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February 5, 2026

Department of Environmental Quality  
Cleaner Air Oregon (CAO)  
700 NE Multnomah Street, Suite 600  
Portland, OR 97232  
Attn: Amy DeVita-McBride, Project Engineer

RE: Response to CAO Comments on Emission Inventory dated December 8, 2025  
Orchid Orthopedic Solutions Oregon, Inc., 13963 S Fir St., Oregon City, OR 97045  
ENW Project 1827-23001-06

Thank you for your comments on Orchid Orthopedic Solutions Oregon, Inc.'s emission inventory, submitted December 8, 2025. Cleaner Air Oregon's (CAO) comments are outlined below (shaded) and ENW's responses are presented in italics following each of ODEQ's general and specific comments.

In response to the comments, the following documents have been revised and uploaded to YDO:

- Emissions Inventory: "1827-23001-06 Orchid 2026 AQ520 Form (v01)-FINAL.xlsx"
- Supporting Calculations: "1827-23001-06 Orchid 2026 Supporting Calcs (v01)-FINAL.xlsx"
- Process Flow Diagrams: "1827-23001-06\_Fig4ProcessFlowDiagram(v09).pdf"

## General Comments

1. Actual Emissions: Per OAR 340-245-0040(4)(a)(B)(i)(I), existing sources are required to submit actual annual and maximum daily production activities and usage for the calendar year preceding the DEQ call in. Orchid Orthopedics is not required to submit emissions estimates for the Actual activities and these may be omitted from the revised Inventory requested under Specific Comment 2.

Emission estimates based on actual activities have been omitted in the revised AQ520.

## Specific Comments

1. **Process Flow Diagram:** Process Flow Diagram: Submit to DEQ a revised process flow diagram (PFD) to address the following comments.
  - a. Ensure consistency in naming of Toxics Emissions Units (TEUs) between the AQ520 form and the PFD. The following TEUs have different names in the AQ520 form and the PFD:
    - i. "Knock Out" versus "Knockout" TEU;
    - ii. "Finish Sandblast" versus "Finishing Sandblast" TEU;
    - iii. F-75 Sandblast and 17-4 Sandblast TEUs; and
    - iv. F-75 Grind and 17-4 Grind TEUs.

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TEU names used in the flow diagrams have been reviewed against the TEU names used in the AQ520 form with changes made as needed to create consistency. A revised version of Figure 4 Process Flow Diagrams has been uploaded to YDO.

- b. Ensure all TEUs from the AQ520 form are included in the PFD. The following TEUs were excluded from the PFD:
  - i. WELD (MIG);
  - ii. CELL 1 SANDBLAST
  - iii. CELL 2 SANDBLAST; and
  - iv. FINISHING-POLISHING

The Process Flow Diagram has been updated to reflect all TEUs from the AQ520 form. This included adding the Exempt TEU Machining. The Kolene TEU was not included as that process has been discontinued, as previously documented.

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

- a. Per the General Comment, Orchid Orthopedics may omit emission estimates for the Actual activity basis from both Worksheets 3 and 5.

Emission estimates based on actual activities have been omitted in the revised AQ520 on both Worksheets 3 and 5.

- b. DEQ noted updates to the following throughputs or usage rates in Worksheets 2 and 4 of the revised Inventory submitted on June 17, 2025, when compared to the Inventory submitted on November 22, 2024. These changes were not documented in the submittal materials. Confirm that these changes were incorporated intentionally and if not revise as needed.

The changes noted below in 2.b.i through 2.b.iv were intentional and related to facility capacity. Except for TEU WELD (17-4), the logic used:

- Production at the facility is limited by the physical areas available to dry molds (Tunnel 1, Tunnel 2 and Final Dry rooms). This correlates to a maximum production of approximately 615 tons of alloy poured annually. This is conservatively assumed to be all F-75.
- In 2023, the ratio of capacity to actual value for F-75 alloy poured was almost 1.1x.
- While a 1.1x multiplier on all dependent TEUS is likely close to actual capacity, it was decided to conservatively use a 2x multiplier,

- i. Annual PTE and capacity welding usage rates for the following TEUs:
  - 1. WELD (F-75);
  - 2. WELD (17-4); and
  - 3. WELD (MIG);

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Intentional change. Capacity multiplier revised to 2x actual (see response to comment 2b).

- ii. WELD (17-4) TEU: The actual annual usage rate for the 17-4 alloy welding differs from information presented in the previous version of the Inventory and from the usage rates presented in the information presented in supporting workbook “Orchid CAO - UPDATED Supporting Calcs for Emissions (Rev01)-FINAL.xlsx”;

Intentional change. Reason: updated annual use from 160 rods per year to 7 rods per year. The supporting workbook has been updated to be consistent.

- iii. Annual PTE and capacity alloy poured for the following TEUs:
  - 1. F-75 CAST;
  - 2. 17-4 CAST;
  - 3. F-75 CUT;
  - 4. 17-4 CUT; and
  - 5. KNOCK OUT; and

Intentional change.

- F-75 CAST and F-75 CUT annual PTE and capacity were revised to reflect the maximum amount of F-75 alloy that can be poured at the facility in a year (see response to comment 2b).
- 17-4 CAST and 17-4 CUT values changed due to capacity multiplier revised to 2x actual (see response to comment 2b).
- KNOCK OUT is a summation of the changes to F-75 CAST and 17-4 CAST.

- iv. Annual PTE and capacity material usage rates for the following TEUs:
  - 1. PARTS CLEANING;
  - 2. FLASHFIRE DEWAX;
  - 3. CELL 1 SANDBLAST;
  - 4. CELL 2 SANDBLAST;
  - 5. MACHINING OIL;
  - 6. FINISH SANDBLAST;
  - 7. ROBOT POLISH; and
  - 8. FINISHING-POLISHING.

Intentional change. Capacity multiplier revised to 2x actual on all the above TEUs (see response to comment 2b).

- c. F-75 Alloy TEUs:
  - i. Review of alloy specifications provided by Orchid Orthopedics shows the F-75 alloy contains manganese (CASRN 7439-96-5). Include emission estimates for manganese from the following TEUs:
    - 1. WELD (F-75);
    - 2. F-75 CAST;
    - 3. F-75 CUT;

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4. F-75 GRIND; and
5. F-75 SANDBLAST; and

The Inventory has been updated to include manganese emission estimates for the above TEUs.

- ii. Review of 2023 actual annual alloy poured against information submitted in both the 2023 Annual Report and the Air Toxics Emissions Inventory (ATEI) show discrepancies. Review and revise throughputs as appropriate to resolve the discrepancy for the following TEUs:
  1. F-75 CAST;
  2. F-75 CUT;
  3. F-75 GRIND; and
  4. F-75 SANDBLAST.

The Inventory has been updated to reflect the F-75 Alloy poured value (563.821 tons) reported on the 2023 Air Toxics Emissions Inventory form as the actual values for the above TEUs. Note that the actual value for the Knockout TEU also was changed as it is a summation of F-75 and 17-4 alloy throughputs.

- d. 17-4 Alloy TEUs: Review of alloy specifications provided by Orchid Orthopedics shows the 17-4 alloy contains phosphorus (DEQ ID 504). Include emission estimates for phosphorus from the following TEUs:
  - i. WELD (17-4);
  - ii. 17-4 CAST;
  - iii. 17-4 CUT;
  - iv. 17-4 GRIND; and
  - v. 17-4 SANDBLAST.

The Inventory has been updated to include phosphorus emission estimates for the above TEUs. The supporting workbook has been updated to show the emission factor calculation for phosphorus.

- e. WELD (MIG) TEU: The SDS for this electrode show that it contains copper (CASRN 7440-50-8). Include emission estimates for copper using the calculation methodology outlined in Section 1.1.2 of guidance from San Diego County Air Pollution Control District.<sup>1</sup>

Form AQ520 emission estimates have been updated to include copper for WELD (MIG) TEU using the calculation methodology outlined in Section 1.1.2 of the referenced “Welding Operations” from San Diego County Air Pollution Control District (SDCAPCD). Methodology and calculations are presented here. The supporting workbook has also been updated to show emission factor calculation for copper.

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<sup>1</sup> San Diego County Air Pollution Control District. October 16, 1998 (revised July 11, 2022). “Welding Operations.” (<https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/welding/APCD-Welding-Operations.pdf>).

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**Welding Wire: ER70S-6**

*Note: SDCAPCD guidance states "Currently, the District does not distinguish emissions between product prefixes 'E' (electrode) and 'ER' (electrode or rod)." Therefore, ER70S-6 and E70S-6 are treated the same for emission calculation purposes. The "ER" designation just indicates the wire can be used as either an electrode or a filler rod.*

$$EF_{\text{copper}} = EF \times FCF \times Ci$$

Where:

- EF = Particulate fume generation rate
  - Per AP-42 Table 12.19-1: EF = 0.0052 lb. fume/lb. E70S electrode consumed
- FCF = Fume Correction Factor (lb. metal / lb. fume)
  - Per SDCAPCD guidance, FCF = 0.5464 for GMAW
- Ci = Copper concentration from the SDS: <0.5%. To be conservative the maximum value (0.05% = 0.005) was used.

$$EF_{\text{copper}} = 0.0052 \times 0.5464 \times 0.005 = 0.0000142 \text{ lb. copper / lb. electrode consumed}$$

f. Casting TEUs (F-75 CAST and 17-4 CAST): DEQ will not accept the assumption of full capture of casting operation emissions (inclusive of emissions from melting, charging & tapping, pouring, and cooling) by control devices DC1, DC2, and DC3. The justification provided is inadequate to support such a high degree of capture for emissions generated from casting activities. Either substantiate a lesser amount of capture by these control devices or remove entirely.

This comment prompted ongoing discussions with CAO during which ENW proposed smoke testing to demonstrate capture of casting operations emissions (i.e., melting, charging, tapping, pouring and cooling) by the baghouse dust control devices (e.g., DC1 through DC3). On January 6, 2026, ENW submitted a letter, *Smoke Testing*, via email summarizing the smoke testing conducted. On January 12, 2026, a smoke test video was shared with CAO via ShareFile.

The findings of the letter state:

*Smoke was observed to be drawn into the cast room at both [roof] vent locations, regardless of whether the dampers were opened or not. Opening the dampers only increased the amount of smoke drawn into the space, suggesting the dampers do not provide an airtight seal, but do provide restriction. The smoke test in the actual casting area showed that air in that area is drawn to the back corner of that space, under the influence of the baghouse dust control devices, and that air is not drawn towards the operating furnaces, even with all four furnaces operating. Based on operations we conclude that emissions from the cast area are drawn to the baghouse dust control devices and are not drawn towards the furnaces or roof vents.*

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Smoke testing visually confirmed that:

- 1) Air is drawn into the building at the location of roof vents,
- 2) Air is drawn from the casting operations toward the rooms controlled by dust collectors DC1 through DC3, and
- 3) Air is not drawn towards furnace stacks during casting operation.

Therefore, smoke testing has confirmed casting operation emissions are 100% controlled by DC1 through DC3.

- g. 17-4 SANDBLAST TEU: Update TEU name on Worksheet 2 from “17-4 SANSBLAST” to “17-4 SANDBLAST”.

The TEU name on Worksheet 2 has been updated as requested.

- h. FINISH SANDBLAST TEU: Revise the control efficiency for DC6 from 99.9 percent to 99 percent consistent with the control efficiency for DC6 used at the grinding TEUs (F-75 GRIND and 17-4 GRIND). Reference DEQ’s March 18, 2025, letter for DEQ’s comments regarding Orchid Orthopedics’ baghouse control efficiencies.

The control efficiency for the DC6 filters have been updated to 99 percent.

- i. ROBOT POLISH TEU: Update control efficiency of the DC9 filters to reflect the MERV 10 equivalency rating stated by the manufacturer. Additional documentation provided by Orchid Orthopedics in the June 17, 2025, submittal appears to be for a different filter media than is used at DC9 based on a comparison to supporting documentation provided by Orchid Orthopedics with the November 22, 2024, submittal. This is therefore insufficient to justify a control efficiency of 99 percent. DEQ will accept a control efficiency of 80 percent based on the EPA’s minimum stated control efficiency for MERV 10 filters for particulate of size range 3-10 micron. DEQ will accept this higher control efficiency for the robot polishing as it is a mechanical process and is not expected to generate particulate matter of a size less than 3 microns in significant quantities.<sup>2</sup>

The control efficiency for the DC9 filters have been updated to 80 percent.

- j. KOLENE TEU: Review of 2023 actual annual usage of the Caustic Soda Beads material against information submitted in the ATEI show discrepancies. Review and revise throughputs as appropriate to resolve the discrepancy.

The throughput of 2023 actual annual usage of the Caustic Soda Beads material for the KOLENE TEU has been revised. *It appears that the 2020 ATEI value was inadvertently referenced versus the 2023 ATEI value.*

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<sup>2</sup> EPA. Indoor Air Quality. Updated March 5, 2024. “What is a MERV rating?” (<https://www.epa.gov/indoor-air-quality-iaq/what-merv-rating>)

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Please let me know if you have any additional questions or comments related to any of the CAO submittal documents for this project or related to this project in general. We appreciate your assistance with this project.

Sincerely,

EVREN Northwest, Inc.



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CC: Nathan Holwege, Orchid Orthopedic Solutions Oregon, Inc.

