comment period (see 40 CFR 49.139(c)(5)(iv));
2. After the close of the public comment period, the EPA will consider all comments received and prepare a final permit to operate and final technical support document. The final technical support document will include a response to all comments received during the public comment period (see 40 CFR 49.139(c)(6));

After issuance of the final permit and technical support document, the following requirements must also be satisfied:

1. Make the final permit and technical support document available at all of the locations where the draft permit was made available (see 40 CFR 49.139(c)(7)); and
2. Send the final permit and technical support document to all persons who provided comments on the draft permit to operate (see 40 CFR 49.139(c)(7)).

For this permit, a notice was published in the Lewiston Tribune and a 30-day period for public comment was made available. The public comment period ended on December 9, 2013. No comments were received during this time.

6. Abbreviations and Acronyms

CFR	Code of Federal Regulations
CO	Carbon monoxide
CO_2e	Carbon dioxide equivalent
EPA	United States Environmental Protection Agency (also U.S. EPA)
EJ	Environmental Justice
ESA	Endangered Species Act
FARR	Federal Air Rules for Reservations
FIP	Federal Implementation Plan
FR	Federal Register
GHG	Greenhouse gases
HAP	Hazardous air pollutant
hr	Hour
MMBtu	Million British thermal units
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NOx	Nitrogen oxides
NSPS	New Source Performance Standards
PM	Particulate matter
PM_{10}	Particulate matter with an aerodynamic diameter less than 10 microns
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than 2.5 microns
PSD	Prevention of significant deterioration
PTE	Potential to emit
SO_2	Sulfur dioxide
VOC	Volatile organic compounds

APPENDIX A

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Potential to Emit Emission Inventory

Summary of Annual Emissions

Unit ID	Description	Make/Model	Potential to Emit (tons/year)							
			CO	NO_x	PM	$PM_{2.5}$	PM_{10}	SO_2	VOC	Lead
EMF-01	Steam Boiler	Fulton Boiler	0.36	0.62	0.01	0.03	0.03	0.07	0.05	2.16E-06
EMF-02	Iron Side Activities	Inductotherm	0.00	0.00	5.62	14.95	14.95	0.00	0.00	0.16
EMF-03	Aluminum Side Activities	Inductotherm	0.00	0.00	0.88	2.33	2.33	0.00	0.00	0.03
EMF-04	Bronze Side Activities	Inductotherm	0.00	0.00	4.29	12.15	12.15	0.00	0.00	0.00
EMF-05	Sand Handling	Vulcan Engineering	0.00	0.00	3.08	3.08	3.08	0.00	0.00	0.00
EMF-06	Shot Blasting	Bronco Tumble Blaster	0.00	0.00	1.24	38.74	38.74	0.00	0.00	0.00
EMF-07	Cooling Tower	Marley 4871	0.00	0.00	2.40	2.40	2.40	0.00	0.00	0.00
EMF-08	Foam Use	NA	0.00	0.00	0.00	0.00	0.00	0.00	20.56	0.00
TOTAL PROJECT EMISSIONS (tons/year)			0.36	0.62	17.52	73.68	73.68	0.07	20.61	0.18

Notes

1 Emissions from hot-melt gluing of sprues assumed to be negligible.
2 Emissions from application of ceramic coating assumed to be negligible.

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Emission Inventory

Emissions Unit: EMF-01 Steam Boiler
Make/Model[1]: Fulton ICS/FB-A
Fuel: Propane
Rating[2]: 30 Boiler hp
Rating[2]: 1.004 MMBtu/hr

Emissions are on a per-boiler basis at 100% load

Pollutant	Emission Factors[3,4]	Emission Factor Units[3]	Maximum Annual Operation		Control Efficiency	Potential to Emit Tons per Year
CO	0.0820	lb/MMBtu	8796.44	MMBtu	NA	0.36
NO_x	0.1421	lb/MMBtu	8796.44	MMBtu	NA	0.62
PM	0.0022	lb/MMBtu	8796.44	MMBtu	NA	0.01
$PM_{2.5}$	0.0077	lb/MMBtu	8796.44	MMBtu	NA	0.03
PM_{10}	0.0077	lb/MMBtu	8796.44	MMBtu	NA	0.03
SO_2	0.0164	lb/MMBtu	8796.44	MMBtu	NA	0.07
VOC	0.0109	lb/MMBtu	8796.44	MMBtu	NA	0.05
Lead	4.90E-07	lb/MMBtu	8796.44	MMBtu	NA	2.16E-06

Emissions Factor References

CO	From AP-42 Table 1.5-1 for commercial boilers:	7.5 lb/10^3 gal
NO_x	From AP-42 Table 1.5-1 for commercial boilers:	13 lb/10^3 gal
PM	From AP-42 Table 1.5-1 for commercial boilers:	0.2 lb/10^3 gal
$PM_{2.5}$	PM2.5 emissions assumed to be same as PM10 emissions	0.7 lb/103 gal
PM_{10}	PM10 emissions assumed to be same as total PM emissions	0.7 lb/10^3 gal
	From AP-42 Table 1.5-1 for commercial boilers:	
SO_2	From AP-42 Table 1.5-1 for cor 0.000015 by weight	1.5 lb/10^3 gal
	Sulfur content of propane	15 gr/100 ft^3
VOC	From AP-42 Table 1.5-1 for commercial boilers:	1.0 lb/10^3 gal
Lead	AP-42, Table 1.4-2, for natural gas fuel	0.0005 lb/10^6 scf

Conversions Used

2,000	lbs/ton	
33472	Btu/boiler hp	
91.5	MMBtu/10^3 gal	Propane heat content from AP-42, Table 1.5-1, footnote a
1020	MMBtu/MMscf	Natural gas heat content from AP-42, Table 1.5-1, footnote a

Footnotes/Assumptions

1 Equipment specification per permit application dated April 8, 2010.
2 Equipment rating per permit application dated April 8, 2010.
3 Emission Factors converted based on propane heat content (except for lead):
4 Emission Factor converted based on natural gas heat content (for lead only):

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Emission Inventory

Emissions Unit: EMF-02 Iron Side Activities[3]
Make/Model[1]: Inductotherm
Fuel: Electricity
Rating[2]: 500 lbs/batch
Production Limit[4]: 3153 tons of iron/year

Pollutant	Emission Factors	Emission Factor Units	Maximum Annual Operation		Control Efficiency[5]	Potential to Emit[6] Tons per Year
CO	0.00	lb/ton	3153.00	tons		0.00
NO_x	0.00	lb/ton	3153.00	tons		0.00
PM	32.70	lb/ton	3153.00	tons	0.891	5.62
$PM_{2.5}$	27.65	lb/ton	3153.00	tons	0.657	14.95
PM_{10}	29.60	lb/ton	3153.00	tons	0.81	14.95
SO_2	0.00	lb/ton	3153.00	tons		0.00
VOC	0.00	lb/ton	3153.00	tons		0.00
Lead	1.00E-01	lb/ton	3153.00	tons		0.16

Emissions Factor References

CO	From AP-42 Table 12.10-5 electric induction furnace:		0	lb/ton
NO_x	From AP-42 Table 12.10-5 electric induction furnace:		0	lb/ton
PM	All from AP-42, tables as shown:		Uncont. EF	
	Electric induction furnace (baghouse):	Table 12.10-3	0.90	lb/ton
	Scrap + charge handling & heating	Table 12.10-7	0.60	lb/ton
	Magnesium treatment	Table 12.10-7	1.80	lb/ton
	Refining	Table 12.10-7	5.00	lb/ton
	Cleaning, finishing	Table 12.10-7	17.00	lb/ton
	Pouring, cooling	Table 12.10-7	4.20	lb/ton
	Shakeout	Table 12.10-7	3.20	lb/ton
	Total uncontrolled emission factor:		32.70	lb/ton
$PM_{2.5}$	$PM_{2.5}$ emissions for electric induction furnace, scrap and charge handling/heating, magnesium treatment, refining, cleaning and finishing assumed to be same as for PM:		25.3	lb/ton
	Other activities use particle size distribution from AP-42 Table 12-10-9:			
	Pouring, cooling:	0.24	1.01	lb/ton
	Shakeout:	0.42	1.34	lb/ton
	Total uncontrolled emission factor:		27.65	lb/ton
PM_{10}	PM_{10} emissions for electric induction furnace, scrap and charge handling/heating, magnesium treatment, refining, cleaning and finishing assumed to be same as for PM:		25.3	lb/ton
	Other activities use particle size distribution from AP-42 Table 12-10-9:			
	Pouring, cooling:	0.49	2.06	lb/ton
	Shakeout:	0.7	2.24	lb/ton
	Total uncontrolled emission factor:		29.60	lb/ton
SO_2	From AP-42 Table 12.10-5 electric induction furnace:		0	lb/ton
VOC	From AP-42 Table 12.10-5 electric induction furnace:		0	lb/ton
Lead	From AP-42 Table 12.10-5 electric induction furnace:		0.1	lb/ton

Conversions Used

2,000 lbs/ton

Footnotes/Assumptions

1 Equipment specification per permit application dated April 8, 2010.
2 Equipment rating per permit application dated April 8, 2010.
3 Iron side activities include activities listed for PM emission factors
4 Production limit proposed in application dated April 8, 2010
5 Overall control efficiency is based on system capture efficiency and control efficiency for each pollutant:
Capture efficiency (estimated) 0.9
Control efficiency based on TDC Filter (manuf) data per applicant e-mail of January 18, 2011
Although manufacturer's material suggests 100% control of coarser particulates,
this emission inventory will conservatively assume a lesser PM value: 0.99
For $PM_{2.5}$: 0.73
Assuming an equal distribution of the three size ranges, the average control efficiency
for PM_{10}: 0.9
6 Since $PM_{2.5}$ is a subset of PM_{10}, annual PTE for PM_{10} is maximum of value calculated using control efficiency for PM_{10} or value calculated for $PM_{2.5}$.

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Emission Inventory

Emissions Unit: EMF-03 Aluminum Side Activities[3]
Make/Model[1]: Inductotherm
Fuel: Electricity
Rating[2]: 90 lbs/batch
Production Limit[4]: 525 tons of aluminum/year

Pollutant	Emission Factors	Emission Factor Units[5]	Maximum Annual Operation		Control Efficiency[6]	Potential to Emit[7] Tons per Year
CO	0.00	lb/ton	525.00	tons		0.00
NO_x	0.00	lb/ton	525.00	tons		0.00
PM	30.90	lb/ton	525.00	tons	0.891	0.88
$PM_{2.5}$	25.85	lb/ton	525.00	tons	0.657	2.33
PM_{10}	27.80	lb/ton	525.00	tons	0.81	2.33
SO_2	0.00	lb/ton	525.00	tons		0.00
VOC	0.00	lb/ton	525.00	tons		0.00
Lead	1.00E-01	lb/ton	525.00	tons		0.03

Emissions Factor References

CO	From AP-42 Table 12.10-5 electric induction furnace:		0 lb/ton
NO_x	From AP-42 Table 12.10-5 electric induction furnace:		0 lb/ton
PM	All from AP-42, tables as shown:		Uncont. EF
	Electric induction furnace (baghouse):	Table 12.10-3	0.90 lb/ton
	Scrap + charge handling & heating	Table 12.10-7	0.60 lb/ton
	Refining	Table 12.10-7	5.00 lb/ton
	Cleaning, finishing	Table 12.10-7	17.00 lb/ton
	Pouring, cooling	Table 12.10-7	4.20 lb/ton
	Shakeout	Table 12.10-7	3.20 lb/ton
	Total uncontrolled emission factor:		30.90 lb/ton
$PM_{2.5}$	$PM_{2.5}$ emissions for electric induction furnace, scrap and charge handling/heating, refining, cleaning and finishing assumed to be same as for PM:		23.5 lb/ton
	Other activities use particle size distribution from AP-42 Table 12-10-9:		
	Pouring, cooling:	0.24	1.01 lb/ton
	Shakeout:	0.42	1.34 lb/ton
	Total uncontrolled emission factor:		25.85 lb/ton
PM_{10}	PM_{10} emissions for electric induction furnace, scrap and charge handling/heating, refining, cleaning and finishing assumed to be same as for PM:		23.5 lb/ton
	Other activities use particle size distribution from AP-42 Table 12-10-9:		
	Pouring, cooling:	0.49	2.06 lb/ton
	Shakeout:	0.7	2.24 lb/ton
	Total uncontrolled emission factor:		27.80 lb/ton
SO_2	From AP-42 Table 12.10-5 electric induction furnace:		0 lb/ton
VOC	From AP-42 Table 12.10-5 electric induction furnace:		0 lb/ton
Lead	From AP-42 Table 12.10-5 electric induction furnace:		0.1 lb/ton

Conversions Used

2,000 lbs/ton

Footnotes/Assumptions

1 Equipment specification per permit application dated April 8, 2010.
2 Equipment rating per permit application dated April 8, 2010.
3 Activities include activities listed for PM emission factors
4 Production limit proposed in application dated April 8, 2010
5 As this emission unit comprises activities that parallel those for the iron side and where activity-specific emission information is not available, emission factors for iron foundries will be used except that there is no magnesium treatment.
6 Overall control efficiency is based on system capture efficiency and control efficiency for each pollutant:

Capture efficiency (estimated)	0.9
PM control efficiency (see Page A-3):	0.99
$PM_{2.5}$ control eficiency (seePage A-3):	0.73
PM_{10} control efficiency (see Page A-3):	0.9

7 Since $PM_{2.5}$ is a subset of PM_{10}, annual PTE for PM_{10} is maximum of value calculated using control efficiency for PM_{10} or value calculated for $PM_{2.5}$.

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Emission Inventory

Emissions Unit: EMF-04 Bronze Side Activities[3]
Make/Model[1]: Inductotherm
Fuel: Electricity
Rating[2]: 260 lbs/batch
Production Limit[4]: 1576 tons of bronze/year

Pollutant	Emission Factors	Emission Factor Units[5]	Maximum Annual Operation		Control Efficiency[6]	Potential to Emit[7] Tons per Year
CO	0.00	lb/ton	1576.00	tons		0.00
NO_x	0.00	lb/ton	1576.00	tons		0.00
PM	50.00	lb/ton	1576.00	tons	0.891	4.29
$PM_{2.5}$	44.95	lb/ton	1576.00	tons	0.657	12.15
PM_{10}	46.90	lb/ton	1576.00	tons	0.81	12.15
SO_2	0.00	lb/ton	1576.00	tons		0.00
VOC	0.00	lb/ton	1576.00	tons		0.00
Lead	0.00E+00	lb/ton	1576.00	tons		0.00

Emissions Factor References

CO	From AP-42 Table 12.10-5 electric induction furnace:		0 lb/ton
NO_x	From AP-42 Table 12.10-5 electric induction furnace:		0 lb/ton
PM	All from AP-42, tables as shown:		Uncont. EF
	Electric induction furnace (baghouse):	Table 12.9-2	20.00 lb/ton
	Scrap + charge handling & heating	Table 12.10-7	0.60 lb/ton
	Refining	Table 12.10-7	5.00 lb/ton
	Cleaning, finishing	Table 12.10-7	17.00 lb/ton
	Pouring, cooling	Table 12.10-7	4.20 lb/ton
	Shakeout	Table 12.10-7	3.20 lb/ton
	Total uncontrolled emission factor:		50.00 lb/ton
$PM_{2.5}$	$PM_{2.5}$ emissions for electric induction furnace, scrap and charge handling		lb/ton
	cleaning and finishing assumed to be same as for PM:		42.6 lb/ton
	Other activities use particle size distribution from AP-42 Table 12-10-9:		
	Pouring, cooling:	0.24	1.01 lb/ton
	Shakeout:	0.42	1.34 lb/ton
	Total uncontrolled emission factor:		44.95 lb/ton
PM_{10}	PM_{10} emissions for electric induction furnace, scrap and charge handling/heating, refining,		
	cleaning and finishing assumed to be same as for PM:		42.6 lb/ton
	Other activities use particle size distribution from AP-42 Table 12-10-9:		
	Pouring, cooling:	0.49	2.06 lb/ton
	Shakeout:	0.7	2.24 lb/ton
	Total uncontrolled emission factor:		46.90 lb/ton
SO_2	From AP-42 Table 12.10-5 electric induction furnace:		0 lb/ton
VOC	From AP-42 Table 12.10-5 electric induction furnace:		0 lb/ton
Lead	From AP-42 Table 12.9-2 electric induction furnace:		0 lb/ton

Conversions Used

2,000 lbs/ton

Footnotes/Assumptions

1 Equipment specification per permit application dated April 8, 2010.
2 Equipment rating per permit application dated April 8, 2010.
3 Activities include activities listed for PM emission factors
4 Production limit proposed in application dated April 8, 2010
5 As this emission unit comprises activities that parallel those for the iron side and where activity-specific emission information is not available, emission factors for iron foundries will be used except that there is no magnesium treatment.
6 Overall control efficiency is based on system capture efficiency and control efficiency for each pollutant:

Capture efficiency (estimated)	0.9
PM control efficiency (see Page A-3):	0.99
$PM_{2.5}$ control eficiency (seePage A-3):	0.73
PM_{10} control efficiency (see Page A-3):	0.9

7 Since $PM_{2.5}$ is a subset of PM_{10}, annual PTE for PM_{10} is maximum of value calculated using control efficiency for PM_{10} or value calculated for $PM_{2.5}$.

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Emission Inventory

Emissions Unit: EMF-05 Sand Handling
Make/Model[1]: Vulcan Engineering
Fuel: NA
Rating[2]:
Maximum Sand Handled[2]: 30,766.02 tons per year

Pollutant	Emission Factors[3]	Emission Factor Units	Maximum Annual Operation		Control Efficiency	Potential to Emit Tons per Year
CO	0.00	lb/ton	30766.02	tons	NA	0.00
NO_x	0.00	lb/ton	30766.02	tons	NA	0.00
PM	0.20	lb/ton	30766.02	tons	see PM EF	3.08
$PM_{2.5}$	0.20	lb/ton	30766.02	tons	see PM EF	3.08
PM_{10}	0.20	lb/ton	30766.02	tons	see PM EF	3.08
SO_2	0.00	lb/ton	30766.02	tons	NA	0.00
VOC	0.00	lb/ton	30766.02	tons	NA	0.00
Lead	0.00	lb/ton	30766.02	tons	NA	0.00

Emissions Factor References

CO	AP-42 Section 12-10 does not list any non-particulate EF:	0 lb/ton
NO_x	AP-42 Section 12-10 does not list any non-particulate EF:	0 lb/ton
PM	From AP-42 Table 12.10-7, controlled, baghouse	0.2 lb/ton
$PM_{2.5}$	$PM_{2.5}$ emissions assumed to be same as PM emissions:	0.2 lb/ton
PM_{10}	PM_{10} emissions assumed to be same as PM emissions:	0.2 lb/ton
SO_2	AP-42 Section 12-10 does not list any non-particulate EF:	0 lb/ton
VOC	AP-42 Section 12-10 does not list any non-particulate EF:	0 lb/ton
Lead	AP-42 Section 12-10 does not list any non-particulate EF:	0 lb/ton

Conversions Used

2,000 lbs/ton

Footnotes/Assumptions

1 Equipment specification per permit application dated April 8, 2010.
2 Equipment rating per permit application dated April 8, 2010.
3 Determining sand handling usage:

Flask volume (based on flask size of 32" dia, 38" ht): 17.68 cu ft
density of sand: 99.88 lbs/cu ft

	Iron	Alum.	Bronze	
weight of metal:	500	90	260	lbs
density of metal:	411.26	171	530.50	lbs/cu ft
volume of metal:	1.22	0.53	0.49	cu ft
volume of sand:	16.46	17.15	17.19	cu ft
weight of sand:	1644.15	1713.01	1716.6305	lbs
annual metal production:	3153	525	1576	tons
no. of batches:	12612	11666.67	12123.08	batches
sand handled	10368.01	9992.58	10405.42	tons

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Emission Inventory

Emissions Unit: EMF-06 Shot Blasting
Make/Model[1]: Industrial Associates, Inc., Bronco Tumble Blaster
Fuel: NA
Rating: NA
Maximum Shot Used[2]: 45,990.00 tons per year

Pollutant	Emission Factors	Emission Factor Units	Maximum Annual Operation		Control Efficiency[3]	Potential to Emit[4] Tons per Year
CO	0.00	lb/ton	45990.00	tons	NA	0.00
NO_x	0.00	lb/ton	45990.00	tons	NA	0.00
PM	5.40	lb/ton	45990.00	tons	0.99	1.24
$PM_{2.5}$	6.24	lb/ton	45990.00	tons	0.73	38.74
PM_{10}	0.26	lb/ton	45990.00	tons	0.9	38.74
SO_2	0.00	lb/ton	45990.00	tons	NA	0.00
VOC	0.00	lb/ton	45990.00	tons	NA	0.00
Lead	0.00	lb/ton	45990.00	tons	NA	0.00

Emissions Factor References

CO	AP-42 Section 13.2.6 does not list any non-particulate EF:	0 lb/ton
NO_x	AP-42 Section 13.2.6 does not list any non-particulate EF:	0 lb/ton
PM	AP-42 Table 13.2.6-1, uncontrolled and page 13.2.6-2	2.7 lb/1000 lb
$PM_{2.5}$	AP-42 Table 13.2.6-1, uncontrolled and Western Regional Air Partnership, Fugitive Dust Handbook, 9-7-2006, Chapter 12, Abrasive Blasting page 12.1	3.12 lb/1000 lb
PM_{10}	AP-42 Table 13.2.6-1, uncontrolled and Western Regional Air Partnership, Fugitive Dust Handbook, 9-7-2006, Chapter 12, Abrasive Blasting page 12-1	0.13 lb/1000 lb
SO_2	AP-42 Section 13.2.6 does not list any non-particulate EF:	0 lb/ton
VOC	AP-42 Section 13.2.6 does not list any non-particulate EF:	0 lb/ton
Lead	AP-42 Section 13.2.6 does not list any non-particulate EF:	0 lb/ton

Conversions Used

2,000 lbs/ton

Footnotes/Assumptions

1 Equipment specification per permit application of April 8, 2010, and e-mail of January 18, 2011.
2 Maximum shot throughput per e-mail dated January 18, 2011 and limit proposed in e-mail dated April 6, 2011: 91980000 lbs
3 Overall control efficiency is based on system capture efficiency and control efficiency for each pollutant:
Capture efficiency (inside enclosed cabinet) 1
PM control efficiency (see Page A-3): 0.99
$PM_{2.5}$ control eficiency (seePage A-3): 0.73
PM_{10} control efficiency (see Page A-3): 0.9
4 Since $PM_{2.5}$ is a subset of PM_{10}, annual PTE for PM_{10} is maximum of value calculated using control efficiency for PM_{10} or value calculated for $PM_{2.5}$.

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Emission Inventory

Emissions Unit: EMF-07 Cooling Tower
Make/Model[1]: Marley Series 4800 Aquatower, Model 4871
Fuel: NA
Rating[2]: 160 ton
Maximum Circulating Water[2]: 480.00 Gallons per minute

Pollutant	Emission Factors[3]	Emission Factor Units	Maximum Annual Operation		Control Efficiency	Potential to Emit Tons per Year
CO	0.00	lb/1000 gal	252,288	1000 gallons	NA	0.00
NO_x	0.00	lb/1000 gal	252,288	1000 gallons	NA	0.00
PM	0.02	lb/1000 gal	252,288	1000 gallons	see PM EF	2.40
$PM_{2.5}$	0.02	lb/1000 gal	252,288	1000 gallons	see PM EF	2.40
PM_{10}	0.02	lb/1000 gal	252,288	1000 gallons	see PM EF	2.40
SO_2	0.00	lb/1000 gal	252,288	1000 gallons	NA	0.00
VOC	0.00	lb/1000 gal	252,288	1000 gallons	NA	0.00
Lead	0.00	lb/1000 gal	252,288	1000 gallons	NA	0.00

Emissions Factor References

CO	AP-42 Section 13.4-1 does not list any non-particulate EF:	0 lb/ton
NO_x	AP-42 Section 13.4-1 does not list any non-particulate EF:	0 lb/ton
PM	From AP-42 Table 13.4-1	0.019 lb/1000 gal
$PM_{2.5}$	$PM_{2.5}$ emissions assumed to be same as PM emissions:	0.019 lb/1000 gal
PM_{10}	PM_{10} emissions assumed to be same as PM emissions:	0.019 lb/1000 gal
SO_2	AP-42 Section 13.4-1 does not list any non-particulate EF:	0 lb/ton
VOC	AP-42 Section 13.4-1 does not list any non-particulate EF:	0 lb/ton
Lead	AP-42 Section 13.4-1 does not list any non-particulate EF:	0 lb/ton

Conversions Used

2,000 lbs/ton

Footnotes/Assumptions

1 Equipment specification per Endebrock e-mail dated 10-07-10.
2 Equipment rating per Endebrock e-mail dated 10-07-10.

Ende Machine & Foundry LLC
Non-Title V Permit
Criteria Pollutant Emission Inventory

Emissions Unit: EMF-08 Foam Use
Make/Model[1]: NA
Fuel: NA
Rating[2]:
Maximum Foam Use[2]: 20.56 tons per year

Pollutant	Emission Factors[3]	Emission Factor Units	Maximum Annual Operation		Control Efficiency	Potential to Emit Tons per Year
CO	0.00	lb/ton	20.56	tons	NA	0.00
NO_x	0.00	lb/ton	20.56	tons	NA	0.00
PM	0.00	lb/ton	20.56	tons	see PM EF	0.00
$PM_{2.5}$	0.00	lb/ton	20.56	tons	see PM EF	0.00
PM_{10}	0.00	lb/ton	20.56	tons	see PM EF	0.00
SO_2	0.00	lb/ton	20.56	tons	NA	0.00
VOC	2000.00	lb/ton	20.56	tons	NA	20.56
Lead	0.00	lb/ton	20.56	tons	NA	0.00

Emissions Factor References

NO non-VOC pollutants are expected from this activity

VOC — Clear Cast foam, pentane content up to 11% by weight: 0.11 lb/lb

Non-pentane VOC emissions (assuming all non-pentane foam is released as a decomposed or partially-decomposed VOC) 0.89 lb/lb

Conversions Used

2,000 lbs/ton

Footnotes/Assumptions

1 Equipment specification per permit application dated April 8, 2010.
2 Equipment rating per permit application dated April 8, 2010.
3 Determining foam usage:

Iron annual production limit:	3153 tons	
Density of iron:	411.26 lbs/cu ft.	
Volume of iron		15333.37 cu ft
Aluminum annual production limit:	525 tons	
Density of aluminum:	171.00	
Volume of aluminum:		6140.35 cu ft
Bronze annual production limit:	1576	
Density of bronze:	530.50	
Volume of bronze		5941.61 cu ft
Total metal volume:		27415.33 cu ft
Foam density:		1.50 lbs/cu ft
Mass of foam used:		41122.99 lbs
or		20.56 tons