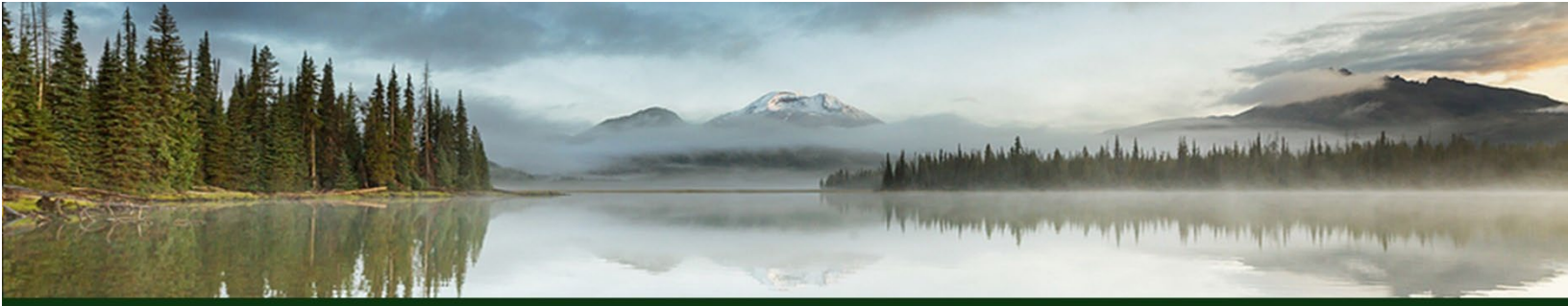

Fact Sheet

Evaluating Risk from Evaporative Fuel Emissions

The Cleaner Air Oregon (CAO) program requires commercial and industrial facilities to assess potential health risks to nearby communities from exposure to toxic air contaminants, or TAC, emissions. The CAO program evaluates both cancer and noncancer risks at various locations around a facility where people live, work, attend school, and play. For more information about cancer and noncancer risks, please see the Excess Cancer Risk and Noncancer Health Risk fact sheets.

This fact sheet explains how DEQ proposes to evaluate potential health risks from exposure to the evaporation[1] of liquid hydrocarbon-based fuels based on the proposed Cleaner Air Oregon rule changes. In the current rulemaking DEQ is proposing new Risk-Based Concentrations[2] (RBCs) for noncancer acute risk for a number of specific fuels that would require sources to report emissions and assess risk from these fuels.

- Fuel oil no. 2 (evaporative) {diesel vapor}
- Jet propulsion fuels: JP-4, JP-5, JP-7, and JP-8 (commercially known as Jet-A and Jet-A1)
- Kerosene

What follows is DEQ's proposal for estimating emissions and risk from these fuels, along with an example walk through to illustrate how sources would assess risk from evaporative emissions from a fuel tank in a CAO risk assessment.

Proposal for Evaluating Risk

These fuels are complex mixtures composed of many different volatile organic compounds (VOCs), some of which are considered toxic air contaminants (TACs) and currently have established RBCs under the CAO program. For example, benzene, toluene, and xylene are in many of these fuels in varying amounts and each of these chemicals currently have individual RBCs for assessing risk from them.

Currently, DEQ's approach to estimating risk from these fuels is to require sources to identify the individual TACs in each fuel and assess risk based on their individual RBCs. In the fuels noted above, DEQ is proposing to require sources to assess risk from these fuels using the proposed noncancer acute RBCs for the fuel itself rather than the individual RBCs for the specific TACs in the fuel. Table 1 summarizes the current and proposed approaches.

Table 1. Current and Proposed Approaches for Evaluating Risks from Evaporative Fuels

Type of Risk	Current Approach	Proposed Approach
Cancer and Noncancer Chronic	Use RBCs for each individual TAC in fuel to assess risk.	Maintain current practice of using RBCs for individual TACs to assess risk. No update.
Noncancer Acute	Use RBCs for each individual TAC to assess risk.	Use fuel RBC only, not RBCs for individual TACs, to assess risk. This is an update.

[1] It is important to note that this fact sheet is referring strictly to the evaporative emissions of fuels and not emissions from their combustion.

[2] Risk-Based Concentrations, or RBCs, are the regulatory values used in the CAO program to assess risk from exposure to toxic air contaminants.

Example CAO Emissions Inventory

Bulk liquid fuel storage tanks are often fugitive emission sources and may need to be included in a CAO emissions inventory, even when they qualify as an Exempt toxics emissions unit (TEU) due to small capacity or throughput. As an example, consider the evaporative emissions from a bulk diesel fuel storage tank (Tank1) with an annual throughput of 50,000 gallons and a maximum daily throughput of 7,000 gallons.

Under the proposed approach, sources would be required to report emissions of both the individual TACs and the fuel itself, Fuel oil no. 2 (evaporative) {diesel vapor} (CASRN 68476-30-2), on the "3. Pollutant Emissions - EF" worksheet of the AQ520 CAO emissions inventory form.

As shown in Table 2 below, emissions of the individual TACs should be reported for the annual basis and the fuel TAC emissions should be reported for the maximum daily basis. Emission estimates for Tank1 were calculated using EPA's TANKS online software.

Table 2. Example Emission Estimates for Fuel Oil No. 2

TEU ID	CASRN or DEQ ID	Toxic Air Contaminant (TAC) Name	Annual Emissions (lbs)	Max Daily Emissions (lbs)
Tank1	68476-30-2	Fuel oil no. 2 (evaporative) {diesel vapor}	--	0.39[3]
Tank1	71-43-2	Benzene	0.09	--
Tank1	110-82-7	Cyclohexane	0.28	--
Tank1	100-41-4	Ethyl benzene	0.02	--
Tank1	98-82-8	Isopropylbenzene (cumene)	2.49E-03	--
Tank1	91-20-3	Naphthalene	8.38E-03	--
Tank1	100-42-5	Styrene	1.55E-06	--
Tank1	108-88-3	Toluene	0.09	--
Tank1	25551-13-7	Trimethylbenzene (mixed isomers)	5.98E-02	--
Tank1	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	6.40E-02	--

Example CAO Risk Calculations

As noted above, cancer and noncancer chronic risk are assessed using the RBCs for the individual TACs in the fuel, while noncancer acute risk is assessed using only the RBC for the fuel. The example below uses the emissions reported in Table 2 and applies the default Level 1 dispersion factors and proposed RBCs to solve for risk using the following equation (results are shown in Table 3):

$$\text{Risk} = \frac{\text{Emissions} \times \text{DF}}{\text{RBC}}$$

Where:

Risk = Residential Excess Cancer Risk, Residential Noncancer Chronic Hazard Index, or Noncancer Acute Hazard Index, as specified by the column headers

Emissions = Annual emissions (lb/year) or Daily Emissions (lb/day)

DF = Dispersion factor (µg/m^3 per lb/year or µg/m^{3}per lb/day)[4]

RBC = Risk-Based Concentration. DEQ used the proposed RBCs presented in the RAC meeting for the TRV Rulemaking (µg/m^3)

[3] Note that the sum of estimated emissions from the individual TACs may not equal the estimated emissions from the fuel itself, as there are many volatile organic compounds in the fuel that are not TACs and not required to be reported under the CAO program.

[4] For this example, DEQ used the upper left value in the Annual fugitive and Daily fugitive dispersion factor table [OAR 340-245-8010 Table 3], or 0.0045 µg/m^3/lb/yr and 4.8 µg/m^3/lb/day, respectively.

Table 3. Example Risk Estimates for Emissions of Fuel Oil No. 2 for Tank1

CASRN or DEQ ID	Toxic Air Contaminant (TAC) Name	Res. Cancer RBC (µg/m³)	Res. NC Chronic RBC (µg/m³)	NC Acute RBC (µg/m³)	Res. Cancer Risk	Res. NC Chronic Risk	NC Acute Risk
68476-30-2	Fuel oil no. 2 (evaporative) {diesel vapor}	--	--	20	--	--	0.094
71-43-2	Benzene	0.13	6	30	3.12E-03	6.75E-05	n/a[5]
110-82-7	Cyclohexane	--	6,000	--	--	2.10E-07	n/a
100-41-4	Ethyl benzene	0.4	260	22,000	2.25E-04	3.46E-07	n/a
98-82-8	Isopropylbenzene (cumene)	--	400	--	--	2.80E-08	n/a
91-20-3	Naphthalene	0.013	--	0.3	2.90E-03	--	n/a
100-42-5	Styrene	--	850	21,000	--	8.21E-12	n/a
108-88-3	Toluene	--	420	7500	--	9.64E-07	n/a
25551-13-7	Trimethylbenzene (mixed isomers)	--	4	390	--	6.73E-05	n/a
1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	--	220	8,700	--	1.31E-06	n/a
				Total Risk[6,7]	**6.2E-03**	**1.4E-04**	**0.09**

This example was provided solely for the purposes of illustrating how sources would be required to calculate risks for the fuels with proposed RBCs for noncancer acute risk for the fuel itself – it is not representative of any specific source assessed under the CAO program.

Questions?

Please contact CAOTRV.2026@DEQ.oregon.gov with questions on this draft fact sheet.

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[5] n/a = not applicable because acute risk is evaluated for Fuel oil no. 2, and not the individual TACs.
[6] The excess cancer risk and the chronic noncancer risk is the sum of the individual TACs. The acute risk is the risk from Fuel oil no. 2 only.
[7] Risk results are rounded to two significant figures.