CLEANER AIR OREGON—
RISK ASSESSMENT WORK PLAN

COLLINS PINE COMPANY
LAKEVIEW, OREGON

Prepared for
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
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Project No. 8006.59.01

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ACRONYMS AND ABBREVIATIONS

CAO	Cleaner Air Oregon
Collins	Collins Pine Company
DEQ	Oregon Department of Environmental Quality
facility	sawmill located at 1600 Missouri Avenue in Lakeview, Oregon
MFA	Maul Foster & Alongi, Inc.
OAR	Oregon Administrative Rule
RAL	risk action level
RAWP	Level 3 Risk Assessment work plan
RBC	risk-based concentration
TAC	toxic air contaminant
TBACT	best available control technology for toxics
TEU	toxic emissions unit

1 INTRODUCTION

Collins Pine Company (Collins) owns and operates a sawmill located at 1600 Missouri Avenue in Lakeview, Oregon ("the facility"). The facility currently operates under Standard Air Contaminant Discharge Permit No. 19-0002-ST-01 issued by the Oregon Department of Environmental Quality (DEQ) on February 27, 2014.

Collins has submitted the Cleaner Air Oregon (CAO) permitting program requirements presented in Table 1-1. Each completed requirement is presented with the date of Collins submittal and the corresponding date of DEQ approval.

Table 1-1. CAO Process Step Submittals and Approvals

CAO Requirement	Submittal Date	DEQ Approval Date
CAO Emissions Inventory	November 25, 2019	March 9, 2020
CAO Modeling Protocol	April 20 2020	Awaiting Approval

Collins has retained Maul Foster & Alongi, Inc. (MFA) to assist the facility with the dispersion modeling and risk assessment component of the CAO permitting process. Collins intends to conduct a Level 3 Risk Assessment to estimate the potential excess cancer risk, and chronic and acute noncancer risk (expressed numerically as the chronic and acute hazard index) impacts from the facility for comparison to the applicable risk action levels (RALs) shown in Oregon Administrative Rule (OAR) OAR 340-245-8010 Table 1.

As stated in OAR 340-245-0030(2)(c), a Level 3 Risk Assessment work plan (RAWP) must be submitted to the DEQ no later than 60 days after receiving DEQ approval of the CAO emissions inventory. Collins submitted a request to the DEQ to extend the RAWP submittal deadline to allow for accommodation of staffing challenges during the Covid-19 pandemic. This extension request was approved by the DEQ on April 6, 2020. The revised deadline for submittal of the RAWP is May 22, 2020.

The remainder of this RAWP outlines the proposed methodology for completing the Level 3 Risk Assessment for the facility and presents specific information required by OAR-340-245-0210(2). In order to avoid duplicating efforts, CAO modeling protocol sections relevant to the RAWP are directly referenced where applicable.

2 CONCEPTUAL SITE MODEL

Sections 2 and 3 of the CAO modeling protocol discuss the facility location, process description, toxic emission units (TEUs), and toxic air contaminant (TAC) emission estimates which satisfy the requirements of OAR 340-245-0210(2)(a).

2.1 Exempt Gas Combustion TEUs

The specific procedures for assessing the risk of each TEU is dependent on the TEU designation per OAR 340-245-0050(4). Per OAR 340-245-0050(5), the gas combustion "exemption applies to TEUs that solely combust natural gas, propane, [or] liquefied petroleum gas." There are no TEUs at the facility that represent sources of natural gas, propane, or liquified petroleum gas combustion emissions. Therefore, no TEUs qualify for the gas combustion exemption.

2.2 Aggregated TEUs

A Level 3 Risk Assessment will be conducted that includes all facility TEUs. This assessment will be used to determine whether the facility exceeds the source permit RAL (i.e., de minimis source determination) per OAR 340-245-0050(7). After completion of the Level 3 Risk Assessment, if it is determined that one or more of the assessed cancer or noncancer facility risks exceed the source permit RAL, Collins will determine which, if any, TEUs at the facility may be collectively grouped into the Aggregated TEU category. Aggregated TEUs "means all of a source's TEUs that are identified by an owner or operator with total cumulative risk less than the Aggregate TEU Level" per OAR 340-245-0020(8). The excess cancer risk Aggregate TEU RAL is equal to 2.5 chances-in-one-million, and the noncancer hazard index Aggregate TEU RAL is equal to 0.1 as established under OAR 340-245-8010 Table 1 for existing sources.

Cancer and noncancer risks will be reported separately for Aggregated (if any) and Significant TEUs. Risks associated with Aggregated TEUs will be compared with the applicable Aggregated TEU RALs. For compliance demonstration, only calculated risks associated with Significant TEUs will be compared with the applicable RALs.

3 EXPOSURE ASSESSMENT

3.1 Land-Use Zoning Classification—Exposure Types

Section 4 of the CAO modeling protocol provides details relevant to the exposure assessment, including the dispersion modeling approach used to estimate TAC concentrations at exposure

locations, and the corresponding exposure type classifications to satisfy the requirements set forth under OAR 340-245-0210(2)(b).

3.2 Exposure Pathways

A Level 3 Risk Assessment is proposed in this RAWP. It is assumed that cancer and noncancer risk (i.e., chronic and acute hazard index) resulting from facility TEUs will not have additional exposure pathways (i.e., ingestion or injection) other than those already accounted for in each risk-based concentrations (RBC). Moreover, based on a review of land-use zoning classifications and aerial imagery, there are no known locations that might present additional exposure pathways, such as a local lake where fish consumption might present an ingestion pathway, or a nearby farm where subsistence farming practices may occur. Since no additional exposure pathways are present, a Level 4 Risk Assessment is not warranted.

4 RISK CHARCTERIZATION

4.1 Risk-Based Concentrations

Excess cancer risk and chronic and acute noncancer risk will be assessed using the current RBCs shown in OAR 340-245-8040 Table 4.

4.2 Risk Estimates

As described in section 4.4 of the CAO modeling protocol, a single dispersion model will be executed using a unit emission rate of 1 gram per second (g/s) for each TEU for both the 24-hour and annual averaging periods. The maximum modeled unit concentration in micrograms per cubic meter ($\mu g/m^3$) for each averaging period will be considered a "dispersion factor" with units of $\mu g/m^3$ per g/s.

Risk estimates will be determined for each TEU by multiplying this dispersion factor by the TAC-specific emission rate (g/s) presented in the approved CAO emission inventory to produce a maximum predicted model concentration for a specific TAC. The maximum predicted model concentration for a specific TAC will be divided by the appropriate RBC. The resulting risk for all TACs will be summed for each TEU. The calculated risks for each TEU will be summed at each exposure location to obtain the total excess cancer risk, the total chronic noncancer hazard index, and the total acute noncancer hazard index for the facility.

Collins proposes to assess noncancer risk by calculating separate noncancer hazard indices for each applicable target organ. A target organ spreadsheet was provided by the DEQ and the Oregon Health Authority that outlines which organs and/or organ systems are potentially affected by specific TACs. For a given target organ, the calculated risk from applicable TACs that affect that specific target organ will be summed for each TEU. The calculated target organ-specific risk for each TEU will be summed at each exposure location to obtain the total chronic noncancer hazard index, and the total acute

noncancer hazard index for each target organ. The individual target organ risk values will then be compared against the applicable RALs.

4.2.1 Example Calculation—Level 3 Risk Assessment

Examples of the excess cancer risk and noncancer hazard index (representative of both chronic and acute assessments) calculations for a single proposed exposure location required by OAR 340-245-0210(2)(c) are presented below in Equation 1 and Equation 2.

Equation 1.

$$\text{Excess cancer risk (chances-in-a-million)} = \sum \frac{\text{(TAC annual emission rate [g/s]) x (proposed TEU dispersion factor } [\frac{\mu g/m^3}{g/s}])}{\text{(applicable RBC at exposure location } [\mu g/m^3])}$$

Equation 2.

$$\text{Risk per TEU} = \sum \frac{\text{(TAC emission rate [g/s]) x (proposed TEU dispersion factor } [\frac{\mu g/m^3}{g/s}])}{\text{(applicable RBC at exposure location } [\mu g/m^3])}$$

The total facility excess cancer risk and chronic and acute noncancer hazard index will be derived by summing each individual TAC risk contribution at each proposed exposure location.

Equation 3.

$$\text{Cumulative Risk} = \sum Risk\ per\ TEU$$

4.3 Revised Noncancer Risk Action Levels

The Environmental Quality Commission adopted new CAO hazard index rules on April 24, 2020. The new hazard index rules identify certain TACs expected to have developmental, reproductive, respiratory, or other noncancer health effects and set new RALs for these TACs. The noncancer hazard index RALs for existing facilities, both before and after issuance of the new hazard index rules, are presented in Table 4-1.

Table 4-1. Revisions to the Noncancer Hazard Index Risk Action Levels

Risk Action Levels For Existing Sources	Noncancer Hazard Index	
	Before Issuance	After Issuance
Aggregate TEU Level	0.1	0.1
Source Permit Level	0.5	0.5
Community Engagement Level	1	1
TBACT Level	5	5[a] or 3[b] or Risk Determination Ratio of >1[c]
Risk Reduction Level	10	10[a] or 6[b] or Risk Determination Ratio of 2[c]
Immediate Curtailment Level	20	20[a] or 12[b] or Risk Determination Ratio of 4[c]

(a) If all TACs emitted by the source are identified as hazard index of 5 in OAR 340-245-8030, Table 3, and OAR 340-245-8040, Table 4.

(b) If all TACs emitted by the source are identified as hazard index of 3 in OAR 340-245-8030, Table 3, and OAR 340-245-8040, Table 4.

(c) If TACs emitted by the source include contaminants listed as both hazard index of 3 and 5 in OAR 340-245- 8030, Table 3, and OAR 340-245-8040, Table 4, and a Risk Determination Ratio is required to be calculated under OAR 340-245-0200.

As shown in Table 4-1, the new noncancer hazard index RALs can be lower than the current best available control technology for toxics (TBACT) benchmark of 5, but no lower than 3 depending on the specific TACs emitted by a given facility. The new hazard index rules also introduce the risk determination ratio, which weighs the noncancer risk from a source's emissions relative to both hazard index RALs of 3 and 5. The new hazard index rules do not affect cancer risk determinations.

The calculation of the risk determination ratio is required when facilities emit a mixture of TACs assigned noncancer TBACT RALs of both a hazard index of 3 and a hazard index of 5, as identified in OAR 340-245-8030, Table 3 and OAR 340-245-8040, Table 4. The risk determination ratio formula set forth under OAR 340-245-0200(5) is presented below in Equation 4.

Equation 4.

$$\text{Risk Determination Ratio} = \frac{\text{Risk}_{\text{HI3}}}{3} + \frac{\text{Risk}_{\text{HI5}}}{5}$$

As shown in the approved CAO emissions inventory, TAC emissions from the facility are comprised of a mixture of TACs with assigned hazard indices of 3 and 5 per OAR 340-245-8030 Table 3 and OAR 340-245-8040 Table 4, respectively. As a result, if the estimated facility chronic and acute noncancer risk is greater than the Community Engagement RAL, the risk determination ratio will be determined per Equation 3.

5 UNCERTAINTY ANALYSIS

Although the proposed Level 3 Risk Assessment will be conducted using the most accurate and readily available information, there are various levels of uncertainty associated with the proposed risk assessment. Per OAR 340-245-0210(2)(d), potential quantitative and qualitative uncertainties with the proposed Level 3 Risk Assessment include, but may not be limited to, the following:

Acute Assessments:

- To assess acute noncancer risk (i.e., acute hazard index), the full 24-hour exposure duration will be assumed. While it is unlikely a person would be at most of the proposed exposure locations for 24 consecutive hours, this method will provide a worst-case potential exposure duration for an individual at these locations. For example, if an employee at an identified acute exposure location only works a single, eight-hour shift, the exposure would only be a third of what is being assumed in the proposed Level 3 Risk Assessment. **Assuming a full 24-hour exposure duration may overestimate the exposure duration of a given individual and so may overestimate the acute noncancer risk.**

- The Level 3 Risk Assessment will be conducted assuming each TEU at the facility is operating at maximum design capacity, simultaneously. For example, the boiler typically does not need to operate at maximum operational capacity to satisfy the steam requirements of the facility. It is highly unlikely that all TEUs at the facility will operate at their maximum capacity for a

24-hour period simultaneously. **Therefore, the proposed Level 3 Risk Assessment likely overestimates acute noncancer risk due to unrealistic operating conditions.**

- The Level 3 Risk Assessment relies on modeling using a five-year period of hourly meteorological data. Some meteorological conditions, which may only occur a few days or less in a five-year period, result in worst-case dispersion characteristics. It is extremely unlikely that these infrequent meteorological conditions would occur while the facility is simultaneously operating all TEUs at maximum capacity. **Therefore, the proposed Level 3 Risk Assessment likely overestimates acute noncancer risk because of the improbability of facility operations at maximum capacity aligning with worst-case meteorological conditions.**

- Dispersion modeling will be used to determine the daily (i.e. 24-hour) dispersion factors per exposure location for use in risk estimation calculations. This method determines, for each TEU, a single day within the five-year period of hourly meteorological data during which the highest predicted concentration occurs at each exposure location. It is highly unlikely that the maximum predicted concentration at a given exposure location occurs on the same day for all TEUs at the facility. For example, the highest predicted concentration for the boiler may occur at exposure location "X" on March 1, while, due to differences in location, release characteristics (i.e., stack height, velocity, etc.), and meteorological variation, the highest predicted concentration for a kiln may occur at exposure location "X" on December 1. The maximum predicted concentrations per TEU may occur on different days within the meteorological dataset. **Therefore, the proposed Level 3 Risk Assessment may overestimate acute noncancer risk because the highest predicted concentration from each TEU may not be paired-in-time at every exposure location.**

<u>Cancer and Chronic Noncancer Assessments:</u>

- The RBCs developed by the DEQ for excess cancer risk and chronic noncancer risk assume a 70-year exposure duration for 24 hours per day. It is unlikely that a person would remain at the same residence or in areas potentially impacted by emissions covered by the CAO program for 70 consecutive years for 24 hours per day. The risk assessments also account for a person being exposed to the local facility emission rate for the entire exposure duration (i.e., 70 years). In addition, the California Office of Environmental Health Hazard Assessment recommends that an exposure duration of 30 years be used to estimate the individual cancer risk for the maximally exposed individual resident. **Therefore, the proposed Level 3 Risk Assessment will likely overestimate cancer and chronic noncancer risk due to this unrealistic exposure duration assumption.**

- The excess cancer risk and chronic noncancer risk assessments will be performed assuming that all TEUs operate for the course of the calendar year at their potential to emit levels. It is physically impossible that the facility could operate several of the facility TEUs at maximum capacity for an entire year without shutdown time for maintenance and cleaning, such as the boiler. **Therefore, the proposed Level 3 Risk Assessment will overestimate cancer and**

chronic noncancer risk due to the overestimation of emissions resulting from continuous facility operation at potential to emit levels.

All Assessments:

- MFA proposes to only assess excess cancer risk and chronic and acute noncancer hazard index from TACs that have RBCs published by the DEQ. Table 5-1 presents a list of the TACs emitted from the facility TEUs that do not have RBCs published by the DEQ. **As a result, the proposed Level 3 Risk Assessment may underestimate cancer and/or noncancer risk associated with those TACs that do not have an associated RBC. However, the development of RBCs generally has a level of conservatism that may overestimate cancer and/or noncancer risk from TACs with known RBCs.**

Table 5-1. List of Toxic Air Contaminants with No Published Risk-Based Concentrations

Toxic Air Contaminant (1)	CAS	Risk-Based Concentration? (2) (Yes/No)
Acetophenone	98-86-2	No
Acenaphthene	83-32-9	No
Acenaphthylene	208-96-8	No
Anthracene	120-12-7	No
Benzo[e]pyrene	192-97-2	No
Fluorene	86-73-7	No
2-Methyl naphthalene	91-57-6	No
Perylene	198-55-0	No
Phenanthrene	85-01-8	No
Pyrene	129-00-0	No
Crotonaldehyde	4170-30-3	No
Diethylphthalate	84-66-2	No
Dibutyl phthalate	84-74-2	No
Molybdenum trioxide	1313-27-5	No
Barium	7440-39-3	No
Phosphorus	7723-14-0	No
Silver	7440-22-4	No
Zinc	7440-66-6	No

(1) Oregon Administrative Rule 340-245-8020 Table 2.

(2) Oregon Administrative Rule 340-245-8040 Table 4.

6 CLOSING

MFA looks forward to working with the DEQ through the CAO permit application process. If there are any questions or comments regarding this risk assessment work plan, please contact Leslie Riley at (971) 570-5319.

LIMITATIONS

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