MAUL FOSTER ALONGI
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January 10, 2024
Project No. M8006.63.001

Julia DeGagné
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

Re: Response to DEQ request for information dated August 11, 2023

Dear Julia:

On behalf of Eagle Foundry Company (Eagle Foundry), Maul Foster & Alongi (MFA) is providing this response to your letter dated August 11, 2023 (the Letter) in which the Department of Environmental Quality (DEQ) requested additional information as well as changes to Eagle Foundry's air toxics emissions inventory. The Letter states that Eagle Foundry must submit responses to the Letter and an updated Cleaner Air Oregon (CAO) emissions inventory no later than 30 days after receiving DEQ approval of the source test data for toxic emission units (TEUs) AIRARC, GRIND, MELT, and POUR_COOL. Eagle Foundry received the DEQ's approval letter on November 20, 2023 and, therefore, the revised CAO emissions inventory and response would have been due by December 20, 2023. In response to our request for an extension, we received your approval on December 13, allowing the facility to submit the following information by January 10, 2024. That was very appreciated given the amount of work that needed to be completed.

This response document is organized in the same manner as the information was requested in the Letter. The Letter comments are shown in bold followed by the response. To address the requests of the DEQ in the Letter, MFA has prepared a revised version of the CAO emissions inventory included as Attachment A. An updated copy of the AQ520 form has been prepared and will be provided electronically to the DEQ.

1. Submit to DEQ a revised Inventory (AQ520), along with all supporting calculations in Excel format, as well as all information required under OAR 340-245-0040(4), including the following updates:

a. Process flow diagram:

i. Update as needed to reflect any changes to emissions capture assumptions (e.g. foundry and mold wash emissions); and

ii. Correct labeling for the "New Bead Hopper" and "Reclaimed Bead Hopper" for the Big Palmer Molding System – these appear to be transposed.

MFA has updated the process flow diagram and included as Attachment B.

b. Foundry melting, pouring, and cooling (MELT and POUR_COOL TEUs): include emissions estimates for molybdenum trioxide (CASRN 1313-27-5):

i. To determine PM [particulate matter] emissions, use the uncontrolled emission factors for electric induction furnaces in AP-42, Tables 12.10-3 and 12.10-7: 0.9 lb per ton metal (MELT TEU) and 4.2 lb per ton metal (POUR_COOL TEU);

ii. **Assume the concentration of molybdenum in the PM emitted is equal to the concentration of molybdenum reported for the Foundry baghouses in the 2021 Baghouse Dust Analysis, provided in Attachment F of the January 11, 2023, Inventory submittal;**

iii. **Assume all molybdenum is emitted as molybdenum trioxide; and**

iv. **Assume a control efficiency of 90 percent, based on DEQ's analysis of control efficiencies calculated from the Main Foundry and Cooling Bunker Baghouses Emissions Test Report submitted by Eagle to DEQ on June 16, 2023.**

The emissions inventory has been updated to include estimated emissions of molybdenum trioxide from the foundry melting, pouring, and cooling TEUs. Four new TEUs replace the MELT and POUR_COOL TEUs in AQ520 to align with updated emission factors: MF_IRON, MF_STEEL, CB_IRON, CB_STEEL.

Foundry emission factors were provided by the DEQ on November 20, 2023 in their source test review memorandum following review of the Main Foundry and Cooling Bunker Baghouses Emission Factor Determination and Main Foundry PTE Verification Source Test Report, prepared by Bison Engineering.

c. **Hot Top usage (HOTTOP TEU): update emission factors and emissions in Tab 3 of the AQ520 to reflect the emissions presented in the supporting calculations.**

MFA has incorporated the requested updates to the HOTTOP TEU in the revised AQ520 form.

d. **Air Arcing (AIRARC TEU):**

i. **Update the PM emission factor to 0.06 pounds total PM per hour cutting time per station, as reported in emissions data from the American Welding Society for torch cutting of clean, ½-inch steel plate;**

ii. **Based on the results of the Permanent Total Enclosure verification testing by EPA Method 204 on April 18 and June 1, 2023, and the Source Test Review Memorandum issued by DEQ on June 22, 2023, Eagle may assume 100 percent capture of emissions from TORCH activities; and**

iii. **Alloy composition data provided to DEQ on February 7, 2023, indicates that molybdenum is present in alloys cut by air arcing – include molybdenum trioxide (CASRN 1313-27-5) emissions in the Inventory based on alloy composition.**

MFA has incorporated the requested updates to molybdenum trioxide the AIRARC TEU in the revised emissions inventory (Attachment A). Eagle Foundry conducted a study observing the amount of time that Air Arc was engaged in cutting metal for a 30-minute time span during normal Air Arc operating hours. Eagle Foundry determined that Air Arc operators are engaged in cutting metal approximately 27.5 percent of total operating hours. The emissions inventory has been updated to base emissions on the time spent cutting metal. A memo summarizing the study is included as Attachment C.

In addition, MFA has updated the TAC composition used for daily emissions estimates with the composition data for MNB2. MNB2 is the Air Arc cut alloy with the highest toxicity-weighted emission rate based on acute risk-based concentrations (RBCs). This methodology will result in the maximum predicted acute hazard index. Annual emissions are based on the average TAC content of all Air Arc cut alloys.

e. **Grinding (GRIND TEU):**

i. **Update the PM emission factor to 0.16 pounds per ton metal produced to reflect the median emission factor for grinding, developed from data collected in the EPA's 1998 Foundry Information Collection Request;**

The Total PM emission factor has been updated to 0.16 pounds per ton metal processed to reflect the median emission factor for grinding. MFA calculated Total PM emissions using the collection efficiencies of particulate control devices and particle size fractions in Table 3-4 and Table 6-2 of RTI International, *Emission Estimation Protocol for Iron and Steel Foundries,* December, 2012 (RTI document).

ii. **Due to the sharing of the baghouse between the grinding and rotoblast processes and the potential for daily variation in production, site-specific metal chemistry data may be more representative of the overall TAC [toxic air contaminant] composition of PM emissions than baghouse dust. Update the TAC composition to match the higher of either:**

1. **The baghouse dust composition; or**
2. **The TAC composition of the melted alloys, on a daily maximum basis and annual average basis;**

The grinding TEU has been split into grinding stainless steel alloys (GRIND_SS) and non-stainless steel alloys (GRIND_NSS). The TAC composition of the emissions from grinding has been speciated based on the maximum between alloy composition data and baghouse dust data. As an additional conservative assumption, MFA has updated the alloy composition used for daily emissions estimates with the composition of the stainless steel alloy or non-stainless steel alloy with the highest weighted emission rates based on acute RBCs (alloys HK and MNB2, respectively). This methodology will result in the maximum predicted acute hazard indices. Annual emissions are based on the average TAC content of all stainless steel or non-stainless steel alloys.

iii. **Include molybdenum trioxide (CASRN 1313-27-5) emissions (see footnote 2); and**

iv. **Results of the Permanent Total Enclosure verification testing by EPA Method 204 on April 18, 2023, were not sufficient to demonstrate 100 percent capture of emissions from GRIND activities. Based on DEQ observation of the effectiveness of controls during the test, Eagle may assume a maximum of 95 percent capture for this TEU.**

MFA has added molybdenum trioxide emissions to the GRIND_SS and GRIND_NSS TEUs in the revised emissions inventory (Attachment A) and assumed a 95 percent capture by the building enclosure.

f. **Welding (WELD TEU):**

i. **Update the annual throughputs, emission factors, and emissions reported in the AQ520 and supporting calculations to be consistent with one another – currently the throughput reported on Tab 2 of the AQ520 assumes that 5 percent of welding wire is wasted and not used, but the emissions reported on Tab 3 and in the supporting calculations assume that 100 percent of welding wire is used;**

ii. **Update molybdenum trioxide (CASRN 1313-27-5) emissions to account for conversion from molybdenum to molybdenum trioxide (see footnote 2); and**

iii. **For welding rods without published hexavalent chromium emission factors, Eagle may update the default hexavalent chromium (CAS 18540-29-9) speciation assumptions for SMAW**

processes from 63 percent to 55 percent of total chromium updated, based on updated guidance from San Diego County Air Pollution Control District.

MFA has incorporated the requested updates to the WELD TEU in the revised emissions inventory tables (Attachment A) and AQ520 form.

g. Abrasive blasting (MESH TEU and SHOT TEU):

i. Update activity rates in AQ520 and throughputs in supporting calculations to reflect the amount of blast material sprayed rather than the amount purchased; and

ii. Include molybdenum trioxide (CASRN 1313-27-5) emissions, based on the results of the 2021 Baghouse Dust Analysis (see footnote 2);

MFA has incorporated emissions estimates for molybdenum trioxide from the MESH and SHOT TEUs in the revised emissions inventory tables (Attachment A) and AQ520 form.

h. Abrasive blasting (MESH TEU):

i. For consistency with the methodology used for the SHOT TEU, calculate uncontrolled PM emissions using an emission factor of 5.77 pounds per thousand pounds abrasive material used; and

ii. Apply a control efficiency of 98 percent (based on the specifications provided).

Following receipt of the Letter, MFA reached out to you to discuss the use of Section 6 of the 2012 RTI document to estimate emissions from abrasive blasting. We received your approval of this approach by email on August 29, 2023. Consistent with this approach, the Total PM emission factor has been updated to 16.0 pounds per ton metal processed to reflect the emission factor for shot blasting, captured and uncontrolled. MFA calculated Total PM emissions using the particle size fractions in Table 6-2 of the RTI document. Following the guidance in Section 3.1.4.1, MFA assumed that PM control efficiencies for PM greater than 10 micrometers are 100 percent. A control efficiency of 98 percent was applied to PM_{10} and $PM_{2.5}$.

i. Abrasive blasting (SHOT TEU):

i. Update all annual and maximum daily emission factors in columns F and G of Tab 3 of the AQ520 to be consistent with the supporting calculations; and

ii. For all TACs, in the "Reference/Notes" column on Tab 3 of the AQ520, note that PM emission factor used for shot blasting represents 10 percent of the AP-42 sandblasting emission factor cited.

Following receipt of the Letter, MFA reached out to you to discuss the use of Section 6 of the 2012 RTI document to estimate emissions from abrasive blasting. We received your approval of this approach by email on August 29, 2023. Consistent with this approach, the Total PM emission factor has been updated to 16.0 pounds per ton metal processed to reflect the emission factor for shot blasting, captured and uncontrolled. MFA calculated Total PM emissions using the collection efficiencies of particulate control devices and particle size fractions in Table 3-4 and Table 6-2 of the RTI document. MFA has updated emission factors and references in the revised AQ520 form.

j. Mold-making (MOLD TEUs):

i. If including the silica portion of mullite as crystalline silica (CASRN 7631-86-9), include this for all mullite-containing materials, including the Coated Cerabead product;

MFA has updated the contents of Coated Cerabead and Naigai Cerabead to include the silica portion of mullite as crystalline silica. These updates are reflected in the revised emissions inventory tables (Attachment A) and AQ520 form. Safety Data Sheets for Coated Cerabead and Naigai Cerabead are included as Attachment D.

ii. **Crystalline silica (CASRN 7631-86-9) emissions associated with the Velvacoat ST803, Isomol 780, Unibond 1350, Naigai Cerabead, Coated Cerabead and G-29 Sand products will generally occur when particulate matter emissions result from mold handling, and are best characterized as emissions from other TEUs. Remove crystalline silica emissions from this TEU and include them in the emissions estimates for the SCREENING, RECLAIM, and S_PALMER TEUs (see Items 1.i-k below);**

MFA has incorporated the updates in the revised emissions inventory tables (Attachment A) and AQ520 form. Emission estimates for crystalline silica have been included in the SCREENING, RECLAIM, and MOLD_SP and MOLD_BP TEUs.

iii. **In Tab 4 of the AQ520, include a second TEU ID and Stack or Fugitive ID emission point, to represent emissions from the mold fill area associated with the small palmer molding system.**

MFA has incorporated these updates in the revised emissions inventory tables (Attachment A) and AQ520 form. A new TEU (MOLD_SP) has been included to represent emissions from the mold fill area at the small palmer molding system.

k. <u>Small Palmer (S_PALMER TEU):</u>

i. **Include emissions of crystalline silica (CASRN 7631-86-9), based on the estimated fraction of crystalline silica in the particulate matter emitted from this TEU;**

ii. **Include molybdenum trioxide (CASRN 1313-27-5) emissions, based on the results of the 2021 Baghouse Dust Analysis (see footnote 2); and**

iii. **In Tab 2 of the AQ520, update the daily Requested Potential To Emit activity to 0.0572 tons of PM generated for consistency with the supporting calculations (Small Palmer PTE tab).**

MFA has incorporated emission estimates of crystalline silica from material handling in the Small Palmer molding system in the MOLD_SP TEU. Emission estimates for molybdenum trioxide have been added to the S_PALMER TEU in the revised emissions inventory tables (Attachment A) and AQ520 form.

l. <u>Material handling (SCREENING TEU):</u>

i. **Include emissions of crystalline silica (CASRN 7631-86-9), based on the estimated fraction of crystalline silica in the particulate matter emitted from this TEU;**

MFA has added emission estimates of crystalline silica from the SCREENING TEU in the revised emissions inventory tables (Attachment A) and AQ520 form.

ii. **Include molybdenum trioxide (CASRN 1313-27-5) emissions, based on the results of the 2021 Baghouse Dust Analysis (see footnote 2);**

MFA has added emission estimates of molybdenum trioxide from the SCREENING TEU in the revised emissions inventory tables (Attachment A) and AQ520 form.

iii. **Update the emission factor and activity (throughput) units to "tons sand handled" instead of tons metal poured for consistency with the emission factor listed in AP-42 Table 12.10-7;**

MFA has incorporated requested updates to the SCREENING TEU in the revised emissions inventory tables (Attachment A) and AQ520 form.

iv. **Provide quantitative documentation and any analyses done to determine the ratio of tons of sand handled to tons of metal poured; and**

v. **On the AQ520, update the emission point name to indicate emissions exit from the screening baghouse (e.g., "SCN_BH" or similar).**

Eagle Foundry has prepared a memo documenting their study to determine the ratio of tons of sand handled to tons of metal poured. This memo has been included at Attachment E.

Per the request of 1(l)(v), the Emission Point ID in the AQ520 form has been updated to EP1_3 consistent with Standard ACDP no. 03-2631-ST-01 to indicate emissions are routed to the screening baghouse.

<u>Rotary shakeout (RECLAIM TEU):</u>

i. **Revise the capture efficiency to 90 percent. The EPA report referenced by MFA in Attachment G of the Inventory supporting documentation cites a 97 percent capture efficiency for double-sided draft hoods, but no test data has been provided that is directly applicable to rotary shakeout units. Because the rotary shakeout is largely enclosed, DEQ agrees that the unit is capable of providing a capture efficiency greater than the permitted 75 percent when operated properly. Even though direct quantitative test data for this unit is not available for this unit or a similar unit, assuming the capture efficiency is somewhat closer to the capture efficiency for double-sided draft hoods than what is permitted currently, DEQ will accept a maximum capture efficiency of 90 percent.**

   Emission estimates for the RECLAIM TEU have been updated to reflect a capture efficiency of 90 percent. The 10 percent of emissions that are not captured by the RECLAIM TEU are captured and accounted for in the exhaust from the main foundry building permanent total enclosure and controlled by the main foundry baghouse.

ii. **Include emissions of crystalline silica (CASRN 7631-86-9), based on the estimated fraction of crystalline silica in the particulate matter emitted from this TEU; and**

   Emission estimates of crystalline silica have been added to the revised emissions inventory and Form AQ520. Silica percentage of PM is based on the weighted average silica content of all mold making materials.

iii. **Include molybdenum trioxide (CASRN 1313-27-5) emissions, based on the results of the 2021 Baghouse Dust Analysis (see footnote 2).**

   MFA has incorporated emissions estimates for molybdenum trioxide from the RECLAIM TEU in the revised emissions inventory tables (Attachment A) and AQ520 form.

m. <u>Bead storage (SILO TEUs):</u>

i. **Add new TEUs for the New Bead Silo (D1-3), Overflow Bead Silo (D1-5), and Reclaimed Bead Silo (D1-4) to Tab 2 and Tab 3 of the AQ520, using emissions and activity information from the supporting calculations;**

   The New Bead Silo (D1-3), Overflow Bead Silo (D1-5), and Reclaimed Bead Silo (D1-4) have been added to Tab 2 and Tab 3 of the AQ520, using emissions and activity information from the supporting calculations.

ii. **Estimate emissions of crystalline silica (CASRN 7631-86-9) for the New Bead Silo (D1-3), Overflow Bead Silo (D1-5), Reclaimed Bead Silo (D1-4), and Small Palmer Bead Silo (D1-1, included in the S_PALMER TEU), if crystalline silica is a component of products stored in the silos; and**

Emission estimates of crystalline silica have been added to the New Bead Silo (D1-3), Overflow Bead Silo (D1-5), Reclaimed Bead Silo (D1-4), and Small Palmer Bead Silo (D1-1) TEUs. Silica percentage of PM for D1-1, D1-4, and D1-5 is based on the weighted average silica content of all mold making materials. Silica percentage of PM for D1-3 is based on the silica content of Naigai Cerabead.

iii. **For the New Bead Silo (D1-3), estimate emissions of aluminum (CASRN 7421-90-5), which is a component of the Naigai Cerabead and Coated Cerabead products.**

Emission estimates of aluminum from Naigai Cerabead and Coated Cerabead products have been added to the New Bead Silo (D1-3), Small Palmer Material Handling (MOLD_SP), and Big Palmer Material Handling (MOLD_BP).

n. **Pattern making (PATTERN TEU): Update the material usage for Polyurethane Clear Varnish in Tab 4 of the AQ520 to reflect usage in pounds per day and pounds per year.**

Material usage for Polyurethane Clear Varnish has been updated in Tab 4 of the AQ520 form to reflect usage in pounds per day and pounds per year.

o. **Emergency diesel engines (EGEN TEU):**

i. **For benzo[a]pyrene (CASRN 50-32-8), update the emission factor to 3.52E-5lb/Mgal and the Reference/Note to "AP-42 Section 3.4, Table 3.4-4, converted to lb/Mgal using a heating value 137,000 Btu/gal (AP-42 Appendix A)."**

ii. **For all other TACs except ammonia, update the Reference/Note in Tab 3 of theAQ520 to include the emission factor source and date (South Coast Air Quality Management District, 2016).**

MFA has incorporated the requested updates to the EGEN TEU in the revised emissions inventory and AQ520 form.

p. **Slag handling: Include slag handling as a TEU in the Inventory, calculating emissions as follows:**

i. **Estimate PM10 emissions from aggregate handling for each drop point using the methodology in AP-42, Section 13.2.4 (Equation 13.2.4-1) – calculate annual emissions using a representative annual average wind speed and maximum daily emissions using a maximum daily average wind speed; and**

ii. **TAC composition of PM10 may be estimated using site-specific data, a representative dataset from a similar operation, or conservative assumptions based on available information.**

MFA has added estimated emissions from slag handling (SLAG) to the revised emissions inventory and AQ520 form. PM_{10} emissions were estimated using the methodology in AP-42, Section 13.2.4 (Equation 13,2,4-1). TAC speciation of PM_{10} is based on a slag dust analysis conducted by Apex Laboratories in September 2023.

q. **Raw materials handling:**

i. **If any TAC-containing raw materials handling activities are open to the atmosphere and may emit TACs, provide Safety Data Sheets for these materials and include the activities as a TEU or TEUs in the Inventory; and**

While Eagle Foundry has raw material handling and storage that is open to the atmosphere, a review of these materials and handling procedures indicates that TAC emissions will not be present.

ii. **If any TAC-containing raw materials handling is enclosed or otherwise not expected to emit TACs, please provide a description of work practices ensuring this or other justification for classifying materials handling as an exempt TEU under OAR 340-245-0060(3)(a).**

1. High Carbon Ferrous Chromium (HCFeCr) is received in 15 ton loads that are screened in Portland by the supplier. Eagle Foundry receives ¼" and larger materials. Fines have been removed. When received, the material is deposited in a roof covered bunker on the back side of the casting cooling bunkers adjacent to the main foundry building. Dust has been removed prior to arriving and the material is stored in a sheltered area out of any windy conditions so no TAC emissions are estimated.

2. Scrap steel is sized by the supplier for Eagle Foundry to fit the induction furnaces and is carefully sourced. It is not purchased or received from the public. Some of the steel is even received in drums ready to be charged in the melting furnaces. Any bulk steel that is received is deposited under roof cover next to the HCFeCr material on the back side of the casting cooling bunkers out of the wind. The steel is spec'd to be free of dirt, paint, oil, and grease. Due to the nature of induction melting, it must be received within these narrow specifications. Eagle Foundry has three specific suppliers that have maintained long-term relationships by delivering materials that meet these specifications. Because this scrap is specified to be clean, no TAC emissions are estimated for scrap steel storage.

3. Three raw materials are received in 4,000 lb sealed super sacks. These sacks are placed inside bins that are located at the west end of the main foundry building along the backside of the casting cooling bunkers near other raw materials. The bins are located under shelter. The facility carefully opens the bags to extract small buckets of raw material as needed to achieve a particular alloy recipe. The buckets are unloaded by the induction furnaces inside the main foundry building total enclosure. Because of the handling procedures and the containment and shelter, no emissions are estimated for these materials in the raw material handling area. To the extent any dust is created during the emptying of the buckets into the induction furnaces, these emissions would have been captured during the main foundry source test and emissions would have been included in the emission factors developed.

    - Bin1- LC FerroChrome: 11 bags per year. Bin size is 48" x 48" x 48" high.
    - Bin2- HC Ferromanganese Alloy: 40 bags per year. Bin size is 48" x 48" x 48" high.
    - Bin3- LC Ferromanganese Alloy: 3 bags per year. Bin size is 48" x 48" x 48" high.

4. Several additional raw materials are received in drums and cans that are opened on the furnace deck in the main foundry building. These materials would have been handled under normal conditions during the source test conducted for the foundry building. As a result, it is assumed that emissions from handling these materials, to the extent there is dust, would have been captured in the source test results.
    a. Ferro Molybdenum

b. Ferro Silicon
c. Nickel
d. Aluminum
e. Silicon/Titanium
f. Ferro Titanium
g. Carbon

r. Heat Treat (PROPANE TEU): Update the name of the "PROPANE" TEU to "HEATTREAT."

The PROPANE TEU has been updated to HT1, HT2 and HT3.

s. Update the AQ520 as follows:

i. Include separate TEU IDs (line items) for each applicable "Stack or Fugitive ID"(FND_A, FND_B, RCLM, RCLM_FUG, FINBGH, FIN_FUG, WELD1, WELD2,WELD3, HT1, HT2, and HT3) for the following TEUs:

a. MELT;

b. POUR_COOL;

MELT and POUR_COOL TEU IDs have been updated and are listed in the AQ520 form as MF_IRON, MF_STEEL, CB_IRON, AND CB_STEEL.

c. HOTTOP;

All emissions from the HOTTOP TEU are released through the Main Foundry baghouse (EP2_3).

d. REC;

REC TEU IDs are listed in the AQ520 form as REC_R, for emissions captured by the reclamation system and controlled by the reclamation baghouse, and REC_MF for fugitive reclamation emissions captured and controlled by the main foundry baghouse.

e. WELD;

The WELD TEU IDs are listed in the AQ520 form as WELD. Emissions will be represented in the dispersion model as WELD1, WELD2 and WELD3.

GRIND;

The GRIND TEU IDs are listed in the AQ520 form as GRIND_SS_C for grinding stainless steel alloy, controlled by a baghouse; GRIND_SS_F for grinding stainless steel alloy, fugitive emissions; GRIND_NSS_C for grinding non-stainless steel alloy, controlled by a baghouse; and GRIND_NSS_F for grinding non-stainless steel alloy, fugitive emissions. Fugitive emissions for grinding will be represented in the dispersion model as GRIND_F1, GRIND_F2, AND GRIND_F3.

f. PROPANE; and

The PROPANE TEU has been updated to HT. HT TEUs are listed in the AQ520 form as HT1, HT2 and HT3.

g. MOLD;

The MOLD TEU has been updated to separate products between the Big Palmer and Small Palmer molding systems. The MOLD TEU is listed in AQ520 as MOLD_SP_CC,

MOLD_SP_G, MOLD_SP_U, MOLD_SP_C, MOLD_BP_V, MOLD_BP_I, MOLD_BP_C, MOLD_BP_U.

ii. **In Column C on Tab 2, specify the Pollution Control Device ID (PCD ID) from the Air Contaminant Discharge Permit (Permit number 03-2631-ST-01) where applicable;**

The PCD IDs from Standard ACDP no. 03-2631-ST-01 have been added to form AQ520 where applicable.

iii. **On Tab 2, include maintenance shop chemical usage as a TEU. This may be considered an exempt TEU under OAR 340-245-0060(3)(a); exempt TEUs must be included in the Inventory but emissions do not need to be quantified or included on Tab 3.**

The Eagle Foundry maintenance shop uses small amounts of grease and lubricants that do not have emissions to atmosphere. Maintenance welding usage has been included in the WELD TEU.

Sincerely,

Maul Foster & Alongi, Inc.

Chad Darby
Principal Air Quality Specialist

Attachments

A—CAO Emissions Inventory (Rev1.10.24)

B—Process Flow Diagrams (Rev1.10.24)

C—AIRARC Study

D—SDS—Coated Cerabead, Naigai Cerabead

E—Sand Memo

Attachment A

Revised CAO Emissions Inventory

MAUL FOSTER ALONGI

Table of Contents
Eagle Foundry Company

Table 1
Input Process Rates and Parameters
Eagle Foundry Company

Source	Production or Throughput Rate							
	2021				PTE			
	Daily		Annual		Daily		Annual	
Facility								
Facility Hours of Operation	20.0	(hrs/day) [1]	6,240	(hrs/yr) [a]	24.0	(hrs/day) [2]	8,760	(hrs/yr) [2]
Foundry								
Total Metal Melted	23.6	(tons/day) [b]	5,675	(tons/yr) [1]	31.0	(tons/day) [4]	8,060	(tons/yr) [1]
Total White Iron Melted	18.9	(tons/day) [c]	4,540	(tons/yr) [c]	0	(tons/day) [5]	6,448	(tons/yr) [c]
Total Steel Melted	4.72	(tons/day) [c]	1,135	(tons/yr) [c]	31.0	(tons/day) [5]	1,612	(tons/yr) [c]
Total Metal Processed	14.5	(tons/day) [d]	3,482	(tons/yr) [d]	19.0	(tons/day) [d]	4,945	(tons/yr) [d]
Total Hot Top	92.3	(lb/day) [b]	24,005	(lb/yr) [1]	142	(lb/day) [b]	34,093	(lb/yr) [e]
Heat Treat								
Total Propane Usage	633	(gal/day) [b]	151,830	(gal/yr) [1]	898	(gal/day) [b]	215,639	(gal/yr) [e]
AirArc								
Cutting Torch Hours of Operation	2.80	(hrs/day) [f]	859	(hrs/yr) [f]	6.60	(hrs/day) [f]	1,220	(hrs/yr) [f]
AirArc Process Hours of Operation	10.0	(hrs/day) [1]	3,120	(hrs/yr) [a]	24.0	(hrs/day) [b]	4,431	(hrs/yr) [e]
Welding								
Percentage of Welding Wire to Waste	--		5	(%) [1]	--		5	(%) [1]
Total Wire - Excluding Waste	29.8	(lb/day) [h]	7,150	(lb/yr) [h]	42.3	(lb/day) [b]	10,155	(lb/yr) [h]
Lincore M WIRE HF LCM 1/16 25# SP	3.33	(lb/day) [b]	800	(lb/yr) [1]	--		1,136	(lb/yr) [e]
Sandvik WIRE 309LSI .035 X 33 LB	0.14	(lb/day) [b]	33.0	(lb/yr) [1]	--		46.9	(lb/yr) [e]
Avesta 2205 ELECTR SS E2209 1/8 10#	1.25	(lb/day) [b]	300	(lb/yr) [1]	--		426	(lb/yr) [e]
Prostar S-6 WIRE MS 70S6 035 33# SP PRS	3.35	(lb/day) [b]	803	(lb/yr) [1]	--		1,140	(lb/yr) [e]
Stoody WIRE HF 965-G 045 33# SP	3.71	(lb/day) [b]	891	(lb/yr) [1]	--		1,265	(lb/yr) [e]
Hobart WIRE EXCELARC 71 .045 X 33 LB	0.41	(lb/day) [b]	99.0	(lb/yr) [1]	--		141	(lb/yr) [e]
CARBONS 1/2X17 CTD DC JTD 100	19.2	(lb/day) [b]	4,600	(lb/yr) [1]	--		6,533	(lb/yr) [e]

Table 1
Input Process Rates and Parameters
Eagle Foundry Company

Source	Production or Throughput Rate									
	2021					PTE				
	Daily			Annual		Daily			Annual	
Pattern Production										
Urethane	0.25	(gal/day) [b]		60.0	(gal/yr) [1]	0.36	(gal/day) [b]		85.2	(gal/yr) [e]
Mar-Proof H/S Lacquer Sanding Sealer	0.021	(gal/day) [b]		5.00	(gal/yr) [1]	0.030	(gal/day) [b]		7.1	(gal/yr) [e]
Finishing										
Total Grinding (Metal Processed)	14.5	(tons/day) [7]		3,482	(tons/yr) [7]	19.0	(tons/day) [7]		4,945	(tons/yr) [7]
Grinding - Stainless Steel	--			--		2.5	(tons/day) [1]		651	(tons/yr) [1]
Grinding - Non-stainless Steel	--			--		16.5	(tons/day) [1]		4,294	(tons/yr) [1]
Abrasive Blasting										
Total Metal Finished by Abrasive Blasting	1.74	(tons/day) [i]		418	(tons/yr) [i]	12.0	(tons/day) [1]		593	(tons/yr) [i]
Mesh Blast (metal finished)	--		[8]	--	[8]	3.00	(tons/day) [1]		59.3	(tons/yr) [1]
Shot Blast (metal finished)	1.74	(tons/day) [1]		418	(tons/yr) [1]	9.00	(tons/day) [1]		534	(tons/yr) [1]
Mold Production										
Small Palmer Molding System										
Coated Cerabead	37.5	(lb/day) [b]		9,000	(lb/yr) [1]	53.3	(lb/day) [b]		12,782	(lb/yr) [e]
G-29 Sand	88.8	(lb/day) [b]		21,312	(lb/yr) [1]	126	(lb/day) [b]		30,269	(lb/yr) [e]
Naigai Cerabead	3,789	(lb/day) [b]		820,964	(lb/yr) [1]	4,858	(lb/day) [b]		1,165,986	(lb/yr) [e]
Unibond 1350 Core Paste	32.0	(lb/day) [b]		6,925	(lb/yr) [1]	41.0	(lb/day) [b]		9,835	(lb/yr) [e]
Small Palmer Molding Line (dust collected)	#REF!	(lb/day) [1]		#REF!	(tons/yr) [l]	#REF!	(lb/day) [j]		#REF!	(tons/yr) [e]
Big Palmer Molding System										
Velvacoat St 803 - Mold Wash Z	49.2	(lb/day) [b]		11,800	(lb/yr) [1]	69.8	(lb/day) [b]		16,759	(lb/yr) [e]
Isomol - Mold Wash M	15.0	(lb/day) [b]		3,600	(lb/yr) [1]	21.3	(lb/day) [b]		5,113	(lb/yr) [e]
Naigai Cerabead	2,097	(lb/day) [b]		503,172	(lb/yr) [1]	2,978	(lb/day) [b]		714,637	(lb/yr) [e]
Unibond 1350 Core Paste	17.7	(lb/day) [b]		4,244	(lb/yr) [1]	25.1	(lb/day) [b]		6,028	(lb/yr) [e]

Table 1
Input Process Rates and Parameters
Eagle Foundry Company

Source	Production or Throughput Rate									
	2021					PTE				
	Daily			Annual		Daily			Annual	
Silo Operation										
Silos Hours of Operation	20.0	(hrs/day)	(9)	4,800	(hrs/yr) (9)	20.0	(hrs/day)	(9)	4,800	(hrs/yr) (9)
Slag Handling										
Slag Handling	0.50	(tons/day)	(1)	156	(tons/yr) (1)	0.90	(tons/day)	(b)	222	(tons/yr) (e)
Emergency Generator										
Hours of Operation	2.00	(hrs/day)	(1)	65.0	(hrs/yr) (1)	2.00	(hrs/day)	(1)	100	(hrs/yr) (10)
Diesel Usage	14.6	(gal/day)	(k)	475	(gal/yr) (k)	14.6	(gal/day)	(k)	730	(gal/yr) (k)

Filter	Control Efficiency (%)
Foundry Baghouse Control Efficiency for PM	90.0 (12)
Reclamation Baghouse Control Efficiency for PM	99.0 (1)
Baghouse Control Efficiency for $PM_{>10}$	100 (13)
Baghouse Control Efficiency for $PM_{2.5-10}$	99.5 (13)
Baghouse Control Efficiency for $PM_{2.5}$	99.0 (13)

Notes

M-lb = thousand pounds

(a) 2021 Annual hours of operation (hrs/yr) = (daily hours of operation [hrs/day]) x (operational days per week [days/week]) x (operational weeks per year [weeks/yr])

Operational days per week (days/week) = 6.00 (1)

Operational weeks per year [weeks/yr]) = 52.0 (1)

Table 1
Input Process Rates and Parameters
Eagle Foundry Company

(b) Daily usage (unit/day) = (annual usage [unit/yr]) / (operational days per week [days/week]) / (operational weeks per year [weeks/yr])
x (1 + [short-term variability factor {%}]/100)

Short-term variability factor (%) =	30.0	(3)

(c) Metal poured (tons/unit) = (annual usage [tons/yr]) / (percentage of total metal poured [%]/100)

White Iron percentage of total metal poured (%) =	80.0	(1)
Steel percentage of total metal poured (%) =	20.0	(1)

(d) Total metal processed (tons metal processed) = (total metal poured [tons metal poured]) x (1 - [reject percentage {%}]/100)
x (1 - [percentage of metal poured for riser {%}]/100)

Reject percentage (%) =	1.05	(1)
Percentage of metal poured for riser (%) =	38.0	(1)

(e) Annual parameter, PTE (units/yr) = (annual parameter, 2021 [units/yr]) x (total metal melt, PTE [tons melt/yr]) / (total metal melt, 2021 [tons melt/yr])

(f) Cutting torch hours of operation = (AirArc process hours of operation [hours/unit]) x (AirArc cutting time to total work time ratio)

AirArc cutting torch time to total work time ratio =	0.28	(g)

(g) AirArc cutting time to total work time ratio = (average minutes of cutting torch operation [minutes/unit]) / (average total minutes of operation [minutes/unit])

Average minutes of cutting torch operation (minutes) =	8.26	(6)
Average total minutes of operation (minutes) =	30.0	(6)

(h) Total welding wire - excluding waste (lb/unit) = (sum of welding wire usage [lb/unit]) x (1 - (percentage of welding wire waste [%] /100)

(i) Total metal finished by abrasive blasting (tons/unit) = (total metal processed [tons/unit]) x (percentage of metal processed finished by abrasive blasting [%]/100)

Percentage of metal processed finished by abrasive blasting (%) =	12.0	(1)

(j) Maximum daily parameter (lb/day) = (annual parameter [tons/yr]) x (2,000 lb/ton) / (operational days per week [days/week]) / (operational weeks per year [weeks/yr])
x (1 + [short-term variability factor {%}]/100)

Short-term variability factor (%) =	20.0	(3)

(k) Diesel usage (gal/unit) = (diesel usage [gal/hour]) x (hours of operation [hrs/unit])

Diesel usage (gal/hr) =	7.30	(11)

(l) Annual dust collected (tons/yr) = (daily dust collected [lb/day]) / (2,000 lb/ton) x (operational days per week [days/week]) x (operational weeks per year [weeks/yr])

Table 1
Input Process Rates and Parameters
Eagle Foundry Company

References

(1) Information provided by facility.

(2) Assumes continuous operation.

(3) Based on a 20 percent increase for short-term variability.

(4) Information provided by facility. Maximum daily production for PTE is based on the daily capacity of foundry operations.

(5) 100 percent of daily metal melted is allocated to HK steel alloy. Emissions from alloy HK results in the maximum predicted acute risk value.

(6) Based on an Eagle Foundry study of the time that cutting torches are in operation during AirArc process operations.

(7) Value represents the total metal processed. Total metal processed is equivalent to total metal melt minus reject percentage and metal poured for risers.

(8) The mesh blast unit was not used in 2021.

(9) Based on facility estimate. Bin vents only create emissions when system is operating.

(10) See CFR 40 Ch. 1(C)(63). Emergency engines may only be operated for a maximum of 100 hours per calendar year.

(11) Based on a 100 kW emergency generator at 100 percent load.

(12) Assumed control efficiency provided by the Oregon DEQ by letter dated August 11, 2023.

(13) RTI International, 2012, Table F-1, Typical Collection Efficiencies of Various Particulate Control Devices. Assumes fabric filter—low temperature. RTI states that control efficiencies for PM larger that 10 micrometers in diameter are 100 percent.

Table 2
Foundry Emission Factors
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor															
		Steel									White Iron						
		Main Foundry Baghouse			Cooling Bunker Baghouse			Total			Main Foundry Baghouse			Cooling Bunker Baghouse			Total	
Aluminum and Compounds	7429-90-5	1.89E-03	(lb/ton melt)	[1]	1.45E-03	(lb/ton melt)	[1]	3.34E-03	(lb/ton melt)		1.94E-03	(lb/ton melt)	[1]	1.72E-03	(lb/ton melt)	[1]	3.66E-03	(lb/ton melt)
Antimony and Compounds	7440-36-0	< 1.60E-05	(lb/ton melt)	[1]	< 1.48E-05	(lb/ton melt)	[1]	< 3.08E-05	(lb/ton melt)		1.49E-05	(lb/ton melt)	[1]	< 1.05E-05	(lb/ton melt)	[1]	2.54E-05	(lb/ton melt)
Arsenic and Compounds	7440-38-2	< 6.01E-05	(lb/ton melt)	[1]	< 5.43E-05	(lb/ton melt)	[1]	< 1.14E-04	(lb/ton melt)		ND			< 4.42E-05	(lb/ton melt)	[1]	< 4.42E-05	(lb/ton melt)
Barium and Compounds	7440-39-3	1.29E-04	(lb/ton melt)	[1]	4.76E-05	(lb/ton melt)	[1]	1.77E-04	(lb/ton melt)		7.42E-05	(lb/ton melt)	[1]	3.70E-05	(lb/ton melt)	[1]	1.11E-04	(lb/ton melt)
Beryllium and compounds	7440-41-7	ND			ND			ND			ND			ND			ND	
Cadmium and Compounds	7440-43-9	< 7.78E-06	(lb/ton melt)	[1]	< 3.14E-06	(lb/ton melt)	[1]	< 1.09E-05	(lb/ton melt)		< 3.71E-06	(lb/ton melt)	[1]	ND			< 3.71E-06	(lb/ton melt)
Chromium	7440-47-3	3.43E-03	(lb/tons TAC in melt)	[1]	9.38E-04	(lb/tons TAC in melt)	[1]	4.37E-03	(lb/tons TAC in melt)		2.31E-04	(lb/tons TAC in melt)	[1]	9.26E-05	(lb/tons TAC in melt)	[1]	3.24E-04	(lb/tons TAC in melt)
Chromium VI	18540-29-9	1.32E-05	(lb/tons TAC in melt)	[1]	1.87E-05	(lb/tons TAC in melt)	[1]	3.19E-05	(lb/tons TAC in melt)		7.20E-07	(lb/tons TAC in melt)	[1]	< 1.16E-06	(lb/tons TAC in melt)	[1]	1.88E-06	(lb/tons TAC in melt)
Cobalt and Compounds	7440-48-4	< 2.43E-06	(lb/ton melt)	[1]	< 1.98E-06	(lb/ton melt)	[1]	< 4.41E-06	(lb/ton melt)		< 2.45E-06	(lb/ton melt)	[1]	< 2.03E-06	(lb/ton melt)	[1]	< 4.48E-06	(lb/ton melt)
Copper and Compounds	7440-50-8	< 7.96E-05	(lb/ton melt)	[1]	< 7.42E-05	(lb/ton melt)	[1]	< 1.54E-04	(lb/ton melt)		< 9.54E-05	(lb/ton melt)	[1]	7.87E-05	(lb/ton melt)	[1]	1.74E-04	(lb/ton melt)
Lead and Compounds	7439-92-1	ND			< 3.66E-05	(lb/ton melt)	[1]	< 3.66E-05	(lb/ton melt)		< 5.49E-05	(lb/ton melt)	[1]	< 4.44E-05	(lb/ton melt)	[1]	< 9.93E-05	(lb/ton melt)
Manganese and Compounds	7439-96-5	4.11E-03	(lb/tons TAC in melt)	[1]	2.20E-03	(lb/tons TAC in melt)	[1]	6.31E-03	(lb/tons TAC in melt)		0.0345	(lb/tons TAC in melt)	[1]	0.0122	(lb/tons TAC in melt)	[1]	4.67E-02	(lb/tons TAC in melt)
Mercury	7439-97-6	< 4.16E-06	(lb/ton melt)	[1]	< 2.92E-06	(lb/ton melt)	[1]	< 7.08E-06	(lb/ton melt)		< 1.99E-06	(lb/ton melt)	[1]	< 1.52E-06	(lb/ton melt)	[1]	< 3.51E-06	(lb/ton melt)
Molybdenum Trioxide	1313-27-5	2.24E-06	(lb/ton melt)	[a]	1.05E-05	(lb/ton melt)	[a]	1.27E-05	(lb/ton melt)		2.24E-06	(lb/ton melt)	[a]	1.05E-05	(lb/ton melt)	[a]	1.27E-05	(lb/ton melt)
Nickel and Compounds	7440-02-0	< 0.0197	(lb/tons TAC in melt)	[1]	5.98E-03	(lb/tons TAC in melt)	[1]	0.0257	(lb/tons TAC in melt)		< 9.78E-05	(lb/ton melt)	[1]	6.44E-05	(lb/ton melt)	[1]	1.62E-04	(lb/ton melt)
Phosphorus and Compounds	504	< 2.14E-04	(lb/ton melt)	[1]	< 1.74E-04	(lb/ton melt)	[1]	< 3.88E-04	(lb/ton melt)		< 1.66E-04	(lb/ton melt)	[1]	< 4.19E-05	(lb/ton melt)	[1]	< 2.08E-04	(lb/ton melt)
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	[1]	ND			< 1.07E-04	(lb/ton melt)		ND			ND			ND	
Silver and Compounds	7440-22-4	ND			ND			ND			< 1.75E-05	(lb/ton melt)	[1]	ND			< 1.75E-05	(lb/ton melt)
Thallium	7440-28-0	ND			ND			ND			ND			ND			ND	
Vanadium (fume or dust)	7440-62-2	ND			ND			ND			ND			ND			ND	
Zinc and Compounds	7440-66-6	2.17E-04	(lb/ton melt)	[1]	2.17E-04	(lb/ton melt)	[1]	4.34E-04	(lb/ton melt)		2.29E-04	(lb/ton melt)	[1]	2.03E-04	(lb/ton melt)	[1]	4.32E-04	(lb/ton melt)

Notes

< = Value calculated using the minimum detection limit for front half and/or back half results that were non-detect

ND = Non-detect. Results were below the analytical detection limit for all sample train components in all source test runs

TAC = toxic air contaminant

[a] Emission factor (lb/ton melt) = (PM emission factor [lb/ton]) x (1 - [control efficiency of the foundry baghouses {%}]/100) x (percent TAC in PM [%]) / 100

PM emission factor, melt (lb/ton) =	0.90	(2)
PM emission factor, pour/cool (lb/ton) =	4.20	(3)
Control efficiency of foundry baghouses (%) =	90.0	(4)
Molybdenum trioxide percentage of PM (%) =	2.49E-03	(b)

Table 2
Foundry Emission Factors
Eagle Foundry Company

(b) Molybdenum trioxide emission factor (% of PM emitted) = (molybdenum emission factor [% of PM emitted]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole]) (5)

Molybdenum and Compounds percentage of PM (%) =	1.66E-03	(6)
Molybdenum trioxide molecular weight (lb/lb-mole) =	143.94	
Molybdenum molecular weight (lb/lb-mole) =	95.95	

References

(1) Values provided by the DEQ on November 20, 2023 in their source test review memorandum following review of the Main Foundry and Cooling Bunker Baghouses Emission Factor Determination and Main Foundry PTE Verification Source Test Report prepared by Bison Engineering, dated October 13, 2023.

(2) AP-42, Chapter 12.10, Table 12.10-3 "Particulate Emission Factors for Iron Furnaces". Uncontrolled particulate emission factor for melting in an electric induction furnace.

(3) AP-42, Chapter 12.10, Table 12.10-7 "Particulate Emission Factors for Ancillary Operations and Fugitive Sources at Gray Iron Foundries". Value for uncontrolled particulate emission factor for pouring and cooling in an electric induction furnace.

(4) See Table 1, Input Process Rates and Parameters. The foundry building has been approved as a permanent total enclosure. Fugitive emissions from the reclamation system are controlled by the main foundry baghouse.

(5) Conservatively assumes 100 percent of molybdenum is in the trioxide form.

(6) Based on baghouse dust analysis conducted by Apex Laboratories, March 2021.

Table 3
PTE Foundry White Iron TAC Emissions Estimate
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	White Iron Emission Factor [1]		Emissions Estimate				Total Emissions Estimate	
		Main Foundry	Cooling Bunker	Main Foundry		Cooling Bunker			
				Daily [2] (lb/day)	Annual (lb/yr)	Daily [2] (lb/day)	Annual (lb/yr)	Daily [2] (lb/day)	Annual [3] (lb/yr)
Aluminum and Compounds	7429-90-5	1.94E-03 (lb/ton melt)	1.72E-03 (lb/ton melt)	--	12.5 [a]	--	11.1 [a]	--	23.6
Antimony and Compounds	7440-36-0	1.49E-05 (lb/ton melt)	< 1.05E-05 (lb/ton melt)	--	0.096 [a]	--	0.068 [a]	--	0.16
Arsenic and Compounds	7440-38-2	ND	< 4.42E-05 (lb/ton melt)	--	--	--	0.29 [a]	--	0.29
Barium and Compounds	7440-39-3	7.42E-05 (lb/ton melt)	3.70E-05 (lb/ton melt)	--	0.48 [a]	--	0.24 [a]	--	0.72
Cadmium and Compounds	7440-43-9	< 3.71E-06 (lb/ton melt)	ND	--	0.024 [a]	--	--	--	0.024
Chromium	7440-47-3	2.31E-04 (lb/tons TAC in melt)	9.26E-05 (lb/tons TAC in melt)	--	0.39 [b]	--	0.16 [b]	--	0.54
Chromium VI	18540-29-9	7.20E-07 (lb/tons TAC in melt)	< 1.16E-06 (lb/tons TAC in melt)	--	1.2E-03 [b]	--	1.9E-03 [b]	--	3.2E-03
Cobalt and Compounds	7440-48-4	< 2.45E-06 (lb/ton melt)	< 2.03E-06 (lb/ton melt)	--	0.016 [a]	--	0.013 [a]	--	0.029
Copper and Compounds	7440-50-8	< 9.54E-05 (lb/ton melt)	7.87E-05 (lb/ton melt)	--	0.62 [a]	--	0.51 [a]	--	1.12
Lead and Compounds	7439-92-1	< 5.49E-05 (lb/ton melt)	< 4.44E-05 (lb/ton melt)	--	0.35 [a]	--	0.29 [a]	--	0.64
Mercury	7439-97-6	< 1.99E-06 (lb/ton melt)	< 1.52E-06 (lb/ton melt)	--	0.013 [a]	--	9.8E-03 [a]	--	0.023
Manganese and Compounds	7439-96-5	0.0345 (lb/tons TAC in melt)	0.0122 (lb/tons TAC in melt)	--	2.67 [b]	--	0.94 [b]	--	3.61
Molybdenum Trioxide	1313-27-5	2.24E-06 (lb/ton melt)	1.05E-05 (lb/ton melt)	--	0.014 [a]	--	0.067 [a]	--	0.082
Nickel and Compounds	7440-02-0	< 9.78E-05 (lb/ton melt)	6.44E-05 (lb/ton melt)	--	0.63 [a]	--	0.42 [a]	--	1.05
Phosphorus and Compounds	504	< 1.66E-04 (lb/ton melt)	< 4.19E-05 (lb/ton melt)	--	1.07 [a]	--	0.27 [a]	--	1.34
Silver and Compounds	7440-22-4	< 1.75E-05 (lb/ton melt)	ND	--	0.11 [a]	--	--	--	0.11
Zinc and Compounds	7440-66-6	2.29E-04 (lb/ton melt)	2.03E-04 (lb/ton melt)	--	1.48 [a]	--	1.31 [a]	--	2.79

Table 3
PTE Foundry White Iron TAC Emissions Estimate
Eagle Foundry Company

Notes

ND = Non-detect. Results were below the analytical detection limit for all sample train components in all source test runs

[a] Annual emissions estimate (lb/yr) = (emission factor [lb/ton melt]) x (annual metal melted [tons/yr])

White Iron - total metal melted (tons/yr) =	6,448	(4)

[b] Annual emissions estimate (lb/yr) = (emission factor [lb/tons TAC in melt]) x (annual metal melt [tons/yr]) x (tons TAC/ton melt)

White Iron - Chromium in melt (ton TAC/ton melt) =	0.26	(5)
White Iron - Manganese in melt (ton TAC /ton melt) =	0.012	(5)

References

(1) See Table 2, Foundry Emission Factors.

(2) See Table 1, Input Process Rates and Parameters and Table D2, Alloy Toxicity Weighted Emission Rates . All daily production is attributed to HK steel alloy which will result in the maximum predicted acute hazard index. The daily emissions estimates for the main foundry and cooling bunker are shown in Table 4, PTE Foundry Steel TAC Emissions Estimate.

(3) Sum of main foundry and cooling bunker emission estimates.

(4) See Table 1, Input Process Rates and Parameters.

(5) See Table D1, Alloy Composition Data. Annual emissions estimate for the main foundry and cooling bunker are based on the maximum TAC content of all iron alloys.

Table 4
PTE Foundry Steel TAC Emissions Estimate
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Steel Emission Factor [1]		Emissions Estimate				Total Emissions Estimate [2]	
		Main Foundry	Cooling Bunker	Main Foundry		Cooling Bunker			
				Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
Aluminum and Compounds	7429-90-5	1.89E-03 (lb/ton melt)	1.45E-03 (lb/ton melt)	0.059 [a]	3.05 [b]	0.045 [a]	2.34 [b]	0.10	5.38
Antimony and Compounds	7440-36-0	< 1.60E-05 (lb/ton melt)	< 1.48E-05 (lb/ton melt)	5.0E-04 [a]	0.026 [b]	4.6E-04 [a]	0.024 [b]	9.5E-04	0.050
Arsenic and Compounds	7440-38-2	< 6.01E-05 (lb/ton melt)	< 5.43E-05 (lb/ton melt)	1.9E-03 [a]	0.097 [b]	1.7E-03 [a]	0.088 [b]	3.5E-03	0.18
Barium and Compounds	7440-39-3	1.29E-04 (lb/ton melt)	4.76E-05 (lb/ton melt)	4.0E-03 [a]	0.21 [b]	1.5E-03 [a]	0.077 [b]	5.5E-03	0.28
Cadmium and Compounds	7440-43-9	< 7.78E-06 (lb/ton melt)	< 3.14E-06 (lb/ton melt)	2.4E-04 [a]	0.013 [b]	9.7E-05 [a]	5.1E-03 [b]	3.4E-04	0.018
Chromium	7440-47-3	3.43E-03 (lb/tons TAC in melt)	9.38E-04 (lb/tons TAC in melt)	0.028 [c]	0.53 [d]	7.6E-03 [c]	0.14 [d]	0.035	0.67
Chromium VI	18540-29-9	1.32E-05 (lb/tons TAC in melt)	1.87E-05 (lb/tons TAC in melt)	1.1E-04 [c]	2.0E-03 [d]	1.5E-04 [c]	2.9E-03 [d]	2.6E-04	4.9E-03
Cobalt and Compounds	7440-48-4	< 2.43E-06 (lb/ton melt)	< 1.98E-06 (lb/ton melt)	7.5E-05 [a]	3.9E-03 [b]	6.1E-05 [a]	3.2E-03 [b]	1.4E-04	7.1E-03
Copper and Compounds	7440-50-8	< 7.96E-05 (lb/ton melt)	< 7.42E-05 (lb/ton melt)	2.5E-03 [a]	0.13 [b]	2.3E-03 [a]	0.12 [b]	4.8E-03	0.25
Lead and Compounds	7439-92-1	ND	< 3.66E-05 (lb/ton melt)	--	--	1.1E-03 [a]	0.059 [b]	1.1E-03	0.059
Mercury	7439-97-6	< 4.16E-06 (lb/ton melt)	< 2.92E-06 (lb/ton melt)	1.3E-04 [a]	6.7E-03 [b]	9.1E-05 [a]	4.7E-03 [b]	2.2E-04	0.011
Manganese and Compounds	7439-96-5	4.11E-03 (lb/tons TAC in melt)	2.20E-03 (lb/tons TAC in melt)	1.3E-03 [c]	0.23 [d]	6.8E-04 [c]	0.12 [d]	2.0E-03	0.35
Molybdenum Trioxide	1313-27-5	2.24E-06 (lb/ton melt)	1.05E-05 (lb/ton melt)	6.9E-05 [a]	3.6E-03 [b]	3.2E-04 [a]	0.017 [b]	3.9E-04	0.020
Nickel and Compounds	7440-02-0	< 0.020 (lb/tons TAC in melt)	5.98E-03 (lb/tons TAC in melt)	0.12 [c]	1.48 [d]	0.037 [c]	0.45 [d]	0.16	1.93
Phosphorus and Compounds	504	< 2.14E-04 (lb/ton melt)	< 1.74E-04 (lb/ton melt)	6.6E-03 [a]	0.34 [b]	5.4E-03 [a]	0.28 [b]	0.012	0.63
Selenium and Compounds	7782-49-2	< 1.07E-04 (lb/ton melt)	ND	3.3E-03 [a]	0.17 [b]	--	--	3.3E-03	0.17
Zinc and Compounds	7440-66-6	2.17E-04 (lb/ton melt)	2.17E-04 (lb/ton melt)	6.7E-03 [a]	0.35 [b]	6.7E-03 [a]	0.35 [b]	0.013	0.70

Table 4
PTE Foundry Steel TAC Emissions Estimate
Eagle Foundry Company

Notes

ND = Non-detect. Results were below the analytical detection limit for all sample train components in all source test runs

[a] Daily emissions estimate (lb/day) = (emission factor [lb/ton melt]) x (daily metal melt [tons/day])

Steel - total metal melt (tons/day) =	31.0	(3)

[b] Annual emissions estimate (lb/yr) = (emission factor [lb/ton melt]) x (annual metal melt [tons/yr])

Steel - total metal melt (tons/yr) =	1,612	(3)

[c] Daily emissions estimate (lb/day) = (emission factor [lb/tons TAC in melt]) x (daily metal melt [tons/day]) x (tons TAC/ton melt)

Steel - Chromium in melt (tons TAC/ton melt) =	0.26	(4)
Steel - Manganese in melt (tons TAC/ton melt) =	0.010	(4)
Steel - Nickel in melt (tons TAC/ton melt) =	0.20	(4)

[d] Annual emissions estimate (lb/yr) = (emission factor [lb/tons TAC in melt]) x (annual metal melt [tons/yr]) x (tons TAC/ton melt)

Steel - Chromium in melt (tons TAC/ton melt) =	0.10	(5)
Steel - Manganese in melt (tons TAC/ton melt) =	0.035	(5)
Steel - Nickel in melt (tons TAC/ton melt) =	0.047	(5)

References

[1] See Table 2, Foundry Emission Factors.

[2] Sum of main foundry and cooling bunker emission estimates.

[3] See Table 1, Input Process Rates and Parameters.

[4] See Table D1, Alloy Composition Data and Table D2, Alloy Toxicity Weighted Emission Rates. Daily emissions estimate for the main foundry and cooling bunker are based on alloy HK, which has the highest toxicity weighted emission rate of any melt and results in the maximum predicted acute hazard index.

[5] See Table D1, Alloy Composition Data. Annual emissions estimate for the main foundry and cooling bunker are based on the average TAC content of all Steel alloys.

Table 5
PTE Hot Top TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant [1]	CAS	Emission Factor [a] (lb/lb hot top)	Emissions Estimate	
			Daily [b] (lb/day)	Annual [c] (lb/yr)
Silica, crystalline	7631-86-9 [4]	3.0E-04	4.3E-03	1.02

Notes

TAC = toxic air contaminant

[a] Emission factor (lb/lb hot top used) = (percentage of TAC [%]/100) x (percentage airborne [%]/100)

Percentage of quartz (%) = 3.00 (1)

Percentage of product airborne (%) = 1.00 (2)

[b] Maximum daily emissions estimate (lb/day) = (emission factor [lb/lb hot top used])
x (maximum daily hot top usage [lb hot top used/day]) x (1 - control efficiency of baghouse [%]/100)

Maximum daily hot top usage (lb hot top used/day) = 142 (3)

Control efficiency of baghouse (%) = 90.0 (3)

[c] Annual emissions estimate (lb/yr) = (emission factor [lb/lb hot top used])
x (annual hot top usage [lb hot top used/yr]) x (1 - control efficiency of baghouse [%]/100)

Annual hot top usage (lb hot top used/yr) = 34,093 (3)

Control efficiency of baghouse (%) = 90.0 (3)

References

[1] Information from product SDS. Aluminum content of Hot Top is accounted for in foundry emissions.

[2] Hot top is the molten metal insulation applied after casting. Based on similar operations at other facilities, it is conservatively estimated that up to 1 percent of the total mass of the hot top used becomes airborne.

[3] See Table 1, Input Process Rates and Parameters.

[4] CAS 7631-86-9 (Silica, crystalline,-respirable) was substituted for CAS 14808-60-7 (crystalline silica—Quartz). Conservatively assumes all crystalline silica emitted is of respirable size.

Table 6
PTE Reclamation TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor		Emissions Estimate					
				To Main Foundry BH [1]		To Reclamation BH		Total	
				Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
PM	--	3.20	(lb/ton metal poured) [2]	0.99 [a]	258 [b]	0.89 [c]	232 [d]	1.88	490
Aluminum and Compounds	7429-90-5	1.52	(% of PM emitted) [6]	0.015 [e]	3.92 [f]	0.014 [e]	3.53 [f]	0.029	7.45
Antimony and Compounds	7440-36-0	3.7E-04	(% of PM emitted) [6]	3.7E-06 [e]	9.6E-04 [f]	3.3E-06 [e]	8.6E-04 [f]	7.0E-06	1.8E-03
Arsenic and Compounds	7440-38-2	2.4E-04	(% of PM emitted) [6]	2.4E-06 [e]	6.2E-04 [f]	2.2E-06 [e]	5.6E-04 [f]	4.6E-06	1.2E-03
Barium and Compounds	7440-39-3	9.5E-03	(% of PM emitted) [6]	9.4E-05 [e]	0.024 [f]	8.4E-05 [e]	0.022 [f]	1.8E-04	0.046
Beryllium and compounds	7440-41-7	2.6E-05	(% of PM emitted) [6]	2.6E-07 [e]	6.8E-05 [f]	2.3E-07 [e]	6.1E-05 [f]	4.9E-07	1.3E-04
Cadmium and Compounds	7440-43-9	1.4E-04	(% of PM emitted) [6]	1.4E-06 [e]	3.7E-04 [f]	1.3E-06 [e]	3.3E-04 [f]	2.7E-06	7.0E-04
Chromium	7440-47-3	0.0454	(% of PM emitted) [6]	4.5E-04 [e]	0.12 [f]	4.1E-04 [e]	0.11 [f]	8.6E-04	0.22
Chromium VI	18540-29-9	1.4E-03	(% of PM emitted) [7]	1.4E-05 [e]	3.5E-03 [f]	1.2E-05 [e]	3.2E-03 [f]	2.6E-05	6.7E-03
Cobalt and Compounds	7440-48-4	3.6E-04	(% of PM emitted) [6]	3.6E-06 [e]	9.4E-04 [f]	3.2E-06 [e]	8.4E-04 [f]	6.8E-06	1.8E-03
Copper and Compounds	7440-50-8	0.031	(% of PM emitted) [6]	3.0E-04 [e]	0.079 [f]	2.7E-04 [e]	0.071 [f]	5.8E-04	0.15
Lead and Compounds	7439-92-1	0.011	(% of PM emitted) [6]	1.1E-04 [e]	0.029 [f]	1.0E-04 [e]	0.026 [f]	2.1E-04	0.056
Manganese and Compounds	7439-96-5	0.27	(% of PM emitted) [6]	2.6E-03 [e]	0.69 [f]	2.4E-03 [e]	0.62 [f]	5.0E-03	1.31
Molybdenum trioxide	1313-27-5	1.7E-03	(% of PM emitted) [g]	1.6E-05 [e]	4.3E-03 [f]	1.5E-05 [e]	3.8E-03 [f]	3.1E-05	8.1E-03
Nickel and Compounds	7440-02-0	5.8E-03	(% of PM emitted) [6]	5.7E-05 [e]	0.015 [f]	5.1E-05 [e]	0.013 [f]	1.1E-04	0.028
Selenium and Compounds	7782-49-2	2.3E-04	(% of PM emitted) [6]	2.3E-06 [e]	6.0E-04 [f]	2.1E-06 [e]	5.4E-04 [f]	4.4E-06	1.1E-03
Silica, crystalline	7631-86-9	36.1	(% of PM emitted) [9]	0.36 [e]	93.1 [f]	0.32 [e]	83.8 [f]	0.68	177
Silver and Compounds	7440-22-4	2.5E-04	(% of PM emitted) [6]	2.5E-06 [e]	6.5E-04 [f]	2.3E-06 [e]	5.9E-04 [f]	4.8E-06	1.2E-03
Thallium	7440-28-0	1.5E-05	(% of PM emitted) [6]	1.5E-07 [e]	3.9E-05 [f]	1.4E-07 [e]	3.5E-05 [f]	2.9E-07	7.4E-05
Vanadium (fume or dust)	7440-62-2	1.5E-03	(% of PM emitted) [6]	1.4E-05 [e]	3.7E-03 [f]	1.3E-05 [e]	3.4E-03 [f]	2.7E-05	7.1E-03
Zinc and Compounds	7440-66-6	5.9E-03	(% of PM emitted) [6]	5.9E-05 [e]	0.015 [f]	5.3E-05 [e]	0.014 [f]	1.1E-04	0.029

Table 6
PTE Reclamation TAC Emission Estimates
Eagle Foundry Company

Notes

TAC = toxic air contaminant

(a) Daily emissions estimate to Main Foundry Baghouse (lb/day) = (emission factor [lb/ton metal poured]) x (daily metal poured [tons/day]) x (1 - [capture efficiency of reclamation system {%}]/100) x (1 - [control efficiency of the main foundry baghouse {%}]/100)

Daily metal poured (tons/day) =	31.0	(3)
Capture efficiency of reclamation system (%) =	90.0	(4)
Control efficiency of main foundry baghouse (%) =	90.0	(5)

(b) Annual emissions estimate to Main Foundry Baghouse (lb/day) = (emission factor [lb/ton metal poured]) x (annual metal poured [tons/yr]) x (1 - [capture efficiency of reclamation system {%}]/100) x (1 - [control efficiency of the main foundry baghouse {%}]/100)

Annual metal poured (tons/yr) =	8,060	(3)

(c) Daily emissions estimate to Reclamation Baghouse (lb/day) = (emission factor [lb/ton metal poured]) x (daily metal poured [tons/day]) x (capture efficiency of reclamation system [%]/100) x (1 - [control efficiency of the reclamation baghouse {%}]/100)

Daily metal poured (tons/day) =	31.0	(3)
Control efficiency of the reclamation baghouse (%) =	99.0	(3)

(d) Annual emissions estimate to Reclamation Baghouse (lb/day) = (emission factor [lb/ton metal poured]) x (annual metal poured [tons/yr]) x (capture efficiency of reclamation system [%]/100) x (1 - [control efficiency of the reclamation baghouse {%}]/100)

Annual metal poured (ton/yr) =	8,060	(3)

(e) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(f) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

(g) Molybdenum trioxide emission factor (% of PM emitted) = (molybdenum emission factor [% of PM emitted]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole])

		(8)
Molybdenum and Compounds percentage of PM (%) =	1.1E-03	(6)
Molybdenum trioxide molecular weight (lb/lb-mole) =	143.94	
Molybdenum molecular weight (lb/lb-mole) =	95.95	

Table 6
PTE Reclamation TAC Emission Estimates
Eagle Foundry Company

References

(1) Fugitive emissions from the reclamation system are captured by the foundry permanent total enclosure and are controlled by the main foundry baghouse.

(2) AP-42, Chapter 12.10, Table 12.10-7 "Particulate Emission Factors for Ancillary Operations and Fugitive Sources at Gray Iron Foundries". Uncontrolled particulate emission factor for shakeout.

(3) See Table 1, Input Process Rates and Parameters.

(4) Capture efficiency provided by the DEQ based on equipment configuration of enclosed, rotary shakeout.

(5) See Table 1, Input Process Rates and Parameters. The foundry building has been approved as a permanent total enclosure. Fugitive emissions from the reclamation system are controlled by the main foundry baghouse.

(6) Based on baghouse dust analysis conducted by Apex Laboratories, March 2021.

(7) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site specific data becomes available.

(8) Conservatively assumes 100 percent of molybdenum is in the trioxide form.

(9) Value is the weighted average silica content of mold making materials.

Table 7
PTE Air Arc Cutting TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor				Emissions Estimate	
		Daily		Annual		Daily (lb/day)	Annual (lb/yr)
PM	--	0.060	(lb/hr) [1]	0.060	(lb/hr) [1]	4.0E-03 [a]	0.73 [b]
Chromium	7440-47-3	0.50	(% TAC in alloy) [3]	0.95	(% TAC in alloy) [4]	2.0E-05 [c]	7.0E-03 [d]
Chromium VI	18540-29-9	0.015	(% TAC in alloy) [5]	0.029	(% TAC in alloy) [5]	5.9E-07 [c]	2.1E-04 [d]
Copper and Compounds	7440-50-8	0	[3]	0.083	(% TAC in alloy) [4]	0	6.1E-04 [d]
Manganese and Compounds	7439-96-5	12.75	(% TAC in alloy) [3]	4.74	(% TAC in alloy) [4]	5.0E-04 [c]	0.035 [d]
Molybdenum trioxide	1313-27-5	0.75	(% TAC in alloy) [e]	0.66	(% TAC in alloy) [e]	3.0E-05 [c]	4.8E-03 [d]
Nickel and Compounds	7440-02-0	0.80	(% TAC in alloy) [3]	0.91	(% TAC in alloy) [4]	3.2E-05 [c]	6.7E-03 [d]
Phosphorus and Compounds	504	0.070	(% TAC in alloy) [3]	0.055	(% TAC in alloy) [4]	2.8E-06 [c]	4.0E-04 [d]

Notes

TAC = toxic air contaminant

[a] Daily emissions estimate (lb/day) = (emission factor [lb/hr]) x (torch hours of operation [hrs/day]) x (1 - [baghouse control efficiency {%}]/100)

Daily cutting torch hours of operation (hrs/day) = 6.60 (2)

Baghouse control efficiency (%) = 99.0 (2)

[b] Annual emissions estimate (lb/yr) = (emission factor [lb/hr]) x (annual hours of operation [hrs/yr]) x (1-[baghouse control efficiency {%}]/100)

Annual cutting torch hours of operation (hrs/yr) = 1,220 (2)

Baghouse control efficiency (%) = 99.0 (2)

[c] Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% TAC in alloy]/100)

[d] Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% TAC in alloy]/100)

Table 7
PTE Air Arc Cutting TAC Emission Estimates
Eagle Foundry Company

(e) Molybdenum trioxide emission factor (% of PM emitted) = (molybdenum emission factor [% of PM emitted]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole]) (6)

Daily Molybdenum and Compounds percentage of PM (%) =	0.50	(3)
Annual Molybdenum and Compounds percentage of PM (%) =	0.44	(4)
Molybdenum trioxide molecular weight (lb/lb-mole) =	143.94	
Molybdenum molecular weight (lb/lb-mole) =	95.95	

References

(1) Versar, Inc. Title V Applicability Workbook, prepared for the Institute of Scrap Recycling Industries, 1996, Table D-5, Torch Cutting Emission Factors.

(2) See Table 1, Input Process Rates and Parameters.

(3) See Table D1, Alloy Composition Data and Table D2, Alloy Toxicity Weighted Emission Rates. Daily emissions estimates for AirArc are based on alloy MNB2, which has the highest toxicity weighted emission rate for AirArc cut alloys and results in the maximum predicted acute risk value.

(4) See Table D1, Alloy Composition Data. Based on alloy composition data for manganese and low alloy steel. Value represents the average content for AirArc cut metals.

(5) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site specific data becomes available.

(6) Conservatively assumes 100 percent of molybdenum is in the trioxide form.

Table 8
PTE Welding TAC Emission Estimates
Eagle Foundry Company

Product	Toxic Air Contaminant	CAS/DEQ ID	Weight Percentage (%)	Usage		Total Emissions Estimate	
				Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
Total By Toxic Air Contaminant							
Total	Aluminum	7429-90-5	--	--	--	-- (2)	7.8E-03 (3)
	Arsenic	7440-38-2				-- (2)	1.9E-04 (3)
	Chromium and Compounds	7440-47-3				0.040 (2)	1.32 (3)
	Chromium VI	18540-29-9				2.0E-03 (2)	0.31 (3)
	Cobalt	7440-48-4				-- (2)	7.3E-03 (3)
	Copper	7440-50-8				4.6E-03 (2)	7.51 (3)
	Manganese	7439-96-5				0.013 (2)	1.06 (3)
	Molybdenum trioxide	1313-27-5				0.019 (2)	0.096 (3)
	Nickel	7440-02-0				0.042 (2)	0.32 (3)
	Phosphorus	504				-- (2)	5.6E-04 (3)
	Vanadium	7440-62-2				0.013 (2)	0.064 (3)
Individual Products							
Sandvik WIRE 309LSI .035 X 33 LB	Chromium and Compounds	7440-47-3	17.5 (4)	42.3 (5)	46.9 (6)	0.040 (a)	0.045 (a)
	Chromium VI	18540-29-9	-- (4)			2.0E-03 (b)	2.2E-03 (b)
	Copper	7440-50-8	2.00 (4)			4.6E-03 (a)	5.1E-03 (a)
	Manganese	7439-96-5	5.50 (4)			0.013 (a)	0.014 (a)
	Molybdenum and Compounds	7440-62-2	5.50 (4)			0.013 (a)	0.014 (a)
	Molybdenum trioxide	1313-27-5	--			0.019 (d)	0.021 (d)
	Nickel	7440-02-0	18.0 (4)			0.042 (a)	0.046 (a)
Lincore M WIRE HF LCM 1/16 25# SP	Manganese	7439-96-5	13.0 (4)	(2)	1,136 (6)	(2)	0.81 (a)
	Chromium and Compounds	7440-47-3	4.90 (4)			(2)	0.30 (a)
	Chromium VI	18540-29-9	-- (4)			(2)	0.015 (b)
	Nickel	7440-02-0	0.50 (4)			(2)	0.031 (a)
Avesta 2205 ELECTR SS E2209 1/8 10#	Manganese	7439-96-5	1.70 (4)	(2)	426 (6)	(2)	0.042 (c)
	Molybdenum and Compounds	7440-62-2	0.30 (4)			(2)	7.3E-03 (c)
	Molybdenum trioxide	1313-27-5	--			(2)	0.011 (d)
	Chromium and Compounds	7440-47-3	20.0 (4)			(2)	0.49 (c)
	Chromium VI	18540-29-9	-- (4)			(2)	0.27 (e)
	Copper	7440-50-8	0.30 (4)			(2)	7.3E-03 (c)
	Nickel	7440-02-0	10.0 (4)			(2)	0.24 (c)
	Cobalt	7440-48-4	0.30 (4)			(2)	7.3E-03 (c)
CARBONS 1/2X17 CTD DC JTD 100	Copper	7440-50-8	20.0 (4)	(2)	6,533 (6)	(2)	7.49 (c)
Stoody WIRE HF 965-G 045 33# SP	Manganese	7439-96-5	1.10 (4)	(2)	1,265 (6)	(2)	0.076 (a)
	Molybdenum and Compounds	7440-62-2	0.55 (4)			(2)	0.038 (a)
	Molybdenum trioxide	1313-27-5	--			(2)	0.057 (d)
	Chromium and Compounds	7440-47-3	7.00 (4)			(2)	0.48 (a)
	Chromium VI	18540-29-9	-- (4)			(2)	0.024 (b)
Hobart WIRE EXCELARC 71 .045 X 33 LB	Aluminum	7429-90-5	1.00 (4)	(2)	141 (6)	(2)	7.7E-03 (a)
	Manganese	7439-96-5	2.50 (4)			(2)	0.019 (a)
	Molybdenum and Compounds	7440-62-2	0.50 (4)			(2)	3.8E-03 (a)
	Molybdenum trioxide	1313-27-5	--			(2)	5.8E-03 (d)

Table 8
PTE Welding TAC Emission Estimates
Eagle Foundry Company

Product	Toxic Air Contaminant	CAS/DEQ ID	Weight Percentage (%)	Usage		Total Emissions Estimate	
				Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
Prostar S-6 WIRE MS 70S6 035 33# SP PRS	Phosphorus	504	9.0E-03 (4)	(2)	1,140 (6)	(2)	5.6E-04 (a)
	Aluminum	7429-90-5	2.0E-03 (4)			(2)	1.2E-04 (a)
	Chromium and Compounds	7440-47-3	0.027 (4)			(2)	1.7E-03 (a)
	Chromium VI	18540-29-9	-- (4)			(2)	8.4E-05 (b)
	Copper	7440-50-8	0.14 (4)			(2)	8.9E-03 (a)
	Manganese	7439-96-5	1.63 (4)			(2)	0.10 (a)
	Molybdenum and Compounds	7440-62-2	8.0E-03 (4)			(2)	5.0E-04 (a)
	Molybdenum trioxide	1313-27-5	--			(2)	7.5E-04 (d)
	Nickel	7440-02-0	0.031 (4)			(2)	1.9E-03 (a)
	Vanadium	7440-62-2	3.0E-03 (4)			(2)	1.9E-04 (a)
	Arsenic	7440-38-2	3.0E-03 (4)			(2)	1.9E-04 (a)

Notes

(a) Emissions estimate (lb/unit) = (fume generation rate—GMAW [lb fume/lb wire]) x (fume correction factor—GMAW) x (weight percentage [%]/100) x (usage [lb/unit])

Fume generation rate—GMAW (lb fume/lb wire) = 0.010 (7)

Fume correction factor—GMAW = 0.5464 (7)

(b) Emissions estimate (lb/unit) = (fume generation rate [lb fume/lb wire]) x (fume correction factor) x (chromium and compounds weight percentage [%]/100) x (usage [lb/unit]) x (chromium VI conversion rate [%]/100)

Fume generation rate—GMAW (lb fume/lb wire) = 0.010 (7)

Fume correction factor—GMAW = 0.5464 (7)

Chromium VI conversion rate—GMAW (%) = 5.00 (7)

(c) Emissions estimate (lb/unit) = (fume generation rate—SMAW [lb fume/lb wire]) x (fume correction factor—SMAW) x (weight percentage [%]/100) x (usage [lb/unit])

Fume generation rate—SMAW (lb fume/lb wire) = 0.020 (8)

Fume correction factor—SMAW = 0.2865 (8)

(d) Molybdenum trioxide emission estimate (lb/unit) = molybdenum emission estimate [lb/unit]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole]) (9)

Molybdenum trioxide molecular weight (lb/lb-mole) = 143.94

Molybdenum molecular weight (lb/lb-mole) = 95.95

(e) Emissions estimate (lb/unit) = (fume generation rate [lb fume/lb wire]) x (fume correction factor) x (chromium and compounds weight percentage [%]/100) x (usage [lb/unit]) x (chromium VI conversion rate [%]/100)

Fume generation rate—SMAW (lb fume/lb wire) = 0.020 (8)

Fume correction factor—SMAW = 0.2865 (8)

Chromium VI conversion rate—SMAW (%) = 55.0 (8)

References

(1) Information from product safety data sheets. Value represents maximum percentage in all wires/rods used at Eagle Foundry.

(2) Daily emissions calculated based on total daily product usage attributed to the welding wire that results in the highest predicted acute risk.

(3) Total annual emission estimates are the sum of individual product annual emission estimates (see below).

(4) Information from product safety data sheets.

(5) See Table 1, Input Process Rates and Parameters. Value represents total product usage excluding waste.

(6) See Table 1, Input Process Rates and Parameters.

(7) San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998. Based on American Welding Society information and the National Steel Shipbuilding Company (NASSCO) research. Assumes GMAW fume generation rate and correction factor. Hexavalent chromium accounts for 5 percent of total chromium emissions for GMAW welding.

(8) San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998. Based on American Welding Society information and the NASSCO research. Assumes SMAW fume generation rate and correction factor. Hexavalent chromium accounts for 55 percent of total chromium emissions for SMAW welding.

(9) Conservatively assume 100 percent of molybdenum is in the trioxide form.

Table 9
PTE Grinding - Stainless Steel TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor				Emissions Estimate					
						Controlled		Fugitive		Total	
		Daily		Annual		Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
$PM_{>10}$	--	0.016	(lb/ton metal processed) [a]	0.016	(lb/ton metal processed) [a]	0 [b]	0 [c]	2.0E-03 [d]	0.52 [e]	2.0E-03	0.52
$PM_{2.5-10}$	--	0.016	(lb/ton metal processed) [a]	0.016	(lb/ton metal processed) [a]	1.9E-04 [b]	0.049 [c]	2.0E-03 [d]	0.52 [e]	2.2E-03	0.57
$PM_{2.5}$	--	0.13	(lb/ton metal processed) [a]	0.13	(lb/ton metal processed) [a]	3.0E-03 [b]	0.79 [c]	0.016 [d]	4.17 [e]	0.019	4.96
Total PM	--	*0.16*	*(lb/ton metal processed)* [1]	*0.16*	*(lb/ton metal processed)* [1]	*3.2E-03*	*0.84*	*0.020*	*5.21*	*0.023*	*6.05*
Aluminum and Compounds	7429-90-5	0.48	(% of PM emitted) [5]	0.48	(% of PM emitted) [5]	1.5E-05 [f]	4.0E-03 [g]	9.6E-05 [f]	0.025 [g]	1.1E-04	0.029
Antimony and Compounds	7440-36-0	2.6E-04	(% of PM emitted) [5]	2.6E-04	(% of PM emitted) [5]	8.4E-09 [f]	2.2E-06 [g]	5.2E-08 [f]	1.4E-05 [g]	6.1E-08	1.6E-05
Arsenic and Compounds	7440-38-2	1.6E-03	(% of PM emitted) [5]	1.6E-03	(% of PM emitted) [5]	5.1E-08 [f]	1.3E-05 [g]	3.1E-07 [f]	8.2E-05 [g]	3.6E-07	9.5E-05
Barium and Compounds	7440-39-3	0.014	(% of PM emitted) [5]	0.014	(% of PM emitted) [5]	4.5E-07 [f]	1.2E-04 [g]	2.8E-06 [f]	7.3E-04 [g]	3.3E-06	8.5E-04
Beryllium and Compounds	7440-41-7	5.2E-05	(% of PM emitted) [5]	5.2E-05	(% of PM emitted) [5]	1.7E-09 [f]	4.4E-07 [g]	1.0E-08 [f]	2.7E-06 [g]	1.2E-08	3.1E-06
Cadmium and Compounds	7440-43-9	4.1E-04	(% of PM emitted) [5]	4.1E-04	(% of PM emitted) [5]	1.3E-08 [f]	3.4E-06 [g]	8.1E-08 [f]	2.1E-05 [g]	9.4E-08	2.4E-05
Chromium and Compounds	7440-47-3	26.0	(% TAC in alloy) [6]	26.7	(% TAC in alloy) [7]	8.4E-04 [f]	0.22 [g]	5.2E-03 [f]	1.39 [g]	6.0E-03	1.61
Chromium VI	18540-29-9	0.78	(% TAC in alloy) [8]	0.80	(% TAC in alloy) [8]	2.5E-05 [f]	6.7E-03 [g]	1.6E-04 [f]	0.042 [g]	1.8E-04	0.048
Cobalt and Compounds	7440-48-4	7.6E-03	(% of PM emitted) [5]	7.6E-03	(% of PM emitted) [5]	2.5E-07 [f]	6.4E-05 [g]	1.5E-06 [f]	4.0E-04 [g]	1.8E-06	4.6E-04
Copper and Compounds	7440-50-8	0.075	(% of PM emitted) [5]	0.075	(% of PM emitted) [5]	2.4E-06 [f]	6.3E-04 [g]	1.5E-05 [f]	3.9E-03 [g]	1.7E-05	4.6E-03
Lead and Compounds	7439-92-1	4.5E-04	(% of PM emitted) [5]	4.5E-04	(% of PM emitted) [5]	1.5E-08 [f]	3.8E-06 [g]	9.0E-08 [f]	2.3E-05 [g]	1.0E-07	2.7E-05
Manganese and Compounds	7439-96-5	1.00	(% TAC in alloy) [6]	0.92	(% TAC in alloy) [7]	3.2E-05 [f]	7.7E-03 [g]	2.0E-04 [f]	0.048 [g]	2.3E-04	0.055
Molybdenum trioxide	1313-27-5	0.75	(% TAC in alloy) [h]	0.75	(% TAC in alloy) [h]	2.4E-05 [f]	6.3E-03 [g]	1.5E-04 [f]	0.039 [g]	1.7E-04	0.045
Nickel and Compounds	7440-02-0	20.0	(% TAC in alloy) [6]	12.2	(% TAC in alloy) [7]	6.5E-04 [f]	0.10 [g]	4.0E-03 [f]	0.63 [g]	4.6E-03	0.74
Phosphorus and Compounds	504	0.040	(% TAC in alloy) [6]	0.040	(% TAC in alloy) [7]	1.3E-06 [f]	3.4E-04 [g]	8.0E-06 [f]	2.1E-03 [g]	9.3E-06	2.4E-03
Selenium and Compounds	7782-49-2	2.6E-04	(% of PM emitted) [5]	2.6E-04	(% of PM emitted) [5]	8.4E-09 [f]	2.2E-06 [g]	5.2E-08 [f]	1.4E-05 [g]	6.1E-08	1.6E-05
Silver and Compounds	7440-22-4	5.2E-05	(% of PM emitted) [5]	5.2E-05	(% of PM emitted) [5]	1.7E-09 [f]	4.4E-07 [g]	1.0E-08 [f]	2.7E-06 [g]	1.2E-08	3.1E-06
Thallium	7440-28-0	5.2E-05	(% of PM emitted) [5]	5.2E-05	(% of PM emitted) [5]	1.7E-09 [f]	4.4E-07 [g]	1.0E-08 [f]	2.7E-06 [g]	1.2E-08	3.1E-06
Vanadium (fume or dust)	7440-62-2	6.0E-03	(% of PM emitted) [5]	6.0E-03	(% of PM emitted) [5]	1.9E-07 [f]	5.1E-05 [g]	1.2E-06 [f]	3.1E-04 [g]	1.4E-06	3.6E-04
Zinc and Compounds	7440-66-6	3.4E-03	(% of PM emitted) [5]	3.4E-03	(% of PM emitted) [5]	1.1E-07 [f]	2.8E-05 [g]	6.7E-07 [f]	1.7E-04 [g]	7.8E-07	2.0E-04

Table 9
PTE Grinding - Stainless Steel TAC Emission Estimates
Eagle Foundry Company

Notes

TAC = toxic air contaminant

(a) PM emission factor (lb/ton metal processed) = (total PM emission factor [lb/ton metal processed]) x (percentage of total PM [%]/100)

$PM_{>10}$ percentage of total PM (%) =	10.0	(1)
$PM_{2.5-10}$ percentage of total PM (%) =	10.0	(1)
$PM_{2.5}$ percentage of total PM (%) =	80.0	(1)

(b) Daily controlled emissions estimate (lb/day) = (emission factor [lb/ton metal processed]) x (daily stainless steel processed for grinding [tons/day]) x (capture efficiency of building enclosure [%]/100) x (1 - [control efficiency of baghouse {%}]/100)

Daily stainless steel processed for grinding (tons/day) =	2.50	(2)
Capture efficiency of building enclosure (%) =	95.0	(3)
Control efficiency of baghouse for $PM_{>10}$ (%) =	100	(4)
Control efficiency of baghouse for $PM_{2.5-10}$ (%) =	99.5	(4)
Control efficiency of baghouse for $PM_{2.5}$ (%) =	99.0	(4)

(c) Annual controlled emissions estimate (lb/yr) = (emission factor [lb/ton metal processed]) x (annual stainless steel processed for grinding [tons/yr]) x (capture efficiency of building enclosure [%]/100) x (1 - [control efficiency of baghouse {%}]/100)

Annual stainless steel processed for grinding (tons/yr) =	651	(2)

(d) Daily fugitive emissions estimate (lb/day) = (emission factor [lb/ton metal processed]) x (daily stainless steel processed for grinding [tons/day]) x (1 - [capture efficiency of building enclosure {%}]/100)

(e) Annual fugitive emissions estimate (lb/yr) = (emission factor [lb/ton metal processed]) x (annual stainless steel processed for grinding [tons/yr]) x (1 - [capture efficiency of building enclosure {%}]/100)

(f) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% TAC in alloy]/100)

(g) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% TAC in alloy]/100)

(h) Molybdenum trioxide emission factor (% of PM emitted) = (molybdenum emission factor [% of PM emitted]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole])

Daily Molybdenum and Compounds percentage of PM (%) =	0.50	(6)
Annual Molybdenum and Compounds percentage of PM (%) =	0.50	(7)
Molybdenum trioxide molecular weight (lb/lb-mole) =	143.94	
Molybdenum molecular weight (lb/lb-mole) =	95.95	

Table 9
PTE Grinding - Stainless Steel TAC Emission Estimates
Eagle Foundry Company

References

(1) RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table 6-2, PM Emission Factors for Finishing Operations.

(2) See Table 1, Input Process Rates and Parameters.

(3) Based on EPA methodology enclosure testing conducted on April 18, 2023.

(4) RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table 3-4, Typical Collection Efficiencies of Various Particulate Control Devices. Section 3.1.4.1 notes that it can be assumed that PM collection efficiencies for PM greater than 10 µm are 100 percent.

(5) Based on baghouse dust analysis for the finishing baghouse conducted by Apex Laboratories, March 2021.

(6) See Table D1, Alloy Composition Data and Table D2, Alloy Toxicity Weighted Emission Rates. Daily emissions estimates for stainless steel grinding are based on alloy HK, which has the highest toxicity weighted emission rate for stainless steel alloys and results in the maximum predicted acute risk value.

(7) Information provided by facility. Value represents the average content for stainless steel alloys.

(8) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site specific data becomes available.

(9) Conservatively assumes 100 percent of molybdenum is in the trioxide form.

Table 10
PTE Grinding - Non-stainless Steel TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor				Emissions Estimate					
						Controlled		Fugitive		Total	
		Daily		Annual		Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
$PM_{>10}$	--	0.016	(lb/ton metal processed) [a]	0.016	(lb/ton metal processed) [a]	0 [b]	0 [c]	0.013 [d]	3.44 [e]	0.013	3.44
$PM_{2.5-10}$	--	0.016	(lb/ton metal processed) [a]	0.016	(lb/ton metal processed) [a]	1.3E-03 [b]	0.33 [c]	0.013 [d]	3.44 [e]	0.014	3.76
$PM_{2.5}$	--	0.13	(lb/ton metal processed) [a]	0.13	(lb/ton metal processed) [a]	0.020 [b]	5.22 [c]	0.11 [d]	27.5 [e]	0.13	32.7
Total PM	--	*0.16*	*(lb/ton metal processed)* [1]	*0.16*	*(lb/ton metal processed)* [1]	*0.021*	*5.55*	*0.13*	*34.4*	*0.15*	*39.9*
Aluminum and Compounds	7429-90-5	0.48	(% of PM emitted) [5]	0.48	(% of PM emitted) [5]	1.0E-04 [f]	0.027 [g]	6.3E-04 [f]	0.16 [g]	7.3E-04	0.19
Antimony and Compounds	7440-36-0	2.6E-04	(% of PM emitted) [5]	2.6E-04	(% of PM emitted) [5]	5.6E-08 [f]	1.4E-05 [g]	3.4E-07 [f]	8.9E-05 [g]	4.0E-07	1.0E-04
Arsenic and Compounds	7440-38-2	1.6E-03	(% of PM emitted) [5]	1.6E-03	(% of PM emitted) [5]	3.3E-07 [f]	8.7E-05 [g]	2.1E-06 [f]	5.4E-04 [g]	2.4E-06	6.3E-04
Barium and Compounds	7440-39-3	0.014	(% of PM emitted) [5]	0.014	(% of PM emitted) [5]	3.0E-06 [f]	7.8E-04 [g]	1.8E-05 [f]	4.8E-03 [g]	2.1E-05	5.6E-03
Beryllium and Compounds	7440-41-7	5.2E-05	(% of PM emitted) [5]	5.2E-05	(% of PM emitted) [5]	1.1E-08 [f]	2.9E-06 [g]	6.9E-08 [f]	1.8E-05 [g]	8.0E-08	2.1E-05
Cadmium and Compounds	7440-43-9	4.1E-04	(% of PM emitted) [5]	4.1E-04	(% of PM emitted) [5]	8.6E-08 [f]	2.2E-05 [g]	5.3E-07 [f]	1.4E-04 [g]	6.2E-07	1.6E-04
Chromium and Compounds	7440-47-3	0.50	(% TAC in alloy) [6]	9.38	(% TAC in alloy) [7]	1.1E-04 [f]	0.52 [g]	6.6E-04 [f]	3.22 [g]	7.7E-04	3.74
Chromium VI	18540-29-9	0.015	(% TAC in alloy) [8]	0.28	(% TAC in alloy) [8]	3.2E-06 [f]	0.016 [g]	2.0E-05 [f]	0.097 [g]	2.3E-05	0.11
Cobalt and Compounds	7440-48-4	7.6E-03	(% of PM emitted) [5]	7.6E-03	(% of PM emitted) [5]	1.6E-06 [f]	4.2E-04 [g]	1.0E-05 [f]	2.6E-03 [g]	1.2E-05	3.0E-03
Copper and Compounds	7440-50-8	--	[6]	0.045	(% TAC in alloy) [7]	--	2.5E-03 [g]	--	0.016 [g]	0	0.018
Lead and Compounds	7439-92-1	4.5E-04	(% of PM emitted) [5]	4.5E-04	(% of PM emitted) [5]	9.6E-08 [f]	2.5E-05 [g]	6.0E-07 [f]	1.5E-04 [g]	6.9E-07	1.8E-04
Manganese and Compounds	7439-96-5	12.8	(% TAC in alloy) [6]	3.06	(% TAC in alloy) [7]	2.7E-03 [f]	0.17 [g]	0.017 [f]	1.05 [g]	0.020	1.22
Molybdenum trioxide	1313-27-5	0.75	(% TAC in alloy) [h]	0.70	(% TAC in alloy) [h]	1.6E-04 [f]	0.039 [g]	9.9E-04 [f]	0.24 [g]	1.2E-03	0.28
Nickel and Compounds	7440-02-0	0.80	(% TAC in alloy) [6]	0.86	(% TAC in alloy) [7]	1.7E-04 [f]	0.048 [g]	1.1E-03 [f]	0.30 [g]	1.2E-03	0.34
Phosphorus and Compounds	504	0.070	(% TAC in alloy) [6]	0.069	(% TAC in alloy) [7]	1.5E-05 [f]	3.8E-03 [g]	9.2E-05 [f]	0.024 [g]	1.1E-04	0.028
Selenium and Compounds	7782-49-2	2.6E-04	(% of PM emitted) [5]	2.6E-04	(% of PM emitted) [5]	5.6E-08 [f]	1.4E-05 [g]	3.4E-07 [f]	8.9E-05 [g]	4.0E-07	1.0E-04
Silver and Compounds	7440-22-4	5.2E-05	(% of PM emitted) [5]	5.2E-05	(% of PM emitted) [5]	1.1E-08 [f]	2.9E-06 [g]	6.9E-08 [f]	1.8E-05 [g]	8.0E-08	2.1E-05
Thallium	7440-28-0	5.2E-05	(% of PM emitted) [5]	5.2E-05	(% of PM emitted) [5]	1.1E-08 [f]	2.9E-06 [g]	6.9E-08 [f]	1.8E-05 [g]	8.0E-08	2.1E-05
Vanadium (fume or dust)	7440-62-2	6.0E-03	(% of PM emitted) [5]	6.0E-03	(% of PM emitted) [5]	1.3E-06 [f]	3.3E-04 [g]	7.9E-06 [f]	2.1E-03 [g]	9.2E-06	2.4E-03
Zinc and Compounds	7440-66-6	3.4E-03	(% of PM emitted) [5]	3.4E-03	(% of PM emitted) [5]	7.1E-07 [f]	1.9E-04 [g]	4.4E-06 [f]	1.2E-03 [g]	5.1E-06	1.3E-03

Table 10
PTE Grinding - Non-stainless Steel TAC Emission Estimates
Eagle Foundry Company

Notes

TAC = toxic air contaminant

(a) PM emission factor (lb/ton metal processed) = (total PM emission factor [lb/ton metal processed]) x (percentage of total PM [%]/100)

$PM_{>10}$ percentage of total PM (%) =	10.0	(1)
$PM_{2.5-10}$ percentage of total PM (%) =	10.0	(1)
$PM_{2.5}$ percentage of total PM (%) =	80.0	(1)

(b) Daily controlled emissions estimate (lb/day) = (emission factor [lb/ton metal processed]) x (daily non-stainless steel processed for grinding [tons/day]) x (capture efficiency of building enclosure [%]/100) x (1 - [control efficiency of baghouse {%}]/100)

Daily non-stainless steel processed for grinding (tons/day) =	16.5	(2)
Capture efficiency of building enclosure (%) =	95.0	(3)
Control efficiency of baghouse for $PM_{>10}$ (%) =	100	(4)
Control efficiency of baghouse for $PM_{2.5-10}$ (%) =	99.5	(4)
Control efficiency of baghouse for $PM_{2.5}$ (%) =	99.0	(4)

(c) Annual controlled emissions estimate (lb/yr) = (emission factor [lb/ton metal processed]) x (annual non-stainless steel processed for grinding [tons/yr]) x (capture efficiency of building enclosure [%]/100) x (1 - [control efficiency of baghouse {%}]/100)

Annual non-stainless steel processed for grinding (tons/yr) =	4,294	(2)

(d) Daily fugitive emissions estimate (lb/day) = (emission factor [lb/ton metal processed]) x (daily non-stainless steel processed for grinding [tons/day]) x (1 - [capture efficiency of building enclosure {%}]/100)

(e) Annual fugitive emissions estimate (lb/yr) = (emission factor [lb/ton metal processed]) x (annual non-stainless steel processed for grinding [tons/yr]) x (1 - [capture efficiency of building enclosure {%}]/100)

(f) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% TAC in alloy]/100)

(g) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% TAC in alloy]/100)

(h) Molybdenum trioxide emission factor (% of PM emitted) = (molybdenum emission factor [% of PM emitted]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole])

Daily Molybdenum and Compounds percentage of PM (%) =	0.50	(6)
Annual Molybdenum and Compounds percentage of PM (%) =	0.47	(7)
Molybdenum trioxide molecular weight (lb/lb-mole) =	143.94	
Molybdenum molecular weight (lb/lb-mole) =	95.95	

Table 10
PTE Grinding - Non-stainless Steel TAC Emission Estimates
Eagle Foundry Company

References

(1) RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table 6-2, PM Emission Factors for Finishing Operations.

(2) See Table 1, Input Process Rates and Parameters.

(3) Based on EPA methodology enclosure testing conducted on April 18, 2023.

(4) RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table 3-4, Typical Collection Efficiencies of Various Particulate Control Devices. Section 3.1.4.1 notes that it can be assumed that PM collection efficiencies for PM greater than 10 µm are 100 percent.

(5) Based on baghouse dust analysis for the finishing baghouse conducted by Apex Laboratories, March 2021.

(6) See Table D1, Alloy Composition Data and Table D2, Alloy Toxicity Weighted Emission Rates. Daily emissions estimates for non-stainless steel grinding are based on alloy MNB2, which has the highest toxicity weighted emission rate for non-stainless steel alloys and results in the maximum predicted acute risk value.

(7) Information provided by facility. Value represents the average content for non-stainless steel alloys.

(8) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site specific data becomes available.

(9) Conservatively assumes 100 percent of molybdenum is in the trioxide form.

Table 11
PTE Mesh Blast TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor			Total Emissions Estimate	
					Daily (lb/day)	Annual (lb/yr)
$PM_{>10}$	--	4.80	(lb/ton metal processed)	(a)	0 (b)	0 (c)
$PM_{2.5-10}$	--	8.00	(lb/ton metal processed)	(a)	0.48 (b)	9.49 (c)
$PM_{2.5}$	--	3.20	(lb/ton metal processed)	(a)	0.19 (b)	3.80 (c)
Total PM	--	*16.0*	*(lb/ton metal processed)*	*(1)*	*0.67*	*13.3*
Aluminum and Compounds	7429-90-5	0.064	(% of PM emitted)	(5)	4.3E-04 (d)	8.5E-03 (e)
Antimony and Compounds	7440-36-0	1.6E-03	(% of PM emitted)	(5)	1.1E-05 (d)	2.1E-04 (e)
Arsenic and Compounds	7440-38-2	4.9E-03	(% of PM emitted)	(5)	3.3E-05 (d)	6.5E-04 (e)
Barium and Compounds	7440-39-3	5.1E-04	(% of PM emitted)	(5)	3.4E-06 (d)	6.8E-05 (e)
Beryllium and compounds	7440-41-7	1.0E-04	(% of PM emitted)	(5)	6.9E-07 (d)	1.4E-05 (e)
Cadmium and Compounds	7440-43-9	1.0E-04	(% of PM emitted)	(5)	6.9E-07 (d)	1.4E-05 (e)
Chromium	7440-47-3	0.24	(% of PM emitted)	(5)	1.6E-03 (d)	0.032 (e)
Chromium VI	18540-29-9	7.3E-03	(% of PM emitted)	(6)	4.9E-05 (d)	9.7E-04 (e)
Cobalt and Compounds	7440-48-4	7.0E-03	(% of PM emitted)	(5)	4.7E-05 (d)	9.3E-04 (e)
Copper and Compounds	7440-50-8	0.27	(% of PM emitted)	(5)	1.8E-03 (d)	0.035 (e)
Lead and Compounds	7439-92-1	7.9E-04	(% of PM emitted)	(5)	5.3E-06 (d)	1.0E-04 (e)
Manganese and Compounds	7439-96-5	0.65	(% of PM emitted)	(5)	4.4E-03 (d)	0.087 (e)
Molybdenum trioxide	1313-27-5	0.056	(% of PM emitted)	(f)	3.8E-04 (d)	7.4E-03 (e)
Nickel and Compounds	7440-02-0	0.10	(% of PM emitted)	(5)	6.9E-04 (d)	0.014 (e)
Selenium and Compounds	7782-49-2	5.1E-05	(% of PM emitted)	(5)	3.4E-07 (d)	6.8E-06 (e)
Silver and Compounds	7440-22-4	1.0E-04	(% of PM emitted)	(5)	6.9E-07 (d)	1.4E-05 (e)
Thallium	7440-28-0	1.0E-04	(% of PM emitted)	(5)	6.9E-07 (d)	1.4E-05 (e)
Vanadium (fume or dust)	7440-62-2	9.1E-03	(% of PM emitted)	(5)	6.1E-05 (d)	1.2E-03 (e)
Zinc and Compounds	7440-66-6	8.9E-03	(% of PM emitted)	(5)	6.0E-05 (d)	1.2E-03 (e)

Notes

TAC = toxic air contaminant

(a) Emission factor (lb/ton metal produced) = (total PM emission factor [lb/ton metal processed]) x (percentage of total PM [%]/100)

$PM_{>10}$ percentage of total PM (%) =	30.0	(1)
$PM_{2.5-10}$ percentage of total PM (%) =	50.0	(1)
$PM_{2.5}$ percentage of total PM (%) =	20.0	(1)

Table 11
PTE Mesh Blast TAC Emission Estimates
Eagle Foundry Company

(b) Daily emissions estimate (lb/day) = (emission factor [lb/ton metal processed])
x (daily metal finished by mesh blasting [tons/day]) x (1 - [control efficiency of filters {%}]/100)

Daily metal finished by mesh blasting (tons/day) =	3.00	(2)
Control efficiency of filters for $PM_{>10}$ (%) =	100	(3)
Control efficiency of filters for $PM_{2.5-10}$ (%) =	98.0	(4)
Control efficiency of filters for $PM_{2.5}$ (%) =	98.0	(4)

(c) Annual emissions estimate (lb/yr) = (emission factor [lb/ton metal processed])
x (annual metal finished by mesh blasting [tons/yr]) x (1 - [control efficiency of filters {%}]/100)

Annual metal finished by mesh blasting (tons/yr) =	59.3	(2)

(d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

(f) Molybdenum trioxide percentage of PM (% of PM emitted) = (molybdenum percentage of PM [%])
x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole]) (7)

Molybdenum percentage of PM (%) =	0.037	(5)
Molybdenum trioxide molecular weight (lb/lb-mole) =	143.94	
Molybdenum molecular weight (lb/lb-mole) =	95.95	

References

(1) RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table 6-2. Value for shot blasting, captured and uncontrolled.

(2) See Table 1, Input Process Rates and Parameters.

(3) RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table 3-4, Typical Collection Efficiencies of Various Particulate Control Devices. Section 3.1.4.1 notes that it can be assumed that PM collection efficiencies for PM greater than 10 µm are 100 percent.

(4) Based on filter specifications.

(5) Based on dust analysis conducted by Apex Laboratories, March 2021.

(6) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site specific data becomes available.

(7) Conservatively assume 100 percent of molybdenum is in the trioxide form.

Table 12
PTE Shot Blast TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor		Total Emissions Estimate	
				Daily (lb/day)	Annual (lb/yr)
$PM_{>10}$	--	4.80	(lb/ton metal processed) [a]	0 [b]	0 [c]
$PM_{2.5-10}$	--	8.00	(lb/ton metal processed) [a]	0.36 [b]	21.3 [c]
$PM_{2.5}$	--	3.20	(lb/ton metal processed) [a]	0.29 [b]	17.1 [c]
Total PM	--	*16.0*	*(lb/ton metal processed)* [1]	*0.65*	*38.4*
Aluminum and Compounds	7429-90-5	0.064	(% of PM emitted) [4]	4.2E-04 [d]	0.025 [e]
Antimony and Compounds	7440-36-0	1.6E-03	(% of PM emitted) [4]	1.0E-05 [d]	6.1E-04 [e]
Arsenic and Compounds	7440-38-2	4.9E-03	(% of PM emitted) [4]	3.2E-05 [d]	1.9E-03 [e]
Barium and Compounds	7440-39-3	5.1E-04	(% of PM emitted) [4]	3.3E-06 [d]	2.0E-04 [e]
Beryllium and compounds	7440-41-7	1.0E-04	(% of PM emitted) [4]	6.6E-07 [d]	3.9E-05 [e]
Cadmium and Compounds	7440-43-9	1.0E-04	(% of PM emitted) [4]	6.6E-07 [d]	3.9E-05 [e]
Chromium	7440-47-3	0.24	(% of PM emitted) [4]	1.6E-03 [d]	0.094 [e]
Chromium VI	18540-29-9	7.3E-03	(% of PM emitted) [5]	4.7E-05 [d]	2.8E-03 [e]
Cobalt and Compounds	7440-48-4	7.0E-03	(% of PM emitted) [4]	4.6E-05 [d]	2.7E-03 [e]
Copper and Compounds	7440-50-8	0.27	(% of PM emitted) [4]	1.7E-03 [d]	0.10 [e]
Lead and Compounds	7439-92-1	7.9E-04	(% of PM emitted) [4]	5.1E-06 [d]	3.0E-04 [e]
Manganese and Compounds	7439-96-5	0.65	(% of PM emitted) [4]	4.2E-03 [d]	0.25 [e]
Molybdenum trioxide	1313-27-5	0.056	(% of PM emitted) [f]	3.6E-04 [d]	0.022 [e]
Nickel and Compounds	7440-02-0	0.10	(% of PM emitted) [4]	6.6E-04 [d]	0.039 [e]
Selenium and Compounds	7782-49-2	5.1E-05	(% of PM emitted) [4]	3.3E-07 [d]	2.0E-05 [e]
Silver and Compounds	7440-22-4	1.0E-04	(% of PM emitted) [4]	6.6E-07 [d]	3.9E-05 [e]
Thallium	7440-28-0	1.0E-04	(% of PM emitted) [4]	6.6E-07 [d]	3.9E-05 [e]
Vanadium (fume or dust)	7440-62-2	9.1E-03	(% of PM emitted) [4]	5.9E-05 [d]	3.5E-03 [e]
Zinc and Compounds	7440-66-6	8.9E-03	(% of PM emitted) [4]	5.8E-05 [d]	3.4E-03 [e]

Table 12
PTE Shot Blast TAC Emission Estimates
Eagle Foundry Company

Notes

TAC = toxic air contaminant

(a) Emission factor (lb/ton metal produced) = (total PM emission factor [lb/ton metal processed]) x (percentage of total PM [%]/100)

$PM_{>10}$ percentage of total PM (%) =	30.0	(1)
$PM_{2.5-10}$ percentage of total PM (%) =	50.0	(1)
$PM_{2.5}$ percentage of total PM (%) =	20.0	(1)

(b) Daily emissions estimate (lb/day) = (emission factor [lb/ton metal produced]) x (daily metal finished by abrasive blasting [tons/day]) x (percentage of total PM [%]/100) x (1 - [control efficiency of baghouse {%}]/100)

Daily metal finished by abrasive blasting (tons/day) =	9.00	(2)
Control efficiency of filters for $PM_{>10}$ (%) =	100	(3)
Control efficiency of filters for $PM_{2.5-10}$ (%) =	99.5	(3)
Control efficiency of filters for $PM_{2.5}$ (%) =	99.0	(3)

(c) Annual emissions estimate (lb/yr) = (emission factor [lb/ton metal produced]) x (annual metal finished by abrasive blasting [tons/yr]) x (percentage of total PM [%]/100) x (1 - [control efficiency of baghouse {%}]/100)

Annual metal finished by abrasive blasting (tons/yr) =	534	(2)

(d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

(f) Molybdenum trioxide percentage of PM (% of PM emitted) = (molybdenum percentage of PM [%]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole]) (6)

Molybdenum percentage of PM (%) =	0.037	(4)
Molybdenum trioxide molecular weight (lb/lb-mole) =	143.94	
Molybdenum molecular weight (lb/lb-mole) =	95.95	

Table 12
PTE Shot Blast TAC Emission Estimates
Eagle Foundry Company

References

(1) RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table 6-2. Value for shot blasting, captured and uncontrolled.

(2) See Table 1, Input Process Rates and Parameters.

(3) RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table 3-4, Typical Collection Efficiencies of Various Particulate Control Devices. Section 3.1.4.1 notes that it can be assumed that PM collection efficiencies for PM greater than 10 µm are 100 percent.

(4) Based on a dust analysis conducted by Apex Laboratories, March 2021. Dust speciation for the mesh blast hopper is assumed to be representative of shotblast speciation.

(5) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site specific data becomes available.

(6) Conservatively assume 100 percent of molybdenum is in the trioxide form.

Table 13
PTE Small Palmer TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor (lb/ton PM generated)	Total Emissions Estimate	
			Daily [a] (lb/day)	Annual [b] (lb/yr)
Aluminum and Compounds	7429-90-5	10.3 [1]	5.9E-03	1.55
Antimony and Compounds	7440-36-0	1.5E-03 [1]	8.4E-07	2.2E-04
Arsenic and Compounds	7440-38-2	1.2E-03 [1]	6.9E-07	1.8E-04
Barium and Compounds	7440-39-3	0.060 [1]	3.5E-05	9.0E-03
Beryllium and compounds	7440-41-7	9.9E-05 [1]	5.7E-08	1.5E-05
Cadmium and Compounds	7440-43-9	2.3E-04 [1]	1.3E-07	3.4E-05
Chromium	7440-47-3	0.098 [1]	5.6E-05	0.015
Chromium VI	18540-29-9	2.9E-03 [3]	1.7E-06	4.4E-04
Cobalt and Compounds	7440-48-4	1.7E-03 [1]	9.5E-07	2.5E-04
Copper and Compounds	7440-50-8	0.26 [1]	1.5E-04	0.039
Lead and Compounds	7439-92-1	0.031 [1]	1.8E-05	4.7E-03
Manganese and Compounds	7439-96-5	0.78 [1]	4.5E-04	0.12
Molybdenum trioxide	1313-27-5	0.024 [c]	1.4E-05	3.5E-03
Nickel and Compounds	7440-02-0	0.037 [1]	2.1E-05	5.6E-03
Selenium and Compounds	7782-49-2	4.9E-04 [1]	2.8E-07	7.4E-05
Silver and Compounds	7440-22-4	6.2E-04 [1]	3.6E-07	9.2E-05
Thallium	7440-28-0	9.9E-05 [1]	5.7E-08	1.5E-05
Vanadium (fume or dust)	7440-62-2	6.7E-03 [1]	3.9E-06	1.0E-03
Zinc and Compounds	7440-66-6	0.17 [1]	9.6E-05	0.025

Notes

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

[a] Daily emissions estimate (lb/day) = (daily PM generated [lb/day])
x (emission factor [lb/ton PM generated]) x (ton/2,000 lb) x (1 - [baghouse control efficiency {%}]/100)

Daily PM generated (lb PM generated/day) = 115 (1)
Baghouse control efficiency (%) = 99.0 (2)

[b] Annual emissions estimate (lb/yr) = (annual PM generated [ton/yr]) x (emission factor [lb/ton PM generated])
x (1 - [baghouse control efficiency {%}]/100)

Annual PM generated (tons PM generated/yr) = 14.9 (1)
Baghouse control efficiency (%) = 99.0 (2)

[c] Molybdenum trioxide emission factor (lb/ton PM generated) = (molybdenum emission factor [lb/ton PM generated])
x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole])

Molybdenum emission factor (lb/ton PM generated) = 0.016 (1)
Molybdenum trioxide molecular weight (lb/lb-mole) = 143.94
Molybdenum molecular weight (lb/lb-mole) = 95.95

References

[1] #REF!

[2] See Table 1, Input Process Rates and Parameters.

[3] As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site specific data becomes available.

[4] Conservatively assume 100 percent of molybdenum is in the trioxide form.

Table 14
PTE Small Palmer Material Handling TAC Emission Estimates
Eagle Foundry Company

Product	Toxic Air Contaminant	CAS	Weight Percentage (%)	Product Usage [1]		Total Emissions Estimate	
				Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
Coated Cerabead	Phenol	108-95-2	0.010 [2]	53.3	12,782	5.3E-03 [a]	1.28 [b]
	Silica, crystalline	7631-86-9	35.38 [4]			3.4E-04 [c]	0.081 [d]
	Aluminum Oxide	7440-02-0	64.62 [4]			6.2E-04 [c]	0.15 [d]
G-29 Sand	Silica, crystalline	7631-86-9 [5]	95.0 [2]	126.1	30,269	2.2E-03 [c]	0.52 [d]
Unibond 1350 Core Paste	Silica, crystalline	7631-86-9 [5]	55.0 [2]	41.0	9,835	4.1E-04 [c]	0.097 [d]
Naigai Cerabead	Silica, crystalline	7631-86-9	35.38 [4]	4,858	1,165,986	0.031 [c]	7.43 [d]
	Aluminum Oxide	7429-90-5	64.62 [4]			0.057 [c]	13.6 [d]

Notes

TAC = toxic air contaminant

[a] Daily emissions estimate (lb/day) = (weight percentage [%]/100) x (daily product usage [lb/day])

[b] Annual emissions estimate (lb/yr) =(weight percentage [%]/100) x (annual product usage [lb/yr])

[c] Daily emissions estimate (lb/day) = (PM emission factor [lb/ton]) x (daily product usage [lb/day]) x (ton/2,000 lb) x (weight percent [%])/100 x (1 - [baghouse control efficiency {%}]/100)

PM emission factor (lb/ton sand handled) = 3.6 (3)

Baghouse control efficiency (%) = 99.0 (1)

[d] Annual emissions estimate (lb/yr) = (PM emission factor [lb/ton]) x (annual product usage [lb/yr]) x (ton/2,000 lb) x (weight percent [%])/100 x (1 - [baghouse control efficiency {%}]/100)

PM emission factor (lb/ton sand handled) = 3.6 (3)

Baghouse control efficiency (%) = 99.0 (1)

Table 14
PTE Small Palmer Material Handling TAC Emission Estimates
Eagle Foundry Company

References

(1) See Table 1, Input Process Rates and Parameters.

(2) Information from product SDS. Value is midpoint of the range.

(3) AP-42 Chapter 12.10, Table 12.10-7, Particulate Emission factors for Ancillary Operations and Fugitive Sources at Gray Iron Foundries. Value for sand handling, uncontrolled.

(4) See Table D3, Silica Data.

(5) CAS numbers have been updated to the CAS for silica, crystalline- respirable. Not all crystalline silica in the product is of a respirable size. Conservatively assumes all crystalline silica emitted is of respirable size

Table 15
PTE Big Palmer Material Handling TAC Emission Estimates
Eagle Foundry Company

Product	Toxic Air Contaminant	CAS	Weight Percentage [1] (%)	Product Usage [2]		Total Emissions Estimate	
				Daily (lb/day)	Annual (lb/yr)	Daily (lb/day)	Annual (lb/yr)
Velvacoat ST 803	Isopropanol	67-63-0	25.0	69.8	16,759	17.5 [a]	4,190 [b]
	Silica, crystalline	7631-86-9 [5]	0.55			6.9E-05 [c]	0.017 [d]
	Silica, crystalline	7631-86-9 [5]	0.55			6.9E-05 [c]	0.017 [d]
Isomol 780	Isopropanol	67-63-0	27.5	21.3	5,113	5.86 [a]	1,406 [b]
	Silica, crystalline	7631-86-9 [5]	0.55			2.1E-05 [c]	5.1E-03 [d]
Unibond 1350 Core Paste	Silica, crystalline	7631-86-9 [5]	55.0	25.1	6,028	2.5E-03 [c]	0.60 [d]
Naigai Cerabead	Silica, crystalline	7631-86-9 [5]	35.38 [4]	2,978	714,637	0.19 [c]	45.5 [d]
	Aluminum Oxide	7429-90-5	64.62 [4]			0.35 [c]	83.1 [d]

Notes

TAC = toxic air contaminant

[a] Daily emissions estimate (lb/day) = (weight percentage [%]/100) x (daily product usage [lb/day])

[b] Annual emissions estimate (lb/yr) =(weight percentage [%]/100) x (annual product usage [lb/yr])

[c] Daily emissions estimate (lb/day) = (PM emission factor [lb/ton]) x (daily product usage [lb/day]) x (ton/2,000 lb) x (weight percent [%])/100 x (1 - [baghouse control efficiency {%}]/100)

PM emission factor (lb/ton sand handled) = 3.6 (3)

Main Foundry baghouse control efficiency (%) = 90.0 (2)

[d] Annual emissions estimate (lb/yr) = (PM emission factor [lb/ton]) x (annual product usage [lb/yr]) x (ton/2,000 lb) x (weight percent [%])/100 x (1 - [baghouse control efficiency {%}]/100)

PM emission factor (lb/ton sand handled) = 3.6 (3)

Main Foundry baghouse control efficiency (%) = 90.0 (2)

Table 15
PTE Big Palmer Material Handling TAC Emission Estimates
Eagle Foundry Company

References

(1) Information from product SDS. Value is midpoint of the range.

(2) See Table 1, Input Process Rates and Parameters.

(3) AP-42 Chapter 12.10, Table 12.10-7, Particulate Emission factors for Ancillary Operations and Fugitive Sources at Gray Iron Foundries. Value for sand handling, uncontrolled.

(4) See Table D3, Silica Data.

(5) CAS numbers have been updated to the CAS for silica, crystalline- respirable. Not all crystalline silica in the product is of a respirable size. Conservatively assumes all crystalline silica emitted is of respirable size

Table 16
PTE Screening Station TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor			Total Emissions Estimate			
					Daily (lb/day)		Annual (lb/yr)	
PM	--	0.20	(lb PM/ton sand handled)	(1)	7.19	(a)	1,870	(c)
Aluminum and Compounds	7429-90-5	0.50	(% of PM emitted)	(4)	0.036	(d)	9.31	(e)
Antimony and Compounds	7440-36-0	7.0E-05	(% of PM emitted)	(4)	5.0E-06	(d)	1.3E-03	(e)
Arsenic and Compounds	7440-38-2	2.7E-05	(% of PM emitted)	(4)	1.9E-06	(d)	5.0E-04	(e)
Barium and Compounds	7440-39-3	2.4E-03	(% of PM emitted)	(4)	1.8E-04	(d)	0.046	(e)
Beryllium and compounds	7440-41-7	5.3E-06	(% of PM emitted)	(4)	3.8E-07	(d)	9.9E-05	(e)
Cadmium and Compounds	7440-43-9	5.3E-06	(% of PM emitted)	(4)	3.8E-07	(d)	9.9E-05	(e)
Chromium	7440-47-3	5.8E-03	(% of PM emitted)	(4)	4.2E-04	(d)	0.11	(e)
Chromium VI	18540-29-9	1.7E-04	(% of PM emitted)	(5)	1.3E-05	(d)	3.3E-03	(e)
Cobalt and Compounds	7440-48-4	9.2E-05	(% of PM emitted)	(4)	6.6E-06	(d)	1.7E-03	(e)
Copper and Compounds	7440-50-8	0.017	(% of PM emitted)	(4)	1.3E-03	(d)	0.33	(e)
Lead and Compounds	7439-92-1	1.2E-03	(% of PM emitted)	(4)	8.6E-05	(d)	0.022	(e)
Manganese and Compounds	7439-96-5	0.046	(% of PM emitted)	(4)	3.3E-03	(d)	0.87	(e)
Molybdenum trioxide	1313-27-5	1.7E-03	(% of PM emitted)	(f)	1.2E-04	(d)	0.031	(e)
Nickel and Compounds	7440-02-0	3.0E-03	(% of PM emitted)	(4)	2.1E-04	(d)	0.056	(e)
Selenium and Compounds	7782-49-2	2.7E-05	(% of PM emitted)	(4)	1.9E-06	(d)	5.0E-04	(e)
Silica, crystalline	7631-86-9	36.1	(% of PM emitted)	(7)	2.60	(d)	675	(e)
Silver and Compounds	7440-22-4	3.1E-05	(% of PM emitted)	(4)	2.2E-06	(d)	5.7E-04	(e)
Thallium	7440-28-0	5.3E-06	(% of PM emitted)	(4)	3.8E-07	(d)	9.9E-05	(e)
Vanadium (fume or dust)	7440-62-2	2.8E-04	(% of PM emitted)	(4)	2.0E-05	(d)	5.2E-03	(e)
Zinc and Compounds	7440-66-6	5.7E-03	(% of PM emitted)	(4)	4.1E-04	(d)	0.11	(e)

Notes

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Daily emissions estimate (lb/day) = (emission factor [lb/ton sand handled]) x (daily sand handled [tons/day])

Daily sand handled (tons/day) = 36.0 (b)

(b) Total sand handling (lb/unit) = (metal poured [tons/unit]) x (sand-to-metal ratio)

Daily total metal poured (tons/day) = 31.0 (2)

Annual total metal poured (tons/yr) = 8,060 (2)

Sand-to-metal ratio (tons/ton) = 1.16 (3)

(c) Annual emissions estimate (lb/yr) = (emission factor [lb/ton sand handled]) x (annual sand used [tons/yr])

Annual sand used (tons/yr) = 9,350 (b)

(d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

(f) Molybdenum trioxide emission factor (% of PM emitted) = (molybdenum emission factor [% of PM emitted]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole]) (6)

Molybdenum percentage of PM (%) = 1.1E-03 (4)

Molybdenum trioxide molecular weight (lb/lb-mole) = 143.94

Molybdenum molecular weight (lb/lb-mole) = 95.95

References

(1) AP-42 Chapter 12.10, Table 12.10-7. Assumes value for baghouse-controlled sand handling.

(2) See Table 1, Input Process Rates and Parameters.

(3) Ratio of sand to total metal poured is based on facility operations. Value includes G-29 Sand, Naigai Cerabead, and Coated Cerabead.

(4) Based on a dust analysis conducted by Apex Laboratories, March 2021.

(5) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site specific data becomes available.

(6) Conservatively assume 100 percent of molybdenum is in the trioxide form.

(7) Value is the weighted average silica content of mold making materials.

Table 17
PTE Slag Handling TAC Emission Estimates
Eagle Foundry Company

Pollutant	CAS/DEQ ID	Emission Factor			Total Emissions Estimate			
					Daily (lb/day)		Annual (lb/yr)	
PM_{10}	--	0.018	(lb PM/ton slag)	(a)	0.016	(b)	4.06	(c)
Aluminum and Compounds	7429-90-5	0.46	(% of PM emitted)	(5)	7.6E-05	(d)	0.019	(e)
Antimony and Compounds	7440-36-0	5.4E-05	(% of PM emitted)	(5)	8.8E-09	(d)	2.2E-06	(e)
Arsenic and Compounds	7440-38-2	5.4E-05	(% of PM emitted)	(5)	8.8E-09	(d)	2.2E-06	(e)
Barium and Compounds	7440-39-3	1.0E-03	(% of PM emitted)	(5)	1.7E-07	(d)	4.2E-05	(e)
Beryllium and compounds	7440-41-7	1.1E-05	(% of PM emitted)	(5)	1.8E-09	(d)	4.3E-07	(e)
Cadmium and Compounds	7440-43-9	1.1E-05	(% of PM emitted)	(5)	1.8E-09	(d)	4.3E-07	(e)
Chromium	7440-47-3	0.26	(% of PM emitted)	(5)	4.3E-05	(d)	0.010	(e)
Chromium VI	18540-29-9	1.5E-03	(% of PM emitted)	(5)	2.5E-07	(d)	6.2E-05	(e)
Cobalt and Compounds	7440-48-4	3.6E-04	(% of PM emitted)	(5)	5.9E-08	(d)	1.4E-05	(e)
Copper and Compounds	7440-50-8	2.4E-03	(% of PM emitted)	(5)	4.0E-07	(d)	9.8E-05	(e)
Lead and Compounds	7439-92-1	4.1E-05	(% of PM emitted)	(5)	6.7E-09	(d)	1.6E-06	(e)
Manganese and Compounds	7439-96-5	0.77	(% of PM emitted)	(5)	1.3E-04	(d)	0.031	(e)
Mercury	7439-97-6	4.3E-06	(% of PM emitted)	(5)	7.1E-10	(d)	1.7E-07	(e)
Molybdenum trioxide	1313-27-5	0.012	(% of PM emitted)	(5)	2.0E-06	(d)	4.9E-04	(e)
Nickel and Compounds	7440-02-0	5.4E-05	(% of PM emitted)	(5)	8.8E-09	(d)	2.2E-06	(e)
Phosphorus and Compounds	504	5.4E-03	(% of PM emitted)	(5)	8.8E-07	(d)	2.2E-04	(e)
Selenium and Compounds	7782-49-2	5.4E-05	(% of PM emitted)	(5)	8.8E-09	(d)	2.2E-06	(e)
Silver and Compounds	7440-22-4	1.1E-05	(% of PM emitted)	(5)	1.8E-09	(d)	4.3E-07	(e)
Thallium	7440-28-0	1.1E-05	(% of PM emitted)	(5)	1.8E-09	(d)	4.3E-07	(e)
Vanadium (fume or dust)	7440-62-2	5.7E-04	(% of PM emitted)	(5)	9.4E-08	(d)	2.3E-05	(e)
Zinc and Compounds	7440-66-6	2.1E-04	(% of PM emitted)	(5)	3.5E-08	(d)	8.7E-06	(e)

Notes

ND = Analyte was not detected at or above the reporting limit for any samples.

(a) Emission factor (lb/ton) = (0.0032) x (particulate size multiplier) x ([wind speed {mph}] / 5)$^{1.3}$ / ([material moisture content {%}] / 2)$^{1.4}$

Particulate size multiplier for PM_{10} =	0.35	(1)
Wind speed (mph) =	18.6	(2)
Moisture content of slag (%) =	0.92	(3)

(b) Daily emissions estimate (lb/day) = (emission factor [lb/ton slag]) x (daily slag handled [tons/day])

Daily slag handled (tons/day) =	0.90	(4)

(c) Annual emissions estimate (lb/yr) = (emission factor [lb/ton slag]) x (annual slag handled [tons/yr])

Annual slag handled (tons/yr) =	222	(4)

(d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

(e) Molybdenum trioxide emission factor (lb/ton PM generated) = (molybdenum emission factor [lb/ton PM generated]) x (molybdenum trioxide molecular weight [lb/lb-mole]) / (molybdenum molecular weight [lb/lb-mole]) (6)

Molybdenum emission factor (lb/ton PM generated) =	8.0E-03	(5)
Molybdenum trioxide molecular weight (lb/lb-mole) =	143.94	
Molybdenum molecular weight (lb/lb-mole) =	95.95	

References

(1) AP-42, Chapter 13.2.4 "Aggregate Handling and Storage Piles" (November 2006). Equation for quantity of particulate emissions generated by drop operations.

(2) Value represents the highest average daily wind speed, 2018 - 2022, from the Carus-Spangler monitoring station (DEQ).

(3) Based on operations at similar facility.

(4) See Table 1, Input Process Rates and Parameters.

(5) Based on facility dust collection records and the dust analysis conducted by Apex Laboratories, September 2023.

(6) Conservatively assume 100 percent of molybdenum is in the trioxide form.

Table 18
PTE Pattern Making TAC Emission Estimates
Eagle Foundry Company

Product	Toxic Air Contaminant	CAS	Weight Percentage (%)	Specific Gravity	Product Density (lb/gal)	Product Usage [1]		Total Emissions Estimate	
						Maximum Daily (gal/day)	Annual (gal/yr)	Daily [a] (lb/day)	Annual [b] (lb/yr)
Urethane	Toluene	108-88-3	5.50 [2]	0.907 [3]	7.56 [c]	0.36	85.2	0.15	35.4
	1,2,4-Trimethylbenzene	95-63-6	5.50 [5]					0.15	35.4
Mar-Proof H/S Lacquer Sanding Sealer	Methyl Ethyl Ketone	78-93-3	17.5 [2]	--	7.56 [3]	0.030	7.10	0.039	9.40
	Toluene	108-88-3	17.5 [2]					0.039	9.40
	Isopropanol	67-63-0	5.00 [2]					0.011	2.68
	n-Butyl Alcohol	71-36-3	5.00 [2]					0.011	2.68

Notes

TAC = toxic air contaminant

[a] Daily emissions estimate (lb/day) = (weight percentage [%]/100) x (product density [lb/gal]) x (daily product usage [gal/day])

[b] Annual emissions estimate (lb/yr) =(weight percentage [%]/100) x (product density [lb/gal]) x (maximum annual product usage [gal/yr])

[c] Product density (lb/gal) = (specific gravity) x (density of water [lb/gal])

Density of water (lb/gal) = 8.331 (4)

References

[1] See Table 1, Input Process Rates and Parameters.

[2] Information from product SDS. Value is midpoint of the range.

[3] Information from product SDS.

[4] Density of water at 20 degrees Celsius.

[5] Information from product SDS. CAS 95-63-6 (1,2,4-trimethylbenzene) was substituted for CAS 25551-13-7 (trimethylbenzene).

Table 19
PTE Heat Treat—Propane Combustion TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS	Emission Factor [1] (lb/Mgal)	Total Emissions Estimate	
			Daily [a] (lb/day)	Annual [b] (lb/yr)
Benzene	71-43-2	7.1E-04	6.4E-04	0.15
Formaldehyde	50-00-0	1.5E-03	1.4E-03	0.33
PAHs (excluding Naphthalene)	401	1.0E-05	9.0E-06	2.2E-03
Naphthalene	91-20-3	3.0E-05	2.7E-05	6.5E-03
Acetaldehyde	75-07-0	3.8E-04	3.4E-04	0.082
Acrolein	107-02-8	2.4E-04	2.2E-04	0.052
Ammonia	7664-41-7	0.30	0.27	64.7
Ethylbenzene	100-41-4	8.4E-04	7.5E-04	0.18
Hexane	110-54-3	5.6E-04	5.0E-04	0.12
Toluene	108-88-3	3.3E-03	2.9E-03	0.70
Xylene (mixed isomers)	1330-20-7	2.4E-03	2.2E-03	0.52

Notes

Mgal = thousand gallons.

TAC = toxic air contaminant

[a] Daily emissions estimate (lb/day) = (emission factor [lb/Mgal]) x (daily propane usage [gal/day]) x (Mgal/1,000 gal)

Daily propane usage (gal/day) = 898 [2]

[b] Annual emissions estimate (lb/yr) = (emission factor [lb/Mgal]) x (annual propane usage [gal/yr]) x (Mgal/1,000 gal)

Annual propane usage (gal/yr) = 215,639 [2]

References

[1] Emission factors provided by Oregon Department of Environmental Quality for Propane External Combustion Sources. Emission factors for sources <10 MMBtu/hr were used.

[2] See Table 1, Input Process Rates and Parameters.

Table 20
PTE Diesel Emergency Generator TAC Emission Estimates
Eagle Foundry Company

TAC	CAS	Emission Factor (lb/Mgal)		Emissions Estimates	
				Daily [a] (lb/day)	Annual [b] (lb/yr)
Arsenic	7440-38-2	1.6E-03	[2]	2.3E-05	1.2E-03
Cadmium	7440-43-9	1.5E-03	[2]	2.2E-05	1.1E-03
Chromium VI	18540-29-9	1.0E-04	[2]	1.5E-06	7.3E-05
Copper	7440-50-8	4.1E-03	[2]	6.0E-05	3.0E-03
Lead	7439-92-1	8.3E-03	[2]	1.2E-04	6.1E-03
Manganese	7439-96-5	3.1E-03	[2]	4.5E-05	2.3E-03
Mercury	7439-97-6	2.0E-03	[2]	2.9E-05	1.5E-03
Nickel	7440-02-0	3.9E-03	[2]	5.7E-05	2.8E-03
Selenium	7782-49-2	2.2E-03	[2]	3.2E-05	1.6E-03
Acetaldehyde	75-07-0	0.78	[2]	0.011	0.57
Acrolein	107-02-8	0.034	[2]	4.9E-04	0.025
Benzene	71-43-2	0.19	[2]	2.7E-03	0.14
1,3-Butadiene	106-99-0	0.217	[2]	3.2E-03	0.16
Ethylbenzene	100-41-4	0.011	[2]	1.6E-04	8.0E-03
Formaldehyde	50-00-0	1.73	[2]	0.025	1.26
Hexane	110-54-3	0.027	[2]	3.9E-04	0.020
Toluene	108-88-3	0.11	[2]	1.5E-03	0.077
Xylenes (mixed isomers)	1330-20-7	0.042	[2]	6.2E-04	0.031
Ammonia	7664-41-7	0.80	[4]	0.012	0.58
Hydrochloric Acid	7647-01-0	0.19	[2]	2.7E-03	0.14
PAHs	401	0.036	[2]	5.3E-04	0.026
Benzo(a)pyrene	50-32-8	3.52E-05	[3]	5.1E-07	2.6E-05
Naphthalene	91-20-3	0.020	[2]	2.9E-04	0.014
DPM	200	33.5	[2]	0.49	24.5

Notes

DPM = Diesel particulate matter

Mgal = thousand gallons.

TAC = toxic air contaminant.

[a] Daily emissions estimate (lb/day) = (emission factor [lb/Mgal]) x (Mgal/1,000 gal) x (daily fuel consumption [gal/day])

Daily fuel consumption (gal/day) = 14.6 (1)

[b] Annual emissions estimate (lb/yr) = (emission factor [lb/Mgal]) x (Mgal/1,000 gal) x (annual fuel consumption [gal/yr])

Annual fuel consumption (gal/yr) = 730 (1)

References

(1) See Table 1, Input Process Rates and Parameters.

(2) DEQ approved diesel combustion emission factors for stationary and portable internal combustion engines.

(3) AP-42 Section 3.4, Table 3.4-4, converted to lb/Mgal using a heating value of 137,000 Btu/gal (Appendix A)

(4) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Appendix B, Table B-2 "Default EF for Diesel/Distillate Oil Fuel Combustion (lb/1,000 gal)" for stationary and portable internal combustion engines (ICE). Assumes no control.

Table 21
PTE Reclaimed Bead Silo TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor			Total Emissions Estimate			
					Daily (lb/day)		Annual (lb/yr)	
PM	--	2.1E-04	(lb/hr)	(a)	4.2E-03	(b)	1.01	(c)
Aluminum and Compounds	7429-90-5	0.50	(% of PM emitted)	(3)	2.1E-05	(d)	5.0E-03	(e)
Antimony and Compounds	7440-36-0	7.0E-05	(% of PM emitted)	(3)	2.9E-09	(d)	7.0E-07	(e)
Arsenic and Compounds	7440-38-2	2.7E-05	(% of PM emitted)	(3)	1.1E-09	(d)	2.7E-07	(e)
Barium and Compounds	7440-39-3	2.4E-03	(% of PM emitted)	(3)	1.0E-07	(d)	2.5E-05	(e)
Beryllium and compounds	7440-41-7	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Cadmium and Compounds	7440-43-9	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Chromium	7440-47-3	5.8E-03	(% of PM emitted)	(3)	2.4E-07	(d)	5.9E-05	(e)
Chromium VI	18540-29-9	1.7E-04	(% of PM emitted)	(4)	7.3E-09	(d)	1.8E-06	(e)
Cobalt and Compounds	7440-48-4	9.2E-05	(% of PM emitted)	(3)	3.9E-09	(d)	9.3E-07	(e)
Copper and Compounds	7440-50-8	0.017	(% of PM emitted)	(3)	7.3E-07	(d)	1.8E-04	(e)
Lead and Compounds	7439-92-1	1.2E-03	(% of PM emitted)	(3)	5.0E-08	(d)	1.2E-05	(e)
Manganese and Compounds	7439-96-5	0.046	(% of PM emitted)	(3)	1.9E-06	(d)	4.7E-04	(e)
Nickel and Compounds	7440-02-0	3.0E-03	(% of PM emitted)	(3)	1.2E-07	(d)	3.0E-05	(e)
Silica, crystalline	7631-86-9	36.1	(% of PM emitted)	(5)	1.5E-03	(d)	0.36	(e)
Selenium and Compounds	7782-49-2	2.7E-05	(% of PM emitted)	(3)	1.1E-09	(d)	2.7E-07	(e)
Silver and Compounds	7440-22-4	3.1E-05	(% of PM emitted)	(3)	1.3E-09	(d)	3.1E-07	(e)
Thallium	7440-28-0	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Vanadium (fume or dust)	7440-62-2	2.8E-04	(% of PM emitted)	(3)	1.2E-08	(d)	2.8E-06	(e)
Zinc and Compounds	7440-66-6	5.7E-03	(% of PM emitted)	(3)	2.4E-07	(d)	5.7E-05	(e)

Notes

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Emission factor (lb/hr) = (PM discharge rate [lb/10^6 ft^3]) x (bin vent airflow rate [ft^3/hr]) x (10^6) x (1 - [baghouse control efficiency {%}]/100)

Bin vent airflow rate (ft^3/hr) =	30,000	(1)
PM discharge rate (lb/10^6 ft^3) =	0.70	(1)
Baghouse control efficiency (%) =	99.0	(2)

(b) Daily emissions estimate (lb/day) = (emission factor [lb/hr]) x (daily hours of operation [hrs/day])

Daily hours of operation (hrs/day) =	20.0	(2)

(c) Annual emissions estimate (lb/yr) = (emission factor [lb/hr]) x (annual hours of operation [hrs/yr])

Annual hours of operation (hrs/yr) =	4,800	(2)

(d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

References

(1) Draft Review Report 03-2631, Application no. 016656, October 29, 1998.

(2) See Table 1, Input Process Rates and Parameters.

(3) Based on a dust analysis conducted by Apex Laboratories, March 2021.

(4) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site-specific data becomes available.

(5) Value is the weighted average silica content of mold making materials.

Table 22
PTE Reclaimed Bead Overflow Silo TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor			Total Emissions Estimate			
					Daily (lb/day)		Annual (lb/yr)	
PM	--	2.1E-04	(lb/hr)	(a)	4.2E-03	(b)	1.01	(c)
Aluminum and Compounds	7429-90-5	0.50	(% of PM emitted)	(3)	2.1E-05	(d)	5.0E-03	(e)
Antimony and Compounds	7440-36-0	7.0E-05	(% of PM emitted)	(3)	2.9E-09	(d)	7.0E-07	(e)
Arsenic and Compounds	7440-38-2	2.7E-05	(% of PM emitted)	(3)	1.1E-09	(d)	2.7E-07	(e)
Barium and Compounds	7440-39-3	2.4E-03	(% of PM emitted)	(3)	1.0E-07	(d)	2.5E-05	(e)
Beryllium and compounds	7440-41-7	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Cadmium and Compounds	7440-43-9	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Chromium	7440-47-3	5.8E-03	(% of PM emitted)	(3)	2.4E-07	(d)	5.9E-05	(e)
Chromium VI	18540-29-9	1.7E-04	(% of PM emitted)	(4)	7.3E-09	(d)	1.8E-06	(e)
Cobalt and Compounds	7440-48-4	9.2E-05	(% of PM emitted)	(3)	3.9E-09	(d)	9.3E-07	(e)
Copper and Compounds	7440-50-8	0.017	(% of PM emitted)	(3)	7.3E-07	(d)	1.8E-04	(e)
Lead and Compounds	7439-92-1	1.2E-03	(% of PM emitted)	(3)	5.0E-08	(d)	1.2E-05	(e)
Manganese and Compounds	7439-96-5	0.046	(% of PM emitted)	(3)	1.9E-06	(d)	4.7E-04	(e)
Nickel and Compounds	7440-02-0	3.0E-03	(% of PM emitted)	(3)	1.2E-07	(d)	3.0E-05	(e)
Silica, crystalline	7631-86-9	36.1	(% of PM emitted)	(5)	1.5E-03	(d)	0.36	(e)
Selenium and Compounds	7782-49-2	2.7E-05	(% of PM emitted)	(3)	1.1E-09	(d)	2.7E-07	(e)
Silver and Compounds	7440-22-4	3.1E-05	(% of PM emitted)	(3)	1.3E-09	(d)	3.1E-07	(e)
Thallium	7440-28-0	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Vanadium (fume or dust)	7440-62-2	2.8E-04	(% of PM emitted)	(3)	1.2E-08	(d)	2.8E-06	(e)
Zinc and Compounds	7440-66-6	5.7E-03	(% of PM emitted)	(3)	2.4E-07	(d)	5.7E-05	(e)

Notes

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Emission factor (lb/hr) = (PM discharge rate [lb/10^6 ft^3]) x (bin vent airflow rate [ft^3/hr]) x (10^6) x (1 - [baghouse control efficiency {%}]/100)

Bin vent airflow rate (ft^3/hr) =	30,000	(1)
PM discharge rate (lb/10^6 ft^3) =	0.70	(1)
Baghouse control efficiency (%) =	99.0	(2)

(b) Daily emissions estimate (lb/day) = (emission factor [lb/hr]) x (daily hours of operation [hrs/day])

Daily hours of operation (hrs/day) =	20.0	(2)

(c) Annual emissions estimate (lb/yr) = (emission factor [lb/hr]) x (annual hours of operation [hrs/yr])

Annual hours of operation (hrs/yr) =	4,800	(2)

(d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

References

(1) Draft Review Report 03-2631, Application no. 016656, October 29, 1998.

(2) See Table 1, Input Process Rates and Parameters.

(3) Based on a dust analysis conducted by Apex Laboratories, March 2021.

(4) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site-specific data becomes available.

(5) Value is the weighted average silica content of mold making materials.

Table 23
PTE Small Palmer Silo TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor			Total Emissions Estimate			
					Daily (lb/day)		Annual (lb/yr)	
PM	--	2.1E-04	(lb/hr)	(a)	4.2E-03	(b)	1.01	(c)
Aluminum and Compounds	7429-90-5	0.50	(% of PM emitted)	(3)	2.1E-05	(d)	5.0E-03	(e)
Antimony and Compounds	7440-36-0	7.0E-05	(% of PM emitted)	(3)	2.9E-09	(d)	7.0E-07	(e)
Arsenic and Compounds	7440-38-2	2.7E-05	(% of PM emitted)	(3)	1.1E-09	(d)	2.7E-07	(e)
Barium and Compounds	7440-39-3	2.4E-03	(% of PM emitted)	(3)	1.0E-07	(d)	2.5E-05	(e)
Beryllium and compounds	7440-41-7	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Cadmium and Compounds	7440-43-9	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Chromium	7440-47-3	5.8E-03	(% of PM emitted)	(3)	2.4E-07	(d)	5.9E-05	(e)
Chromium VI	18540-29-9	1.7E-04	(% of PM emitted)	(4)	7.3E-09	(d)	1.8E-06	(e)
Cobalt and Compounds	7440-48-4	9.2E-05	(% of PM emitted)	(3)	3.9E-09	(d)	9.3E-07	(e)
Copper and Compounds	7440-50-8	0.017	(% of PM emitted)	(3)	7.3E-07	(d)	1.8E-04	(e)
Lead and Compounds	7439-92-1	1.2E-03	(% of PM emitted)	(3)	5.0E-08	(d)	1.2E-05	(e)
Manganese and Compounds	7439-96-5	0.046	(% of PM emitted)	(3)	1.9E-06	(d)	4.7E-04	(e)
Nickel and Compounds	7440-02-0	3.0E-03	(% of PM emitted)	(3)	1.2E-07	(d)	3.0E-05	(e)
Silica, crystalline	7631-86-9	36.1	(% of PM emitted)	(5)	1.5E-03	(d)	0.36	(e)
Selenium and Compounds	7782-49-2	2.7E-05	(% of PM emitted)	(3)	1.1E-09	(d)	2.7E-07	(e)
Silver and Compounds	7440-22-4	3.1E-05	(% of PM emitted)	(3)	1.3E-09	(d)	3.1E-07	(e)
Thallium	7440-28-0	5.3E-06	(% of PM emitted)	(3)	2.2E-10	(d)	5.3E-08	(e)
Vanadium (fume or dust)	7440-62-2	2.8E-04	(% of PM emitted)	(3)	1.2E-08	(d)	2.8E-06	(e)
Zinc and Compounds	7440-66-6	5.7E-03	(% of PM emitted)	(3)	2.4E-07	(d)	5.7E-05	(e)

Notes

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Emission factor (lb/hr) = (PM discharge rate [lb/10^6 ft^3]) x (bin vent airflow rate [ft^3/hr]) x (10^6) x (1 - [baghouse control efficiency {%}]/100)

Bin vent airflow rate (ft^3/hr) =	30,000	(1)
PM discharge rate (lb/10^6 ft^3) =	0.70	(1)
Baghouse control efficiency (%) =	99.0	(2)

(b) Daily emissions estimate (lb/day) = (emission factor [lb/hr]) x (daily hours of operation [hrs/day])

Daily hours of operation (hrs/day) =	20.0	(2)

(c) Annual emissions estimate (lb/yr) = (emission factor [lb/hr]) x (annual hours of operation [hrs/yr])

Annual hours of operation (hrs/yr) =	4,800	(2)

(d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

References

(1) Draft Review Report 03-2631, Application no. 016656, October 29, 1998.

(2) See Table 1, Input Process Rates and Parameters.

(3) Based on a dust analysis conducted by Apex Laboratories, March 2021.

(4) As a conservative estimate, Chromium VI is assumed to be 3 percent of total chromium. Eagle Foundry reserves the right to revise this assumption if site-specific data becomes available.

(5) Value is the weighted average silica content of mold making materials.

Table 24
PTE New Bead Silo TAC Emission Estimates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor			Total Emissions Estimate			
					Daily (lb/day)		Annual (lb/yr)	
PM	--	2.1E-04	(lb/hr)	(a)	4.2E-03	(b)	1.01	(c)
Aluminum and Compounds	7429-90-5	64.62	(% of PM emitted)	(2)	2.7E-03	(d)	0.65	(e)
Silica, crystalline	7631-86-9	35.38	(% of PM emitted)	(2)	1.5E-03	(d)	0.36	(e)

Notes

ND = Analyte was not detected at or above the reporting limit for any samples.

TAC = toxic air contaminant

(a) Emission factor (lb/hr) = (PM discharge rate [lb/10^6 ft^3]) x (bin vent airflow rate [ft^3/hr]) x (10^6) x (1 - [baghouse control efficiency {%}]/100)

Bin vent airflow rate (ft^3/hr) = 30,000 (1)

PM discharge rate (lb/10^6 ft^3) = 0.70 (1)

Baghouse control efficiency (%) = 99.0 (3)

(b) Daily emissions estimate (lb/day) = (emission factor [lb/hr]) x (daily hours of operation [hrs/day])

Daily hours of operation (hrs/day) = 20.0 (3)

(c) Annual emissions estimate (lb/yr) = (emission factor [lb/hr]) x (annual hours of operation [hrs/yr])

Annual hours of operation (hrs/yr) = 4,800 (3)

(d) Daily emissions estimate (lb/day) = (daily PM emissions [lb/day]) x (emission factor [% of PM emitted]/100)

(e) Annual emissions estimate (lb/yr) = (annual PM emissions [lb/yr]) x (emission factor [% of PM emitted]/100)

References

(1) Draft Review Report 03-2631, Application no. 016656, October 29, 1998.

(2) See Table D3, Silica Data.

(3) See Table 1, Input Process Rates and Parameters.

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	HAP? (Yes/No)	RBC? (Yes/No)	Emissions Estimate			
				Foundry White Iron		Foundry Steel	
				(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS							
Acetaldehyde	75-07-0	Yes	Yes	--	--	--	--
Acrolein	107-02-8	Yes	Yes	--	--	--	--
Benzene	71-43-2	Yes	Yes	--	--	--	--
1,3-Butadiene	106-99-0	Yes	Yes	--	--	--	--
Ethylbenzene	100-41-4	Yes	Yes	--	--	--	--
Formaldehyde	50-00-0	Yes	Yes	--	--	--	--
Hexane	110-54-3	Yes	Yes	--	--	--	--
Isopropanol	67-63-0	No	Yes	--	--	--	--
Methyl Ethyl Ketone	78-93-3	No	Yes	--	--	--	--
n-Butyl Alcohol	71-36-3	No	No	--	--	--	--
Phenol	108-95-2	Yes	Yes	--	--	--	--
Toluene	108-88-3	Yes	Yes	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	No	Yes	--	--	--	--
Xylene (mixed)	1330-20-7	Yes	Yes	--	--	--	--
INORGANIC COMPOUNDS							
Ammonia	7664-41-7	No	Yes	--	--	--	--
Hydrochloric Acid	7647-01-0	Yes	Yes	--	--	--	--
Molybdenum trioxide	1313-27-5	No	No	--	0.082	3.9E-04	0.020
Silicon dioxide (respirable)	7631-86-9	No	Yes	--	--	--	--
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)							
Benzo(a)pyrene	50-32-8	Yes	Yes	--	--	--	--
Naphthalene	91-20-3	Yes	Yes	--	--	--	--
PAHs (excluding Naphthalene)*	401	Yes	Yes	--	--	--	--
METALS							
Aluminum and Compounds	7429-90-5	No	Yes	--	23.6	0.10	5.38
Antimony and Compounds	7440-36-0	Yes	Yes	--	0.16	9.5E-04	0.050
Arsenic and Compounds	7440-38-2	Yes	Yes	--	0.29	3.5E-03	0.18
Barium and Compounds	7440-39-3	No	No	--	0.72	5.5E-03	0.28
Beryllium and compounds	7440-41-7	Yes	Yes	--	--	--	--
Cadmium and Compounds	7440-43-9	Yes	Yes	--	0.024	3.4E-04	0.018
Chromium	7440-47-3	Yes	No	--	0.54	0.035	0.67
Chromium VI	18540-29-9	Yes	Yes	--	3.2E-03	2.6E-04	4.9E-03
Cobalt and Compounds	7440-48-4	Yes	Yes	--	0.029	1.4E-04	7.1E-03
Copper and Compounds	7440-50-8	No	Yes	--	1.12	4.8E-03	0.25
Lead and Compounds	7439-92-1	Yes	Yes	--	0.64	1.1E-03	0.059
Manganese and Compounds	7439-96-5	Yes	Yes	--	3.61	2.0E-03	0.35
Mercury	7439-97-6	Yes	Yes	--	0.023	2.2E-04	0.011
Nickel and Compounds	7440-02-0	Yes	Yes	--	1.05	0.16	1.93
Phosphorus and Compounds	504	Yes	No	--	1.34	0.012	0.63
Selenium and Compounds	7782-49-2	Yes	Yes	--	--	3.3E-03	0.17
Silver and Compounds	7440-22-4	No	No	--	0.11	--	--
Thallium	7440-28-0	No	No	--	--	--	--
Vanadium (fume or dust)	7440-62-2	No	Yes	--	--	--	--
Zinc and Compounds	7440-66-6	No	No	--	2.79	0.013	0.70
DIESEL PARTICULATE MATTER (DPM)							
DPM	200	No	Yes	--	--	--	--
Total TAC Emissions Estimate				**0**	**36.1**	**0.35**	**10.7**
Total HAP Emissions Estimate				**0**	**7.71**	**0.22**	**4.09**

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emissions Estimate					
		Hot Top		Reclamation		Air Arc	
		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS							
Acetaldehyde	75-07-0	--	--	--	--	--	--
Acrolein	107-02-8	--	--	--	--	--	--
Benzene	71-43-2	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--
Ethylbenzene	100-41-4	--	--	--	--	--	--
Formaldehyde	50-00-0	--	--	--	--	--	--
Hexane	110-54-3	--	--	--	--	--	--
Isopropanol	67-63-0	--	--	--	--	--	--
Methyl Ethyl Ketone	78-93-3	--	--	--	--	--	--
n-Butyl Alcohol	71-36-3	--	--	--	--	--	--
Phenol	108-95-2	--	--	--	--	--	--
Toluene	108-88-3	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--
Xylene (mixed)	1330-20-7	--	--	--	--	--	--
INORGANIC COMPOUNDS							
Ammonia	7664-41-7	--	--	--	--	--	--
Hydrochloric Acid	7647-01-0	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	--	--	3.1E-05	8.1E-03	3.0E-05	4.8E-03
Silicon dioxide (respirable)	7631-86-9	4.3E-03	1.02	0.68	177	--	--
POLYCYCLIC AROMATIC HYDROCARBONS (PAH							
Benzo(a)pyrene	50-32-8	--	--	--	--	--	--
Naphthalene	91-20-3	--	--	--	--	--	--
PAHs (excluding Naphthalene)*	401	--	--	--	--	--	--
METALS							
Aluminum and Compounds	7429-90-5	--	--	0.029	7.45	--	--
Antimony and Compounds	7440-36-0	--	--	7.0E-06	1.8E-03	--	--
Arsenic and Compounds	7440-38-2	--	--	4.6E-06	1.2E-03	--	--
Barium and Compounds	7440-39-3	--	--	1.8E-04	0.046	--	--
Beryllium and compounds	7440-41-7	--	--	4.9E-07	1.3E-04	--	--
Cadmium and Compounds	7440-43-9	--	--	2.7E-06	7.0E-04	--	--
Chromium	7440-47-3	--	--	8.6E-04	0.22	2.0E-05	7.0E-03
Chromium VI	18540-29-9	--	--	2.6E-05	6.7E-03	5.9E-07	2.1E-04
Cobalt and Compounds	7440-48-4	--	--	6.8E-06	1.8E-03	--	--
Copper and Compounds	7440-50-8	--	--	5.8E-04	0.15	0	6.1E-04
Lead and Compounds	7439-92-1	--	--	2.1E-04	0.056	--	--
Manganese and Compounds	7439-96-5	--	--	5.0E-03	1.31	5.0E-04	0.035
Mercury	7439-97-6	--	--	--	--	--	--
Nickel and Compounds	7440-02-0	--	--	1.1E-04	0.028	3.2E-05	6.7E-03
Phosphorus and Compounds	504	--	--	--	--	2.8E-06	4.0E-04
Selenium and Compounds	7782-49-2	--	--	4.4E-06	1.1E-03	--	--
Silver and Compounds	7440-22-4	--	--	4.8E-06	1.2E-03	--	--
Thallium	7440-28-0	--	--	2.9E-07	7.4E-05	--	--
Vanadium (fume or dust)	7440-62-2	--	--	2.7E-05	7.1E-03	--	--
Zinc and Compounds	7440-66-6	--	--	1.1E-04	0.029	--	--
DIESEL PARTICULATE MATTER (DPM)							
DPM	200	--	--	--	--	--	--
Total TAC Emissions Estimate		**4.3E-03**	**1.02**	**0.72**	**186**	**5.9E-04**	**0.054**
Total HAP Emissions Estimate		**0**	**0**	**6.3E-03**	**1.63**	**5.6E-04**	**0.049**

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emissions Estimate					
		Welding		Grinding SS (Controlled)		Grinding SS (Fugitive)	
		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS							
Acetaldehyde	75-07-0	--	--	--	--	--	--
Acrolein	107-02-8	--	--	--	--	--	--
Benzene	71-43-2	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--
Ethylbenzene	100-41-4	--	--	--	--	--	--
Formaldehyde	50-00-0	--	--	--	--	--	--
Hexane	110-54-3	--	--	--	--	--	--
Isopropanol	67-63-0	--	--	--	--	--	--
Methyl Ethyl Ketone	78-93-3	--	--	--	--	--	--
n-Butyl Alcohol	71-36-3	--	--	--	--	--	--
Phenol	108-95-2	--	--	--	--	--	--
Toluene	108-88-3	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--
Xylene (mixed)	1330-20-7	--	--	--	--	--	--
INORGANIC COMPOUNDS							
Ammonia	7664-41-7	--	--	--	--	--	--
Hydrochloric Acid	7647-01-0	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	0.019	0.096	2.4E-05	6.3E-03	1.5E-04	0.039
Silicon dioxide (respirable)	7631-86-9	--	--	--	--	--	--
POLYCYCLIC AROMATIC HYDROCARBONS (PAH							
Benzo(a)pyrene	50-32-8	--	--	--	--	--	--
Naphthalene	91-20-3	--	--	--	--	--	--
PAHs (excluding Naphthalene)*	401	--	--	--	--	--	--
METALS							
Aluminum and Compounds	7429-90-5	--	7.8E-03	1.5E-05	4.0E-03	9.6E-05	0.025
Antimony and Compounds	7440-36-0	--	--	8.4E-09	2.2E-06	5.2E-08	1.4E-05
Arsenic and Compounds	7440-38-2	--	1.9E-04	5.1E-08	1.3E-05	3.1E-07	8.2E-05
Barium and Compounds	7440-39-3	--	--	4.5E-07	1.2E-04	2.8E-06	7.3E-04
Beryllium and compounds	7440-41-7	--	--	1.7E-09	4.4E-07	1.0E-08	2.7E-06
Cadmium and Compounds	7440-43-9	--	--	1.3E-08	3.4E-06	8.1E-08	2.1E-05
Chromium	7440-47-3	0.040	1.32	8.4E-04	0.22	5.2E-03	1.39
Chromium VI	18540-29-9	2.0E-03	0.31	2.5E-05	6.7E-03	1.6E-04	0.042
Cobalt and Compounds	7440-48-4	--	7.3E-03	2.5E-07	6.4E-05	1.5E-06	4.0E-04
Copper and Compounds	7440-50-8	4.6E-03	7.51	2.4E-06	6.3E-04	1.5E-05	3.9E-03
Lead and Compounds	7439-92-1	--	--	1.5E-08	3.8E-06	9.0E-08	2.3E-05
Manganese and Compounds	7439-96-5	0.013	1.06	3.2E-05	7.7E-03	2.0E-04	0.048
Mercury	7439-97-6	--	--	--	--	--	--
Nickel and Compounds	7440-02-0	0.042	0.32	6.5E-04	0.10	4.0E-03	0.63
Phosphorus and Compounds	504	--	5.6E-04	1.3E-06	3.4E-04	8.0E-06	2.1E-03
Selenium and Compounds	7782-49-2	--	--	8.4E-09	2.2E-06	5.2E-08	1.4E-05
Silver and Compounds	7440-22-4	--	--	1.7E-09	4.4E-07	1.0E-08	2.7E-06
Thallium	7440-28-0	--	--	1.7E-09	4.4E-07	1.0E-08	2.7E-06
Vanadium (fume or dust)	7440-62-2	0.013	0.064	1.9E-07	5.1E-05	1.2E-06	3.1E-04
Zinc and Compounds	7440-66-6	--	--	1.1E-07	2.8E-05	6.7E-07	1.7E-04
DIESEL PARTICULATE MATTER (DPM)							
DPM	200	--	--	--	--	--	--
Total TAC Emissions Estimate		**0.13**	**10.7**	**1.6E-03**	**0.35**	**9.8E-03**	**2.18**
Total HAP Emissions Estimate		**0.097**	**3.02**	**1.5E-03**	**0.34**	**9.6E-03**	**2.11**

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emissions Estimate					
		Grinding NSS (Controlled)		Grinding NSS (Fugitive)		Mesh Blast	
		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS							
Acetaldehyde	75-07-0	--	--	--	--	--	--
Acrolein	107-02-8	--	--	--	--	--	--
Benzene	71-43-2	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--
Ethylbenzene	100-41-4	--	--	--	--	--	--
Formaldehyde	50-00-0	--	--	--	--	--	--
Hexane	110-54-3	--	--	--	--	--	--
Isopropanol	67-63-0	--	--	--	--	--	--
Methyl Ethyl Ketone	78-93-3	--	--	--	--	--	--
n-Butyl Alcohol	71-36-3	--	--	--	--	--	--
Phenol	108-95-2	--	--	--	--	--	--
Toluene	108-88-3	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--
Xylene (mixed)	1330-20-7	--	--	--	--	--	--
INORGANIC COMPOUNDS							
Ammonia	7664-41-7	--	--	--	--	--	--
Hydrochloric Acid	7647-01-0	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	1.6E-04	0.039	9.9E-04	0.24	3.8E-04	7.4E-03
Silicon dioxide (respirable)	7631-86-9	--	--	--	--	--	--
POLYCYCLIC AROMATIC HYDROCARBONS (PAH							
Benzo(a)pyrene	50-32-8	--	--	--	--	--	--
Naphthalene	91-20-3	--	--	--	--	--	--
PAHs (excluding Naphthalene)*	401	--	--	--	--	--	--
METALS							
Aluminum and Compounds	7429-90-5	1.0E-04	0.027	6.3E-04	0.16	4.3E-04	8.5E-03
Antimony and Compounds	7440-36-0	5.6E-08	1.4E-05	3.4E-07	8.9E-05	1.1E-05	2.1E-04
Arsenic and Compounds	7440-38-2	3.3E-07	8.7E-05	2.1E-06	5.4E-04	3.3E-05	6.5E-04
Barium and Compounds	7440-39-3	3.0E-06	7.8E-04	1.8E-05	4.8E-03	3.4E-06	6.8E-05
Beryllium and compounds	7440-41-7	1.1E-08	2.9E-06	6.9E-08	1.8E-05	6.9E-07	1.4E-05
Cadmium and Compounds	7440-43-9	8.6E-08	2.2E-05	5.3E-07	1.4E-04	6.9E-07	1.4E-05
Chromium	7440-47-3	1.1E-04	0.52	6.6E-04	3.22	1.6E-03	0.032
Chromium VI	18540-29-9	3.2E-06	0.016	2.0E-05	0.097	4.9E-05	9.7E-04
Cobalt and Compounds	7440-48-4	1.6E-06	4.2E-04	1.0E-05	2.6E-03	4.7E-05	9.3E-04
Copper and Compounds	7440-50-8	--	2.5E-03	--	0.016	1.8E-03	0.035
Lead and Compounds	7439-92-1	9.6E-08	2.5E-05	6.0E-07	1.5E-04	5.3E-06	1.0E-04
Manganese and Compounds	7439-96-5	2.7E-03	0.17	0.017	1.05	4.4E-03	0.087
Mercury	7439-97-6	--	--	--	--	--	--
Nickel and Compounds	7440-02-0	1.7E-04	0.048	1.1E-03	0.30	6.9E-04	0.014
Phosphorus and Compounds	504	1.5E-05	3.8E-03	9.2E-05	0.024	--	--
Selenium and Compounds	7782-49-2	5.6E-08	1.4E-05	3.4E-07	8.9E-05	3.4E-07	6.8E-06
Silver and Compounds	7440-22-4	1.1E-08	2.9E-06	6.9E-08	1.8E-05	6.9E-07	1.4E-05
Thallium	7440-28-0	1.1E-08	2.9E-06	6.9E-08	1.8E-05	6.9E-07	1.4E-05
Vanadium (fume or dust)	7440-62-2	1.3E-06	3.3E-04	7.9E-06	2.1E-03	6.1E-05	1.2E-03
Zinc and Compounds	7440-66-6	7.1E-07	1.9E-04	4.4E-06	1.2E-03	6.0E-05	1.2E-03
DIESEL PARTICULATE MATTER (DPM)							
DPM	200	--	--	--	--	--	--
Total TAC Emissions Estimate		**3.3E-03**	**0.83**	**0.020**	**5.12**	**9.6E-03**	**0.19**
Total HAP Emissions Estimate		**3.0E-03**	**0.76**	**0.019**	**4.69**	**6.9E-03**	**0.14**

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emissions Estimate					
		Shotblast		Small Palmer		Small Palmer Material Handling	
		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS							
Acetaldehyde	75-07-0	--	--	--	--	--	--
Acrolein	107-02-8	--	--	--	--	--	--
Benzene	71-43-2	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--
Ethylbenzene	100-41-4	--	--	--	--	--	--
Formaldehyde	50-00-0	--	--	--	--	--	--
Hexane	110-54-3	--	--	--	--	--	--
Isopropanol	67-63-0	--	--	--	--	--	--
Methyl Ethyl Ketone	78-93-3	--	--	--	--	--	--
n-Butyl Alcohol	71-36-3	--	--	--	--	--	--
Phenol	108-95-2	--	--	--	--	5.3E-03	1.28
Toluene	108-88-3	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--
Xylene (mixed)	1330-20-7	--	--	--	--	--	--
INORGANIC COMPOUNDS							
Ammonia	7664-41-7	--	--	--	--	--	--
Hydrochloric Acid	7647-01-0	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	3.6E-04	0.022	1.4E-05	3.5E-03	--	--
Silicon dioxide (respirable)	7631-86-9	--	--	--	--	0.034	8.12
POLYCYCLIC AROMATIC HYDROCARBONS (PAH							
Benzo(a)pyrene	50-32-8	--	--	--	--	--	--
Naphthalene	91-20-3	--	--	--	--	--	--
PAHs (excluding Naphthalene)*	401	--	--	--	--	--	--
METALS							
Aluminum and Compounds	7429-90-5	4.2E-04	0.025	5.9E-03	1.55	0.057	13.6
Antimony and Compounds	7440-36-0	1.0E-05	6.1E-04	8.4E-07	2.2E-04	--	--
Arsenic and Compounds	7440-38-2	3.2E-05	1.9E-03	6.9E-07	1.8E-04	--	--
Barium and Compounds	7440-39-3	3.3E-06	2.0E-04	3.5E-05	9.0E-03	--	--
Beryllium and compounds	7440-41-7	6.6E-07	3.9E-05	5.7E-08	1.5E-05	--	--
Cadmium and Compounds	7440-43-9	6.6E-07	3.9E-05	1.3E-07	3.4E-05	--	--
Chromium	7440-47-3	1.6E-03	0.094	5.6E-05	0.015	--	--
Chromium VI	18540-29-9	4.7E-05	2.8E-03	1.7E-06	4.4E-04	--	--
Cobalt and Compounds	7440-48-4	4.6E-05	2.7E-03	9.5E-07	2.5E-04	--	--
Copper and Compounds	7440-50-8	1.7E-03	0.10	1.5E-04	0.039	--	--
Lead and Compounds	7439-92-1	5.1E-06	3.0E-04	1.8E-05	4.7E-03	--	--
Manganese and Compounds	7439-96-5	4.2E-03	0.25	4.5E-04	0.12	--	--
Mercury	7439-97-6	--	--	--	--	--	--
Nickel and Compounds	7440-02-0	6.6E-04	0.039	2.1E-05	5.6E-03	6.2E-04	0.15
Phosphorus and Compounds	504	--	--	--	--	--	--
Selenium and Compounds	7782-49-2	3.3E-07	2.0E-05	2.8E-07	7.4E-05	--	--
Silver and Compounds	7440-22-4	6.6E-07	3.9E-05	3.6E-07	9.2E-05	--	--
Thallium	7440-28-0	6.6E-07	3.9E-05	5.7E-08	1.5E-05	--	--
Vanadium (fume or dust)	7440-62-2	5.9E-05	3.5E-03	3.9E-06	1.0E-03	--	--
Zinc and Compounds	7440-66-6	5.8E-05	3.4E-03	9.6E-05	0.025	--	--
DIESEL PARTICULATE MATTER (DPM)							
DPM	200	--	--	--	--	--	--
Total TAC Emissions Estimate		**9.2E-03**	**0.55**	**6.8E-03**	**1.77**	**0.096**	**23.1**
Total HAP Emissions Estimate		**6.6E-03**	**0.39**	**5.5E-04**	**0.14**	**5.9E-03**	**1.43**

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emissions Estimate					
		Big Palmer Material Handling		Screening Station		Slag Handling	
		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS							
Acetaldehyde	75-07-0	--	--	--	--	--	--
Acrolein	107-02-8	--	--	--	--	--	--
Benzene	71-43-2	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--
Ethylbenzene	100-41-4	--	--	--	--	--	--
Formaldehyde	50-00-0	--	--	--	--	--	--
Hexane	110-54-3	--	--	--	--	--	--
Isopropanol	67-63-0	23.3	5,596	--	--	--	--
Methyl Ethyl Ketone	78-93-3	--	--	--	--	--	--
n-Butyl Alcohol	71-36-3	--	--	--	--	--	--
Phenol	108-95-2	--	--	--	--	--	--
Toluene	108-88-3	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--
Xylene (mixed)	1330-20-7	--	--	--	--	--	--
INORGANIC COMPOUNDS							
Ammonia	7664-41-7	--	--	--	--	--	--
Hydrochloric Acid	7647-01-0	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	--	--	1.2E-04	0.031	2.0E-06	4.9E-04
Silicon dioxide (respirable)	7631-86-9	0.19	46.1	2.60	675	--	--
POLYCYCLIC AROMATIC HYDROCARBONS (PAH							
Benzo(a)pyrene	50-32-8	--	--	--	--	--	--
Naphthalene	91-20-3	--	--	--	--	--	--
PAHs (excluding Naphthalene)*	401	--	--	--	--	--	--
METALS							
Aluminum and Compounds	7429-90-5	0.35	83.1	0.036	9.31	7.6E-05	0.019
Antimony and Compounds	7440-36-0	--	--	5.0E-06	1.3E-03	8.8E-09	2.2E-06
Arsenic and Compounds	7440-38-2	--	--	1.9E-06	5.0E-04	8.8E-09	2.2E-06
Barium and Compounds	7440-39-3	--	--	1.8E-04	0.046	1.7E-07	4.2E-05
Beryllium and compounds	7440-41-7	--	--	3.8E-07	9.9E-05	1.8E-09	4.3E-07
Cadmium and Compounds	7440-43-9	--	--	3.8E-07	9.9E-05	1.8E-09	4.3E-07
Chromium	7440-47-3	--	--	4.2E-04	0.11	4.3E-05	0.010
Chromium VI	18540-29-9	--	--	1.3E-05	3.3E-03	2.5E-07	6.2E-05
Cobalt and Compounds	7440-48-4	--	--	6.6E-06	1.7E-03	5.9E-08	1.4E-05
Copper and Compounds	7440-50-8	--	--	1.3E-03	0.33	4.0E-07	9.8E-05
Lead and Compounds	7439-92-1	--	--	8.6E-05	0.022	6.7E-09	1.6E-06
Manganese and Compounds	7439-96-5	--	--	3.3E-03	0.87	1.3E-04	0.031
Mercury	7439-97-6	--	--	--	--	7.1E-10	1.7E-07
Nickel and Compounds	7440-02-0	--	--	2.1E-04	0.056	8.8E-09	2.2E-06
Phosphorus and Compounds	504	--	--	--	--	8.8E-07	2.2E-04
Selenium and Compounds	7782-49-2	--	--	1.9E-06	5.0E-04	8.8E-09	2.2E-06
Silver and Compounds	7440-22-4	--	--	2.2E-06	5.7E-04	1.8E-09	4.3E-07
Thallium	7440-28-0	--	--	3.8E-07	9.9E-05	1.8E-09	4.3E-07
Vanadium (fume or dust)	7440-62-2	--	--	2.0E-05	5.2E-03	9.4E-08	2.3E-05
Zinc and Compounds	7440-66-6	--	--	4.1E-04	0.11	3.5E-08	8.7E-06
DIESEL PARTICULATE MATTER (DPM)							
DPM	200	--	--	--	--	--	--
Total TAC Emissions Estimate		**23.8**	**5,725**	**2.64**	**686**	**2.5E-04**	**0.061**
Total HAP Emissions Estimate		**0**	**0**	**4.1E-03**	**1.06**	**1.7E-04**	**0.042**

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emissions Estimate					
		Pattern Making		Reclaimed Bead Silo		Reclaimed Bead Overflow Silo	
		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS							
Acetaldehyde	75-07-0	--	--	--	--	--	--
Acrolein	107-02-8	--	--	--	--	--	--
Benzene	71-43-2	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--
Ethylbenzene	100-41-4	--	--	--	--	--	--
Formaldehyde	50-00-0	--	--	--	--	--	--
Hexane	110-54-3	--	--	--	--	--	--
Isopropanol	67-63-0	0.011	2.68	--	--	--	--
Methyl Ethyl Ketone	78-93-3	0.039	9.40	--	--	--	--
n-Butyl Alcohol	71-36-3	0.011	2.68	--	--	--	--
Phenol	108-95-2	--	--	--	--	--	--
Toluene	108-88-3	0.19	44.8	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	0.15	35.4	--	--	--	--
Xylene (mixed)	1330-20-7	--	--	--	--	--	--
INORGANIC COMPOUNDS							
Ammonia	7664-41-7	--	--	--	--	--	--
Hydrochloric Acid	7647-01-0	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	--	--	--	--	--	--
Silicon dioxide (respirable)	7631-86-9	--	--	1.5E-03	0.36	1.5E-03	0.36
POLYCYCLIC AROMATIC HYDROCARBONS (PAH							
Benzo(a)pyrene	50-32-8	--	--	--	--	--	--
Naphthalene	91-20-3	--	--	--	--	--	--
PAHs (excluding Naphthalene)*	401	--	--	--	--	--	--
METALS							
Aluminum and Compounds	7429-90-5	--	--	2.1E-05	5.0E-03	2.1E-05	5.0E-03
Antimony and Compounds	7440-36-0	--	--	2.9E-09	7.0E-07	2.9E-09	7.0E-07
Arsenic and Compounds	7440-38-2	--	--	1.1E-09	2.7E-07	1.1E-09	2.7E-07
Barium and Compounds	7440-39-3	--	--	1.0E-07	2.5E-05	1.0E-07	2.5E-05
Beryllium and compounds	7440-41-7	--	--	2.2E-10	5.3E-08	2.2E-10	5.3E-08
Cadmium and Compounds	7440-43-9	--	--	2.2E-10	5.3E-08	2.2E-10	5.3E-08
Chromium	7440-47-3	--	--	2.4E-07	5.9E-05	2.4E-07	5.9E-05
Chromium VI	18540-29-9	--	--	7.3E-09	1.8E-06	7.3E-09	1.8E-06
Cobalt and Compounds	7440-48-4	--	--	3.9E-09	9.3E-07	3.9E-09	9.3E-07
Copper and Compounds	7440-50-8	--	--	7.3E-07	1.8E-04	7.3E-07	1.8E-04
Lead and Compounds	7439-92-1	--	--	5.0E-08	1.2E-05	5.0E-08	1.2E-05
Manganese and Compounds	7439-96-5	--	--	1.9E-06	4.7E-04	1.9E-06	4.7E-04
Mercury	7439-97-6	--	--	--	--	--	--
Nickel and Compounds	7440-02-0	--	--	1.2E-07	3.0E-05	1.2E-07	3.0E-05
Phosphorus and Compounds	504	--	--	--	--	--	--
Selenium and Compounds	7782-49-2	--	--	1.1E-09	2.7E-07	1.1E-09	2.7E-07
Silver and Compounds	7440-22-4	--	--	1.3E-09	3.1E-07	1.3E-09	3.1E-07
Thallium	7440-28-0	--	--	2.2E-10	5.3E-08	2.2E-10	5.3E-08
Vanadium (fume or dust)	7440-62-2	--	--	1.2E-08	2.8E-06	1.2E-08	2.8E-06
Zinc and Compounds	7440-66-6	--	--	2.4E-07	5.7E-05	2.4E-07	5.7E-05
DIESEL PARTICULATE MATTER (DPM)							
DPM	200	--	--	--	--	--	--
Total TAC Emissions Estimate		**0.40**	**95.0**	**1.5E-03**	**0.37**	**1.5E-03**	**0.37**
Total HAP Emissions Estimate		**0.19**	**44.8**	**2.4E-06**	**5.7E-04**	**2.4E-06**	**5.7E-04**

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emissions Estimate					
		Small Palmer Silo		New Bead Silo		Emergency Generator	
		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS							
Acetaldehyde	75-07-0	--	--	--	--	0.011	0.57
Acrolein	107-02-8	--	--	--	--	4.9E-04	0.025
Benzene	71-43-2	--	--	--	--	2.7E-03	0.14
1,3-Butadiene	106-99-0	--	--	--	--	3.2E-03	0.16
Ethylbenzene	100-41-4	--	--	--	--	1.6E-04	8.0E-03
Formaldehyde	50-00-0	--	--	--	--	0.025	1.26
Hexane	110-54-3	--	--	--	--	3.9E-04	0.020
Isopropanol	67-63-0	--	--	--	--	--	--
Methyl Ethyl Ketone	78-93-3	--	--	--	--	--	--
n-Butyl Alcohol	71-36-3	--	--	--	--	--	--
Phenol	108-95-2	--	--	--	--	--	--
Toluene	108-88-3	--	--	--	--	1.5E-03	0.077
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--
Xylene (mixed)	1330-20-7	--	--	--	--	6.2E-04	0.031
INORGANIC COMPOUNDS							
Ammonia	7664-41-7	--	--	--	--	0.012	0.58
Hydrochloric Acid	7647-01-0	--	--	--	--	2.7E-03	0.14
Molybdenum trioxide	1313-27-5	--	--	--	--	--	--
Silicon dioxide (respirable)	7631-86-9	1.5E-03	0.36	1.5E-03	0.36	--	--
POLYCYCLIC AROMATIC HYDROCARBONS (PAH							
Benzo(a)pyrene	50-32-8	--	--	--	--	5.1E-07	2.6E-05
Naphthalene	91-20-3	--	--	--	--	2.9E-04	0.014
PAHs (excluding Naphthalene)*	401	--	--	--	--	5.3E-04	0.026
METALS							
Aluminum and Compounds	7429-90-5	2.1E-05	5.0E-03	--	--	--	--
Antimony and Compounds	7440-36-0	2.9E-09	7.0E-07	--	--	--	--
Arsenic and Compounds	7440-38-2	1.1E-09	2.7E-07	--	--	2.3E-05	1.2E-03
Barium and Compounds	7440-39-3	1.0E-07	2.5E-05	--	--	--	--
Beryllium and compounds	7440-41-7	2.2E-10	5.3E-08	--	--	--	--
Cadmium and Compounds	7440-43-9	2.2E-10	5.3E-08	--	--	2.2E-05	1.1E-03
Chromium	7440-47-3	2.4E-07	5.9E-05	--	--	--	--
Chromium VI	18540-29-9	7.3E-09	1.8E-06	--	--	1.5E-06	7.3E-05
Cobalt and Compounds	7440-48-4	3.9E-09	9.3E-07	--	--	--	--
Copper and Compounds	7440-50-8	7.3E-07	1.8E-04	--	--	6.0E-05	3.0E-03
Lead and Compounds	7439-92-1	5.0E-08	1.2E-05	--	--	1.2E-04	6.1E-03
Manganese and Compounds	7439-96-5	1.9E-06	4.7E-04	--	--	4.5E-05	2.3E-03
Mercury	7439-97-6	--	--	--	--	2.9E-05	1.5E-03
Nickel and Compounds	7440-02-0	1.2E-07	3.0E-05	--	--	5.7E-05	2.8E-03
Phosphorus and Compounds	504	--	--	--	--	--	--
Selenium and Compounds	7782-49-2	1.1E-09	2.7E-07	--	--	3.2E-05	1.6E-03
Silver and Compounds	7440-22-4	1.3E-09	3.1E-07	--	--	--	--
Thallium	7440-28-0	2.2E-10	5.3E-08	--	--	--	--
Vanadium (fume or dust)	7440-62-2	1.2E-08	2.8E-06	--	--	--	--
Zinc and Compounds	7440-66-6	2.4E-07	5.7E-05	--	--	--	--
DIESEL PARTICULATE MATTER (DPM)							
DPM	200	--	--	--	--	0.49	24.5
Total TAC Emissions Estimate		**1.5E-03**	**0.37**	**1.5E-03**	**0.36**	**0.55**	**27.5**
Total HAP Emissions Estimate		**2.4E-06**	**5.7E-04**	**0**	**0**	**0.050**	**2.48**

Table 25
PTE TAC Emissions Summary
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emissions Estimate			
		Heat Treat Propane Combustion		Facility Total	
		(lb/day)	(lb/yr)	(lb/day)	(lb/yr)
ORGANIC COMPOUNDS					
Acetaldehyde	75-07-0	3.4E-04	0.082	0.012	0.65
Acrolein	107-02-8	2.2E-04	0.052	7.1E-04	0.077
Benzene	71-43-2	6.4E-04	0.15	3.4E-03	0.29
1,3-Butadiene	106-99-0	--	--	3.2E-03	0.16
Ethylbenzene	100-41-4	7.5E-04	0.18	9.1E-04	0.19
Formaldehyde	50-00-0	1.4E-03	0.33	0.027	1.59
Hexane	110-54-3	5.0E-04	0.12	9.0E-04	0.14
Isopropanol	67-63-0	--	--	23.3	5,599
Methyl Ethyl Ketone	78-93-3	--	--	0.039	9.40
n-Butyl Alcohol	71-36-3	--	--	0.011	2.68
Phenol	108-95-2	--	--	5.3E-03	1.28
Toluene	108-88-3	2.9E-03	0.70	0.19	45.6
1,2,4-Trimethylbenzene	95-63-6	--	--	0.15	35.4
Xylene (mixed)	1330-20-7	2.2E-03	0.52	2.8E-03	0.55
INORGANIC COMPOUNDS					
Ammonia	7664-41-7	0.27	64.7	0.28	65.3
Hydrochloric Acid	7647-01-0	--	--	2.7E-03	0.14
Molybdenum trioxide	1313-27-5	--	--	0.022	0.60
Silicon dioxide (respirable)	7631-86-9	--	--	3.51	909
POLYCYCLIC AROMATIC HYDROCARBONS (PAH					
Benzo(a)pyrene	50-32-8	--	--	5.1E-07	2.6E-05
Naphthalene	91-20-3	2.7E-05	6.5E-03	3.1E-04	0.021
PAHs (excluding Naphthalene)*	401	9.0E-06	2.2E-03	5.4E-04	0.029
METALS					
Aluminum and Compounds	7429-90-5	--	--	0.58	144
Antimony and Compounds	7440-36-0	--	--	9.9E-04	0.22
Arsenic and Compounds	7440-38-2	--	--	3.6E-03	0.48
Barium and Compounds	7440-39-3	--	--	5.9E-03	1.11
Beryllium and compounds	7440-41-7	--	--	2.4E-06	3.2E-04
Cadmium and Compounds	7440-43-9	--	--	3.7E-04	0.044
Chromium	7440-47-3	--	--	0.087	8.38
Chromium VI	18540-29-9	--	--	2.6E-03	0.49
Cobalt and Compounds	7440-48-4	--	--	2.6E-04	0.054
Copper and Compounds	7440-50-8	--	--	0.015	9.56
Lead and Compounds	7439-92-1	--	--	1.6E-03	0.79
Manganese and Compounds	7439-96-5	--	--	0.053	9.00
Mercury	7439-97-6	--	--	2.5E-04	0.036
Nickel and Compounds	7440-02-0	--	--	0.21	4.68
Phosphorus and Compounds	504	--	--	0.012	2.00
Selenium and Compounds	7782-49-2	--	--	3.4E-03	0.18
Silver and Compounds	7440-22-4	--	--	8.8E-06	0.11
Thallium	7440-28-0	--	--	2.2E-06	2.7E-04
Vanadium (fume or dust)	7440-62-2	--	--	0.013	0.085
Zinc and Compounds	7440-66-6	--	--	0.014	3.65
DIESEL PARTICULATE MATTER (DPM)					
DPM	200	--	--	0.49	24.5
Total TAC Emissions Estimate		**0.28**	**66.8**	**29.1**	**6,881**
Total HAP Emissions Estimate		**8.9E-03**	**2.14**	**0.62**	**77.0**

Table D1
Alloy Composition Data
Eagle Foundry Company

ALLOY	TAC Percentage of Alloy [1] (%)						TAC Fraction of Alloy [a] (ton TAC/ton melt)		
	Mn	Cr	P	Ni	Cu	Mo	Mn	Cr	Ni
	7439-96-5	7440-47-3	504	7440-02-0	7440-50-8	7439-98-7	7439-96-5	7440-47-3	7440-02-0
High Chrome Alloy									
HC25	1.05	26.0 [2]	0.10 [2]	0.80 [2]	0	0.50	0.011	0.26	--
LC25	1.05	24.5 [2]	0.10 [2]	0.80 [2]	0	0.50	0.011	0.25	--
CR20	0.90	19.0 [2]	0.10 [2]	0.80 [2]	0	0.70	9.0E-03	0.19	--
CR12	1.20	13.0 [2]	0.10 [2]	0.80 [2]	0	0.50	0.012	0.13	--
F3	1.00	15.0 [2]	0.030 [2]	0.80 [2]	0	0.325	0.010	0.15	--
Manganese Alloy									
MNB2	12.75	0.50 [2]	0.070 [2]	0.80 [2]	0	0.50	0.13	5.0E-03	8.0E-03
121L	12.75	0.50 [2]	0.070 [2]	0.80 [2]	0	0.95	0.13	5.0E-03	8.0E-03
Low Alloy									
1025	0.70	0.30 [2]	0.060 [2]	0.50 [2]	0.5	0.25	7.0E-03	3.0E-03	5.0E-03
8630	0.80	0.50 [2]	0.040 [2]	0.55	0	0.20	8.0E-03	5.0E-03	5.5E-03
4330	0.70	0.80 [2]	0.040 [2]	1.83	0	0.25	7.0E-03	8.0E-03	0.018
CM40	0.75	3.10 [2]	0.050 [2]	1.00	0	0.475	7.5E-03	0.031	0.010
Stainless Alloy									
HH	1.00	26.0 [2]	0.040 [2]	12.5	0	0.50 [2]	0.010	0.26	0.125
HK	1.00	26.0 [2]	0.040 [2]	20.0	0	0.50 [2]	0.010	0.26	0.20
HC	0.75	28.0 [2]	0.040 [2]	4.00 [2]	0	0.50 [2]	7.5E-03	0.28	0.040
All Non-Stainless Steel Alloys [3]									
Average Annual	**3.06**	**9.38**	**0.069**	**0.86**	**0.045**	**0.47**	**--**	**--**	**--**
Stainless Steel Alloy [4]									
Average Annual	**0.92**	**26.67**	**0.04**	**12.17**	**--**	**0.50**	**--**	**--**	**--**
Maximum Daily	**1.00**	**28.00**	**0.04**	**20.00**	**--**	**0.50**	**--**	**--**	**--**
MN & Low Alloy [5]									
Average Annual	**4.74**	**0.95**	**0.055**	**0.91**	**0.083**	**0.44**	**--**	**--**	**--**
Maximum Daily	**12.75**	**3.10**	**0.070**	**1.83**	**0.50**	**0.95**	**--**	**--**	**--**
Ton TAC/Ton Melt [6]									
White Iron (Maximum)	**--**	**--**	**--**	**--**	**--**	**--**	**0.012**	**0.26**	**--**
Steel (Average)	**--**	**--**	**--**	**--**	**--**	**--**	**0.035**	**0.10**	**0.047**

Notes

[a] TAC fraction of alloy (ton TAC/ton melt) = (TAC percentage of alloy [%]/100) x (1 ton melt)

References

[1] Alloy data provided by Eagle Foundry.

[2] This is not added element to the alloy. Value is the maximum trace quantity that may be in raw materials.

[3] See Table 10, PTE Grinding - Non-stainless Steel TAC Emission Estimates and Table D2, Alloy Toxicity Weighted Emission Rates. Annual emissions for non-stainless steel grinding are based on the average composition of non-stainless steel alloys. Daily emissions estimates are based on alloy MNB2, which has the highest acute toxicity weighted emission rate for non-stainless steel alloys and will result in the maximum predicted acute hazard index.

[4] See Table 9, PTE Grinding - Stainless Steel TAC Emission Estimates and Table D2, Alloy Toxicity Weighted Emission Rates. Annual emissions for stainless steel grinding are based on the average composition of stainless steel alloys. Daily emissions estimates are based on alloy HK, which has the highest acute toxicity weighted emission rate for stainless steel alloys and will result in the maximum predicted acute hazard index.

[5] See Table 7, PTE Air Arc Cutting TAC Emission Estimates and Table D2, Alloy Toxicity Weighted Emission Rates. Annual emissions for Air Arc are based on the average composition of Air Arc alloys. Daily emissions estimates are based on alloy MNB2, which has the highest acute toxicity weighted emission rate for Air Arc cut alloys and will result in the maximum predicted acute hazard index.

[6] White Iron TAC fractions of alloy are based on the maximum TAC fraction of all White Iron alloys as a conservative estimate. Steel TAC fractions of alloy are based on the average TAC fraction of all steel alloys. This is highly conservative, as stainless steel alloys comprise less than 2 percent of total production.

Table D2
Alloy Toxicity Weighted Emission Rates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor [1]		Emissions (lb)	Acute RBC [2] (ug/m^3)	Toxicity Weighted Emissions Rate [a]
Maximum WER (HK-Steel) =						**0.027**
Maximum WER for Manganese and Low Alloy Steel (MNB2) =						**4.99E-03**
Maximum WER for Non-Stainless Steel (MNB2) =						**4.99E-03**
HC25 - White Iron						
Total WER						**3.49E-03**
Aluminum and Compounds	7429-90-5	3.66E-03	(lb/ton melt)	3.66E-03 [b]	--	--
Antimony and Compounds	7440-36-0	2.54E-05	(lb/ton melt)	2.54E-05 [b]	1	2.54E-05
Arsenic and Compounds	7440-38-2	< 4.42E-05	(lb/ton melt)	4.42E-05 [b]	0.2	2.21E-04
Barium and Compounds	7440-39-3	1.11E-04	(lb/ton melt)	1.11E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 3.71E-06	(lb/ton melt)	3.71E-06 [b]	0.03	1.24E-04
Chromium	7440-47-3	3.24E-04	(lb/tons TAC in melt)	8.41E-05 [c]	--	--
Chromium VI	18540-29-9	1.88E-06	(lb/tons TAC in melt)	4.89E-07 [c]	0.3	1.63E-06
Cobalt and Compounds	7440-48-4	< 4.48E-06	(lb/ton melt)	4.48E-06 [b]	--	--
Copper and Compounds	7440-50-8	1.74E-04	(lb/ton melt)	1.74E-04 [b]	100	1.74E-06
Lead and Compounds	7439-92-1	< 9.93E-05	(lb/ton melt)	9.93E-05 [b]	0.15	6.62E-04
Manganese and Compounds	7439-96-5	4.67E-02	(lb/tons TAC in melt)	4.90E-04 [c]	0.3	1.63E-03
Mercury	7439-97-6	< 3.51E-06	(lb/ton melt)	3.51E-06 [b]	0.6	5.85E-06
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	1.62E-04	(lb/ton melt)	1.62E-04 [b]	0.2	8.11E-04
Phosphorus and Compounds	504	< 2.08E-04	(lb/ton melt)	2.08E-04 [b]	--	--
Selenium and Compounds	7782-49-2	ND		--	2	--
Silver and Compounds	7440-22-4	< 1.75E-05	(lb/ton melt)	1.75E-05 [b]	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.32E-04	(lb/ton melt)	4.32E-04 [b]	--	--
LC25 - White Iron						
Total WER						**3.49E-03**
Aluminum and Compounds	7429-90-5	3.66E-03	(lb/ton melt)	3.66E-03 [b]	--	--
Antimony and Compounds	7440-36-0	2.54E-05	(lb/ton melt)	2.54E-05 [b]	1	2.54E-05
Arsenic and Compounds	7440-38-2	< 4.42E-05	(lb/ton melt)	4.42E-05 [b]	0.2	2.21E-04
Barium and Compounds	7440-39-3	1.11E-04	(lb/ton melt)	1.11E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 3.71E-06	(lb/ton melt)	3.71E-06 [b]	0.03	1.24E-04
Chromium	7440-47-3	3.24E-04	(lb/tons TAC in melt)	7.93E-05 [c]	--	--
Chromium VI	18540-29-9	1.88E-06	(lb/tons TAC in melt)	4.61E-07 [c]	0.3	1.54E-06
Cobalt and Compounds	7440-48-4	< 4.48E-06	(lb/ton melt)	4.48E-06 [b]	--	--
Copper and Compounds	7440-50-8	1.74E-04	(lb/ton melt)	1.74E-04 [b]	100	1.74E-06
Lead and Compounds	7439-92-1	< 9.93E-05	(lb/ton melt)	9.93E-05 [b]	0.15	6.62E-04
Manganese and Compounds	7439-96-5	0.047	(lb/tons TAC in melt)	4.90E-04 [c]	0.3	1.63E-03
Mercury	7439-97-6	< 3.51E-06	(lb/ton melt)	3.51E-06 [b]	0.6	5.85E-06
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	1.62E-04	(lb/ton melt)	1.62E-04 [b]	0.2	8.11E-04
Phosphorus and Compounds	504	< 2.08E-04	(lb/ton melt)	2.08E-04 [b]	--	--
Selenium and Compounds	7782-49-2	ND		--	2	--
Silver and Compounds	7440-22-4	< 1.75E-05	(lb/ton melt)	1.75E-05 [b]	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.32E-04	(lb/ton melt)	4.32E-04 [b]	--	--

Table D2
Alloy Toxicity Weighted Emission Rates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor [1]	Emissions (lb)	Acute RBC [2] (ug/m^3)	Toxicity Weighted Emissions Rate [a]
CR20 - White Iron					
Total WER					**3.25E-03**
Aluminum and Compounds	7429-90-5	3.66E-03 (lb/ton melt)	3.66E-03 [b]	--	--
Antimony and Compounds	7440-36-0	2.54E-05 (lb/ton melt)	2.54E-05 [b]	1	2.54E-05
Arsenic and Compounds	7440-38-2	< 4.42E-05 (lb/ton melt)	4.42E-05 [b]	0.2	2.21E-04
Barium and Compounds	7440-39-3	1.11E-04 (lb/ton melt)	1.11E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND	--	0.02	--
Cadmium and Compounds	7440-43-9	< 3.71E-06 (lb/ton melt)	3.71E-06 [b]	0.03	1.24E-04
Chromium	7440-47-3	3.24E-04 (lb/tons TAC in melt)	6.15E-05 [c]	--	--
Chromium VI	18540-29-9	1.88E-06 (lb/tons TAC in melt)	3.57E-07 [c]	0.3	1.19E-06
Cobalt and Compounds	7440-48-4	< 4.48E-06 (lb/ton melt)	4.48E-06 [b]	--	--
Copper and Compounds	7440-50-8	1.74E-04 (lb/ton melt)	1.74E-04 [b]	100	1.74E-06
Lead and Compounds	7439-92-1	< 9.93E-05 (lb/ton melt)	9.93E-05 [b]	0.15	6.62E-04
Manganese and Compounds	7439-96-5	0.047 (lb/tons TAC in melt)	4.20E-04 [c]	0.3	1.40E-03
Mercury	7439-97-6	< 3.51E-06 (lb/ton melt)	3.51E-06 [b]	0.6	5.85E-06
Molybdenum Trioxide	1313-27-5	1.27E-05 (lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	1.62E-04 (lb/ton melt)	1.62E-04 [b]	0.2	8.11E-04
Phosphorus and Compounds	504	< 2.08E-04 (lb/ton melt)	2.08E-04 [b]	--	--
Selenium and Compounds	7782-49-2	ND	--	2	--
Silver and Compounds	7440-22-4	< 1.75E-05 (lb/ton melt)	1.75E-05 [b]	--	--
Thallium	7440-28-0	ND	--	--	--
Vanadium (fume or dust)	7440-62-2	ND	--	0.8	--
Zinc and Compounds	7440-66-6	4.32E-04 (lb/ton melt)	4.32E-04 [b]	--	--
CR12 - White Iron					
Total WER					**3.72E-03**
Aluminum and Compounds	7429-90-5	3.66E-03 (lb/ton melt)	3.66E-03 [b]	--	--
Antimony and Compounds	7440-36-0	2.54E-05 (lb/ton melt)	2.54E-05 [b]	1	2.54E-05
Arsenic and Compounds	7440-38-2	< 4.42E-05 (lb/ton melt)	4.42E-05 [b]	0.2	2.21E-04
Barium and Compounds	7440-39-3	1.11E-04 (lb/ton melt)	1.11E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND	--	0.02	--
Cadmium and Compounds	7440-43-9	< 3.71E-06 (lb/ton melt)	3.71E-06 [b]	0.03	1.24E-04
Chromium	7440-47-3	3.24E-04 (lb/tons TAC in melt)	4.21E-05 [c]	--	--
Chromium VI	18540-29-9	1.88E-06 (lb/tons TAC in melt)	2.44E-07 [c]	0.3	8.15E-07
Cobalt and Compounds	7440-48-4	< 4.48E-06 (lb/ton melt)	4.48E-06 [b]	--	--
Copper and Compounds	7440-50-8	1.74E-04 (lb/ton melt)	1.74E-04 [b]	100	1.74E-06
Lead and Compounds	7439-92-1	< 9.93E-05 (lb/ton melt)	9.93E-05 [b]	0.15	6.62E-04
Manganese and Compounds	7439-96-5	0.047 (lb/tons TAC in melt)	5.60E-04 [c]	0.3	1.87E-03
Mercury	7439-97-6	< 3.51E-06 (lb/ton melt)	3.51E-06 [b]	0.6	5.85E-06
Molybdenum Trioxide	1313-27-5	1.27E-05 (lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	1.62E-04 (lb/ton melt)	1.62E-04 [b]	0.2	8.11E-04
Phosphorus and Compounds	504	< 2.08E-04 (lb/ton melt)	2.08E-04 [b]	--	--
Selenium and Compounds	7782-49-2	ND	--	2	--
Silver and Compounds	7440-22-4	< 1.75E-05 (lb/ton melt)	1.75E-05 [b]	--	--
Thallium	7440-28-0	ND	--	--	--
Vanadium (fume or dust)	7440-62-2	ND	--	0.8	--
Zinc and Compounds	7440-66-6	4.32E-04 (lb/ton melt)	4.32E-04 [b]	--	--

Table D2
Alloy Toxicity Weighted Emission Rates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor [1]		Emissions (lb)	Acute RBC [2] (ug/m^3)	Toxicity Weighted Emissions Rate [a]
F3 - White Iron						
Total WER						**3.41E-03**
Aluminum and Compounds	7429-90-5	3.66E-03	(lb/ton melt)	3.66E-03 [b]	--	--
Antimony and Compounds	7440-36-0	2.54E-05	(lb/ton melt)	2.54E-05 [b]	1	2.54E-05
Arsenic and Compounds	7440-38-2	< 4.42E-05	(lb/ton melt)	4.42E-05 [b]	0.2	2.21E-04
Barium and Compounds	7440-39-3	1.11E-04	(lb/ton melt)	1.11E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 3.71E-06	(lb/ton melt)	3.71E-06 [b]	0.03	1.24E-04
Chromium	7440-47-3	3.24E-04	(lb/tons TAC in melt)	4.85E-05 [c]	--	--
Chromium VI	18540-29-9	1.88E-06	(lb/tons TAC in melt)	2.82E-07 [c]	0.3	9.40E-07
Cobalt and Compounds	7440-48-4	< 4.48E-06	(lb/ton melt)	4.48E-06 [b]	--	--
Copper and Compounds	7440-50-8	1.74E-04	(lb/ton melt)	1.74E-04 [b]	100	1.74E-06
Lead and Compounds	7439-92-1	< 9.93E-05	(lb/ton melt)	9.93E-05 [b]	0.15	6.62E-04
Manganese and Compounds	7439-96-5	0.047	(lb/tons TAC in melt)	4.67E-04 [c]	0.3	1.56E-03
Mercury	7439-97-6	< 3.51E-06	(lb/ton melt)	3.51E-06 [b]	0.6	5.85E-06
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	1.62E-04	(lb/ton melt)	1.62E-04 [b]	0.2	8.11E-04
Phosphorus and Compounds	504	< 2.08E-04	(lb/ton melt)	2.08E-04 [b]	--	--
Selenium and Compounds	7782-49-2	ND		--	2	--
Silver and Compounds	7440-22-4	< 1.75E-05	(lb/ton melt)	1.75E-05 [b]	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.32E-04	(lb/ton melt)	4.32E-04 [b]	--	--
CM40 - Steel						
Total WER						**2.72E-03**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	1.35E-04 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	9.89E-07 [c]	0.3	3.30E-06
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	4.73E-05 [c]	0.3	1.58E-04
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	2.57E-04 [c]	0.2	1.28E-03
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05
Silver and Compounds	7440-22-4	ND		--	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04	(lb/ton melt)	4.34E-04 [b]	--	--

Table D2
Alloy Toxicity Weighted Emission Rates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor [1]		Emissions (lb)	Acute RBC [2] (ug/m^3)	Toxicity Weighted Emissions Rate [a]
MNB2 - Steel						
Total WER						**4.99E-03**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	2.18E-05 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	1.60E-07 [c]	0.3	5.32E-07
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	8.05E-04 [c]	0.3	2.68E-03
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	2.05E-04 [c]	0.2	1.03E-03
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05
Silver and Compounds	7440-22-4	ND		--	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04	(lb/ton melt)	4.34E-04 [b]	--	--
121L - Steel						
Total WER						**4.99E-03**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	2.18E-05 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	1.60E-07 [c]	0.3	5.32E-07
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	8.05E-04 [c]	0.3	2.68E-03
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	2.05E-04 [c]	0.2	1.03E-03
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05
Silver and Compounds	7440-22-4	ND		--	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04	(lb/ton melt)	4.34E-04 [b]	--	--

Table D2
Alloy Toxicity Weighted Emission Rates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor [1]		Emissions (lb)	Acute RBC [2] (ug/m^3)	Toxicity Weighted Emissions Rate [a]
1025 - Steel						
Total WER						**2.07E-03**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	1.31E-05 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	9.57E-08 [c]	0.3	3.19E-07
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	4.42E-05 [c]	0.3	1.47E-04
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	1.28E-04 [c]	0.2	6.42E-04
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05
Silver and Compounds	7440-22-4	ND		--	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04	(lb/ton melt)	4.34E-04 [b]	--	--
8630 - Steel						
Total WER						**2.15E-03**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	2.18E-05 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	1.60E-07 [c]	0.3	5.32E-07
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	5.05E-05 [c]	0.3	1.68E-04
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	1.41E-04 [c]	0.2	7.06E-04
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05
Silver and Compounds	7440-22-4	ND		--	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04	(lb/ton melt)	4.34E-04 [b]	--	--

Table D2
Alloy Toxicity Weighted Emission Rates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor [1]		Emissions (lb)	Acute RBC [2] (ug/m^3)	Toxicity Weighted Emissions Rate [a]
4330 - Steel						
Total WER						**3.77E-03**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	3.49E-05 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	2.55E-07 [c]	0.3	8.51E-07
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	4.42E-05 [c]	0.3	1.47E-04
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	4.69E-04 [c]	0.2	2.34E-03
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05
Silver and Compounds	7440-22-4	ND		--	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04	(lb/ton melt)	4.34E-04 [b]	--	--
HC - Steel						
Total WER						**6.60E-03**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	1.22E-03 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	8.93E-06 [c]	0.3	2.98E-05
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	4.73E-05 [c]	0.3	1.58E-04
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	1.03E-03 [c]	0.2	5.14E-03
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05
Silver and Compounds	7440-22-4	ND		--	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04	(lb/ton melt)	4.34E-04 [b]	--	--

Table D2
Alloy Toxicity Weighted Emission Rates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor [1]		Emissions (lb)	Acute RBC [2] (ug/m^3)	Toxicity Weighted Emissions Rate [a]
HH - Steel						
Total WER						**0.018**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	1.14E-03 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	8.29E-06 [c]	0.3	2.76E-05
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	6.31E-05 [c]	0.3	2.10E-04
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	3.21E-03 [c]	0.2	1.61E-02
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05
Silver and Compounds	7440-22-4	ND		--	--	--
Thallium	7440-28-0	ND		--	--	--
Vanadium (fume or dust)	7440-62-2	ND		--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04	(lb/ton melt)	4.34E-04 [b]	--	--
HK - Steel						
Total WER						**0.027**
Aluminum and Compounds	7429-90-5	3.34E-03	(lb/ton melt)	3.34E-03 [b]	--	--
Antimony and Compounds	7440-36-0	< 3.08E-05	(lb/ton melt)	3.08E-05 [b]	1.00	3.08E-05
Arsenic and Compounds	7440-38-2	< 1.14E-04	(lb/ton melt)	1.14E-04 [b]	0.2	5.72E-04
Barium and Compounds	7440-39-3	1.77E-04	(lb/ton melt)	1.77E-04 [b]	--	--
Beryllium and compounds	7440-41-7	ND		--	0.02	--
Cadmium and Compounds	7440-43-9	< 1.09E-05	(lb/ton melt)	1.09E-05 [b]	0.03	3.64E-04
Chromium	7440-47-3	4.37E-03	(lb/tons TAC in melt)	1.14E-03 [c]	--	--
Chromium VI	18540-29-9	3.19E-05	(lb/tons TAC in melt)	8.29E-06 [c]	0.3	2.76E-05
Cobalt and Compounds	7440-48-4	< 4.41E-06	(lb/ton melt)	4.41E-06 [b]	--	--
Copper and Compounds	7440-50-8	< 1.54E-04	(lb/ton melt)	1.54E-04 [b]	100	1.54E-06
Lead and Compounds	7439-92-1	< 3.66E-05	(lb/ton melt)	3.66E-05 [b]	0.15	2.44E-04
Manganese and Compounds	7439-96-5	6.31E-03	(lb/tons TAC in melt)	6.31E-05 [c]	0.3	2.10E-04
Mercury	7439-97-6	< 7.08E-06	(lb/ton melt)	7.08E-06 [b]	0.6	1.18E-05
Molybdenum Trioxide	1313-27-5	1.27E-05	(lb/ton melt)	1.27E-05 [b]	--	--
Nickel and Compounds	7440-02-0	0.026	(lb/tons TAC in melt)	5.14E-03 [c]	0.2	2.57E-02
Phosphorus and Compounds	504	< 3.88E-04	(lb/ton melt)	3.88E-04 [b]	--	--
Selenium and Compounds	7782-49-2	< 1.07E-04	(lb/ton melt)	1.07E-04 [b]	2	5.35E-05

Table D2
Alloy Toxicity Weighted Emission Rates
Eagle Foundry Company

Toxic Air Contaminant	CAS/DEQ ID	Emission Factor [1]	Emissions (lb)	Acute RBC [2] (ug/m^3)	Toxicity Weighted Emissions Rate [a]
Silver and Compounds	7440-22-4	ND	--	--	--
Thallium	7440-28-0	ND	--	--	--
Vanadium (fume or dust)	7440-62-2	ND	--	0.8	--
Zinc and Compounds	7440-66-6	4.34E-04 (lb/ton melt)	4.34E-04 [b]	--	--

Notes

ND = non-detect

[a] Toxicity weighted emission rate = (emissions [lb]) / (acute RBC [ug/m^3])

[b] Emissions estimate (lb) = (emission factor [lb/tons melt]) x (metal melted [tons])

Metal melted (tons) = 1

[c] Emissions estimate (lb) = (emission factor [lb/tons TAC in melt]) x (metal melted [tons]) x (tons TAC/tons metal melted)

ALLOY	TAC in Melt [3] (tons TAC/ton melt)		
	Mn	Cr	Ni
HC25	0.011	0.26	--
LC25	0.011	0.245	--
CR20	9.0E-03	0.19	--
CR12	0.012	0.13	--
F3	0.010	0.15	--
CM40	7.5E-03	0.031	0.010
MNB2	0.128	5.0E-03	8.0E-03
121L	0.128	5.0E-03	8.0E-03
1025	7.0E-03	3.0E-03	5.0E-03
8630	8.0E-03	5.0E-03	5.5E-03
4330	7.0E-03	8.0E-03	0.018
HC	7.5E-03	0.28	0.04
HH	0.010	0.26	0.13
HK	0.010	0.26	0.20

References

[1] See Table 2, Foundry Emission Factors. Value assumes the sum of the Main Foundry and Cooling Bunker emission factors.

[2] OAR 340-245-8010, Table 2.

[3] See Table D1, Alloy Composition Data.

Table D3
Silica Data
Eagle Foundry Company

Product	Product Constituent [1]	CAS	Product Constituent Weight Percent (%)	Constituent Molecular Formula	Constituent Molecular Weight (g/mol)	TAC	CAS	TAC Compound Molecular Weight (g/mol)	TAC Compound Count	TAC Percentage (%)	Total TAC Percentage in Product [b] (%)
Naigai Cerabead Coated Cerabead	Mullite	1302-93-8	90	$3Al_2O_3 \cdot 2SiO_2$	426.2	Aluminum Oxide	7429-90-5	102	3	71.8 [a]	64.62
						Silica, crystalline	7631-86-9	60.1	2	28.2 [a]	25.38
	Silica, crystalline	7631-86-9	10	SiO_2	60.1	Silica, crystalline	7631-86-9	60.1	1	100 [a]	10.00
										Total crystalline silica percentage in product (%) =	**35.38**

Element	MW (g/mol)
Oxygen (O)	16.0
Silica (Si)	28.1
Aluminum (Al)	27.0

Notes

[a] TAC percentage (%) = (TAC compound molecular weight [g/mol]) x (TAC compound count) /(constituent molecular weight [g/mol]) x 100

[b] Total TAC percentage in product (%) = (TAC percentage [%]) x (product constituent weight percentage [%]/100)

References

[1] Solid constituent of Cerabead as identified in the product SDS.

Table D4
Baghouse Dust
Eagle Foundry Company

Pollutant	CAS/ DEQ ID	Sample (mg/kg) [1]					
		Foundry	Reclaim	Small Palmer	Finishing	Mesh Blast	Screening
		FND	REC	SP	FIN	MESH	SCR
Aluminum	7429-90-5	7,460	15,200	5,170	4,780	641	4,980
Antimony	7440-36-0	1.40	3.72	0.729	ND (5.21)	16.0	0.699
Arsenic	7440-38-2	0.860	2.42	0.600	15.7	48.8	ND (0.532)
Barium	7440-39-3	41.2	94.5	30.2	140	ND (10.2)	24.4
Beryllium	7440-41-7	ND (0.104)	0.262	ND (0.0988)	ND (1.04)	ND (2.05)	ND (0.106)
Cadmium	7440-43-9	ND (1.04)	1.42	0.114	4.05	ND (2.05)	ND (0.106)
Chromium	7440-47-3	99.5	454	48.9	15,800	2,440	58.1
Chromium VI	18540-29-9	ND (0.217)	2.74	0.985	ND (0.221)	0.281	0.401
Cobalt	7440-48-4	1.35	3.63	0.828	76.0	70.3	0.920
Copper	7440-50-8	191	306	130	753	2,660	174
Lead	7439-92-1	25.0	114	15.6	4.51	7.86	12.0
Manganese	7439-96-5	648	2,670	389	7,240	6,520	464
Mercury	7439-97-6	ND (0.0415)	ND (0.0430)	ND (0.0395)	ND (0.417)	ND (0.820)	ND (0.0426)
Molybdenum	7439-98-7	16.6	11.0	7.84	980	373	11.1
Nickel	7440-02-0	30.3	57.6	18.6	1,490	1,020	29.7
Phosphorus	504	ND (51.9)	ND (53.8)	ND (49.4)	ND (52.1)	ND (102)	ND (53.2)
Selenium	7782-49-2	ND (0.519)	2.31	ND (0.494)	ND (5.21)	ND (1.02)	ND (0.532)
Silver	7440-22-4	ND (1.04)	2.53	0.309	ND (1.04)	ND (2.05)	0.306
Thallium	7440-28-0	ND (0.104)	0.152	ND (0.0988)	ND (1.04)	ND (2.05)	ND (0.106)
Vanadium	7440-62-2	5.80	14.5	3.36	60.2	90.9	2.79
Zinc	7440-66-6	185	59.4	83.9	33.5	89.4	57.0

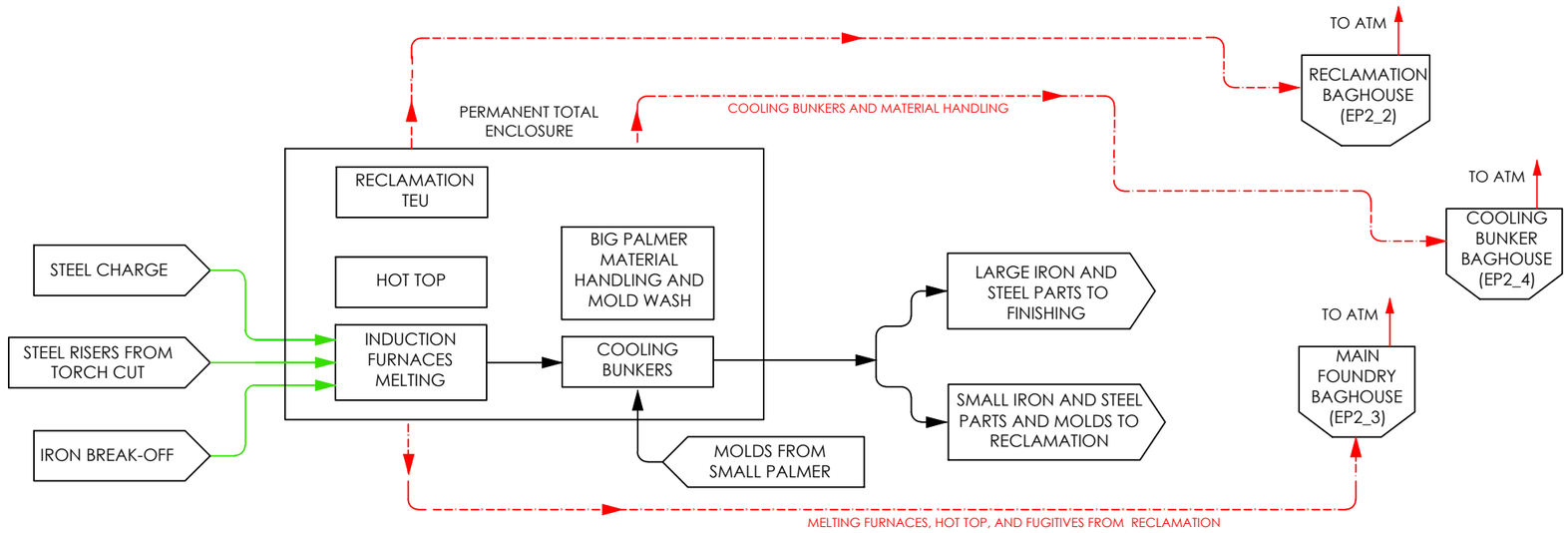
Pollutant	CAS/ DEQ ID	Sample (% of PM)					
		Foundry	Reclaim	Small Palmer	Finishing	Mesh Blast	Screening
		FND	REC	SP	FIN	MESH	SCR
Aluminum	7429-90-5	0.746	1.52	0.517	0.478	0.0641	0.498
Antimony	7440-36-0	1.40E-04	3.72E-04	7.29E-05	2.61E-04	1.60E-03	6.99E-05
Arsenic	7440-38-2	8.60E-05	2.42E-04	6.00E-05	1.57E-03	4.88E-03	2.66E-05
Barium	7440-39-3	4.12E-03	9.45E-03	3.02E-03	0.014	5.10E-04	2.44E-03
Beryllium	7440-41-7	5.20E-06	2.62E-05	4.94E-06	5.20E-05	1.03E-04	5.30E-06
Cadmium	7440-43-9	5.20E-05	1.42E-04	1.14E-05	4.05E-04	1.03E-04	5.30E-06
Chromium	7440-47-3	9.95E-03	0.0454	4.89E-03	1.58	0.244	5.81E-03
Chromium VI	18540-29-9	1.09E-05	2.74E-04	9.85E-05	1.11E-05	2.81E-05	4.01E-05
Cobalt	7440-48-4	1.35E-04	3.63E-04	8.28E-05	7.60E-03	7.03E-03	9.20E-05
Copper	7440-50-8	0.0191	0.0306	0.013	0.0753	0.266	0.0174
Lead	7439-92-1	2.50E-03	0.0114	1.56E-03	4.51E-04	7.86E-04	1.20E-03
Manganese	7439-96-5	0.0648	0.267	0.0389	0.724	0.652	0.0464
Mercury	7439-97-6	ND	ND	ND	ND	ND	ND
Molybdenum	7439-98-7	1.66E-03	1.10E-03	7.84E-04	0.098	0.0373	1.11E-03
Nickel	7440-02-0	3.03E-03	5.76E-03	1.86E-03	0.149	0.102	2.97E-03
Phosphorus	504	ND	ND	ND	ND	ND	ND
Selenium	7782-49-2	2.60E-05	2.31E-04	2.47E-05	2.61E-04	5.10E-05	2.66E-05
Silver	7440-22-4	5.20E-05	2.53E-04	3.09E-05	5.20E-05	1.03E-04	3.06E-05
Thallium	7440-28-0	5.20E-06	1.52E-05	4.94E-06	5.20E-05	1.03E-04	5.30E-06
Vanadium	7440-62-2	5.80E-04	1.45E-03	3.36E-04	6.02E-03	9.09E-03	2.79E-04
Zinc	7440-66-6	0.0185	5.94E-03	8.39E-03	3.35E-03	8.94E-03	5.70E-03

Attachment B

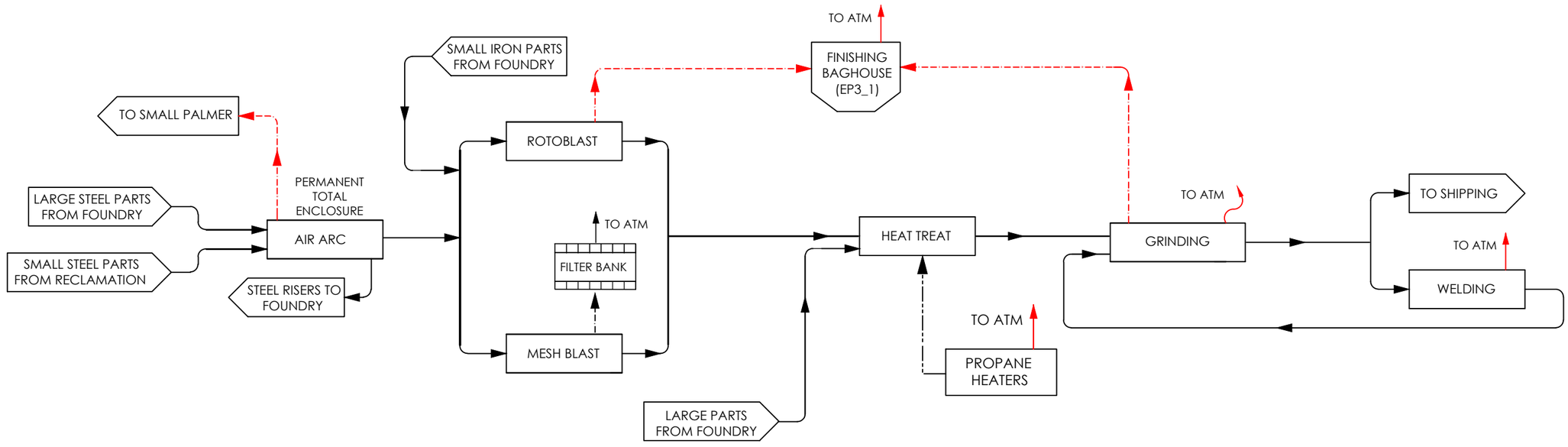
Revised Process Flow Diagram

MAUL FOSTER ALONGI

FOUNDRY



FINISHING



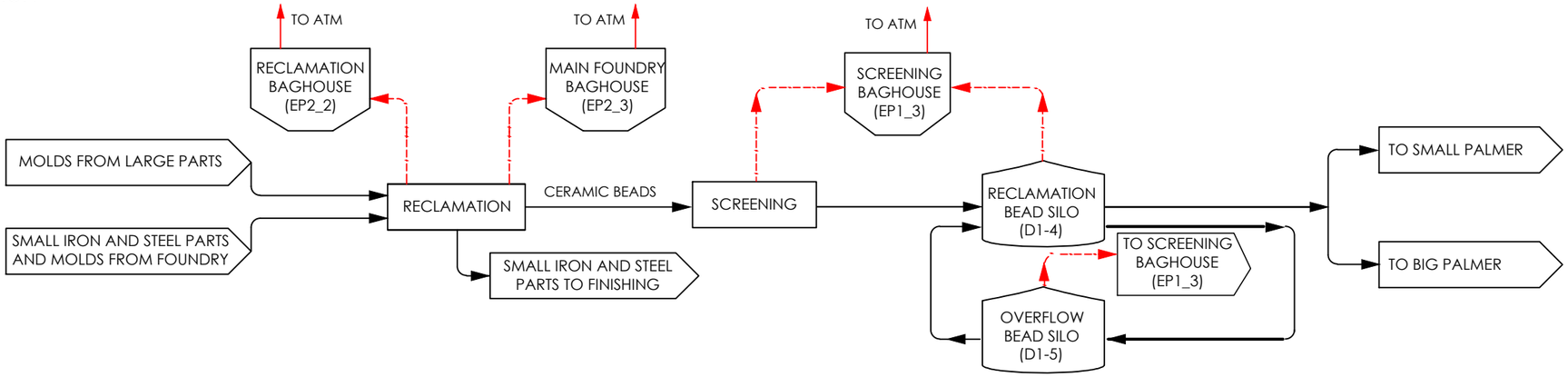
MAUL FOSTER ALONGI
971.544.2139 (phone) | www.maulfoster.com

LEGEND:

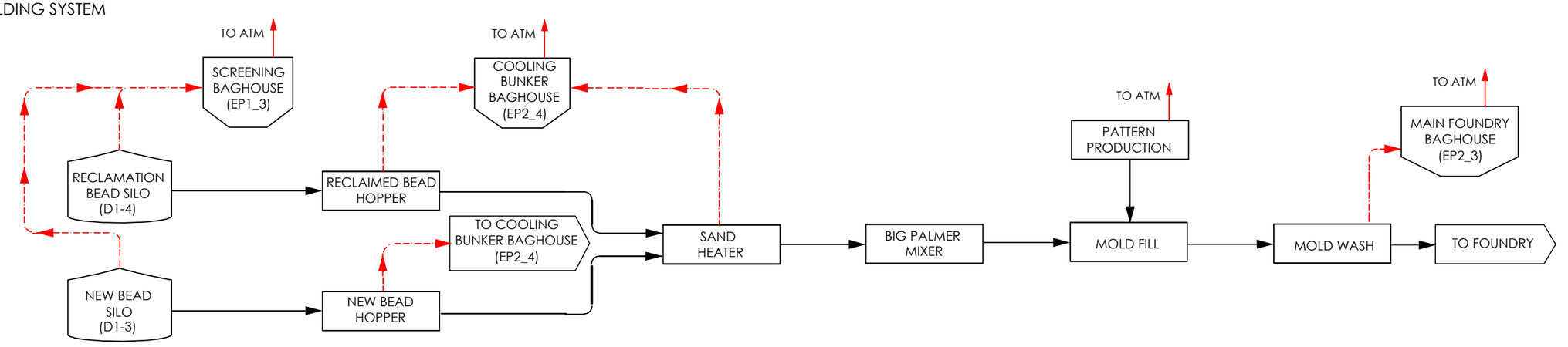
- PRODUCT
- RAW MATERIALS
- EMISSIONS
- ATM ATMOSPHERE
- EMISSIONS TO ATMOSPHERE (VENT OR STACK)
- EMISSIONS TO ATMOSPHERE (FUGITIVE SOURCE)

Figure 1
Process Flow Diagram - Foundry and Finishing
Eagle Foundry
Eagle Creek, Oregon

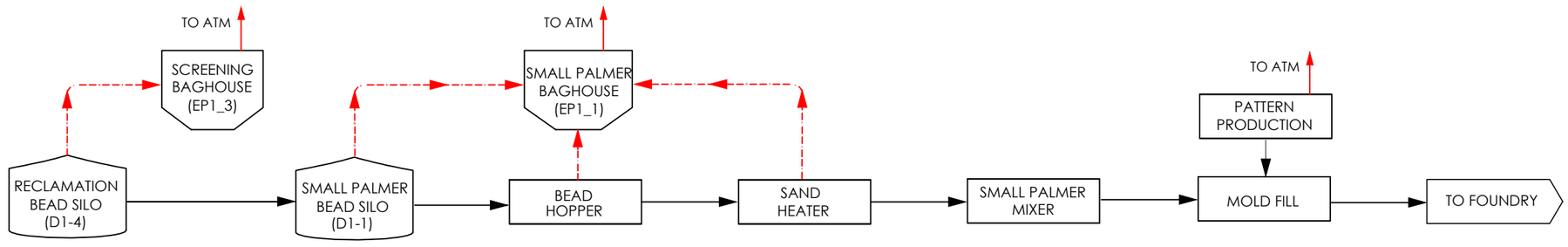
CERAMIC BEAD RECLAMATION



BIG PALMER MOLDING SYSTEM



SMALL PALMER MOLDING SYSTEM



MAUL FOSTER ALONGI
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LEGEND:

- PRODUCT
- RAW MATERIALS
- EMISSIONS
- ATM ATMOSPHERE
- EMISSIONS TO ATMOSPHERE (VENT OR STACK)
- EMISSIONS TO ATMOSPHERE (FUGITIVE SOURCE)

Figure 2
Process Flow Diagram - Reclamation and Mold Stations
Eagle Foundry
Eagle Creek, Oregon

Attachment C

AIRARC Study

MAUL FOSTER ALONGI

EAGLE FOUNDRY COMPANY

MEMORANDUM

DATE: November 29, 2023

SUBJECT: Eagle Foundry Co. Air Arc work time-study.

Between November 29th, 2022 and December 7th, 2022, Eagle Foundry conducted an in-person time study observing the amount of time the Air Carbon Arc was engaged in gouging metal during a 30 minute time span during normal operating hours.

To conduct this study, we utilized a stopwatch to begin timing when the air arc engages and stop timing when the air arc disengages. Each time the air arc engages during the 30-minute time span observed, we measured and compiled the total time the air arc was engaged in gouging metal for that session. Below are the results of this test.

Date work studied	Timeframe studied	Work time studied	Total time cutting (mm:ss)
11/29/2022	11:45am - 12:15pm	30 minutes	11:32
11/29/2022	1:30pm - 2:00pm	30 minutes	3:45
11/29/2022	2:35pm - 3:05pm	30 minutes	11:16
11/30/2022	2:35pm - 3:05pm	30 minutes	5:05
12/2/2022	9:32am - 10:02am	30 minutes	8:25
12/6/2022	2:28pm - 2:58pm	30 minutes	9:26
12/7/2022	2:35pm - 3:05pm	30 minutes	9:39
	AVERAGE TIMES	**30 minutes**	**8:26**

P.O. BOX 250 EAGLE CREEK, OREGON 97022-0250 PHONE (503) 637-3048 FAX (503) 637-3091

Attachment D

SDS

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SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: NAIGAI CERABEADS 60 (NCB)
Chemical Name: Mullite
CAS number: 1302-93-8

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Moulding sand
Uses advised against: General industrial uses

1.3. Details of the supplier of the safety data sheet

Name of manufacturer in Japan: ITOCHU CERATECH CORPORATION
Department in Charge Research and Development Dept.
Address 12-8 Shiokusa-cho, Seto-shi, Aichi, 489-0895, Japan
Telephone number +81-561-21-0511
Fax number +81-561-21-3112
e-mail address qcs@itc-cera.co.jp

1.4. Emergency telephone number

+81-561-21-0511 (MON - FRI: 8:00 - 17:00 JST)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification in accordance with GHS (Rev.8) (2019):
Eye Irrit.2: H319

2.2. Label elements

Hazard pictograms

Signal word **Warning**
Hazard Statements H319: Causes serious eye irritation
Precautionary Statements
[Prevention] P264: Wash hands thoroughly after handling.
P280: Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
[Emergency response] P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.

[Storage]	No information
[Disposal]	P501: Dispose of contents/ container in accordance with related laws and local/ regional regulations.
Supplemental hazard information	No information

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical name	CAS No.	Chemical Formula	Concentration (wt %)	Specific Concentration limits/ M-factor/ Acute Toxicity Estimate
Mullite	1302-93-8	$3Al_2O_3 \cdot 2SiO_2$	90	ATE (Inhalation): Rat (male and female) 4h LC_{50} > 2.19 mg/L
Amorphous silica	7631-86-9	SiO_2	10	ATE (Oral): Rat (male and female) LD_{50} > 5,000 mg/kg ATE (Dermal): Rabbit LD_{50} > 2,000 mg/kg Rabbit LD_0 > 2,000 mg/kg ATE (Inhalation): Rat (male and female) 4h LC_{50} > 5.01 mg/L Rat (male and female) 4h LC_0 > 5.01 mg/L

Quartz (Detection lower limit: 0.5 wt%), Cristobalite (Detection lower limit: 0.1 wt%), Tridymite (Detection lower limit: 0.5 wt%) is less than detection lower limit.

SECTION 4: First aid measures

4.1. Description of first aid measures

GENERAL ADVICE	If you feel unwell, call doctor/physician.
IF INHALED	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is unusual, get medical advice immediately.
IF ON SKIN	Rinse with water and soap. If symptoms continue, call a doctor/physician.
IF IN EYES	Immediately rinse cautiously with water for 15 - 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If symptoms continue, call a doctor/physician.
IF SWALLOWED	Rinse mouth. Induce vomiting by giving plenty of water. Insert fingers into the throat to induce vomiting. Get medical advice immediately.
Self-Protection of the First Aider	Wear appropriate eyes and skin protective equipment.

4.2. Most important symptoms and effects, both acute and delayed

Causes serious eye irritation.

4.3. Indication of any immediate medical attention and special treatment needed

No information

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:

Use water mist, dry chemical powder, fire foam or carbon dioxide depending on fire in surrounding area.

Unsuitable extinguishing media:

Applying direct water may be dangerous because fire may expand to surroundings.

5.2. Special hazards arising from the substance or mixture

No information

5.3. Advice for firefighters

Take action from windward.
Keep out except responsible personnel.
Move container to a safe area if it can be done without risk.
Fire fighters should wear appropriate personal protective equipment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:

Wear suitable protective equipment (see SECTION 8) e.g., safety gloves, protective mask and/or protective glasses to prevent exposure.

For emergency responders:

Keep out except responsible personnel.
Wear suitable protective equipment described in “SECTION 8: Exposure controls/personal protection”.

6.2. Environmental precautions

Avoid release into the environment because product may cause local effects.

6.3. Methods and material for containment and cleaning up

Sweep up scattered materials or vacuum them using a vacuum cleaner so as not to cause dust then collect them into an empty container.
Floors covered with the product may become slippery. Avoid walking on the product.
Do not eat or drink near handling and storage locations.
Prevent to flowing into drains, sewers, basements or closed areas.

6.4. Reference to other sections

Refer to “SECTION 8: Exposure controls/personal protection” and “SECTION 13: Disposal considerations” as appropriate.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Protective measures:

Install appropriate equipment and wear suitable protective apparatus described in "SECTION 8: Exposure controls/personal protection".
Do not eat, drink or smoke when using this product.
Avoid the generation of dust.

Advice on general occupational hygiene:

Wash hands thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures:

In the storage area, install adequate light and ventilation systems to handle hazardous materials.

Incompatible materials:

Hydrofluoric acid

Conditions for safe storage:

Avoid wet with water and store in an indoor place.

Packing material:

Use a sealed container without damage or leakage.

7.3. Specific end use(s)

Moulding sand

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Acceptable concentration (exposure limit, biological exposure index)

EU IOELV	Not applicable
ACGIH TLV-TWA (2021)	3 mg/m^3 (Insoluble respirable particles not other specified) 10 mg/m^3 (Insoluble inhalable particles not other specified)
ACGIH TLV-STEL (2021)	Not applicable
JSOH (2020)	Respirable Dust: 1 mg/m^3, Total Dust: 4 mg/m^3

8.2. Exposure controls

Appropriate engineering controls:

In a work place where dusts generate, ensure to use sealed instrument or local ventilation.

Personal protective equipment:

Respiratory protection	In case of dust generation, wear appropriate protective mask or air aspirator as required.

Hand protection	If hand contact is possible, wear protective gloves.
Eye protection	Wear safety glasses or goggles if in eyes.
Skin and body protection	Wear protective clothing and apron if necessary.

Environmental exposure controls:

Prevent product from entering drains.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Granular Particle shape: Spherical particles
Colour	White and brown
Odour	Odourless
Melting point/freezing point	1,825℃
Boiling point or initial boiling point and boiling range	No information
Flammability	Non-flammable solid
Lower and upper explosion limit	Not applicable
Flash point	Not applicable
Auto-ignition temperature	Not applicable
Decomposition temperature	No information
pH	Representative values: 7.2, Solid-liquid ratio: 2 : 5 (according to JACT Test Method S-3)
Kinematic viscosity	Not applicable
Solubility	Insoluble in water or organic solvents.
Partition coefficient n-octanol/water (log value)	No information
Vapour pressure	No information
Density and/or relative density	Specific gravity: 2.7, Bulk density: 1.7 g/cm^3
Relative vapour density	Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosives	Not applicable
Flammable gases	Not applicable
Aerosols	Not applicable
Oxidizing gases	Not applicable
Gases under pressure	Not applicable
Flammable liquids	Not applicable
Flammable solids	No information
Self-reactive substances and mixtures	Not applicable
Pyrophoric liquids	Not applicable
Pyrophoric solids	Not applicable
Self-heating substances and mixtures	No information

Substances and mixtures, which emit flammable gases in contact with water	Not applicable
Oxidizing liquids	Not applicable
Oxidizing solids	No information
Organic peroxides	Not applicable
Corrosive to metals	Not applicable
Desensitized explosives	Not applicable

9.2.2 Other safety characteristics

Mechanical sensitivity	No information
Self-accelerating polymerization temperature	Not applicable
Formation of explosible dust/air mixtures	No information
Acid/alkaline reserve	No information
Evaporation rate	No information
Miscibility	No information
Conductivity	No information
Corrosiveness	No information
Gas group	Not applicable
Redox potential	No information
Radical formation potential	No information
Photocatalytic properties	No information

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal handling condition.

10.2. Chemical stability

Stable under normal handling condition.

10.3. Possibility of hazardous reactions

Mullite dissolves in hydrofluoric acid and produces a corrosive gas (silicon tetrafluoride).

10.4. Conditions to avoid

Avoid raising dust.

10.5. Incompatible materials

Hydrofluoric acid

10.6. Hazardous decomposition products

No information

SECTION 11: Toxicological information

11.1. Information on hazard classes

Acute toxicity (oral):	No information
Acute toxicity (dermal):	No information
Acute toxicity (inhalation):	Rat (male and female) 4h LC_{50} > 2.19 mg/L
Skin corrosion/irritation:	No information
Serious eye damage/irritation:	No information
Respiratory sensitization:	No information
Skin sensitization:	No information
Germ cell mutagenicity:	No information
Carcinogenicity:	No information
Reproductive toxicity:	No information
STOT-single exposure:	No information
STOT-repeated exposure:	No information
Aspiration hazard:	No information

Information on impurities:

Amorphous silica

Acute toxicity (oral):	Rat (male and female) LD_{50} > 5,000 mg/kg
Acute toxicity (dermal):	Rabbit LD_{50} > 2,000 mg/kg Rabbit LD_0 > 2,000 mg/kg
Acute toxicity (inhalation):	Rat (male and female) 4h LC_{50} > 5.01 mg/L Rat (male and female) 4h LC_0 > 5.01 mg/L
Skin corrosion/irritation:	No information
Serious eye damage/irritation:	Reports of tests in which rabbits were treated with different forms of precipitated silica or amorphous silica. They were recoverable with mild to moderate symptoms.
Respiratory sensitization:	No information
Skin sensitization:	No information
Germ cell mutagenicity:	No information
Carcinogenicity:	No information
Reproductive toxicity:	No information
STOT-single exposure:	Report of silica gel has respiratory irritation.
STOT-repeated exposure:	No information
Aspiration hazard:	No information

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

All substances are not listed in the candidate list as having endocrine disrupting properties.

11.2.2. Other information

No information

SECTION 12: Ecological information

12.1. Toxicity:

Acute (short-term) toxicity: No information
Chronic (long-term) toxicity: No information

Information on impurities:
Amorphous silica

Acute (short-term) toxicity: No information
Chronic (long-term) toxicity: No information

12.2. Persistence and degradability:

No information

Information on impurities:
Amorphous silica

No information

12.3. Bioaccumulative potential:

No information

Information on impurities:
Amorphous silica

No information

12.4. Mobility in soil:

No information

Information on impurities:
Amorphous silica

No information

12.5. Results of PBT and vPvB assessment:

The product does not meet the PBT and vPvB criteria.

12.6. Endocrine disrupting properties:

All substances are not listed in the candidate list as having endocrine disrupting properties.

12.7. Other adverse effects:

No information

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Dispose of waste in accordance with applicable local, regional and international regulations and standards.
When disposing, consult to a certificated waste trader or local offices if they deal with the waste.
Used container should be disposed of in compliance with related laws and local regulations.
Contents should be removed completely when dispose of empty containers.

SECTION 14: Transport information

14.1. UN number or ID number	Not applicable
14.2. UN proper shipping name	Not applicable
14.3. Transport hazard class(es)	Not applicable
14.4. Packing group	Not applicable
14.5. Environmental hazards	Not applicable

14.6. Special precautions for user

When transporting, avoid direct sunlight. Confirm no leakage to containers. When loading, prevent containers from falling, dropping off or damaging. Take preventive measures of collapse.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/ legislation specific for the substance or mixture

Regulation (EC) No 1907/2006	Not meet the criteria for PBT or vPvB
Regulation (EU) 2017/2100	Not contain to Endocrine disruptor
Montreal Protocol	Not applicable
Stockholm Convention	Not applicable
Rotterdam Convention	Not applicable

15.2. International Inventories

TSCA	Complies, CAS No. 1302-93-8
EINECS	Complies, EC No. 215-113-2
ENCS	Complies, No. 1-26

15.3. Chemical safety assessment

Not conducted

SECTION 16: Other information

Update history:

Date of issue: 19th November, 2021

Key literature references and sources for data:

Information of ITOCHU CERATECH CORPORATION
ACGIH, American Conference of Governmental Industrial Hygienists (2021) TLVs and BEIs.

Abbreviations

EINECS: European Inventory of Existing Chemical Substances
ENCS: Japan Existing and New Chemical Substances inventory
PBT: Persistent, Bioaccumulative and Toxic substance
POPs: Persistent Organic Pollutants
STOT: Specific Target Organ Toxicity
SVHC: Substances of Very High Concern
TSCA: United States Toxic Substances Control Act inventory
vPvB: Very Persistent and Very Bioaccumulative

[Disclaimer]

This SDS has been prepared based on the best available information however, it may not be sufficient in some cases. It is user's responsibility to modify or update any contents in this SDS regarding information on hazardous properties and/or instruction for safe handling of the product when they become available. Precautionary measures in this SDS are only applicable for normal handling conditions and it is necessary to take appropriate additional measures to ensure safe handling which depend on your specific use conditions or situations.

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name: CERABEADS-ES (CB-ES)
Chemical Name: Mullite
CAS number: 1302-93-8

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Moulding sand
Uses advised against: General industrial uses

1.3. Details of the supplier of the safety data sheet

Name of manufacturer in Japan: ITOCHU CERATECH CORPORATION
Department in Charge Research and Development Dept.
Address 12-8 Shiokusa-cho, Seto-shi, Aichi, 489-0895, Japan
Telephone number +81-561-21-0511
Fax number +81-561-21-3112
e-mail address qcs@itc-cera.co.jp

1.4. Emergency telephone number

+81-561-21-0511 (MON - FRI: 8:00 - 17:00 JST)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification in accordance with GHS (Rev.8) (2019):
Eye Irrit.2: H319

2.2. Label elements

Hazard pictograms

Signal word **Warning**
Hazard Statements H319: Causes serious eye irritation
Precautionary Statements
[Prevention] P264: Wash hands thoroughly after handling.
P280: Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.
[Emergency response] P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.

[Storage]	No information
[Disposal]	P501: Dispose of contents/ container in accordance with related laws and local/ regional regulations.
Supplemental hazard information	No information

SECTION 3: Composition/information on ingredients

3.1. Substances

Chemical name	CAS No.	Chemical Formula	Concentration (wt %)	Specific Concentration limits/ M-factor/ Acute Toxicity Estimate
Mullite	1302-93-8	$3Al_2O_3 \cdot 2SiO_2$	90	ATE (Inhalation): Rat (male and female) 4h LC_{50} > 2.19 mg/L
Amorphous silica	7631-86-9	SiO_2	10	ATE (Oral): Rat (male and female) LD_{50} > 5,000 mg/kg ATE (Dermal): Rabbit LD_{50} > 2,000 mg/kg Rabbit LD_0 > 2,000 mg/kg ATE (Inhalation): Rat (male and female) 4h LC_{50} > 5.01 mg/L Rat (male and female) 4h LC_0 > 5.01 mg/L

Quartz (Detection lower limit: 0.5 wt%), Cristobalite (Detection lower limit: 0.1 wt%), Tridymite (Detection lower limit: 0.5 wt%) is less than detection lower limit.

SECTION 4: First aid measures

4.1. Description of first aid measures

GENERAL ADVICE	If you feel unwell, call doctor/physician.
IF INHALED	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is unusual, get medical advice immediately.
IF ON SKIN	Rinse with water and soap. If symptoms continue, call a doctor/physician.
IF IN EYES	Immediately rinse cautiously with water for 15 - 20 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If symptoms continue, call a doctor/physician.
IF SWALLOWED	Rinse mouth. Induce vomiting by giving plenty of water. Insert fingers into the throat to induce vomiting. Get medical advice immediately.
Self-Protection of the First Aider	Wear appropriate eyes and skin protective equipment.

4.2. Most important symptoms and effects, both acute and delayed

Causes serious eye irritation.

4.3. Indication of any immediate medical attention and special treatment needed

No information

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media:

Use water mist, dry chemical powder, fire foam or carbon dioxide depending on fire in surrounding area.

Unsuitable extinguishing media:

Applying direct water may be dangerous because fire may expand to surroundings.

5.2. Special hazards arising from the substance or mixture

No information

5.3. Advice for firefighters

Take action from windward.
Keep out except responsible personnel.
Move container to a safe area if it can be done without risk.
Fire fighters should wear appropriate personal protective equipment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:

Wear suitable protective equipment (see SECTION 8) e.g., safety gloves, protective mask and/or protective glasses to prevent exposure.

For emergency responders:

Keep out except responsible personnel.
Wear suitable protective equipment described in “SECTION 8: Exposure controls/personal protection”.

6.2. Environmental precautions

Avoid release into the environment because product may cause local effects.

6.3. Methods and material for containment and cleaning up

Sweep up scattered materials or vacuum them using a vacuum cleaner so as not to cause dust then collect them into an empty container.
Floors covered with the product may become slippery. Avoid walking on the product.
Do not eat or drink near handling and storage locations.
Prevent to flowing into drains, sewers, basements or closed areas.

6.4. Reference to other sections

Refer to “SECTION 8: Exposure controls/personal protection” and “SECTION 13: Disposal considerations” as appropriate.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Protective measures:

Install appropriate equipment and wear suitable protective apparatus described in “SECTION 8: Exposure controls/personal protection”.
Do not eat, drink or smoke when using this product.
Avoid the generation of dust.

Advice on general occupational hygiene:

Wash hands thoroughly after handling.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures:

In the storage area, install adequate light and ventilation systems to handle hazardous materials.

Incompatible materials:

Hydrofluoric acid

Conditions for safe storage:

Avoid wet with water and store in an indoor place.

Packing material:

Use a sealed container without damage or leakage.

7.3. Specific end use(s)

Moulding sand

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Acceptable concentration (exposure limit, biological exposure index)

EU IOELV	Not applicable
ACGIH TLV-TWA (2021)	3 mg/m^3 (Insoluble respirable particles not other specified) 10 mg/m^3 (Insoluble inhalable particles not other specified)
ACGIH TLV-STEL (2021)	Not applicable
JSOH (2020)	Respirable Dust: 1 mg/m^3, Total Dust: 4 mg/m^3

8.2. Exposure controls

Appropriate engineering controls:

In a work place where dusts generate, ensure to use sealed instrument or local ventilation.

Personal protective equipment:

Respiratory protection	In case of dust generation, wear appropriate protective mask or air aspirator as required.

Hand protection	If hand contact is possible, wear protective gloves.
Eye protection	Wear safety glasses or goggles if in eyes.
Skin and body protection	Wear protective clothing and apron if necessary.

Environmental exposure controls:

Prevent product from entering drains.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Granular Particle shape: Spherical particles
Colour	White and brown
Odour	Odourless
Melting point/freezing point	1,825℃
Boiling point or initial boiling point and boiling range	No information
Flammability	Non-flammable solid
Lower and upper explosion limit	Not applicable
Flash point	Not applicable
Auto-ignition temperature	Not applicable
Decomposition temperature	No information
pH	Representative values: 7.2, Solid-liquid ratio: 2 : 5 (according to JACT Test Method S-3)
Kinematic viscosity	Not applicable
Solubility	Insoluble in water or organic solvents.
Partition coefficient n-octanol/water (log value)	No information
Vapour pressure	No information
Density and/or relative density	Specific gravity: 2.7, Bulk density: 1.7 g/cm^3
Relative vapour density	Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosives	Not applicable
Flammable gases	Not applicable
Aerosols	Not applicable
Oxidizing gases	Not applicable
Gases under pressure	Not applicable
Flammable liquids	Not applicable
Flammable solids	No information
Self-reactive substances and mixtures	Not applicable
Pyrophoric liquids	Not applicable
Pyrophoric solids	Not applicable
Self-heating substances and mixtures	No information

Substances and mixtures, which emit flammable gases in contact with water	Not applicable
Oxidizing liquids	Not applicable
Oxidizing solids	No information
Organic peroxides	Not applicable
Corrosive to metals	Not applicable
Desensitized explosives	Not applicable

9.2.2 Other safety characteristics

Mechanical sensitivity	No information
Self-accelerating polymerization temperature	Not applicable
Formation of explosible dust/air mixtures	No information
Acid/alkaline reserve	No information
Evaporation rate	No information
Miscibility	No information
Conductivity	No information
Corrosiveness	No information
Gas group	Not applicable
Redox potential	No information
Radical formation potential	No information
Photocatalytic properties	No information

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal handling condition.

10.2. Chemical stability

Stable under normal handling condition.

10.3. Possibility of hazardous reactions

Mullite dissolves in hydrofluoric acid and produces a corrosive gas (silicon tetrafluoride).

10.4. Conditions to avoid

Avoid raising dust.

10.5. Incompatible materials

Hydrofluoric acid

10.6. Hazardous decomposition products

No information

SECTION 11: Toxicological information

11.1. Information on hazard classes

Acute toxicity (oral):	No information
Acute toxicity (dermal):	No information
Acute toxicity (inhalation):	Rat (male and female) 4h LC_{50} > 2.19 mg/L
Skin corrosion/irritation:	No information
Serious eye damage/irritation:	No information
Respiratory sensitization:	No information
Skin sensitization:	No information
Germ cell mutagenicity:	No information
Carcinogenicity:	No information
Reproductive toxicity:	No information
STOT-single exposure:	No information
STOT-repeated exposure:	No information
Aspiration hazard:	No information

Information on impurities:

Amorphous silica

Acute toxicity (oral):	Rat (male and female) LD_{50} > 5,000 mg/kg
Acute toxicity (dermal):	Rabbit LD_{50} > 2,000 mg/kg Rabbit LD_0 > 2,000 mg/kg
Acute toxicity (inhalation):	Rat (male and female) 4h LC_{50} > 5.01 mg/L Rat (male and female) 4h LC_0 > 5.01 mg/L
Skin corrosion/irritation:	No information
Serious eye damage/irritation:	Reports of tests in which rabbits were treated with different forms of precipitated silica or amorphous silica. They were recoverable with mild to moderate symptoms.
Respiratory sensitization:	No information
Skin sensitization:	No information
Germ cell mutagenicity:	No information
Carcinogenicity:	No information
Reproductive toxicity:	No information
STOT-single exposure:	Report of silica gel has respiratory irritation.
STOT-repeated exposure:	No information
Aspiration hazard:	No information

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

All substances are not listed in the candidate list as having endocrine disrupting properties.

11.2.2. Other information

No information

SECTION 12: Ecological information

12.1. Toxicity:

Acute (short-term) toxicity:	No information
Chronic (long-term) toxicity:	No information

Information on impurities:
Amorphous silica

Acute (short-term) toxicity:	No information
Chronic (long-term) toxicity:	No information

12.2. Persistence and degradability:

No information

Information on impurities:
Amorphous silica

No information

12.3. Bioaccumulative potential:

No information

Information on impurities:
Amorphous silica

No information

12.4. Mobility in soil:

No information

Information on impurities:
Amorphous silica

No information

12.5. Results of PBT and vPvB assessment:

The product does not meet the PBT and vPvB criteria.

12.6. Endocrine disrupting properties:

All substances are not listed in the candidate list as having endocrine disrupting properties.

12.7. Other adverse effects:

No information

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Dispose of waste in accordance with applicable local, regional and international regulations and standards.
When disposing, consult to a certificated waste trader or local offices if they deal with the waste.
Used container should be disposed of in compliance with related laws and local regulations.
Contents should be removed completely when dispose of empty containers.

SECTION 14: Transport information

14.1. UN number or ID number	Not applicable
14.2. UN proper shipping name	Not applicable
14.3. Transport hazard class(es)	Not applicable
14.4. Packing group	Not applicable
14.5. Environmental hazards	Not applicable

14.6. Special precautions for user

When transporting, avoid direct sunlight. Confirm no leakage to containers. When loading, prevent containers from falling, dropping off or damaging. Take preventive measures of collapse.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/ legislation specific for the substance or mixture

Regulation (EC) No 1907/2006	Not meet the criteria for PBT or vPvB
Regulation (EU) 2017/2100	Not contain to Endocrine disruptor
Montreal Protocol	Not applicable
Stockholm Convention	Not applicable
Rotterdam Convention	Not applicable

15.2. International Inventories

TSCA	Complies, CAS No. 1302-93-8
EINECS	Complies, EC No. 215-113-2
ENCS	Complies, No. 1-26

15.3. Chemical safety assessment

Not conducted

SECTION 16: Other information

Update history:

Date of issue: 19th November, 2021

Key literature references and sources for data:

Information of ITOCHU CERATECH CORPORATION
ACGIH, American Conference of Governmental Industrial Hygienists (2021) TLVs and BEIs.

Abbreviations

EINECS: European Inventory of Existing Chemical Substances
ENCS: Japan Existing and New Chemical Substances inventory
PBT: Persistent, Bioaccumulative and Toxic substance
POPs: Persistent Organic Pollutants
STOT: Specific Target Organ Toxicity
SVHC: Substances of Very High Concern
TSCA: United States Toxic Substances Control Act inventory
vPvB: Very Persistent and Very Bioaccumulative

[Disclaimer]

This SDS has been prepared based on the best available information however, it may not be sufficient in some cases. It is user's responsibility to modify or update any contents in this SDS regarding information on hazardous properties and/or instruction for safe handling of the product when they become available. Precautionary measures in this SDS are only applicable for normal handling conditions and it is necessary to take appropriate additional measures to ensure safe handling which depend on your specific use conditions or situations.

Attachment E

Sand Memo

MAUL
FOSTER
ALONGI

Memorandum

To:	The Department of Environmental Quality	Date:	January 10, 2024
From:	Chad Darby	Project No.:	M8006.63.001
Re:	Ceramic bead usage--Eagle Foundry Company		

Eagle Foundry Company owns and operates a facility specializing in white iron and steel alloy components casting located in Eagle Creek, Oregon (the facility). Metal parts are cast in "no-bake" molds made of ceramic bead solidified with a two-part binder system and sand cores. Collectively, the mold materials are referred to as sand as this is the common material of use for many foundries. Despite the reference, the bulk of the mold material used at Eagle Foundry is ceramic bead, which is lighter and more recyclable than traditional sand.

Screening Station Emissions

Reclamation and recirculation of mold material back to the screening station and silos for reuse can result in emissions at the screening station, controlled by a baghouse. To estimate emissions of particulate matter (PM) from the material handling at the screening station, it is necessary to use an emission factor from the Environmental Protection Agency for sand handling controlled by a baghouse, 0.2 lbs PM/ton of sand handled.[1] In order to determine the amount of sand handled, the facility undertook a study of their molding machine and furnace throughputs for the period of February 2023 to August 2023. January was not included due to incomplete data availability.

For the period of February-August 2023, the facility had 4,169.58 tons of sand throughput at the Small Palmer and Big Palmer mold stations. During the same period the facility melted and poured 3,601 tons of metal. This resulted in a sand to metal ratio of 1.16 tons/ton.

To estimate potential daily and annual emissions from the screening process, the sand-to-metal ratio is multiplied by the maximum daily and annual rate of metal poured, resulting in the maximum daily and annual sand throughput. The maximum sand throughput can then be multiplied by the emission factor 0.2 lbs PM/ton sand handled to determine the potential daily and annual PM emissions from the screening station.

[1] AP-42 Chapter 12.10, Table 12.10-7. Assumes value for baghouse-controlled sand handling.