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November 8, 2022

Eagle Foundry Co.
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Sent via email only

Jack Scott,

DEQ received the submittal of the Cleaner Air Oregon (CAO) Emissions Inventory (Inventory) for Eagle Foundry in Eagle Creek, OR on May 16, 2022 and has completed an initial review.

In accordance with Oregon Administrative Rule (OAR) 340-245-0030(2), DEQ has determined that the following additional information, corrections, and updates are required by December 28, 2022, in order to approve the Inventory:

General Comments

At this time, DEQ is not requiring stack testing to characterize Eagle Foundry's emissions. Published particulate matter (PM) emission factors for representative processes, combined with site-specific PM composition data and capture efficiencies, may be sufficient to complete an Emissions Inventory. However, DEQ may re-evaluate the need for stack testing after review of the information provided in response to this letter.

Regardless of whether stack testing is used in the development of emission factors in the Inventory, DEQ will consider testing requirements during the development of CAO permit conditions. It is likely that testing (including verification of capture efficiencies) will be incorporated into Eagle Foundry's Air Contaminant Discharge Permit to either verify or confirm compliance with the emissions in the Inventory. Where the quality or representativeness of emission factors used in the Inventory is uncertain, DEQ may require verification via site-specific source testing. In this case, enforceable permit limits could be set after verification of emission factors and any necessary revision of the CAO health risk assessment (based on source test results). For processes and Toxic Air Contaminants (TACs) with well-characterized emissions, enforceable permit limits and stack testing requirements could be set based on the emission factors in the Inventory, without additional verification of emission factors.

Because actual PM emissions may vary from default emission factors and actual composition of emitted PM may vary from baghouse dust analyses, DEQ is requiring that the Inventory be updated to calculate emissions more conservatively in some cases (details are provided in the Specific Comments below). DEQ also recommends that Eagle Foundry closely evaluate the potential variation in actual emissions from emission factors used (due to differences in process parameters, averaging periods, raw materials used, testing methods, or other factors), and consider incorporating additional conservative assumptions where appropriate.

If Eagle Foundry chooses to perform stack testing or collect additional data on a voluntary basis, CAO staff are available to review and approve source test plans to ensure acceptability, and the Inventory may be updated any time throughout the CAO process if more representative data become available. However,

undertaking voluntary testing will not affect CAO submittal deadlines.

Specific Comments

1. Baghouse dust composition analyses are not representative of the hexavalent chromium composition of emissions to air due to the potential for conversion between hexavalent and trivalent chromium. Update hexavalent chromium [CASRN 18540-29-9] emissions to use these more conservative assumptions[1] for the following Toxics Emissions Units (TEUs):
    a. MELT (steel production): assume total chromium emissions are composed of 12 percent hexavalent chromium;
    b. MELT (iron production): assume total chromium emissions are composed of 3 percent hexavalent chromium; and
    c. POUR/COOL, REC, TORCH, GRIND, MESH, SHOT, S_PALMER, and SCREEN: assume total chromium emissions are composed of 3 percent hexavalent chromium.
2. Metal melting activities (MELT TEU):
    a. Particulate matter (PM) emissions were reported for this TEU using AP-42 (EPA's Compilation of Air Pollutant Emission Factors), Chapter 12.10, Table 12.10-3, "Particulate Emission Factors for Iron Furnaces"; however, more recent data indicates potentially higher PM emissions from metal melting in induction furnaces[2]. Revise these emissions estimates as follows:
        i. Use an uncontrolled emission factor of 2.06 pounds PM per ton metal melted[3] (2 pounds per ton filterable PM and 0.06 pounds per ton condensable PM); and
        ii. Use an applicable default control efficiency for controlled condensable PM emissions, based on Table 3-4 of Research Triangle Institute (RTI) International's "Emission Estimation Protocol for Iron and Steel Foundries" report.[4]
    b. Site-specific metal chemistry data is considered to be more representative of the overall TAC profile of filterable PM emissions than baghouse dust – update the TAC composition of the filterable PM to match the TAC composition of the melted alloys, on a daily maximum basis (for acute emission estimates) and annual average basis (for chronic emission estimates); and
    c. Neither baghouse dust nor site-specific metal chemistry data is appropriate for the determination of condensable PM composition; the TAC profile of condensable PM may be determined by assuming the default composition presented in Table 3-6 of RTI International's "Emission Estimation Protocol for Iron and Steel Foundries" report.[5]
3. Pouring and cooling activities (POUR_COOL TEU): site-specific metal chemistry data may be more representative of the overall TAC composition of filterable PM emissions than baghouse dust, depending on the temperature, process step, and averaging time of the emissions estimate. For conservatism, update the TAC composition to match the higher of either:
    a. The baghouse dust composition; or

[1] Source: RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Table B-9. (https://www.rti.org/publication/emission-estimation-protocol-iron-and-steel-foundries/fulltext.pdf).
[2] See RTI International, 2012, Appendix B, discussion on page 107.
[3] Source: RTI International, 2012, Table 3-3 (sum of uncontrolled emissions from induction melting and charging and tapping).
[4] RTI International, 2012, Table 3-4 ("Typical Collection Efficiencies of Various Particulate Control Devices").
[5] RTI International, 2012, Table 3-6 ("Default Metal Composition for PM from Melting Furnace Operations", see column "% of PM-CON").

b. The TAC composition of the melted alloys, on a daily maximum basis and annual average basis.

4. Hot Top usage (HOTTOP TEU): because the aluminum oxide emitted is anticipated to be non-fibrous (based on information reported in the Safety Data Sheet (SDS)), report emissions for aluminum oxide as "aluminum and compounds" [CASRN 7429-90-5] rather than aluminum oxide (fibrous forms) [CASRN 1344-28-1].
5. Torch cutting activities (TORCH TEU):
    a. DEQ observed a significant amount of visible torch cutting emissions not being captured by controls during a site visit on July 8, 2022. Please update the baghouse capture efficiency for the TORCH TEU to zero percent.
    b. The AP-42 emission factor for PM emissions from this activity used in the Inventory is based on emissions from billet cutting in units of pounds per ton of steel produced, which may not be representative of Eagle Foundry's torch cutting process. 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.[6]
6. Grinding activities (GRIND TEU):
    a. 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.[7]
    b. 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 composition of PM emissions than baghouse dust. For conservatism, update the TAC composition to match the higher of either:
        i. The baghouse dust composition; or
        ii. The TAC composition of the melted alloys, on a daily maximum basis and annual average basis.
7. Welding activities (WELD TEU):
    a. Include emissions for molybdenum (reported as molybdenum trioxide [CASRN 1313-27-5]) for consistency with the SDS information provided in Attachment C of the Inventory submittal for the following welding materials:
        i. Prostar 6S Wire;
        ii. Stoody Wire; and
        iii. Avesta 2205.
    b. Confirm that all welding processes used are Tungsten Inert or Gas Metal Arc Welding (TIG or GMAW, respectively), or update emission factors to reflect alternative welding processes (e.g., Flux Core Arc Welding, or FCAW).[8]
    c. Update the annual throughput, emission factors, and emissions reported in the AQ520 to be consistent with one another (i.e., emissions should equal the throughput multiplied by the emission factor).

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[6] Versar, Inc. "Title V Applicability Workbook", 1996, Table D-5 ("Torch Cutting Emission Factors"). See excerpt provided as Attachment A.

[7] RTI International, 2012, Table 6-2, ("Default PM Emission Factors for Finishing Operations", emission factor for "grinding, uncaptured and uncontrolled").

[8] See San Diego County Air Pollution Control District, Welding Operations, dated October 16, 1998 (revised July 11, 2022). (https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/welding/APCD-Welding-Operations.pdf). If the process type is not known, emission factors should be assigned for an "unidentified" process.

8. Abrasive blasting activities:
    a. Provide a detailed description of mesh (MESH TEU) and steel shot (SHOT TEU) abrasive blasting processes, including blasting equipment used (e.g. manufacturer make/model, type of housing and whether fully enclosed, control device type and specifications) and abrasive materials used (including type, whether materials are recycled, and how material usage is tracked).
    b. Update the process flow diagram (Attachment D of the Inventory submittal) for mesh abrasive blasting (MESH TEU) to illustrate emissions to atmosphere from this process, any applicable control devices, and type of emissions (stack or fugitive).
9. Based on the SDSs provided in Attachment C to the Inventory, raw materials containing respirable crystalline silica are used in the HOTTOP and MOLD TEUs. All forms of respirable crystalline silica are TACs and must be reported. CASRN 14808-60-7 and CASRN 14464-46-1 identify specific forms of crystalline silica (quartz and cristobalite), which fall under the general silica category (CASRN 7631-86-9).[9] If TACs are not likely to be emitted, justification must be provided for exemption per OAR 340-245-0060(3)(a). Update the Inventory to include emissions from handling of the following, reported under the general CASRN 7631-86-9 ("Silica, crystalline (respirable)"):
    a. HOTTOP: the Vesuvius Ferrux® 746 hot top product (contains between 1 and 5 percent crystalline silica (Quartz) [CASRN 14808-60-7]); and
    b. MOLD:
        i. Vesuvius Isomol® 780 (contains between 0.1 and 1 percent crystalline silica (Quartz) [CASRN 14808-60-7]); and
        ii. Velvacoat™ ST 803 (contains between 0.1 and 1 percent quartz/sand [CASRN 14808-60-7]) and between 0.1 and 1 percent cristobalite [CASRN 14464-46-1].
10. Pattern making activities (PATTERN TEU): Include emissions of trimethylbenzene [CASRN 25551-13-7] from use of Polyurethane Clear Varnish, for consistency with the SDS information provided in Attachment C of the Inventory submittal. CASRN 25551-13-7 indicates a mixture of the trimethylbenzene isomers 1,2,3-trimethylbenzene [CASRN 526-73-8], 1,2,4-trimethylbenzene [CASRN 95-63-6] and 1,3,5-trimethylbenzene [CASRN 108-67-8], all of which are listed TACs. Please report emissions as one of the isomers (e.g., assume all emissions are 1,2,3-trimethylbenzene [CASRN 526-73-8]).
11. Propane combustion activities (PROPANE TEU): Update the process flow diagram (Attachment D of the Inventory submittal) to illustrate emissions to atmosphere from this process and indicate stack or fugitive emissions.
12. Emergency diesel engine combustion activities (EGEN TEU):
    a. Update assumed load factor to 100 percent; and
    b. For hourly actual throughput and for annual and hourly potential to emit throughputs, report fuel usage rates based on manufacturer's specifications, rather than a calculated average (please provide documentation of reported fuel usage rates).
13. Update the AQ520 form as follows:
    a. Include additional line items for TEUs with multiple emission points.[10] For these TEUs, designate a separate TEU ID for each stack and fugitive emission point (on Tab 2), and list individual activity information (on Tab 2), emission factor information, control

[9] See the Agency for Toxic Substances and Disease Registry's (ATSDR) Toxicological Profile for Silica (September 2019), Table 4-1 (https://www.atsdr.cdc.gov/ToxProfiles/tp211.pdf).

[10] OAR 340-245-0060(1) stipulates how TEUs should be designated under CAO. Where a single activity exhausts from multiple emission points with varying emission factors or capture/control efficiencies, separate TEU ID emission points must be listed for a single TEU. Designate these in the format "TEU_[modifier]" where the [modifier] indicates a subset of emissions for that TEU, such as "fugitive" or "stack".

efficiency, and calculated emissions (on Tab 3) for each emission point. This is necessary to ensure correspondence of emission rates between the Inventory and the Modeling Protocol. Updated TEUs should include, but may not be limited to:

i. MELT;
ii. POUR_COOL;
iii. HOTTOP;
iv. REC;
v. WELD;
vi. SCREENING; and
vii. GRIND;

b. Update activity units in column F of Tab 2 to be a single unit (for example, pounds *or* tons, but not both), and to be consistent with both daily and annual activities and the reported emission factor units for the following TEUs:

i. MELT;
ii. POUR_COOL;
iii. REC;
iv. TORCH;
v. GRIND;
vi. MESH;
vii. S_PALMER;
viii. SCREENING;
ix. PROPANE; and
x. EGEN;

c. Update annual and daily throughput for the S_PALMER TEU on Tab 2 to reflect "PM generated" rather than "PM collected", for consistency with the emission factor and emissions reported in Tab 3.

d. Update the "Reference/Notes" column in Tab 3 to fully specify the source of the emission factor for each TEU and TAC (for example, "PM emission factor from 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 pouring and cooling in an electric induction furnace; TAC emissions estimated from baghouse dust analysis."); and

e. Correct daily and annual emission factors in Tab 3 for TORCH TEU, which appear to have been transposed for manganese [CASRN 7439-96-5], nickel [CASRN 7440-02-0], and phosphorus [DEQ SEQ ID 504].

14. Provide the following additional documentation and background information to support the Inventory [OAR 340-245-0040(b)(C)]:

a. Documentation related to baghouse and other dust collection data for both 2020[11] and 2021 dust-collection periods for each sample (including but not limited to: "Foundry", "Reclaim", "Small Palmer", "Finishing", "Mesh Blast", and "Screening"), including:

i. Mass measurements and laboratory analytical reports;
ii. Corresponding TEU throughput; and
iii. Breakdown of TEU throughput by metal alloy during the collection period.

[11] If the 2020 data used to determine emissions for Eagle Foundry's 2020 Air Toxics Emissions Inventory submittal is inadequate, please provide justification for its exclusion from consideration for the CAO Emissions Inventory.

b. Documentation supporting the reported capture efficiency for the following control devices/TEUs:[12]
    i. TEU MELT and TEU POUR_COOL (permitted Device IDs "Roof peak" and "Bunkers");
    ii. TEU S_PALMER (permitted Device ID "Palmer"); and
    iii. TEU REC (permitted Device ID "Rotary").
c. Manufacturer specifications or other documentation of control efficiencies for the following control devices:
    i. Foundry baghouses (permitted Device IDs "Roof peak" and "Bunkers");
    ii. Reclaim baghouse (permitted Device ID "Rotary");
    iii. Finishing baghouse (permitted Device ID "Finish"); and
    iv. Small Palmer baghouse (permitted Device ID "Palmer").
d. SCREENING TEU: review the narrative description of the PM emission factor (see Attachment B), which includes silos and sand handling activities, and:
    i. Document any changes needed to equipment, air flows, operating hours, throughputs, controls, or emission factors based on current operations;
    ii. Update the PM emission factor or emission factors used in the Inventory if necessary; and
    iii. Update TEU IDs and emission points reported in the PFD, AQ520, and supporting calculations to attribute emissions to specific emission points.
e. SDSs for all raw materials used that have not been provided in Attachment C of the Inventory, including but not limited to:
    i. Abrasive material used in the mesh blast process (MESH TEU); and
    ii. Abrasive material used in the shot blast process (SHOT TEU); and
f. Technical basis for the assumption that 1 percent of the Vesuvius Ferrux® 746 hot top product becomes airborne (HOTTOP TEU).

DEQ is requesting that you submit additional information to complete your Inventory. If you think that any of that information is confidential, trade secret or otherwise exempt from disclosure, in whole or in part, you must comply with the requirements in OAR 340-214-0130 to identify this information. This includes clearly marking each page of the writing with a request for exemption from disclosure and stating the specific statutory provision under which you claim exemption. Emissions data is not exempt from disclosure.

DEQ remains available to discuss this information request with you and answer any questions you may have. Failure to provide additional information, corrections, or updates to DEQ by the deadlines above may result in a violation of OAR 340-245-0030(1).

If you have any questions regarding this letter please contact me directly at (503)866-9643 or julia.degagne@deq.oregon.gov, and I look forward to your continued assistance with this process.

[12] At this time, Eagle Foundry must provide the information used to determine the reported capture efficiencies (for example, narratives describing the observations, engineering assumptions, and/or equipment flow rates); verification testing may be required if sufficient documentation is not currently available.

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Sincerely,

Julia Degagne

Julia DeGagné
Air Toxics Project Manager

Enc: Attachment A: Torch Cutting Emission Factors, Table D-5 from Versar, 1996.
Attachment B: Sand Handling Emission Factor Development

Cc: Leslie Riley, Maul Foster & Alongi, Inc.
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