

# REVISED MODELING PROTOCOL AND RISK ASSESSMENT WORK PLAN

Cleaner Air Oregon

**Reworld Marion Inc.**

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## 1. EXECUTIVE SUMMARY

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Reworld Marion Inc. (RMI) owns and operates a municipal waste combustor facility (the Facility) in Brooks, Oregon within the jurisdiction of Oregon Department of Environmental Quality (Oregon DEQ). The Facility operates under Title V Operating Permit 24-5398-TV-01, Standard Industrial Classification (SIC) Code 4953 – Refuse Systems, and North American Industry Classification System (NAICS) code 562213 – Solid Waste Combustors and Incinerators.

The primary operations at the Facility are comprised of two municipal waste combustion units, in which permitted solid waste streams are combusted in a boiler, with the resulting generated heat used to produce steam. Steam is then directed to a turbine generator that produces electricity. Each combustion unit is equipped with a spray dryer adsorber (SDA) for acid gas removal, a selective noncatalytic reduction (SNCR) system for control of nitrogen oxides, a dry activated carbon injection system for control of mercury emissions, and a fabric filter baghouse (equipped with a bag leak detection system) for the control of particulate matter emissions. The Facility also operates ancillary equipment including a cooling tower, an ash handling system, and a diesel fired fire pump.

In August 2020, the Facility was called into the Cleaner Air Oregon (CAO) program and a toxic emissions inventory was subsequently approved on November 7, 2023. RMI is submitting this modeling protocol and risk assessment workplan for approval to comply with Oregon DEQ's requirements for a Level 3 Risk Assessment under the CAO program in accordance with OAR 340-245-0210.

A summary of the contents within this document is provided as follows:

- ▶ Section 2 describes the prescribed modeling methodology, including model selection, source characterization and selection of meteorological data.
- ▶ Section 3 details modeled sources.
- ▶ Section 4 includes the risk determination methodology for the CAO risk assessment work plan.

## 2. MODELING METHODOLOGY

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### 2.1 Model Overview

#### 2.1.1 Dispersion Model Selection

The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee modeling system, AERMOD version 23132 with Plume Rise Model Enhancements (PRIME) advanced downwash algorithms, will be used as the dispersion model in the air quality analysis.

#### 2.1.2 Coordinate System

The location of the emission sources, structures, and receptors for this modeling analysis will be represented in the North American Datum of 1983 (NAD83) coordinate system using the Universal Transverse Mercator (UTM) projection. The UTM grid divides the world into coordinates that are measured in north meters (measured from the equator) and east meters (measured from the central meridian of a particular zone, which is set at 500 km). The location of the Facility is approximately 4,988,268.45 meters Northing and 502,964.35 meters Easting in UTM Zone 10 N.

#### 2.1.3 Terrain Elevations

Terrain, modeled sources, and building elevations are determined using National Elevation Dataset (NED) supplied by the United States Geological Survey (USGS).<sup>1</sup> The NED is a seamless dataset with the best available raster elevation data of the contiguous United States. NED data retrieved for this model have a grid spacing of 1/3 arc-second (10 m spacing). The AERMOD preprocessor, AERMAP version 18081, will be used to compute terrain elevations for the Facility buildings, sources, and receptors. AERMAP also calculates hill height data for all receptors.

### 2.2 Source Characterization

#### 2.2.1 Facility Description

The Facility operates the following significant toxic emission units (TEUs), which as defined in OAR 340-245-0020(52) are units that are not exempt TEUs and are not aggregated TEUs:

- ▶ Municipal waste combustors, and
- ▶ A diesel-fired fire pump.

The municipal waste combustors primarily operate on municipal solid waste (MSW) during normal operations, while natural gas is used primarily during startup to bring the operations to the necessary heat load requirements. Given that the Facility's main purpose is to provide electricity to Portland General Electric as a sustainable alternative to landfill disposal of MSW, the intent of the Facility is to operate continuously with the only expected downtime being for required outages. The fire pump is mainly operated for testing and maintenance purposes; however, the purpose of the fire pump is to provide fire-protection water in the unlikely event a fire was to occur at the Facility.

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<sup>1</sup> NED data retrieved from the National Map website at <https://viewer.nationalmap.gov/basic/>.

In addition to the significant TEUs as defined in OAR 340-245-0020(52), the Facility also operates various exempt TEUs such as routine maintenance activities, welding activities and cooling towers to ensure the proper operation of the Facility. The full list of exempt TEUs and details surrounding how RMI determined these activities satisfied the requirements of OAR 340-245-0060(3) for exempt TEUs is provided in Section 3.1.1.

A Facility site layout and a description of each modeled emission source and its associated dispersion parameters is provided in Section 3.

### 2.2.2 Downwash

Emissions from each source will be evaluated in terms of their proximity to nearby structures. The purpose of this evaluation is to determine if stack discharges might become caught in the turbulent wakes of these structures. Wind blowing around a building creates zones of turbulence that are greater than if the buildings were absent. The concepts and procedures expressed in the Guideline for Determination of Good Engineering Practice Stack Height (Technical Support Document for the Stack Height Regulations)<sup>2</sup> and other related documents are applied to all structures at the Facility. The Building Profile Input Program (BPIP) Version 04274 will be used to calculate the downwash values for each point source.

Buildings located within the Facility fence line will be included in this evaluation. Building elevations are determined using AERMAP as described in Section 2.1.3. The building parameters are provided in Table 2-1 and are shown in Figure 3-1. It should be noted that due to the size of the various tanks at the Facility, it is anticipated that nearby emission sources may be impacted by downwash from the tanks themselves. As such, the tanks at the Facility have been included in the model as both emission sources and buildings.

**Table 2-1. Building Parameters**

<b>Building ID</b>	<b>Description</b>	<b>UTM Easting (m)</b>	<b>UTM Northing (m)</b>	<b>Elevation (m)</b>	<b>Height (m)</b>
ASH	Ash Building	502,916.0	4,988,236.0	56.2	10.05
SCOMBUST	Short section of combustor building	502,867.0	4,988,302.0	59.74	12.73
FIREPUMP	Building between tanks next to fire pump	502,895.0	4,988,245.6	57.21	3.96
TCMBUST2	Section of combustor building, north	502,894.3	4,988,324.9	56.4	17.83
TCMBUST	Taller section combustor building	502,896.3	4,988,306.1	56.57	30.22
STORAGE	Storage Building	502941.2	4988266.3	56.42	5.62
AMTC	Ammonia Tank Cover	502956	4988272.6	56.51	7.9
BH1	Baghouse Unit 1	502953.8	4988276.9	56.5	17.53
BH2	Baghouse Unit 2	502954.2	4988290.3	56.48	17.53
COOLING	Cooling Tower	503004.9	4988314.8	56.52	4
CHEMB	Chemical Building	503005.3	4988325.6	56.44	4.35

<sup>2</sup> <https://www.epa.gov/sites/default/files/2020-09/documents/gep.pdf>

**Table 2-2. Tank Building Parameters**

<b>Building ID</b>	<b>Description</b>	<b>UTM Easting (m)</b>	<b>UTM Northing (m)</b>	<b>Elevation (m)</b>	<b>Height (m)</b>
N_TANK	North Tank near fire pump	502,898.6	4,988,248.9	56.62	8.44
S_TANK	South Tank near fire pump	502,899.0	4,988,232.6	56.36	8.67
LSILO1	Lime Silo 1	502,951.6	4,988,285.5	56.51	10
LSILO2	Lime Silo 2	502,951.8	4,988,290.9	56.46	10
DS1	Dry Scrubber 1	502,946.5	4,988,285.0	56.53	21
DS2	Dry Scrubber 2	502,946.6	4,988,291.6	56.42	21
PACS	Powdered Activated Carbon Silo	502,950.3	4,988,268.6	56.46	11.9

### 2.2.3 Urban/Rural Determination

The Multi-Resolution Land Characteristics Consortium National 2019 Land Cover Database (NLCD) was consulted to determine whether the site location should be classified as urban or rural.

In accordance with 40 CFR Part 51 Appendix W, Section 7.2.1.1(b)(i), the land use is classified based on a 3-kilometer radius circle around the Facility center. Developed, high intensity (Class 23) and developed, medium intensity (Class 24) areas are considered urban, and all other areas are considered rural.

The NLCD2016 data map demonstrates that less than 50% of the land use within a 3-kilometer radius of the Facility is urban. A land use map with this graphical interpretation is included in Figure 2-1 below and tables showing the AERSURFACE land use categories are provided in Table 2-3 and Table 2-4 below. AERMOD's urban option will not be selected.

**Table 2-3. Percent and Use Categorization**

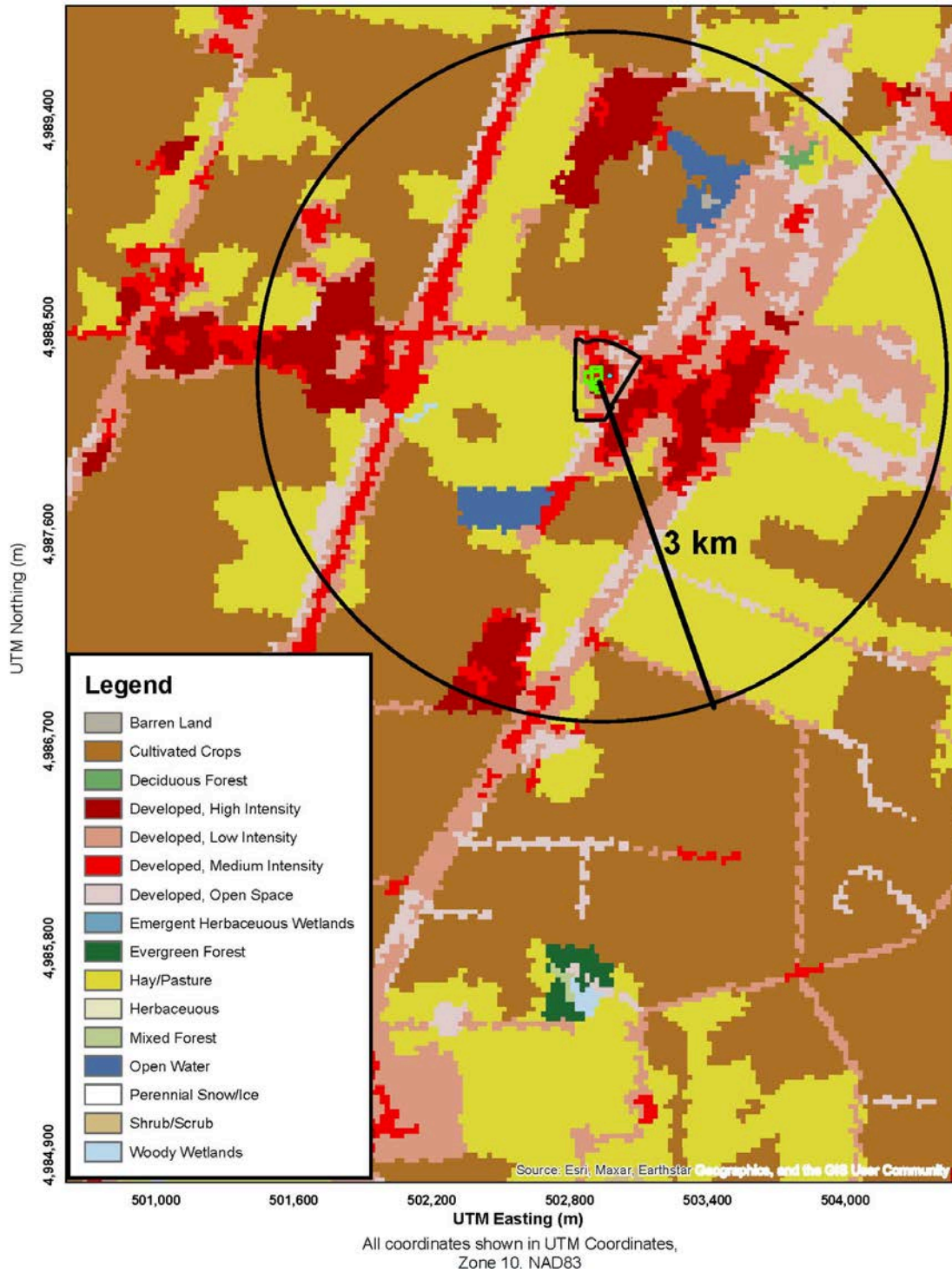
<b>Category ID</b>	<b>Category Description</b>	<b>Percent</b>
11	Open Water	6.0%
21	Developed, Open Space	20.2%
22	Developed, Low Intensity	24.0%
23	Developed, Medium Intensity	20.3%
24	Developed, High Intensity	5.5%
31	Barren Land	0.25%
41	Deciduous Forest	0.39%
81	Pasture/Hay	17.1%
82	Cultivated Crops	6.0%
90	Woody Wetlands	0.21%
<b>Total</b>		<b>100%</b>
<b>Urban</b>		<b>44.3%</b>
<b>Rural</b>		<b>55.7%</b>



Table 2-4. NLCD Data

OID	Value	Area (m <sup>2</sup> )
0	11	138,148
1	21	461,814
2	22	549,189
3	23	465,099
4	24	126,997
5	31	5,766
6	41	8,966
7	81	391,255
8	82	137,124
9	90	4,829

Figure 2-1. Urban/Rural Determination Land Use Map



## 2.3 Meteorological Data

This section discusses the selection of representative meteorological data that will be used for this analysis.

### 2.3.1 Meteorological Data Overview

Five years of surface meteorological data, from 2017 to 2021, were taken from the most representative nearby airport, Salem McNary Field (Station ID: KSLE; WBAN ID: 24232). The upper air data is taken from the most representative upper air station in Salem, Oregon (Station ID: SLE; WBAN: 24232) for the corresponding period. The meteorological data is processed using AERMET version 23132 using regulatory default options following EPA's guidance on AERSURFACE and AERMET. The ADJ\_U\* option is used to more accurately account for low wind speed, stable atmosphere conditions.

Salem was chosen over two other available datasets: the Corvallis Municipal Airport (KCVO), and an onsite meteorological dataset provided by Oregon DEQ for a Hollingsworth and Vose (HV) facility in Corvallis, as both appear to be less representative of the project site.

KCVO is an AWOS weather station, meaning it does not record "1-minute" wind data and uses a threshold wind speed of ~3 mph, below which all measured wind speeds are recorded as "calm" or "variable" wind. These "calm" or "variable" winds are not usable by AERMOD, and result in the "calm" hour being skipped over. In the case of KCVO, this results in 26% of all hours being unusable, making the data unrepresentative and potentially not conservative. KSLE is an ASOS station, meaning it does record "1-minute" wind data and also records speeds much lower than 3 mph. As a result, only 1% of hours at KSLE are recorded as "calm", meaning KSLE will provide a more representative and conservative dataset for modeling.

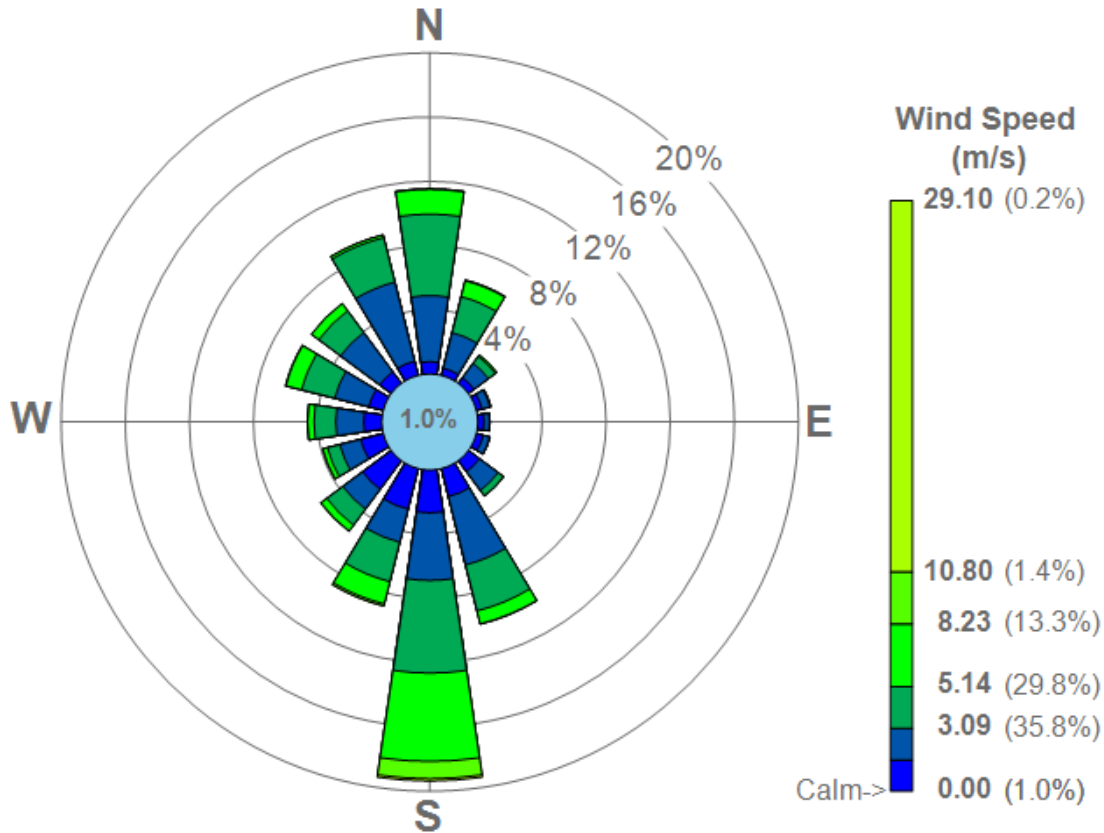
The HV site in Corvallis appears to have data quality issues. The data provided by Oregon DEQ for the site indicates that a wind direction blowing from 330 to 30 degrees (NNW to NNE) never occurred (zero hours out of 8,760) during all of 2017. Given the natural variability of wind directions at any site, plus the fact that KCVO records approximately 10% of all wind directions as blowing from that 60 degree arc, this is highly unlikely to be correct. Additionally, the wind speeds in the HV dataset appear to be extremely low: 14 mph is the highest wind speed recorded in the year (as opposed to a maximum speed of 35 mph in the KCVO dataset and 60 mph in the KSLE dataset), and more than 50% of winds in the HV dataset are below 3 mph, (as opposed to 26% and 19% in the KCVO and KSLE datasets). Together, these facts suggest that the HV station may be improperly sited (e.g., with a building located too close to the station to the north, blocking winds from that direction), or has other issues resulting in these highly unlikely data patterns.

Given the data quality issues with the KCVO and HV sites, the KSLE data was selected. This data is also considered to be more representative of the project site because KSLE is located near the center of the Willamette Valley, as is the project site, while both KCVO and the HV site are located close to the extreme western edge of the Valley. One-minute automated surface observing system (ASOS) data was processed using the latest version of AERMINUTE pre-processing tool (version 15272). The 1-minute wind speed threshold of 0.5 meter per second (m/s) is applied for the 1-minute ASOS data according to EPA guidance.<sup>3</sup> The wind rose for the modeled period (2017-2021) is provided in Figure 2-2.

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<sup>3</sup> EPA Memo *Use of ASOS meteorological data in AERMOD dispersion modeling*, March 8, 2013.

Figure 2-2. 2017-2021 Wind Rose at Salem McNary Field (KSLE)



The total percentage of calm wind data is 1.0% for the modeled period. AERSURFACE was used to process land cover data to determine surface characteristics for use in AERMET.

Thirty years of precipitation data for the period of 1981-2010 was reviewed against the precipitation data for 2017-2021 to identify the moisture condition for each year. Moisture conditions were determined in accordance with EPA's AERSURFACE User Guide.

### 2.3.2 Meteorological Data Representativeness

Per 40 CFR Part 51 Appendix W, Section 8.4.1(b), the representativeness of meteorological data is dependent on factors including "(1) The proximity of the meteorological monitoring site to the area under consideration; (2) the complexity of the terrain; (3) the exposure of the meteorological monitoring site; and (4) the period of time during which data are collected".

Salem McNary Field's meteorological station is located approximately 15 kilometers to the south of the Facility. The terrain of the project site and of the Salem Airport is flat. The Facility elevation is approximately 61 m and the Salem Airport elevation is approximately 62 m. The meteorological dataset includes five recent years of data, from 2017 to 2021, as this was the most recent available meteorological dataset at the time RMI was called into CAO. The total percentage of missing data is 0.23% for the modeled period.

Because of the site's proximity to the Salem Airport, the similar terrain between the two sites, and the recency and high quality/completeness of the meteorological dataset, the selected surface station dataset is considered representative for the Facility.

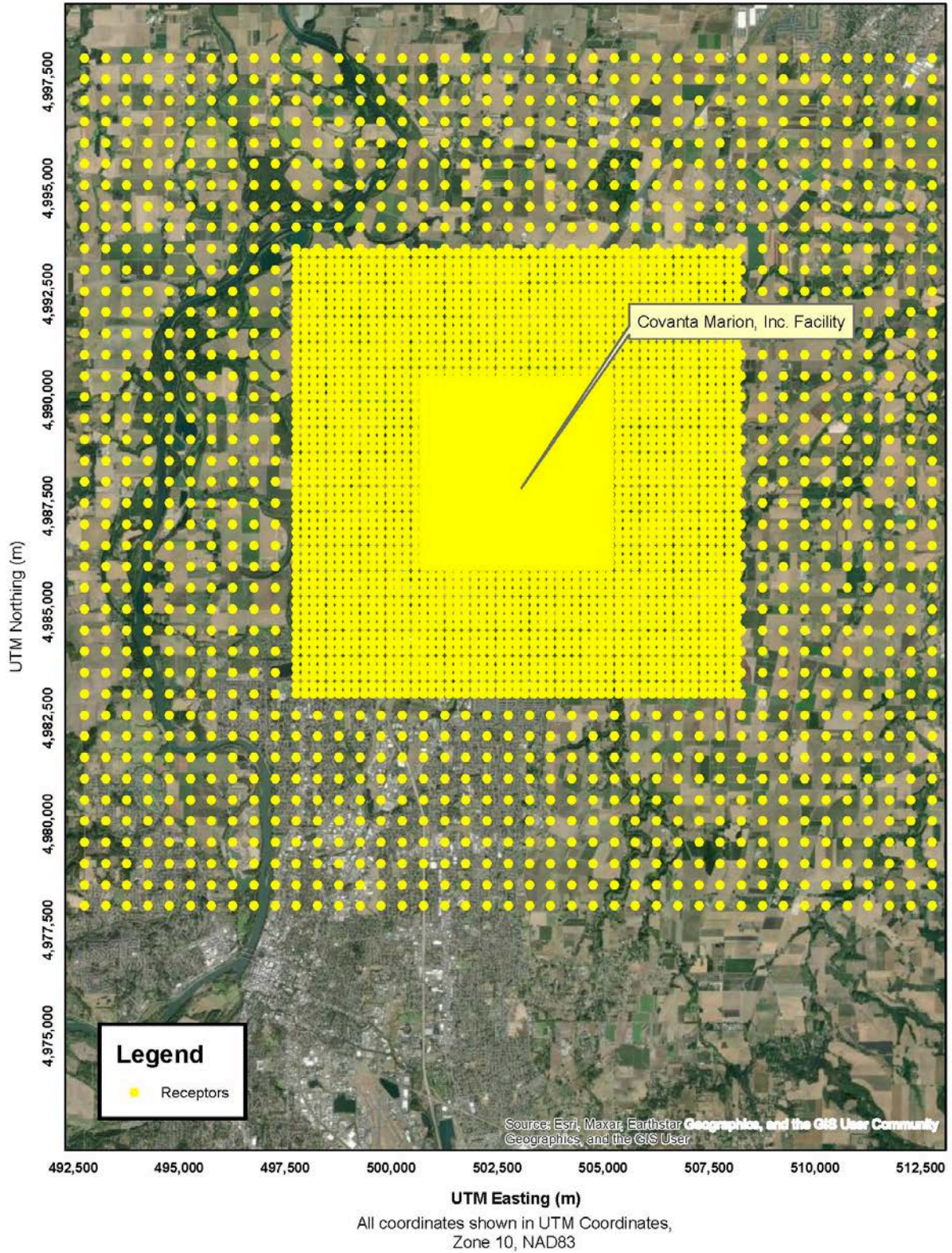
## 2.4 Modeling Domain and Receptors

Five square Cartesian receptor grids are used in the analysis, in alignment with Oregon DEQ's *Recommended Procedures for Air Quality Dispersion Modeling*.

- ▶ A grid containing 25-meter spaced receptors and extending 400 meters from the Facility center (at least 200 meters from the fence line).
- ▶ A grid containing 50-meter spaced receptors extending from 400 meters to 1,200 meters from the Facility center.
- ▶ A grid containing 100-meter spaced receptors extending from 1,200 meters to 2,200 meters from the Facility center.
- ▶ A grid containing 200-meter spaced receptors extending from 2,200 meters to 5,200 meters from the Facility center.
- ▶ A grid containing 500-meter spaced receptors extending from 5,200 meters to 10,200 meters from the Facility center.

In addition, 25-meter spaced receptors are included along the Facility's physical fence line. Additional discrete receptors representing child exposure location as discussed in Section 4.1 are included for CAO requirements. All gridded modeled receptors are shown in Figure 2-3. All receptors will be placed at the ground level.

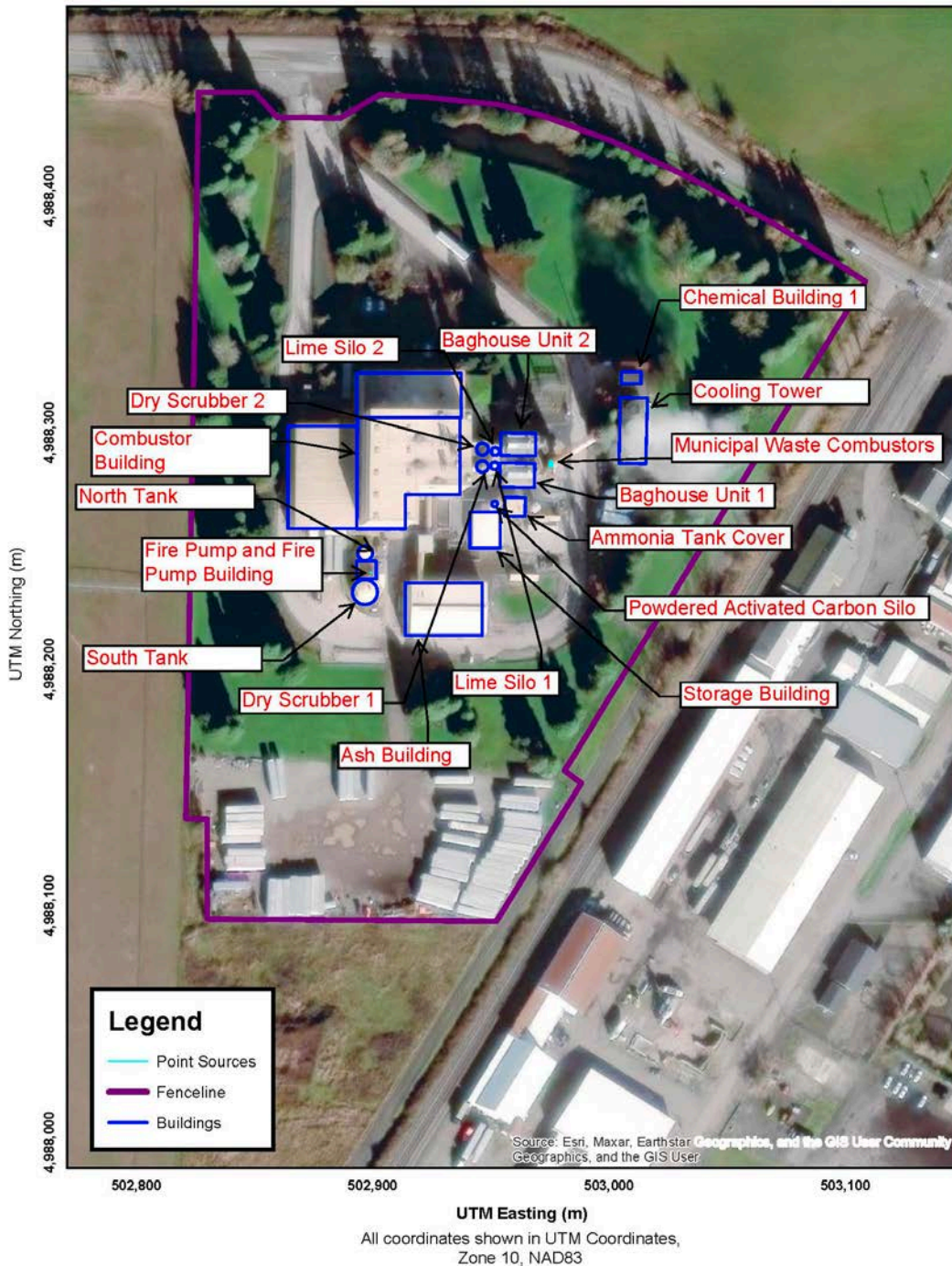
Figure 2-3. Gridded Receptors



### 3. MODELED EMISSION SOURCE PARAMETERS

Section 2.2.1 provides a general Facility description and all significant toxic emission units (TEUs) are shown on Figure 3-1.

Figure 3-1. Facility Layout and Modeled Sources



### 3.1 Significant TEUs<sup>4</sup>

The stack parameters that will be used to model emissions of toxics are obtained from the manufacturer, available Oregon DEQ approved source test plans and data, design team engineering estimates, and/or direct measurement of physical parameters.

Specifically for the waste combustors, RMI evaluated exhaust flow and temperature data from Oregon DEQ approved source test reports from the most recent five years: 2019, 2020, 2021, 2022 and 2023. The average temperature and flow values across the five test years were determined and will be utilized in the model for both combustors. Additionally, the stack height for the waste combustors was determined in accordance with requirements in 40 CFR 51.100 for good engineering practice stack height, as the physical stack height of 82 meters exceeds 65 meters. Specifically, since the combustors were constructed after January 12, 1979, GEP stack height was determined using the following formula:

$$H_g = H + 1.5L$$

where:

- ▶  $H_g$  = good engineering practice stack height, measured from the ground-level elevation at the base of the stack,
- ▶  $H$  = height of nearby structure(s) measured from ground-level elevation at the base of the stack, and
- ▶  $L$  = lesser dimension, height ( $H$ ) or projected width, of nearby structure(s)

Using the formula detailed above, RMI determined  $H$  to be 30.22 meters which represented the maximum building height onsite<sup>5</sup>, and  $L$  to also be 30.22 meters since the building height was the lesser dimension between the width and the height of the same building. As such, GEP stack height was determined to be 75.55 m for each combustor.

The diameter of the waste combustor stacks as well as the parameters for the fire pump were determined from manufacturer specifications and actual in field measurements (i.e., height, diameter).

Stack exhaust parameters are provided in Table 3-1. Full description of the processes associated with these point sources are included in the CAO emission inventory submittal. Emission estimates for each modeled source are included in the previously submitted Form CAO AQ520. Location of the units are shown in Figure 3-1.

**Table 3-1. Summary of Exhaust Stack Modeled Parameters**

Source	Model Type	X Coordinate (m)	Y Coordinate (m)	Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
MWC-1	POINT	502,975.5	4,988,287.2	56.47	75.55	1.22	395.04	29.77
MWC-2	POINT	502,975.5	4,988,286.2	56.48	75.55	1.22	404.69	29.12
RICE	POINT	502,899.4	4,988,240.9	56.41	7.92	0.1	708.15	55.48
AUX-1	POINT	502,975.5	4,988,287.2	56.47	75.55	1.22	385.93	11

<sup>4</sup> As defined in OAR 340-245-0020(52), a significant TEU means a TEU that is not an exempt TEU and is not an aggregated TEU

<sup>5</sup> Identified as the “Combustor Building” in Figure 3-1



AUX-2	POINT	502,975.5	4,988,286.2	56.48	75.55	1.22	385.93	11
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### 3.1.1 Modeled Emission Rates

Toxic air pollutant emissions for each emission unit are calculated in grams per second (g/s). The emission rate is then divided by the risk-based concentration (RBC) to obtain the Risk-Equivalent Emission Rate (REER). RMI is proposing to use Approach C: REER provided in *Recommended Procedures for Toxic Air Contaminant Health Risk Assessments*.<sup>6</sup> Therefore, REER will be the input “emission rate” for AERMOD and a resultant risk value will be the AERMOD output. The modeled emission rates, as well as the associated REER values are provided in Appendix C.

## 3.2 Exempt TEUs

In addition to significant TEUs which are defined as units that are not exempt TEUs or aggregate TEUs in OAR 340-245-0020(52), RMI also reviewed operations at the Facility to determine which would be considered exempt TEUs. Exempt TEUs may meet the definition per OAR 340-245-0060(3) or are determined to have insignificant impact on the potential risk at the Facility.

Exempt TEUs as defined in OAR 340-245 that will be excluded from the risk assessment include:

- ▶ Evaporative and tail pipe emissions from on-site motor vehicle operation.
- ▶ Janitorial activities.
- ▶ Office activities.
- ▶ Personal care activities.
- ▶ Grounds keeping activities, including, but not limited to building painting and road and parking lot maintenance.
- ▶ On-site laundry activities.
- ▶ Instrument calibration.
- ▶ Refrigeration systems with less than 50 pounds of charge of ozone depleting substances regulated under Title VI, including pressure tanks used in refrigeration systems but excluding any combustion equipment associated with such systems.
- ▶ Temporary construction activities.
- ▶ Warehouse activities.
- ▶ Accidental fires and fire suppression.
- ▶ Air vents from compressors.
- ▶ Air purification systems.
- ▶ Continuous emissions monitoring lines.
- ▶ Demineralized water tanks.
- ▶ Pre-treatment of municipal water, including use of deionized water purification systems.
- ▶ Electrical charging stations.
- ▶ Instrument air dryers and distribution.
- ▶ Fully enclosed process raw water filtration systems.
- ▶ Electric motors.
- ▶ Pressurized tanks containing gaseous compounds that do not contain toxic air contaminants.
- ▶ Stormwater settling basins.
- ▶ Health, safety, and emergency response activities.
- ▶ Non-contact steam vents and leaks and safety and relief valves for boiler steam distribution systems.

<sup>6</sup> Section 3.1.3, Recommended Procedures for Toxic Air Contaminant Health Risk Assessments, Oregon DEQ (October 2022).

- ▶ Non-contact steam condensate flash tanks.
- ▶ Non-contact steam vents on condensate receivers, deaerators, and similar equipment.
- ▶ Boiler blowdown tanks.
- ▶ Ash piles maintained in a wetted condition and associated handling systems and activities.

Additionally, RMI provided necessary usage and safety data sheet (SDS) information to Oregon DEQ for the following activities, which were approved to be Exempt TEUs by CAO in its emission inventory approval on November 7, 2023:

- ▶ Aqueous ammonia and lime storage;
- ▶ Chemicals used in cooling tower water treatment;
- ▶ Brazing operations;
- ▶ Routine maintenance chemical use; and
- ▶ Welding activities.<sup>7</sup>

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<sup>7</sup> RMI developed a conservative estimate of annual and daily welding emissions, as well as a Level 1 assessment using these emission values to justify that welding would qualify as an Exempt TEU. This assessment was approved by Oregon DEQ on November 7, 2023.

## 4. RISK ASSESSMENT WORKPLAN

### 4.1 Conceptual Site Model

#### 4.1.1 Toxic Air Contaminants

RMI has the potential to emit toxic pollutants from the emission units onsite and has submitted Form AQ520 with details of the emission rates for each pollutant. The following list of toxic air contaminants (TACS) will be included in the Risk Assessment.

- ▶ 1,1,1-Trichloroethane
- ▶ 1,1,2,2-Tetrachloroethane
- ▶ 1,1,1,2-Tetrachloroethane
- ▶ 1,1,2-Trichloroethane
- ▶ 1,1-Dichloroethene
- ▶ 1,2,3-Trichloropropane
- ▶ 1,2,4-Trichlorobenzene
- ▶ 2,4,6-Trichlorophenol
- ▶ 1,2,4-Trimethylbenzene
- ▶ 1,2-Dibromo-3-Chloropropane
- ▶ 1,2-Dibromoethane
- ▶ 1,2-Dichlorobenzene
- ▶ 1,2-Dichloroethane
- ▶ 1,2-Dichloropropane
- ▶ 1,3,5-Trimethylbenzene
- ▶ 1,3-Butadiene
- ▶ 1,3-Dichlorobenzene
- ▶ 1,3-Dichloropropene
- ▶ 1,4-Dichlorobenzene
- ▶ 2,3,4,6-Tetrachlorophenol
- ▶ 2,4,5-Trichlorophenol
- ▶ 2,4-Dichlorophenol
- ▶ 2-Butanone
- ▶ 2-Chlorophenol
- ▶ 2-Methyl naphthalene
- ▶ Acetaldehyde
- ▶ Acenaphthylene
- ▶ Acenaphthene
- ▶ Acetone
- ▶ Acrolein
- ▶ Aluminum and compounds
- ▶ Ammonia
- ▶ Anthracene
- ▶ Antimony and compounds
- ▶ Arsenic and compounds
- ▶ Barium and compounds
- ▶ Benzene
- ▶ Benz(a)anthracene
- ▶ Benzo(a)pyrene
- ▶ Benzo(b)fluoranthene
- ▶ Benzo(k)fluoranthene
- ▶ Benzo(e)pyrene
- ▶ Benzo(g,h,i)perylene
- ▶ Beryllium and compounds
- ▶ Bromine and compounds
- ▶ Bromodichloromethane
- ▶ Bromoform
- ▶ Bromomethane
- ▶ Cadmium and cadmium compounds
- ▶ Carbon Disulfide
- ▶ Carbon Tetrachloride
- ▶ Chlorine
- ▶ Chlorobenzene
- ▶ Chlorodibromomethane
- ▶ Chloroethane
- ▶ Chloroform
- ▶ Chloromethane
- ▶ Chrysene
- ▶ Cis-1,2-Dichloroethane
- ▶ Cis-1,3-Dichloropropene
- ▶ Cobalt and compounds
- ▶ Copper and compounds
- ▶ Dibenz(a,h)anthracene
- ▶ Dibromochloromethane
- ▶ Dichlorodifluoromethane
- ▶ Dichloromethane
- ▶ Diesel particulate matter
- ▶ Ethyl benzene
- ▶ Formaldehyde
- ▶ Fluoranthene
- ▶ Fluorene
- ▶ Hexachlorobenzene
- ▶ Hexachlorobutadiene
- ▶ Hexane
- ▶ Hexavalent Chromium
- ▶ Hydrochloric acid

- ▶ Hydrogen Bromide
- ▶ Hydrogen Fluoride
- ▶ Ideno(1,2,3,-cd)pyrene
- ▶ Lead and compounds
- ▶ m,p-xylene
- ▶ Manganese and compounds
- ▶ Mercury and compounds
- ▶ Methyl isobutyl ketone
- ▶ Molybdenum trioxide
- ▶ Naphthalene
- ▶ Nickel and compounds
- ▶ o-xylene
- ▶ Pentachlorophenol (CCC)
- ▶ Perylene
- ▶ Phenanthrene
- ▶ Phosphorus and compounds
- ▶ Pyrene
- ▶ Polychlorinated biphenyls
- ▶ Polychlorinated dibenzo-p-dioxins
- ▶ Polychlorinated dibenzofurans
- ▶ Polycyclic aromatic hydrocarbons
- ▶ Selenium and compounds
- ▶ Silver and compounds
- ▶ Styrene
- ▶ Tetrachloroethene
- ▶ Thallium and compounds
- ▶ Toluene
- ▶ Trans-1,2-Dichloroethene
- ▶ Trichloroethene
- ▶ Trichlorofluoromethane
- ▶ Vanadium
- ▶ Vinyl Chloride
- ▶ Vinylidene chloride
- ▶ Xylene
- ▶ Zinc and compounds

### 4.1.2 Exposure Locations

The exposure type for each receptor is determined using the digital shapefile for zoning information from the Oregon Department of Land Conservation and Development and Marion County Planning and Development.<sup>8,9</sup> Based on the zoning information, each receptor has been designated according to the Oregon DEQ Cleaner Air Oregon State Zoning to Exposure Crosswalk and Exposure Location Assignment Guidance documents.<sup>10,11</sup> Receptors located on sidewalks, physical fence, or other areas surrounding the Facility that "...people would not normally congregate,"<sup>12</sup> are not evaluated within the fine receptor grid and are designated accordingly as "Risk Not Evaluated". RMI has provided an electronic copy in Appendix A of the crosswalk indicating each receptor to be modeled with the risk exposure type of *worker, residential, child, acute, or not evaluated*. The child exposure locations are determined based on the available information found online for schools and daycare facilities. These receptors are listed in Appendix B. The child exposure locations are added to the model as discrete receptors.

The Zoning Variance Request, as illustrated in Figure 4-1 and provided in Appendix D,<sup>13</sup> contains a request to categorize Exclusive Farm Use (EFU) more specifically. Oregon DEQ has specified that EFU zoned areas must be designated as residential for conservatism since a home or barn could be built in the future within zoning codes, unless a justification is provided that residential would not be an applicable designation. RMI is requesting, by filing updated forms AQ521 and AQ522, an update to the exposure location designation for the EFU-zoned receptors that show no buildings with the following changes:

- ▶ Categorize receptors on the land immediately to the west and south of the Facility as Acute Only,
- ▶ Categorize receptors on the wastewater pits southwest of the Facility as Worker, and
- ▶ Categorize receptors zoned as EFU-Residential within 1.5 kilometers of the Facility that sit on open fields as Acute Only.

Acute risks will be evaluated everywhere that people may spend several hours in a day per OAR 340-245-0020(4). All receptors assessed for chronic risks are also assessed for acute risks.

A map depicting the exposure location type associated with each modeled receptor is provided in Figure 4-1 and a map depicting receptors near the Facility is provided in Figure 4-2.

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<sup>8</sup> Available at [https://tools.oregonexplorer.info/OE\\_HtmlViewer/Index.html?viewer=planners](https://tools.oregonexplorer.info/OE_HtmlViewer/Index.html?viewer=planners).

<sup>9</sup> Available at <https://marioncounty.maps.arcgis.com/apps/webappviewer/index.html?id=540ccada27a64cfc855e009ce7434361>.

<sup>10</sup> State of Oregon Department of Environmental Quality, Cleaner Air Oregon State Zoning to Exposure Location Crosswalk Guidance Document (7/24/2020). <https://www.oregon.gov/deq/aq/cao/Documents/CAO-ZoningClassification.pdf>

<sup>11</sup> State of Oregon Department of Environmental Quality, Exposure Location Guidance Document (8/7/2020). <https://www.oregon.gov/deq/aq/cao/Documents/ExposureLocation.pdf>

<sup>12</sup> *ibid*.

<sup>13</sup> A similar zoning request change was submitted along with the Level 1 assessment for welding operations, and the receptors identified in this assessment will match the ones identified in the Level 1 assessment.

Figure 4-1. Map of Variance Request

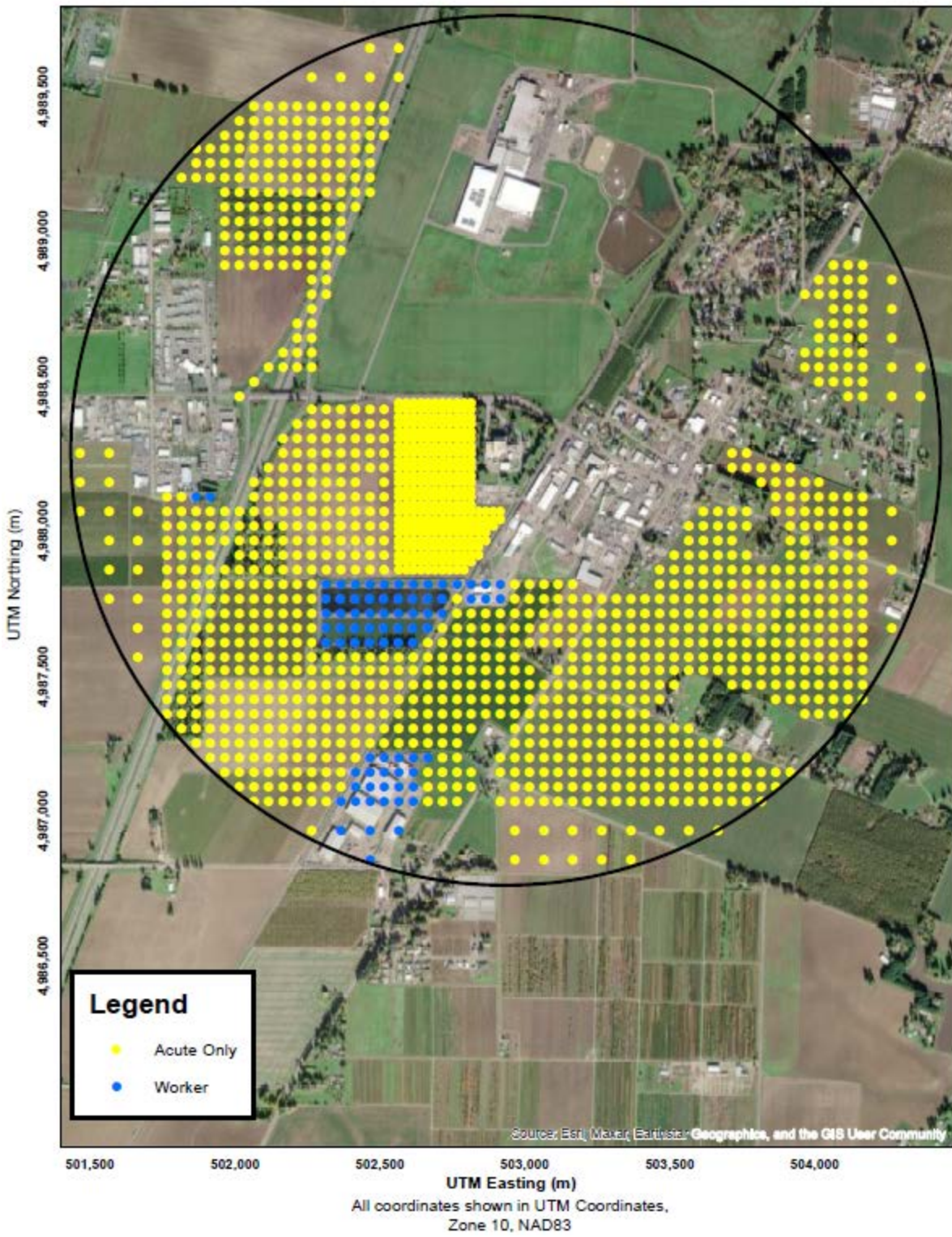
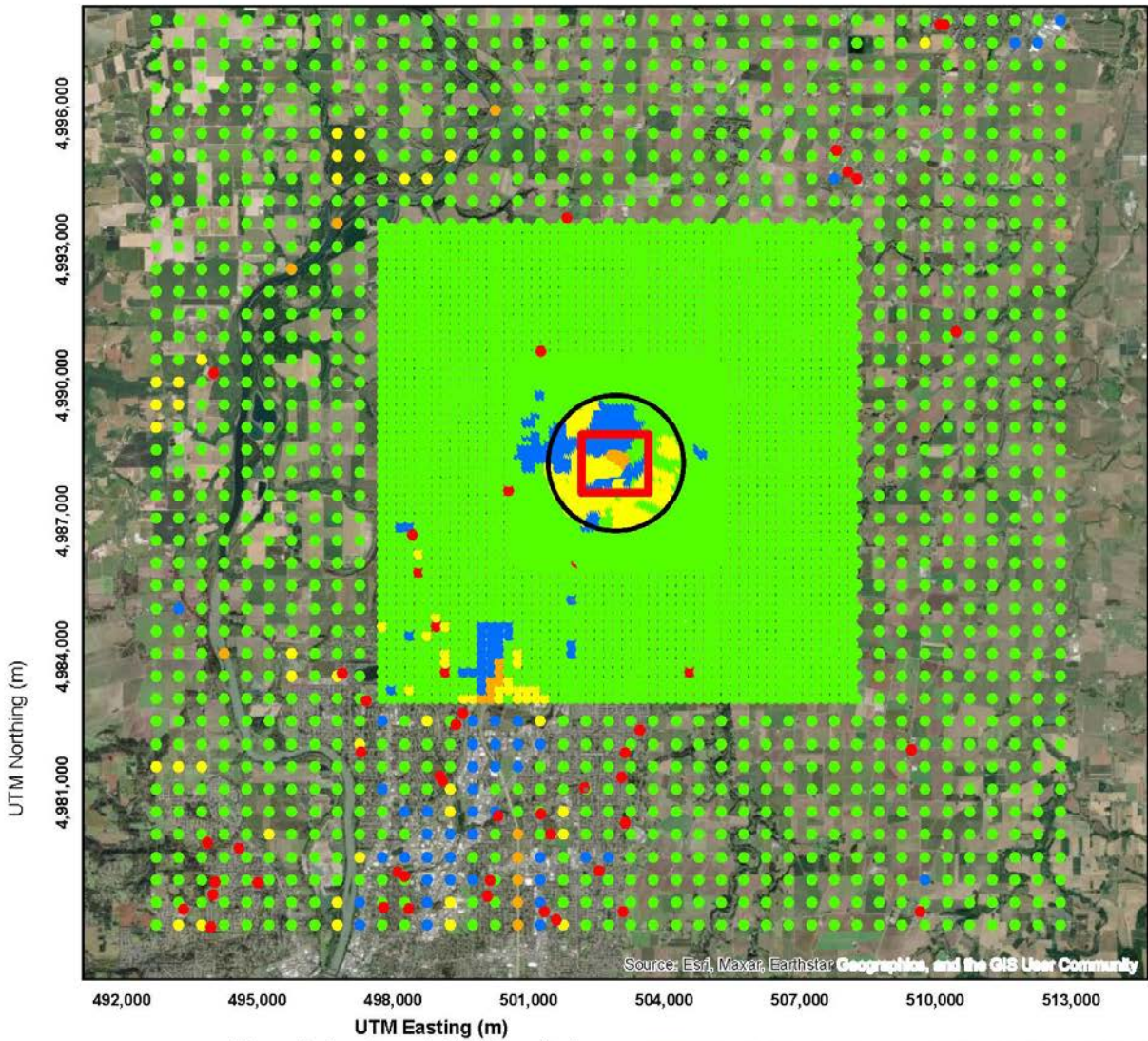
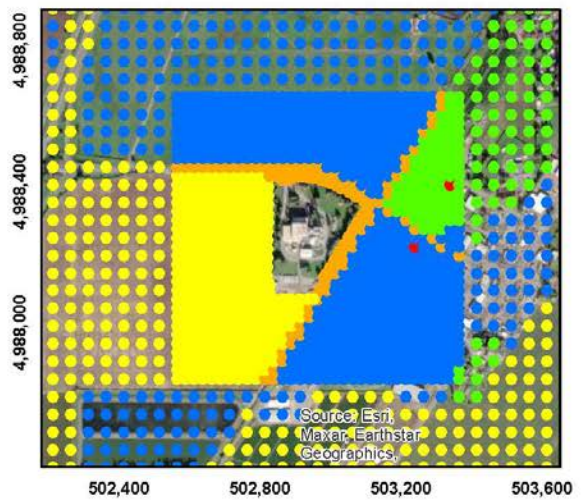


Figure 4-2. Exposure Locations by Type



All coordinates shown in UTM Coordinates, Zone 10, NAD83



### 4.1.3 Exposure Pathways

An exposure pathway is the course a toxic air contaminant takes from a source to the exposed organism. The toxic chemicals incorporated into this risk assessment are airborne. Adjustments to incorporate any variance in exposure pathways are accommodated by using the RBC as defined by OAR 340-245-8010, Table 2. Oregon DEQ fully details adjustments for multipathway pollutants in Section 2.5 of the Recommended Procedures for Toxic Air Contaminant Health Risk Assessments (October 2022). Arsenic, benzo(a)pyrene, cadmium, chromium VI, lead, naphthalene, and PAHs have RBCs adjusted for chronic cancer categories. Arsenic, cadmium, chromium VI, and mercury have RBCs adjusted for chronic noncancer categories.

It should be noted that RMI is proposing a Level 3 as part of this risk assessment process as it is assumed that risk from the Facility will not result in additional exposure pathways. Although the Facility emits a variety of chemical constituents (i.e., dioxins/furans), emissions from these chemicals will not pose additional pathway impacts for the following reasons:

- ▶ The overly conservative method, detailed in Section 3.5, used to determine emission factors for the potential emissions-based risk assessment does not lead to a significant amount of emissions for the various chemicals of concern. For example, several chemicals were not detected in the source testing completed at the request of Oregon DEQ and actual emissions for several pollutants were tested to be below various published screening thresholds such as those listed in the published documents including the *Technical Support Document for the TRIM-Based Multipathway Tiered Screening Methodology for RTR (August 2017)*.
- ▶ The majority of land surrounding the Facility is classified as EFU and, as discussed in Section 3.3.2, RMI is proposing zoning variance requests for many of these areas to be acute exposure only as no buildings are present. Acute exposure would not lead to a substantial amount of localized deposition during the acute time period of 24-hours that would warrant additional exposure pathways being considered.
- ▶ Parcels with homes present where a prolonged period of deposition that impacts the same person(s) will be treated as residential exposure. Residential RBCs already include multipathway adjustment factors (MPFs) and therefore will not require an additional analysis to be completed, such as a Level 4.
- ▶ The stack heights of the municipal waste combustors at the Facility were originally constructed to minimize emission impacts at ground level, and as such minimal nearby deposition would be expected. High stack heights allow for greater dispersion prior to any deposition occurring to ensure a single location is not highly impacted. Additionally, the modeled stack height of 75 m is below the actual stack height of the units of 82 m, and as such, the actual stack height would result in even less deposition (if any deposition were to occur) in comparison to the modeled stack height.
- ▶ Review of zoning classifications did not result in findings of nearby locations where either fish consumption would occur or where drinking water reservoirs may be present.

## 4.2 Methodology to Determine Potential Risk

RMI plans to complete two risk assessments for the Facility. The first assessment includes emissions from the Facility based on the actual emission factors using source testing completed at the request of, and approved by, Oregon DEQ during the CAO process. The second assessment includes the maximum allowable emissions from the Facility which includes safety factors applied to the actual emission factors detailed above for each of the pollutants emitted from the site allowing for a great deal of conservatism, as developed with the CAO staff during the EI approval process. While risk assessments are required to show the potential risk from a given facility, RMI is electing to provide the additional risk assessment based on the actual emission factors to provide a more realistic depiction of the risk surrounding the Facility. RMI understands that Oregon DEQ will not review or approve the results of this elective risk assessment, as such



this risk assessment will be provided in a separate document and can be used for informational purposes only. A Level 3 Risk Assessment will be completed for each of these risk assessments and only risk from non-natural gas emission sources will be compared against the applicable RALs, pursuant to OAR 340-245-0050(5)(b).

RMI used Approach C: REER provided in Recommended Procedures for Toxic Air Contaminant Health Risk Assessments.<sup>14</sup> All emission sources are modeled using the parameters identified in Section 3. The REER tables that are used to calculate risk are provided in Appendix C. REER calculations use the annual and daily emission rates described in the approved CAO Form AQ520.

The Facility maximum exposure location is determined as follows:

- ▶ Under each exposure scenario, the receptor with the maximum Facility risk is determined to be the maximum exposure location. The risk at that receptor represents the assessed Facility risk, which is compared against the corresponding RALs as shown in Table 4-1 below.
- ▶ In accordance with OAR 340-245-0200(5), the risk from non-cancer pollutants will be calculated using the Risk Determination Ratio (RDR) to determine if a Toxic Best Available Control Technology (TBACT) analysis could be required. The calculation of the RDR could be required if RMI emits pollutants with either a Hazard Index (HI) of 3 or 5.
- ▶ Risk is determined separately for TAC emissions generated via the combustion of natural gas only in the boilers. Note that for combustion emissions from this scenario, risk will be calculated but not compared to against the applicable RALs, pursuant to OAR 340-245-0050(5)(b).

**Table 4-1. Risk Action Levels**

<b>Risk Action Level</b>	<b>Cancer</b>	<b>Non-Cancer</b>
Source Permit Level	5	0.5
Community Engagement Level	25	1
TBACT Level	50	5 3, or RDR = 1
Risk Reduction Level	200	10 6, or RDR = 2
Immediate Curtailment Level	500	20 12, or RDR = 4

### 4.3 Uncertainty Evaluation

This section discusses the assumptions made for this risk assessment work plan and provides qualitative discussion on the uncertainty in the risks that will be reported in the risk assessment.

#### 4.3.1 Selection of TACs for Evaluation

The list of TACs used for this risk assessment is presented in Section 4.1.1. The following TACs do not have any associated RBCs:

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<sup>14</sup> Section 3.1.3, Recommended Procedures for Toxic Air Contaminant Health Risk Assessments, Oregon DEQ (October 2022).

- ▶ 1,2,4-Trichlorobenzene,
- ▶ 1,2-Dichlorobenzene,
- ▶ 1,3-Dichlorobenzene,
- ▶ 2,3,4,6-Tetrachlorophenol,
- ▶ 2,4,5-Trichlorophenol,
- ▶ 2,4-Dichlorophenol,
- ▶ 2-Chlorophenol,
- ▶ 2-Methyl naphthalene,
- ▶ Acenaphthylene,
- ▶ Acenaphthene,
- ▶ Anthracene,
- ▶ Barium and barium compounds,
- ▶ Benzo(e)pyrene,
- ▶ Bromine,
- ▶ Bromodichloromethane,
- ▶ Chlorodibromomethane,
- ▶ Dichlorodifluoromethane,
- ▶ Fluorene,
- ▶ Hydrogen Bromide,
- ▶ Molybdenum trioxide,
- ▶ Perylene,
- ▶ Phenanthrene,
- ▶ Phosphorus and compounds,
- ▶ Pyrene,
- ▶ Silver,
- ▶ Thallium,
- ▶ Trichlorofluoromethane, and
- ▶ Zinc and compounds.

Therefore, risk has not been assessed for these TACs, which are each emitted through both Municipal Waste Combustor Unit 1 and Municipal Waste Combustor Unit 2.

#### 4.3.2 Emission Rate Calculations

For the actual emissions-based risk assessment, there is a low degree of uncertainty in emission calculations and risk assessment as emission factors are based on source testing data from 2021, 2022 and 2023. RMI followed the methods in Appendix G of Oregon DEQ's Recommended Procedures for TAC Health Risk Assessments (HRA) (July 2022), utilizing the concept that if a pollutant is not detected in all test runs, it has an emission rate of zero.

However, for the potential emissions-based risk assessment, the emission factors do not utilize the methods described in Oregon DEQ's Recommended Procedures for TAC HRA. Emission factors were developed using the average of the non-detect reported values from source testing with a safety factor applied, even when no pollutant was detected. Additionally, several polychlorinated dibenzo-p-dioxins (PCDDs) & dibenzofurans (PCDFs) toxic equivalency (TEQ) pollutants were not detected in source testing, yet half the detection limit was used to determine the emission factor for the pollutant in the calculation of the PCDD & PCDF TEQ per Source Sampling Manual Volume 1, Revised November 2018, Section 2.11.c. Lastly, RMI is required to annually source test, under its Oregon DEQ Title V permit, several HAPs and other pollutants, such as criteria pollutants, and source test results have consistently shown that actual emissions are below the

potential emissions calculated as part of this risk assessment. Due to the increased degree of conservatism in developing emission factors for the potential emissions-based risk assessment and because the emission factors are based on actual source testing values as approved by Oregon DEQ, there is a high degree of certainty in the risk assessment.

### 4.3.3 Exposure Assessment Assumptions

The calculated risks will be based on AERMOD outputs, which are expected to overestimate the predicted concentrations at receptor locations, for the following reasons:

- ▶ AERMOD is an EPA-approved steady-state plume model and is periodically updated to refine the dispersion calculations and provide more accurate results with the intention to avoid underestimating the impacts.
- ▶ The modeled concentrations are based on the maximum results over the 5-year meteorological period, to cover the weather conditions that can result in high concentrations in the model domain.
- ▶ The acute risks are calculated based on maximum 24-hour model outputs. This method assumes that the worst-case emission rates occur on the worst-case meteorological day. Considering the conservatism built into the emission calculations and the variation of meteorological data, this creates an unrealistic, conservative scenario.

### 4.3.4 Derivation of Toxicity Values

The calculated risks are determined based on the model results and the RBCs for each TAC evaluated in this risk assessment. The RBCs in OAR Chapter 340-245 are determined from the Toxicity Reference Values (TRVs) and then are adjusted with expected exposure duration and target organs for each TAC.

Firstly, the TRVs are obtained from various sources, including but not limited to EPA's Integrated Risk Information System (IRIS) database, Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles, and California's Office of Environmental Health Hazard Assessment (OEHHA). The TRVs are selected from the reference concentrations (RfCs) for noncancer effects and unit risk factors (URFs) for cancer effects. When EPA and other agencies developed the RfCs or URFs, uncertainty factors (UFs) are applied to derive the doses or concentrations from various studies. The UFs usually include interspecies extrapolation, possible human variability in sensitivity etc. which are intended to result in protective doses or concentrations.

Secondly, the exposure duration is also based on conservative assumptions, e.g., a worker stays in the area with highest ambient concentration for 8 hours per day, 250 days per year, over a period of 25 years. These assumptions significantly overestimate the reported risks.

Lastly, not all TACs have the same target organ for the same exposure type. For example, ethyl benzene compounds target kidneys while ammonia targets the respiratory system and 1,3-butadiene compounds target reproductive systems for the chronic effects. However, when calculating the risks reported in this risk assessment, it is assumed that all compounds target the same organ by summing the calculated risks directly. Therefore, the reported risks are likely overestimated in this risk assessment.

## **APPENDIX A. EXPOSURE LOCATION CROSSWALK**

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Crosswalk has been provided electronically only.

## APPENDIX B. CHILD EXPOSURE LOCATIONS

<b>Child Receptor Type</b>	<b>Name</b>	<b>UTM Easting (m)</b>	<b>UTM Northing (m)</b>
School	Chemeketa Community College	503239.4	4988243.5
School	Williamette Valley Christian School	503339.4	4988418.5
School	Lake Labish Elementary School	502064.4	4986068.5
School	Clear Lake Elementary School	498564.4	4985868.5
School	Gubser Elementary School	498964.4	4984668.5
School	Whiteaker Middle School	499164.4	4983668.5
School	Valley Inquiry Charter School	504564.4	4983668.5
School	Gervais Middle and High School	508264.4	4994568.5
School	Harritt Elementary School	495009.8	4979010
School	Heritage Elementary	510201.6	4997971.3
School	Valor Middle School	510095.5	4997970.8
School	Waldo Middle School	500098.9	4978709.2
School	Keizer Elementary School	496873.8	4983629.2
School	McNary High School	497409.4	4983019.9
School	Claggett Creek Middle School	499103.4	4981256.5
School	Kennedy Elementary School	499396.2	4982503.5
School	Cummings Elementary School	497294.5	4981888.3
School	Weddle Elementary School	499032.3	4981371.1
School	Washington Elementary School	500155.1	4979042.2
School	Highland Elementary School	497789.6	4978453.3
School	Hallman Elementary School	500332.4	4980483.7
School	Brush College Elementary School	493902	4979886.9
School	West Salem High School	493373.7	4978408.5
School	Chapman Hill Elementary School	493964.7	4978022.5
School	Hayesville Elementary School	502236.3	4981105.2
School	Stephens Middle School	503138.9	4981875.2
School	Lamb Elementary School	503140.6	4980316.9
School	Hammond Elementary School	503463.4	4982381.3
School	McKay High School	501616.9	4978180.2
School	Pratum Elementary School	509663.7	4978365.7
School	Scott Elementary School	502557.2	4979269.3
School	Yoshikai Elementary School	503058.6	4981332.3
School	Central Howell Elementary School	509482.1	4981946.3
School	Gervais Elementary School/ Samuel Brown Academy	508066.1	4994703.1
School	Jane Goodall Environmental Middle Charter School	498106.9	4979236.1
School	Oregon School for the Deaf	498106.9	4979236.1
School	Cesar E Chavez Elem	503084	4978369.4
School	Salem-Keizer SD 24J	501345.9	4978369.9
School	Early College High School	501498.2	4980080.1
School	Eagle Charter School	498252.9	4979138
School	Kalapuya Elementary School	494062.2	4979011.8
School	Straub Middle School	494021.8	4978734.3
School	Crosshill Christian School	499541.6	4982753.8

School	Grace Academy	501268.2	4980520
School	Holy Family Academy	510458.8	4991179.9
School	Riviera Christian School	494593.9	4979760.2
School	Sacred Heart Catholic School	507812.7	4995197.1
School	St. John Bosco High School	501268.2	4990753.3
School	St. Vincent de Paul Catholic School	498359.9	4978431.9
School	Western Mennonite School	494027.7	4990258.4
School	Salem Bible College	501841.1	4993695.3
School	Forest Ridge Elementary School/ Optimum Learning Environmental Charter School	498434.6	4986695.9
School	Buena Crest Head Start	500564.4	4987669

## APPENDIX C. REER CALCULATIONS

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**Appendix C. REER Calculations - Actual Emissions**

**Appendix Table C-1. Risk Based Concentrations**

Pollutant	CAS	Toxic Pollutant Included in DEQ List? <sup>1</sup>	Toxic Pollutant Included in Table 4? <sup>1</sup>	Risk-Based Concentrations <sup>2</sup> ( µg/m <sup>3</sup> )						
				Residential Chronic		Non-residential Chronic			Acute Non-cancer	
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer		Worker Non-cancer
1,1,1-Trichloroethane	71-55-6	Yes	Yes	--	5000	--	22000	--	22000	11000
1,1,2,2-Tetrachloroethane	79-34-5	Yes	Yes	0.017	--	0.45	--	0.21	--	--
1,1,1,2-Tetrachloroethane	630-20-6	Yes	Yes	0.14	--	3.5	--	1.6	--	--
1,1,2-Trichloroethane	79-00-5	Yes	Yes	0.063	--	1.6	--	0.75	--	--
1,1-Dichloroethane	75-34-3	Yes	Yes	0.63	--	16	--	7.5	--	--
1,1-Dichloroethene	75-35-4	Yes	Yes	--	200	--	880	--	880	200
1,2,3-Trichloropropane	96-18-4	Yes	Yes	--	0.3	--	1.3	--	1.3	1.8
1,2,4-Trichlorobenzene	120-82-1	Yes	No	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	Yes	Yes	0.05	--	1.3	--	0.6	--	--
1,2,4-Trimethylbenzene	95-63-6	Yes	Yes	--	60	--	260	--	260	--
1,2-Dibromo-3-Chloropropane	96-12-8	Yes	Yes	0.000098	0.2	0.001	0.88	0.002	0.88	1.9
1,2-Dibromoethane	106-93-4	Yes	Yes	0.0017	9	0.043	40	0.02	40	--
1,2-Dichlorobenzene	95-50-1	Yes	No	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	Yes	Yes	0.038	7	1	31	0.46	31	--
1,2-Dichloropropane	78-87-5	Yes	Yes	--	4	--	18	--	18	230
1,3,5-Trimethylbenzene	108-67-8	Yes	Yes	--	60	--	260	--	260	--
1,3-Butadiene	106-99-0	Yes	Yes	0.033	2	0.86	8.8	0.4	8.8	660
1,3-Dichlorobenzene	541-73-1	Yes	No	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	Yes	Yes	0.091	60	2.4	260	1.1	260	12000
2,3,4,6-Tetrachlorophenol	58-90-2	Yes	No	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	Yes	No	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	Yes	No	--	--	--	--	--	--	--
2-Butanone	78-93-3	Yes	Yes	--	5000	--	22000	--	22000	5000
2-Chlorophenol	95-57-8	Yes	No	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	Yes	Yes	--	3000	--	13000	--	13000	--
2-Methyl naphthalene	91-57-6	Yes	No	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	Yes	Yes	0.45	140	12	620	5.5	620	470
Acenaphthylene	208-96-8	Yes	No	--	--	--	--	--	--	--
Acenaphthene	83-32-9	Yes	No	--	--	--	--	--	--	--
Acetone	67-64-1	Yes	Yes	--	31000	--	140000	--	140000	62000
Acrolein	107-02-8	Yes	Yes	--	0.35	--	1.5	--	1.5	6.9
Aluminum	7429-90-5	Yes	Yes	--	5	--	22	--	22	--
Ammonia	7664-41-7	Yes	Yes	--	500	--	2200	--	2200	1200
Anthracene	120-12-7	Yes	No	--	--	--	--	--	--	--
Antimony	7440-36-0	Yes	Yes	--	0.3	--	1.3	--	1.3	1
Arsenic and compounds	7440-38-2	Yes	Yes	0.000024	0.00017	0.0013	0.0024	0.00062	0.0024	0.2
Barium and compounds	7440-39-3	Yes	No	--	--	--	--	--	--	--
Benzene	71-43-2	Yes	Yes	0.13	3	3.3	13	1.5	13	29
Benz[a]anthracene	56-55-3	Yes	Yes	0.00021	--	0.0078	--	0.015	--	--
Benzo(a)pyrene	50-32-8	Yes	Yes	0.000043	0.002	0.0016	0.0088	0.003	0.0088	0.002
Benzo[b]fluoranthene	205-99-2	Yes	Yes	0.000053	--	0.002	--	0.0038	--	--
Benzo[k]fluoranthene	207-08-9	Yes	Yes	0.0014	--	0.052	--	0.1	--	--
Benzo[e]pyrene	192-97-2	Yes	No	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	Yes	Yes	0.0047	--	0.17	--	0.34	--	--
Beryllium and compounds	7440-41-7	Yes	Yes	0.00042	0.007	0.011	0.031	0.005	0.031	0.02
Bromine	7726-95-6	Yes	No	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	Yes	No	--	--	--	--	--	--	--
Bromoform	75-25-2	Yes	Yes	0.91	--	24	--	11	--	--
Bromomethane	74-83-9	Yes	Yes	--	5	--	22	--	22	3900
Cadmium and compounds	7440-43-9	Yes	Yes	0.00056	0.005	0.014	0.037	0.0067	0.037	0.03
Carbon Disulfide	75-15-0	Yes	Yes	--	800	--	3500	--	3500	6200



**Appendix C. REER Calculations - Actual Emissions**

Carbon Tetrachloride	56-23-5	Yes	Yes	0.17	100	4.3	440	2	440	1900
Chlorine	7782-50-5	Yes	Yes	--	0.15	--	0.66	--	0.66	170
Chlorobenzene	108-90-7	Yes	Yes	--	50	--	220	--	220	--
Chlorodibromomethane	124-48-1	Yes	No	--	--	--	--	--	--	--
Chloroethane	75-00-3	Yes	Yes	--	30000	--	130000	--	130000	40000
Chloroform	67-66-3	Yes	Yes	--	300	--	1300	--	1300	490
Chloromethane	74-87-3	Yes	Yes	--	90	--	400	--	400	1000
Chrysene	218-01-9	Yes	Yes	0.00043	--	0.016	--	0.03	--	--
Cobalt and compounds	7440-48-4	Yes	Yes	--	0.1	--	0.44	--	0.44	--
Copper and compounds	7440-50-8	Yes	Yes	--	--	--	--	--	--	100
Dibenz[a,h]anthracene	53-70-3	Yes	Yes	0.0000043	--	0.00016	--	0.0003	--	--
Dichlorodifluoromethane	75-71-8	Yes	No	--	--	--	--	--	--	--
Diesel Particulate Matter	200	Yes	Yes	0.1	5	2.6	22	1.2	22	--
Ethylbenzene	100-41-4	Yes	Yes	0.4	260	10	1100	4.8	1100	22000
Formaldehyde	50-00-0	Yes	Yes	0.17	9	4.3	40	2	40	49
Fluoranthene	206-44-0	Yes	Yes	0.00053	--	0.02	--	0.038	--	--
Fluorene	86-73-7	Yes	No	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	Yes	Yes	0.002	--	0.051	--	0.024	--	--
Hexachlorobutadiene	87-68-3	Yes	Yes	0.045	--	1.2	--	0.55	--	--
Hexane	110-54-3	Yes	Yes	--	700	--	3100	--	3100	--
Hexavalent Chromium (Cr+6)	18540-29-9	Yes	Yes	0.000031	0.083	0.00052	0.88	0.001	0.88	0.3
Hydrochloric acid	7647-01-0	Yes	Yes	--	20	--	88	--	88	2100
Hydrogen Bromide	10035-10-6	Yes	No	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	Yes	Yes	--	2.1	--	19	--	19	16
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	Yes	0.00061	--	0.022	--	0.043	--	--
Lead and compounds	7439-92-1	Yes	Yes	--	0.15	--	0.66	--	0.66	0.15
Manganese and compounds	7439-96-5	Yes	Yes	--	0.09	--	0.4	--	0.4	0.3
Mercury and compounds	7439-97-6	Yes	Yes	--	0.077	--	0.63	--	0.63	0.6
Methylene Chloride	75-09-2	Yes	Yes	59	600	620	2600	1200	2600	2100
Molybdenum trioxide	1313-27-5	Yes	No	--	--	--	--	--	--	--
Naphthalene	91-20-3	Yes	Yes	0.029	3.7	0.76	16	0.35	16	200
Nickel and compounds	7440-02-0	Yes	Yes	0.0038	0.014	0.1	0.062	0.046	0.062	0.2
o-Xylene	95-47-6	Yes	Yes	--	200	--	880	--	880	8700
Pentachlorophenol (CCC)	87-86-5	Yes	Yes	0.2	--	5.1	--	2.4	--	--
Perylene	198-55-0	Yes	No	--	--	--	--	--	--	--
Phenanthrene	85-01-8	Yes	No	--	--	--	--	--	--	--
Phosphorous and compounds	504	Yes	No	--	--	--	--	--	--	--
Pyrene	129-00-0	Yes	No	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	Yes	Yes	--	--	--	--	--	--	2
Silver	7440-22-4	Yes	No	--	--	--	--	--	--	--
Styrene	100-42-5	Yes	Yes	--	1000	--	4400	--	4400	21000
Tetrachloroethene	127-18-4	Yes	Yes	3.8	41	100	180	46	180	41
Thallium	7440-28-0	Yes	No	--	--	--	--	--	--	--
Toluene	108-88-3	Yes	Yes	--	5000	--	22000	--	22000	7500
Total PAHs (excluding Naphthalene)	401	Yes	Yes	0.000043	--	0.0016	--	0.003	--	--
Total PCBs	1336-36-3	Yes	Yes	0.00053	--	0.02	--	0.0092	--	--
Total PCB TEQ	645	Yes	Yes	0.000000001	0.00000013	0.00000009	0.000026	0.000000042	0.000026	--
Total PCDD and PCDF	646	Yes	Yes	0.000000001	0.00000013	0.00000009	0.000026	0.000000042	0.000026	--
trans-1,2-Dichloroethene	156-60-5	Yes	Yes	--	--	--	--	--	--	790
trans-1,3-Dichloropropene	542-75-6	Yes	Yes	0.25	32	6.5	140	3	140	36
Trichloroethene	79-01-6	Yes	Yes	0.2	2.1	3.5	9.2	2.9	9.2	2.1
Trichlorofluoromethane	75-69-4	Yes	No	--	--	--	--	--	--	--
Vanadium	7440-62-2	Yes	Yes	--	0.1	--	0.44	--	0.44	0.8
Vinyl Chloride	75-01-4	Yes	Yes	0.11	100	0.22	440	2.7	440	1300
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	Yes	Yes	--	220	--	970	--	970	8700
Zinc and compounds	7440-66-6	Yes	No	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

<sup>1</sup> If the toxic is listed in the Toxic Air Contaminant Reporting List (Table 2) or the Risk-Based Concentrations (Table 4) in OAR Chapter 340-245, then it's considered a permitted toxic.

<sup>2</sup> RBCs for benzo(a)pyrene is only listed for non-cancer risk categories because the chronic cancer risks are accounted for under PAHs.

**Table C-2. REER for Municipal Waste Combustor 1 - Normal Operation**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						
				Residential Chronic		Non-residential Chronic			Acute Non-cancer	
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer		Worker Non-cancer
1,1,1-Trichloroethane	71-55-6	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
1,1,2,2-Tetrachloroethane	79-34-5	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
1,1,1,2-Tetrachloroethane	630-20-6	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
1,1,2-Trichloroethane	79-00-5	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
1,1-Dichloroethane	75-34-3	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
1,1-Dichloroethene	75-35-4	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
1,2,3-Trichloropropane	96-18-4	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
1,2,4-Trichlorobenzene	120-82-1	0.00E+00	0.00E+00	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	9.55E-07	9.55E-07	1.91E-05	--	7.35E-07	--	1.59E-06	--	--
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	--
1,2-Dibromo-3-Chloropropane	96-12-8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2-Dibromoethane	106-93-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--
1,2-Dichlorobenzene	95-50-1	0.00E+00	0.00E+00	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--
1,2-Dichloropropane	78-87-5	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
1,3,5-Trimethylbenzene	108-67-8	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	0.00E+00	0.00E+00	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,3,4,6-Tetrachlorophenol	58-90-2	0.00E+00	0.00E+00	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	0.00E+00	0.00E+00	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	0.00E+00	0.00E+00	--	--	--	--	--	--	--
2-Butanone	78-93-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
2-Chlorophenol	95-57-8	0.00E+00	0.00E+00	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	--
2-Methyl naphthalene	91-57-6	5.49E-07	5.49E-07	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	5.00E-04	5.00E-04	1.11E-03	3.57E-06	4.17E-05	8.06E-07	9.09E-05	8.06E-07	1.06E-06
Acenaphthylene	208-96-8	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Acenaphthene	83-32-9	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Acetone	67-64-1	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Acrolein	107-02-8	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Aluminum	7429-90-5	1.03E-03	1.03E-03	--	2.05E-04	--	4.66E-05	--	4.66E-05	--
Ammonia	7664-41-7	2.39E-02	2.39E-02	--	4.79E-05	--	1.09E-05	--	1.09E-05	1.99E-05
Anthracene	120-12-7	6.84E-08	6.84E-08	--	--	--	--	--	--	--
Antimony	7440-36-0	5.86E-05	5.86E-05	--	1.95E-04	--	4.51E-05	--	4.51E-05	5.86E-05
Arsenic and compounds	7440-38-2	3.71E-06	3.71E-06	1.55E-01	2.18E-02	2.85E-03	1.55E-03	5.98E-03	1.55E-03	1.86E-05
Barium and compounds	7440-39-3	2.37E-05	2.37E-05	--	--	--	--	--	--	--
Benzene	71-43-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz[a]anthracene	56-55-3	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Benzo(a)pyrene	50-32-8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo[b]fluoranthene	205-99-2	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Benzo[k]fluoranthene	207-08-9	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Benzo[e]pyrene	192-97-2	1.10E-07	1.10E-07	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	2.06E-07	2.06E-07	4.38E-05	--	1.21E-06	--	6.05E-07	--	--

**Appendix C. REER Calculations - Actual Emissions**

Beryllium and compounds	7440-41-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bromine	7726-95-6	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Bromoform	75-25-2	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Bromomethane	74-83-9	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Cadmium and compounds	7440-43-9	8.27E-06	8.27E-06	1.48E-02	1.65E-03	5.91E-04	2.24E-04	1.23E-03	2.24E-04	2.76E-04
Carbon Disulfide	75-15-0	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorine	7782-50-5	3.61E-03	3.61E-03	--	2.41E-02	--	5.47E-03	--	5.47E-03	2.12E-05
Chlorobenzene	108-90-7	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	--
Chlorodibromomethane	124-48-1	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Chloroethane	75-00-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Chloroform	67-66-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Chloromethane	74-87-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Chrysene	218-01-9	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Cobalt and compounds	7440-48-4	2.72E-06	2.72E-06	--	2.72E-05	--	6.18E-06	--	6.18E-06	--
Copper and compounds	7440-50-8	3.64E-05	3.64E-05	--	--	--	--	--	--	3.64E-07
Dibenz[a,h]anthracene	53-70-3	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Dichlorodifluoromethane	75-71-8	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Diesel Particulate Matter	200	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Formaldehyde	50-00-0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	206-44-0	2.76E-07	2.76E-07	5.20E-04	--	1.38E-05	--	7.25E-06	--	--
Fluorene	86-73-7	1.33E-07	1.33E-07	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Hexachlorobutadiene	87-68-3	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Hexane	110-54-3	--	--	--	--	--	--	--	--	--
Hexavalent Chromium (Cr+6)	18540-29-9	1.64E-05	1.64E-05	5.27E-01	1.97E-04	3.14E-02	1.86E-05	1.64E-02	1.86E-05	5.45E-05
Hydrochloric acid	7647-01-0	1.55E-01	1.55E-01	--	7.73E-03	--	1.76E-03	--	1.76E-03	7.36E-05
Hydrogen Bromide	10035-10-6	3.58E-03	3.58E-03	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Indeno[1,2,3-cd]pyrene	193-39-5	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Lead and compounds	7439-92-1	6.42E-05	6.42E-05	--	4.28E-04	--	9.73E-05	--	9.73E-05	4.28E-04
Manganese and compounds	7439-96-5	3.53E-05	3.53E-05	--	3.92E-04	--	8.82E-05	--	8.82E-05	1.18E-04
Mercury and compounds	7439-97-6	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Methylene Chloride	75-09-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum trioxide	1313-27-5	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	1.87E-06	1.87E-06	6.44E-05	5.05E-07	2.46E-06	1.17E-07	5.34E-06	1.17E-07	9.34E-09
Nickel and compounds	7440-02-0	1.57E-05	1.57E-05	4.13E-03	1.12E-03	1.57E-04	2.53E-04	3.41E-04	2.53E-04	7.85E-05
o-Xylene	95-47-6	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Pentachlorophenol (CCC)	87-86-5	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Perylene	198-55-0	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Phenanthrene	85-01-8	1.25E-06	1.25E-06	--	--	--	--	--	--	--
Phosphorous and compounds	504	1.68E-04	1.68E-04	--	--	--	--	--	--	--
Pyrene	129-00-0	2.45E-07	2.45E-07	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	6.26E-04	6.26E-04	--	--	--	--	--	--	3.13E-04
Silver	7440-22-4	2.02E-06	2.02E-06	--	--	--	--	--	--	--
Styrene	100-42-5	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Tetrachloroethene	127-18-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Thallium	7440-28-0	0.00E+00	0.00E+00	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

Toluene	108-88-3	6.24E-05	6.24E-05	--	1.25E-08	--	2.84E-09	--	2.84E-09	8.32E-09
Total PAHs (excluding Naphthalene)	401	--	--	--	--	--	--	--	--	--
Total PCBs	1336-36-3	7.06E-08	7.06E-08	1.33E-04	--	3.53E-06	--	7.68E-06	--	--
Total PCB TEQ	645	4.74E-12	4.74E-12	4.74E-03	3.65E-05	5.27E-05	1.82E-07	1.13E-04	1.82E-07	--
Total PCDD and PCDF	646	1.12E-10	1.12E-10	1.12E-01	8.63E-04	1.25E-03	4.31E-06	2.67E-03	4.31E-06	--
trans-1,2-Dichloroethene	156-60-5	0.00E+00	0.00E+00	--	--	--	--	--	--	0.00E+00
trans-1,3-Dichloropropene	542-75-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichloroethene	79-01-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichlorofluoromethane	75-69-4	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Vanadium	7440-62-2	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Vinyl Chloride	75-01-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Zinc and compounds	7440-66-6	1.26E-03	1.26E-03	--	--	--	--	--	--	--
TOTAL REER for Municipal Waste Combustor 1 - Normal Operation (g/s per µg/m <sup>3</sup> )		1.9E-01	1.9E-01	8.2E-01	5.9E-02	3.6E-02	9.6E-03	2.7E-02	9.6E-03	1.5E-03

**Table C-3. REER for Municipal Waste Combustor 2 - Normal Operation**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						Acute Non-cancer
				Residential Chronic		Non-residential Chronic				
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer	Worker Non-cancer	
1,1,1-Trichloroethane	71-55-6	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
1,1,2,2-Tetrachloroethane	79-34-5	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
1,1,1,2-Tetrachloroethane	630-20-6	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
1,1,2-Trichloroethane	79-00-5	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
1,1-Dichloroethane	75-34-3	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
1,1-Dichloroethene	75-35-4	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
1,2,3-Trichloropropane	96-18-4	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
1,2,4-Trichlorobenzene	120-82-1	0.00E+00	0.00E+00	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	9.55E-07	9.55E-07	1.91E-05	--	7.35E-07	--	1.59E-06	--	--
1,2,4-Trimethylbenzene	95-63-6	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	--
1,2-Dibromo-3-Chloropropane	96-12-8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1,2-Dibromoethane	106-93-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--
1,2-Dichlorobenzene	95-50-1	0.00E+00	0.00E+00	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	--
1,2-Dichloropropane	78-87-5	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
1,3,5-Trimethylbenzene	108-67-8	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	0.00E+00	0.00E+00	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2,3,4,6-Tetrachlorophenol	58-90-2	0.00E+00	0.00E+00	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	0.00E+00	0.00E+00	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	0.00E+00	0.00E+00	--	--	--	--	--	--	--
2-Butanone	78-93-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
2-Chlorophenol	95-57-8	0.00E+00	0.00E+00	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	--
2-Methyl naphthalene	91-57-6	5.49E-07	5.49E-07	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	5.00E-04	5.00E-04	1.11E-03	3.57E-06	4.17E-05	8.06E-07	9.09E-05	8.06E-07	1.06E-06
Acenaphthylene	208-96-8	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Acenaphthene	83-32-9	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Acetone	67-64-1	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Acrolein	107-02-8	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00

**Appendix C. REER Calculations - Actual Emissions**

Aluminum	7429-90-5	1.03E-03	1.03E-03	--	2.05E-04	--	4.66E-05	--	4.66E-05	--
Ammonia	7664-41-7	2.39E-02	2.39E-02	--	4.79E-05	--	1.09E-05	--	1.09E-05	1.99E-05
Anthracene	120-12-7	6.84E-08	6.84E-08	--	--	--	--	--	--	--
Antimony	7440-36-0	5.86E-05	5.86E-05	--	1.95E-04	--	4.51E-05	--	4.51E-05	5.86E-05
Arsenic and compounds	7440-38-2	3.71E-06	3.71E-06	1.55E-01	2.18E-02	2.85E-03	1.55E-03	5.98E-03	1.55E-03	1.86E-05
Barium and compounds	7440-39-3	2.37E-05	2.37E-05	--	--	--	--	--	--	--
Benzene	71-43-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benz[a]anthracene	56-55-3	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Benzo(a)pyrene	50-32-8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo[b]fluoranthene	205-99-2	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Benzo[k]fluoranthene	207-08-9	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Benzo[e]pyrene	192-97-2	1.10E-07	1.10E-07	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	2.06E-07	2.06E-07	4.38E-05	--	1.21E-06	--	6.05E-07	--	--
Beryllium and compounds	7440-41-7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bromine	7726-95-6	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Bromoform	75-25-2	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Bromomethane	74-83-9	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Cadmium and compounds	7440-43-9	8.27E-06	8.27E-06	1.48E-02	1.65E-03	5.91E-04	2.24E-04	1.23E-03	2.24E-04	2.76E-04
Carbon Disulfide	75-15-0	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Carbon Tetrachloride	56-23-5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorine	7782-50-5	3.61E-03	3.61E-03	--	2.41E-02	--	5.47E-03	--	5.47E-03	2.12E-05
Chlorobenzene	108-90-7	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	--
Chlorodibromomethane	124-48-1	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Chloroethane	75-00-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Chloroform	67-66-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Chloromethane	74-87-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Chrysene	218-01-9	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Cobalt and compounds	7440-48-4	2.72E-06	2.72E-06	--	2.72E-05	--	6.18E-06	--	6.18E-06	--
Copper and compounds	7440-50-8	3.64E-05	3.64E-05	--	--	--	--	--	--	3.64E-07
Dibenz[a,h]anthracene	53-70-3	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Dichlorodifluoromethane	75-71-8	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Diesel Particulate Matter	200	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Formaldehyde	50-00-0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoranthene	206-44-0	2.76E-07	2.76E-07	5.20E-04	--	1.38E-05	--	7.25E-06	--	--
Fluorene	86-73-7	1.33E-07	1.33E-07	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Hexachlorobutadiene	87-68-3	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Hexane	110-54-3	--	--	--	--	--	--	--	--	--
Hexavalent Chromium (Cr+6)	18540-29-9	1.64E-05	1.64E-05	5.27E-01	1.97E-04	3.14E-02	1.86E-05	1.64E-02	1.86E-05	5.45E-05
Hydrochloric acid	7647-01-0	1.55E-01	1.55E-01	--	7.73E-03	--	1.76E-03	--	1.76E-03	7.36E-05
Hydrogen Bromide	10035-10-6	3.58E-03	3.58E-03	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Indeno[1,2,3-cd]pyrene	193-39-5	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Lead and compounds	7439-92-1	6.42E-05	6.42E-05	--	4.28E-04	--	9.73E-05	--	9.73E-05	4.28E-04
Manganese and compounds	7439-96-5	3.53E-05	3.53E-05	--	3.92E-04	--	8.82E-05	--	8.82E-05	1.18E-04
Mercury and compounds	7439-97-6	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Methylene Chloride	75-09-2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum trioxide	1313-27-5	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

Naphthalene	91-20-3	1.87E-06	1.87E-06	6.44E-05	5.05E-07	2.46E-06	1.17E-07	5.34E-06	1.17E-07	9.34E-09
Nickel and compounds	7440-02-0	1.57E-05	1.57E-05	4.13E-03	1.12E-03	1.57E-04	2.53E-04	3.41E-04	2.53E-04	7.85E-05
o-Xylene	95-47-6	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Pentachlorophenol (CCC)	87-86-5	0.00E+00	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	--
Perylene	198-55-0	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Phenanthrene	85-01-8	1.25E-06	1.25E-06	--	--	--	--	--	--	--
Phosphorous and compounds	504	1.68E-04	1.68E-04	--	--	--	--	--	--	--
Pyrene	129-00-0	2.45E-07	2.45E-07	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	6.26E-06	6.26E-06	--	--	--	--	--	--	3.13E-06
Silver	7440-22-4	2.02E-06	2.02E-06	--	--	--	--	--	--	--
Styrene	100-42-5	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Tetrachloroethene	127-18-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Thallium	7440-28-0	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Toluene	108-88-3	6.24E-05	6.24E-05	--	1.25E-08	--	2.84E-09	--	2.84E-09	8.32E-09
Total PAHs (excluding Naphthalene)	401	--	--	--	--	--	--	--	--	--
Total PCBs	1336-36-3	7.06E-08	7.06E-08	1.33E-04	--	3.53E-06	--	7.68E-06	--	--
Total PCB TEQ	645	4.74E-12	4.74E-12	4.74E-03	3.65E-05	5.27E-05	1.82E-07	1.13E-04	1.82E-07	--
Total PCDD and PCDF	646	1.12E-10	1.12E-10	1.12E-01	8.63E-04	1.25E-03	4.31E-06	2.67E-03	4.31E-06	--
trans-1,2-Dichloroethene	156-60-5	0.00E+00	0.00E+00	--	--	--	--	--	--	0.00E+00
trans-1,3-Dichloropropene	542-75-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichloroethene	79-01-6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichlorofluoromethane	75-69-4	0.00E+00	0.00E+00	--	--	--	--	--	--	--
Vanadium	7440-62-2	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Vinyl Chloride	75-01-4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	0.00E+00	0.00E+00	--	0.00E+00	--	0.00E+00	--	0.00E+00	0.00E+00
Zinc and compounds	7440-66-6	1.26E-03	1.26E-03	--	--	--	--	--	--	--
TOTAL REER for Municipal Waste Combustor 2 - Normal Operation (g/s per µg/m <sup>3</sup> )		1.9E-01	1.9E-01	8.2E-01	5.9E-02	3.6E-02	9.6E-03	2.7E-02	9.6E-03	1.2E-03

**Table C-4. REER for Municipal Waste Combustor 1 - Startup**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						Acute Non-cancer
				Residential Chronic		Non-residential Chronic				
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer	Worker Non-cancer	
1,1,1-Trichloroethane	71-55-6	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	--	--	--	--	--	--
1,1,1,2-Tetrachloroethane	630-20-6	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-Chloropropane	96-12-8	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

1,4-Dichlorobenzene	106-46-7	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	--	--	--
2-Methyl naphthalene	91-57-6	--	--	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	8.42E-07	3.41E-05	1.87E-06	6.01E-09	7.02E-08	1.36E-09	1.53E-07	1.36E-09	7.26E-08
Acenaphthylene	208-96-8	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	--	--	--	--	--	--	--	--	--
Acrolein	107-02-8	7.48E-07	3.03E-05	--	2.14E-06	--	4.99E-07	--	4.99E-07	4.40E-06
Aluminum	7429-90-5	--	--	--	--	--	--	--	--	--
Ammonia	7664-41-7	1.68E-02	6.83E-01	--	3.37E-05	--	7.65E-06	--	7.65E-06	5.69E-04
Anthracene	120-12-7	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	--	--	--	--	--	--	--	--	--
Arsenic and compounds	7440-38-2	1.87E-07	7.59E-06	7.80E-03	1.10E-03	1.44E-04	7.80E-05	3.02E-04	7.80E-05	3.79E-05
Barium and compounds	7440-39-3	4.12E-06	1.67E-04	--	--	--	--	--	--	--
Benzene	71-43-2	1.59E-06	6.45E-05	1.22E-05	5.30E-07	4.82E-07	1.22E-07	1.06E-06	1.22E-07	2.22E-06
Benz[a]anthracene	56-55-3	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	1.12E-09	4.55E-08	2.61E-05	5.61E-07	7.02E-07	1.28E-07	3.74E-07	1.28E-07	2.28E-05
Benzo[b]fluoranthene	205-99-2	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	207-08-9	--	--	--	--	--	--	--	--	--
Benzo[e]pyrene	192-97-2	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	--	--	--	--	--	--	--	--	--
Beryllium and compounds	7440-41-7	1.12E-08	4.55E-07	2.67E-05	1.60E-06	1.02E-06	3.62E-07	2.25E-06	3.62E-07	2.28E-05
Bromine	7726-95-6	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	--	--	--	--	--	--	--	--	--
Cadmium and compounds	7440-43-9	1.03E-06	4.17E-05	1.84E-03	2.06E-04	7.35E-05	2.78E-05	1.54E-04	2.78E-05	1.39E-03
Carbon Disulfide	75-15-0	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	--	--	--	--	--	--	--	--	--
Chlorine	7782-50-5	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	124-48-1	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	--	--	--	--	--	--	--	--	--
Cobalt and compounds	7440-48-4	7.86E-08	3.19E-06	--	7.86E-07	--	1.79E-07	--	1.79E-07	--
Copper and compounds	7440-50-8	7.95E-07	3.22E-05	--	--	--	--	--	--	3.22E-07
Dibenz[a,h]anthracene	53-70-3	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	--	--	--	--	--	--	--	--	--
Diesel Particulate Matter	200	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	1.87E-06	7.59E-05	4.68E-06	7.20E-09	1.87E-07	1.70E-09	3.90E-07	1.70E-09	3.45E-09
Formaldehyde	50-00-0	3.37E-06	1.37E-04	1.98E-05	3.74E-07	7.83E-07	8.42E-08	1.68E-06	8.42E-08	2.79E-06
Fluoranthene	206-44-0	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

Hexachlorobenzene	118-74-1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	--	--	--	--	--	--	--	--	--
Hexane	110-54-3	1.22E-06	4.93E-05	--	1.74E-09	--	3.92E-10	--	3.92E-10	--
Hexavalent Chromium (Cr+6)	18540-29-9	1.31E-06	5.31E-05	4.22E-02	1.58E-05	2.52E-03	1.49E-06	1.31E-03	1.49E-06	1.77E-04
Hydrochloric acid	7647-01-0	--	--	--	--	--	--	--	--	--
Hydrogen Bromide	10035-10-6	--	--	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	193-39-5	--	--	--	--	--	--	--	--	--
Lead and compounds	7439-92-1	4.68E-07	1.90E-05	--	3.12E-06	--	7.09E-07	--	7.09E-07	1.26E-04
Manganese and compounds	7439-96-5	3.55E-07	1.44E-05	--	3.95E-06	--	8.89E-07	--	8.89E-07	4.81E-05
Mercury and compounds	7439-97-6	2.43E-07	9.86E-06	--	3.16E-06	--	3.86E-07	--	3.86E-07	1.64E-05
Methylene Chloride	75-09-2	--	--	--	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	1.54E-06	6.26E-05	--	--	--	--	--	--	--
Naphthalene	91-20-3	2.81E-07	1.14E-05	9.68E-06	7.58E-08	3.69E-07	1.75E-08	8.02E-07	1.75E-08	5.69E-08
Nickel and compounds	7440-02-0	1.96E-06	7.97E-05	5.17E-04	1.40E-04	1.96E-05	3.17E-05	4.27E-05	3.17E-05	3.98E-04
o-Xylene	95-47-6	--	--	--	--	--	--	--	--	--
Pentachlorophenol (CCC)	87-86-5	--	--	--	--	--	--	--	--	--
Perylene	198-55-0	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	--	--	--	--	--	--	--	--	--
Phosphorous and compounds	504	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	--	--	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	2.25E-08	9.10E-07	--	--	--	--	--	--	4.55E-07
Silver	7440-22-4	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	--	--	--	--	--	--	--	--	--
Thallium	7440-28-0	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	7.30E-06	2.96E-04	--	1.46E-09	--	3.32E-10	--	3.32E-10	3.95E-08
Total PAHs (excluding Naphthalene)	401	--	--	--	--	--	--	--	--	--
Total PCBs	1336-36-3	--	--	--	--	--	--	--	--	--
Total PCB TEQ	645	--	--	--	--	--	--	--	--	--
Total PCDD and PCDF	646	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	542-75-6	--	--	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	2.15E-06	8.73E-05	--	2.15E-05	--	4.89E-06	--	4.89E-06	1.09E-04
Vinyl Chloride	75-01-4	--	--	--	--	--	--	--	--	--
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	5.43E-06	2.20E-04	--	2.47E-08	--	5.59E-09	--	5.59E-09	2.53E-08
Zinc and compounds	7440-66-6	2.71E-05	1.10E-03	--	--	--	--	--	--	--
TOTAL REER for Municipal Waste Combustor 1 - Startup (g/s per µg/m <sup>3</sup> )		1.7E-02	6.9E-01	5.2E-02	1.5E-03	2.8E-03	1.5E-04	1.8E-03	1.5E-04	2.9E-03

**Table C-5. REER for Municipal Waste Combustor 2 - Startup**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						
				Residential Chronic		Non-residential Chronic			Acute Non-cancer	
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer		Worker Non-cancer
1,1,1-Trichloroethane	71-55-6	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	--	--	--	--	--	--
1,1,1,2-Tetrachloroethane	630-20-6	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	--	--	--	--	--	--	--	--	--



**Appendix C. REER Calculations - Actual Emissions**

1,1-Dichloroethene	75-35-4	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-Chloropropane	96-12-8	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	--	--	--
2-Methyl naphthalene	91-57-6	--	--	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	8.42E-07	3.41E-05	1.87E-06	6.01E-09	7.02E-08	1.36E-09	1.53E-07	1.36E-09	7.26E-08
Acenaphthylene	208-96-8	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	--	--	--	--	--	--	--	--	--
Acrolein	107-02-8	7.48E-07	3.03E-05	--	2.14E-06	--	4.99E-07	--	4.99E-07	4.40E-06
Aluminum	7429-90-5	--	--	--	--	--	--	--	--	--
Ammonia	7664-41-7	1.68E-02	6.83E-01	--	3.37E-05	--	7.65E-06	--	7.65E-06	5.69E-04
Anthracene	120-12-7	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	--	--	--	--	--	--	--	--	--
Arsenic and compounds	7440-38-2	1.87E-07	7.59E-06	7.80E-03	1.10E-03	1.44E-04	7.80E-05	3.02E-04	7.80E-05	3.79E-05
Barium and compounds	7440-39-3	4.12E-06	1.67E-04	--	--	--	--	--	--	--
Benzene	71-43-2	1.59E-06	6.45E-05	1.22E-05	5.30E-07	4.82E-07	1.22E-07	1.06E-06	1.22E-07	2.22E-06
Benz[a]anthracene	56-55-3	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	1.12E-09	4.55E-08	2.61E-05	5.61E-07	7.02E-07	1.28E-07	3.74E-07	1.28E-07	2.28E-05
Benzo[b]fluoranthene	205-99-2	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	207-08-9	--	--	--	--	--	--	--	--	--
Benzo[e]pyrene	192-97-2	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	--	--	--	--	--	--	--	--	--
Beryllium and compounds	7440-41-7	1.12E-08	4.55E-07	2.67E-05	1.60E-06	1.02E-06	3.62E-07	2.25E-06	3.62E-07	2.28E-05
Bromine	7726-95-6	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	--	--	--	--	--	--	--	--	--
Cadmium and compounds	7440-43-9	1.03E-06	4.17E-05	1.84E-03	2.06E-04	7.35E-05	2.78E-05	1.54E-04	2.78E-05	1.39E-03
Carbon Disulfide	75-15-0	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	--	--	--	--	--	--	--	--	--
Chlorine	7782-50-5	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	124-48-1	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

Chloroethane	75-00-3	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	--	--	--	--	--	--	--	--	--
Cobalt and compounds	7440-48-4	7.86E-08	3.19E-06	--	7.86E-07	--	1.79E-07	--	1.79E-07	--
Copper and compounds	7440-50-8	7.95E-07	3.22E-05	--	--	--	--	--	--	3.22E-07
Dibenz[a,h]anthracene	53-70-3	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	--	--	--	--	--	--	--	--	--
Diesel Particulate Matter	200	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	1.87E-06	7.59E-05	4.68E-06	7.20E-09	1.87E-07	1.70E-09	3.90E-07	1.70E-09	3.45E-09
Formaldehyde	50-00-0	3.37E-06	1.37E-04	1.98E-05	3.74E-07	7.83E-07	8.42E-08	1.68E-06	8.42E-08	2.79E-06
Fluoranthene	206-44-0	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	--	--	--	--	--	--	--	--	--
Hexane	110-54-3	1.22E-06	4.93E-05	--	1.74E-09	--	3.92E-10	--	3.92E-10	--
Hexavalent Chromium (Cr+6)	18540-29-9	1.31E-06	5.31E-05	4.22E-02	1.58E-05	2.52E-03	1.49E-06	1.31E-03	1.49E-06	1.77E-04
Hydrochloric acid	7647-01-0	--	--	--	--	--	--	--	--	--
Hydrogen Bromide	10035-10-6	--	--	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	193-39-5	--	--	--	--	--	--	--	--	--
Lead and compounds	7439-92-1	4.68E-07	1.90E-05	--	3.12E-06	--	7.09E-07	--	7.09E-07	1.26E-04
Manganese and compounds	7439-96-5	3.55E-07	1.44E-05	--	3.95E-06	--	8.89E-07	--	8.89E-07	4.81E-05
Mercury and compounds	7439-97-6	2.43E-07	9.86E-06	--	3.16E-06	--	3.86E-07	--	3.86E-07	1.64E-05
Methylene Chloride	75-09-2	--	--	--	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	1.54E-06	6.26E-05	--	--	--	--	--	--	--
Naphthalene	91-20-3	2.81E-07	1.14E-05	9.68E-06	7.58E-08	3.69E-07	1.75E-08	8.02E-07	1.75E-08	5.69E-08
Nickel and compounds	7440-02-0	1.96E-06	7.97E-05	5.17E-04	1.40E-04	1.96E-05	3.17E-05	4.27E-05	3.17E-05	3.98E-04
o-Xylene	95-47-6	--	--	--	--	--	--	--	--	--
Pentachlorophenol (CCC)	87-86-5	--	--	--	--	--	--	--	--	--
Perylene	198-55-0	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	--	--	--	--	--	--	--	--	--
Phosphorous and compounds	504	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	--	--	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	2.25E-08	9.10E-07	--	--	--	--	--	--	4.55E-07
Silver	7440-22-4	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	--	--	--	--	--	--	--	--	--
Thallium	7440-28-0	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	7.30E-06	2.96E-04	--	1.46E-09	--	3.32E-10	--	3.32E-10	3.95E-08
Total PAHs (excluding Naphthalene)	401	9.35E-08	3.79E-06	2.18E-03	--	5.85E-05	--	3.12E-05	--	--
Total PCBs	1336-36-3	--	--	--	--	--	--	--	--	--
Total PCB TEQ	645	--	--	--	--	--	--	--	--	--
Total PCDD and PCDF	646	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	542-75-6	--	--	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	2.15E-06	8.73E-05	--	2.15E-05	--	4.89E-06	--	4.89E-06	1.09E-04
Vinyl Chloride	75-01-4	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	5.43E-06	2.20E-04	--	2.47E-08	--	5.59E-09	--	5.59E-09	2.53E-08
Zinc and compounds	7440-66-6	2.71E-05	1.10E-03	--	--	--	--	--	--	--
TOTAL REER for Municipal Waste Combustor 2 - Startup (g/s per µg/m <sup>3</sup> )		1.7E-02	6.9E-01	5.5E-02	1.5E-03	2.8E-03	1.5E-04	1.8E-03	1.5E-04	2.9E-03

**Table C-6. REER for Emergency Fire Pump**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						Acute Non-cancer
				Residential Chronic		Non-residential Chronic				
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer	Worker Non-cancer	
1,1,1-Trichloroethane	71-55-6	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	--	--	--	--	--	--
1,1,1,2-Tetrachloroethane	630-20-6	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-Chloropropane	96-12-8	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	--	--	--	--
1,3-Butadiene	106-99-0	3.25E-06	2.85E-04	9.85E-05	1.63E-06	3.78E-06	3.70E-07	8.13E-06	3.70E-07	4.32E-07
1,3-Dichlorobenzene	541-73-1	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	--	--	--
2-Methyl naphthalene	91-57-6	--	--	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	1.17E-05	1.03E-03	2.60E-05	8.37E-08	9.76E-07	1.89E-08	2.13E-06	1.89E-08	2.18E-06
Acenaphthylene	208-96-8	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	--	--	--	--	--	--	--	--	--
Acrolein	107-02-8	5.07E-07	4.44E-05	--	1.45E-06	--	3.38E-07	--	3.38E-07	6.44E-06
Aluminum	7429-90-5	--	--	--	--	--	--	--	--	--
Ammonia	7664-41-7	4.34E-05	3.80E-03	--	8.68E-08	--	1.97E-08	--	1.97E-08	3.17E-06
Anthracene	120-12-7	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	--	--	--	--	--	--	--	--	--
Arsenic and compounds	7440-38-2	2.39E-08	2.10E-06	9.97E-04	1.41E-04	1.84E-05	9.97E-06	3.86E-05	9.97E-06	1.05E-05
Barium and compounds	7440-39-3	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	2.79E-06	2.44E-04	2.14E-05	9.29E-07	8.44E-07	2.14E-07	1.86E-06	2.14E-07	8.42E-06
Benz[a]anthracene	56-55-3	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	5.31E-10	4.65E-08	1.23E-05	2.66E-07	3.32E-07	6.03E-08	1.77E-07	6.03E-08	2.33E-05
Benzo[b]fluoranthene	205-99-2	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	207-08-9	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

Benzo[e]pyrene	192-97-2	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	--	--	--	--	--	--	--	--	--
Beryllium and compounds	7440-41-7	--	--	--	--	--	--	--	--	--
Bromine	7726-95-6	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	--	--	--	--	--	--	--	--	--
Cadmium and compounds	7440-43-9	2.24E-08	1.97E-06	4.01E-05	4.49E-06	1.60E-06	6.06E-07	3.35E-06	6.06E-07	6.55E-05
Carbon Disulfide	75-15-0	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	--	--	--	--	--	--	--	--	--
Chlorine	7782-50-5	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	124-48-1	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	--	--	--	--	--	--	--	--	--
Cobalt and compounds	7440-48-4	--	--	--	--	--	--	--	--	--
Copper and compounds	7440-50-8	6.13E-08	5.37E-06	--	--	--	--	--	--	5.37E-08
Dibenz[a,h]anthracene	53-70-3	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	--	--	--	--	--	--	--	--	--
Diesel Particulate Matter	200	5.01E-04	4.39E-02	5.01E-03	1.00E-04	1.93E-04	2.28E-05	4.18E-04	2.28E-05	--
Ethylbenzene	100-41-4	1.63E-07	1.43E-05	4.08E-07	6.27E-10	1.63E-08	1.48E-10	3.40E-08	1.48E-10	6.49E-10
Formaldehyde	50-00-0	2.58E-05	2.26E-03	1.52E-04	2.87E-06	6.00E-06	6.46E-07	1.29E-05	6.46E-07	4.62E-05
Fluoranthene	206-44-0	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	--	--	--	--	--	--	--	--	--
Hexane	110-54-3	4.02E-07	3.52E-05	--	5.75E-10	--	1.30E-10	--	1.30E-10	--
Hexavalent Chromium (Cr+6)	18540-29-9	1.50E-09	1.31E-07	4.83E-05	1.80E-08	2.88E-06	1.70E-09	1.50E-06	1.70E-09	4.37E-07
Hydrochloric acid	7647-01-0	2.79E-06	2.44E-04	--	1.39E-07	--	3.17E-08	--	3.17E-08	1.16E-07
Hydrogen Bromide	10035-10-6	--	--	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	193-39-5	--	--	--	--	--	--	--	--	--
Lead and compounds	7439-92-1	1.24E-07	1.09E-05	--	8.28E-07	--	1.88E-07	--	1.88E-07	7.25E-05
Manganese and compounds	7439-96-5	4.64E-08	4.06E-06	--	5.15E-07	--	1.16E-07	--	1.16E-07	1.35E-05
Mercury and compounds	7439-97-6	2.99E-08	2.62E-06	--	3.89E-07	--	4.75E-08	--	4.75E-08	4.37E-06
Methylene Chloride	75-09-2	--	--	--	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	2.95E-07	2.58E-05	1.02E-05	7.96E-08	3.88E-07	1.84E-08	8.42E-07	1.84E-08	1.29E-07
Nickel and compounds	7440-02-0	5.83E-08	5.11E-06	1.54E-05	4.17E-06	5.83E-07	9.41E-07	1.27E-06	9.41E-07	2.56E-05
o-Xylene	95-47-6	--	--	--	--	--	--	--	--	--
Pentachlorophenol (CCC)	87-86-5	--	--	--	--	--	--	--	--	--
Perylene	198-55-0	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	--	--	--	--	--	--	--	--	--
Phosphorous and compounds	504	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	--	--	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	3.29E-08	2.88E-06	--	--	--	--	--	--	1.44E-06
Silver	7440-22-4	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Actual Emissions**

Tetrachloroethene	127-18-4	--	--	--	--	--	--	--	--	--
Thallium	7440-28-0	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	1.58E-06	1.38E-04	--	3.15E-10	--	7.17E-11	--	7.17E-11	1.84E-08
Total PAHs (excluding Naphthalene)	401	5.42E-07	4.74E-05	1.26E-02	--	3.38E-04	--	1.81E-04	--	--
Total PCBs	1336-36-3	--	--	--	--	--	--	--	--	--
Total PCB TEQ	645	--	--	--	--	--	--	--	--	--
Total PCDD and PCDF	646	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	542-75-6	--	--	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	--	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	--	--	--	--	--	--	--	--	--
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	6.34E-07	5.56E-05	--	2.88E-09	--	6.54E-10	--	6.54E-10	6.39E-09
Zinc and compounds	7440-66-6	--	--	--	--	--	--	--	--	--
TOTAL REER for Emergency Fire Pump (g/s per µg/m <sup>3</sup> )		6.0E-04	5.2E-02	1.9E-02	2.6E-04	5.7E-04	3.6E-05	6.7E-04	3.6E-05	2.8E-04

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

**Table C-7. Risk Based Concentrations**

Pollutant	CAS	Toxic Pollutant Included in DEQ List? <sup>1</sup>	Toxic Pollutant Has RBC? <sup>1</sup>	Risk-Based Concentrations <sup>2,3</sup> (µg/m <sup>3</sup> )						
				Residential Chronic		Non-residential Chronic			Acute Non-cancer	
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer		Worker Non-cancer
1,1,1-Trichloroethane	71-55-6	Yes	Yes	--	5000	--	22000	--	22000	11000
1,1,2,2-Tetrachloroethane	79-34-5	Yes	Yes	0.017	--	0.45	--	0.21	--	--
1,1,1,2-Tetrachloroethane	630-20-6	Yes	Yes	0.14	--	3.5	--	1.6	--	--
1,1,2-Trichloroethane	79-00-5	Yes	Yes	0.063	--	1.6	--	0.75	--	--
1,1-Dichloroethane	75-34-3	Yes	Yes	0.63	--	16	--	7.5	--	--
1,1-Dichloroethene	75-35-4	Yes	Yes	--	200	--	880	--	880	200
1,2,3-Trichloropropane	96-18-4	Yes	Yes	--	0.3	--	1.3	--	1.3	1.8
1,2,4-Trichlorobenzene	120-82-1	Yes	No	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	Yes	Yes	0.05	--	1.3	--	0.6	--	--
1,2,4-Trimethylbenzene	95-63-6	Yes	Yes	--	60	--	260	--	260	--
1,2-Dibromo-3-Chloropropane	96-12-8	Yes	Yes	0.000098	0.2	0.001	0.88	0.002	0.88	1.9
1,2-Dibromoethane	106-93-4	Yes	Yes	0.0017	9	0.043	40	0.02	40	--
1,2-Dichlorobenzene	95-50-1	Yes	No	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	Yes	Yes	0.038	7	1	31	0.46	31	--
1,2-Dichloropropane	78-87-5	Yes	Yes	--	4	--	18	--	18	230
1,3,5-Trimethylbenzene	108-67-8	Yes	Yes	--	60	--	260	--	260	--
1,3-Butadiene	106-99-0	Yes	Yes	0.033	2	0.86	8.8	0.4	8.8	660
1,3-Dichlorobenzene	541-73-1	Yes	No	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	Yes	Yes	0.091	60	2.4	260	1.1	260	12000
2,3,4,6-Tetrachlorophenol	58-90-2	Yes	No	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	Yes	No	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	Yes	No	--	--	--	--	--	--	--
2-Butanone	78-93-3	Yes	Yes	--	5000	--	22000	--	22000	5000
2-Chlorophenol	95-57-8	Yes	No	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	Yes	Yes	--	3000	--	13000	--	13000	--
2-Methyl naphthalene	91-57-6	Yes	No	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	Yes	Yes	0.45	140	12	620	5.5	620	470
Acenaphthylene	208-96-8	Yes	No	--	--	--	--	--	--	--
Acenaphthene	83-32-9	Yes	No	--	--	--	--	--	--	--
Acetone	67-64-1	Yes	Yes	--	31000	--	140000	--	140000	62000
Acrolein	107-02-8	Yes	Yes	--	0.35	--	1.5	--	1.5	6.9
Aluminum	7429-90-5	Yes	Yes	--	5	--	22	--	22	--
Ammonia	7664-41-7	Yes	Yes	--	500	--	2200	--	2200	1200
Anthracene	120-12-7	Yes	No	--	--	--	--	--	--	--
Antimony	7440-36-0	Yes	Yes	--	0.3	--	1.3	--	1.3	1
Arsenic and compounds	7440-38-2	Yes	Yes	0.000024	0.00017	0.0013	0.0024	0.00062	0.0024	0.2
Barium and compounds	7440-39-3	Yes	No	--	--	--	--	--	--	--
Benzene	71-43-2	Yes	Yes	0.13	3	3.3	13	1.5	13	29
Benz[a]anthracene	56-55-3	Yes	Yes	0.00021	--	0.0078	--	0.015	--	--
Benzo(a)pyrene	50-32-8	Yes	Yes	0.000043	0.002	0.0016	0.0088	0.003	0.0088	0.002
Benzo[b]fluoranthene	205-99-2	Yes	Yes	0.000053	--	0.002	--	0.0038	--	--
Benzo[k]fluoranthene	207-08-9	Yes	Yes	0.0014	--	0.052	--	0.1	--	--
Benzo[e]pyrene	192-97-2	Yes	No	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	Yes	Yes	0.0047	--	0.17	--	0.34	--	--
Beryllium and compounds	7440-41-7	Yes	Yes	0.00042	0.007	0.011	0.031	0.005	0.031	0.02
Bromine	7726-95-6	Yes	No	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	Yes	No	--	--	--	--	--	--	--
Bromoform	75-25-2	Yes	Yes	0.91	--	24	--	11	--	--
Bromomethane	74-83-9	Yes	Yes	--	5	--	22	--	22	3900
Cadmium and compounds	7440-43-9	Yes	Yes	0.00056	0.005	0.014	0.037	0.0067	0.037	0.03
Carbon Disulfide	75-15-0	Yes	Yes	--	800	--	3500	--	3500	6200
Carbon Tetrachloride	56-23-5	Yes	Yes	0.17	100	4.3	440	2	440	1900
Chlorine	7782-50-5	Yes	Yes	--	0.15	--	0.66	--	0.66	170
Chlorobenzene	108-90-7	Yes	Yes	--	50	--	220	--	220	--

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Chlorodibromomethane	124-48-1	Yes	No	--	--	--	--	--	--	--
Chloroethane	75-00-3	Yes	Yes	--	30000	--	130000	--	130000	40000
Chloroform	67-66-3	Yes	Yes	--	300	--	1300	--	1300	490
Chloromethane	74-87-3	Yes	Yes	--	90	--	400	--	400	1000
Chrysene	218-01-9	Yes	Yes	0.00043	--	0.016	--	0.03	--	--
Cobalt and compounds	7440-48-4	Yes	Yes	--	0.1	--	0.44	--	0.44	--
Copper and compounds	7440-50-8	Yes	Yes	--	--	--	--	--	--	100
Dibenz[a,h]anthracene	53-70-3	Yes	Yes	0.0000043	--	0.00016	--	0.0003	--	--
Dichlorodifluoromethane	75-71-8	Yes	No	--	--	--	--	--	--	--
Diesel Particulate Matter	200	Yes	Yes	0.1	5	2.6	22	1.2	22	--
Ethylbenzene	100-41-4	Yes	Yes	0.4	260	10	1100	4.8	1100	22000
Formaldehyde	50-00-0	Yes	Yes	0.17	9	4.3	40	2	40	49
Fluoranthene	206-44-0	Yes	Yes	0.00053	--	0.02	--	0.038	--	--
Fluorene	86-73-7	Yes	No	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	Yes	Yes	0.002	--	0.051	--	0.024	--	--
Hexachlorobutadiene	87-68-3	Yes	Yes	0.045	--	1.2	--	0.55	--	--
Hexane	110-54-3	Yes	Yes	--	700	--	3100	--	3100	--
Hexavalent Chromium (Cr+6)	18540-29-9	Yes	Yes	0.000031	0.083	0.00052	0.88	0.001	0.88	0.3
Hydrochloric acid	7647-01-0	Yes	Yes	--	20	--	88	--	88	2100
Hydrogen Bromide	10035-10-6	Yes	No	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	Yes	Yes	--	2.1	--	19	--	19	16
Indeno[1,2,3-cd]pyrene	193-39-5	Yes	Yes	0.00061	--	0.022	--	0.043	--	--
Lead and compounds	7439-92-1	Yes	Yes	--	0.15	--	0.66	--	0.66	0.15
Manganese and compounds	7439-96-5	Yes	Yes	--	0.09	--	0.4	--	0.4	0.3
Mercury and compounds	7439-97-6	Yes	Yes	--	0.077	--	0.63	--	0.63	0.6
Methylene Chloride	75-09-2	Yes	Yes	59	600	620	2600	1200	2600	2100
Molybdenum trioxide	1313-27-5	Yes	No	--	--	--	--	--	--	--
Naphthalene	91-20-3	Yes	Yes	0.029	3.7	0.76	16	0.35	16	200
Nickel and compounds	7440-02-0	Yes	Yes	0.0038	0.014	0.1	0.062	0.046	0.062	0.2
o-Xylene	95-47-6	Yes	Yes	--	200	--	880	--	880	8700
Pentachlorophenol (CCC)	87-86-5	Yes	Yes	0.2	--	5.1	--	2.4	--	--
Perylene	198-55-0	Yes	No	--	--	--	--	--	--	--
Phenanthrene	85-01-8	Yes	No	--	--	--	--	--	--	--
Phosphorous and compounds	504	Yes	No	--	--	--	--	--	--	--
Pyrene	129-00-0	Yes	No	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	Yes	Yes	--	--	--	--	--	--	2
Silver	7440-22-4	Yes	No	--	--	--	--	--	--	--
Styrene	100-42-5	Yes	Yes	--	1000	--	4400	--	4400	21000
Tetrachloroethene	127-18-4	Yes	Yes	3.8	41	100	180	46	180	41
Thallium	7440-28-0	Yes	No	--	--	--	--	--	--	--
Toluene	108-88-3	Yes	Yes	--	5000	--	22000	--	22000	7500
Total PAHs (excluding Naphthalene)	401	Yes	Yes	0.000043	--	0.0016	--	0.003	--	--
Total PCBs	1336-36-3	Yes	Yes	0.00053	--	0.02	--	0.0092	--	--
Total PCB TEQ	645	Yes	Yes	0.000000001	0.00000013	0.00000009	0.000026	0.00000042	0.000026	--
Total PCDD and PCDF	646	Yes	Yes	0.000000001	0.00000013	0.00000009	0.000026	0.00000042	0.000026	--
trans-1,2-Dichloroethene	156-60-5	Yes	Yes	--	--	--	--	--	--	790
trans-1,3-Dichloropropene	542-75-6	Yes	Yes	0.25	32	6.5	140	3	140	36
Trichloroethene	79-01-6	Yes	Yes	0.2	2.1	3.5	9.2	2.9	9.2	2.1
Trichlorofluoromethane	75-69-4	Yes	No	--	--	--	--	--	--	--
Vanadium	7440-62-2	Yes	Yes	--	0.1	--	0.44	--	0.44	0.8
Vinyl Chloride	75-01-4	Yes	Yes	0.11	100	0.22	440	2.7	440	1300
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	Yes	Yes	--	220	--	970	--	970	8700
Zinc and compounds	7440-66-6	Yes	No	--	--	--	--	--	--	--

<sup>1</sup> If the toxic is listed in the Risk-Based Concentrations (Table 2) in OAR Chapter 340-245-8010, then it's considered a permitted toxic.

<sup>2</sup> RBCs for benzo(a)pyrene is only listed for non-cancer risk categories because the chronic cancer risks are accounted for under PAHs. Any source emitting Benzo(a)pyrene is also emitting PAHs.

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

**Table C-8. REER for Municipal Waste Combustor 1 - Normal Operation**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						Acute Non-cancer
				Residential Chronic		Non-residential Chronic				
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer	Worker Non-cancer	
1,1,1-Trichloroethane	71-55-6	1.18E-03	1.18E-03	--	2.36E-07	--	5.36E-08	--	5.36E-08	1.07E-07
1,1,2,2-Tetrachloroethane	79-34-5	2.44E-03	2.44E-03	1.43E-01	--	5.41E-03	--	1.16E-02	--	--
1,1,1,2-Tetrachloroethane	630-20-6	5.29E-04	5.29E-04	3.78E-03	--	1.51E-04	--	3.31E-04	--	--
1,1,2-Trichloroethane	79-00-5	1.57E-03	1.57E-03	2.49E-02	--	9.79E-04	--	2.09E-03	--	--
1,1-Dichloroethane	75-34-3	7.45E-04	7.45E-04	1.18E-03	--	4.66E-05	--	9.94E-05	--	--
1,1-Dichloroethene	75-35-4	1.06E-03	1.06E-03	--	5.32E-06	--	1.21E-06	--	1.21E-06	5.32E-06
1,2,3-Trichloropropane	96-18-4	2.59E-03	2.59E-03	--	8.62E-03	--	1.99E-03	--	1.99E-03	1.44E-03
1,2,4-Trichlorobenzene	120-82-1	3.99E-03	3.99E-03	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	9.55E-05	9.55E-05	1.91E-03	--	7.35E-05	--	1.59E-04	--	--
1,2,4-Trimethylbenzene	95-63-6	1.54E-03	1.54E-03	--	2.57E-05	--	5.93E-06	--	5.93E-06	--
1,2-Dibromo-3-Chloropropane	96-12-8	2.44E-04	2.44E-04	2.49E+00	1.22E-03	2.44E-01	2.78E-04	1.22E-01	2.78E-04	1.29E-04
1,2-Dibromoethane	106-93-4	1.58E-03	1.58E-03	9.29E-01	1.75E-04	3.67E-02	3.95E-05	7.90E-02	3.95E-05	--
1,2-Dichlorobenzene	95-50-1	1.76E-03	1.76E-03	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	9.03E-04	9.03E-04	2.38E-02	1.29E-04	9.03E-04	2.91E-05	1.96E-03	2.91E-05	--
1,2-Dichloropropane	78-87-5	9.47E-04	9.47E-04	--	2.37E-04	--	5.26E-05	--	5.26E-05	4.12E-06
1,3,5-Trimethylbenzene	108-67-8	6.41E-04	6.41E-04	--	1.07E-05	--	2.47E-06	--	2.47E-06	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	1.45E-03	1.45E-03	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	1.73E-03	1.73E-03	1.91E-02	2.89E-05	7.23E-04	6.67E-06	1.58E-03	6.67E-06	1.45E-07
2,3,4,6-Tetrachlorophenol	58-90-2	1.93E-04	1.93E-04	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1.42E-04	1.42E-04	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	1.18E-04	1.18E-04	--	--	--	--	--	--	--
2-Butanone	78-93-3	1.35E-02	1.35E-02	--	2.70E-06	--	6.13E-07	--	6.13E-07	2.70E-06
2-Chlorophenol	95-57-8	6.00E-05	6.00E-05	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	8.21E-03	8.21E-03	--	2.74E-06	--	6.32E-07	--	6.32E-07	--
2-Methyl naphthalene	91-57-6	5.49E-06	5.49E-06	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	5.00E-02	5.00E-02	1.11E-01	3.57E-04	4.17E-03	8.06E-05	9.09E-03	8.06E-05	1.06E-04
Acenaphthylene	208-96-8	9.56E-07	9.56E-07	--	--	--	--	--	--	--
Acenaphthene	83-32-9	9.56E-07	9.56E-07	--	--	--	--	--	--	--
Acetone	67-64-1	3.57E-02	3.57E-02	--	1.15E-06	--	2.55E-07	--	2.55E-07	5.76E-07
Acrolein	107-02-8	7.47E-02	7.47E-02	--	2.13E-01	--	4.98E-02	--	4.98E-02	1.08E-02
Aluminum	7429-90-5	1.03E-01	1.03E-01	--	2.05E-02	--	4.66E-03	--	4.66E-03	--
Ammonia	7664-41-7	2.39E+00	2.39E+00	--	4.79E-03	--	1.09E-03	--	1.09E-03	1.99E-03
Anthracene	120-12-7	1.01E-06	1.01E-06	--	--	--	--	--	--	--
Antimony	7440-36-0	5.86E-03	5.86E-03	--	1.95E-02	--	4.51E-03	--	4.51E-03	5.86E-03
Arsenic and compounds	7440-38-2	1.86E-05	1.86E-05	7.73E-01	1.09E-01	1.43E-02	7.73E-03	2.99E-02	7.73E-03	9.28E-05
Barium and compounds	7440-39-3	2.37E-03	2.37E-03	--	--	--	--	--	--	--
Benzene	71-43-2	4.86E-02	4.86E-02	3.74E-01	1.62E-02	1.47E-02	3.74E-03	3.24E-02	3.74E-03	1.68E-03
Benz[a]anthracene	56-55-3	9.56E-07	9.56E-07	4.55E-03	--	1.23E-04	--	6.38E-05	--	--
Benzo(a)pyrene	50-32-8	9.56E-06	9.56E-06	2.22E-01	4.78E-03	5.98E-03	1.09E-03	3.19E-03	1.09E-03	4.78E-03
Benzo[b]fluoranthene	205-99-2	9.56E-07	9.56E-07	1.80E-02	--	4.78E-04	--	2.52E-04	--	--
Benzo[k]fluoranthene	207-08-9	9.56E-07	9.56E-07	6.83E-04	--	1.84E-05	--	9.56E-06	--	--
Benzo[e]pyrene	192-97-2	1.47E-06	1.47E-06	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	2.23E-06	2.23E-06	4.75E-04	--	1.31E-05	--	6.56E-06	--	--
Beryllium and compounds	7440-41-7	5.43E-05	5.43E-05	1.29E-01	7.75E-03	4.93E-03	1.75E-03	1.09E-02	1.75E-03	2.71E-03
Bromine	7726-95-6	2.52E-01	2.52E-01	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	3.59E-03	3.59E-03	--	--	--	--	--	--	--
Bromoform	75-25-2	7.39E-04	7.39E-04	8.12E-04	--	3.08E-05	--	6.72E-05	--	--
Bromomethane	74-83-9	1.01E-02	1.01E-02	--	2.01E-03	--	4.57E-04	--	4.57E-04	2.58E-06



**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Cadmium and compounds	7440-43-9	8.27E-05	8.27E-05	1.48E-01	1.65E-02	5.91E-03	2.24E-03	1.23E-02	2.24E-03	2.76E-03
Carbon Disulfide	75-15-0	8.52E-03	8.52E-03	--	1.07E-05	--	2.43E-06	--	2.43E-06	1.37E-06
Carbon Tetrachloride	56-23-5	5.28E-03	5.28E-03	3.10E-02	5.28E-05	1.23E-03	1.20E-05	2.64E-03	1.20E-05	2.78E-06
Chlorine	7782-50-5	3.61E-02	3.61E-02	--	2.41E-01	--	5.47E-02	--	5.47E-02	2.12E-04
Chlorobenzene	108-90-7	1.18E-03	1.18E-03	--	2.36E-05	--	5.37E-06	--	5.37E-06	--
Chlorodibromomethane	124-48-1	1.47E-03	1.47E-03	--	--	--	--	--	--	--
Chloroethane	75-00-3	2.62E-03	2.62E-03	--	8.75E-08	--	2.02E-08	--	2.02E-08	6.56E-08
Chloroform	67-66-3	8.97E-03	8.97E-03	--	2.99E-05	--	6.90E-06	--	6.90E-06	1.83E-05
Chloromethane	74-87-3	9.52E-03	9.52E-03	--	1.06E-04	--	2.38E-05	--	2.38E-05	9.52E-06
Chrysene	218-01-9	9.56E-07	9.56E-07	2.22E-03	--	5.98E-05	--	3.19E-05	--	--
Cobalt and compounds	7440-48-4	2.72E-04	2.72E-04	--	2.72E-03	--	6.18E-04	--	6.18E-04	--
Copper and compounds	7440-50-8	3.64E-03	3.64E-03	--	--	--	--	--	--	3.64E-05
Dibenz[a,h]anthracene	53-70-3	9.56E-07	9.56E-07	2.22E-01	--	5.98E-03	--	3.19E-03	--	--
Dichlorodifluoromethane	75-71-8	3.32E-03	3.32E-03	--	--	--	--	--	--	--
Diesel Particulate Matter	200	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	1.58E-03	1.58E-03	3.95E-03	6.07E-06	1.58E-04	1.44E-06	3.29E-04	1.44E-06	7.18E-08
Formaldehyde	50-00-0	7.47E-02	7.47E-02	4.39E-01	8.30E-03	1.74E-02	1.87E-03	3.73E-02	1.87E-03	1.52E-03
Fluoranthene	206-44-0	2.76E-06	2.76E-06	5.21E-03	--	1.38E-04	--	7.26E-05	--	--
Fluorene	86-73-7	1.65E-06	1.65E-06	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	1.81E-04	1.81E-04	9.07E-02	--	3.56E-03	--	7.56E-03	--	--
Hexachlorobutadiene	87-68-3	3.44E-03	3.44E-03	7.64E-02	--	2.87E-03	--	6.25E-03	--	--
Hexane	110-54-3	--	--	--	--	--	--	--	--	--
Hexavalent Chromium (Cr+6)	18540-29-9	8.18E-05	8.18E-05	2.64E+00	9.85E-04	1.57E-01	9.29E-05	8.18E-02	9.29E-05	2.73E-04
Hydrochloric acid	7647-01-0	5.41E-01	5.41E-01	--	2.70E-02	--	6.15E-03	--	6.15E-03	2.58E-04
Hydrogen Bromide	10035-10-6	3.58E-01	3.58E-01	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	3.25E-02	3.25E-02	--	1.55E-02	--	1.71E-03	--	1.71E-03	2.03E-03
Indeno[1,2,3-cd]pyrene	193-39-5	9.56E-07	9.56E-07	1.57E-03	--	4.35E-05	--	2.22E-05	--	--
Lead and compounds	7439-92-1	6.42E-03	6.42E-03	--	4.28E-02	--	9.73E-03	--	9.73E-03	4.28E-02
Manganese and compounds	7439-96-5	3.53E-03	3.53E-03	--	3.92E-02	--	8.82E-03	--	8.82E-03	1.18E-02
Mercury and compounds	7439-97-6	2.55E-03	2.55E-03	--	3.31E-02	--	4.05E-03	--	4.05E-03	4.25E-03
Methylene Chloride	75-09-2	2.47E-02	2.47E-02	4.18E-04	4.11E-05	3.98E-05	9.48E-06	2.05E-05	9.48E-06	1.17E-05
Molybdenum trioxide	1313-27-5	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	1.87E-04	1.87E-04	6.44E-03	5.05E-05	2.46E-04	1.17E-05	5.34E-04	1.17E-05	9.34E-07
Nickel and compounds	7440-02-0	1.57E-03	1.57E-03	4.13E-01	1.12E-01	1.57E-02	2.53E-02	3.41E-02	2.53E-02	7.85E-03
o-Xylene	95-47-6	1.52E-03	1.52E-03	--	7.60E-06	--	1.73E-06	--	1.73E-06	1.75E-07
Pentachlorophenol (CCC)	87-86-5	1.26E-04	1.26E-04	6.31E-04	--	2.48E-05	--	5.26E-05	--	--
Perylene	198-55-0	9.56E-07	9.56E-07	--	--	--	--	--	--	--
Phenanthrene	85-01-8	1.25E-05	1.25E-05	--	--	--	--	--	--	--
Phosphorous and compounds	504	1.68E-02	1.68E-02	--	--	--	--	--	--	--
Pyrene	129-00-0	2.62E-06	2.62E-06	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	6.26E-04	6.26E-04	--	--	--	--	--	--	3.13E-04
Silver	7440-22-4	2.02E-04	2.02E-04	--	--	--	--	--	--	--
Styrene	100-42-5	7.40E-04	7.40E-04	--	7.40E-07	--	1.68E-07	--	1.68E-07	3.53E-08
Tetrachloroethene	127-18-4	1.82E-03	1.82E-03	4.79E-04	4.44E-05	1.82E-05	1.01E-05	3.95E-05	1.01E-05	4.44E-05
Thallium	7440-28-0	1.91E-04	1.91E-04	--	--	--	--	--	--	--
Toluene	108-88-3	6.24E-03	6.24E-03	--	1.25E-06	--	2.84E-07	--	2.84E-07	8.32E-07
Total PAHs (excluding Naphthalene)	401	--	--	--	--	--	--	--	--	--
Total PCBs	1336-36-3	7.06E-06	7.06E-06	1.33E-02	--	3.53E-04	--	7.68E-04	--	--
Total PCB TEQ	645	4.74E-10	4.74E-10	4.74E-01	3.65E-03	5.27E-03	1.82E-05	1.13E-02	1.82E-05	--
Total PCDD and PCDF	646	5.61E-09	5.61E-09	5.61E+00	4.31E-02	6.23E-02	2.16E-04	1.34E-01	2.16E-04	--
trans-1,2-Dichloroethene	156-60-5	8.54E-04	8.54E-04	--	--	--	--	--	--	1.08E-06
trans-1,3-Dichloropropene	542-75-6	9.11E-04	9.11E-04	3.64E-03	2.85E-05	1.40E-04	6.50E-06	3.04E-04	6.50E-06	2.53E-05
Trichloroethene	79-01-6	1.32E-03	1.32E-03	6.61E-03	6.29E-04	3.78E-04	1.44E-04	4.56E-04	1.44E-04	6.29E-04

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Trichlorofluoromethane	75-69-4	2.08E-03	2.08E-03	--	--	--	--	--	--	--
Vanadium	7440-62-2	6.69E-03	6.69E-03	--	6.69E-02	--	1.52E-02	--	1.52E-02	8.36E-03
Vinyl Chloride	75-01-4	2.03E-03	2.03E-03	1.84E-02	2.03E-05	9.22E-03	4.61E-06	7.51E-04	4.61E-06	1.56E-06
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	3.09E-03	3.09E-03	--	1.41E-05	--	3.19E-06	--	3.19E-06	3.55E-07
Zinc and compounds	7440-66-6	1.26E-01	1.26E-01	--	--	--	--	--	--	--
TOTAL REER for Municipal Waste Combustor 1 - Normal Operation (g/s per µg/m <sup>3</sup> )		4.3E+00	4.3E+00	15.48	1.06	0.62	0.21	0.64	0.21	0.11

**Table C-9. REER for Municipal Waste Combustor 2 - Normal Operation**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						
				Residential Chronic		Non-residential Chronic			Acute Non-cancer	
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer		Worker Non-cancer
1,1,1-Trichloroethane	71-55-6	1.18E-03	1.18E-03	--	2.36E-07	--	5.36E-08	--	5.36E-08	1.07E-07
1,1,1,2-Tetrachloroethane	79-34-5	2.44E-03	2.44E-03	1.43E-01	--	5.41E-03	--	1.16E-02	--	--
1,1,1,2-Tetrachloroethane	630-20-6	5.29E-04	5.29E-04	3.78E-03	--	1.51E-04	--	3.31E-04	--	--
1,1,2-Trichloroethane	79-00-5	1.57E-03	1.57E-03	2.49E-02	--	9.79E-04	--	2.09E-03	--	--
1,1-Dichloroethane	75-34-3	7.45E-04	7.45E-04	1.18E-03	--	4.66E-05	--	9.94E-05	--	--
1,1-Dichloroethene	75-35-4	1.06E-03	1.06E-03	--	5.32E-06	--	1.21E-06	--	1.21E-06	5.32E-06
1,2,3-Trichloropropane	96-18-4	2.59E-03	2.59E-03	--	8.62E-03	--	1.99E-03	--	1.99E-03	1.44E-03
1,2,4-Trichlorobenzene	120-82-1	3.99E-03	3.99E-03	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	9.55E-05	9.55E-05	1.91E-03	--	7.35E-05	--	1.59E-04	--	--
1,2,4-Trimethylbenzene	95-63-6	1.54E-03	1.54E-03	--	2.57E-05	--	5.93E-06	--	5.93E-06	--
1,2-Dibromo-3-Chloropropane	96-12-8	2.44E-04	2.44E-04	2.49E+00	1.22E-03	2.44E-01	2.78E-04	1.22E-01	2.78E-04	1.29E-04
1,2-Dibromoethane	106-93-4	1.58E-03	1.58E-03	9.29E-01	1.75E-04	3.67E-02	3.95E-05	7.90E-02	3.95E-05	--
1,2-Dichlorobenzene	95-50-1	1.76E-03	1.76E-03	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	9.03E-04	9.03E-04	2.38E-02	1.29E-04	9.03E-04	2.91E-05	1.96E-03	2.91E-05	--
1,2-Dichloropropane	78-87-5	9.47E-04	9.47E-04	--	2.37E-04	--	5.26E-05	--	5.26E-05	4.12E-06
1,3,5-Trimethylbenzene	108-67-8	6.41E-04	6.41E-04	--	1.07E-05	--	2.47E-06	--	2.47E-06	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	1.45E-03	1.45E-03	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	1.73E-03	1.73E-03	1.91E-02	2.89E-05	7.23E-04	6.67E-06	1.58E-03	6.67E-06	1.45E-07
2,3,4,6-Tetrachlorophenol	58-90-2	1.93E-04	1.93E-04	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	1.42E-04	1.42E-04	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	1.18E-04	1.18E-04	--	--	--	--	--	--	--
2-Butanone	78-93-3	1.35E-02	1.35E-02	--	2.70E-06	--	6.13E-07	--	6.13E-07	2.70E-06
2-Chlorophenol	95-57-8	6.00E-05	6.00E-05	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	8.21E-03	8.21E-03	--	2.74E-06	--	6.32E-07	--	6.32E-07	--
2-Methyl naphthalene	91-57-6	5.49E-06	5.49E-06	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	5.00E-02	5.00E-02	1.11E-01	3.57E-04	4.17E-03	8.06E-05	9.09E-03	8.06E-05	1.06E-04
Acenaphthylene	208-96-8	9.56E-07	9.56E-07	--	--	--	--	--	--	--
Acenaphthene	83-32-9	9.56E-07	9.56E-07	--	--	--	--	--	--	--
Acetone	67-64-1	3.57E-02	3.57E-02	--	1.15E-06	--	2.55E-07	--	2.55E-07	5.76E-07
Acrolein	107-02-8	7.47E-02	7.47E-02	--	2.13E-01	--	4.98E-02	--	4.98E-02	1.08E-02
Aluminum	7429-90-5	1.03E-01	1.03E-01	--	2.05E-02	--	4.66E-03	--	4.66E-03	--
Ammonia	7664-41-7	2.39E+00	2.39E+00	--	4.79E-03	--	1.09E-03	--	1.09E-03	1.99E-03
Anthracene	120-12-7	1.01E-06	1.01E-06	--	--	--	--	--	--	--
Antimony	7440-36-0	5.86E-03	5.86E-03	--	1.95E-02	--	4.51E-03	--	4.51E-03	5.86E-03
Arsenic and compounds	7440-38-2	1.86E-05	1.86E-05	7.73E-01	1.09E-01	1.43E-02	7.73E-03	2.99E-02	7.73E-03	9.28E-05
Barium and compounds	7440-39-3	2.37E-03	2.37E-03	--	--	--	--	--	--	--
Benzene	71-43-2	4.86E-02	4.86E-02	3.74E-01	1.62E-02	1.47E-02	3.74E-03	3.24E-02	3.74E-03	1.68E-03
Benz[a]anthracene	56-55-3	9.56E-07	9.56E-07	4.55E-03	--	1.23E-04	--	6.38E-05	--	--
Benzo(a)pyrene	50-32-8	9.56E-06	9.56E-06	2.22E-01	4.78E-03	5.98E-03	1.09E-03	3.19E-03	1.09E-03	4.78E-03
Benzo[b]fluoranthene	205-99-2	9.56E-07	9.56E-07	1.80E-02	--	4.78E-04	--	2.52E-04	--	--
Benzo[k]fluoranthene	207-08-9	9.56E-07	9.56E-07	6.83E-04	--	1.84E-05	--	9.56E-06	--	--

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Benzo[e]pyrene	192-97-2	1.47E-06	1.47E-06	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	2.23E-06	2.23E-06	4.75E-04	--	1.31E-05	--	6.56E-06	--	--
Beryllium and compounds	7440-41-7	5.43E-05	5.43E-05	1.29E-01	7.75E-03	4.93E-03	1.75E-03	1.09E-02	1.75E-03	2.71E-03
Bromine	7726-95-6	2.52E-01	2.52E-01	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	3.59E-03	3.59E-03	--	--	--	--	--	--	--
Bromoform	75-25-2	7.39E-04	7.39E-04	8.12E-04	--	3.08E-05	--	6.72E-05	--	--
Bromomethane	74-83-9	1.01E-02	1.01E-02	--	2.01E-03	--	4.57E-04	--	4.57E-04	2.58E-06
Cadmium and compounds	7440-43-9	8.27E-05	8.27E-05	1.48E-01	1.65E-02	5.91E-03	2.24E-03	1.23E-02	2.24E-03	2.76E-03
Carbon Disulfide	75-15-0	8.52E-03	8.52E-03	--	1.07E-05	--	2.43E-06	--	2.43E-06	1.37E-06
Carbon Tetrachloride	56-23-5	5.28E-03	5.28E-03	3.10E-02	5.28E-05	1.23E-03	1.20E-05	2.64E-03	1.20E-05	2.78E-06
Chlorine	7782-50-5	3.61E-02	3.61E-02	--	2.41E-01	--	5.47E-02	--	5.47E-02	2.12E-04
Chlorobenzene	108-90-7	1.18E-03	1.18E-03	--	2.36E-05	--	5.37E-06	--	5.37E-06	--
Chlorodibromomethane	124-48-1	1.47E-03	1.47E-03	--	--	--	--	--	--	--
Chloroethane	75-00-3	2.62E-03	2.62E-03	--	8.75E-08	--	2.02E-08	--	2.02E-08	6.56E-08
Chloroform	67-66-3	8.97E-03	8.97E-03	--	2.99E-05	--	6.90E-06	--	6.90E-06	1.83E-05
Chloromethane	74-87-3	9.52E-03	9.52E-03	--	1.06E-04	--	2.38E-05	--	2.38E-05	9.52E-06
Chrysene	218-01-9	9.56E-07	9.56E-07	2.22E-03	--	5.98E-05	--	3.19E-05	--	--
Cobalt and compounds	7440-48-4	2.72E-04	2.72E-04	--	2.72E-03	--	6.18E-04	--	6.18E-04	--
Copper and compounds	7440-50-8	3.64E-03	3.64E-03	--	--	--	--	--	--	3.64E-05
Dibenz[a,h]anthracene	53-70-3	9.56E-07	9.56E-07	2.22E-01	--	5.98E-03	--	3.19E-03	--	--
Dichlorodifluoromethane	75-71-8	3.32E-03	3.32E-03	--	--	--	--	--	--	--
Diesel Particulate Matter	200	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	1.58E-03	1.58E-03	3.95E-03	6.07E-06	1.58E-04	1.44E-06	3.29E-04	1.44E-06	7.18E-08
Formaldehyde	50-00-0	7.47E-02	7.47E-02	4.39E-01	8.30E-03	1.74E-02	1.87E-03	3.73E-02	1.87E-03	1.52E-03
Fluoranthene	206-44-0	2.76E-06	2.76E-06	5.21E-03	--	1.38E-04	--	7.26E-05	--	--
Fluorene	86-73-7	1.65E-06	1.65E-06	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	1.81E-04	1.81E-04	9.07E-02	--	3.56E-03	--	7.56E-03	--	--
Hexachlorobutadiene	87-68-3	3.44E-03	3.44E-03	7.64E-02	--	2.87E-03	--	6.25E-03	--	--
Hexane	110-54-3	--	--	--	--	--	--	--	--	--
Hexavalent Chromium (Cr+6)	18540-29-9	8.18E-05	8.18E-05	2.64E+00	9.85E-04	1.57E-01	9.29E-05	8.18E-02	9.29E-05	2.73E-04
Hydrochloric acid	7647-01-0	5.41E-01	5.41E-01	--	2.70E-02	--	6.15E-03	--	6.15E-03	2.58E-04
Hydrogen Bromide	10035-10-6	3.58E-01	3.58E-01	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	3.25E-02	3.25E-02	--	1.55E-02	--	1.71E-03	--	1.71E-03	2.03E-03
Indeno[1,2,3-cd]pyrene	193-39-5	9.56E-07	9.56E-07	1.57E-03	--	4.35E-05	--	2.22E-05	--	--
Lead and compounds	7439-92-1	6.42E-03	6.42E-03	--	4.28E-02	--	9.73E-03	--	9.73E-03	4.28E-02
Manganese and compounds	7439-96-5	3.53E-03	3.53E-03	--	3.92E-02	--	8.82E-03	--	8.82E-03	1.18E-02
Mercury and compounds	7439-97-6	2.55E-03	2.55E-03	--	3.31E-02	--	4.05E-03	--	4.05E-03	4.25E-03
Methylene Chloride	75-09-2	2.47E-02	2.47E-02	4.18E-04	4.11E-05	3.98E-05	9.48E-06	2.05E-05	9.48E-06	1.17E-05
Molybdenum trioxide	1313-27-5	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	1.87E-04	1.87E-04	6.44E-03	5.05E-05	2.46E-04	1.17E-05	5.34E-04	1.17E-05	9.34E-07
Nickel and compounds	7440-02-0	1.57E-03	1.57E-03	4.13E-01	1.12E-01	1.57E-02	2.53E-02	3.41E-02	2.53E-02	7.85E-03
o-Xylene	95-47-6	1.52E-03	1.52E-03	--	7.60E-06	--	1.73E-06	--	1.73E-06	1.75E-07
Pentachlorophenol (CCC)	87-86-5	1.26E-04	1.26E-04	6.31E-04	--	2.48E-05	--	5.26E-05	--	--
Perylene	198-55-0	9.56E-07	9.56E-07	--	--	--	--	--	--	--
Phenanthrene	85-01-8	1.25E-05	1.25E-05	--	--	--	--	--	--	--
Phosphorous and compounds	504	1.68E-02	1.68E-02	--	--	--	--	--	--	--
Pyrene	129-00-0	2.62E-06	2.62E-06	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	6.26E-04	6.26E-04	--	--	--	--	--	--	3.13E-04
Silver	7440-22-4	2.02E-04	2.02E-04	--	--	--	--	--	--	--
Styrene	100-42-5	7.40E-04	7.40E-04	--	7.40E-07	--	1.68E-07	--	1.68E-07	3.53E-08
Tetrachloroethene	127-18-4	1.82E-03	1.82E-03	4.79E-04	4.44E-05	1.82E-05	1.01E-05	3.95E-05	1.01E-05	4.44E-05
Thallium	7440-28-0	1.91E-04	1.91E-04	--	--	--	--	--	--	--
Toluene	108-88-3	6.24E-03	6.24E-03	--	1.25E-06	--	2.84E-07	--	2.84E-07	8.32E-07

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Total PAHs (excluding Naphthalene)	401	--	--	--	--	--	--	--	--	--
Total PCBs	1336-36-3	7.06E-06	7.06E-06	1.33E-02	--	3.53E-04	--	7.68E-04	--	--
Total PCB TEQ	645	4.74E-10	4.74E-10	4.74E-01	3.65E-03	5.27E-03	1.82E-05	1.13E-02	1.82E-05	--
Total PCDD and PCDF	646	5.61E-09	5.61E-09	5.61E+00	4.31E-02	6.23E-02	2.16E-04	1.34E-01	2.16E-04	--
trans-1,2-Dichloroethene	156-60-5	8.54E-04	8.54E-04	--	--	--	--	--	--	1.08E-06
trans-1,3-Dichloropropene	542-75-6	9.11E-04	9.11E-04	3.64E-03	2.85E-05	1.40E-04	6.50E-06	3.04E-04	6.50E-06	2.53E-05
Trichloroethene	79-01-6	1.32E-03	1.32E-03	6.61E-03	6.29E-04	3.78E-04	1.44E-04	4.56E-04	1.44E-04	6.29E-04
Trichlorofluoromethane	75-69-4	2.08E-03	2.08E-03	--	--	--	--	--	--	--
Vanadium	7440-62-2	6.69E-03	6.69E-03	--	6.69E-02	--	1.52E-02	--	1.52E-02	8.36E-03
Vinyl Chloride	75-01-4	2.03E-03	2.03E-03	1.84E-02	2.03E-05	9.22E-03	4.61E-06	7.51E-04	4.61E-06	1.56E-06
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	3.09E-03	3.09E-03	--	1.41E-05	--	3.19E-06	--	3.19E-06	3.55E-07
Zinc and compounds	7440-66-6	1.26E-01	1.26E-01	--	--	--	--	--	--	--
TOTAL REER for Municipal Waste Combustor 2 - Normal Operation (g/s per µg/m <sup>3</sup> )		4.33	4.33	15.48	1.06	0.62	0.21	0.64	0.21	0.11

**Table C-10. REER for Municipal Waste Combustor 1 - Startup Operation**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						
				Residential Chronic		Non-residential Chronic			Acute Non-cancer	
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer		Worker Non-cancer
1,1,1-Trichloroethane	71-55-6	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	--	--	--	--	--	--
1,1,1,2-Tetrachloroethane	630-20-6	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-Chloropropane	96-12-8	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	--	--	--
2-Methyl naphthalene	91-57-6	--	--	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	8.42E-07	1.19E-05	1.87E-06	6.01E-09	7.02E-08	1.36E-09	1.53E-07	1.36E-09	2.52E-08
Acenaphthylene	208-96-8	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	--	--	--	--	--	--	--	--	--
Acrolein	107-02-8	7.48E-07	1.05E-05	--	2.14E-06	--	4.99E-07	--	4.99E-07	1.53E-06
Aluminum	7429-90-5	--	--	--	--	--	--	--	--	--
Ammonia	7664-41-7	1.68E-02	2.37E-01	--	3.37E-05	--	7.65E-06	--	7.65E-06	1.98E-04
Anthracene	120-12-7	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Arsenic and compounds	7440-38-2	1.87E-07	2.63E-06	7.80E-03	1.10E-03	1.44E-04	7.80E-05	3.02E-04	7.80E-05	1.32E-05
Barium and compounds	7440-39-3	4.12E-06	5.80E-05	--	--	--	--	--	--	--
Benzene	71-43-2	1.59E-06	2.24E-05	1.22E-05	5.30E-07	4.82E-07	1.22E-07	1.06E-06	1.22E-07	7.72E-07
Benz[a]anthracene	56-55-3	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	1.12E-09	1.58E-08	2.61E-05	5.61E-07	7.02E-07	1.28E-07	3.74E-07	1.28E-07	7.90E-06
Benzo[b]fluoranthene	205-99-2	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	207-08-9	--	--	--	--	--	--	--	--	--
Benzo[e]pyrene	192-97-2	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	--	--	--	--	--	--	--	--	--
Beryllium and compounds	7440-41-7	1.12E-08	1.58E-07	2.67E-05	1.60E-06	1.02E-06	3.62E-07	2.25E-06	3.62E-07	7.90E-06
Bromine	7726-95-6	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	--	--	--	--	--	--	--	--	--
Cadmium and compounds	7440-43-9	1.03E-06	1.45E-05	1.84E-03	2.06E-04	7.35E-05	2.78E-05	1.54E-04	2.78E-05	4.83E-04
Carbon Disulfide	75-15-0	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	--	--	--	--	--	--	--	--	--
Chlorine	7782-50-5	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	124-48-1	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	--	--	--	--	--	--	--	--	--
Cobalt and compounds	7440-48-4	7.86E-08	1.11E-06	--	7.86E-07	--	1.79E-07	--	1.79E-07	--
Copper and compounds	7440-50-8	7.95E-07	1.12E-05	--	--	--	--	--	--	1.12E-07
Dibenz[a,h]anthracene	53-70-3	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	--	--	--	--	--	--	--	--	--
Diesel Particulate Matter	200	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	1.87E-06	2.63E-05	4.68E-06	7.20E-09	1.87E-07	1.70E-09	3.90E-07	1.70E-09	1.20E-09
Formaldehyde	50-00-0	3.37E-06	4.74E-05	1.98E-05	3.74E-07	7.83E-07	8.42E-08	1.68E-06	8.42E-08	9.68E-07
Fluoranthene	206-44-0	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	--	--	--	--	--	--	--	--	--
Hexane	110-54-3	1.22E-06	1.71E-05	--	1.74E-09	--	3.92E-10	--	3.92E-10	--
Hexavalent Chromium (Cr+6)	18540-29-9	1.31E-06	1.84E-05	4.22E-02	1.58E-05	2.52E-03	1.49E-06	1.31E-03	1.49E-06	6.15E-05
Hydrochloric acid	7647-01-0	--	--	--	--	--	--	--	--	--
Hydrogen Bromide	10035-10-6	--	--	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	193-39-5	--	--	--	--	--	--	--	--	--
Lead and compounds	7439-92-1	4.68E-07	6.59E-06	--	3.12E-06	--	7.09E-07	--	7.09E-07	4.39E-05
Manganese and compounds	7439-96-5	3.55E-07	5.01E-06	--	3.95E-06	--	8.89E-07	--	8.89E-07	1.67E-05
Mercury and compounds	7439-97-6	2.43E-07	3.42E-06	--	3.16E-06	--	3.86E-07	--	3.86E-07	5.71E-06
Methylene Chloride	75-09-2	--	--	--	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	1.54E-06	2.17E-05	--	--	--	--	--	--	--
Naphthalene	91-20-3	2.81E-07	3.95E-06	9.68E-06	7.58E-08	3.69E-07	1.75E-08	8.02E-07	1.75E-08	1.98E-08
Nickel and compounds	7440-02-0	1.96E-06	2.77E-05	5.17E-04	1.40E-04	1.96E-05	3.17E-05	4.27E-05	3.17E-05	1.38E-04
o-Xylene	95-47-6	--	--	--	--	--	--	--	--	--
Pentachlorophenol (CCC)	87-86-5	--	--	--	--	--	--	--	--	--
Perylene	198-55-0	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	--	--	--	--	--	--	--	--	--
Phosphorous and compounds	504	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Pyrene	129-00-0	--	--	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	2.25E-08	3.16E-07	--	--	--	--	--	--	1.58E-07
Silver	7440-22-4	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	--	--	--	--	--	--	--	--	--
Thallium	7440-28-0	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	7.30E-06	1.03E-04	--	1.46E-09	--	3.32E-10	--	3.32E-10	1.37E-08
Total PAHs (excluding Naphthalene)	401	--	--	--	--	--	--	--	--	--
Total PCBs	1336-36-3	--	--	--	--	--	--	--	--	--
Total PCB TEQ	645	--	--	--	--	--	--	--	--	--
Total PCDD and PCDF	646	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	542-75-6	--	--	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	2.15E-06	3.03E-05	--	2.15E-05	--	4.89E-06	--	4.89E-06	3.79E-05
Vinyl Chloride	75-01-4	--	--	--	--	--	--	--	--	--
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	5.43E-06	7.64E-05	--	2.47E-08	--	5.59E-09	--	5.59E-09	8.78E-09
Zinc and compounds	7440-66-6	2.71E-05	3.82E-04	--	--	--	--	--	--	--
TOTAL REER for Municipal Waste Combustor 1 - Startup Operation (g/s per µg/m <sup>3</sup> )		1.7E-02	2.4E-01	5.2E-02	1.5E-03	2.8E-03	1.5E-04	1.8E-03	1.5E-04	1.0E-03

**Table C-11. REER for Municipal Waste Combustor 2 - Startup Operation**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						Acute Non-cancer
				Residential Chronic		Non-residential Chronic				
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer	Worker Non-cancer	
1,1,1-Trichloroethane	71-55-6	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	--	--	--	--	--	--
1,1,1,2-Tetrachloroethane	630-20-6	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-Chloropropane	96-12-8	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	--	--	--	--
1,3-Butadiene	106-99-0	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	541-73-1	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	120-83-2	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	--	--	--
2-Methyl naphthalene	91-57-6	--	--	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	8.42E-07	1.19E-05	1.87E-06	6.01E-09	7.02E-08	1.36E-09	1.53E-07	1.36E-09	2.52E-08
Acenaphthylene	208-96-8	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Acenaphthene	83-32-9	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	--	--	--	--	--	--	--	--	--
Acrolein	107-02-8	7.48E-07	1.05E-05	--	2.14E-06	--	4.99E-07	--	4.99E-07	1.53E-06
Aluminum	7429-90-5	--	--	--	--	--	--	--	--	--
Ammonia	7664-41-7	1.68E-02	2.37E-01	--	3.37E-05	--	7.65E-06	--	7.65E-06	1.98E-04
Anthracene	120-12-7	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	--	--	--	--	--	--	--	--	--
Arsenic and compounds	7440-38-2	1.87E-07	2.63E-06	7.80E-03	1.10E-03	1.44E-04	7.80E-05	3.02E-04	7.80E-05	1.32E-05
Barium and compounds	7440-39-3	4.12E-06	5.80E-05	--	--	--	--	--	--	--
Benzene	71-43-2	1.59E-06	2.24E-05	1.22E-05	5.30E-07	4.82E-07	1.22E-07	1.06E-06	1.22E-07	7.72E-07
Benzo[a]anthracene	56-55-3	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	1.12E-09	1.58E-08	2.61E-05	5.61E-07	7.02E-07	1.28E-07	3.74E-07	1.28E-07	7.90E-06
Benzo[b]fluoranthene	205-99-2	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	207-08-9	--	--	--	--	--	--	--	--	--
Benzo[e]pyrene	192-97-2	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	--	--	--	--	--	--	--	--	--
Beryllium and compounds	7440-41-7	1.12E-08	1.58E-07	2.67E-05	1.60E-06	1.02E-06	3.62E-07	2.25E-06	3.62E-07	7.90E-06
Bromine	7726-95-6	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	--	--	--	--	--	--	--	--	--
Cadmium and compounds	7440-43-9	1.03E-06	1.45E-05	1.84E-03	2.06E-04	7.35E-05	2.78E-05	1.54E-04	2.78E-05	4.83E-04
Carbon Disulfide	75-15-0	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	--	--	--	--	--	--	--	--	--
Chlorine	7782-50-5	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	124-48-1	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	--	--	--	--	--	--	--	--	--
Cobalt and compounds	7440-48-4	7.86E-08	1.11E-06	--	7.86E-07	--	1.79E-07	--	1.79E-07	--
Copper and compounds	7440-50-8	7.95E-07	1.12E-05	--	--	--	--	--	--	1.12E-07
Dibenz[a,h]anthracene	53-70-3	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	--	--	--	--	--	--	--	--	--
Diesel Particulate Matter	200	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	1.87E-06	2.63E-05	4.68E-06	7.20E-09	1.87E-07	1.70E-09	3.90E-07	1.70E-09	1.20E-09
Formaldehyde	50-00-0	3.37E-06	4.74E-05	1.98E-05	3.74E-07	7.83E-07	8.42E-08	1.68E-06	8.42E-08	9.68E-07
Fluoranthene	206-44-0	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	--	--	--	--	--	--	--	--	--
Hexane	110-54-3	1.22E-06	1.71E-05	--	1.74E-09	--	3.92E-10	--	3.92E-10	--
Hexavalent Chromium (Cr+6)	18540-29-9	1.31E-06	1.84E-05	4.22E-02	1.58E-05	2.52E-03	1.49E-06	1.31E-03	1.49E-06	6.15E-05
Hydrochloric acid	7647-01-0	--	--	--	--	--	--	--	--	--
Hydrogen Bromide	10035-10-6	--	--	--	--	--	--	--	--	--
Hydrogen Fluoride	7664-39-3	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	193-39-5	--	--	--	--	--	--	--	--	--
Lead and compounds	7439-92-1	4.68E-07	6.59E-06	--	3.12E-06	--	7.09E-07	--	7.09E-07	4.39E-05
Manganese and compounds	7439-96-5	3.55E-07	5.01E-06	--	3.95E-06	--	8.89E-07	--	8.89E-07	1.67E-05
Mercury and compounds	7439-97-6	2.43E-07	3.42E-06	--	3.16E-06	--	3.86E-07	--	3.86E-07	5.71E-06
Methylene Chloride	75-09-2	--	--	--	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	1.54E-06	2.17E-05	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Naphthalene	91-20-3	2.81E-07	3.95E-06	9.68E-06	7.58E-08	3.69E-07	1.75E-08	8.02E-07	1.75E-08	1.98E-08
Nickel and compounds	7440-02-0	1.96E-06	2.77E-05	5.17E-04	1.40E-04	1.96E-05	3.17E-05	4.27E-05	3.17E-05	1.38E-04
o-Xylene	95-47-6	--	--	--	--	--	--	--	--	--
Pentachlorophenol (CCC)	87-86-5	--	--	--	--	--	--	--	--	--
Perylene	198-55-0	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	--	--	--	--	--	--	--	--	--
Phosphorous and compounds	504	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	--	--	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	2.25E-08	3.16E-07	--	--	--	--	--	--	1.58E-07
Silver	7440-22-4	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	--	--	--	--	--	--	--	--	--
Thallium	7440-28-0	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	7.30E-06	1.03E-04	--	1.46E-09	--	3.32E-10	--	3.32E-10	1.37E-08
Total PAHs (excluding Naphthalene)	401	9.35E-08	1.32E-06	2.18E-03	--	5.85E-05	--	3.12E-05	--	--
Total PCBs	1336-36-3	--	--	--	--	--	--	--	--	--
Total PCB TEQ	645	--	--	--	--	--	--	--	--	--
Total PCDD and PCDF	646	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	542-75-6	--	--	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	2.15E-06	3.03E-05	--	2.15E-05	--	4.89E-06	--	4.89E-06	3.79E-05
Vinyl Chloride	75-01-4	--	--	--	--	--	--	--	--	--
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	5.43E-06	7.64E-05	--	2.47E-08	--	5.59E-09	--	5.59E-09	8.78E-09
Zinc and compounds	7440-66-6	2.71E-05	3.82E-04	--	--	--	--	--	--	--
TOTAL REER for Municipal Waste Combustor 2 - Startup Operation (g/s per µg/m <sup>3</sup> )		1.7E-02	2.4E-01	5.5E-02	1.5E-03	2.8E-03	1.5E-04	1.8E-03	1.5E-04	1.0E-03

**Table C-12. REER for Fire Pump**

Pollutant	CAS	Long-Term Emission Rate (g/s)	Short-Term Emission Rate (g/s)	REER Used for Modeling with Unit Emission Rate						Acute Non-cancer
				Residential Chronic		Non-residential Chronic				
				Chronic Cancer	Chronic Non-cancer	Child Cancer	Child Non-cancer	Worker Cancer	Worker Non-cancer	
1,1,1-Trichloroethane	71-55-6	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79-34-5	--	--	--	--	--	--	--	--	--
1,1,1,2-Tetrachloroethane	630-20-6	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	79-00-5	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	75-35-4	--	--	--	--	--	--	--	--	--
1,2,3-Trichloropropane	96-18-4	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	95-63-6	--	--	--	--	--	--	--	--	--
1,2-Dibromo-3-Chloropropane	96-12-8	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	106-93-4	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	95-50-1	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	107-06-2	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	78-87-5	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	108-67-8	--	--	--	--	--	--	--	--	--
1,3-Butadiene	106-99-0	3.25E-06	2.85E-04	9.85E-05	1.63E-06	3.78E-06	3.70E-07	8.13E-06	3.70E-07	4.32E-07
1,3-Dichlorobenzene	541-73-1	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	58-90-2	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	--	--	--	--	--



**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

2,4-Dichlorophenol	120-83-2	--	--	--	--	--	--	--	--	--
2-Butanone	78-93-3	--	--	--	--	--	--	--	--	--
2-Chlorophenol	95-57-8	--	--	--	--	--	--	--	--	--
4-Methyl-2-pentanone	108-10-1	--	--	--	--	--	--	--	--	--
2-Methyl naphthalene	91-57-6	--	--	--	--	--	--	--	--	--
Acetaldehyde	75-07-0	1.17E-05	1.03E-03	2.60E-05	8.37E-08	9.76E-07	1.89E-08	2.13E-06	1.89E-08	2.18E-06
Acenaphthylene	208-96-8	--	--	--	--	--	--	--	--	--
Acenaphthene	83-32-9	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	--	--	--	--	--	--	--	--	--
Acrolein	107-02-8	5.07E-07	4.44E-05	--	1.45E-06	--	3.38E-07	--	3.38E-07	6.44E-06
Aluminum	7429-90-5	--	--	--	--	--	--	--	--	--
Ammonia	7664-41-7	4.34E-05	3.80E-03	--	8.68E-08	--	1.97E-08	--	1.97E-08	3.17E-06
Anthracene	120-12-7	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	--	--	--	--	--	--	--	--	--
Arsenic and compounds	7440-38-2	2.39E-08	2.10E-06	9.97E-04	1.41E-04	1.84E-05	9.97E-06	3.86E-05	9.97E-06	1.05E-05
Barium and compounds	7440-39-3	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	2.79E-06	2.44E-04	2.14E-05	9.29E-07	8.44E-07	2.14E-07	1.86E-06	2.14E-07	8.42E-06
Benz[a]anthracene	56-55-3	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	50-32-8	5.31E-10	4.65E-08	1.23E-05	2.66E-07	3.32E-07	6.03E-08	1.77E-07	6.03E-08	2.33E-05
Benzo[b]fluoranthene	205-99-2	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene	207-08-9	--	--	--	--	--	--	--	--	--
Benzo[e]pyrene	192-97-2	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene	191-24-2	--	--	--	--	--	--	--	--	--
Beryllium and compounds	7440-41-7	--	--	--	--	--	--	--	--	--
Bromine	7726-95-6	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	--	--	--	--	--	--	--	--	--
Bromoform	75-25-2	--	--	--	--	--	--	--	--	--
Bromomethane	74-83-9	--	--	--	--	--	--	--	--	--
Cadmium and compounds	7440-43-9	2.24E-08	1.97E-06	4.01E-05	4.49E-06	1.60E-06	6.06E-07	3.35E-06	6.06E-07	6.55E-05
Carbon Disulfide	75-15-0	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride	56-23-5	--	--	--	--	--	--	--	--	--
Chlorine	7782-50-5	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	124-48-1	--	--	--	--	--	--	--	--	--
Chloroethane	75-00-3	--	--	--	--	--	--	--	--	--
Chloroform	67-66-3	--	--	--	--	--	--	--	--	--
Chloromethane	74-87-3	--	--	--	--	--	--	--	--	--
Chrysene	218-01-9	--	--	--	--	--	--	--	--	--
Cobalt and compounds	7440-48-4	--	--	--	--	--	--	--	--	--
Copper and compounds	7440-50-8	6.13E-08	5.37E-06	--	--	--	--	--	--	5.37E-08
Dibenz[a,h]anthracene	53-70-3	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	75-71-8	--	--	--	--	--	--	--	--	--
Diesel Particulate Matter	200	5.01E-04	4.39E-02	5.01E-03	1.00E-04	1.93E-04	2.28E-05	4.18E-04	2.28E-05	--
Ethylbenzene	100-41-4	1.63E-07	1.43E-05	4.08E-07	6.27E-10	1.63E-08	1.48E-10	3.40E-08	1.48E-10	6.49E-10
Formaldehyde	50-00-0	2.58E-05	2.26E-03	1.52E-04	2.87E-06	6.00E-06	6.46E-07	1.29E-05	6.46E-07	4.62E-05
Fluoranthene	206-44-0	--	--	--	--	--	--	--	--	--
Fluorene	86-73-7	--	--	--	--	--	--	--	--	--
Hexachlorobenzene	118-74-1	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	87-68-3	--	--	--	--	--	--	--	--	--
Hexane	110-54-3	4.02E-07	3.52E-05	--	5.75E-10	--	1.30E-10	--	1.30E-10	--
Hexavalent Chromium (Cr+6)	18540-29-9	1.50E-09	1.31E-07	4.83E-05	1.80E-08	2.88E-06	1.70E-09	1.50E-06	1.70E-09	4.37E-07
Hydrochloric acid	7647-01-0	2.79E-06	2.44E-04	--	1.39E-07	--	3.17E-08	--	3.17E-08	1.16E-07
Hydrogen Bromide	10035-10-6	--	--	--	--	--	--	--	--	--

**Appendix C. REER Calculations - Potential Emissions (Actual Emissions Including Safety Factors)**

Hydrogen Fluoride	7664-39-3	--	--	--	--	--	--	--	--	--
Indeno[1,2,3-cd]pyrene	193-39-5	--	--	--	--	--	--	--	--	--
Lead and compounds	7439-92-1	1.24E-07	1.09E-05	--	8.28E-07	--	1.88E-07	--	1.88E-07	7.25E-05
Manganese and compounds	7439-96-5	4.64E-08	4.06E-06	--	5.15E-07	--	1.16E-07	--	1.16E-07	1.35E-05
Mercury and compounds	7439-97-6	2.99E-08	2.62E-06	--	3.89E-07	--	4.75E-08	--	4.75E-08	4.37E-06
Methylene Chloride	75-09-2	--	--	--	--	--	--	--	--	--
Molybdenum trioxide	1313-27-5	--	--	--	--	--	--	--	--	--
Naphthalene	91-20-3	2.95E-07	2.58E-05	1.02E-05	7.96E-08	3.88E-07	1.84E-08	8.42E-07	1.84E-08	1.29E-07
Nickel and compounds	7440-02-0	5.83E-08	5.11E-06	1.54E-05	4.17E-06	5.83E-07	9.41E-07	1.27E-06	9.41E-07	2.56E-05
o-Xylene	95-47-6	--	--	--	--	--	--	--	--	--
Pentachlorophenol (CCC)	87-86-5	--	--	--	--	--	--	--	--	--
Perylene	198-55-0	--	--	--	--	--	--	--	--	--
Phenanthrene	85-01-8	--	--	--	--	--	--	--	--	--
Phosphorous and compounds	504	--	--	--	--	--	--	--	--	--
Pyrene	129-00-0	--	--	--	--	--	--	--	--	--
Selenium and compounds	7782-49-2	3.29E-08	2.88E-06	--	--	--	--	--	--	1.44E-06
Silver	7440-22-4	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	--	--	--	--	--	--	--	--	--
Tetrachloroethene	127-18-4	--	--	--	--	--	--	--	--	--
Thallium	7440-28-0	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	1.58E-06	1.38E-04	--	3.15E-10	--	7.17E-11	--	7.17E-11	1.84E-08
Total PAHs (excluding Naphthalene)	401	5.42E-07	4.74E-05	1.26E-02	--	3.38E-04	--	1.81E-04	--	--
Total PCBs	1336-36-3	--	--	--	--	--	--	--	--	--
Total PCB TEQ	645	--	--	--	--	--	--	--	--	--
Total PCDD and PCDF	646	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	156-60-5	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	542-75-6	--	--	--	--	--	--	--	--	--
Trichloroethene	79-01-6	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	75-69-4	--	--	--	--	--	--	--	--	--
Vanadium	7440-62-2	--	--	--	--	--	--	--	--	--
Vinyl Chloride	75-01-4	--	--	--	--	--	--	--	--	--
Xylene (mixture), including m-xylene, o-xylene, p-xylene	1330-20-7	6.34E-07	5.56E-05	--	2.88E-09	--	6.54E-10	--	6.54E-10	6.39E-09
Zinc and compounds	7440-66-6	--	--	--	--	--	--	--	--	--
TOTAL REER for Fire Pump (g/s per µg/m³)		6.0E-04	5.2E-02	1.9E-02	2.6E-04	5.7E-04	3.6E-05	6.7E-04	3.6E-05	2.8E-04

## **APPENDIX D. ZONING VARIANCE REQUEST**

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The AQ522 Form has been provided electronically only.

## Exposure Location Change Request

Facility Name: Covanta Marion, Inc. Source Number: 24-5398

### Instructions:

A facility may request to model an exposure location in a manner that differs from underlying zoning for that exposure location based on the current land use [\[OAR 340-245-0210\(1\)\(a\)\(F\)\]](#). In order to request a change to exposure location designation, please submit this form with the following documents when you submit your Cleaner Air Oregon Modeling Protocol:

1. An **aerial photo** indicating the proposed exposure locations for which you are requesting a change to exposure location(s) (for more information on zoning and exposure locations, please see our [FAQ webpage](#)).
2. Complete the **AQ522 Form** (Excel format) – listing exposure locations, their corresponding land use zoning designations (State or local zoning), and an explanation of each location for which you are requesting a change to exposure location.

**Note:** You do not need to submit this form if you have received instruction from DEQ to revise an exposure location to a more conservative exposure type in your risk assessment – e.g., Nonresidential, adult (worker) location to Residential.

If DEQ approves the change to exposure location and a risk assessment is completed, DEQ will issue a permit with annual reporting requirements. Annual verification that the current land use has not changed, and the exposure location change should continue, will be determined using form AQ540, submitted as part of the annual report.

### Statement of Certification:

**By signing this document, I hereby certify that based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.**

Mark Clatt

Name of Certifying or Responsible Official



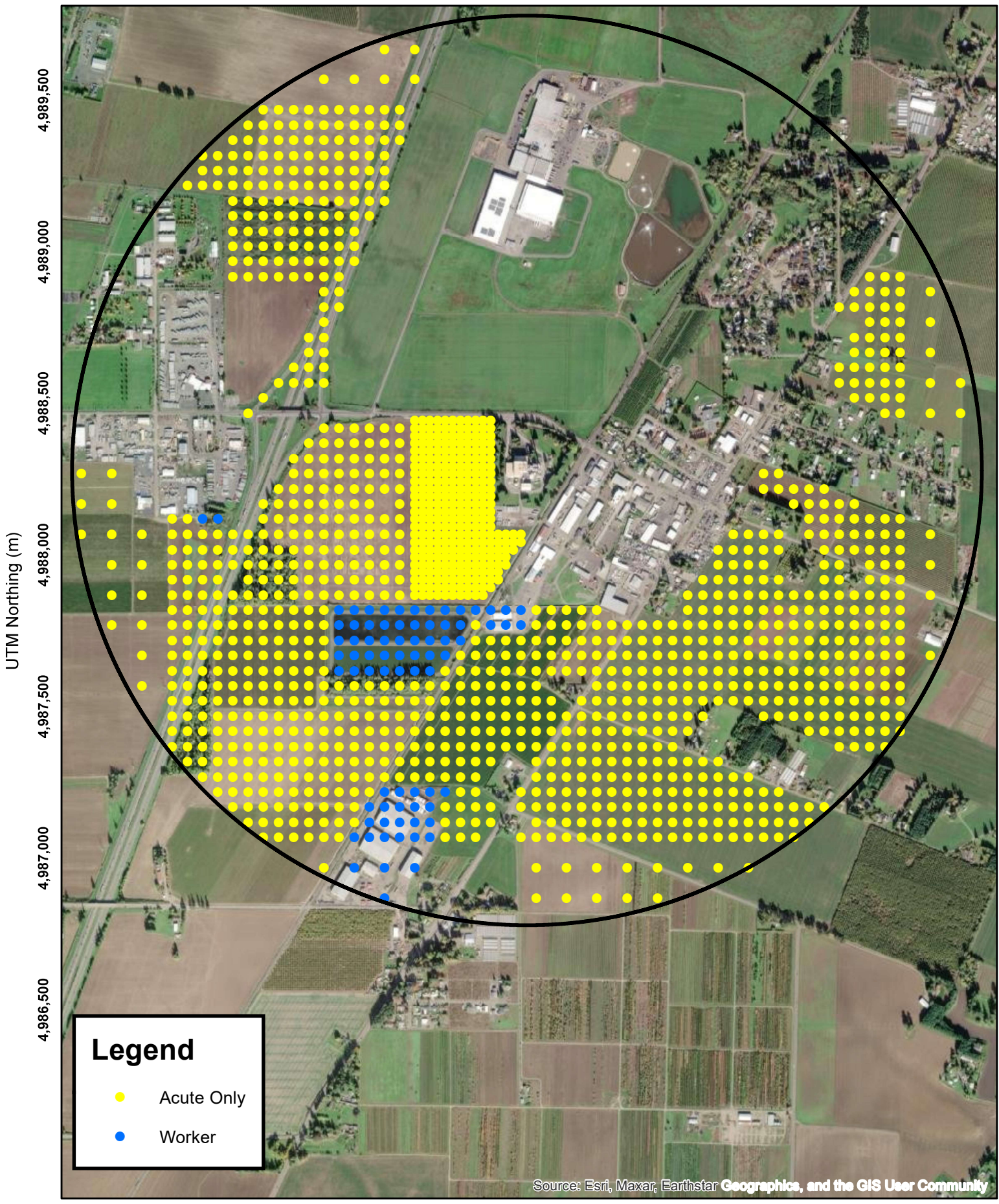
Signature of Certifying or Responsible Official

West Region Chief Operating Officer

Title of Certifying or Responsible Official

12.6.2023

Date



UTM Northing (m)

4,989,500  
4,989,000  
4,988,500  
4,988,000  
4,987,500  
4,987,000  
4,986,500

**Legend**

- Acute Only
- Worker

501,500 502,000 502,500 503,000 503,500 504,000

UTM Easting (m)

All coordinates shown in UTM Coordinates,  
Zone 10, NAD83

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community