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Ms. Kenzie Billings via email: kenzie.billings@deq.state.or.us
CAO Project Manager
Oregon Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232

**Re: Ecolube Recovery AQ Source Number 26-3021.**
**Revised CAO Emissions Inventory**

Dear Ms. Billings:

On behalf of Ecolube Recovery (ELR) we are submitting today a revised Cleaner Air Oregon Air Toxics Emissions Inventory (ATEI). The revised Inventory addresses the Department's comments on ELR's initial ATEI submitted December 9, 2020 as summarized in your letter dated June 24, 2021 including revisions to incorporate the results of air emission source testing conducted at the facility January 26-27, 2022. Below we have repeated the substantive comments from the June 24, 2021 letter (in italics) and provided our response.

**Response to Comments**

Comment #1

*Please revise the Emissions Inventory to include the following:*

a. *Actual production data for both activity levels and resulting emissions estimates for the 2019 calendar year in accordance with OAR 340-245-0040(3)(a)(B)(i) & (b)(B)(i).*
b. *Emission type (e.g. point or fugitive) for each TEU ID listed in Tab 2. Emissions Units & Activities.*

Response

Production data for annual and daily activity levels for 2019 is provided in the revised CAO Air Toxics Emissions Inventory (ATEI) form. We understand with rule changes that occurred in November of 2021 that associated emission estimates are no longer required. The revised ATEI also includes the emission type for each TEU.

Comment #2

*Please provide written explanation of why hourly activity levels and emission rates were used in the Emissions Inventory as opposed to pounds per volume of fuel combusted (e.g., lb/1000 gal).*

Response

We understand that this question relates to the TEU identified as TO-01, the Regenerative Thermal Oxidizer (RTO) controlling emissions from the refinery, oil polishing system (OPS) and sulfonation. As described in our initial Emission Inventory Supporting Information document and more specifically the Figure A-1 Process Flow Diagram, the RTO controls emissions from three essentially distinct processes. In this case it is not practical to relate emissions to a single throughput parameter such as fuel combusted in the heater because the contribution of emissions from any of the three processes cannot be allocated once the air streams are combined and oxidized in the RTO.

Comment #3

*Please provide supporting information (e.g., engineering testing, source testing, parametric monitoring) to verify the assumption that no sulfur trioxide is emitted from the RTO.*

With today's submission we are revising the emissions inventory to include an emission estimate for sulfur trioxide. While it is likely that potentially all sulfur generated by ELR's processes is oxidized to sulfur dioxide (SO2) we note that EPA's AP-42 Chapter 1.3 for external combustion of fuel oil[1] states that about 1 to 5 % of sulfur can be further oxidized to sulfur trioxide.

During the most recent source test for sulfur dioxide[2] emissions were 4.87 lb/hr (as SO2) or about 2.44 lb/hr of sulfur. Assuming 5% was oxidized to sulfur trioxide the total amount of sulfur present would be 1.05 X 2.44 = 2.56 lb/hr. It is noted that during this source test the oil polishing system (OPS) bauxite regeneration process was not likely coincident with testing. The OPS manufacturer indicates that during bauxite regeneration the maximum sulfur generation is 1.75 lb/hr. Assuming 5% of this available sulfur is also oxidized to sulfur trioxide the total amount of sulfur available is:

2.56 lb/hr + 1.75 lb/hr = 4.31 lb/hr S

If 5% of the sulfur present is ultimately oxidized to sulfur trioxide the emissions are:

4.31 lb/hr X 5% X (80.06/32.06) = 0.54 lb/hr SO3.

The supporting emission calculations (see Table B-1a) and ATEI that are being submitted today have been updated to include this emission estimate for sulfur trioxide from the RTO.

Comment #4

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[1] See Section 1.3.3.2

[2] Test Dates: January 30-31, 2020

Comment #4 primarily addresses DEQ's acceptance or rejection of emission factors derived for the RTO toxic emission unit and requested source testing for those rejected emission factors. Source testing for air toxics has has been completed and was approved by DEQ in a letter to ELR on June 15, 2022. The ATEI has been updated using the results of the source test. Source test non-detect values have been handled in accordance with DEQ's Recommended Procedures for Toxic Air Contaminant Health Risk Assessments, Appendix G. DEQ noted in their TAC Source Test Review Report that naphthalene results for all three test runs appeared to be saturated in the detector and that naphthalene emissions presented in the source test report are likely to be under reported from actual emissions. Our proposed approach to estimating naphthalene emissions is provided below.

Naphthalene Emissions

The January 2022 source test of ELR's RTO included testing for 76 different toxic organic compounds and the determination of total gaseous organic emissions by EPA Method 25A. Of the 76 toxic organic analytes, only 40 compounds were detected above method detection limits. Relative to the total gaseous organic compounds detected during the test (measured as propane equivalents) emissions of toxic organics were very low as presented in Attachment A to this letter. The formation or pass through of very small amounts of toxic organics indicates good combustion mechanics in ELR's RTO. We believe that even though the analytical lab reported instrument saturation of naphthalene that multiplying the reported result by a factor of 10 represents a conservative estimate of potential naphthalene emissions and we have done so in the ATEI being submitted today.

Comment #5

*Carbon system samples were collected on December 18, 2008 and analyzed for sulfur compounds and volatile organic compounds, including carbon disulfide, using EPA Method 15/16 and EPA Method TO-15, respectively. Please use the average carbon disulfide value provided in these two analytical reports in your revised Emissions Inventory.*

The ATEI has been updated to reflect the average carbon disulfide values provided in the two analytical reports.

Sincerely,

John Browning

cc: J.R Giska, DEQ
Matt Davis, DEQ
Josh Alexander, DEQ
Thomas Rhodes, DEQ

Eric Spencer, ELR
Tanner Smith, ELR
Steve Mortensen, ELR

Enclosures: AQ520 Form (electronic file)
Updated Attachment B Supporting Calculations (electronic file)

Attachment A
ECL RTO Source Test January 26-27, 2022
Toxic & Total Gaseous Organic Compounds

| | | |
|---|---|---|
| VOC per M25A as propane | 0.40 | lb/hr |

| **Compound** | **lb/hr** | **% of VOC** |
|---|---|---|
| 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD) | 1.54E-10 | 0.00000004% |
| Octachlorodibenzo-p-dioxin (OCDD) | 3.66E-10 | 0.00000009% |
| 2,3,7,8-Tetrachlorodibenzofuran (TcDF) | 7.27E-11 | 0.00000002% |
| Acenaphthene | 2.15E-06 | 0.00053750% |
| Acenaphthylene | 5.31E-06 | 0.00132750% |
| Anthracene | 2.92E-06 | 0.00073005% |
| Benz[a]anthracene | 1.52E-06 | 0.00038000% |
| Benzo[a]pyrene | 2.46E-08 | 0.00000616% |
| Benzo[b]fluoranthene | 7.55E-07 | 0.00018875% |
| Benzo[e]pyrene | 1.85E-07 | 0.00004625% |
| Benzo[g,h,i]perylene | 1.02E-07 | 0.00002550% |
| Benzo[k]fluoranthene | 1.47E-07 | 0.00003675% |
| Chrysene | 2.26E-06 | 0.00056500% |
| Fluoranthene | 6.64E-06 | 0.00166000% |
| Fluorene | 8.99E-06 | 0.00224750% |
| 2-Methyl naphthalene | 0.000214 | 0.05350000% |
| Naphthalene | 0.00028 | 0.07000000% |
| Phenanthrene | 0.000026 | 0.00650000% |
| Pyrene | 4.43E-06 | 0.00110750% |
| PCB-8 [2,4'-dichlorobiphenyl] | 1.2E-08 | 0.00000300% |
| PCB 18 [2,2',5-trichlorobiphenyl] | 7.94E-09 | 0.00000199% |
| PCB-28 [2,4,4'-trichlorobiphenyl] | 6.71E-09 | 0.00000168% |
| PCB-44 [2,2',3,5'-tetrachlorobiphenyl] | 2.69E-09 | 0.00000067% |
| PCB-52 [2,2',5,5'-tetrachlorobiphenyl] | 2.82E-09 | 0.00000071% |
| PCB-66 [2,3',4,4'-tetrachlorobiphenyl] | 1.35E-09 | 0.00000034% |
| PCB 77 [3,3',4,4'-tetrachlorobiphenyl] | 1.65E-10 | 0.00000004% |
| PCB 81 [3,4,4',5-tetrachlorobiphenyl] | 1.42E-11 | 0.00000000% |
| PCB-101 [2,2',4,5,5'-pentachlorobiphenyl] | 1.37E-09 | 0.00000034% |
| PCB 105 [2,3,3',4,4'-pentachlorobiphenyl] | 3.26E-10 | 0.00000008% |
| PCB 118 [2,3',4,4',5-pentachlorobiphenyl] | 8.28E-10 | 0.00000021% |
| PCB 123 [2,3',4,4',5'-pentachlorobiphenyl] | 2.12E-11 | 0.00000001% |
| PCB-128 [2,2',3,3',4,4'-hexachlorobiphenyl] | 6.83E-11 | 0.00000002% |
| PCB-138 [2,2',3,4,4',5'-hexachlorobiphenyl] | 5.53E-10 | 0.00000014% |
| PCB-153 [2,2',4,4',5,5'-hexachlorobiphenyl] | 4.98E-10 | 0.00000012% |
| PCB 156 [2,3,3',4,4',5-hexachlorobiphenyl] | 4.57E-11 | 0.00000001% |
| PCB 167 [2,3',4,4',5,5'-hexachlorobiphenyl] | 1.54E-11 | 0.00000000% |
| PCB 169 [3,3',4,4',5,5'-hexachlorobiphenyl] | 3.56E-11 | 0.00000001% |
| PCB-170 [2,2',3,3',4,4',5-heptachlorobiphenyl] | 5.54E-11 | 0.00000001% |
| PCB-180 [2,2',3,4,4',5,5'-heptachlorobiphenyl] | 2.09E-10 | 0.00000005% |
| PCB-187 [2,2',3,4',5,5',6-heptachlorobiphenyl] | 8.76E-11 | 0.00000002% |
| | **Total** | **0.14%** |