



The Boeing Company  
19000 NE Sandy Boulevard  
Portland, OR 97230

---

February 12, 2026

To:  
Cleaner Air Oregon  
Oregon Department of Environmental Quality  
700 NE Multnomah St., Suite 600  
Portland, Oregon 97232 - 4100

RE: Cleaner Air Oregon Emissions Inventory Data Request

In regards to DEQ's September 15, 2025 letter requesting additional information related to Boeing Portland's Cleaner Air Oregon (CAO) Emissions Inventory, Boeing Portland is Submitting the outstanding data in line with the DEQ CAO Inventory extension letter dated October 22, 2025.

Text from the September 15, 2025 DEQ request is listed in *italics* while the narrative and responses are listed in roman/regular text.

Please let me know if there are any questions.

Respectfully,  
Boeing Portland

Jeff Kosta  
Environmental Engineer

## 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. Boeing is not required to submit emissions estimates for these “actual” activity levels and these may be omitted from the revised Inventory requested under Specific Comment 9.*

Response: Actual emissions have been removed in the updated AQ520 Form (revised EI) submittal in Attachment A – Revised EI.

2. Crystalline Silica: *The CAS registry number (CASRN) of 7631-86-9 is for silica of both amorphous and crystalline form. However, currently, only crystalline silica (of respirable size) is a listed toxic air contaminant (TAC). The following silica materials are of the crystalline form: quartz (CASRN 14808-60-7), cristobalite (CASRN 14464-46-1), and tridymite (CASRN 15468-32-3). Materials under these CASRN should be evaluated as crystalline silica and are reportable as “silica, crystalline (respirable)” (CASRN 7631-86-9) for CAO. DEQ has reviewed Safety Data Sheets (SDSs) for materials used at Boeing and found multiple materials which contain crystalline silica. DEQ has addressed required updates to the Inventory or supporting calculations in the proceeding “Specific Comments” section.*

Response: Crystalline silica was added where appropriate in the revised EI. When crystalline silica is included in paste/liquid example material the TAC was added with 100% control.

3. Short-term variability: *Boeing has assumed the average annual in estimating maximum daily throughput or usage rate for the PTE basis. DEQ requires modeling of the worst-case maximum daily emissions for acute risk – provide documentation supporting the development of the maximum daily throughputs and usage rates.*

Response: Short term variability has been described by TEU in the comment responses below.

## Specific Comments

1. **Process Flow Diagrams:** *Provide a copy of the facility’s process flow diagram which meets the requirements of OAR 340-245-0040(4)(b)(C)(i).*

Response: Process flow diagrams (PFD) are included in Attachment B – Process Flow Diagrams.

2. **SDSs:**

- a. *Provide SDSs for all miscellaneous materials used at your facility which are included as the TEU-FW-MISC TEU.*

Response: The example SDS(s) are included in Attachment C – Requested SDSs & EDSs (Attachment C-1).

- b. *Provide SDSs for all materials used at the Degreasing TEU.*

Response: Response included in the November 11, 2025, submittal.

- c. *Provide updated SDSs for the following coating materials as the SDSs provided with the May 29, 2025, submittal may be out of date:*
  - i. *H.S. Gloss Red/BAC101 (Boeing Code 92827); and*
  - ii. *ERTHGRD HS PU White BAC 702 (Boeing Code 96590).*

Response: Response included in the November 11, 2025, submittal.

- d. *Provide SDSs for all cooling tower chemicals.*

Response: Response included in the November 11, 2025, submittal.

- e. *Provide SDS(s) for penetrant dye(s) used at FPI line.*

Response: The example SDS(s) are included in Attachment C – Requested SDSs & EDSs (Attachment C-2). Only the developer SDS is included as this material is the only material released into ambient air. See comment 9 c response for additional details.

- 3. ***Environmental Data Sheets:*** *Provide environmental data sheets (EDSs) for the following products:*
  - a. *ECLIPSE High Solids Polyurethane Enamel PC-233 (Boeing Code 92002).*

Response: Response included in the November 11, 2025, submittal.

- 4. ***TEU-HVAC:*** *Provide a list of the natural gas HVAC units that are included in TEU-HVAC. Include the Boeing identification name/number for the unit, a description of the unit, and the size of the individual units (heat capacity).*

Response: The TEU-HVAC source has been listed out into individual units in the revised EI. TEU-HVAC was split up into TEU-HV-4-1, TEU-HV-4-2, TEU-HV-4-3, TEU-HV-4-4, TEU-HV-4-5, TEU-HV-4-6, TEU-HV-4-7, TEU-HV-4-8, TEU-HV-779, TEU-HV-784, TEU-HV-12-5, and TEU-HV-MAU.

- 5. ***Categorically Insignificant Activities Equipment List:*** *Boeing provided a file titled “Insignificant\_Source\_List.pdf” which includes a table of equipment at the facility which Boeing has termed “Categorically Insignificant Activities.” Provide the following additional information regarding this equipment:*
  - a. *If Boeing is claiming this equipment as exempt under OAR 340-245-0060(3), provide the appropriate subsection/paragraph for the exemption.*

Response: All activities previously included in the “Insignificant\_Source\_List.pdf” have been included in the revised EI. See comment 5.b response for details.

- b. *If equipment is fuel burning:*
  - i. *Indicate the type of fuel; and*
  - ii. *For fuel burning equipment exempted under OAR 340-245-0060(3)(b)(B), provide the aggregate emissions of the equipment identified to confirm these emissions do not exceed the de minimis level for any regulated pollutant. Per OAR 340-245-0060(3)(b)(B) “if a source’s expected emissions from all such equipment exceed the de minimis levels, then the source may identify a subgroup*

*of such equipment as an exempt TEU with the remainder not designated as an exempt TEU.” Include any non-exempt units in the Inventory.*

Response: Previous submitted categorically insignificant activities equipment have been incorporated into the revised EI. All previously listed categorically insignificant activities units are natural gas combustion sources. Units greater than 2 MMBTU per hour were listed individually in the revised EI as TEU-H169, TEU-H170, TEU-H749, TEU-H906, TEU-H907, TEU-H908, TEU-H909, TEU-H910, TEU-H911, TEU-H912, TEU-H914, TEU-H916, TEU-H917, TEU-H210, TEU-H211, TEU-H212, and TEU-H778. Units less than 2 MMBTU per hour were grouped by building and information was provided as total MMBTU per hour at PTE. **TEU-H85-001** includes units H104, H105, H106, H110, H140, H145, H147, H164, H404, H511, H700, H718, H719, H720, H724, H726, H727, H729, H747, H748, H903, H915, H918, H204, H205, H221, H433, H833, H834, H835, H836, EU-06 (I) T161, H278, H920, T168, V001, Z101HW-1, and Z101HW-2. **TEU-H85-104** includes units H430, H301, H302, H303, H321, H322, H323, H431 and H529. **TEU-H85-105** includes units H255, H256, H257, H271, H272, H314, H329, H330, H333, H334, H365, H780, H801, H802, H803, H804, H943, H944, H945, H946, H947, H948, H949, H950, H951, H952, H360, H362, H507, Water Heat, H840, and H841. **TEU-H85-111** includes units H757, H758, H759, and H760. **TEU-H85-120** includes units H620 and a domestic hot water heater. **TEU-H85-123** includes units H797, H798, H799, and H800. **TEU-H85-140** includes units H512, H772, H774, H775, H776, H777, H414, H521, H522, H523, and H524.

Actual natural gas usage for these units is anticipated to be significantly less than PTE. Per meter, the highest actual annual and daily usage are approximately 9% and 16% respectively of potential to emit. Adjustments to natural gas usage may be made in the future.

**6. *Plating Lines:***

- a. *Provide a list of all tanks and their contents (materials and concentrations) for both the 85-001 and 85-105 plating lines. Indicate to which control device the tanks exhaust.*

Response: Response included in the November 11, 2025, submittal.

- b. *Provide justification for excluding Demisters 001SCBR1 and 001SCBR6 from the Inventory. If these units have no emissions of TACs and are therefore not a TEU, provide justification as necessary. Revise the Inventory as needed to include these units.*

Response: Demisters 001SCBR1 and 001SCBR6 control emissions from the Aqueous Degreasing tanks which contain Super Bee 300 LF. Tanks only emit VOCs which are in the form of ethoxylated alcohols. The VOC compound is not a CAO toxic and the total emission rate from both tanks is 120 lb/year.

- c. *Per the material’s SDS, Oakite 160 Tank Solution (Boeing Code 306826) contains a trade secret ingredient. Confirm if this component is a TAC and revise the Inventory to include emissions of this TAC if so.*

Response: The alternate SDS for Oakite 160 Tank Solution is included in Attachment C – Requested SDSs & EDSs (Attachment C-3).

- d. *Confirm if any chemical fume suppressants are used in the plating tanks. If so, provide copies of the SDSs for these materials.*

Response: Response included in the November 11, 2025, submittal.

- e. *Emission Calculations:*

- i. *Provide documentation to support the control efficiencies assumed for individual TACs at the demisters and scrubbers;*

Response: Scrubber & Demister Unit efficiency (removal) percentages were based on EPA typical ranges or from Manufacturer inquiries (Duall). In either case, the lower values in the published or reported ranges were used to calculate controlled emissions (conservative). Controlled emissions for manganese were estimated using controlled emission factors derived from scrubber stack data for the existing shops at the site.

Demisters – EPA’s fact sheet provides control efficiency range from 70 to greater than 99 percent for PM and VOCs, depending upon the size of the aerosols to be collected and the design of the scrubber and the fiber beds (Envrio-Chem, 1999). Boeing assumed the lower value of 70 percent for all pollutants.

Scrubbers – Packed Tower Wet Acid Scrubbers. EPA’s Air Pollution Control Technology Fact Sheet provides removal efficiencies from 95 to 99 percent for inorganic gas. (EPA-453/B-95-001).

Nitric Acid – Removal efficiency depends on aerosol formation. Efficiency range (80-98%) provided by manufacturer (Duall 2010). Boeing assumed low value of 80 percent removal efficiency.

Hydrogen Floride (HF) – Boeing assumed 95 percent removal efficiency which is at the bottom of EPA’s range of 95 to 99 percent for inorganic gases.

Sulfuric Acid Mist – Boeing assumed 99 percent based on consultation with the scrubber manufacturer Duall, (Duall 2010).

Nickel - Boeing assumed 93 percent based on consultation with the scrubber manufacturer Duall.

Manganese - Controlled emissions for manganese were estimated using controlled emission factors derived from scrubber stack data for the existing shops at the site.

- ii. *Provide the source of the equations used to estimate the following temperature dependent parameters:*
1. *Bath surface tension; and*
  2. *Speed of sound; and*

Response: Surface tension: Calculations assumed 35 dyne/cm for alkaline cleaners. However, there are no CAO emissions as stated above in comment 6.b response from the Aqueous Degreasing tanks which contain Super Bee 300 LF. All other tanks assume the surface tension of water which is 76 dyne/cm at 0 degrees Celsius. Surface tension decreases with an increase in temperature, so the surface tension at 0 degrees Celsius was adjusted to the bath temperature by 0.16 dyne/cm for every degree Celsius above zero.

Speed of Sound: The speed of sound is 331.4 meters per second (m/s) at 0 degrees Celsius. The speed of sound changes with temperature, increasing by approximately by 0.61 m/s for each degree Celsius increase in air temperature.

*iii. Note any assumptions that were incorporated into these calculations – for example, assumptions regarding liquid properties or bath contents for obtaining the necessary parameters.*

Response: Calculations included the following assumptions:

- Maximum bath concentrations were assumed in the estimates (conservative).
- Maximum bath temperatures were assumed in the estimates (conservative).
- Tanks (where agitation is performed through air sparging) were assumed to be sparged with air continuously (conservative).

**7. TEU-Booth TEU:**

*a. Provide a description of the coating activities at Boeing. This should include an explanation of the coating categories used in the Inventory.*

Response: Categories are Boeing specifications and are designed to meet Aerospace RACT/NESHAP requirements. Multiple companies can produce the same product with the same specifications. An example Technical Data Sheet can be sent if requested.

*b. Provide supplemental calculations which demonstrate the development of the emissions estimates for the Paint Booth Operations TEU. The Inventory references the mass balance calculations from the ACDP, but information presented in the ACDP renewal application are insufficient for DEQ's review purposes.*

Response: To incorporate DEQ's comment on short term variability Boeing has adjusted the calculations previously submitted with the eventual goal to establish risk-based standards for this emission unit.

Operations within the TEU Booths at Boeing rely on a wide variety of coatings, each with a unique blend of chemical constituents. Multiple coating formulations are used, and these may vary from year to year or undergo periodic changes over time. Given this variability, Boeing has elected to follow an approach similar to that used by Hydro Extrusion Portland, Inc in establishing risk-based potential to emit (PTE) for operations related to surface coating operations. This approach involves identifying worst-case coating products based on established coating categories (e.g. 10-11 Coating, 10-20 Coating, etc.) with respect to the Clean Air Oregon (CAO) permitting program.

Boeing proposes to evaluate the cancer and noncancer risk using a toxicity weighted emission ranking methodology. This method allows for a consistent comparison of coatings based on their potential to contribute to a health risk, while accounting for differences in toxicity across individual toxic air contaminants (TACs).

Separate toxicity-weighted emission rates are calculated for the following exposure types:

- Chronic cancer risk – the potential for increased cancer risk associated with long-term (lifetime) inhalation exposure;
- Chronic noncancer risk – the potential for long-term adverse health effects other than cancer; and
- Acute noncancer risk – the potential for short-term health effects resulting from brief, high-concentration exposures.

For each exposure type, coatings within a category are ranked based on their toxicity-weighted emission rates. The toxicity-weighted emission rate for each coating is calculated using the following steps:

- Estimated TAC emissions are calculated assuming a normalized coating usage of 1 gallon, allowing for direct comparison among coatings independent of actual usage quantities.
- The estimated TAC emission rates for each coating category are divided by the applicable risk-based concentration (RBC) for chronic cancer, chronic noncancer, or acute noncancer effects, as provided in OAR 340-245-8010, Table 2. This step explicitly incorporates chemical toxicity into the analysis.
- The resulting toxicity-weighted emission concentrations (expressed as pounds per microgram per cubic meter, lbs/ $\mu\text{g}/\text{m}^3$ ) are summed across all TACs for each coating to obtain a total toxicity-weighted emission for each coating category and exposure type.
- For each exposure type (cancer, chronic noncancer, and acute noncancer), the coating category with the highest total toxicity-weighted emission is identified and selected as the worst-case representative for use in the assessment.

Note: Emissions for the worst-case scenarios were then estimated using the following conservative conditions and assumptions to ensure that risk estimates are likely to overestimate, rather than underestimate, potential impacts:

- o All potential TACs associated with each coating category were identified and included in the calculations. TACs classified as hazardous air pollutants (HAPs) were based on existing recordkeeping data. To ensure completeness, the constituent list was expanded to include non-HAP TACs (as noted in DEQ's Comment 7d) using representative example Safety Data Sheets (SDSs) for each coating material type.
- o A mixed "example" coating material type (e.g., 10-11 Coating Category) was developed by selecting the maximum weight percent of each TAC observed across all example SDSs within that coating category. For example, if multiple SDSs for 10-11 Coatings listed ethylbenzene, the highest reported ethylbenzene concentration was used in the emissions inventory and subsequent calculations.
- o Coating densities were calculated using a weighted-average approach based on paint mixing ratios (e.g., 10-11 coatings use a mix of base, cure, and thinner components) for the category. These weighted densities were then averaged across all paints within each coating category.
- o Emissions for the highest-ranked coatings were calculated using maximum daily usage rates for acute risk evaluations and maximum annual usage rates for cancer and chronic noncancer risk evaluations, consistent with the applicable exposure durations for each risk type.

- o For annual usage rates, the maximum historical usage observed between 2019 and 2023 was used for each material, with an additional 20 percent increase applied.
- o For daily usage rates, the maximum average daily usage over a three-year period (2023–2025) was used for each coating category, again with an added 20 percent increase.
- o For particulate TACs such as lead, cadmium, chromium, barium, aluminum, zinc, and silica, transfer efficiency and control efficiencies were added. See response to comment 7c for details.

This methodology intentionally incorporates multiple layers of conservatism—through material selection, usage assumptions, toxicity weighting, and the exclusion of controls—to ensure that the resulting cancer and noncancer risk estimates appropriately represent a very conservative, worst-case operating conditions under the CAO program. The results of this assessment may indicate that additional refinements may be warranted to identify more realistic (yet still conservative) estimates of risks from coating operations at a later date.

- c. *Provide documentation as appropriate to support the coating emissions calculations. This should include the following:*
  - i. *Vendor specifications for spray guns to support transfer efficiencies; and*
  - ii. *Vendor specifications or guarantees for paint booth filters to support removal efficiencies.*

Response: Coating emissions for particulate TACs are based on the following:

- Transfer efficiency: 65% based on HVLP equipment. See example HVLP equipment in Attachment D – Example Control Equipment (Attachment D-1)
- Filter efficiency: 99.74% for stage 1 filter and 90% for stage 2 filter control. See example filters in Attachment D – Example Control Equipment (Attachment D-2)

- d. *DEQ has reviewed SDSs for surface coating materials and found multiple TACs missing from the Inventory. Include these missing TACs in the Inventory or provide justification for excluding.*

- i. *For the “10-11 Coatings” category, the missing TACs include:*
  1. *2-Butanone (CASRN 78-93-3);*
  2. *Propylene glycol monomethyl ether (CASRN 107-98-2);*
  3. *1,2,4-Trimethylbenzene (CASRN 95-63-6);*
  4. *n-Butyl alcohol (CASRN 71-36-3);*
  5. *Crystalline silica (CASRN 7631-86-9, reported as CASRN 14808-60-7 in SDS);*
  6. *sec-Butyl alcohol (CASRN 78-92-2);*
  7. *Barium and compounds (CASRN 7440-39-3). Report the barium content of barium chromate (CASRN 10294-40-3); and*
  8. *Aluminum and compounds (CASRN 7429-90-5). Report the aluminum content of aluminum hydroxide (CASRN 21645-51-2).*
- ii. *For the “10-20 Coatings” category, the missing TACs include:*
  1. *2-Butanone (CASRN 78-93-3);*

2. *Isopropyl alcohol (CASRN 67-63-0);*
  3. *n-Butyl alcohol (CASRN 71-36-3); and*
  4. *Crystalline silica (CASRN 7631-86-9, reported as CASRN 14808-60-7 in SDS).*
- iii. *For the “10-60 Coatings” category, the missing TACs include:*
1. *2-Butanone (CASRN 78-93-3);*
  2. *Crystalline silica (CASRN 7631-86-9, reported as CASRN 14808-60-7 in SDS);*
  3. *Barium and compounds (CASRN 7440-39-3). Report the barium content of barium sulfate (CASRN 7727-43-7); and*
  4. *Aluminum and compounds (CASRN 7429-90-5). Report the aluminum content of aluminum hydroxide (CASRN 21645-51-2).*
- iv. *For the “10-79 Coatings” category, the missing TACs include:*
1. *2-Butanone (CASRN 78-93-3);*
  2. *n-Butyl alcohol (CASRN 71-36-3);*
  3. *Hydroquinone (CASRN 123-31-9);*
  4. *Acetone (CASRN 67-64-1);*
  5. *Crystalline silica (CASRN 7631-86-9, reported as CASRN 14808-60-7 in SDS); and*
  6. *Barium and compounds (CASRN 7440-39-3). Report the barium content of barium chromate (CASRN 10294-40-3).*

Response:

Example SDS 84279 did not include CAS 107-98-2 and 71-36-3. It contains CAS 79-24-3 and 1675-54-3 which don't appear to be CAO TACs

Barium and compounds (CAS 7440-39-3) and remaining TACs for coatings 10-11, 10-60, and 10-79 were evaluated based on our methodology and incorporated.

The comment included adding CAS 7631-86-9 reported as 14808-60-7 for the “10-60 Coatings” from the example SDSs submitted. The follow-up document provided by DEQ named “262204\_Boeing CAO\_DEQ Coatings SDS Review.xlsx” did not list this TAC. After reviewing the “10-60 Coatings” we could not find the CAS 14808-60-7 TAC in the example SDSs. It seems that the “10-60 Coatings” included amorphous silica and not crystalline silica and therefore was not included.

These TACs were incorporated into the updated approach as outlined in comment 7.b response.

**8. Degreasing TEU:**

- a. *Provide a description of degreasing activities at the facility.*

Response: Response included in the November 11, 2025, submittal.

- b. *Provide a copy of the supporting calculations used to develop emission estimates for the vapor degreasing units.*

Response: The emissions are based on the 40 CFR Part 63 Subpart T annual limit for perchloroethylene of 4,800 kilograms per year at 8,760 hours or 365 days per year operation.

9. **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 General Comment 1, Boeing may omit emission estimates for the Actual basis from both Worksheets 3 and 5.

Response: Actual basis was removed.

- b. Per General Comment 3, update PTE maximum daily throughputs or usage rates as appropriate to reflect worst-case short-term conditions.

Response: Please see emission unit specific comment response for details.

- c. Update the Inventory as appropriate with any new information gathered during the review of SDSs requested under Specific Comment 2.

Response:

2a – Example SDSs were reviewed and CAO TACs were added. Solid/paste/pasty materials were adjusted in the revised EI as 100% controlled.

2b – Example SDSs were reviewed and confirmed that no other CAO TACs are included other than Tetrachloroethene (perchloroethylene) which has already been included in the EI.

2c – Not applicable since these products are obsolete (please see Comment 2.c response)

2d – The cooling tower maintenance emissions of TAC CAS 7664-38-2 & CAS 1310-73-2 for a total of 10 cooling towers at a 6 gallons per minute recirculation rate and 0.02% drift loss were added to the EI under TEU-COOL. Supporting calculations are included in Attachment E – Supporting Emission Calculations (Attachment E-1).

2e – Penetrant Dye Developer emissions were added for CAS 1344-28-1 under the conservative assumption that 100% of consumption is released with a Merv 15 rated cartridge filter control of 85%. In operations, emissions are lower due to transfer efficiency. Emissions may be refined in future deliverables. Supporting calculations are included in Attachment E – Supporting Emission Calculations (Attachment E-2).

- d. Update the Inventory as appropriate with any additional TEUs based on analysis requested under Specific Comments 5.b and 6.

Response: See responses to Comments 5.b and 6.

- e. Update the Inventory as appropriate based on requests under Specific Comment 7.

Response: EI has been updated based on Comment 7. See response to Comment 7 for additional details.

- f. Actual Maximum Daily Activity Information: For those TEUs for which actual annual activity information was reported, provide activity information for actual maximum daily. Where available (such as for surface coating usage), use recorded daily throughputs.

*Where daily information is unavailable, provide and document best estimates based on information available.*

Response: Details on maximum daily activity for TEU-BOOTH included in previous comment response (Comment 7.b).

TEU-FW-MISC maximum daily activity is based on the annual usage, which is the maximum actual usage between 2019 and 2023 used plus 20% for each material following the approach of the 2024 ACDP renewal application. Assuming annual operations of 8,760 hours, the daily emissions were based on scaling annual operations to per day emissions (annual emissions/365 days).

Degreasing maximum daily activity is based on the annual HAP limit of 4,800 kg (40 CFR Part 63 Subpart T) following the approach of the 2024 ACDP renewal application. Assuming annual operations of 8,760 hours, the daily emissions were based on scaling annual operations to per day emissions (annual emissions/365 days).

TEU-AB maximum daily activity is based on the annual usage of material processed in 2019 scaled up by 30% following the approach of the 2024 ACDP renewal application. Assuming annual operations of 8,760 hours, the daily emissions were based on scaling annual operations to per day emissions (annual emissions/365 days).

*g. Natural Gas TEUs:*

*i. For all natural gas TEUs, review emission factors in Worksheet 3 and ensure the following:*

- 1. Unless the TEU is equipped with a SCR or SNCR, use the emission factor of 3.2 lb/MMscf for ammonia (CASRN 7664-41-7)1; and*
- 2. Include emissions estimates for benzo[a]pyrene (CASRN 50-32-8) using an emission factor of 0.000012 lb/MMscf.2*

Response: Addressed in revised EI. Ammonia emission factor was updated for natural gas TEUs and benzo[a]pyrene emissions were added for TEU-CBB-3, TEU-CBB-4, TEU-HB-1, TEU-HB-2, TEU-HV-4-1, TEU-HV-4-2, TEU-HV-4-3, TEU-HV-4-4, TEU-HV-4-5, TEU-HV-4-6, TEU-HV-4-7, TEU-HV-4-8, TEU-HV-779, TEU-HV-784, TEU-HV-12-5, TEU-HV-MAU, TEU-PBO-1, TEU-PBO-2, TEU-PBO-3, TEU-PBO-4, TEU-PBO-5, TEU-BPBO-1, TEU-BPBO-2, TEU-HCPO-1, TEU-HCPO-2, TEU-NG-GEN-2, TEU-NG-GEN-3, and TEU-NG-GEN-7.

*h. TEU-PBO-3: The heat input capacity noted in the TEU description and used to estimate PTE natural gas usage for this TEU differs from information in the facility's Air Quality Discharge Permit (ACDP). Review and revise as appropriate.*

Response: The revised EI was not updated. The ACDP 2024 permit application lists the heat capacity as 0.9 MMBTU/hr.

*i. TEU-PBO-4: The heat input capacity noted in the TEU description and used to estimate PTE natural gas usage for this TEU differs from information in the facility's ACDP. Review and revise as appropriate.*

Response: The revised EI was not updated. The ACDP 2024 permit application lists the heat capacity as 1.8 MMBTU/hr.

- j. TEU-PBO-5: *The heat input capacity noted in the TEU description and used to estimate PTE natural gas usage for this TEU differs from information in the facility's ACDP. Review and revise as appropriate.*

Response: The revised EI was not updated. The ACDP 2024 permit application lists the heat capacity as 2.5 MMBTU/hr.

- k. TEU-BPBO-1: *The heat input capacity noted in the TEU description and used to estimate the maximum daily PTE natural gas usage for this TEU differs from information in the facility's ACDP. The heat input capacity used in the annual PTE natural gas usage estimate matches information in the ACDP but differs from the heat input capacity used for the maximum daily usage estimate. Review and revise as appropriate.*

Response: The revised EI was not updated. The ACDP 2024 permit application lists the heat capacity as 0.7 MMBTU/hr.

- l. TEU-BPBO-2: *The heat input capacity noted in the TEU description and used to estimate the maximum daily PTE natural gas usage for this TEU differs from information in the facility's ACDP. The heat input capacity used in the annual PTE natural gas usage estimate matches information in the ACDP but differs from the heat input capacity used for the maximum daily usage estimate. Review and revise as appropriate.*

Response: The revised EI was not updated. The ACDP 2024 permit application lists the heat capacity as 0.7 MMBTU/hr.

- m. TEU-Gen 1: *Correct the naming discrepancy for this TEU between Worksheet 2 and Worksheet 3. On Worksheet 2, the TEU is named "TEU-Gen 1" while on Worksheet 3 the TEU is "TEU-GEN-1." Either naming is acceptable, but the TEU names should be consistent throughout all CAO submittals.*

Response: The naming is consistent between Worksheet 2 and Worksheet 3 in the revised EI.

- n. Natural Gas Generators (TEU-NG Gen 2, TEU- NG Gen 3, and TEU-NG Gen 7): *Confirm that all three natural gas generators are 4-Stroke Lean Burn. Revise emission factors as needed.*

Response: Confirmed. The emission factors in the EI were pulled from the ATEI Combustion Tool NG Engine tab for 4-stroke-lean burn. The emission factors were revised per comment response 9.i.

- o. TEU-Gen 4: *Information in Boeing's permit Review Report indicates that this emergency engine was installed in 1996. Update TAC emission factors to those for pre-2006/Tier 0/Tier 1 engines in DEQ's Combustion Emission Factor Search Tool1 or provide justification for using the post-2006/Tier 2/Tier 3/Tier 4 engine emission factors.*

Response: The revised EI was updated with the emission factors listed in the comment.

- p. TEU-Gen 5: Information in Boeing's permit Review Report indicates that this emergency engine was installed in 1993. Update TAC emission factors to those for pre-2006/Tier 0/Tier 1 engines in DEQ's Combustion Emission Factor Search Tool1 or provide justification for using the post-2006/Tier 2/Tier 3/Tier 4 engine emission factors.

Response: The revised EI was updated with the emission factors listed in the comment.

- q. TEU-Gen 6: Information in Boeing's permit Review Report indicates that this emergency engine was installed in 2002. Update TAC emission factors to those for pre-2006/Tier 0/Tier 1 engines in DEQ's Combustion Emission Factor Search Tool1 or provide justification for using the post-2006/Tier 2/Tier 3/Tier 4 engine emission factors.

Response: The revised EI was updated with the emission factors listed in the comment.

- r. TEU-AB:

- i. Boeing referenced California Air Resources Board's (CARB) California Air Toxics Emission Factor (CATEF) for the Abrasive Blasting TEU emission factors. The emission factors in the CATEF database were developed from source test data collected for CARB's Air Toxics Hots Spots Program during the 1990's. For each pollutant a mean, median, maximum, and minimum value is presented. Review of the database indicates that Boeing elected to use the median value for each TAC. DEQ typically uses the mean value of source test data. Update the emission factors to reflect the mean value from the CATEF database or provide justification for using the median value. Justification should include an analysis of the source test data used by CARB in the development of the abrasive blasting emission factors and an explanation as to why the median is more reflective of abrasive blasting operations at Boeing.

Response: The revised EI was updated with the mean value of CATEF database.

- ii. The facility's 2023 Air Toxics Emissions Inventory (ATEI) accounts for a 91.0 percent control efficiency from baghouses and pleated filters. If Boeing would like to account for these controls in the Inventory, provide manufacturer specifications to support the indicated removal efficiency.

Response: The example filter efficient specifications are included in Attachment D – Example Control Equipment (Attachment D-3). The filter for abrasive blasting has a MERV rating of 15 which has a greater than or equal 90% control efficiency for average particle sizes 1.0-3.0 microns and a greater than or equal to 95% control efficiency for average particle sizes 3.0 to 10.0 microns. 90% was included in the revised EI.

- s. Scrubbers and Demisters (TEUs 001SC2, 001SC3, 001SC4, 001SC5, 105SC1, and 105SC2):

- i. During DEQ's visit of the facility in May 2025, Boeing had indicated that the tanks in the coating lines were continuously vented regardless of use. However, Boeing has reported only 2,551 hours of operation for the Scrubbers and

*Demisters for the Actual Annual activity basis. Provide a description of the plating line tank ventilation and update the actual annual activity if appropriate.*

Response: All tanks are vented and sparged continuously, and PTE is based on 8,760 hours of operations. Actual usage was removed from the revised EI.

- ii. *Chromium VI emissions from the plating lines should be reported under CASRN 7738-94-5 for “Chromic(VI) acid, including chromic acid aerosol mist and chromium trioxide.” Revise or provide justification for reporting as the particulate form.*

Response: The previous EI reported chrome emissions as Chromium VI, chromate and dichromate particulate because the process does not generate chromium trioxide, however the issue appears to be aerosol mist verses particulate. The revised EI reports Chromium VI as an aerosol mist (CAS 7738-94-5).

- iii. *Update the emission factor reference on Worksheet 3 to include reference to the emission factor calculation method used (AP-42 Chapter 12.20).*

Response: References on Worksheet 3 were updated in the revised EI

- iv. *85-001 Scrubbers (TEUs 001SC2, 001SC3, 001SC4, and 001SC5): The following TAC was reported for the 85-001 plating line in the 2023 ATEI but excluded from the Inventory – update the Inventory to include these TACs or provide justification for excluding fluorides (DEQ ID 239).*

Response: The tanks controlled by 001SC3 do not use materials which include fluoride compounds. The tanks controlled 001SC2 do include materials that contain hydrogen fluoride but do not fluoride compounds. The tanks controlled by 001SC4 have fluoride compounds emissions which have been added to the revised EI. The tanks controlled by 001SC5 have fluoride compounds emissions which have been added to the revised EI. The 2023 ATEI was based on outdated source testing information. The revised EI uses the most current information available.

- v. *85-105 Scrubbers (TEUs 105SC1 and 105SC2): The following TACs were reported for the 85-105 plating line in the 2023 ATEI but excluded from the Inventory – update the Inventory to include these TACs or provide justification for excluding:*
  - 1. *Barium and compounds (CASRN 7440-39-3);*
  - 2. *Copper and compounds (CASRN 7440-50-8);*
  - 3. *Fluorides (DEQ ID 239);*
  - 4. *Lead and compounds (CASRN 7439-92-1);*
  - 5. *Manganese and compounds (CASRN 7439-96-5);*
  - 6. *Nickel and compounds (CASRN 7440-02-0); and*
  - 7. *Silver and compounds (CASRN 7440-22-4).*

Response: These scrubbers have been replaced and data provided in the EI is in line with the ACDP permit renewal. The 2023 ATEI was based on outdated source testing information. The revised EI uses the most current information available.

- t. *Degreasing*: Include material usage information for the Degreasing TEU on Worksheet 4. Emissions for tetrachloroethene (CASRN 127-18-4) from Degreasing are included in Worksheet 5, but no corresponding entry was included in Worksheet 4.

Response: The revised EI has been updated with the corresponding emissions on Worksheet 5.

- u. *Hand Finishing Operations*: Include emission estimates for metal TACs from hand finishing operations. Provide documentation to support emissions estimates including control efficiencies and TAC composition of particulate.

Response: Calculations for hand finishing operation emissions and supporting documentation are included in Attachment E – Supporting Emission Calculations (Attachment E-3). Based on sampled metal content of water from the wet filters the total controlled PM emissions are 3.0E-5 TPY for a total of 16 booths. The calculations were assumed that 100% of the metals in the water are released into the air. A control efficiency of 99% was included based on the example Hydrotron filter efficiency as included in Attachment D-Example Control Equipment (D-4). Due to the low emission rate Boeing anticipates that these emissions should be exempt based on OAR 340-245-0060(3)(a) for this TEU and with DEQ approval a limit for this source should not be included in the permit.