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Sent via email only

Jack Scott,

Eagle Foundry (Eagle) was called into the Cleaner Air Oregon (CAO) program on February 1, 2022, and submitted an Emissions Inventory (Inventory) on May 16, 2022, after DEQ granted a 14-day extension. In accordance with Oregon Administrative Rule (OAR) 340-245-0030(2), DEQ issued a written request on November 8, 2022, requiring additional information and a revised Inventory to be submitted by December 29, 2022. On December 12, 2022, Eagle requested extensions to complete source testing and engineering analyses to inform emissions estimates for four Toxics Emissions Units (TEUs): AIRARC and GRIND (until March 31, 2022), MELT and POUR_COOL (until source testing could be completed, and results approved by DEQ), as well as a shorter extension (to January 11, 2023) to complete the requested updates for all other TEUs. DEQ granted the requested extensions and has worked with Eagle to develop an appropriate timeline for the source testing, including approval of additional extensions for testing of the AIRARC and GRIND TEUs and source test reporting for the MELT and POUR/COOL TEUs. Eagle submitted a revised Inventory on January 11, 2023, and the results of source testing on May 15, 2023, June 15, 2023 and June 16, 2023.

Per the submittal deadlines set in DEQ's letters dated December 21, 2023, and March 13, 2023, a revised Inventory including updated emissions for the AIRARC, GRIND, MELT and POUR_COOL TEUs must be submitted to DEQ no later than 30 days after receiving DEQ approval of the source test data. While DEQ's review of the source test data is pending, we have reviewed the January 11, 2023, submittal and identified additional updates that are needed before approval of the Inventory. In accordance with OAR 340-245-0030(4)(b), DEQ is requesting that Eagle provide additional information and revisions. Please submit the information specified below concurrently with updated emissions for the MELT and POUR_COOL TEUs, by no later than 30 days after receiving DEQ approval of the source test data.

General Comment

Because molybdenum is a component of the alloys melted at Eagle Foundry, DEQ is requiring that Eagle estimate molybdenum trioxide (CASRN 1313-27-5) emissions in the Inventory as specified in the comments below, applying the assumption that 100 percent of molybdenum emitted will be in the trioxide form. For most TEUs, the best available data to estimate the molybdenum portion of particulate matter (PM) emitted is the 2021 Baghouse Dust Analysis, provided in Attachment F of the January 11, 2023, Inventory submittal. DEQ mistakenly neglected to require source testing for molybdenum in order to develop emissions from the MELT and POUR_COOL TEUs, and recognizes that as a result there will be more uncertainty in the molybdenum trioxide emissions estimate from these TEUs than for the other metal TACs emitted. However, because molybdenum trioxide does not currently have a Risk Based Concentration (RBC) under Oregon rules (see in OAR 340-245-8010 Table 2), molybdenum trioxide

emissions estimates will not impact the risk assessment results. If an RBC is added to Table 2 in a future rulemaking, DEQ may require an updated risk assessment at that time.

Specific Comments

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.
    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 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.
    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.
    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;[1]
        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.[2]
    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;[3]
        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

[1] Versar, Inc. "Title V Applicability Workbook", 1996, Table D-5 ("Torch Cutting Emission Factors").
[2] In the absence of data specific to molybdenum trioxide, account for 100 percent conversion to molybdenum trioxide by multiplying molybdenum emissions by 1.5 (ratio of the molecular weights of molybdenum trioxide and molybdenum).
[3] RTI International, 2012, Table 6-2, ("Default PM Emission Factors for Finishing Operations", emission factor for "grinding, uncaptured and uncontrolled").

be more representative of the overall TAC 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;
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.

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.[4]
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);
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).
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 sand blasting emission factor cited.
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;
    ii. Crystalline silica (CASRN 7631-86-9) emissions associated with the Velvacoat ST 803, 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

[4] 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).

estimates for the SCREENING, RECLAIM, and S_PALMER TEUs (see Items 1.i-k below);

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.

k. Small Palmer (S_PALMER TEU):
   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).

l. Material handling (SCREENING TEU):
   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);
   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;
   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).

m. Rotary shakeout (RECLAIM TEU):
   i. Revise the capture efficiency to 90 percent. The EPA report referenced by MFA in Attachment G of the Inventory supporting documentation[5] 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.
   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
   iii. Include molybdenum trioxide (CASRN 1313-27-5) emissions, based on the results of the 2021 Baghouse Dust Analysis (see footnote 2).

n. Bead storage (SILO TEUs):
   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;
   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

[5] EPA, 1992. Alternative Control Techniques Document for PM-10 Emissions from Ferrous Foundries. EPA-450/3-92-012. https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=20011UJF.TXT [accessed August 8, 2023].

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.

o. 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.

p. Emergency diesel engines (EGEN TEU):
   i. For benzo[a]pyrene (CASRN 50-32-8), update the emission factor to 3.52E-5 lb/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 the AQ520 to include the emission factor source and date (South Coast Air Quality Management District, 2016).

q. Slag handling: Include slag handling as a TEU in the Inventory, calculating emissions as follows:
   i. Estimate PM_{10} 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 PM_{10} may be estimated using site-specific data, a representative dataset from a similar operation, or conservative assumptions based on available information.

r. 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
   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).

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

t. 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[6]:
      a. MELT;
      b. POUR_COOL;
      c. HOTTOP;
      d. REC;
      e. WELD;
      f. GRIND;
      g. PROPANE; and
      h. MOLD;
   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;

[6] Individual line items will not necessarily be designated as separate TEUs for permitting purposes. Breaking out the release points on the AQ520 form is intended to help verify consistency between the emission rates and "Stack or Fugitive ID" in the Emissions Inventory and those provided in the subsequent Modeling Protocol and Risk Assessment. TEU IDs may be listed in the format "[TEU Name]_[Stack or Fugitive ID]" to indicate that a single TEU has multiple emission points which are separated for clarity on the AQ520 form.

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.

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.

Sincerely,

Julia DeGagné
Air Toxics Project Manager

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