Oregon
Kate Brown, Governor

Department of Environmental Quality
Agency Headquarters
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5696
FAX (503) 229-6124
TTY 711

August 26, 2022

Cascade Steel Rolling Mills, Inc.
3200 N Hwy 99W
McMinnville, OR 97128

Sent via email only

Daniel Lee,

DEQ has completed its initial review of your May 9, 2022 Cleaner Air Oregon (CAO) Emissions Inventory (Inventory) for Cascade Steel Rolling Mills, Inc. (CSRM) in McMinnville, OR.

In accordance with Oregon Administrative Rule (OAR) 340-245-0030(2), DEQ has determined that the following additional information, corrections, and updates are required 45 days from issuance of this letter, by October 10, 2022, in order to approve the Inventory:

General Comments

The current Requested Potential to Emit (PTE) operating scenario includes a number of proposed modifications to your facility that represent a proposed, future state, including the installation of a number of new control devices and building modifications to increase the capture and control of Toxic Air Contaminant (TAC) emissions. Based on information conveyed by CSRM, DEQ's understanding is that planned upgrades are in the design phase and as such, detailed technical documentation is not currently available, nor is the possibility that source testing can occur to verify capture and control efficiencies. Therefore, DEQ will not allow the use of the proposed capture and control efficiencies as submitted in the Requested PTE operating scenario. DEQ requires that you revise the Inventory to reflect CSRM's current operational state when estimating emissions for Requested PTE activities. As described in DEQ's specific comments for each Toxics Emissions Unit (TEU) below, please remove control and capture efficiencies associated with proposed future upgrades and include current, verifiable capture and control efficiencies and emission points.

Specific Comments

1. Please make updates to emissions from the following TEUs to reflect existing conditions, as follows:
    a. Remove control and capture efficiencies associated with proposed future upgrades, including:
        i. the proposed baghouse ("BH01") to control emissions from the melt shop (TEU EU-1);
        ii. the proposed baghouse ("BH02") to control emissions from billet cutting at casting (TEU EU-10) and slag handling (TEU EU-5);
        iii. the proposed baghouse ("BH03") to control emissions from scrap billet cutting (TEU EU-12);

        iv. the proposed enclosures to capture emissions from slag handling (TEU EU-5 and TEU EU-13); and
        v. the proposed scrubber ("WSCRUB") to control emissions from slag handling (TEU EU-13).
    b. Inclusion of current, verifiable capture and control efficiencies and emission points for the following TEUs, as they are described in the current Title V Operating Permit:
        i. TEU EU-1 (including melt shop baghouses BH-1, BH-1A, and BH-2);
        ii. TEU EU-3 (uncontrolled melt shop emissions; please add this TEU to the Inventory);
        iii. TEU EU-5 (uncontrolled slag handling);
        iv. TEU EU-10 (uncontrolled billet cutting at casting); and
        v. TEU EU-12 (uncontrolled scrap billet cutting at the rolling mill).
2. For melt shop fugitive emissions (TEU EU-3) and billet cutting (TEUs EU-10 and EU-12):
    a. CSRM has provided engineering testing data to support emissions estimates from the melt shop roof monitor and billet cutting ("2019 Emissions Testing", Attachment C of the Inventory). Because the condensable portion of particulate TAC emissions was not measured (as described in Item VII(8) in DEQ's Source Test Review Report Memorandum, included as Attachment A to this letter), update the following emission factors to include estimates of condensable particulate emissions in addition to filterable particulate emissions[1]:
        i. Antimony (CASRN 7440-36-0);
        ii. Arsenic (CASRN 7440-38-2);
        iii. Cadmium (CASRN 7440-43-9);
        iv. Chromium VI (CASRN 18540-29-9);
        v. Cobalt (CASRN 7440-48-4);
        vi. Lead (CASRN 7439-92-1);
        vii. Manganese (CASRN 7439-96-5);
        viii. Nickel (DEQ SEQ ID 365);
        ix. Phosphorus (DEQ SEQ ID 504);
        x. Selenium (CASRN 7782-49-2); and
        xi. Zinc (CASRN 7440-66-6).
    b. Include emission estimates for the following TACs, which were not included in the 2019 Emissions Testing[1]:
        i. Mercury (CASRN 7439-97-6): in the absence of more recent, representative mercury emissions data, assume a filterable fraction equal to 0.00043 percent of total particulate matter for TEU EU-3, as listed in CSRM's Permit Review Report (36-5034-TV-01, Page 59); and
        ii. Barium (CASRN 7440-39-3).
    c. The information provided with the 2019 Emissions Testing report was insufficient to evaluate the validity of the blank corrections. Use the data set "Filter Only no Blank Subtraction" instead of the "Filter Only Reagent Blank Subtraction" from the 2019 Emissions Testing report to provide a conservative basis for the "Roof Monitor" and "Billet Cutting" TAC emission factors.

[1] In the absence of site-specific emissions data, the use of default emission factors or representative source test data from similar facilities for filterable and condensable particulate and TAC speciation may be considered. CSRM should work with DEQ to determine appropriate emission factors. See, for example, RTI International, Emission Estimation Protocol for Iron and Steel Foundries (December, 2012), Sections 3.1.4.1 and 3.1.4.3. https://www.rti.org/publication/emission-estimation-protocol-iron-and-steel-foundries/fulltext.pdf.

3. For billet cutting (TEUs EU-10 and EU-12):
    a. The potential for fugitive emissions, in addition to those captured in the 2019 Emissions Testing, must be considered. Please include an estimate of additional fugitive emissions or provide substantiation in the form of test data or design specifications that 100 percent of billet cutting emissions were captured by the 2019 Emissions Testing.
4. For the melt shop baghouses (TEU EU-1, baghouses BH-1, BH-1A, and BH-2):
    a. Update the particulate matter emission factor for BH-2 to 0.00028 lb/ton to reflect an average of the 2013 (0.00026 lb/ton) and 2016 (0.0003 lb/ton) source test results, for consistency with method used for Baghouses 1 and 1A.
    b. CSRM has provided laboratory analytical data to support TAC speciation for the baghouses (“2013 Filter Testing”, Attachment D of the Inventory). Include emission estimates for the following TACs, which were not included in the 2013 Filter Testing[2]:
        i. Barium (CASRN 7440-39-3);
        ii. Beryllium (CASRN 7440-41-7); and
        iii. Selenium (CASRN 7782-49-2).
    c. The condensable portion of particulate emissions is not accounted for in the particulate matter emission factors or TAC speciation used. Please adjust the following emission factors to include estimates of condensable particulate emissions in addition to filterable particulate emissions[2]:
        i. Cadmium (CASRN 7440-43-9);
        ii. Chromium VI (CASRN 18540-29-9);
        iii. Lead (CASRN 7439-92-1);
        iv. Manganese (CASRN 7439-96-5);
        v. Nickel (DEQ SEQ ID 365); and
        vi. Zinc (CASRN 7440-66-6).
    d. Include emissions (filterable and condensable) for the following TACs, for consistency with detections in the 2013 Filter Testing data (Attachment D of Inventory, page 7 of 18):
        i. Antimony (CASRN 7440-36-0): Antimony was detected in BH-1A, sample Run #3 at 4.9 mg/kg.
        ii. Phosphorus (DEQ ID 504): Phosphorus was detected in BH-1A, sample Run #3 at 50 mg/kg.
5. For melt shop fugitive emissions (TEU EU-3) and melt shop baghouses (TEU EU-1, baghouses BH-1, BH-1A, and BH-2), include emission estimates for the following TACs, which may be emitted from foundries melting scrap metal[3]:

---

[2] In the absence of site-specific representative emissions data, the use of default emission factors for filterable and condensable particulate and TAC speciation may be considered. CSRM should work with DEQ to determine appropriate emission factors. See, for example, RTI International, 2012, Sections 3.1.4.1 and 3.1.4.3. https://www.rti.org/publication/emission-estimation-protocol-iron-and-steel-foundries/fulltext.pdf.

[3] See, for example, the following sources for discussions of emissions from foundries:

US EPA. Locating and Estimating Air Emissions from Sources of Dioxins and Furans. EPA-454/R-97-003. May, 1997, Section 4.4. (https://www3.epa.gov/ttnchie1/le/dioxin.pdf).

US EPA. Locating and Estimating Air Emissions from Sources of Polycyclic Organic Matter. EPA-454/R-98-014. July 1998,Section 4.4. (https://www.epa.gov/sites/default/files/2020-11/documents/polycyclic_organic_matter.pdf).

RTI International. Emission Estimation Protocol for Iron and Steel Foundries. Submitted to Office of Air Quality Planning and Standards U.S. Environmental Protection Agency. December, 2012. https://www.rti.org/publication/emission-estimation-protocol-iron-and-steel-foundries/fulltext.pdf

Yang et al., Organic pollutants from electric arc furnaces in steelmaking: a review. Environmental Chemistry Letters (2021) 19:1509–1523. https://doi.org/10.1007/s10311-020-01128-0.

    a. Dioxins/furans (various CASRNs);
    b. Polychlorinated biphenyls (PCBs; CASRN 1336-36-3 and various CASRNs); and
    c. Polycyclic Aromatic Hydrocarbons (PAHs; various CASRNs).

6. As discussed in the notes to Table B-2 of the Inventory supporting calculations, CSRM estimates a 64-fold increase in emissions of chromium VI (CASRN 18540-29-9) during the production of "MMFX" stainless steel. To account for this increase on an annual basis, adjust the annual emissions estimates for the following emission units by a factor of 64, proportional to the maximum requested annual ratio of MMFX to non-stainless steel production rates for the following:
    a. Melt shop fugitive emissions (TEU EU-3);
    b. Melt shop baghouses (TEU EU-1, baghouses BH-1, BH-1A, and BH-2); and
    c. Billet cutting at casting (TEU EU-10).
7. The potential for fugitive emissions of organic TACs from TEU EU-1 (emission point "MELTFUG") must be considered. Please provide substantiation in the form of test data or design specifications that 100 percent of these emissions exit the baghouses, or update emissions to include fugitive emission estimates for the following organic TACs:
    a. Benzene (CASRN 71-43-2);
    b. Chlorobenzene (CASRN 108-90-7);
    c. Chloromethane (methyl chloride) (CASRN 74-87-3);
    d. Ethylbenzene (CASRN 100-41-4);
    e. Styrene (CASRN 100-42-5);
    f. Toluene (CASRN 108-88-3);
    g. Vinyl chloride (CASRN 75-01-4); and
    h. Xylene (CASRN 1330-20-7).
8. For slag handling (TEU EU-5):
    a. Update emissions for the following TACs, for consistency with the slag analytical report (Attachment F to the Inventory submittal):
        i. Zinc (CASRN 7440-66-6): Update emission factors to reflect the analytical result of 160 mg/kg (currently the analytical result is listed as 16 mg/kg); and
        ii. Phosphorus (DEQ ID 504): Include emissions for this TAC, based on the analytical result of 350 mg/kg.
    b. Update the "Max Daily – Acute" emission factor to use a representative maximum daily average wind speed for unenclosed drop points, rather than the 5-year average wind speed, in the EPA Drop Equation (AP-42 Section 13.2.4, equation 1).
9. Update the Inventory to more accurately allocate natural gas emissions for TEU EU-4 to emission points, as follows:
    a. Update TEU EU-4 to include only the vertical pre-heater (permitted unit EU-4) - emissions from permitted unit EU-4 vent through a stack on the melt shop roof; and
    b. Designate a new TEU or TEUs to identify other natural gas heaters in the melt shop (identified in the Title V Operating permit as four EAF preheaters, the ladle furnace preheater, four tundish heaters, and two horizontal heaters) - these emissions may be divided between fugitive emissions and baghouse stacks.
10. For the Gasoline Dispensing Facility (TEU EU-15):
    a. Calculate VOC emissions from tank filling, breathing, and emptying using the methodology presented in AP-42, Section 7.1.3;
    b. Calculate daily VOC working losses using the attached methodology from the Texas Commission on Environmental Quality (TCEQ; included as Attachment B) - assume maximum daily emissions are equal to maximum hourly emissions multiplied by the maximum hours of tank filling. Provide justification for the worst-case liquid temperature used, or assume the TCEQ default of 95 degrees F; and

    c. Include a complete set of TACs emitted from the gasoline dispensing facility - in the absence of site-specific gasoline composition data, the TAC speciation percentages provided in Attachment C may be used.

11. All TEUs must be included in the Inventory.[4] If TACs are not likely to be emitted from a TEU, justification must be provided for exemption per OAR 340-245-0060(3)(a). Please revise the Inventory to include the following TEUs:
    a. Scrap handling (permitted emission unit EU-9);
    b. Wastewater treatment and storage ponds (including potential metal particulate emissions from cooling storage ponds as a result of entrainment or maintenance activities);
    c. Maintenance shops and routine maintenance activities (including incidental welding and miscellaneous chemical usage), if applicable; and
    d. Fugitive dust from unpaved roads.
12. Please provide the following additional documentation to support the emissions inventory:
    a. Additional information related to the 2019 source test:
        i. Laboratory analysis data for cadmium (CASRN 7440-43-9) and vanadium (CASRN 7440-62-2);
        ii. Types and quantities of alloys produced during the 2019 Emissions Testing; and
        iii. Photographs or annotated design documents indicating the billet cutting and roof monitor sample locations.
    b. A list of alloys produced or potentially produced at CSRM, including the following:
        i. TAC constituent weight percentages for each alloy;
        ii. Maximum amount (tons) of each alloy potentially produced on a daily basis; and
        iii. Maximum amount (tons) of each alloy potentially produced on an annual basis.
    c. Justification for the assumption listed in the Notes to Table B-2 that 60 percent of melt shop emissions (TEU EU-1) are from the electric arc furnace and 40 percent are from other sources.
    d. Quantitative justification for the assumption that the condensable fraction of mercury (CASRN 7439-97-6) emissions from the baghouses (BH-1, BH-1A and BH-2) is equal to the measured filterable fraction.
    e. The "1995 Source Test" report used to derive the organic TAC emission factors for TEU EU-1.

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.

[4] DEQ's Cleaner Air Oregon Exempt TEU Reporting document may assist with identifying non-exempt TEUs, and provides information about requesting an exemption for activities such as welding and product usage which fall below CAO reporting thresholds.

Sincerely,

Julia DeGagné
Air Toxics Project Manager

Cc: Michael Eisele, DEQ
JR Giska, DEQ
Matt Davis, DEQ
Keith Anderson, DEQ
File

Enc: Attachment A: Source Test Review Report Memorandum
Attachment B: Estimating Short Term Emission Rates from Fixed Roof Tanks
Attachment C: Default Gasoline TAC Speciation for Storage Tanks

State of Oregon

Department of Environmental Quality Memorandum

Date: 8/19/2022

To: File/Julia DeGagné
From: Thomas Rhodes

Subject: Source Test Review Report
Cascade Steel Rolling Mills
Permit Number: 36-5034

Test Dates: August 6-8, 2019
Report Received: May 9, 2022
Source Tester: Mostardi Platt
DEQ Observed: No

I) Source Description: The facility processes ferrous scrap metal to produce various steel products.

II) Process (es)/Emissions Unit(s) Tested: Roof Monitor above the casting area and the vent above the Billet Cutting area.

III) Test Purpose: Investigative test to develop emission factors for metal emissions to use in a Cleaner Air Oregon (CAO) Emission Inventory.

IV) Testing Locations:

Roof Monitor Exhaust:

Depth:	120”
Length:	934”
Equivalent Diameter:	212.7”
Distance A (Method 1):	0” (0 Diameter)
Distance B (Method 1):	0” (0 Diameters)

Billet Cutting Exhaust:

Depth:	74”
Length:	292”
Equivalent Diameter:	118”
Distance A (Method 1):	0” (0 Diameter)
Distance B (Method 1):	0” (0 Diameters)

V) Testing Methodology: The following testing methods were utilized during the testing program:

Flow Rate: EPA Method 1 and Hotwire Anemometer
Moisture Content: ASTM E337-02
Multi Metals: Modified ODEQ Method 8

VI) Summary of Results: The testing parameters, test results and operating parameters are summarized in the Tables below:

Table 1: Roof Monitor multi metals
Table 2: Billet Cutting multi metals

TABLE 1: Roof Monitor

Parameter	Run 1	Run 3	Run 5	Average
Date	8/6/2019	8/6/2019	8/6/2019	--
Test Times	9:35-10:45	12:18-13:24	13:35-14:47	--
Metal Production Rate (tons/hr)	132.0	116.0	131.0	**126.3**
Exhaust Gas Flow Rate (dscf/m)	337,051	412,758	303,468	**364,426**
Sample Volume (dscf)	1,357.8	1,409.7	1,094.6	**1,287.4**
Aluminum Emissions:	--	--	--	--
· **ug/dscm**	222.1	45.2	88.4	**118.6**
· **lb/hr**	3.14E-01	6.99E-02	1.01E-01	**1.61E-01**
· **lb/ton**	2.38E-03	6.02E-04	7.7E-04	**1.25E-03**
Antimony Emissions:	--	--	--	--
· **ug/dscm**	< 0.27	< 0.24	< 0.74	**< 0.42**
· **lb/hr**	< 3.82E-04	< 3.72E-04	< 8.46E-04	**< 5.33E-04**
· **lb/ton**	< 2.89E-06	< 3.21E-06	< 6.46E-06	**< 4.19E-06**
Arsenic Emissions:	--	--	--	--
· **ug/dscm**	0.43	< 0.32	< 1.03	**< 0.59**
· **lb/hr**	6.09E-04	< 4.96E-04	< 1.17E-03	**< 7.58E-04**
· **lb/ton**	4.61E-06	< 4.28E-06	< 8.93E-06	**< 5.94E-06**
Beryllium Emissions:	--	--	--	--
· **ug/dscm**	< 0.08	< 0.07	< 0.09	**< 0.08**
· **lb/hr**	< 1.06E-04	< 1.12E-04	< 1.06E-04	**< 1.08E-04**
· **lb/ton**	< 8.03E-07	< 9.66E-07	< 8.09E-07	**< 8.59E-07**
Cadmium Emissions:	--	--	--	--
· **ug/dscm**	0.04	0.04	0.05	**0.04**
· **lb/hr**	6.32E-05	5.73E-05	5.13E-05	**5.73E-05**
· **lb/ton**	4.79E-07	4.94E-07	3.92E-07	**4.55E-07**
Chromium Emissions:	--	--	--	--
· **ug/dscm**	2.90	1.26	3.79	**2.65**
· **lb/hr**	4.10E-03	1.95E-03	4.33E-03	**3.46E-03**
· **lb/ton**	3.10E-05	1.68E-05	3.30E-05	**2.70E-05**
Cobalt Emissions:	--	--	--	--
· **ug/dscm**	0.47	0.13	0.32	**0.31**
· **lb/hr**	7.00E-04	1.84E-04	4.00E-04	**4.28E-04**
· **lb/ton**	5.30E-06	1.58E-06	3.05E-06	**3.31E-06**
Copper Emissions:	--	--	--	--
· **ug/dscm**	10.1	9.3	22.1	**13.9**
· **lb/hr**	1.43E-02	1.44E-02	2.25E-02	**1.80E-02**
· **lb/ton**	1.08E-04	1.24E-04	1.92E-04	**1.42E-04**

'<' denotes results calculated using the MDL for one of more analytical fraction that was non-detect

TABLE 1 continued: Roof Monitor

Parameter	Run 1	Run 3	Run 5	Average
Lead Emissions:	--	--		--
· **ug/dscm**	34.9	6.4	31.6	**24.3**
· **lb/hr**	4.93E-02	1.00E-02	3.61E-02	**3.18E-02**
· **lb/ton**	3.73E-04	8.62E-05	2.76E-04	**2.45E-04**
Manganese Emissions:	--	--	--	--
· **ug/dscm**	305.0	80.3	157.2	**180.8**
· **lb/hr**	4.31E-01	1.24E-01	1.79E-01	**2.45E-01**
· **lb/ton**	3.26E-03	1.07E-03	1.37E-03	**1.90E-03**
Nickel Emissions:	--	--	--	--
· **ug/dscm**	1.4	1.1	3.0	**1.9**
· **lb/hr**	2.00E-03	1.80E-03	3.50E-03	**2.43E-03**
· **lb/ton**	1.52E-05	1.55E-05	2.67E-05	**1.91E-05**
Phosphorus Emissions:	--	--	--	--
· **ug/dscm**	4.3	< 2.9	< 5.2	**< 4.1**
· **lb/hr**	6.00E-03	< 4.50E-03	< 6.00E-03	**< 5.50E-03**
· **lb/ton**	4.55E-05	< 3.88E-05	< 4.58E-05	**< 4.33E-05**
Selenium Emissions:	--	--	--	--
· **ug/dscm**	0.4	< 0.4	< 1.0	**< 0.6**
· **lb/hr**	6.00E-04	< 6.00E-04	< 1.10E-03	**< 7.67E-04**
· **lb/ton**	4.55E-06	< 5.17E-06	< 8.40E-06	**< 6.04E-06**
Vanadium Emissions:	--	--	--	--
· **ug/dscm**	0.9	0.2	0.4	**0.5**
· **lb/hr**	1.30E-03	3.00E-04	5.00E-04	**7.00E-04**
· **lb/ton**	9.85E-06	2.59E-06	3.82E-06	**5.42E-06**
Zinc Emissions:	--	--	--	--
· **ug/dscm**	146.9	47.5	278.1	**157.5**
· **lb/hr**	2.08E-01	7.35E-02	3.17E-01	**1.99E-01**
· **lb/ton**	1.57E-03	6.34E-04	2.42E-03	**1.54E-03**

‘<’ denotes results calculated using the MDL for one of more analytical fraction that was non-detect

TABLE 2: Billet Cutting

Parameter	Run 1	Run 3	Runs 5	Run 7	Average
Date	8/7/2019	8/7/2019	8/7/2019	8//2019	--
Test Times	10:07-11:07	12:27-13:07	15:05-16:05	8:55-9:55	--
Metal Production Rate (tons/hr)	89	121	120	140	**117.5**
Exhaust Gas Flow Rate (dscf/m)	76,464	84,323	88,456	86,403	**83,912**
Sample Volume (dscf)	1,265.8	949.3	662.2	712.5	**897.5**
Aluminum Emissions:	--	--	--	--	--
· **ug/dscm**	13.1	16.5	21.3	15.9	**16.7**
· **lb/hr**	3.75 E-03	3.54E-03	7.07E-03	5.13E-03	**4.87E-03**
· **lb/ton**	4.21E-05	2.93E-05	5.89E-05	3.67E-05	**4.17E-05**
Antimony Emissions:	--	--		--	--
· **ug/dscm**	< 0.3	< 1.0	< 1.8	< 0.8	**< 1.0**
· **lb/hr**	< 8.90E-05	< 2.08E-04	< 6.01E-04	< 2.57E-04	**< 2.89E-04**
· **lb/ton**	< 1.00E-06	< 1.72E-06	< 5.01E-06	< 1.84E-03	**< 2.39E-06**
Arsenic Emissions:	--	--		--	--
· **ug/dscm**	< 1.5	3.2	< 3.8	< 1.7	**< 2.5**
· **lb/hr**	< 4.22E-04	6.78E-04	< 1.25E-03	< 5.42E-04	**< 7.23E-04**
· **lb/ton**	< 4.74E-06	5.50E-06	< 1.04E-05	< 3.87E-06	**< 6.16E-06**
Beryllium Emissions:	--	--		--	--
· **ug/dscm**	< 0.08	< 0.11	< 0.15	< 0.14	**< 0.12**
· **lb/hr**	< 2.30E-05	< 2.30E-05	< 5.10E-05	< 4.60E-05	**< 3.58E-05**
· **lb/ton**	< 2.58E-07	< 1.90E-07	< 4.25E-07	< 3.29E-07	**< 3.01E-07**
Cadmium Emissions:					
· **ug/dscm**	0.03	0.04	0.06	0.05	**0.05**
· **lb/hr**	8.63E-06	1.27E-05	1.91E-05	1.73E-05	**1.44E-05**
· **lb/ton**	9.70E-08	1.05E-07	1.59E-07	1.24E-07	**1.21E-07**
Chromium Emissions:	--	--		--	--
· **ug/dscm**	2.3	6.4	6.1	6.8	**5.4**
· **lb/hr**	6.66E-04	1.38E-03	2.03E-03	2.21E-03	**1.57E-03**
· **lb/ton**	7.48E-06	1.14E-05	1.69E-05	1.58E-05	**1.29E-05**
Cobalt Emissions:	--	--		--	--
· **ug/dscm**	0.7	1.7	1.6	0.9	**1.2**
· **lb/hr**	2.09E-04	3.54E-04	5.22E-04	3.00E-04	**3.46E-04**
· **lb/ton**	2.34E-06	2.92E-06	4.35E-06	2.14E-06	**2.94E-06**
Copper Emissions:	--	--	--	--	--
· **ug/dscm**	23.2	79.5	149.7	61.5	**78.5**
· **lb/hr**	6.60E-03	1.71E-02	4.96E-02	1.99E-02	**2.33E-02**
· **lb/ton**	7.42E-05	1.41E-04	4.13E-04	1.42E-04	**1.93E-04**

'<' denotes results calculated using the MDL for one of more analytical fraction that was non-detect

TABLE 2 continued: Billet Cutting

Parameter	Run 1	Run 3	Run 5	Run 7	Average
Lead Emissions:	--	--	--	--	--
· **ug/dscm**	0.3	0.5	< 4.9	5.6	**< 2.8**
· **lb/hr**	8.54E-05	9.77E-05	< 1.62E-03	1.79E-03	**< 8.99E-04**
· **lb/ton**	9.60E-07	8.08E-07	< 1.35E-05	1.28E-05	**< 7.02E-06**
Manganese Emissions:	--	--	--		--
· **ug/dscm**	25.0	56.5	77.2	52.4	**52.8**
· **lb/hr**	7.20E-03	1.21E-02	2.56E-02	1.70E-02	**1.55E-02**
· **lb/ton**	8.09E-05	1.00E-04	2.13E-04	1.21E-04	**1.29E-04**
Nickel Emissions:	--	--	--		--
· **ug/dscm**	5.5	16.3	17.8	10.3	**12.5**
· **lb/hr**	1.60E-03	3.50E-03	5.91E-03	3.30E-03	**3.58E-03**
· **lb/ton**	1.80E-05	2.89E-05	4.92E-05	2.39E-05	**2.99E-05**
Phosphorus Emissions:	--	--	--		--
· **ug/dscm**	< 4.0	< 7.5	< 12.9	< 7.7	**< 8.0**
· **lb/hr**	< 1.20E-03	< 1.60E-03	< 4.30E-03	< 2.50E-03	**< 2.40E-03**
· **lb/ton**	< 1.35E-05	< 1.32E-05	< 3.58E-05	< 1.79E-05	**< 2.01E-05**
Selenium Emissions:	--	--	--		--
· **ug/dscm**	< 0.3	< 0.4	< 0.6	< 0.6	**< 0.5**
· **lb/hr**	< 8.79E-05	< 8.49E-05	< 1.94E-04	< 1.76E-04	**< 1.37E-04**
· **lb/ton**	< 9.88E-07	< 7.26E-07	< 1.62E-06	< 1.26E-06	**< 1.15E-06**
Vanadium Emissions:	--	--	--		--
· **ug/dscm**	1.0	1.4	0.3	0.7	**0.8**
· **lb/hr**	3.00E-04	4.00E-04	9.54E-05	2.00E-04	**2.49E-04**
· **lb/ton**	3.37E-06	3.31E-06	7.95E-07	1.43E-06	**2.23E-06**
Zinc Emissions:	--	--	--		--
· **ug/dscm**	5.8	4.5	< 29.9	11.5	**< 12.9**
· **lb/hr**	1.60E-03	1.00E-03	< 9.90E-03	3.70E-03	**< 4.05E-03**
· **lb/ton**	1.80E-05	8.26E-06	< 8.25E-05	2.64E-05	**< 3.38E-05**

'<' denotes results calculated using the MDL for one of more analytical fraction that was non-detect

VII) Concerns & Comments:

1) The results presented above are without any blank corrections.

2) Some of the emission rates presented in the summary tables at the beginning of the source test report do not match run averages from the result summaries in Section 3.0 of the source test report. The tables in Section 3.0 contain the correct run average values.

3) The report does not contain any example calculations as required by Item #11 in Table A-2 of the Oregon Source Sampling Manual (SSM). Using the data provided, Oregon DEQ calculations closely matched values in the source test report.

4) Full velocity traverse measurements required for volumetric flow rate determination are not included in the report. It appears that velocity measurements were only made at the traverse points selected for ODEQ Method 8 sampling. Volumetric flow rates may be biased high or low by excluding traverse points. The average volumetric flow rate from all six test runs on the Roof Monitor was 367,051 dscfm. For comparison, 2016 compliance testing on the Roof Monitor measured a flow rate of 310,000 dscfm, 419,000 dscfm in 2013, and 410,000 dscfm in 2012. There is no recent compliance testing data from the Billet Cutting area to compare against the volumetric flow rates in this source test report.

5) Wet bulb/dry bulb temperature measurements used for moisture determination are not included in the report even though the source test report stated that wet bulb/dry bulb measurements were made during each sampling run. A moisture value of 1.4% was used for every sample run for the Roof Monitor and for the Billet Cutting. For comparison, 2016 compliance testing on the Roof Monitor measured a moisture value of 1.8%, 1.5% in 2013, and 1.6% in 2012.

6) The report does not contain the pre-test velocity traverse for the Roof Monitor to determine which traverse points to sample at with the ODEQ Method 8 sample train. Section 6.2 of ODEQ Method 8 states " The points shall be representative of the flow pattern, and shall include the point of maximum velocity." Without a documented pretest traverse, it is unknown if the points selected for sampling meet the requirements in Section 6.2.

7) The laboratory results do not contain analysis data for cadmium or vanadium. Emission rates for those metals in the report could not be verified.

8) Reported metals only account for those that were captured on a filter along with the associated probe rinse. Metals that could pass through the filter and would normally be caught in EPA Method 29 impingers are not accounted for in this test report. Method 29 testing at different metal facility with an ambient source, 1.1% moisture and 76 °F, for metals that were detected both on the filter and in the impingers, the impingers contained 1-40% of the total metals.

9) The test report does not contain most of the required calibration information for the equipment that was used during the test.

a. ODEQ Method 8
   i. The orifice calibration was only completed at four settings covering the range used during the source test instead of the required seven settings over the full range of the orifice.
   ii. Documentation on the primary standard used to calibrate the orifice was not included.
   iii. Calibration documentation of the differential pressure gauges was not included.
   iv. Calibration documentation of the orifice thermocouple was not included.
   v. Calibration documentation of the two-inch diameter nozzle was not included.

b. No calibration information was provided for the hotwire anemometer that was used to take the stack temperature and velocity measurements.

<u>VIII) Overall Evaluation:</u> The severe deficiencies in the source test report would preclude its use for determining compliance with any regulatory standards. However, the particulate matter, moisture, and volumetric flow rates for the Roof Monitor in this report are within the historical range of previous compliance testing. Reported metals emissions from the Roof Monitor are likely to be reasonable estimates of what is being emitted. There is no recent data available from the Billet Cutting to compare against the data in this report. The metals analytical data also provides valuable information regarding emissions of metals relative to each other. The values presented above from the source test report currently represent the best available data for metals emissions from the Roof Monitor and Billet Cutting.

Air Permit Reviewer Reference Guide

APDG 6250

Estimating Short Term Emission Rates from Fixed Roof Tanks

Air Permit Division

Texas Commission on Environmental Quality

Table of Contents

Estimating Short Term Emission Rates from Fixed Roof Tanks

Scope

The goal of this document is to provide a methodology to calculate the worst case short term emissions from a vertical fixed roof tank (VFR tank) during routine operations. All calculations and derivations for short term emissions also apply to horizontal tanks. However, this calculation methodology does not apply to pressure vessels capable of handling 29.72 psia or greater, constant level or "surge" tanks (i.e., tanks that have inflow and outflow at the same time), and certain cases where a tank contains mixed phase materials (i.e., water with dense non aqueous phase liquid or crude with dissolved methane) or may otherwise have flash emissions.

Calculation Procedure

Emissions from loading a VFR tank should be calculated using Equation 1:

Equation 1

$$L_{MAX} = \frac{M_V \times P_{VA}}{R \times T} \times FR_M$$

- L_{MAX} (lb/hr) is the maximum potential short term emission rate at worst case conditions (highest liquid surface temperature, vapor pressure, and fill rate).
- M_V (lb/lbmol) is the vapor molecular weight of the VOC.
- P_{VA} (psia) is the vapor pressure of the tank contents at the worst case temperature.
- FR_M (gal/hr) is the maximum filling rate.
- R ((psia × gal)/(lbmol × °R)) is the ideal gas constant (80.273 for the selected units).
- T (Rankine) is the worst case liquid surface temperature. It is TCEQ practice to use either 95°F (554.67°R) or the actual temperature, whichever is higher.

Engineering Derivation

This section derives and explains Equation 1 listed above. Working losses are emissions of VOC that occur during the filling of a VFR tank. In an atmospheric vessel with fixed volume, a rising liquid level causes the displacement of vapors between the liquid surface and the vessel roof (the "headspace"). Emissions can be calculated by taking note of the fact that the total tank volume (liquid volume plus headspace) is a constant, and writing down its derivative, as is done in Equation 3.

Equation 2

$$V_{LIQUID} + V_{HEADSPACE} = Constant$$

Equation 3

$$\frac{d}{dt}V_{LIQUID} + \frac{d}{dt}V_{HEADSPACE} = 0$$

The rate at which the tank liquid volume increases (the derivative of V_{LIQUID} with respect to time) is equal to its filling rate, FR, and the rate at which the headspace volume decreases (the derivative of $V_{HEADSPACE}$ with respect to time) is equal to the volumetric emission rate, ER_{VOL}. Substituting and rearranging Equation 3, we have:

Equation 4

$$FR = ER_{VOL}$$

The mass emission rate is equal to the volumetric emission rate times the density of the vapor space, W_V. This is expressed in Equation 5 when Equation 4 is substituted.

Equation 5

$$ER = W_V \times FR$$

Assuming that the vapor space is of constant density, the vapor VOC density may be rewritten using the ideal gas law:

Equation 6

$$W_V = \frac{M_V \times P_{VA}}{R \times T}$$

All calculations for working losses are based on the relationship in Equation 5. Additional complexities such as incomplete saturation of the vapor space,[i] or pressure differentials between the vessel and the atmosphere introduced by tank breather settings, are accounted for with the use of various correction factors.

Endnote

---

[i] When the partial pressure of VOC in the vessel vapor space is equal to its vapor pressure, the vapor space is saturated. When the partial pressure of the VOC in the vessel space is less than its vapor pressure, the vapor space is incompletely saturated.

Summary of Changes to Guidance

Revision Date	Description of Changes
February 2020	Removed historical methodology discussion due to its reliance on a method rendered obsolete by November 2019 update of EPA AP-42. Performed other typographical corrections.
February 2018	Added clarification of product factor (K_P) relative to historical methodology discussion.
September 2014	Original publication of short-term fixed roof tank guidance document.

Attachment C. TAC Speciation for Gasoline

CASRN	*Toxic Air Contaminant (TAC)*	*TAC Vapor Weight Fraction*
526-73-8	1,2,3-Trimethylbenzene	0.00007058
95-63-6	1,2,4-Trimethylbenzene	0.00039799
108-67-8	1,3,5-Trimethylbenzene	0.00015565
540-84-1	2,2,4-Trimethylpentane	0.01543471
91-57-6	2-Methyl naphthalene	0.00000183
71-43-2	Benzene	0.00549442
110-82-7	Cyclohexane	0.00452826
100-41-4	Ethyl benzene	0.00141423
110-54-3	Hexane	0.02169322
78-79-5	Isoprene, except from vegetative emission sources	0.00026761
98-82-8	Isopropylbenzene (cumene)	0.00004279
108-38-3	m-Xylene	0.00267533
91-20-3	Naphthalene	0.00000597
95-47-6	o-Xylene	0.00125055
106-42-3	p-Xylene	0.00116709
108-88-3	Toluene	0.013467

Source: California Air Resources Board Speciation Profiles, highest weight fraction for each TAC from from Profile 691 ("Headspace vapors E10 summer gasoline fuel") and Profile 695 ("Headspace vapors E10 winter gasoline fuel").
https://ww2.arb.ca.gov/speciation-profiles-used-carb-modeling