Black Butte Ranch Air Curtain Incinerator Level 3 Health Risk Assessment Modeling Report

Black Butte Ranch plans to install and operate an AirBurner S-220 air curtain incinerator (ACI) at their facility located near the south west edge of Black Butte Mountain located in Deschutes County, Oregon.

As part of their air permitting analysis, Black Butte Ranch (BBR) has elected to do a Level 3 Risk Assessment to assess their air toxics emissions. This modeling report and risk assessment summarizes the air dispersion models, approach, and results of this modeling assessment. All modeling was performed in accordance with the approved protocol[1] Oregon Department of Environmental Quality's (ODEQ) and Recommended Procedures for Air Quality Dispersion Modeling[2] and U.S. Environmental Protection Agency's 40 CFR Part 51 Appendix W *Guideline on Air Quality Models*[3]. A copy of the protocol and associated approval is included in Appendix A.

Facility Location

BBR is located approximately 8 miles Northwest of Sisters, Oregon in Deschutes County. The geographical coordinates of the approximate center of BBR are:

- Universal Transverse Mercator (UTM) Easting meters (m): 605,020
- UTM Northing (m): 4,914,871
- UTM Zone: 10
- North American Datum (NAD): 1983

The facility elevation is approximately 1,029 meters above mean sea level. The surrounding area is relatively flat except for Black Butte Mountain located 4km Northeast from BBR.

[1] Oregon DEQ's October 9, 2020 Protocol Approval Letter from Kristen Martin

[2] https://www.oregon.gov/deq/aq/cao/Documents/CAORP-AirQualityModeling.pdf

[3] https://www3.epa.gov/ttn/scram/guidance/guide/appw_17.pdf

Model Selection

The American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) (Version 19191) was used as recommended in the Environmental Protection Agency (EPA) Appendix W, Guideline on Air Quality Models (EPA, 2017).

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (less than 50 kilometers dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific preprocessor programs, AERMET/MAKEMET and AERMAP. AERMOD was run with the following options:

- Direction specific building downwash
- Regulatory default options
- Rural dispersion characteristics
- Actual receptor elevations and hill height scales obtained from AERMAP (Version 18081)

Meteorological Data

Three years of prognostic WRF-MMIF meteorological data for Sisters, Oregon for years 2013-2015 were provided by ODEQ for use in this analysis. The representativeness of these data was determined based upon comparison of the prognostic data to the nearest local airport data meteorological station located at the Redmond Municipal Airport for years 2012-2016.

The Sisters data grid cell is located approximately 12 km South of BBR with a predominant wind direction blowing from the East-Southeast with an average windspeed of 4.53 m/s. The location of the prognostic data is near multiple large mountains including North Sister, South Sister, and Broken Top to the South, Belknap Crater and Mount Washington to the Northeast, and Black Butte to the North. The predominate land use surround the data location is forested land with the nearest urban area being Sisters, approximately 10 km East. The location of this meteorological data location is shown in Figure 1 and the wind rose included as Figure 2.

The Redmond Municipal Airport is located approximately 45 km Southeast of BBR with predominant wind directions blowing from the Northeast and then South-Southwest with an average speed of 3.24 m/s. The location of this meteorological station is not located near any significant mountains or geographic features, with the closes being North Sister, South Sister, and Broken Top 50 km to the West. The land use surrounding the Redmond Municipal Airport is approximately 50% urban and 50% rural within 5 km. The location of this meteorological data location is shown in Figure 1 and the wind rose included as Figure 3.

Despite the differences in average wind speed and predominant wind direction, the geographic features in the surrounding area and closer proximity to the site, the Sisters prognostic WRF-MMIF data are considered to be more representative of the BBR Project location than the Redmond Municipal Airport. Therefore, the Sisters prognostic WRF-MMIF data were used in this analysis.

Figure 1 Meteorological Stations Map

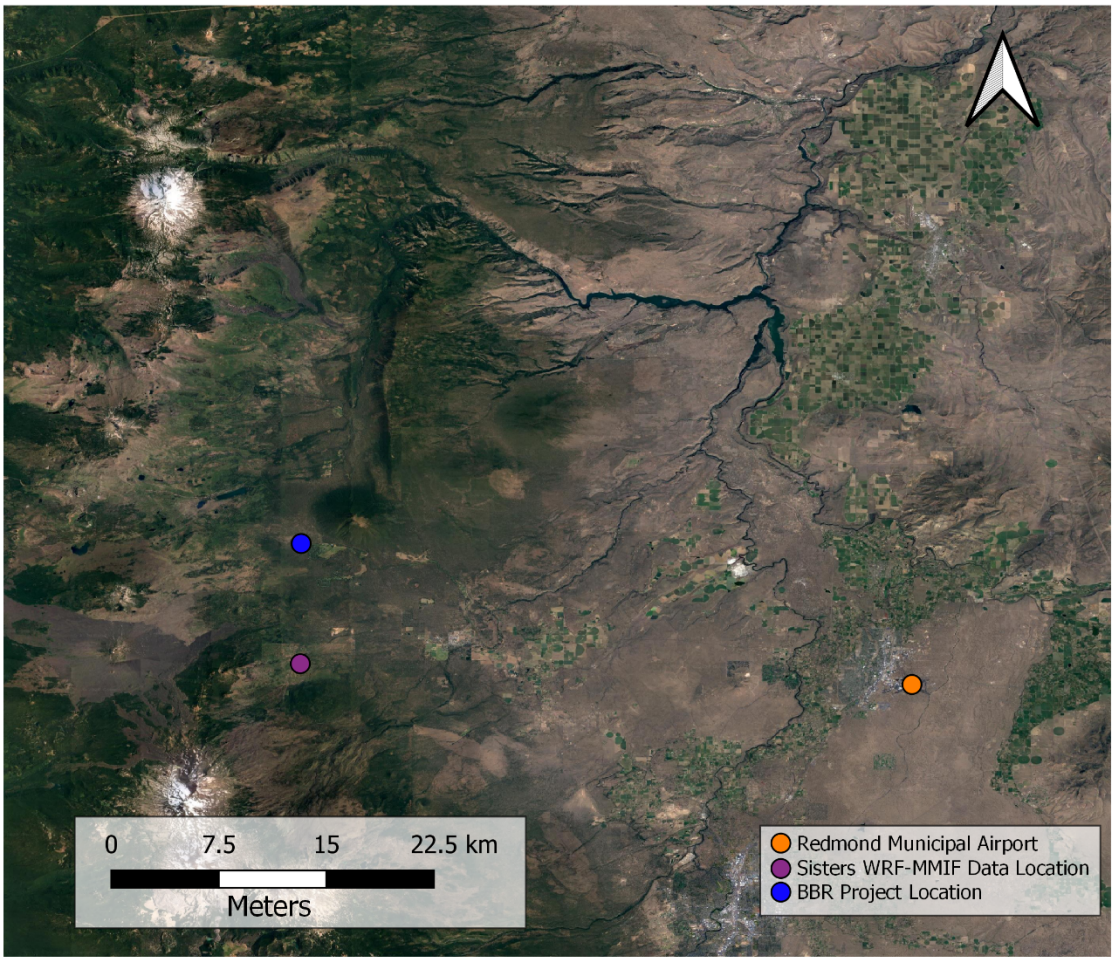


Figure 2 Sisters Prognostic WRF-MMIF Wind Rose (Years 2013-2015)

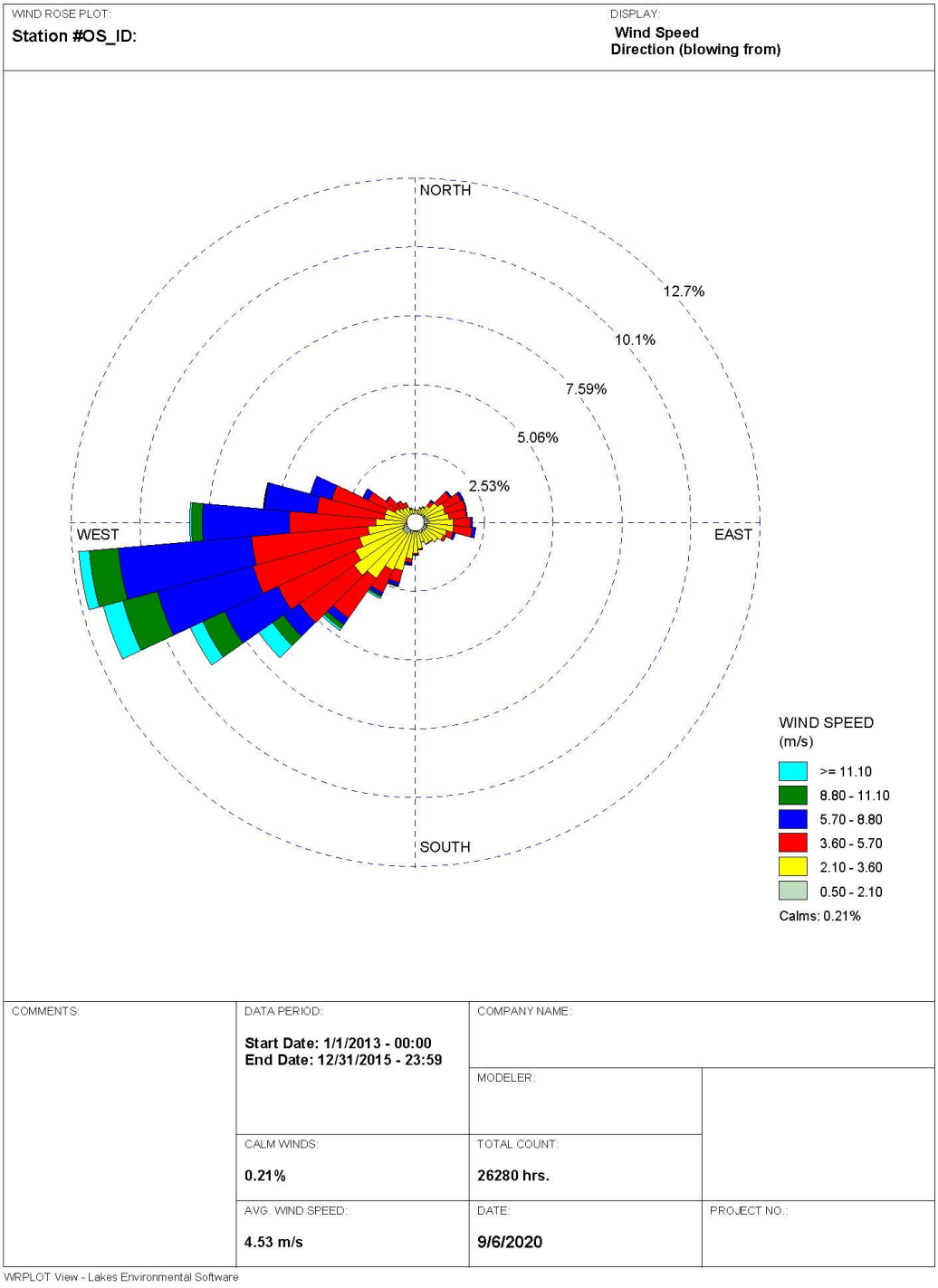
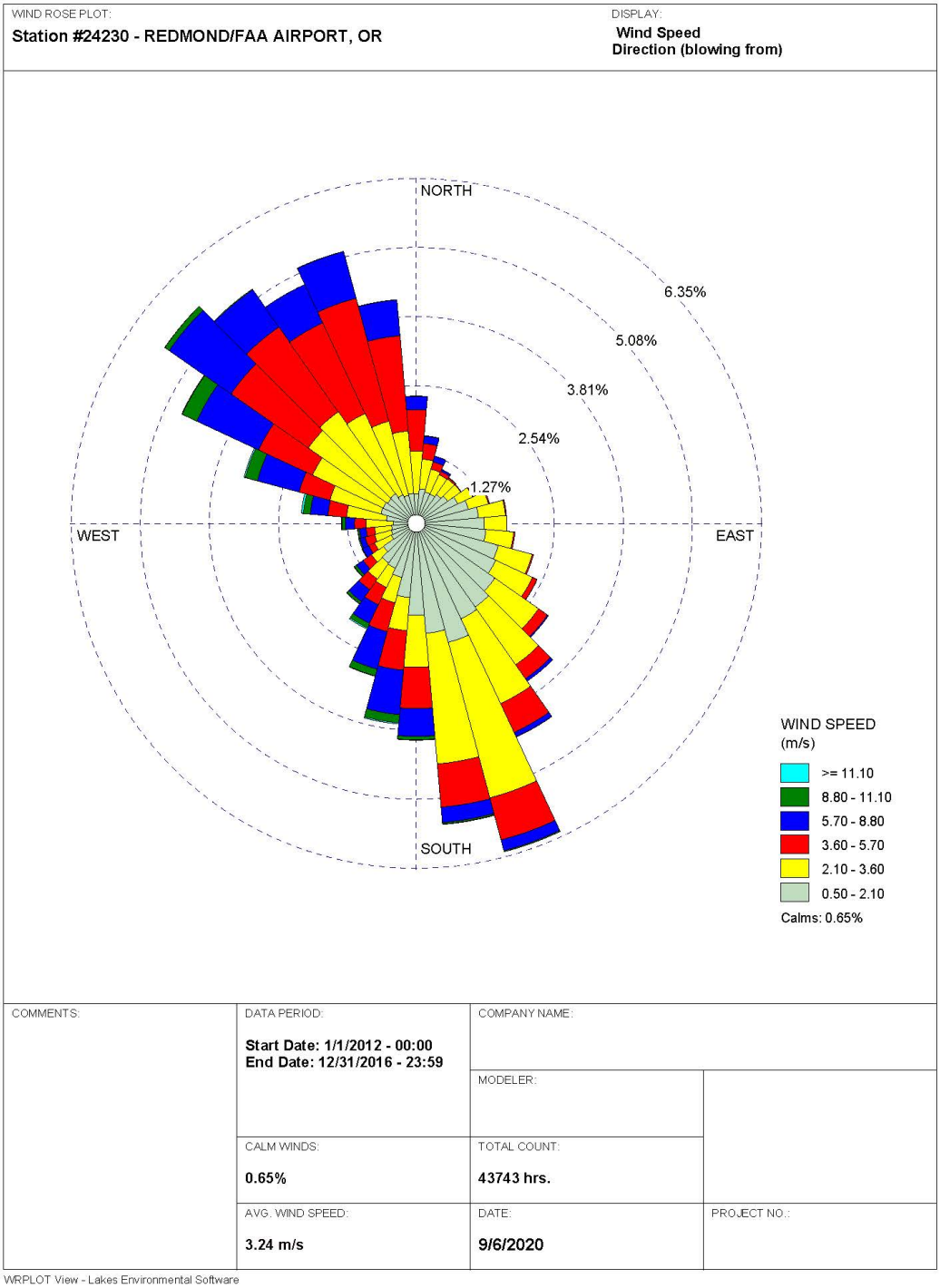


Figure 3 Redmond Municipal Airport Wind Rose (Years 2012-2016)



Receptors

The selection of receptors in AERMOD used a nested Cartesian grid as follows:

- 25-meter (m) spacing along the fenceline
- 25-m spacing from the fenceline to 200 m from grid origin
- 100-m spacing from beyond 200 m to 1,000 m from the fenceline
- 200-m spacing from beyond 1,000 m to 2,000 m from the fenceline

Grid spacing out to 2,000 maters is expected to be sufficient to capture potential impacts from the facility based upon source size and characteristics. Increasing concentration gradients nor high concentrations are observed near the edges of the raptor grid included in this analysis, therefore the receptors grid is adequate to capture potential impacts.

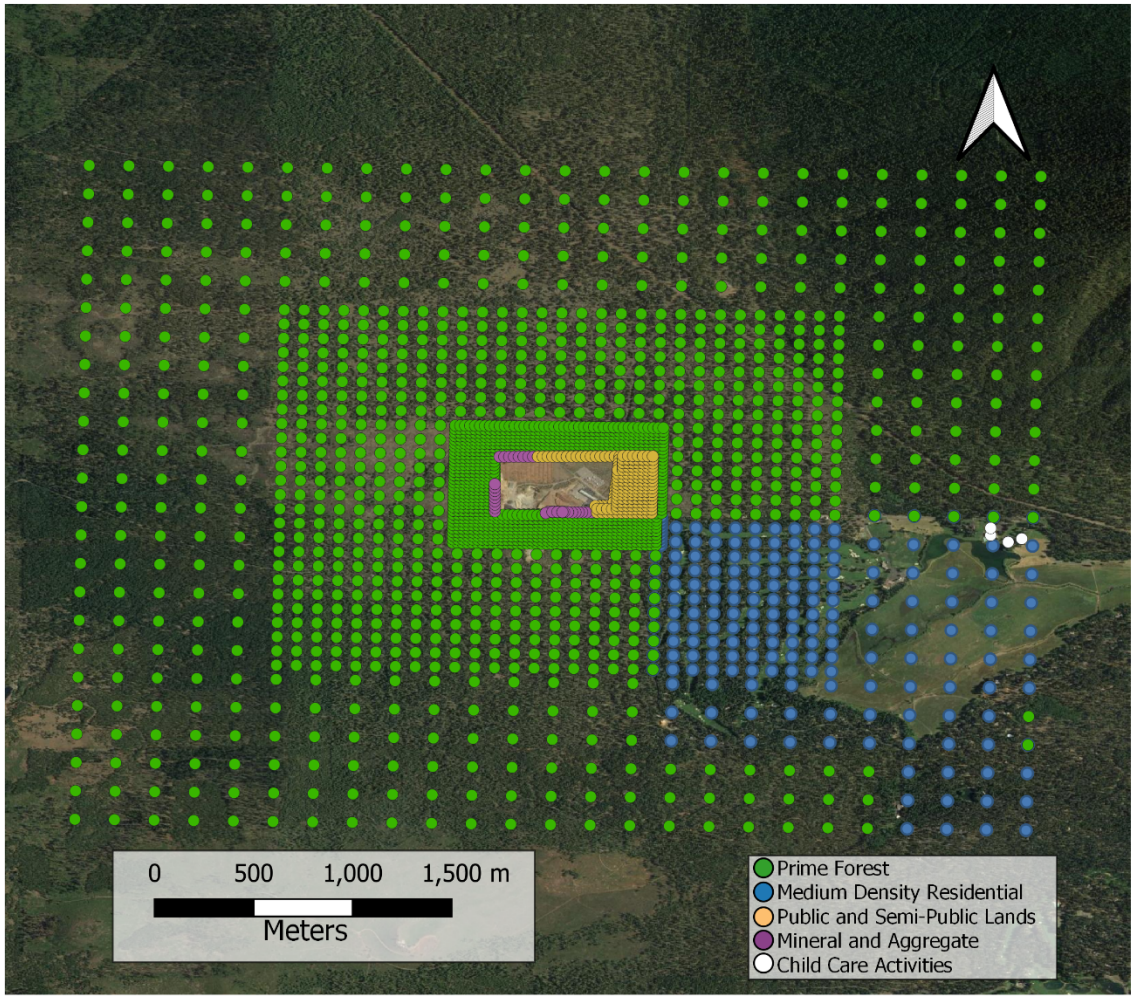
All gridded receptors proposed in this analysis are classified as residential or non-residential exposure locations based upon Oregon Zoning Maps[4]. However, additional discrete receptors (four in total) were added at the Black Butte Mountain Ranch Lodge facilities to capture child exposure health risk scenarios due to the child care activities at this location. The nearest school or daycare center to BBR is Sisters High School, located approximately 12.5 km Southeast of the Project. No sensitive receptors were identified in the modeling domain therefore, all sensitive receptor analyses were modeled using the maximum impact at a residential receptor.

The receptor grid was overlaid with the zoning maps to assign each receptor a zoning classification of Prime Forest, Medium Density Residential, Mineral and Aggregate, and Public and Semi-Public Lands. Residential exposure analyses will be performed for Medium Density Residential zoned receptors, Acute analyses will be considered at all receptors in the analysis, and worker exposure will be considered at all non-residentially zoned receptors. An excel spreadsheet of all receptors and their respective zoning classification is included in Appendix B.

Receptors and source locations are expressed in the Universal Transverse Mercator North American Datum 1983, Zone 10 coordinate system. This receptor grid is included in Figure 4.

[4] https://www.oregon.gov/lcd/About/Pages/Maps-Data-Tools.aspx

Figure 4: Receptor Layout



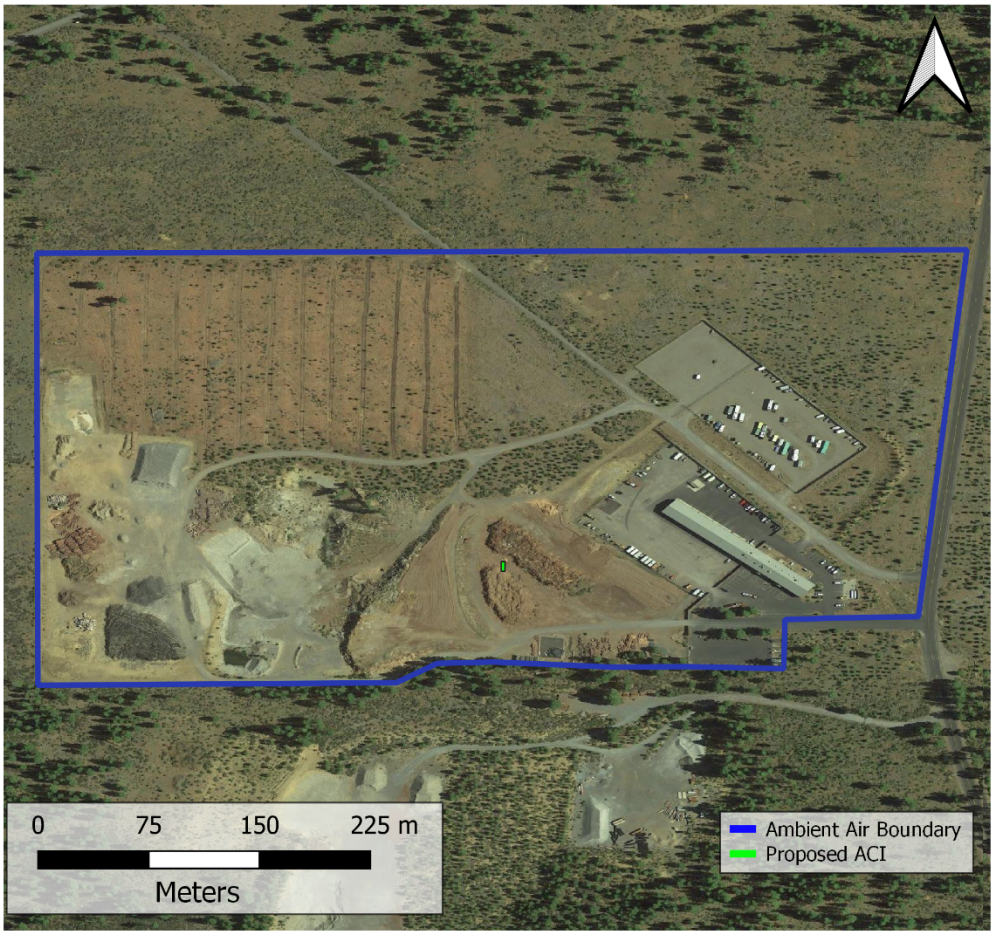
Ambient Air Boundary

The land and area controlled by BBR represents the ambient air boundary for this analysis. The BBR area is fenced with eight-foot-high cyclone fencing (heavy duty chain link). One main gated point of ingress and egress with a lockable rolling gate under maintenance key system. Hours of operation are Monday-Friday 7:30am to 3:30pm. One full-time year-round employee with primary responsibilities of area functions and monitoring is staffed.

There is a second lockable rolling gated access point also eight-foot-high that is normally locked and used under supervision when needed. Additionally, Black Butte Ranch Fire Department checks on the area during normal rounds.

This ambient air boundary is illustrated in Figure 5.

Figure 5 Ambient Air Boundary



Building Downwash

Building influences on stacks were calculated by incorporating the updated EPA Building Profile Input Program for use with the plume-rise model-enhancement algorithm (BPIP-PRIME). The stack heights used in the dispersion modeling are the actual stack height or good engineering practice stack height, whichever is less.

Elevation Data

Terrain elevations for sources, buildings, and receptors were developed using the AERMAP (Version 18081) terrain preprocessor and United State Geological Survey (USGS) 1:24,000 National Elevation Dataset (NED) files. The horizontal resolution of the NED data is 10m.

Source Characterization

The Project consist of two emissions sources that comprise the air curtain incinerator, a diesel engine powering the blower and the emissions associated with the organic material combustion.

The diesel engine powering the blower of the air curtain incinerator will be a HATZ Model 3H50TIC diesel engine with a power rating of 49 horsepower and will be U.S. EPA Tier 4 final

emissions certified. The exhaust from this engine is routed to a horizontal release through the side of the air curtain incinerator unit. The exhaust parameters for these sources are included in Table 1.

The emissions from the combustion of the organic material in the air curtain incinerator will be classified as a row of point sources based upon evaluations and testing performed by the San Joaquin Valley Air Pollution Control District's in their *Air Curtain Incinerator Emissions Factors Determination* document included as Appendix C. The results of this analysis indicate the exhaust flow from the organic material combustion is confined to a small 18-inch wide section of the ACI at the opposite end of the blower along the length of the combustion chamber. Based upon this information, the emissions were modeled as a row point sources with an 18-inch diameter along the length of the combustion chamber.

Both the generator and air curtain incineration were modeled using the HROFDAY factor in AERMOD to reflect the facility operating hours of 7am to 7pm. The exhaust parameters for this source are included in Table 1. A copy of the source layout is included as Figure 6.

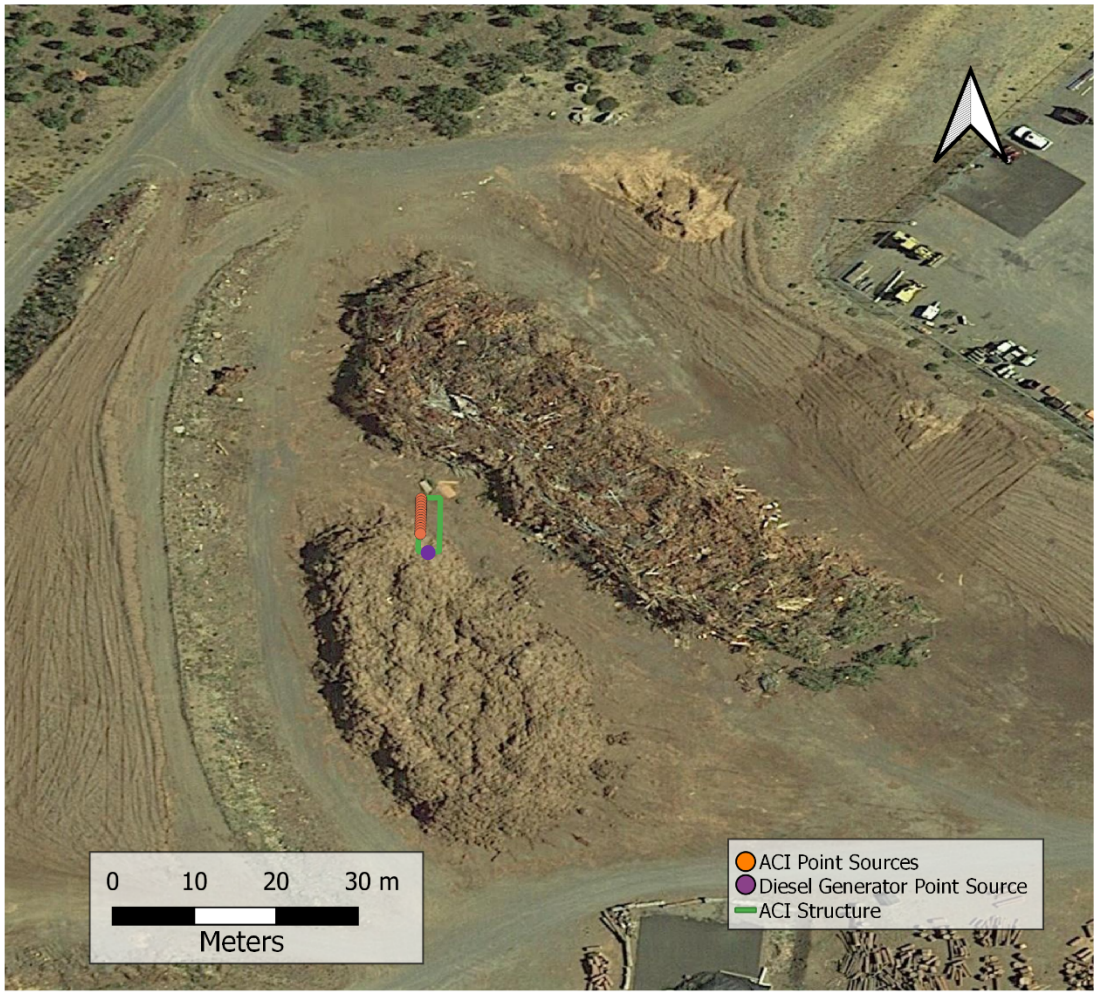
Table 1: Source Parameters

Source	Northing[a]	Easting[a]	Elevation (m)	Modeled Emission Rate (g/s)	Release Height (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)	Exhaust Diameter (m)
Organic Material Combustion (14 total sources)	Varies	Varies	1030	0.0714[b]	2.164	644.3	28.7	0.457
HATZ Diesel Engine	605,021.3	4,914,865.0	1,029.4	1	0.4816	646.5	35.5	0.0509

[a] UTM NAD 83 (meters)

[b] The g/s emission rate is modeled as 1g/s divided by 14 for all 14 modeled sources to represent total source modeled impact from 1 g/s total emissions.

Figure 6: Proposed Source Layout



Level 3 Risk Assessment Work Plan

ODEQ has developed and implemented up to seven risk-based concentration (RBC) for each compound to determine potential chronic cancer, chronic non-cancer, and short-term acute risk near BBR. These RBCs are included in CAO Rules at OAR 340-245-8040 Table 4 which are designed to evaluate the following exposure scenarios:

- **Chronic cancer and non-cancer exposure**
  - Residential exposure – Areas of long-term exposure for adults and children
  - Worker/Non-resident adult exposure – Places of work and areas adults spend a large amount of time that is not their residence
  - Non-resident child exposure – Places where children do not reside but may spend a large amount of time, such as daycares.
- **Acute exposure** – Areas where people may visit and spend all or a portion of their day

Risk is calculated at each receptor using the following equation:

$$Risk\ (R_r) = \sum_p \frac{X_{r,p}}{RBC_{p,L(r)}}$$

Where $X_{r,p}$ is the pollutant concentration at each receptor *r*, and $RBC_{p,L(r)}$ is the RBC for pollutant *p* and land use *L* at each receptor *r*. Each receptor in the analysis will have three risk numbers: chronic cancer risk, chronic non-cancer risk, and acute risk. These risks are then be compared to the respective New Facility Risk Action Levels (RALs) which are included in Table 2.

Table 2: New Facility Risk Action Levels

Exposure Type	Risk Action Levels (RALs)		
		Excess Cancer Risk Per Million	
	Source Permit Level	Community Engagement Level	TBACT Level
Residential Chronic Worker Non-Residential Chronic Child Non-Residential Chronic	0.5	5	10
Exposure Type	**Risk Action Levels (RALs)**		
		Noncancer Hazard Index	
	Source Permit Level	**Community Engagement Level**	**TBACT Level**
Residential Chronic Worker Non-Residential Chronic Child Non-Residential Chronic	0.5	1	1

Dispersion Modeling Results

The results of this dispersion modeling analysis are presented in Table 3 and reflect the ambient air concentrations resulting from an emission rate of 1 gram/second per source. Results are tabulated as the maximum daily and annual average concentrations at each receptor type as input into the health risk analysis calculations.

Table 3: Air Dispersion Modeling Results

Receptor Type	Averaging Period	ACI Modeled Concentration	Diesel Generator Modeled Concentration	Units
Medium Density Residential	Annual	0.21668	0.41561	ug/m3 per gram/second
	24-hour	2.31743	17.36253	ug/m3 per gram/second
Mineral and Aggregate	Annual	1.0362	6.50673	ug/m3 per gram/second
	24-hour	7.88167	668.80991	ug/m3 per gram/second
Public and Semi-Public Lands	Annual	0.67798	3.52921	ug/m3 per gram/second
	24-hour	9.13123	156.24468	ug/m3 per gram/second
Prime Forest	Annual	0.76491	1.95147	ug/m3 per gram/second
	24-hour	9.34663	80.77676	ug/m3 per gram/second
Child Activities	Annual	0.0317	0.06071	ug/m3 per gram/second

	24-hour	0.58034	3.37387	ug/m3 per gram/second

Risk Assessment Results

The unit emission rate-based concentrations presented in Table 3 were applied to the facility emission inventory supplied by ODEQ dated June 15th, 2020 to determine the facility air toxics ambient concentration at each receptor used in the analysis. Risk scenarios selected for analysis are specific to each receptor type. For example, prime forest and mineral and aggregate land use zone receptors are not analyzed for residential or child risk scenarios since these land use types are not zoned for long term exposure or child care facilities. Tables 4, 5, and 6 outline the risk assessment results for BBR Project, ACI, and diesel engine, respectively.

Table 4: BBR Facility Risk Assessment Results

Risk Scenario Type	Medium Density Residential	Mineral and Aggregate	Public and Semi-Public Lands	Prime Forest	Child Activities	Units
Residential Cancer	3.46	--	--	--	--	Cancer Risk Per Million
Residential Noncancer	0.39	--	--	--	--	Hazard Index
Child Cancer	--	--	--	--	0.02	Cancer Risk Per Million
Child Noncancer	--	--	--	--	0.01	Hazard Index
Worker Cancer	--	0.67	0.43	0.46	0.02	Cancer Risk Per Million
Worker Noncancer	--	0.28	0.18	0.20	0.01	Hazard Index
Acute	0.19	0.66	0.74	0.75	0.05	Hazard Index

Table 5: Air Curtain Incinerator Source-Specific Risk Assessment Results

Risk Scenario Type	Medium Density Residential	Mineral and Aggregate	Public and Semi-Public Lands	Prime Forest	Child Activities	Units
Residential Cancer	3.23	--	--	--	--	Cancer Risk Per Million
Residential Noncancer	0.39	--	--	--	--	Hazard Index
Child Cancer	--	--	--	--	0.02	Cancer Risk Per Million
Child Noncancer	--	--	--	--	0.01	Hazard Index
Worker Cancer	--	0.60	0.39	0.44	0.02	Cancer Risk Per Million
Worker Noncancer	--	0.27	0.18	0.20	0.01	Hazard Index
Acute	0.19	0.63	0.73	0.75	0.05	Hazard Index

Table 6: Diesel Engine Source-Specific Risk Assessment Results

Risk Scenario Type	Medium Density Residential	Mineral and Aggregate	Public and Semi-Public Lands	Prime Forest	Child Activities	Units
Residential Cancer	0.24	--	--	--	--	Cancer Risk Per Million
Residential Noncancer	0.003	--	--	--	--	Hazard Index
Child Cancer	--	--	--	--	0.001	Cancer Risk Per Million
Child Noncancer	--	--	--	--	0.000	Hazard Index
Worker Cancer	--	0.069	0.04	0.02	0.001	Cancer Risk Per Million
Worker Noncancer	--	0.004	0.002	0.001	0.000	Hazard Index
Acute	0.001	0.029	0.01	0.00	0.000	Hazard Index

Based upon the maximum calculated cancer risk of 3.46 per million, non-cancer chronic hazard index of 0.39, non-cancer acute hazard index of 0.75, the facility exceeds the source permit level thresholds but is below all community engagement action levels.

A copy of the approved emission rates and Risk Based Concentrations are included in Appendix D and E of this report, respectively.

Uncertainty Analysis

Health risk analyses including this health risk assessment involve assumptions and uncertainties that are inherent in the risk estimates. These uncertainties range from emissions estimation, exposure assessment assumptions, and derivation of toxicity values. Each of these sources of uncertainty are qualitatively described below to add perspective to the risk estimates presented in this report.

- **Selection of Toxic Air Contaminants for Evaluation:** Some chemicals emitted from the processes in this analysis do not have associated risk-based concentrations. This is due to insufficient data being available to characterize risk of these chemicals. Not evaluating these chemicals may underestimate risk associated with the facility.
- **Emission Rate Calculations:** Emission estimates for the facility are calculated in coordination with ODEQ and use established emission factors from EPA and assumed heat content of the fuel. These emission factors are selected from the most representative available data. As a result of this representativeness-based emissions approach, uncertainties may be present when compared to the actual emissions from the facility which are not directly measured and tested. This may result in either an over or underestimated of emissions and risk.
- **Exposure Assessment Assumptions:** An exposure assessment can include inaccuracies from multiple data sources include emissions data, air dispersion models (AERMOD), and the toxicity values used in the analysis. These inaccuracies can range in compounds being emitted with no toxicity data or not included in the emission factors used which can underestimate risk or from the inherent degree of conservative

estimates and protection included in air dispersion models and toxicity values which can overestimate risk.

- **Derivation of Toxicity Values:** The derivation of toxicity data for carcinogenic compounds involves a weight of evidence approach illustrated in EPAs Technical Appendix A Toxicity Weights for TRI Chemicals and Chemical Categories[5]. This weight of evidence approach calculates how likely a chemical is to be a human carcinogen. These data are based on considerations of the quality and completeness of data and responses induced by the suspected carcinogen. For non-carcinogenic compounds, toxicity reference values (TRVs) are developed using a structured and assessment intensive approach that incorporates uncertainty factors to the clinical dose. These uncertainty factors scale the clinical dose to a value that is determined to be applicable to the entire population. Toxicity data for both the carcinogenic and non-carcinogenic compounds in this analysis include potential uncertainties with their values to be representative of an entire population. Additional refined analyses such as target organ effects of non-carcinogenic compounds can be evaluated to reduce the amount of uncertainty in a health risk assessment if deemed necessary.

[5] https://www.epa.gov/sites/production/files/2017-01/documents/technical_appendix_a-toxicity_v2.3.5.pdf

Appendix A: Protocol Approval

Oregon
Kate Brown, Governor

Department of Environmental Quality
Agency Headquarters
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5696
FAX (503) 229-6124
TTY 711

October 9, 2020

Source Number: 09-0121

Jay Head
Chief Executive Officer
Black Butte Ranch Corporation
13899 Bishops Cap
Sisters, OR 97759

Dear Mr. Head,

DEQ has received and reviewed the Cleaner Air Oregon (CAO) Emissions Inventory, Modeling Protocol, and Risk Assessment Work Plan submitted by TSS Consultants on behalf of Black Butte Ranch Corporation (Source Number: 09-0121) in accordance with OAR 340-245-0050(2).

The Emissions Inventory was originally submitted on April 2, 2020. DEQ sent a revised Emissions Inventory on June 4, 2020 with recommended emission factors. On June 16, 2020, Black Butte Ranch submitted a revised Emissions Inventory using the DEQ recommended emission factors. DEQ approves the CAO Emission Inventory submitted on June 16, 2020.

The Modeling Protocol and Risk Assessment Work Plan were originally submitted on June 16, 2020 and revised on September 24, 2020. DEQ approves the Modeling Protocol and Risk Assessment Work Plan, **with the following specific conditions**, to incorporate into the final risk assessment:

Specific conditions

1) A two kilometer modeling domain is approved on the condition that the modeling results be evaluated for high concentrations near the boundary receptors. If high concentrations occur near the boundary, please add additional receptors to ensure the location of the highest risk is represented within the submitted modeling domain.
2) Black Butte Ranch offers child care activities at their lodge – please include a child exposure receptor at this location. You can add a discrete receptor or evaluate the risk at an existing receptor in addition to the assigned exposure category. In addition, please state the distance to the nearest school or daycare, likely in Sisters, OR.
3) Outline the steps Black Butte will take to limit public access within the source boundary as modeled. Include details regarding how public access will be controlled - e.g., signage, fencing, etc.

Notwithstanding the above conditions, DEQ concludes that the Emissions Inventory, Modeling Protocol and Risk Assessment Work Plan submitted by Black Butte Ranch is complete and satisfies the requirements pursuant to OAR 340-245-0050(2).

The next step in the CAO process is to complete and submit the Level 3 Risk Assessment following the approved Emissions Inventory, Modeling Protocol and Risk Assessment Work Plan and the conditions listed above. Once DEQ receives the Level 3 Risk Assessment, we will review the submittal and contact you if we have additional questions of require follow-up actions or clarifications in order to finalize our review.

Please contact Kristen Martin (503-229-5713, Martin.Kristen@deq.state.or.us) if you have any questions. We look forward to your continued assistance with this process.

Sincerely,

Kristen Martin

Kristen Martin
Cleaner Air Oregon
(503) 229-5713
Martin.Kristen@deq.state.or.us

Enclosure

Cc: Frederick Tornatore, TSS Consultants
JR Giska, ODAQ
Frank Messina, ODEQ
Ken Hanna, ODEQ

File

Appendix B: Receptor Zoning Classification

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605500	4914575	Medium Density Residential
605525	4914575	Medium Density Residential
605500	4914600	Medium Density Residential
605525	4914600	Medium Density Residential
605500	4914625	Medium Density Residential
605525	4914625	Medium Density Residential
605500	4914650	Medium Density Residential
605525	4914650	Medium Density Residential
605500	4914675	Medium Density Residential
605525	4914675	Medium Density Residential
605500	4914700	Medium Density Residential
605525	4914700	Medium Density Residential
605500	4914725	Medium Density Residential
605525	4914725	Medium Density Residential
605500	4914750	Medium Density Residential
605525	4914750	Medium Density Residential
605500	4914775	Medium Density Residential
605525	4914775	Medium Density Residential
605500	4913700	Medium Density Residential
605600	4913700	Medium Density Residential
605700	4913700	Medium Density Residential
605800	4913700	Medium Density Residential
605900	4913700	Medium Density Residential
606000	4913700	Medium Density Residential
606100	4913700	Medium Density Residential
606200	4913700	Medium Density Residential
606300	4913700	Medium Density Residential
606400	4913700	Medium Density Residential
605500	4913800	Medium Density Residential
605600	4913800	Medium Density Residential
605700	4913800	Medium Density Residential
605800	4913800	Medium Density Residential
605900	4913800	Medium Density Residential
606000	4913800	Medium Density Residential
606100	4913800	Medium Density Residential
606200	4913800	Medium Density Residential
606300	4913800	Medium Density Residential
606400	4913800	Medium Density Residential
605500	4913900	Medium Density Residential
605600	4913900	Medium Density Residential

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605700	4913900	Medium Density Residential
605800	4913900	Medium Density Residential
605900	4913900	Medium Density Residential
606000	4913900	Medium Density Residential
606100	4913900	Medium Density Residential
606200	4913900	Medium Density Residential
606300	4913900	Medium Density Residential
606400	4913900	Medium Density Residential
605500	4914000	Medium Density Residential
605600	4914000	Medium Density Residential
605700	4914000	Medium Density Residential
605800	4914000	Medium Density Residential
605900	4914000	Medium Density Residential
606000	4914000	Medium Density Residential
606100	4914000	Medium Density Residential
606200	4914000	Medium Density Residential
606300	4914000	Medium Density Residential
606400	4914000	Medium Density Residential
605500	4914100	Medium Density Residential
605600	4914100	Medium Density Residential
605700	4914100	Medium Density Residential
605800	4914100	Medium Density Residential
605900	4914100	Medium Density Residential
606000	4914100	Medium Density Residential
606100	4914100	Medium Density Residential
606200	4914100	Medium Density Residential
606300	4914100	Medium Density Residential
606400	4914100	Medium Density Residential
605500	4914200	Medium Density Residential
605600	4914200	Medium Density Residential
605700	4914200	Medium Density Residential
605800	4914200	Medium Density Residential
605900	4914200	Medium Density Residential
606000	4914200	Medium Density Residential
606100	4914200	Medium Density Residential
606200	4914200	Medium Density Residential
606300	4914200	Medium Density Residential
606400	4914200	Medium Density Residential
605500	4914300	Medium Density Residential
605600	4914300	Medium Density Residential

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605700	4914300	Medium Density Residential
605800	4914300	Medium Density Residential
605900	4914300	Medium Density Residential
606000	4914300	Medium Density Residential
606100	4914300	Medium Density Residential
606200	4914300	Medium Density Residential
606300	4914300	Medium Density Residential
606400	4914300	Medium Density Residential
605500	4914400	Medium Density Residential
605600	4914400	Medium Density Residential
605700	4914400	Medium Density Residential
605800	4914400	Medium Density Residential
605900	4914400	Medium Density Residential
606000	4914400	Medium Density Residential
606100	4914400	Medium Density Residential
606200	4914400	Medium Density Residential
606300	4914400	Medium Density Residential
606400	4914400	Medium Density Residential
605500	4914500	Medium Density Residential
605600	4914500	Medium Density Residential
605700	4914500	Medium Density Residential
605800	4914500	Medium Density Residential
605900	4914500	Medium Density Residential
606000	4914500	Medium Density Residential
606100	4914500	Medium Density Residential
606200	4914500	Medium Density Residential
606300	4914500	Medium Density Residential
606400	4914500	Medium Density Residential
605600	4914600	Medium Density Residential
605700	4914600	Medium Density Residential
605800	4914600	Medium Density Residential
605900	4914600	Medium Density Residential
606000	4914600	Medium Density Residential
606100	4914600	Medium Density Residential
606200	4914600	Medium Density Residential
606300	4914600	Medium Density Residential
606400	4914600	Medium Density Residential
605600	4914700	Medium Density Residential
605700	4914700	Medium Density Residential
605800	4914700	Medium Density Residential

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605900	4914700	Medium Density Residential
606000	4914700	Medium Density Residential
606100	4914700	Medium Density Residential
606200	4914700	Medium Density Residential
606300	4914700	Medium Density Residential
606400	4914700	Medium Density Residential
606800	4912600	Medium Density Residential
607000	4912600	Medium Density Residential
607200	4912600	Medium Density Residential
607400	4912600	Medium Density Residential
606800	4912800	Medium Density Residential
607000	4912800	Medium Density Residential
607200	4912800	Medium Density Residential
607400	4912800	Medium Density Residential
606800	4913000	Medium Density Residential
607000	4913000	Medium Density Residential
607200	4913000	Medium Density Residential
607400	4913000	Medium Density Residential
605600	4913200	Medium Density Residential
605800	4913200	Medium Density Residential
606000	4913200	Medium Density Residential
606200	4913200	Medium Density Residential
606400	4913200	Medium Density Residential
606600	4913200	Medium Density Residential
606800	4913200	Medium Density Residential
607000	4913200	Medium Density Residential
607200	4913200	Medium Density Residential
607400	4913200	Medium Density Residential
605600	4913400	Medium Density Residential
605800	4913400	Medium Density Residential
606000	4913400	Medium Density Residential
606200	4913400	Medium Density Residential
606400	4913400	Medium Density Residential
606600	4913400	Medium Density Residential
606800	4913400	Medium Density Residential
607000	4913400	Medium Density Residential
607200	4913400	Medium Density Residential
605600	4913600	Medium Density Residential
605800	4913600	Medium Density Residential
606000	4913600	Medium Density Residential

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
606200	4913600	Medium Density Residential
606400	4913600	Medium Density Residential
606600	4913600	Medium Density Residential
606800	4913600	Medium Density Residential
607000	4913600	Medium Density Residential
607200	4913600	Medium Density Residential
607400	4913600	Medium Density Residential
606600	4913800	Medium Density Residential
606800	4913800	Medium Density Residential
607000	4913800	Medium Density Residential
607200	4913800	Medium Density Residential
607400	4913800	Medium Density Residential
606600	4914000	Medium Density Residential
606800	4914000	Medium Density Residential
607000	4914000	Medium Density Residential
607200	4914000	Medium Density Residential
607400	4914000	Medium Density Residential
606600	4914200	Medium Density Residential
606800	4914200	Medium Density Residential
607000	4914200	Medium Density Residential
607200	4914200	Medium Density Residential
607400	4914200	Medium Density Residential
606600	4914400	Medium Density Residential
606800	4914400	Medium Density Residential
607000	4914400	Medium Density Residential
607200	4914400	Medium Density Residential
607400	4914400	Medium Density Residential
606600	4914600	Medium Density Residential
606800	4914600	Medium Density Residential
607000	4914600	Medium Density Residential
607200	4914600	Medium Density Residential
607400	4914600	Medium Density Residential
606600	4914800	Medium Density Residential
606800	4914800	Medium Density Residential
607000	4914800	Medium Density Residential
607200	4914800	Medium Density Residential
607400	4914800	Medium Density Residential
605189.9	4914822.3	Mineral and Aggregate
605189.9	4914799.1	Mineral and Aggregate
605168.2	4914799.4	Mineral and Aggregate

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605146.4	4914799.7	Mineral and Aggregate
605124.7	4914800.1	Mineral and Aggregate
605107.7	4914799.6	Mineral and Aggregate
605090.8	4914799.2	Mineral and Aggregate
605073.8	4914798.7	Mineral and Aggregate
605053.6	4914799.6	Mineral and Aggregate
605033.5	4914800.5	Mineral and Aggregate
605013.3	4914801.4	Mineral and Aggregate
604993.1	4914802.3	Mineral and Aggregate
604974.1	4914801.4	Mineral and Aggregate
604955.1	4914800.4	Mineral and Aggregate
604941.5	4914791	Mineral and Aggregate
604684.6	4914799.3	Mineral and Aggregate
604684.2	4914823.3	Mineral and Aggregate
604683.7	4914847.3	Mineral and Aggregate
604683.3	4914871.3	Mineral and Aggregate
604682.9	4914895.3	Mineral and Aggregate
604682.4	4914919.3	Mineral and Aggregate
604682	4914943.3	Mineral and Aggregate
604681.6	4914967.3	Mineral and Aggregate
604681.1	4914991.3	Mineral and Aggregate
604701.9	4915183.9	Mineral and Aggregate
604726.1	4915184.4	Mineral and Aggregate
604750.3	4915184.9	Mineral and Aggregate
604774.6	4915185.4	Mineral and Aggregate
604798.8	4915186	Mineral and Aggregate
604823	4915186.5	Mineral and Aggregate
604847.2	4915187	Mineral and Aggregate
604871.5	4915187.5	Mineral and Aggregate
604895.7	4915188	Mineral and Aggregate
604975	4914800	Mineral and Aggregate
605000	4914800	Mineral and Aggregate
605025	4914800	Mineral and Aggregate
604927.8	4914781.7	Prime Forest
604903.5	4914781	Prime Forest
604879.3	4914780.4	Prime Forest
604855	4914779.8	Prime Forest
604830.7	4914779.1	Prime Forest
604806.4	4914778.5	Prime Forest
604782.2	4914777.8	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604757.9	4914777.2	Prime Forest
604733.6	4914776.5	Prime Forest
604709.3	4914775.9	Prime Forest
604685.1	4914775.3	Prime Forest
604680.7	4915015.3	Prime Forest
604680.3	4915039.3	Prime Forest
604679.8	4915063.4	Prime Forest
604679.4	4915087.4	Prime Forest
604679	4915111.4	Prime Forest
604678.5	4915135.4	Prime Forest
604678.1	4915159.4	Prime Forest
604677.7	4915183.4	Prime Forest
604475	4914575	Prime Forest
604500	4914575	Prime Forest
604525	4914575	Prime Forest
604550	4914575	Prime Forest
604575	4914575	Prime Forest
604600	4914575	Prime Forest
604625	4914575	Prime Forest
604650	4914575	Prime Forest
604675	4914575	Prime Forest
604700	4914575	Prime Forest
604725	4914575	Prime Forest
604750	4914575	Prime Forest
604775	4914575	Prime Forest
604800	4914575	Prime Forest
604825	4914575	Prime Forest
604850	4914575	Prime Forest
604875	4914575	Prime Forest
604900	4914575	Prime Forest
604925	4914575	Prime Forest
604950	4914575	Prime Forest
604975	4914575	Prime Forest
605000	4914575	Prime Forest
605025	4914575	Prime Forest
605050	4914575	Prime Forest
605075	4914575	Prime Forest
605100	4914575	Prime Forest
605125	4914575	Prime Forest
605150	4914575	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605175	4914575	Prime Forest
605200	4914575	Prime Forest
605225	4914575	Prime Forest
605250	4914575	Prime Forest
605275	4914575	Prime Forest
605300	4914575	Prime Forest
605325	4914575	Prime Forest
605350	4914575	Prime Forest
605375	4914575	Prime Forest
605400	4914575	Prime Forest
605425	4914575	Prime Forest
605450	4914575	Prime Forest
605475	4914575	Prime Forest
604475	4914600	Prime Forest
604500	4914600	Prime Forest
604525	4914600	Prime Forest
604550	4914600	Prime Forest
604575	4914600	Prime Forest
604600	4914600	Prime Forest
604625	4914600	Prime Forest
604650	4914600	Prime Forest
604675	4914600	Prime Forest
604700	4914600	Prime Forest
604725	4914600	Prime Forest
604750	4914600	Prime Forest
604775	4914600	Prime Forest
604800	4914600	Prime Forest
604825	4914600	Prime Forest
604850	4914600	Prime Forest
604875	4914600	Prime Forest
604900	4914600	Prime Forest
604925	4914600	Prime Forest
604950	4914600	Prime Forest
604975	4914600	Prime Forest
605000	4914600	Prime Forest
605025	4914600	Prime Forest
605050	4914600	Prime Forest
605075	4914600	Prime Forest
605100	4914600	Prime Forest
605125	4914600	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605150	4914600	Prime Forest
605175	4914600	Prime Forest
605200	4914600	Prime Forest
605225	4914600	Prime Forest
605250	4914600	Prime Forest
605275	4914600	Prime Forest
605300	4914600	Prime Forest
605325	4914600	Prime Forest
605350	4914600	Prime Forest
605375	4914600	Prime Forest
605400	4914600	Prime Forest
605425	4914600	Prime Forest
605450	4914600	Prime Forest
605475	4914600	Prime Forest
604475	4914625	Prime Forest
604500	4914625	Prime Forest
604525	4914625	Prime Forest
604550	4914625	Prime Forest
604575	4914625	Prime Forest
604600	4914625	Prime Forest
604625	4914625	Prime Forest
604650	4914625	Prime Forest
604675	4914625	Prime Forest
604700	4914625	Prime Forest
604725	4914625	Prime Forest
604750	4914625	Prime Forest
604775	4914625	Prime Forest
604800	4914625	Prime Forest
604825	4914625	Prime Forest
604850	4914625	Prime Forest
604875	4914625	Prime Forest
604900	4914625	Prime Forest
604925	4914625	Prime Forest
604950	4914625	Prime Forest
604975	4914625	Prime Forest
605000	4914625	Prime Forest
605025	4914625	Prime Forest
605050	4914625	Prime Forest
605075	4914625	Prime Forest
605100	4914625	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605125	4914625	Prime Forest
605150	4914625	Prime Forest
605175	4914625	Prime Forest
605200	4914625	Prime Forest
605225	4914625	Prime Forest
605250	4914625	Prime Forest
605275	4914625	Prime Forest
605300	4914625	Prime Forest
605325	4914625	Prime Forest
605350	4914625	Prime Forest
605375	4914625	Prime Forest
605400	4914625	Prime Forest
605425	4914625	Prime Forest
605450	4914625	Prime Forest
605475	4914625	Prime Forest
604475	4914650	Prime Forest
604500	4914650	Prime Forest
604525	4914650	Prime Forest
604550	4914650	Prime Forest
604575	4914650	Prime Forest
604600	4914650	Prime Forest
604625	4914650	Prime Forest
604650	4914650	Prime Forest
604675	4914650	Prime Forest
604700	4914650	Prime Forest
604725	4914650	Prime Forest
604750	4914650	Prime Forest
604775	4914650	Prime Forest
604800	4914650	Prime Forest
604825	4914650	Prime Forest
604850	4914650	Prime Forest
604875	4914650	Prime Forest
604900	4914650	Prime Forest
604925	4914650	Prime Forest
604950	4914650	Prime Forest
604975	4914650	Prime Forest
605000	4914650	Prime Forest
605025	4914650	Prime Forest
605050	4914650	Prime Forest
605075	4914650	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605100	4914650	Prime Forest
605125	4914650	Prime Forest
605150	4914650	Prime Forest
605175	4914650	Prime Forest
605200	4914650	Prime Forest
605225	4914650	Prime Forest
605250	4914650	Prime Forest
605275	4914650	Prime Forest
605300	4914650	Prime Forest
605325	4914650	Prime Forest
605350	4914650	Prime Forest
605375	4914650	Prime Forest
605400	4914650	Prime Forest
605425	4914650	Prime Forest
605450	4914650	Prime Forest
605475	4914650	Prime Forest
604475	4914675	Prime Forest
604500	4914675	Prime Forest
604525	4914675	Prime Forest
604550	4914675	Prime Forest
604575	4914675	Prime Forest
604600	4914675	Prime Forest
604625	4914675	Prime Forest
604650	4914675	Prime Forest
604675	4914675	Prime Forest
604700	4914675	Prime Forest
604725	4914675	Prime Forest
604750	4914675	Prime Forest
604775	4914675	Prime Forest
604800	4914675	Prime Forest
604825	4914675	Prime Forest
604850	4914675	Prime Forest
604875	4914675	Prime Forest
604900	4914675	Prime Forest
604925	4914675	Prime Forest
604950	4914675	Prime Forest
604975	4914675	Prime Forest
605000	4914675	Prime Forest
605025	4914675	Prime Forest
605050	4914675	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605075	4914675	Prime Forest
605100	4914675	Prime Forest
605125	4914675	Prime Forest
605150	4914675	Prime Forest
605175	4914675	Prime Forest
605200	4914675	Prime Forest
605225	4914675	Prime Forest
605250	4914675	Prime Forest
605275	4914675	Prime Forest
605300	4914675	Prime Forest
605325	4914675	Prime Forest
605350	4914675	Prime Forest
605375	4914675	Prime Forest
605400	4914675	Prime Forest
605425	4914675	Prime Forest
605450	4914675	Prime Forest
605475	4914675	Prime Forest
604475	4914700	Prime Forest
604500	4914700	Prime Forest
604525	4914700	Prime Forest
604550	4914700	Prime Forest
604575	4914700	Prime Forest
604600	4914700	Prime Forest
604625	4914700	Prime Forest
604650	4914700	Prime Forest
604675	4914700	Prime Forest
604700	4914700	Prime Forest
604725	4914700	Prime Forest
604750	4914700	Prime Forest
604775	4914700	Prime Forest
604800	4914700	Prime Forest
604825	4914700	Prime Forest
604850	4914700	Prime Forest
604875	4914700	Prime Forest
604900	4914700	Prime Forest
604925	4914700	Prime Forest
604950	4914700	Prime Forest
604975	4914700	Prime Forest
605000	4914700	Prime Forest
605025	4914700	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605050	4914700	Prime Forest
605075	4914700	Prime Forest
605100	4914700	Prime Forest
605125	4914700	Prime Forest
605150	4914700	Prime Forest
605175	4914700	Prime Forest
605200	4914700	Prime Forest
605225	4914700	Prime Forest
605250	4914700	Prime Forest
605275	4914700	Prime Forest
605300	4914700	Prime Forest
605325	4914700	Prime Forest
605350	4914700	Prime Forest
605375	4914700	Prime Forest
605400	4914700	Prime Forest
605425	4914700	Prime Forest
605450	4914700	Prime Forest
605475	4914700	Prime Forest
604475	4914725	Prime Forest
604500	4914725	Prime Forest
604525	4914725	Prime Forest
604550	4914725	Prime Forest
604575	4914725	Prime Forest
604600	4914725	Prime Forest
604625	4914725	Prime Forest
604650	4914725	Prime Forest
604675	4914725	Prime Forest
604700	4914725	Prime Forest
604725	4914725	Prime Forest
604750	4914725	Prime Forest
604775	4914725	Prime Forest
604800	4914725	Prime Forest
604825	4914725	Prime Forest
604850	4914725	Prime Forest
604875	4914725	Prime Forest
604900	4914725	Prime Forest
604925	4914725	Prime Forest
604950	4914725	Prime Forest
604975	4914725	Prime Forest
605000	4914725	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605025	4914725	Prime Forest
605050	4914725	Prime Forest
605075	4914725	Prime Forest
605100	4914725	Prime Forest
605125	4914725	Prime Forest
605150	4914725	Prime Forest
605175	4914725	Prime Forest
605200	4914725	Prime Forest
605225	4914725	Prime Forest
605250	4914725	Prime Forest
605275	4914725	Prime Forest
605300	4914725	Prime Forest
605325	4914725	Prime Forest
605350	4914725	Prime Forest
605375	4914725	Prime Forest
605400	4914725	Prime Forest
605425	4914725	Prime Forest
605450	4914725	Prime Forest
605475	4914725	Prime Forest
604475	4914750	Prime Forest
604500	4914750	Prime Forest
604525	4914750	Prime Forest
604550	4914750	Prime Forest
604575	4914750	Prime Forest
604600	4914750	Prime Forest
604625	4914750	Prime Forest
604650	4914750	Prime Forest
604675	4914750	Prime Forest
604700	4914750	Prime Forest
604725	4914750	Prime Forest
604750	4914750	Prime Forest
604775	4914750	Prime Forest
604800	4914750	Prime Forest
604825	4914750	Prime Forest
604850	4914750	Prime Forest
604875	4914750	Prime Forest
604900	4914750	Prime Forest
604925	4914750	Prime Forest
604950	4914750	Prime Forest
604975	4914750	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605000	4914750	Prime Forest
605025	4914750	Prime Forest
605050	4914750	Prime Forest
605075	4914750	Prime Forest
605100	4914750	Prime Forest
605125	4914750	Prime Forest
605150	4914750	Prime Forest
605175	4914750	Prime Forest
605200	4914750	Prime Forest
605225	4914750	Prime Forest
605250	4914750	Prime Forest
605275	4914750	Prime Forest
605300	4914750	Prime Forest
605325	4914750	Prime Forest
605350	4914750	Prime Forest
605375	4914750	Prime Forest
605400	4914750	Prime Forest
605425	4914750	Prime Forest
605450	4914750	Prime Forest
605475	4914750	Prime Forest
604475	4914775	Prime Forest
604500	4914775	Prime Forest
604525	4914775	Prime Forest
604550	4914775	Prime Forest
604575	4914775	Prime Forest
604600	4914775	Prime Forest
604625	4914775	Prime Forest
604650	4914775	Prime Forest
604675	4914775	Prime Forest
604700	4914775	Prime Forest
604725	4914775	Prime Forest
604750	4914775	Prime Forest
604775	4914775	Prime Forest
604800	4914775	Prime Forest
604825	4914775	Prime Forest
604850	4914775	Prime Forest
604875	4914775	Prime Forest
604900	4914775	Prime Forest
604925	4914775	Prime Forest
604950	4914775	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604975	4914775	Prime Forest
605000	4914775	Prime Forest
605025	4914775	Prime Forest
605050	4914775	Prime Forest
605075	4914775	Prime Forest
605100	4914775	Prime Forest
605125	4914775	Prime Forest
605150	4914775	Prime Forest
605175	4914775	Prime Forest
605200	4914775	Prime Forest
605225	4914775	Prime Forest
605250	4914775	Prime Forest
605275	4914775	Prime Forest
605300	4914775	Prime Forest
605325	4914775	Prime Forest
605350	4914775	Prime Forest
605375	4914775	Prime Forest
605400	4914775	Prime Forest
605425	4914775	Prime Forest
605450	4914775	Prime Forest
605475	4914775	Prime Forest
604475	4914800	Prime Forest
604500	4914800	Prime Forest
604525	4914800	Prime Forest
604550	4914800	Prime Forest
604575	4914800	Prime Forest
604600	4914800	Prime Forest
604625	4914800	Prime Forest
604650	4914800	Prime Forest
604675	4914800	Prime Forest
605500	4914800	Prime Forest
605525	4914800	Prime Forest
604475	4914825	Prime Forest
604500	4914825	Prime Forest
604525	4914825	Prime Forest
604550	4914825	Prime Forest
604575	4914825	Prime Forest
604600	4914825	Prime Forest
604625	4914825	Prime Forest
604650	4914825	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604675	4914825	Prime Forest
605500	4914825	Prime Forest
605525	4914825	Prime Forest
604475	4914850	Prime Forest
604500	4914850	Prime Forest
604525	4914850	Prime Forest
604550	4914850	Prime Forest
604575	4914850	Prime Forest
604600	4914850	Prime Forest
604625	4914850	Prime Forest
604650	4914850	Prime Forest
604675	4914850	Prime Forest
605500	4914850	Prime Forest
605525	4914850	Prime Forest
604475	4914875	Prime Forest
604500	4914875	Prime Forest
604525	4914875	Prime Forest
604550	4914875	Prime Forest
604575	4914875	Prime Forest
604600	4914875	Prime Forest
604625	4914875	Prime Forest
604650	4914875	Prime Forest
604675	4914875	Prime Forest
605500	4914875	Prime Forest
605525	4914875	Prime Forest
604475	4914900	Prime Forest
604500	4914900	Prime Forest
604525	4914900	Prime Forest
604550	4914900	Prime Forest
604575	4914900	Prime Forest
604600	4914900	Prime Forest
604625	4914900	Prime Forest
604650	4914900	Prime Forest
604675	4914900	Prime Forest
605500	4914900	Prime Forest
605525	4914900	Prime Forest
604475	4914925	Prime Forest
604500	4914925	Prime Forest
604525	4914925	Prime Forest
604550	4914925	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604575	4914925	Prime Forest
604600	4914925	Prime Forest
604625	4914925	Prime Forest
604650	4914925	Prime Forest
604675	4914925	Prime Forest
605500	4914925	Prime Forest
605525	4914925	Prime Forest
604475	4914950	Prime Forest
604500	4914950	Prime Forest
604525	4914950	Prime Forest
604550	4914950	Prime Forest
604575	4914950	Prime Forest
604600	4914950	Prime Forest
604625	4914950	Prime Forest
604650	4914950	Prime Forest
604675	4914950	Prime Forest
605500	4914950	Prime Forest
605525	4914950	Prime Forest
604475	4914975	Prime Forest
604500	4914975	Prime Forest
604525	4914975	Prime Forest
604550	4914975	Prime Forest
604575	4914975	Prime Forest
604600	4914975	Prime Forest
604625	4914975	Prime Forest
604650	4914975	Prime Forest
604675	4914975	Prime Forest
605500	4914975	Prime Forest
605525	4914975	Prime Forest
604475	4915000	Prime Forest
604500	4915000	Prime Forest
604525	4915000	Prime Forest
604550	4915000	Prime Forest
604575	4915000	Prime Forest
604600	4915000	Prime Forest
604625	4915000	Prime Forest
604650	4915000	Prime Forest
604675	4915000	Prime Forest
605500	4915000	Prime Forest
605525	4915000	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604475	4915025	Prime Forest
604500	4915025	Prime Forest
604525	4915025	Prime Forest
604550	4915025	Prime Forest
604575	4915025	Prime Forest
604600	4915025	Prime Forest
604625	4915025	Prime Forest
604650	4915025	Prime Forest
604675	4915025	Prime Forest
605500	4915025	Prime Forest
605525	4915025	Prime Forest
604475	4915050	Prime Forest
604500	4915050	Prime Forest
604525	4915050	Prime Forest
604550	4915050	Prime Forest
604575	4915050	Prime Forest
604600	4915050	Prime Forest
604625	4915050	Prime Forest
604650	4915050	Prime Forest
604675	4915050	Prime Forest
605500	4915050	Prime Forest
605525	4915050	Prime Forest
604475	4915075	Prime Forest
604500	4915075	Prime Forest
604525	4915075	Prime Forest
604550	4915075	Prime Forest
604575	4915075	Prime Forest
604600	4915075	Prime Forest
604625	4915075	Prime Forest
604650	4915075	Prime Forest
604675	4915075	Prime Forest
605500	4915075	Prime Forest
605525	4915075	Prime Forest
604475	4915100	Prime Forest
604500	4915100	Prime Forest
604525	4915100	Prime Forest
604550	4915100	Prime Forest
604575	4915100	Prime Forest
604600	4915100	Prime Forest
604625	4915100	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604650	4915100	Prime Forest
604675	4915100	Prime Forest
605500	4915100	Prime Forest
605525	4915100	Prime Forest
604475	4915125	Prime Forest
604500	4915125	Prime Forest
604525	4915125	Prime Forest
604550	4915125	Prime Forest
604575	4915125	Prime Forest
604600	4915125	Prime Forest
604625	4915125	Prime Forest
604650	4915125	Prime Forest
604675	4915125	Prime Forest
605500	4915125	Prime Forest
605525	4915125	Prime Forest
604475	4915150	Prime Forest
604500	4915150	Prime Forest
604525	4915150	Prime Forest
604550	4915150	Prime Forest
604575	4915150	Prime Forest
604600	4915150	Prime Forest
604625	4915150	Prime Forest
604650	4915150	Prime Forest
604675	4915150	Prime Forest
605500	4915150	Prime Forest
605525	4915150	Prime Forest
604475	4915175	Prime Forest
604500	4915175	Prime Forest
604525	4915175	Prime Forest
604550	4915175	Prime Forest
604575	4915175	Prime Forest
604600	4915175	Prime Forest
604625	4915175	Prime Forest
604650	4915175	Prime Forest
604675	4915175	Prime Forest
605500	4915175	Prime Forest
605525	4915175	Prime Forest
604475	4915200	Prime Forest
604500	4915200	Prime Forest
604525	4915200	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604550	4915200	Prime Forest
604575	4915200	Prime Forest
604600	4915200	Prime Forest
604625	4915200	Prime Forest
604650	4915200	Prime Forest
604675	4915200	Prime Forest
604700	4915200	Prime Forest
604725	4915200	Prime Forest
604750	4915200	Prime Forest
604775	4915200	Prime Forest
604800	4915200	Prime Forest
604825	4915200	Prime Forest
604850	4915200	Prime Forest
604875	4915200	Prime Forest
604900	4915200	Prime Forest
604925	4915200	Prime Forest
604950	4915200	Prime Forest
604975	4915200	Prime Forest
605000	4915200	Prime Forest
605025	4915200	Prime Forest
605050	4915200	Prime Forest
605075	4915200	Prime Forest
605100	4915200	Prime Forest
605125	4915200	Prime Forest
605150	4915200	Prime Forest
605175	4915200	Prime Forest
605200	4915200	Prime Forest
605225	4915200	Prime Forest
605250	4915200	Prime Forest
605275	4915200	Prime Forest
605300	4915200	Prime Forest
605500	4915200	Prime Forest
605525	4915200	Prime Forest
604475	4915225	Prime Forest
604500	4915225	Prime Forest
604525	4915225	Prime Forest
604550	4915225	Prime Forest
604575	4915225	Prime Forest
604600	4915225	Prime Forest
604625	4915225	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604650	4915225	Prime Forest
604675	4915225	Prime Forest
604700	4915225	Prime Forest
604725	4915225	Prime Forest
604750	4915225	Prime Forest
604775	4915225	Prime Forest
604800	4915225	Prime Forest
604825	4915225	Prime Forest
604850	4915225	Prime Forest
604875	4915225	Prime Forest
604900	4915225	Prime Forest
604925	4915225	Prime Forest
604950	4915225	Prime Forest
604975	4915225	Prime Forest
605000	4915225	Prime Forest
605025	4915225	Prime Forest
605050	4915225	Prime Forest
605075	4915225	Prime Forest
605100	4915225	Prime Forest
605125	4915225	Prime Forest
605150	4915225	Prime Forest
605175	4915225	Prime Forest
605200	4915225	Prime Forest
605225	4915225	Prime Forest
605250	4915225	Prime Forest
605275	4915225	Prime Forest
605300	4915225	Prime Forest
605325	4915225	Prime Forest
605350	4915225	Prime Forest
605375	4915225	Prime Forest
605400	4915225	Prime Forest
605425	4915225	Prime Forest
605450	4915225	Prime Forest
605475	4915225	Prime Forest
605500	4915225	Prime Forest
605525	4915225	Prime Forest
604475	4915250	Prime Forest
604500	4915250	Prime Forest
604525	4915250	Prime Forest
604550	4915250	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604575	4915250	Prime Forest
604600	4915250	Prime Forest
604625	4915250	Prime Forest
604650	4915250	Prime Forest
604675	4915250	Prime Forest
604700	4915250	Prime Forest
604725	4915250	Prime Forest
604750	4915250	Prime Forest
604775	4915250	Prime Forest
604800	4915250	Prime Forest
604825	4915250	Prime Forest
604850	4915250	Prime Forest
604875	4915250	Prime Forest
604900	4915250	Prime Forest
604925	4915250	Prime Forest
604950	4915250	Prime Forest
604975	4915250	Prime Forest
605000	4915250	Prime Forest
605025	4915250	Prime Forest
605050	4915250	Prime Forest
605075	4915250	Prime Forest
605100	4915250	Prime Forest
605125	4915250	Prime Forest
605150	4915250	Prime Forest
605175	4915250	Prime Forest
605200	4915250	Prime Forest
605225	4915250	Prime Forest
605250	4915250	Prime Forest
605275	4915250	Prime Forest
605300	4915250	Prime Forest
605325	4915250	Prime Forest
605350	4915250	Prime Forest
605375	4915250	Prime Forest
605400	4915250	Prime Forest
605425	4915250	Prime Forest
605450	4915250	Prime Forest
605475	4915250	Prime Forest
605500	4915250	Prime Forest
605525	4915250	Prime Forest
604475	4915275	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604500	4915275	Prime Forest
604525	4915275	Prime Forest
604550	4915275	Prime Forest
604575	4915275	Prime Forest
604600	4915275	Prime Forest
604625	4915275	Prime Forest
604650	4915275	Prime Forest
604675	4915275	Prime Forest
604700	4915275	Prime Forest
604725	4915275	Prime Forest
604750	4915275	Prime Forest
604775	4915275	Prime Forest
604800	4915275	Prime Forest
604825	4915275	Prime Forest
604850	4915275	Prime Forest
604875	4915275	Prime Forest
604900	4915275	Prime Forest
604925	4915275	Prime Forest
604950	4915275	Prime Forest
604975	4915275	Prime Forest
605000	4915275	Prime Forest
605025	4915275	Prime Forest
605050	4915275	Prime Forest
605075	4915275	Prime Forest
605100	4915275	Prime Forest
605125	4915275	Prime Forest
605150	4915275	Prime Forest
605175	4915275	Prime Forest
605200	4915275	Prime Forest
605225	4915275	Prime Forest
605250	4915275	Prime Forest
605275	4915275	Prime Forest
605300	4915275	Prime Forest
605325	4915275	Prime Forest
605350	4915275	Prime Forest
605375	4915275	Prime Forest
605400	4915275	Prime Forest
605425	4915275	Prime Forest
605450	4915275	Prime Forest
605475	4915275	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605500	4915275	Prime Forest
605525	4915275	Prime Forest
604475	4915300	Prime Forest
604500	4915300	Prime Forest
604525	4915300	Prime Forest
604550	4915300	Prime Forest
604575	4915300	Prime Forest
604600	4915300	Prime Forest
604625	4915300	Prime Forest
604650	4915300	Prime Forest
604675	4915300	Prime Forest
604700	4915300	Prime Forest
604725	4915300	Prime Forest
604750	4915300	Prime Forest
604775	4915300	Prime Forest
604800	4915300	Prime Forest
604825	4915300	Prime Forest
604850	4915300	Prime Forest
604875	4915300	Prime Forest
604900	4915300	Prime Forest
604925	4915300	Prime Forest
604950	4915300	Prime Forest
604975	4915300	Prime Forest
605000	4915300	Prime Forest
605025	4915300	Prime Forest
605050	4915300	Prime Forest
605075	4915300	Prime Forest
605100	4915300	Prime Forest
605125	4915300	Prime Forest
605150	4915300	Prime Forest
605175	4915300	Prime Forest
605200	4915300	Prime Forest
605225	4915300	Prime Forest
605250	4915300	Prime Forest
605275	4915300	Prime Forest
605300	4915300	Prime Forest
605325	4915300	Prime Forest
605350	4915300	Prime Forest
605375	4915300	Prime Forest
605400	4915300	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605425	4915300	Prime Forest
605450	4915300	Prime Forest
605475	4915300	Prime Forest
605500	4915300	Prime Forest
605525	4915300	Prime Forest
604475	4915325	Prime Forest
604500	4915325	Prime Forest
604525	4915325	Prime Forest
604550	4915325	Prime Forest
604575	4915325	Prime Forest
604600	4915325	Prime Forest
604625	4915325	Prime Forest
604650	4915325	Prime Forest
604675	4915325	Prime Forest
604700	4915325	Prime Forest
604725	4915325	Prime Forest
604750	4915325	Prime Forest
604775	4915325	Prime Forest
604800	4915325	Prime Forest
604825	4915325	Prime Forest
604850	4915325	Prime Forest
604875	4915325	Prime Forest
604900	4915325	Prime Forest
604925	4915325	Prime Forest
604950	4915325	Prime Forest
604975	4915325	Prime Forest
605000	4915325	Prime Forest
605025	4915325	Prime Forest
605050	4915325	Prime Forest
605075	4915325	Prime Forest
605100	4915325	Prime Forest
605125	4915325	Prime Forest
605150	4915325	Prime Forest
605175	4915325	Prime Forest
605200	4915325	Prime Forest
605225	4915325	Prime Forest
605250	4915325	Prime Forest
605275	4915325	Prime Forest
605300	4915325	Prime Forest
605325	4915325	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605350	4915325	Prime Forest
605375	4915325	Prime Forest
605400	4915325	Prime Forest
605425	4915325	Prime Forest
605450	4915325	Prime Forest
605475	4915325	Prime Forest
605500	4915325	Prime Forest
605525	4915325	Prime Forest
604475	4915350	Prime Forest
604500	4915350	Prime Forest
604525	4915350	Prime Forest
604550	4915350	Prime Forest
604575	4915350	Prime Forest
604600	4915350	Prime Forest
604625	4915350	Prime Forest
604650	4915350	Prime Forest
604675	4915350	Prime Forest
604700	4915350	Prime Forest
604725	4915350	Prime Forest
604750	4915350	Prime Forest
604775	4915350	Prime Forest
604800	4915350	Prime Forest
604825	4915350	Prime Forest
604850	4915350	Prime Forest
604875	4915350	Prime Forest
604900	4915350	Prime Forest
604925	4915350	Prime Forest
604950	4915350	Prime Forest
604975	4915350	Prime Forest
605000	4915350	Prime Forest
605025	4915350	Prime Forest
605050	4915350	Prime Forest
605075	4915350	Prime Forest
605100	4915350	Prime Forest
605125	4915350	Prime Forest
605150	4915350	Prime Forest
605175	4915350	Prime Forest
605200	4915350	Prime Forest
605225	4915350	Prime Forest
605250	4915350	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605275	4915350	Prime Forest
605300	4915350	Prime Forest
605325	4915350	Prime Forest
605350	4915350	Prime Forest
605375	4915350	Prime Forest
605400	4915350	Prime Forest
605425	4915350	Prime Forest
605450	4915350	Prime Forest
605475	4915350	Prime Forest
605500	4915350	Prime Forest
605525	4915350	Prime Forest
604475	4915375	Prime Forest
604500	4915375	Prime Forest
604525	4915375	Prime Forest
604550	4915375	Prime Forest
604575	4915375	Prime Forest
604600	4915375	Prime Forest
604625	4915375	Prime Forest
604650	4915375	Prime Forest
604675	4915375	Prime Forest
604700	4915375	Prime Forest
604725	4915375	Prime Forest
604750	4915375	Prime Forest
604775	4915375	Prime Forest
604800	4915375	Prime Forest
604825	4915375	Prime Forest
604850	4915375	Prime Forest
604875	4915375	Prime Forest
604900	4915375	Prime Forest
604925	4915375	Prime Forest
604950	4915375	Prime Forest
604975	4915375	Prime Forest
605000	4915375	Prime Forest
605025	4915375	Prime Forest
605050	4915375	Prime Forest
605075	4915375	Prime Forest
605100	4915375	Prime Forest
605125	4915375	Prime Forest
605150	4915375	Prime Forest
605175	4915375	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605200	4915375	Prime Forest
605225	4915375	Prime Forest
605250	4915375	Prime Forest
605275	4915375	Prime Forest
605300	4915375	Prime Forest
605325	4915375	Prime Forest
605350	4915375	Prime Forest
605375	4915375	Prime Forest
605400	4915375	Prime Forest
605425	4915375	Prime Forest
605450	4915375	Prime Forest
605475	4915375	Prime Forest
605500	4915375	Prime Forest
605525	4915375	Prime Forest
604475	4915400	Prime Forest
604500	4915400	Prime Forest
604525	4915400	Prime Forest
604550	4915400	Prime Forest
604575	4915400	Prime Forest
604600	4915400	Prime Forest
604625	4915400	Prime Forest
604650	4915400	Prime Forest
604675	4915400	Prime Forest
604700	4915400	Prime Forest
604725	4915400	Prime Forest
604750	4915400	Prime Forest
604775	4915400	Prime Forest
604800	4915400	Prime Forest
604825	4915400	Prime Forest
604850	4915400	Prime Forest
604875	4915400	Prime Forest
604900	4915400	Prime Forest
604925	4915400	Prime Forest
604950	4915400	Prime Forest
604975	4915400	Prime Forest
605000	4915400	Prime Forest
605025	4915400	Prime Forest
605050	4915400	Prime Forest
605075	4915400	Prime Forest
605100	4915400	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605125	4915400	Prime Forest
605150	4915400	Prime Forest
605175	4915400	Prime Forest
605200	4915400	Prime Forest
605225	4915400	Prime Forest
605250	4915400	Prime Forest
605275	4915400	Prime Forest
605300	4915400	Prime Forest
605325	4915400	Prime Forest
605350	4915400	Prime Forest
605375	4915400	Prime Forest
605400	4915400	Prime Forest
605425	4915400	Prime Forest
605450	4915400	Prime Forest
605475	4915400	Prime Forest
605500	4915400	Prime Forest
605525	4915400	Prime Forest
603600	4913700	Prime Forest
603700	4913700	Prime Forest
603800	4913700	Prime Forest
603900	4913700	Prime Forest
604000	4913700	Prime Forest
604100	4913700	Prime Forest
604200	4913700	Prime Forest
604300	4913700	Prime Forest
604400	4913700	Prime Forest
604500	4913700	Prime Forest
604600	4913700	Prime Forest
604700	4913700	Prime Forest
604800	4913700	Prime Forest
604900	4913700	Prime Forest
605000	4913700	Prime Forest
605100	4913700	Prime Forest
605200	4913700	Prime Forest
605300	4913700	Prime Forest
605400	4913700	Prime Forest
603600	4913800	Prime Forest
603700	4913800	Prime Forest
603800	4913800	Prime Forest
603900	4913800	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604000	4913800	Prime Forest
604100	4913800	Prime Forest
604200	4913800	Prime Forest
604300	4913800	Prime Forest
604400	4913800	Prime Forest
604500	4913800	Prime Forest
604600	4913800	Prime Forest
604700	4913800	Prime Forest
604800	4913800	Prime Forest
604900	4913800	Prime Forest
605000	4913800	Prime Forest
605100	4913800	Prime Forest
605200	4913800	Prime Forest
605300	4913800	Prime Forest
605400	4913800	Prime Forest
603600	4913900	Prime Forest
603700	4913900	Prime Forest
603800	4913900	Prime Forest
603900	4913900	Prime Forest
604000	4913900	Prime Forest
604100	4913900	Prime Forest
604200	4913900	Prime Forest
604300	4913900	Prime Forest
604400	4913900	Prime Forest
604500	4913900	Prime Forest
604600	4913900	Prime Forest
604700	4913900	Prime Forest
604800	4913900	Prime Forest
604900	4913900	Prime Forest
605000	4913900	Prime Forest
605100	4913900	Prime Forest
605200	4913900	Prime Forest
605300	4913900	Prime Forest
605400	4913900	Prime Forest
603600	4914000	Prime Forest
603700	4914000	Prime Forest
603800	4914000	Prime Forest
603900	4914000	Prime Forest
604000	4914000	Prime Forest
604100	4914000	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604200	4914000	Prime Forest
604300	4914000	Prime Forest
604400	4914000	Prime Forest
604500	4914000	Prime Forest
604600	4914000	Prime Forest
604700	4914000	Prime Forest
604800	4914000	Prime Forest
604900	4914000	Prime Forest
605000	4914000	Prime Forest
605100	4914000	Prime Forest
605200	4914000	Prime Forest
605300	4914000	Prime Forest
605400	4914000	Prime Forest
603600	4914100	Prime Forest
603700	4914100	Prime Forest
603800	4914100	Prime Forest
603900	4914100	Prime Forest
604000	4914100	Prime Forest
604100	4914100	Prime Forest
604200	4914100	Prime Forest
604300	4914100	Prime Forest
604400	4914100	Prime Forest
604500	4914100	Prime Forest
604600	4914100	Prime Forest
604700	4914100	Prime Forest
604800	4914100	Prime Forest
604900	4914100	Prime Forest
605000	4914100	Prime Forest
605100	4914100	Prime Forest
605200	4914100	Prime Forest
605300	4914100	Prime Forest
605400	4914100	Prime Forest
603600	4914200	Prime Forest
603700	4914200	Prime Forest
603800	4914200	Prime Forest
603900	4914200	Prime Forest
604000	4914200	Prime Forest
604100	4914200	Prime Forest
604200	4914200	Prime Forest
604300	4914200	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604400	4914200	Prime Forest
604500	4914200	Prime Forest
604600	4914200	Prime Forest
604700	4914200	Prime Forest
604800	4914200	Prime Forest
604900	4914200	Prime Forest
605000	4914200	Prime Forest
605100	4914200	Prime Forest
605200	4914200	Prime Forest
605300	4914200	Prime Forest
605400	4914200	Prime Forest
603600	4914300	Prime Forest
603700	4914300	Prime Forest
603800	4914300	Prime Forest
603900	4914300	Prime Forest
604000	4914300	Prime Forest
604100	4914300	Prime Forest
604200	4914300	Prime Forest
604300	4914300	Prime Forest
604400	4914300	Prime Forest
604500	4914300	Prime Forest
604600	4914300	Prime Forest
604700	4914300	Prime Forest
604800	4914300	Prime Forest
604900	4914300	Prime Forest
605000	4914300	Prime Forest
605100	4914300	Prime Forest
605200	4914300	Prime Forest
605300	4914300	Prime Forest
605400	4914300	Prime Forest
603600	4914400	Prime Forest
603700	4914400	Prime Forest
603800	4914400	Prime Forest
603900	4914400	Prime Forest
604000	4914400	Prime Forest
604100	4914400	Prime Forest
604200	4914400	Prime Forest
604300	4914400	Prime Forest
604400	4914400	Prime Forest
604500	4914400	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604600	4914400	Prime Forest
604700	4914400	Prime Forest
604800	4914400	Prime Forest
604900	4914400	Prime Forest
605000	4914400	Prime Forest
605100	4914400	Prime Forest
605200	4914400	Prime Forest
605300	4914400	Prime Forest
605400	4914400	Prime Forest
603600	4914500	Prime Forest
603700	4914500	Prime Forest
603800	4914500	Prime Forest
603900	4914500	Prime Forest
604000	4914500	Prime Forest
604100	4914500	Prime Forest
604200	4914500	Prime Forest
604300	4914500	Prime Forest
604400	4914500	Prime Forest
604500	4914500	Prime Forest
604600	4914500	Prime Forest
604700	4914500	Prime Forest
604800	4914500	Prime Forest
604900	4914500	Prime Forest
605000	4914500	Prime Forest
605100	4914500	Prime Forest
605200	4914500	Prime Forest
605300	4914500	Prime Forest
605400	4914500	Prime Forest
603600	4914600	Prime Forest
603700	4914600	Prime Forest
603800	4914600	Prime Forest
603900	4914600	Prime Forest
604000	4914600	Prime Forest
604100	4914600	Prime Forest
604200	4914600	Prime Forest
604300	4914600	Prime Forest
604400	4914600	Prime Forest
603600	4914700	Prime Forest
603700	4914700	Prime Forest
603800	4914700	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
603900	4914700	Prime Forest
604000	4914700	Prime Forest
604100	4914700	Prime Forest
604200	4914700	Prime Forest
604300	4914700	Prime Forest
604400	4914700	Prime Forest
603600	4914800	Prime Forest
603700	4914800	Prime Forest
603800	4914800	Prime Forest
603900	4914800	Prime Forest
604000	4914800	Prime Forest
604100	4914800	Prime Forest
604200	4914800	Prime Forest
604300	4914800	Prime Forest
604400	4914800	Prime Forest
605600	4914800	Prime Forest
605700	4914800	Prime Forest
605800	4914800	Prime Forest
605900	4914800	Prime Forest
606000	4914800	Prime Forest
606100	4914800	Prime Forest
606200	4914800	Prime Forest
606300	4914800	Prime Forest
606400	4914800	Prime Forest
603600	4914900	Prime Forest
603700	4914900	Prime Forest
603800	4914900	Prime Forest
603900	4914900	Prime Forest
604000	4914900	Prime Forest
604100	4914900	Prime Forest
604200	4914900	Prime Forest
604300	4914900	Prime Forest
604400	4914900	Prime Forest
605600	4914900	Prime Forest
605700	4914900	Prime Forest
605800	4914900	Prime Forest
605900	4914900	Prime Forest
606000	4914900	Prime Forest
606100	4914900	Prime Forest
606200	4914900	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
606300	4914900	Prime Forest
606400	4914900	Prime Forest
603600	4915000	Prime Forest
603700	4915000	Prime Forest
603800	4915000	Prime Forest
603900	4915000	Prime Forest
604000	4915000	Prime Forest
604100	4915000	Prime Forest
604200	4915000	Prime Forest
604300	4915000	Prime Forest
604400	4915000	Prime Forest
605600	4915000	Prime Forest
605700	4915000	Prime Forest
605800	4915000	Prime Forest
605900	4915000	Prime Forest
606000	4915000	Prime Forest
606100	4915000	Prime Forest
606200	4915000	Prime Forest
606300	4915000	Prime Forest
606400	4915000	Prime Forest
603600	4915100	Prime Forest
603700	4915100	Prime Forest
603800	4915100	Prime Forest
603900	4915100	Prime Forest
604000	4915100	Prime Forest
604100	4915100	Prime Forest
604200	4915100	Prime Forest
604300	4915100	Prime Forest
604400	4915100	Prime Forest
605600	4915100	Prime Forest
605700	4915100	Prime Forest
605800	4915100	Prime Forest
605900	4915100	Prime Forest
606000	4915100	Prime Forest
606100	4915100	Prime Forest
606200	4915100	Prime Forest
606300	4915100	Prime Forest
606400	4915100	Prime Forest
603600	4915200	Prime Forest
603700	4915200	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
603800	4915200	Prime Forest
603900	4915200	Prime Forest
604000	4915200	Prime Forest
604100	4915200	Prime Forest
604200	4915200	Prime Forest
604300	4915200	Prime Forest
604400	4915200	Prime Forest
605600	4915200	Prime Forest
605700	4915200	Prime Forest
605800	4915200	Prime Forest
605900	4915200	Prime Forest
606000	4915200	Prime Forest
606100	4915200	Prime Forest
606200	4915200	Prime Forest
606300	4915200	Prime Forest
606400	4915200	Prime Forest
603600	4915300	Prime Forest
603700	4915300	Prime Forest
603800	4915300	Prime Forest
603900	4915300	Prime Forest
604000	4915300	Prime Forest
604100	4915300	Prime Forest
604200	4915300	Prime Forest
604300	4915300	Prime Forest
604400	4915300	Prime Forest
605600	4915300	Prime Forest
605700	4915300	Prime Forest
605800	4915300	Prime Forest
605900	4915300	Prime Forest
606000	4915300	Prime Forest
606100	4915300	Prime Forest
606200	4915300	Prime Forest
606300	4915300	Prime Forest
606400	4915300	Prime Forest
603600	4915400	Prime Forest
603700	4915400	Prime Forest
603800	4915400	Prime Forest
603900	4915400	Prime Forest
604000	4915400	Prime Forest
604100	4915400	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604200	4915400	Prime Forest
604300	4915400	Prime Forest
604400	4915400	Prime Forest
605600	4915400	Prime Forest
605700	4915400	Prime Forest
605800	4915400	Prime Forest
605900	4915400	Prime Forest
606000	4915400	Prime Forest
606100	4915400	Prime Forest
606200	4915400	Prime Forest
606300	4915400	Prime Forest
606400	4915400	Prime Forest
603600	4915500	Prime Forest
603700	4915500	Prime Forest
603800	4915500	Prime Forest
603900	4915500	Prime Forest
604000	4915500	Prime Forest
604100	4915500	Prime Forest
604200	4915500	Prime Forest
604300	4915500	Prime Forest
604400	4915500	Prime Forest
604500	4915500	Prime Forest
604600	4915500	Prime Forest
604700	4915500	Prime Forest
604800	4915500	Prime Forest
604900	4915500	Prime Forest
605000	4915500	Prime Forest
605100	4915500	Prime Forest
605200	4915500	Prime Forest
605300	4915500	Prime Forest
605400	4915500	Prime Forest
605500	4915500	Prime Forest
605600	4915500	Prime Forest
605700	4915500	Prime Forest
605800	4915500	Prime Forest
605900	4915500	Prime Forest
606000	4915500	Prime Forest
606100	4915500	Prime Forest
606200	4915500	Prime Forest
606300	4915500	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
606400	4915500	Prime Forest
603600	4915600	Prime Forest
603700	4915600	Prime Forest
603800	4915600	Prime Forest
603900	4915600	Prime Forest
604000	4915600	Prime Forest
604100	4915600	Prime Forest
604200	4915600	Prime Forest
604300	4915600	Prime Forest
604400	4915600	Prime Forest
604500	4915600	Prime Forest
604600	4915600	Prime Forest
604700	4915600	Prime Forest
604800	4915600	Prime Forest
604900	4915600	Prime Forest
605000	4915600	Prime Forest
605100	4915600	Prime Forest
605200	4915600	Prime Forest
605300	4915600	Prime Forest
605400	4915600	Prime Forest
605500	4915600	Prime Forest
605600	4915600	Prime Forest
605700	4915600	Prime Forest
605800	4915600	Prime Forest
605900	4915600	Prime Forest
606000	4915600	Prime Forest
606100	4915600	Prime Forest
606200	4915600	Prime Forest
606300	4915600	Prime Forest
606400	4915600	Prime Forest
603600	4915700	Prime Forest
603700	4915700	Prime Forest
603800	4915700	Prime Forest
603900	4915700	Prime Forest
604000	4915700	Prime Forest
604100	4915700	Prime Forest
604200	4915700	Prime Forest
604300	4915700	Prime Forest
604400	4915700	Prime Forest
604500	4915700	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604600	4915700	Prime Forest
604700	4915700	Prime Forest
604800	4915700	Prime Forest
604900	4915700	Prime Forest
605000	4915700	Prime Forest
605100	4915700	Prime Forest
605200	4915700	Prime Forest
605300	4915700	Prime Forest
605400	4915700	Prime Forest
605500	4915700	Prime Forest
605600	4915700	Prime Forest
605700	4915700	Prime Forest
605800	4915700	Prime Forest
605900	4915700	Prime Forest
606000	4915700	Prime Forest
606100	4915700	Prime Forest
606200	4915700	Prime Forest
606300	4915700	Prime Forest
606400	4915700	Prime Forest
603600	4915800	Prime Forest
603700	4915800	Prime Forest
603800	4915800	Prime Forest
603900	4915800	Prime Forest
604000	4915800	Prime Forest
604100	4915800	Prime Forest
604200	4915800	Prime Forest
604300	4915800	Prime Forest
604400	4915800	Prime Forest
604500	4915800	Prime Forest
604600	4915800	Prime Forest
604700	4915800	Prime Forest
604800	4915800	Prime Forest
604900	4915800	Prime Forest
605000	4915800	Prime Forest
605100	4915800	Prime Forest
605200	4915800	Prime Forest
605300	4915800	Prime Forest
605400	4915800	Prime Forest
605500	4915800	Prime Forest
605600	4915800	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605700	4915800	Prime Forest
605800	4915800	Prime Forest
605900	4915800	Prime Forest
606000	4915800	Prime Forest
606100	4915800	Prime Forest
606200	4915800	Prime Forest
606300	4915800	Prime Forest
606400	4915800	Prime Forest
603600	4915900	Prime Forest
603700	4915900	Prime Forest
603800	4915900	Prime Forest
603900	4915900	Prime Forest
604000	4915900	Prime Forest
604100	4915900	Prime Forest
604200	4915900	Prime Forest
604300	4915900	Prime Forest
604400	4915900	Prime Forest
604500	4915900	Prime Forest
604600	4915900	Prime Forest
604700	4915900	Prime Forest
604800	4915900	Prime Forest
604900	4915900	Prime Forest
605000	4915900	Prime Forest
605100	4915900	Prime Forest
605200	4915900	Prime Forest
605300	4915900	Prime Forest
605400	4915900	Prime Forest
605500	4915900	Prime Forest
605600	4915900	Prime Forest
605700	4915900	Prime Forest
605800	4915900	Prime Forest
605900	4915900	Prime Forest
606000	4915900	Prime Forest
606100	4915900	Prime Forest
606200	4915900	Prime Forest
606300	4915900	Prime Forest
606400	4915900	Prime Forest
603600	4916000	Prime Forest
603700	4916000	Prime Forest
603800	4916000	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
603900	4916000	Prime Forest
604000	4916000	Prime Forest
604100	4916000	Prime Forest
604200	4916000	Prime Forest
604300	4916000	Prime Forest
604400	4916000	Prime Forest
604500	4916000	Prime Forest
604600	4916000	Prime Forest
604700	4916000	Prime Forest
604800	4916000	Prime Forest
604900	4916000	Prime Forest
605000	4916000	Prime Forest
605100	4916000	Prime Forest
605200	4916000	Prime Forest
605300	4916000	Prime Forest
605400	4916000	Prime Forest
605500	4916000	Prime Forest
605600	4916000	Prime Forest
605700	4916000	Prime Forest
605800	4916000	Prime Forest
605900	4916000	Prime Forest
606000	4916000	Prime Forest
606100	4916000	Prime Forest
606200	4916000	Prime Forest
606300	4916000	Prime Forest
606400	4916000	Prime Forest
603600	4916100	Prime Forest
603700	4916100	Prime Forest
603800	4916100	Prime Forest
603900	4916100	Prime Forest
604000	4916100	Prime Forest
604100	4916100	Prime Forest
604200	4916100	Prime Forest
604300	4916100	Prime Forest
604400	4916100	Prime Forest
604500	4916100	Prime Forest
604600	4916100	Prime Forest
604700	4916100	Prime Forest
604800	4916100	Prime Forest
604900	4916100	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605000	4916100	Prime Forest
605100	4916100	Prime Forest
605200	4916100	Prime Forest
605300	4916100	Prime Forest
605400	4916100	Prime Forest
605500	4916100	Prime Forest
605600	4916100	Prime Forest
605700	4916100	Prime Forest
605800	4916100	Prime Forest
605900	4916100	Prime Forest
606000	4916100	Prime Forest
606100	4916100	Prime Forest
606200	4916100	Prime Forest
606300	4916100	Prime Forest
606400	4916100	Prime Forest
603600	4916200	Prime Forest
603700	4916200	Prime Forest
603800	4916200	Prime Forest
603900	4916200	Prime Forest
604000	4916200	Prime Forest
604100	4916200	Prime Forest
604200	4916200	Prime Forest
604300	4916200	Prime Forest
604400	4916200	Prime Forest
604500	4916200	Prime Forest
604600	4916200	Prime Forest
604700	4916200	Prime Forest
604800	4916200	Prime Forest
604900	4916200	Prime Forest
605000	4916200	Prime Forest
605100	4916200	Prime Forest
605200	4916200	Prime Forest
605300	4916200	Prime Forest
605400	4916200	Prime Forest
605500	4916200	Prime Forest
605600	4916200	Prime Forest
605700	4916200	Prime Forest
605800	4916200	Prime Forest
605900	4916200	Prime Forest
606000	4916200	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
606100	4916200	Prime Forest
606200	4916200	Prime Forest
606300	4916200	Prime Forest
606400	4916200	Prime Forest
602600	4912600	Prime Forest
602800	4912600	Prime Forest
603000	4912600	Prime Forest
603200	4912600	Prime Forest
603400	4912600	Prime Forest
603600	4912600	Prime Forest
603800	4912600	Prime Forest
604000	4912600	Prime Forest
604200	4912600	Prime Forest
604400	4912600	Prime Forest
604600	4912600	Prime Forest
604800	4912600	Prime Forest
605000	4912600	Prime Forest
605200	4912600	Prime Forest
605400	4912600	Prime Forest
605600	4912600	Prime Forest
605800	4912600	Prime Forest
606000	4912600	Prime Forest
606200	4912600	Prime Forest
606400	4912600	Prime Forest
606600	4912600	Prime Forest
602600	4912800	Prime Forest
602800	4912800	Prime Forest
603000	4912800	Prime Forest
603200	4912800	Prime Forest
603400	4912800	Prime Forest
603600	4912800	Prime Forest
603800	4912800	Prime Forest
604000	4912800	Prime Forest
604200	4912800	Prime Forest
604400	4912800	Prime Forest
604600	4912800	Prime Forest
604800	4912800	Prime Forest
605000	4912800	Prime Forest
605200	4912800	Prime Forest
605400	4912800	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605600	4912800	Prime Forest
605800	4912800	Prime Forest
606000	4912800	Prime Forest
606200	4912800	Prime Forest
606400	4912800	Prime Forest
606600	4912800	Prime Forest
602600	4913000	Prime Forest
602800	4913000	Prime Forest
603000	4913000	Prime Forest
603200	4913000	Prime Forest
603400	4913000	Prime Forest
603600	4913000	Prime Forest
603800	4913000	Prime Forest
604000	4913000	Prime Forest
604200	4913000	Prime Forest
604400	4913000	Prime Forest
604600	4913000	Prime Forest
604800	4913000	Prime Forest
605000	4913000	Prime Forest
605200	4913000	Prime Forest
605400	4913000	Prime Forest
605600	4913000	Prime Forest
605800	4913000	Prime Forest
606000	4913000	Prime Forest
606200	4913000	Prime Forest
606400	4913000	Prime Forest
606600	4913000	Prime Forest
602600	4913200	Prime Forest
602800	4913200	Prime Forest
603000	4913200	Prime Forest
603200	4913200	Prime Forest
603400	4913200	Prime Forest
603600	4913200	Prime Forest
603800	4913200	Prime Forest
604000	4913200	Prime Forest
604200	4913200	Prime Forest
604400	4913200	Prime Forest
604600	4913200	Prime Forest
604800	4913200	Prime Forest
605000	4913200	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605200	4913200	Prime Forest
605400	4913200	Prime Forest
602600	4913400	Prime Forest
602800	4913400	Prime Forest
603000	4913400	Prime Forest
603200	4913400	Prime Forest
603400	4913400	Prime Forest
603600	4913400	Prime Forest
603800	4913400	Prime Forest
604000	4913400	Prime Forest
604200	4913400	Prime Forest
604400	4913400	Prime Forest
604600	4913400	Prime Forest
604800	4913400	Prime Forest
605000	4913400	Prime Forest
605200	4913400	Prime Forest
605400	4913400	Prime Forest
607400	4913400	Prime Forest
602600	4913600	Prime Forest
602800	4913600	Prime Forest
603000	4913600	Prime Forest
603200	4913600	Prime Forest
603400	4913600	Prime Forest
603600	4913600	Prime Forest
603800	4913600	Prime Forest
604000	4913600	Prime Forest
604200	4913600	Prime Forest
604400	4913600	Prime Forest
604600	4913600	Prime Forest
604800	4913600	Prime Forest
605000	4913600	Prime Forest
605200	4913600	Prime Forest
605400	4913600	Prime Forest
602600	4913800	Prime Forest
602800	4913800	Prime Forest
603000	4913800	Prime Forest
603200	4913800	Prime Forest
603400	4913800	Prime Forest
602600	4914000	Prime Forest
602800	4914000	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
603000	4914000	Prime Forest
603200	4914000	Prime Forest
603400	4914000	Prime Forest
602600	4914200	Prime Forest
602800	4914200	Prime Forest
603000	4914200	Prime Forest
603200	4914200	Prime Forest
603400	4914200	Prime Forest
602600	4914400	Prime Forest
602800	4914400	Prime Forest
603000	4914400	Prime Forest
603200	4914400	Prime Forest
603400	4914400	Prime Forest
602600	4914600	Prime Forest
602800	4914600	Prime Forest
603000	4914600	Prime Forest
603200	4914600	Prime Forest
603400	4914600	Prime Forest
602600	4914800	Prime Forest
602800	4914800	Prime Forest
603000	4914800	Prime Forest
603200	4914800	Prime Forest
603400	4914800	Prime Forest
602600	4915000	Prime Forest
602800	4915000	Prime Forest
603000	4915000	Prime Forest
603200	4915000	Prime Forest
603400	4915000	Prime Forest
606600	4915000	Prime Forest
606800	4915000	Prime Forest
607000	4915000	Prime Forest
607200	4915000	Prime Forest
607400	4915000	Prime Forest
602600	4915200	Prime Forest
602800	4915200	Prime Forest
603000	4915200	Prime Forest
603200	4915200	Prime Forest
603400	4915200	Prime Forest
606600	4915200	Prime Forest
606800	4915200	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
607000	4915200	Prime Forest
607200	4915200	Prime Forest
607400	4915200	Prime Forest
602600	4915400	Prime Forest
602800	4915400	Prime Forest
603000	4915400	Prime Forest
603200	4915400	Prime Forest
603400	4915400	Prime Forest
606600	4915400	Prime Forest
606800	4915400	Prime Forest
607000	4915400	Prime Forest
607200	4915400	Prime Forest
607400	4915400	Prime Forest
602600	4915600	Prime Forest
602800	4915600	Prime Forest
603000	4915600	Prime Forest
603200	4915600	Prime Forest
603400	4915600	Prime Forest
606600	4915600	Prime Forest
606800	4915600	Prime Forest
607000	4915600	Prime Forest
607200	4915600	Prime Forest
607400	4915600	Prime Forest
602600	4915800	Prime Forest
602800	4915800	Prime Forest
603000	4915800	Prime Forest
603200	4915800	Prime Forest
603400	4915800	Prime Forest
606600	4915800	Prime Forest
606800	4915800	Prime Forest
607000	4915800	Prime Forest
607200	4915800	Prime Forest
607400	4915800	Prime Forest
602600	4916000	Prime Forest
602800	4916000	Prime Forest
603000	4916000	Prime Forest
603200	4916000	Prime Forest
603400	4916000	Prime Forest
606600	4916000	Prime Forest
606800	4916000	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
607000	4916000	Prime Forest
607200	4916000	Prime Forest
607400	4916000	Prime Forest
602600	4916200	Prime Forest
602800	4916200	Prime Forest
603000	4916200	Prime Forest
603200	4916200	Prime Forest
603400	4916200	Prime Forest
606600	4916200	Prime Forest
606800	4916200	Prime Forest
607000	4916200	Prime Forest
607200	4916200	Prime Forest
607400	4916200	Prime Forest
602600	4916400	Prime Forest
602800	4916400	Prime Forest
603000	4916400	Prime Forest
603200	4916400	Prime Forest
603400	4916400	Prime Forest
603600	4916400	Prime Forest
603800	4916400	Prime Forest
604000	4916400	Prime Forest
604200	4916400	Prime Forest
604400	4916400	Prime Forest
604600	4916400	Prime Forest
604800	4916400	Prime Forest
605000	4916400	Prime Forest
605200	4916400	Prime Forest
605400	4916400	Prime Forest
605600	4916400	Prime Forest
605800	4916400	Prime Forest
606000	4916400	Prime Forest
606200	4916400	Prime Forest
606400	4916400	Prime Forest
606600	4916400	Prime Forest
606800	4916400	Prime Forest
607000	4916400	Prime Forest
607200	4916400	Prime Forest
607400	4916400	Prime Forest
602600	4916600	Prime Forest
602800	4916600	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
603000	4916600	Prime Forest
603200	4916600	Prime Forest
603400	4916600	Prime Forest
603600	4916600	Prime Forest
603800	4916600	Prime Forest
604000	4916600	Prime Forest
604200	4916600	Prime Forest
604400	4916600	Prime Forest
604600	4916600	Prime Forest
604800	4916600	Prime Forest
605000	4916600	Prime Forest
605200	4916600	Prime Forest
605400	4916600	Prime Forest
605600	4916600	Prime Forest
605800	4916600	Prime Forest
606000	4916600	Prime Forest
606200	4916600	Prime Forest
606400	4916600	Prime Forest
606600	4916600	Prime Forest
606800	4916600	Prime Forest
607000	4916600	Prime Forest
607200	4916600	Prime Forest
607400	4916600	Prime Forest
602600	4916800	Prime Forest
602800	4916800	Prime Forest
603000	4916800	Prime Forest
603200	4916800	Prime Forest
603400	4916800	Prime Forest
603600	4916800	Prime Forest
603800	4916800	Prime Forest
604000	4916800	Prime Forest
604200	4916800	Prime Forest
604400	4916800	Prime Forest
604600	4916800	Prime Forest
604800	4916800	Prime Forest
605000	4916800	Prime Forest
605200	4916800	Prime Forest
605400	4916800	Prime Forest
605600	4916800	Prime Forest
605800	4916800	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
606000	4916800	Prime Forest
606200	4916800	Prime Forest
606400	4916800	Prime Forest
606600	4916800	Prime Forest
606800	4916800	Prime Forest
607000	4916800	Prime Forest
607200	4916800	Prime Forest
607400	4916800	Prime Forest
602600	4917000	Prime Forest
602800	4917000	Prime Forest
603000	4917000	Prime Forest
603200	4917000	Prime Forest
603400	4917000	Prime Forest
603600	4917000	Prime Forest
603800	4917000	Prime Forest
604000	4917000	Prime Forest
604200	4917000	Prime Forest
604400	4917000	Prime Forest
604600	4917000	Prime Forest
604800	4917000	Prime Forest
605000	4917000	Prime Forest
605200	4917000	Prime Forest
605400	4917000	Prime Forest
605600	4917000	Prime Forest
605800	4917000	Prime Forest
606000	4917000	Prime Forest
606200	4917000	Prime Forest
606400	4917000	Prime Forest
606600	4917000	Prime Forest
606800	4917000	Prime Forest
607000	4917000	Prime Forest
607200	4917000	Prime Forest
607400	4917000	Prime Forest
602600	4917200	Prime Forest
602800	4917200	Prime Forest
603000	4917200	Prime Forest
603200	4917200	Prime Forest
603400	4917200	Prime Forest
603600	4917200	Prime Forest
603800	4917200	Prime Forest

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
604000	4917200	Prime Forest
604200	4917200	Prime Forest
604400	4917200	Prime Forest
604600	4917200	Prime Forest
604800	4917200	Prime Forest
605000	4917200	Prime Forest
605200	4917200	Prime Forest
605400	4917200	Prime Forest
605600	4917200	Prime Forest
605800	4917200	Prime Forest
606000	4917200	Prime Forest
606200	4917200	Prime Forest
606400	4917200	Prime Forest
606600	4917200	Prime Forest
606800	4917200	Prime Forest
607000	4917200	Prime Forest
607200	4917200	Prime Forest
607400	4917200	Prime Forest
605280.2	4914849.7	Public and Semi-Public Lands
605262.2	4914849	Public and Semi-Public Lands
605244.2	4914848.4	Public and Semi-Public Lands
605226.1	4914847.7	Public and Semi-Public Lands
605208	4914846.6	Public and Semi-Public Lands
605189.9	4914845.4	Public and Semi-Public Lands
604919.9	4915188.5	Public and Semi-Public Lands
604944.1	4915189	Public and Semi-Public Lands
604968.4	4915189.6	Public and Semi-Public Lands
604992.6	4915190.1	Public and Semi-Public Lands
605016.8	4915190.6	Public and Semi-Public Lands
605041	4915191.1	Public and Semi-Public Lands
605065.3	4915191.6	Public and Semi-Public Lands
605089.5	4915192.1	Public and Semi-Public Lands
605113.7	4915192.6	Public and Semi-Public Lands
605137.9	4915193.1	Public and Semi-Public Lands
605162.1	4915193.7	Public and Semi-Public Lands
605186.4	4915194.2	Public and Semi-Public Lands
605210.6	4915194.7	Public and Semi-Public Lands
605234.8	4915195.2	Public and Semi-Public Lands
605259	4915195.7	Public and Semi-Public Lands
605283.3	4915196.2	Public and Semi-Public Lands

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605307.5	4915196.7	Public and Semi-Public Lands
605305.5	4915172	Public and Semi-Public Lands
605303.6	4915147.2	Public and Semi-Public Lands
605301.7	4915122.4	Public and Semi-Public Lands
605299.7	4915097.6	Public and Semi-Public Lands
605297.8	4915072.8	Public and Semi-Public Lands
605295.8	4915048	Public and Semi-Public Lands
605293.9	4915023.2	Public and Semi-Public Lands
605291.9	4914998.4	Public and Semi-Public Lands
605290	4914973.6	Public and Semi-Public Lands
605288	4914948.9	Public and Semi-Public Lands
605286.1	4914924.1	Public and Semi-Public Lands
605284.1	4914899.3	Public and Semi-Public Lands
605282.2	4914874.5	Public and Semi-Public Lands
605200	4914800	Public and Semi-Public Lands
605225	4914800	Public and Semi-Public Lands
605250	4914800	Public and Semi-Public Lands
605275	4914800	Public and Semi-Public Lands
605300	4914800	Public and Semi-Public Lands
605325	4914800	Public and Semi-Public Lands
605350	4914800	Public and Semi-Public Lands
605375	4914800	Public and Semi-Public Lands
605400	4914800	Public and Semi-Public Lands
605425	4914800	Public and Semi-Public Lands
605450	4914800	Public and Semi-Public Lands
605475	4914800	Public and Semi-Public Lands
605200	4914825	Public and Semi-Public Lands
605225	4914825	Public and Semi-Public Lands
605250	4914825	Public and Semi-Public Lands
605275	4914825	Public and Semi-Public Lands
605300	4914825	Public and Semi-Public Lands
605325	4914825	Public and Semi-Public Lands
605350	4914825	Public and Semi-Public Lands
605375	4914825	Public and Semi-Public Lands
605400	4914825	Public and Semi-Public Lands
605425	4914825	Public and Semi-Public Lands
605450	4914825	Public and Semi-Public Lands
605475	4914825	Public and Semi-Public Lands
605300	4914850	Public and Semi-Public Lands
605325	4914850	Public and Semi-Public Lands

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605350	4914850	Public and Semi-Public Lands
605375	4914850	Public and Semi-Public Lands
605400	4914850	Public and Semi-Public Lands
605425	4914850	Public and Semi-Public Lands
605450	4914850	Public and Semi-Public Lands
605475	4914850	Public and Semi-Public Lands
605300	4914875	Public and Semi-Public Lands
605325	4914875	Public and Semi-Public Lands
605350	4914875	Public and Semi-Public Lands
605375	4914875	Public and Semi-Public Lands
605400	4914875	Public and Semi-Public Lands
605425	4914875	Public and Semi-Public Lands
605450	4914875	Public and Semi-Public Lands
605475	4914875	Public and Semi-Public Lands
605300	4914900	Public and Semi-Public Lands
605325	4914900	Public and Semi-Public Lands
605350	4914900	Public and Semi-Public Lands
605375	4914900	Public and Semi-Public Lands
605400	4914900	Public and Semi-Public Lands
605425	4914900	Public and Semi-Public Lands
605450	4914900	Public and Semi-Public Lands
605475	4914900	Public and Semi-Public Lands
605300	4914925	Public and Semi-Public Lands
605325	4914925	Public and Semi-Public Lands
605350	4914925	Public and Semi-Public Lands
605375	4914925	Public and Semi-Public Lands
605400	4914925	Public and Semi-Public Lands
605425	4914925	Public and Semi-Public Lands
605450	4914925	Public and Semi-Public Lands
605475	4914925	Public and Semi-Public Lands
605300	4914950	Public and Semi-Public Lands
605325	4914950	Public and Semi-Public Lands
605350	4914950	Public and Semi-Public Lands
605375	4914950	Public and Semi-Public Lands
605400	4914950	Public and Semi-Public Lands
605425	4914950	Public and Semi-Public Lands
605450	4914950	Public and Semi-Public Lands
605475	4914950	Public and Semi-Public Lands
605300	4914975	Public and Semi-Public Lands
605325	4914975	Public and Semi-Public Lands

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605350	4914975	Public and Semi-Public Lands
605375	4914975	Public and Semi-Public Lands
605400	4914975	Public and Semi-Public Lands
605425	4914975	Public and Semi-Public Lands
605450	4914975	Public and Semi-Public Lands
605475	4914975	Public and Semi-Public Lands
605300	4915000	Public and Semi-Public Lands
605325	4915000	Public and Semi-Public Lands
605350	4915000	Public and Semi-Public Lands
605375	4915000	Public and Semi-Public Lands
605400	4915000	Public and Semi-Public Lands
605425	4915000	Public and Semi-Public Lands
605450	4915000	Public and Semi-Public Lands
605475	4915000	Public and Semi-Public Lands
605300	4915025	Public and Semi-Public Lands
605325	4915025	Public and Semi-Public Lands
605350	4915025	Public and Semi-Public Lands
605375	4915025	Public and Semi-Public Lands
605400	4915025	Public and Semi-Public Lands
605425	4915025	Public and Semi-Public Lands
605450	4915025	Public and Semi-Public Lands
605475	4915025	Public and Semi-Public Lands
605300	4915050	Public and Semi-Public Lands
605325	4915050	Public and Semi-Public Lands
605350	4915050	Public and Semi-Public Lands
605375	4915050	Public and Semi-Public Lands
605400	4915050	Public and Semi-Public Lands
605425	4915050	Public and Semi-Public Lands
605450	4915050	Public and Semi-Public Lands
605475	4915050	Public and Semi-Public Lands
605300	4915075	Public and Semi-Public Lands
605325	4915075	Public and Semi-Public Lands
605350	4915075	Public and Semi-Public Lands
605375	4915075	Public and Semi-Public Lands
605400	4915075	Public and Semi-Public Lands
605425	4915075	Public and Semi-Public Lands
605450	4915075	Public and Semi-Public Lands
605475	4915075	Public and Semi-Public Lands
605300	4915100	Public and Semi-Public Lands
605325	4915100	Public and Semi-Public Lands

Table B-1

Receptor Land Use Classification

BBR Risk Assessment

Easting UTM NAD83 Zone 10 Meters	Northing UTM NAD83 Zone 10 Meters	Zoning Classification
605350	4915100	Public and Semi-Public Lands
605375	4915100	Public and Semi-Public Lands
605400	4915100	Public and Semi-Public Lands
605425	4915100	Public and Semi-Public Lands
605450	4915100	Public and Semi-Public Lands
605475	4915100	Public and Semi-Public Lands
605325	4915125	Public and Semi-Public Lands
605350	4915125	Public and Semi-Public Lands
605375	4915125	Public and Semi-Public Lands
605400	4915125	Public and Semi-Public Lands
605425	4915125	Public and Semi-Public Lands
605450	4915125	Public and Semi-Public Lands
605475	4915125	Public and Semi-Public Lands
605325	4915150	Public and Semi-Public Lands
605350	4915150	Public and Semi-Public Lands
605375	4915150	Public and Semi-Public Lands
605400	4915150	Public and Semi-Public Lands
605425	4915150	Public and Semi-Public Lands
605450	4915150	Public and Semi-Public Lands
605475	4915150	Public and Semi-Public Lands
605325	4915175	Public and Semi-Public Lands
605350	4915175	Public and Semi-Public Lands
605375	4915175	Public and Semi-Public Lands
605400	4915175	Public and Semi-Public Lands
605425	4915175	Public and Semi-Public Lands
605450	4915175	Public and Semi-Public Lands
605475	4915175	Public and Semi-Public Lands
605325	4915200	Public and Semi-Public Lands
605350	4915200	Public and Semi-Public Lands
605375	4915200	Public and Semi-Public Lands
605400	4915200	Public and Semi-Public Lands
605425	4915200	Public and Semi-Public Lands
605450	4915200	Public and Semi-Public Lands
605475	4915200	Public and Semi-Public Lands
607188	4914672	Child Care Facilities
607277	4914625	Child Care Facilities
607345	4914650	Child Care Facilities
607187	4914722	Child Care Facilities

Appendix C: Air Curtain Incinerator Source Reference

Air Curtain Incinerator
Emissions Factors Determination

From:	Brian Clerico, AQE II and Errol Villegas, Permit Services Manager
To:	Arnaud Marjollet, Director of Permit Services
Date:	April 04, 2017
Re:	Recommendation for Air Curtain Incinerator Emission Factor Determination for Woody Biomass from Agricultural Sources and Forest Vegetation

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The purpose of this memo is to examine available test data and recommend emission factors appropriate for an air curtain incinerator (ACI) burning woody biomass derived from agricultural sources and forest vegetation.

1. BACKGROUND

The San Joaquin Valley is a large agricultural region that annually generates hundreds of thousands of tons of woody biomass debris primarily from the pruning and removal of orchards and vineyards. The main historical disposal option for this material has been open burning, but open burning of ag waste has been curtailed by 80% since 2003, largely made possible by the availability of the option of chipping the material and sending it to a nearby biomass power plant.

In recent years, as the biomass power industry has lost its financial and societal support and decreased in numbers from 15 facilities to five today (with none of the five buring much ag waste), the San Joaquin Valley has accumulated a glut of wood material in need of disposal. This excess has been exacerbated by California's recent extreme drought and the bark beetle infestation which has resulted in over 100 million dead trees in the State, mostly in the southern Sierra Nevada, which is in the Valley Air District. For areas where the buildup of wood material has become an acute hazard, air curtain incinerators (ACIs) have become an important disposal option. Within the San Joaquin Valley, CalFire is currently using ACIs for wildfire hazard reduction in forested areas, and an almond huller has received an Authority to Construct to install an ACI to dispose of an accumulation of wood sticks from their almond processing operation. To quantify emissions from ACIs for purposes of permitting and emissions inventory, the most representative emission factors should be used. This memo is intended to identify and recommend the most representative emission factors for ACIs burning woody biomass from agricultural sources and forests.

A number of emission tests have been conducted on ACIs. A table of the emission factors derived from those tests is provided in Table 1 below along with the emission factors for open burning of almond orchard residues and biomass power plants for comparison in Table 2.

In selecting the most representative emission factors, the District was guided by the following considerations:

(1) A limited number of emissions tests have been published to date;
(2) The source test results published show a wide variance;
(3) Air curtain incineration may be regarded as a controlled form of open burning;
(4) The PM10, CO, and VOC emission factors for open burning show a high degree of dependence on the material burned;
(5) The ARB open burn emission factors for agricultural orchard and vine residues provide an upper bound for PM10, CO, and VOC because the visual evidence indicates the ACI is performing significantly better at reducing smoke and visible particulates (and, by extension, other products of incomplete combustion such as PM10, CO and VOC) than open burning of woody biomass derived from agricultural or forest vegetation. The open burn emission factors for almond orchards will be used in Table 2 to represent a type of woody agricultural residue common in the San Joaquin Valley;
(6) The emission factors for biomass power plants controlled by a fabric filter provide a lower bound for PM10 (0.089 lb-PM10/ton)[1];
(7) SOx emissions are entirely material dependent; thus, the open burn SOx emission factors for agricultural orchard and vine crops, or for forests, are also likely the most representative for ACIs.

The emission factors from Table 1 (page 3) were evaluated using the criteria listed above.

A. AP-42, 2.1-12, J.O. Burckle Test from Table 1 (NOx and PM10)

The current AP-42 emission factors for the incineration of wood (cord wood) are based on a pilot scale study from 1968. The unit tested was not a functional ACI but a pilot scale version constructed for the purpose of emissions testing. The maximum temperature reached by the pilot scale firebox was 1,300 ^{0}F, which is approximately 300 to 900 ^{0}F less than an ACI in the field. The PM10 emission factor resulting from this study is higher than the ARB and AP-42 PM10 emission factors in Table 2 for the open burning of almond orchard wood, which is a representative type of orchard wood waste for the San Joaquin Valley. The NOx emission factor obtained was 4 lb-NOx/ton, which is much higher than any of the tests on actual ACIs and similar to open burn emission factors for NOx from Table 2.

[1] The seven most recent source tests for the biomass power plants Merced Power and Ampersand Chowchilla showed an average PM10 emission rate of 0.089 lb-PM10/ton. This average source test value is a more representative estimate of the PM10 emissions from biomass plants than the permitted value (0.61 lb-PM10/ton). As a comparison, a boiler fired on dry wood with a heating value of 7,610 Btu/lb has an uncontrolled emission rate of 5.5 lb-PM10/ton (Table, 1.6-1), which is approximately the same emission factor for open burning of orchard agricultural residues.

The emission factors from this study were not considered representative for an ACI burning woody biomass derived from agricultural sources or forests for the following reasons:

(1) The unit tested was not an actual ACI;
(2) The maximum combustion temperatures were lower than a typical ACI;
(3) The AP-42 ACI PM10 emissions factor is higher than the open burn PM10 emission factors for most agricultural sources (Table 2); and
(4) The NOx emission factor is significantly higher than any of the air curtain tests (note that lower combustion temperatures would be expected to lead to lower NOx emissions, adding an additional degree of caution regarding the results of this test).

2. ASSESSMENT OF SOURCE TESTS RESULTS

Table 1 below summarizes the emission factors derived from source tests conducted on ACIs. For comparison, Table 2 summarizes the generally accepted emission factors for open burning and for biomass power plants.

Table 1 - Emissions Test Results of Air Curtain Incinerators

Test	Material	Year	NOx (lb/ton)	SOx (lb/ton)	PM10 (lb/ton)	CO (lb/ton)	VOC (lb/ton)	Notes
AP-42, 2.1-12, J.O. Burckle	Wood and cord wood	1968	4	-	13	-	-	Pilot Scale Box Trench Burner, Max temp 1,300 F.
Fountainhead Engineering, Michigan	Wood	2000	Not reported*	Not reported	0.12	1.1	Not reported	Modified EPA Methods.
USDA, Baker Oregon, (Air Curtain S-217)	**Forest vegetation**	**2002**	Not measured	Not measured	**1.1 (PM2.5)**	**2.6**	**1.1**	**Missoula Fire Science Lab**
USDA, San Bernardino (McPherson M30)	**Forest vegetation**	**2003**	**Not measured**	**Not measured**	**1.4 (PM2.5)**	30	**0.6**	**Missoula Fire Science Lab**
BC Hydro, Jordan River British Columbia	Wood	2003	0.04	0.0031	0.13	0.61	0.11	Modified EPA Methods and Canadian Methods
Victoria, Australia	Wood	2016	0.27	0.23	0.0064	4.2	0.096	(US)EPA Methods
US EPA – Hurricane Katrina	Vegetative material	2016	1.6	0.49	7.7	6.9	0.41	See Attachment A, Table 5-1 for NOx, SOx, CO, and VOC; Table 5-4 for PM10

* The Victoria, Australia test indicated the Fountainhead test showed 0.05 lb-NOx/ton, but this was not confirmed by the Valley Air District.

Table 2 – Emission Factors for Biomass Open Burn and Biomass Power Plant

Source	Material	Year	NOx (lb/ton)	SOx (lb/ton)	PM10 (lb/ton)	CO (lb/ton)	VOC (lb/ton)	Notes/ Documentation
Open Burn – ARB	**Almond**	1992	5.9	**0.1**	7.0	52	5.2	ARB Memo
Open Burn – ARB	Forest	Not indicated	3.5	0.1	19 - 30	154 - 312	8 - 21	ARB Memo
Open Burn – AP-42	Almond	1974	-	-	6 (PM)	46	6	AP-42, Table 2.5-5
Open Burn – AP-42	Forest	1995	4 (est.)	-	17	140	19	AP-42, Table 2.5-5
Merced Power (N-4607-8) & Ampersand Chowchilla (C-6923-3)	Biomass	-	1.2 (1.1)	0.61 (0.033)	0.61 (0.089)	0.87 (0.25)	0.076	Permitted EFs (top) and average of seven source tests (indicated in parentheses) of two active biomass power plants

B. Fountainhead, Table 1 (PM10, CO)

The Fountainhead study was conducted in October, 2000 in Clarkston, Michigan using a Whitton Model S-127 ACI having a 15-18 ton per hour capacity, burning wood debris. The nature of the wood debris is not described, but the location of the test is in a forested region of Michigan. The test will therefore be considered in this analysis to establish representative emission factors for agricultural sources and forest vegetation.

The PM10 emission factor (0.13 lb-PM10/ton) from the Fountainhead test is only slightly greater than the average PM10 emission factor (0.089 lb-PM10/ton) measured from the seven most recent source tests of the biomass power plants Merced Power (N-4607-8) and Ampersand Chowchilla (C-6923-3), which have a fabric filter for PM10 control. The fabric filter has been established as the highest level of PM10 control for biomass combustion through extensive emissions testing with District oversight. In general, fabric filters are expected to achieve at least 99% control for PM10.

For open burning of almond orchard wood, the accepted PM10 emission factor is 7.0 lb-PM10/ton. When compared to the 0.13 lb-PM10/ton emission factor from the Fountainhead test, the ACI would appear to have achieved over 98% control efficiency, which is comparable to the fabric filter control efficiency rate used to control biomass combustion emissions. The District at this point does not believe that sufficient information is available to overrule the District's doubt that an ACI can achieve a nearly equal level of PM10 emission control as a high efficiency fabric filter.

For instance, ACIs are known to have visible emissions during the approximately 10 - 30 minute start-up period before the air curtain is engaged, when the combustion process is presumably roughly equivalent to an open burn. Also, when new material is added to the firebox, the flow of the air curtain is broken, and the ACI emits a puff of smoke. The fabric filter does not have such gaps associated with its effectiveness as a PM10 control device. Moreover, it is uncertain whether the emission factor adequately accounts for the periodic puffs of smoke from loading because the sampling probe is positioned for the maximum firebox exit velocity during steady-state operation of the air curtain, which is usually at the edge of the firebox opposite the air manifold, whereas the puff of smoke occurs above the material drop point, typically more toward the middle of the firebox.

These considerations lead one to believe that the ACI emission factor for PM10 should be higher than the biomass power plant emission factor for PM10.

C. BC Hydro, Table 1 (NOx, SOx, PM10, CO, and VOC)

The BC Hydro study was conducted in March, 2003 in Jordon River, British Columbia using an Air Burners Inc. Model S-116 ACI loaded between 4 – 8 metric tonnes per hour, burning wood debris. Although the nature of the wood debris is not described, the location of the test is in a forested region of British Columbia. The test will therefore be considered in this analysis to establish representative emission factors for agricultural sources and forest vegetation.

Similar to the Fountainhead results, the PM10 emission factor from BC Hydro (0.12 lb-PM10/ton was roughly equivalent to the average PM10 emission factor from biomass power plants. As discussed above, the District believes that the ACI emission factor for PM10 is likely higher than the fabric filter controlled biomass power plant emission factor for PM10.

The BC Hydro test also reported a NOx emission factor (0.04 lb-NOx/ton) that is significantly lower than the average emission factor (1.1 lb-NOx/ton) from seven recent source tests conducted on the biomass power plants using selective non-catalytic reduction (SNCR) with ammonia injection as a NOx control. NOx reduction levels from SNCR range from 30 to 50% according to EPA's Fact Sheet (EPA-452/F-03-031). It follows then that the BC Hydro NOx emission test would appear to represent a 99% reduction in NOx compared to open burn and a 96% reduction compared to the biomass boiler already controlled by SNCR.

Two possible explanations for the lower NOx emission factors from the ACI tests are that the biomass power plants burn plant material that is higher in nitrogen (i.e. fuel NOx) or that the boiler operates at a higher combustion temperature (i.e. thermal NOx). An analysis of the nitrogen content of the plant material burned in the biomass boiler versus the nitrogen content of the plant material burned in the ACI would need to be performed to establish that the fuel is the source of the difference in NOx emissions.[2] A comparison of peak operating temperatures does not suggest that the air curtain would produce less thermal NOx. Biomass boilers may reach temperatures of 1,850 ºF; whereas an ACI can reach temperatures over 2,000 ºF. Factors other than temperature, such as residence time in the combustion hot zones, may account for differences in thermal NOx emissions, but the District is not aware that this speculative explanation has been demonstrated. These considerations lead the District to believe that the NOx emission factor for an ACI should be significantly higher than recorded in this test.

D. Victoria, Australia, Table 1 (NOx, SOx, PM10, CO, and VOC)

The Victoria study was conducted in February, 2016 at a recycling plant. The material burned was "clean" wood, i.e. vegetative material and uncoated wood pallets, at a rate of 4.2 metric tonnes per hour. Therefore, this source test will be considered in this analysis to establish emission factors for agricultural sources and forest vegetation.

The PM10 emission factor from the Victoria test (0.0064 lb-PM10/ton) was significantly lower than the average PM10 emission factor (0.089 lb-PM10/ton) measured from biomass power plants. For the reasons discussed above, this PM10 emission rate cannot be used at this time.

[2] Extensive Operating Experiments on the Conversion of Fuel-Bound Nitrogen into Nitrogen Oxides in the Combustion of Wood Fuel, *Forests* **2017**, 8, 1. For timber wood having nitrogen content between 0.04 and 1.2%, the conversion of nitrogen to NOx ranged from approximately 66% to 15%, respectively, i.e. the rate of nitrogen to NOx conversion decreased exponentially with increasing nitrogen content.

The Victoria test also reported a NOx emission factor (0.27 lb-NOx/ton) that is significantly lower than recent source tests conducted on the biomass power plants using selective non-catalytic ammonia injection as a NOx control. Similar to the BC Hydro test results, the District believe that the NOx emission factor for an ACI should be significantly higher than recorded in this test.

E. USDA, Baker, Oregon from Table 1 (PM10, CO, and VOC)

USDA performed an ACI emission study in October, 2002 in Baker, Oregon, using an Air Curtain Inc. Model S-217 ACI, having a capacity of 6 tons per hour. The material burned was Ponderosa Pine trees. The test will therefore be considered in this analysis to establish representative emission factors for agricultural sources and forest vegetation.

The PM10 emission factor obtained from the USDA Baker, Oregon test is 1.15 lb-PM10/ton, which is the third highest PM10 emission factor of all the source tests conducted on actual ACIs.

The USDA source tests measured PM2.5. This was converted into a PM10 emission factor by using the ratio of PM10 to PM2.5 from ARB open burn emission factors for almond agricultural residues. For almond agricultural residues, the ratio of PM10 to PM2.5 is 7.0 lb-PM10/ton to 6.7 lb-PM2.5/ton. Therefore 1.1 lb-PM2.5/ton × (7.0 lb-PM10/ton ÷ 6.7 lb-PM2.5/ton) = 1.15 lb-PM10/ton

This emission factor is an order of magnitude larger than the PM10 emissions measured for the biomass power plants (0.089 lb-PM10/ton), which are controlled by a fabric filter, and yet lower than the emission factor for open burning of almond wood (7.0 lb-PM10/ton), which is an uncontrolled source. As the ACI is a controlled form of open burning, it is reasonable that the PM10 emission factor for an ACI would be lower than the PM10 emission factor for open burning. Thus, the USDA emission factor for PM10 falls between the expected upper bound (uncontrolled open burning) and lower bound (biomass power plant with a fabric filter).

As PM10, CO and VOC are the products of incomplete combustion, acceptance of the PM10 emission factor implies an acceptance of the CO and VOC emission factors as well.

The USDA study did not include NOx or SOx emission factors.

F. USDA, San Bernardino from Table 1 (PM10, CO, and VOC)

USDA performed a second ACI emission study in June, 2003 in San Bernardino (Lake Arrowhead), California, using a McPherson Model M30 ACI burning forest vegetation. The burn rate (tons per hour) of the unit was not identified. The test will therefore be considered in this analysis to establish representative emission factors for agricultural sources and forest vegetation.

The PM emission factor obtained from the San Bernardino study is 1.46 lb-PM10/ton, similar to the Baker, Oregon study above.

The USDA source tests measured PM2.5. This was converted into a PM10 emission factor by using the ratio of PM10 to PM2.5 from ARB open burn emission factors for almond agricultural residues. For almond agricultural residues, the ratio of PM10 to PM2.5 is 7.0 lb-PM10/ton to 6.7 lb-PM2.5/ton. Therefore 1.4 lb-PM2.5/ton × (7.0 lb-PM10/ton ÷ 6.7 lb-PM2.5/ton) = 1.46 lb-PM10/ton

For CO, the reported emission factor was 30 lb-CO/ton, which is an order of magnitude higher than the CO emission factor reported for the Baker, Oregon study and more than four times larger than the next highest reported CO emission factor in Table 1.

The San Bernardino report includes tables comparing the Baker, Oregon results to the San Bernardino results. Those tables also show the CO emission factor for the Baker, Oregon study to be ten times larger, i.e. 26 lb-CO/ton than originally reported. It should be noted that the Baker, Oregon study and the San Bernardino study have different lead authors, and no mention is made in the report of USDA making a correction to the originally reported CO emission factor from the Baker, Oregon study. USDA has not responded to requests for clarification of this matter. Norbert Fuhrmann, Vice President of Air Burners, Inc. disputed the 26 lb-CO/ton emission factor in the San Bernardino report, stating that the originally reported value from Baker, Oregon of 2.6 lb-CO/ton was correct and that an error in the placement of the decimal had likely been made in the San Bernardino report. If Mr. Fuhrmann's contention is correct, the CO emission factors from the USDA studies would agree better with the other ACI CO emission factors reported in Table 1. Nevertheless, since USDA has not issued a correction for the San Bernardino CO emission factor, the District will regard the reported value of 30 lb-CO/ton as the official value from this study.

As noted at the beginning of this analysis, the District is primarily concerned with choosing the most representative emission factors for an ACI incinerating woody biomass derived from agricultural sources and forests. The CO emission factor reported in the San Bernardino study (30 lb-CO/ton) is roughly the same order of magnitude as the open burn emission factors in Table 2 for almond wood (e.g. 46 lb-CO/ton and 52 lb-CO/ton). Since the available data suggests that the ACI should perform an order of magnitude better than open burning for the products of incomplete combustion (i.e. PM10, CO and VOC), the CO emission factor from this study will not be considered representative for an ACI burning woody biomass derived from agricultural sources or forests.

In ATC project N-1162806, for an ACI burning almond sticks at an almond huller, the concern about the representativeness of the CO emission factor in the San Bernardino study extended to the other pollutants measured in that study (PM2.5 and VOC). One of the criteria for selecting emission factors in the ATC project was to accept or reject emission factor sets for PM10, CO and VOC because of the assumption that the emission factors of these pollutants are related as the products of incomplete combustion. Therefore, none of the reported emission factors from San Bernardino were used in the ATC project. However, since other emission factor sets of PM, CO and VOC have been evaluated based on the reported PM emission factor, and PM

emission factor from the San Bernardino study is comparable to the Baker, Oregon study, the District has now reconsidered the use of the PM and VOC emission factors from the San Bernardino study.

Therefore, in this memo, the District will include the PM and VOC emission factors from the San Bernardino study with the Baker, Oregon study as representative for the burning of woody biomass derived from both agricultural sources and forests.

The USDA study did not include NOx or SOx emission factors.

G. Assessment of EPA "Katrina" Study (NOx, SOx, PM10, CO, and VOC)

The District received a draft copy of EPA's *Managing Debris after a Natural Disaster: Evaluation of the Combustion of Storm-Generated Vegetative and C&D Debris in an Air Curtain Burner: Source Emissions Measurement Results*, November 17, 2016 (see Attachment A). The study measured emissions and estimated emission factors for an ACI burning vegetative and construction and demolition debris in 2008 as part of the cleanup from Hurricane Katrina. Three test runs of the emissions from vegetative debris and three test runs for construction and demolition debris were measured separately.

Based on the District's analysis of EPA's document (Attachment B), the District concluded that the emission factors from EPA's study are likely overstated and cannot be found to be representative of the emissions from incineration of the agricultural or forest wood biomass in California. Therefore, the results of this test are not recommended to be used in future permitting actions for air curtain incinerators in the District and will not be discussed any further.

3. EMISSION FACTOR DETERMINATION

Based on the following reasons, a single set of ACI emission factors will be recommended for use for both agricultural wood (such as orchard pruning, almond sticks, orchard removals, etc) and forest vegetation (such as large parts of tree trunk, branches and other woody materials):

(1) There are no published ACI emission studies specific to agricultural wood; all the available ACI studies are based on forest vegetation or a mix of forest vegetation and generic wood (e.g. wood pallets).

(2) The USDA studies that are the basis of the PM10, CO, and VOC emission factors recommended in Table 3 below burned forest vegetation, with can be large sections of trunks and small wood. Among the ACI tests considered as potentially representative, the USDA studies produced the highest PM10 and VOC emission factors.

(3) The ARB (August 17, 2000 Memorandum) open burn emission factors for the products of incomplete combustion (i.e. PM10, CO, and VOC) are generally higher

for forest vegetation than for agricultural materials. Since ACI may be considered a controlled form of open burning, the same pattern present in the open burn emission factors may be expected in the ACI emission factors so use of emissions factors for forest debris is likely to conservatively overstate emissions from agricultural waste.

(4) The SOx emission factor is entirely material dependent, and the SOx emission factor for open burning orchard and vineyard residues is the same as for forest vegetation.

(5) The open burn emission factors for NOx for orchard and vineyard wood residues are higher than the NOx open burn emission factor for forest wood. When taken with point (1) above, this means that a single NOx emission factor based on a forest vegetation test may be too low if it is also used to represent woody agricultural residues. However, the District's estimated NOx emission factor includes a compliance margin that more than compensates for the potential greater NOx emissions from woody agricultural residues.

Based on the analysis presented in Section 2 above, the District has determined the following emission factors to be appropriately conservative and representative for the burning of woody biomass derived from agricultural sources and forest vegetation in an ACI.

NOx

Only the BC Hydro and Victoria ACI emissions tests reported a NOx emission factor. However, for the reasons discussed in Sections 2D and 2E above, the emission factors derived from those tests appear to be insufficiently conservative when compared to the NOx emission factor for a biomass boiler.

Therefore, the District estimated a more conservative NOx emission factor of 1.0 lb-NOx/ton by multiplying the emission factors reported by BC Hydro and Victoria by a ratio of concentrations. The numerator in this ratio was based on NOx concentration measurements from a 2007 EPA study, Emissions from the Burning of Vegetative Debris in Air Curtain Destructors, J. AWMA, 57, 959-967. This 2007 EPA study did not include measurements of exhaust flow rate or tons of vegetative debris burned; therefore, no emission factors could be derived from the study by itself.

Although the open burn emission factors for NOx for orchard and vineyard residues is higher than the NOx open burn emission factor for forest vegetation by a factor of 1.5 to 1, the District's estimated NOx emission factor is almost 4 times higher than the highest NOx emission factor measured among the potentially representative ACI emissions tests. Therefore, the recommended NOx emission factor provides a sufficient compliance margin to allow for the potential that smaller sized wood pieces from agricultural sources would burn hotter in an ACI, and potentially producing more thermal NOx, than large wood pieces from forest vegetation.

See Attachment C for the derivation of the 1.0 lb-NOx/ton emission factor.

SOx

Since SOx emissions are entirely dependent on the sulfur content of the material burned, the most representative SOx emission factor for an ACI burning woody biomass derived from agricultural sources and forests will be the same as for open burning of those materials, i.e. 0.1 lb-SOx/ton (ARB Memo, "Agricultural Burning Emission Factors," 2000).

PM10

Our current engineering judgement is that PM10 emissions from the combustion of woody biomass in ACIs should be higher than PM10 emissions from a biomass power plant controlled by a fabric filter baghouse. Although there is a growing body of evidence that ACIs are capable of achieving complete combustion with minimal PM10 emissions, to remain conservative when establishing a PM10 emission factor for ACI, the District is recommending the use of the higher PM10 emissions factors derived from the USDA studies in Baker, Oregon and San Bernardino.

The emission factors from the USDA Baker, Oregon (1.15 lb-PM10/ton) and USDA San Bernardino (1.46 lb-PM10/ton) studies are the second and third highest PM emission factors among the full scale ACIs tested, and the only PM emission factors that are lower than the PM10 emission factors for uncontrolled open burning of woody agricultural and forest biomass and higher than the PM10 emission factor for a biomass power plant with fabric filter for PM10 control.

The average PM10 emission factor for the USDA tests is (1.15 lb-PM10/ton + 1.46 lb-PM10/ton)/2 = 1.3 lb-PM10/ton.

Therefore, the 1.3 lb-PM10/ton emission factor derived from the two USDA studies will be accepted as the most representative and conservative PM emission factor for the burning of woody biomass from agricultural sources and forests in an ACI.

CO

As PM10, CO and VOC are all the products of incomplete combustion, acceptance of the PM10 emission factor from the USDA Baker, Oregon study implies an acceptance of the CO emission factor (2.6 lb-CO/ton) as well. The CO emission factor from the San Bernardino study was not included for reasons discussed in Section 2F of this memo. Among the full scale ACIs tested, the Baker, Oregon study produced the median value for a CO emission factor.

VOC

As PM10, CO and VOC are all the products of incomplete combustion, acceptance of the PM10 emission factors from the USDA studies implies acceptance of the VOC emission factors, as well (1.1 lb-VOC/ton and 0.6 lb-VOC/ton, with an average of 0.9 lb-VOC/ton). Among the full scale ACIs tested, the USDA studies produced the highest two emission factors for VOC.

CONCLUSION

Table 3 below summarizes the emission factors selected from the determination above for an ACI burning woody biomass derived from agricultural sources and forest vegetation.

Table 3: Emission Factors for Air Curtain Incinerator Burning Woody Biomass (Agricultural Sources and Forest Vegetation)		
Pollutant	**Emission Factor (lb/ton)**	**Source**
NOx	1.0	SJV Estimation Using/Averaging Data from Multiple Studies, Attachment B
SOx	0.1	ARB Open Burn for Orchard and Vine Crops and Forest Biomass, Table 2
PM10	1.3	Average of USDA Baker, Oregon and USDA San Bernardino Air Curtain Tests, Table 1
CO	2.6	USDA, Baker, Oregon Air Curtain Test, Table 1
VOC	0.9	Average of USDA Baker, Oregon and USDA San Bernardino Air Curtain Tests, Table 1

Please note, as discussed in Section 2F above, the USDA San Bernardino ACI study was not included in the emission factor determination for Authority to Construct (ATC) project N-1162806, for an ACI burning almond sticks at an almond huller. The PM10 and VOC emission factors in that project were 1.1 lb-PM10/ton and 1.1 lb-VOC/ton (based on USDA Baker, Oregon).

Table 4 below includes a wood ash handling emission factor, which is for the combined activities of unloading from a dump truck and spreading coal fly ash at a landfill.

Table 4: Emission Factor for Wood Ash Handling		
Pollutant	**Emission Factor (lb/ton)**	**Source**
PM10	0.23[3]	Fugitive particulate emission factors for dry fly ash disposal, Journal of the Air & Waste Management Association, 63(&): 806-818, 2013

Attachment A: Managing Debris after a Natural Disaster, EPA's Evaluation of Air Curtain Incinerator Emission Source Test Results
Attachment B: Managing Debris after a Natural Disaster, SJVAPCD's Analysis of EPA's Air Curtain Incinerator Study
Attachment C: Derivation of NOx Emission Factor for Air Curtain Incineration of Woody Biomass

[3] The emission factor was reported as 18 g/Mg for PM2.5 and 96 g/Mg for PM10 – PM2.5. Thus, the total PM10 emission factor is 18 g/Mg + 96 g/Mg = 114 g/Mg. 114 g/Mg = 114 lb/10^6 lb × 2,000 lb/1 ton = 0.228 lb-PM10/ton or 0.23 lb-PM10/ton.

Attachment A

Managing Debris after a Natural Disaster: EPA's Evaluation of the Combustion of Storm-Generated Vegetative and C&D Debris in an Air Curtain Burner:

Source Emissions Measurement Results
(November 17, 2016)

Managing Debris after a Natural Disaster, EPA Air Curtain Emissions Study (11-17-2016).pdf

Attachment B

Managing Debris after a Natural Disaster: Evaluation of the Combustion of Storm-Generated Vegetative and C&D Debris in an Air Curtain Burner:

SJVAPCD Analysis of EPA's Air Curtain Incinerator Study

Analysis of EPA's Air Curtain Incinerator Study

From: Brian Clerico, AQE II

To: Arnaud Marjollet, Director of Permit Services

Reviewed by: Errol Villegas, Permit Services Manager

Date: March 10, 2017

Re: Evaluation of EPA's Air Curtain Incinerator Study: *Managing Debris after a Natural Disaster: Evaluation of the Combustion of Storm-Generated Vegetative and C&D Debris in an Air Curtain Burner: Source Emissions Measurement Results*, November 17, 2016

Background

The District received a draft copy of EPA's *Managing Debris after a Natural Disaster: Evaluation of the Combustion of Storm-Generated Vegetative and C&D Debris in an Air Curtain Burner: Source Emissions Measurement Results*, November 17, 2016 (see **Attachment A**). The study measured emissions and estimated emission factors for an air curtain incinerator (ACI) burning vegetative and construction and demolition debris in 2008 as part of the cleanup from Hurricane Katrina. Three test runs of the emissions from vegetative debris and three test runs for construction and demolition debris were measured separately.

The District's interest in evaluation of this test is in its potential applicability to assessing emissions from Air Curtain Burners that may be employed in and around the San Joaquin Valley to burn vegetative material, such as may be necessary to process over 100 million trees that have died in surrounding forests due to California's recent extreme drought. Therefore, in evaluating the source test results from this EPA study, the District focused solely on the test runs pertaining to vegetative debris.

EPA Air Curtain Incinerator Draft Emission Factors

Table 1 summarizes the emission factors obtained from this study.

Table 1: EPA Emission Factors for Air Curtain Incinerator (Vegetative Debris)		
Pollutant	**Emission Factor (lb/ton)**	**Source**
NOx	1.6	*Managing Debris after a Natural Disaster: Evaluation of the Combustion of Storm-Generated Vegetative and C&D Debris in an Air Curtain Burner: Source Emissions Measurement Result*, Table 5-1 for NOx, SOx, CO, and VOC; Table 5-4 for PM10. See Attachment A
SOx	0.49	
PM10	7.7	
CO	6.9	
VOC	0.41	

Analysis

The District has identified the following concerns with EPA's draft emission factors for vegetative debris:

(1) The vegetative debris in the study is not representative of the types of agricultural or forest wood material in California that would be disposed of in an ACI.

The vegetative debris incinerated consisted of material that had been submerged in brackish water for an unknown amount of time before it was recovered and brought to the test site. Section 3.2.1 Feed Debris from the report describes the vegetative material incinerated as follows:

> *It must be noted that the vegetative debris used for fuel was recovered as part of the Hurricane Katrina response and **had sat in brackish water for an unknown period of time prior to being recovered and brought to the test site**. The debris used in the tests therefore was likely representative of much of the vegetative debris recovered during hurricane response activities, where the debris was exposed to salt water for extended periods of time. This uncontrollable variable may have influenced emissions of chlorinated organic compounds including chlorinated benzenes and phenols as well as polychlorinated dibenzo-p-dioxins and polychlorinated furans.*

Given the known dependence of PM10, VOC, CO, and SOx emission factors on the material burned, emission factors derived from vegetative debris soaked in salt water cannot be treated as universally applicable to all biomass materials.

(2) The pollutant mass emission rates are a function of the measured pollutant concentrations multiplied by total flow rate from the air curtain firebox. EPA's calculated flow rates used to derive the pollutant mass emission rates may be overstated by a factor of 3 - 6.

That EPA's calculated flow rates may be overstated can be seen by a comparison of the calculated "slot" (or linear) velocity derived from the calculated flow rates being 3 to 6 times higher than the measured slot velocity for the same make and model ACI operated by EPA burning the same material in a 2007 study

EPA published a 2007 study of limited testing of the Air Burners Model S-327 ACI burning hurricane Katrina vegetative debris in Emissions from the Burning of Vegetative Debris in Air Curtain Destructors, J. AWMA, 57, 959-967. In that study, EPA noted the following:

> *Velocity measurements suggest that the exhaust flow is occurring in a relatively narrow area along the length of the unit on the side opposite the blower (see Figure 5). Measurements of 15 fps [i.e. 15 ft/s] in this narrow area were close to the estimated temperature adjusted flow velocity based on the ACD fan output.*

The "narrow area" referred to above is an 18 inch-wide slot running the length of the ACI. The measured velocity beyond this slot is 0 f/s, meaning all the exhaust exits the firebox along this slot opposite the blower. This is a finding corroborated by other ACI studies. The 15 ft/s appears to be an average slot velocity measurement, uncorrected for temperature, although the exact temperature corresponding to this velocity is unclear.

EPA did not perform velocity measurements in the draft ACI emission factor study; however, EPA did make use of the findings from the 2007 study to design their sample collection scoop for the ACI emission factor study:

> *The entry face of the extraction scoop was 18 inches by 5 inches, with the longer dimension spanning the final 18 inches of the ACB firebox width on the side opposite the blower plenum as shown in Figure 2-2. This 18-inch span along the length of the ACB represents the area where, from earlier flow determinations on an identical burner, essentially all the combustion product gases exit the firebox. With this experience in mind, and the earlier measurement of 15 ft/sec bulk velocity in that 18-inch span, estimated extraction scoop isokinetic variation during the sampling runs was calculated. During the test program, isokinetic variation was between 47.8% and 90.9%, with an average of 65.9%.[Section 3.2.3]*

Using the calculated flow rates from the emission factor study, an average slot velocity can be calculated. EPA's calculated flow rates from the firebox are based on a mass balance calculation of carbon (Section 3.4 of the EPA report in Attachment A). Taking the average calculated flow rates from Table 3-2 of the report (104,147 dscfm) and dividing by the area of the slot (27 feet by 1.5 feet), yields and average slot velocity of 43 ft/s at 68 ºF, or 94 ft/s at 700 ºF (average scoop temperature along the slot). Since the slot velocity is directly proportional to the average volumetric flow rate, if the volumetric flow is overstated by a factor of 3 (43 ft/s ÷ 15 ft/s) to 6 (94 ft/s ÷ 15 ft/s), then so too will be the emission factors, which are based on the calculated flow rates.

One possible objection to this comparison of the calculated versus the measured slot velocities would be that we do not know the feed rate to the ACI when the velocity measurements were made in the EPA 2007 study. If the feed rates during the slot velocity measurements in the 2007 study were low in comparison to the feed rates during the emission measurements in the emission factor study, then the claim above is not valid. We do know, however, that during the emission factor study, the feed rates to the ACI were reported as 4.8 ton/hr, 4.8 ton/hr and 6.8 ton/hr. Air Burners Model S-327 ACI has a capacity of 6-10 tons/hr. Thus, the feed rates to the ACI during the emission factor study were either below the rated capacity of the unit or on the low side. It seems unlikely during the 2007 study, EPA would have operated the ACI at a feed rate 3 to 6 times lower, i.e. 1 – 2 ton/hr, to account for the observed difference in the measured to the calculated velocities.

(3) The high SOx emission factor suggests a possible overstatement of all the emission factors by a factor of 4 - 5.

The draft SOx emission factor (0.49 lb/ton) is more than twice the next highest reported emission factor for an ACI and almost five times the open burn value for almonds or forest material.

Since SOx emissions are purely a function of the sulfur content of the material burned, the high SOx emission factor could be another indicator that the emission factors are high across the board by a factor of four to five because of EPA's flow rate calculation estimation procedure above. An alternative explanation for the high sulfur is that the wood burned could have a considerable amount of sulfur contamination from being submerged in brackish water for an unknown amount of time; however, this could raise concerns of the representativeness of the emission factors for material not subjected to the same conditions.

On the other hand, when coupled with concern number 2, above, the weight of evidence starts to lead to a conclusion that the emissions factors are significantly overestimated.

The following concerns relate specifically to EPA's particulate matter (PM10) emission factor.

(4) EPA's proposed PM10 emission factor is greater than the currently accepted emission factor for open burning of almond wood as well as many other agricultural materials.

The emission factors for open burning of almond wood (6 lb-PM/ton, AP-42, Table 2.5-5; or 7.0 lb-PM10/ton, ARB Memo, "Agricultural Burning Emission Factors," August 17, 2000) are lower than EPA's proposed air curtain emission factor (7.7 lb-PM10/ton). For the same material burned, we believe all parties should agree that the PM10 emission factor for the ACI should be significantly lower than the emission factor for open burning. At a minimum, this suggests that EPA's proposed emission factor cannot be universally applied to all wood materials.

When considered in conjunction with concerns 2 and 3 above, and the expectation of actual control of PM10 emissions when comparing ACI to open burning (prior tests demonstrated a control efficiency of 54% to 99+%), the weight of evidence continues to grow that emissions estimates from this study are likely and significantly overstated.

(5) *The hurricane occurred in August 2005, whereas the vegetative debris was retrieved and tested in June 2008. Thus vegetative debris/wood may have been submerged in brackish water for up to three years prior to being sent to the air curtain for incineration. The salt water likely left a residue of salts (i.e. inorganic species) precipitated on and in the wood, which would increase the measured PM concentrations. Possible effect on PM10 EF: 30% too high.*

The PM fraction contained a relatively high amount of inorganic condensable PM (EPA report, Table 5 – 4: 38% weighted average; 51% in Run 1 and 26% in Run 2, Run 3 not reported). The report noted a variety of chlorinated organics found in the air toxics analysis. The predominant anionic species in salt water is chloride ion, which could be the source of the elemental chlorine in the chlorinated organics observed. Wood is porous, so salts containing chloride ion could infiltrate and precipitate on the wood over time. The presence of salts in combustion processes are known to produce condensable PM, which can be seen in detached white plumes. This phenomenon would be consistent with the opacities recorded in this study, which were higher than in other air curtain tests: e.g. Run 3 failed opacity (using NSPS Subpart EEEE standard). One potential cause for higher opacity could be associated with overloading the air curtain firebox; however, the higher opacities cannot be due to overloading because according to Air Burners Inc., the model air curtain has a capacity of 6-10 tons/hour, but in the Katrina study, it was fed at an average rate of 4.8 tons/hr.

Additionally, for open burning, wet wood is known to produce more smoke than dry wood. According to the moisture analysis EPA performed on the vegetative debris burned, the water content was not more than 30%, which is similar to "green" wood. In conversation with District staff, Air Burners, Inc. has claimed that the ACI should be able to burn green wood and maintain compliance with NSPS visible emission limits of 10% opacity or less. As a reference, District Rule 4901, Wood Burning Fireplaces and Wood Burning Heaters, which is a PM rule, prohibits the sale of wood having greater than 20% moisture. For comparison, the average moisture content of almond tree derived biomass = 18% according to the ARB agricultural burning emission factors memo.

(6) *The average isokinetic variation (ratio of $Velocity_{sample}/Velocity_{"stack"}$) was 65.9%. Estimated effect on PM10 EF: 10%+ too high.*

A low isokinetic % means the measured PM value is higher than the actual PM value (https://www.arb.ca.gov/testmeth/vol1/vol1suppl.doc). 90 – 110% (or under some conditions 80 – 120%) is the normal acceptable quality control range. The magnitude of error depends on a number of variables, especially particle size distribution. EPA characterizes the overestimation error from anisokinetic sampling

conditions in the Katrina study as "slight" perhaps because the PM emission factor appears to be predominantly composed of PM2.5. However, in ARB's Supplement to Stationary Source Test Methods, Volume 1, Chaper IX, pg. 6), an example is given of a study where an isokinetic variation of 50% represented an 80% over-estimate of the PM12 emissions. On the Fountainhead test, a similar sized unit to the unit used in the EPA study, the reported average isokinetic variation was 112%, which would lead one to believe that the reported Fountainhead emission factor was on the low side, but also that isokinetic sampling is achievable with such as source.

From page 90 (pg 106 .pdf) of EPA's report, "*If isokinetic rate calculations are based upon the estimated total flow rates presented in Table 5-1[4], variation was between 6.1% and 46.5% isokinetic."* Meaning if EPA's calculated flow is 100% correct, then the isokinetic variation (#1) is dramatically worse than the 65.9%. The bias to a higher PM rate grows exponentially higher at lower isokinetic percentages.

Conclusion

Based on the analysis presented above, the District concludes that the weight of evidence suggests that emission factors from EPA's study *Managing Debris after a Natural Disaster: Evaluation of the Combustion of Storm-Generated Vegetative and C&D Debris in an Air Curtain Burner: Source Emissions Measurement Results* (November 17, 2016) are likely overstated and cannot be found to be representative of the emissions from incineration of vegetative materials.

Therefore, the results of this test are not recommended to be used in future permitting actions for air curtain incinerators in the District.

[4] This may be a typographical error as volumetric flow rates are presented in Table 3-2, whereas Table 5-1 present mass emission rates.

Attachment C

Derivation of NOx Emission Factor for Air Curtain Incineration of Woody Biomass

NOx Emission Factor Estimation

There are two published source tests on ACIs where NOx emission factors were derived: BC Hydro (0.040 lb-NOx/ton) and Victoria, Australia (0.274 lb-NOx/ton). These values are significantly lower than the biomass power plant NOx emissions, which is equipped with NOx control selective non-catalytic reduction system).

EPA published NO and NO_2 concentration measurements (ppmv) from an ACI burning vegetative debris in a 2007 study, Emissions from the Burning of Vegetative Debris in Air Curtain Destructors, J. AWMA, 57, 959-967; however, no emission factor (lb-NOx/ton material burned) was published or derived from the data because no flow rates or material throughputs corresponding to the measured concentrations were measured or published. This 2007 EPA study measured an average NOx (NO + NO_2) concentration of 79 ppmv from the air curtain, which is higher than the NOx concentration measurements from the BC Hydro (3.4 ppmv) and Victoria, Australia (19.5 ppmv) tests. Assuming the NOx emission factor that could be derived from the 2007 EPA test data will be proportional to its NOx concentration, following ratio will be used:

$$\left(\frac{lb-NOx}{ton}\right)_{EPA\,(2007)} = \left(\frac{lb-NOx}{ton}\right)_{Source\ Test\ X} \times \frac{(ppmv\ NOx)_{EPA\,(2007)}}{(ppmv\ NOx)_{Source\ Test\ X}}$$

Source Test X = BC Hydro

The NOx emission factor from the BC Hydro test was 0.040 lb-NOx/ton.[5] The average NOx concentration measured during the BC Hydro test was 6.5 mg/m^3 (at 20 ˚C). The molar volume of an ideal gas at 20ºC is 24.1 × 10^{-3} m^3/g-mol.

$$6.5\ \frac{mg\ NO_x}{m^3(at\ 20^0C)} \times \frac{1\ g\ mol\ NO_2}{46\ g\ NO_2} \times \frac{1\ g}{1{,}000\ mg} \times \frac{24.1 \times 10^{-3}\ m^3\ (at\ 20^0C)}{1\ g\ mol} = 3.4\ ppmv\ NO_x$$

$$\left(\frac{lb-NOx}{ton}\right)_{EPA\,(2007)} = \left(\frac{0.040\ lb-NOx}{ton}\right)_{BC\ Hydro} \times \frac{(79\ ppmv\ NOx)_{EPA\,(2007)}}{(3.4\ ppmv\ NOx)_{BC\ Hydro}}$$

$$\left(\frac{lb-NOx}{ton}\right)_{KEPA\,(2007)} = \frac{0.93\ lb-NOx}{ton}$$

[5] Based on an emission rate of 0.12 kg-NO_2/hr and 6 metric tonnes feed/hr
EF = 0.12 kg/hr x 2.2 lb/kg x 1 hr/6 tonne x 1 tonne/1.1 tons = 0.040 lb-NOx/ton

Source Test X = Victoria, Australia

The NOx emission factor from the Victoria test was 0.247 lb-NOx/ton. The average NOx concentration measured during the Victoria test was 40.0 mg/Nm^3 (i.e. at 0 ˚C). The molar volume of an ideal gas at 0ºC is 22.4 × 10^{-3} m^3/g-mol.

$$40.0\ \frac{mg\ NO_2}{Nm^3} \times \frac{1\ g\ mol\ NO_2}{46\ g\ NO_2} \times \frac{1\ g}{1{,}000\ mg} \times \frac{22.4 \times 10^{-3}\ Nm^3}{1\ g\ mol} = 19.5\ ppmv\ NO_x$$

$$\left(\frac{lb - NOx}{ton}\right)_{EPA\ (2007)} = \left(\frac{0.274\ lb - NOx}{ton}\right)_{Australia} \times \frac{(79\ ppmv\ NOx)_{EPA\ (2007)}}{(19.5\ ppmv\ NOx)_{Australia}}$$

$$\left(\frac{lb - NOx}{ton}\right)_{EPA\ (2007)} = \frac{1.1\ lb - NOx}{ton}$$

Average NOx Emission Factor

Average NOx emission factor (lb/ton) = (0.93 lb-NOx/ton + 1.1 lb-NOx/ton) ÷ 2

Average NOx emission factor (lb/ton) = 1.0 lb-NOx/ton

Appendix D: Approved Emissions Inventory

INSTRUCTIONS:

- CAS or DEQ ID: either use the drop-down provided or simply cut and paste each pollutant CAS number or DEQ ID (see DEQ Pollutant List Worksheet) emitted by the referenced TEU.

- Chemical Name: if a CAS number or DEQ ID is entered in *Column B*, *Column C* should perform a lookup from the DEQ Air Toxics list; alternatively, simply cut and paste the chemical names that correspond to the CAS numbers/DEQ ID in *Column B* if applicable.

- Control Efficiency: enter the pollutant specific control efficiency - this should include all capture and removal process efficiencies applicable to each individual pollutant.

- EF Values: provide emission factors for Annual and Max Daily conditions; if Annual and Max Daily EF values are equivalent, please enter value in Annual (*Column F*).

- Emission Factor Information Reference/Notes: provide EF references (e.g. Source Tests, AP-42, Engineering Estimates, etc) as well as any additional notes (e.g. control efficiencies).

- Calculated Emissions: follow guidance in "*Form Instructions*" worksheet for specific formulas.

AQ405CAO Form - Version 1.54
9/19/2019

de by DEQ: switched to boiler EF if data was available, only applied 95% VOC CE if EF was from pile burn

Toxic Emissions Unit ID	Pollutant Information		Control Efficiency	Emission Factor Information				Calculated Emissions					
				EF Values		Units	Reference/Notes	Annual - Chronic [lb/yr]			Max Daily - Acute [lb/day]		
	CAS or DEQ ID	Chemical Name		Annual - Chronic	Max Daily - Acute			Actual	Requested PTE	Capacity	Actual	Requested PTE	Capacity
TEU-1	100-41-4	Ethyl benzene	0.00%	6.72E-03		lb/ton	boiler	2.15E+01	6.72E+01	2.94E+02	2.69E-01	2.69E-01	2.69E-01
TEU-1	100-42-5	Styrene	0.00%	8.11E-03		lb/ton	boiler	2.59E+01	8.11E+01	3.55E+02	3.24E-01	3.24E-01	3.24E-01
TEU-1	100-44-7	Benzyl chloride	95.30%	5.07E-04		lb/ton	pile burn	7.63E-02	2.38E-01	1.04E+00	9.53E-04	9.53E-04	9.53E-04
TEU-1	106-46-7	p-Dichlorobenzene (1,4-Dichlorobenzene)	95.30%	6.63E-04		lb/ton	pile burn	9.97E-02	3.12E-01	1.36E+00	1.25E-03	1.25E-03	1.25E-03
TEU-1	106-93-4	Ethylene dibromide (EDB, 1,2-Dibromoethane)	95.30%	7.53E-04		lb/ton	pile burn	1.13E-01	3.54E-01	1.55E+00	1.42E-03	1.42E-03	1.42E-03
TEU-1	106-99-0	1,3-Butadiene	95.30%	4.19E-01		lb/ton	pile burn	6.31E+01	1.97E+02	8.63E+02	7.88E-01	7.88E-01	7.88E-01
TEU-1	107-02-8	Acrolein	0.00%	4.42E-03		lb/ton	boiler	1.41E+01	4.42E+01	1.94E+02	1.77E-01	1.77E-01	1.77E-01
TEU-1	107-06-2	Ethylene dichloride (EDC, 1,2-Dichloroethane)	95.30%	7.53E-04		lb/ton	pile burn	1.13E-01	3.54E-01	1.55E+00	1.42E-03	1.42E-03	1.42E-03
TEU-1	107-13-1	Acrylonitrile	95.30%	5.07E-02		lb/ton	pile burn	7.63E+00	2.38E+01	1.04E+02	9.53E-02	9.53E-02	9.53E-02
TEU-1	108-05-4	Vinyl acetate	95.30%	5.30E-01		lb/ton	pile burn	7.97E+01	2.49E+02	1.09E+03	9.96E-01	9.96E-01	9.96E-01
TEU-1	108-67-8	1,3,5-Trimethylbenzene	95.30%	6.59E-03		lb/ton	pile burn	9.91E-01	3.10E+00	1.36E+01	1.24E-02	1.24E-02	1.24E-02
TEU-1	108-88-3	Toluene	0.00%	3.59E-04		lb/ton	boiler	1.15E+00	3.59E+00	1.57E+01	1.43E-02	1.43E-02	1.43E-02
TEU-1	108-90-7	Chlorobenzene	0.00%	2.82E-04		lb/ton	boiler	9.03E-01	2.82E+00	1.24E+01	1.13E-02	1.13E-02	1.13E-02
TEU-1	110-54-3	Hexane	0.00%	4.90E-03		lb/ton	boiler	1.57E+01	4.90E+01	2.14E+02	1.96E-01	1.96E-01	1.96E-01
TEU-1	110-82-7	Cyclohexane	95.30%	9.65E-03		lb/ton	pile burn	1.45E+00	4.54E+00	1.99E+01	1.81E-02	1.81E-02	1.81E-02
TEU-1	120-12-7	Anthracene	0.00%	4.56E-05		lb/ton	boiler	1.46E-01	4.56E-01	2.00E+00	1.82E-03	1.82E-03	1.82E-03
TEU-1	120-82-1	1,2,4-Trichlorobenzene	95.30%	7.53E-04		lb/ton	pile burn	1.13E-01	3.54E-01	1.55E+00	1.42E-03	1.42E-03	1.42E-03
TEU-1	123-91-1	1,4-Dioxane	95.30%	7.53E-04		lb/ton	pile burn	1.13E-01	3.54E-01	1.55E+00	1.42E-03	1.42E-03	1.42E-03
TEU-1	124-48-1	Dibromochloromethane	95.30%	7.53E-04		lb/ton	pile burn	1.13E-01	3.54E-01	1.55E+00	1.42E-03	1.42E-03	1.42E-03
TEU-1	127-18-4	Tetrachloroethene (Perchloroethylene)	95.30%	6.63E-04		lb/ton	pile burn	9.97E-02	3.12E-01	1.36E+00	1.25E-03	1.25E-03	1.25E-03
TEU-1	129-00-0	Pyrene	0.00%	6.02E-05		lb/ton	boiler	1.93E-01	6.02E-01	2.64E+00	2.41E-03	2.41E-03	2.41E-03
TEU-1	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xy	95.30%	1.33E-01		lb/ton	pile burn	2.00E+01	6.26E+01	2.74E+02	2.50E-01	2.50E-01	2.50E-01
TEU-1	156-60-5	trans-1,2-dichloroethene	95.30%	8.83E-04		lb/ton	pile burn	1.33E-01	4.15E-01	1.82E+00	1.66E-03	1.66E-03	1.66E-03
TEU-1	1634-04-4	Methyl tert-butyl ether	95.30%	7.93E-04		lb/ton	pile burn	1.19E-01	3.73E-01	1.63E+00	1.49E-03	1.49E-03	1.49E-03
TEU-1	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.00%	1.08E-11		lb/ton	boiler	3.44E-08	1.08E-07	4.71E-07	4.30E-10	4.30E-10	4.30E-10
TEU-1	191-24-2	Benzo[g,h,i]perylene	0.00%	2.57E-06		lb/ton	boiler	8.21E-03	2.57E-02	1.12E-01	1.03E-04	1.03E-04	1.03E-04
TEU-1	193-39-5	Indeno[1,2,3-cd]pyrene	0.00%	1.73E-06		lb/ton	boiler	5.55E-03	1.73E-02	7.59E-02	6.94E-05	6.94E-05	6.94E-05
TEU-1	19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.00%	3.88E-11		lb/ton	boiler	1.24E-07	3.88E-07	1.70E-06	1.55E-09	1.55E-09	1.55E-09
TEU-1	205-99-2	Benzo[b]fluoranthene	0.00%	2.41E-06		lb/ton	boiler	7.72E-03	2.41E-02	1.06E-01	9.66E-05	9.66E-05	9.66E-05
TEU-1	206-44-0	Fluoranthene	0.00%	2.84E-05		lb/ton	boiler	9.08E-02	2.84E-01	1.24E+00	1.14E-03	1.14E-03	1.14E-03
TEU-1	207-08-9	Benzo[k]fluoranthene	0.00%	8.81E-07		lb/ton	boiler	2.82E-03	8.81E-03	3.86E-02	3.52E-05	3.52E-05	3.52E-05
TEU-1	208-96-8	Acenaphthylene	0.00%	7.97E-05		lb/ton	boiler	2.55E-01	7.97E-01	3.49E+00	3.19E-03	3.19E-03	3.19E-03
TEU-1	218-01-9	Chrysene	0.00%	1.34E-06		lb/ton	boiler	4.30E-03	1.34E-02	5.88E-02	5.37E-05	5.37E-05	5.37E-05
TEU-1	3268-87-9	Octachlorodibenzo-p-dioxin (OCDD)	0.00%	4.25E-10		lb/ton	boiler	1.36E-06	4.25E-06	1.86E-05	1.70E-08	1.70E-08	1.70E-08
TEU-1	35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD	0.00%	1.68E-10		lb/ton	boiler	5.38E-07	1.68E-06	7.36E-06	6.73E-09	6.73E-09	6.73E-09
TEU-1	39001-02-0	Octachlorodibenzofuran (OCDF)	0.00%	8.76E-11		lb/ton	boiler	2.80E-07	8.76E-07	3.83E-06	3.50E-09	3.50E-09	3.50E-09
TEU-1	39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.00%	1.57E-11		lb/ton	boiler	5.02E-08	1.57E-07	6.87E-07	6.27E-10	6.27E-10	6.27E-10
TEU-1	40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	0.00%	2.35E-11		lb/ton	boiler	7.51E-08	2.35E-07	1.03E-06	9.38E-10	9.38E-10	9.38E-10
TEU-1	50-32-8	Benzo[a]pyrene	0.00%	4.64E-05		lb/ton	boiler	1.49E-01	4.64E-01	2.03E+00	1.86E-03	1.86E-03	1.86E-03
TEU-1	51207-31-9	2,3,7,8-Tetrachlorodibenzofuran (TcDF)	0.00%	1.41E-10		lb/ton	boiler	4.52E-07	1.41E-06	6.18E-06	5.64E-09	5.64E-09	5.64E-09
TEU-1	53-70-3	Dibenz[a,h]anthracene	0.00%	1.63E-07		lb/ton	boiler	5.22E-04	1.63E-03	7.12E-03	6.50E-06	6.50E-06	6.50E-06
TEU-1	541-73-1	1,3-Dichlorobenzene	95.30%	7.02E-04		lb/ton	pile burn	1.06E-01	3.30E-01	1.45E+00	1.32E-03	1.32E-03	1.32E-03
TEU-1	542-75-6	1,3-Dichloropropene	95.30%	7.53E-04		lb/ton	pile burn	1.13E-01	3.54E-01	1.55E+00	1.42E-03	1.42E-03	1.42E-03
TEU-1	55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.00%	1.59E-11		lb/ton	boiler	5.08E-08	1.59E-07	6.95E-07	6.34E-10	6.34E-10	6.34E-10
TEU-1	56-23-5	Carbon tetrachloride	0.00%	3.42E-04		lb/ton	boiler	1.09E+00	3.42E+00	1.50E+01	1.37E-02	1.37E-02	1.37E-02
TEU-1	56-55-3	Benz[a]anthracene	0.00%	1.38E-06		lb/ton	boiler	4.42E-03	1.38E-02	6.05E-02	5.53E-05	5.53E-05	5.53E-05
TEU-1	57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.00%	9.64E-11		lb/ton	boiler	3.08E-07	9.64E-07	4.22E-06	3.86E-09	3.86E-09	3.86E-09
TEU-1	57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.00%	6.95E-11		lb/ton	boiler	2.22E-07	6.95E-07	3.05E-06	2.78E-09	2.78E-09	2.78E-09
TEU-1	57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.00%	5.39E-11		lb/ton	boiler	1.72E-07	5.39E-07	2.36E-06	2.16E-09	2.16E-09	2.16E-09
TEU-1	57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.00%	3.74E-11		lb/ton	boiler	1.20E-07	3.74E-07	1.64E-06	1.50E-09	1.50E-09	1.50E-09
TEU-1	60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.00%	4.57E-11		lb/ton	boiler	1.46E-07	4.57E-07	2.00E-06	1.83E-09	1.83E-09	1.83E-09
TEU-1	67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.00%	9.89E-11		lb/ton	boiler	3.17E-07	9.89E-07	4.33E-06	3.96E-09	3.96E-09	3.96E-09
TEU-1	67-63-0	Isopropyl alcohol	0.00%	6.19E-02		lb/ton	boiler	1.98E+02	6.19E+02	2.71E+03	2.48E+00	2.48E+00	2.48E+00
TEU-1	67-64-1	Acetone	95.30%	9.17E-01		lb/ton	pile burn	1.38E+02	4.31E+02	1.89E+03	1.72E+00	1.72E+00	1.72E+00
TEU-1	67-66-3	Chloroform	0.00%	3.42E-04		lb/ton	boiler	1.09E+00	3.42E+00	1.50E+01	1.37E-02	1.37E-02	1.37E-02
TEU-1	70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.00%	6.19E-11		lb/ton	boiler	1.98E-07	6.19E-07	2.71E-06	2.48E-09	2.48E-09	2.48E-09
TEU-1	71-43-2	Benzene	0.00%	1.67E-02		lb/ton	boiler	5.33E+01	1.67E+02	7.30E+02	6.66E-01	6.66E-01	6.66E-01
TEU-1	71-55-6	1,1,1-Trichloroethane (Methyl chloroform)	0.00%	9.83E-04		lb/ton	boiler	3.14E+00	9.83E+00	4.30E+01	3.93E-02	3.93E-02	3.93E-02
TEU-1	72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.00%	1.13E-11		lb/ton	boiler	3.60E-08	1.13E-07	4.93E-07	4.50E-10	4.50E-10	4.50E-10
TEU-1	74-83-9	Bromomethane (Methyl bromide)	0.00%	1.94E-04		lb/ton	boiler	6.20E-01	1.94E+00	8.49E+00	7.75E-03	7.75E-03	7.75E-03
TEU-1	74-87-3	Chloromethane (Methyl chloride)	0.00%	6.43E-04		lb/ton	boiler	2.06E+00	6.43E+00	2.81E+01	2.57E-02	2.57E-02	2.57E-02
TEU-1	75-00-3	Chloroethane (Ethyl chloride)	95.30%	7.93E-04		lb/ton	pile burn	1.19E-01	3.73E-01	1.63E+00	1.49E-03	1.49E-03	1.49E-03
TEU-1	75-01-4	Vinyl chloride	95.30%	7.93E-04		lb/ton	pile burn	1.19E-01	3.73E-01	1.63E+00	1.49E-03	1.49E-03	1.49E-03
TEU-1	75-05-8	Acetonitrile	95.30%	1.43E-01		lb/ton	pile burn	2.15E+01	6.71E+01	2.94E+02	2.68E-01	2.68E-01	2.68E-01
TEU-1	75-09-2	Dichloromethane (Methylene chloride)	0.00%	9.30E-03		lb/ton	boiler	2.98E+01	9.30E+01	4.07E+02	3.72E-01	3.72E-01	3.72E-01
TEU-1	75-15-0	Carbon disulfide	95.30%	1.71E-02		lb/ton	pile burn	2.58E+00	8.05E+00	3.53E+01	3.22E-02	3.22E-02	3.22E-02
TEU-1	75-25-2	Bromoform	95.30%	7.02E-04		lb/ton	pile burn	1.06E-01	3.30E-01	1.45E+00	1.32E-03	1.32E-03	1.32E-03
TEU-1	75-27-4	Bromodichloromethane	95.30%	7.02E-04		lb/ton	pile burn	1.06E-01	3.30E-01	1.45E+00	1.32E-03	1.32E-03	1.32E-03
TEU-1	75-34-3	1,1-Dichloroethane (Ethylidene dichloride)	95.30%	7.53E-04		lb/ton	pile burn	1.13E-01	3.54E-01	1.55E+00	1.42E-03	1.42E-03	1.42E-03
TEU-1	75-69-4	Trichlorofluoromethane (Freon 11)	95.30%	7.93E-04		lb/ton	pile burn	1.19E-01	3.73E-01	1.63E+00	1.49E-03	1.49E-03	1.49E-03
TEU-1	78-87-5	1,2-Dichloropropane (Propylene dichloride)	0.00%	2.86E-04		lb/ton	boiler	9.14E-01	2.86E+00	1.25E+01	1.14E-02	1.14E-02	1.14E-02
TEU-1	78-93-3	2-Butanone (Methyl ethyl ketone)	0.00%	2.65E-04		lb/ton	boiler	8.49E-01	2.65E+00	1.16E+01	1.06E-02	1.06E-02	1.06E-02
TEU-1	79-00-5	1,1,2-Trichloroethane (Vinyl trichloride)	95.30%	7.53E-04		lb/ton	pile burn	1.13E-01	3.54E-01	1.55E+00	1.42E-03	1.42E-03	1.42E-03
TEU-1	79-01-6	Trichloroethene (TCE, Trichloroethylene)	95.30%	2.86E-03		lb/ton	pile burn	4.30E-01	1.34E+00	5.89E+00	5.38E-03	5.38E-03	5.38E-03
TEU-1	79-34-5	1,1,2,2-Tetrachloroethane	95.30%	7.02E-04		lb/ton	pile burn	1.06E-01	3.30E-01	1.45E+00	1.32E-03	1.32E-03	1.32E-03
TEU-1	80-62-6	Methyl methacrylate	95.30%	6.27E-03		lb/ton	pile burn	9.41E-01	2.95E+00	1.29E+01	1.18E-02	1.18E-02	1.18E-02
TEU-1	83-32-9	Acenaphthene	0.00%	1.45E-05		lb/ton	boiler	4.64E-02	1.45E-01	6.35E-01	5.80E-04	5.80E-04	5.80E-04
TEU-1	85-01-8	Phenanthrene	0.00%	1.10E-04		lb/ton	boiler	3.51E-01	1.10E+00	4.81E+00	4.39E-03	4.39E-03	4.39E-03
TEU-1	86-73-7	Fluorene	0.00%	5.12E-05		lb/ton	boiler	1.64E-01	5.12E-01	2.24E+00	2.05E-03	2.05E-03	2.05E-03
TEU-1	87-68-3	Hexachlorobutadiene	95.30%	6.63E-04		lb/ton	pile burn	9.97E-02	3.12E-01	1.36E+00	1.25E-03	1.25E-03	1.25E-03
TEU-1	91-20-3	Naphthalene	0.00%	1.69E-03		lb/ton	boiler	5.42E+00	1.69E+01	7.42E+01	6.77E-02	6.77E-02	6.77E-02
TEU-1	95-47-6	o-Xylene	0.00%	1.92E-04		lb/ton	boiler	6.15E-01	1.92E+00	8.41E+00	7.68E-03	7.68E-03	7.68E-03
TEU-1	95-50-1	1,2-Dichlorobenzene	95.30%	7.02E-04		lb/ton	pile burn	1.06E-01	3.30E-01	1.45E+00	1.32E-03	1.32E-03	1.32E-03
TEU-1	95-63-6	1,2,4-Trimethylbenzene	95.30%	2.27E-02		lb/ton	pile burn	3.42E+00	1.07E+01	4.68E+01	4.28E-02	4.28E-02	4.28E-02
TEU-1	96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	95.30%	4.68E-04		lb/ton	pile burn	7.04E-02	2.20E-01	9.63E-01	8.80E-04	8.80E-04	8.80E-04
TEU-1	98-82-8	Isopropylbenzene (Cumene)	95.30%	9.22E-03		lb/ton	pile burn	1.39E+00	4.33E+00	1.90E+01	1.73E-02	1.73E-02	1.73E-02
TEU-1	75-07-0	Acetaldehyde	0.00%	4.81E-03		lb/ton	boiler	1.54E+01	4.81E+01	2.11E+02	1.92E-01	1.92E-01	1.92E-01
TEU-1	98-86-2	Acetophenone	0.00%	3.13E-05		lb/ton	boiler	1.00E-01	3.13E-01	1.37E+00	1.25E-03	1.25E-03	1.25E-03
TEU-1	7440-36-0	Antimony and compounds	0.00%	5.29E-05		lb/ton	boiler	1.69E-01	5.29E-01	2.32E+00	2.11E-03	2.11E-03	2.11E-03
TEU-1	7440-38-2	Arsenic and compounds	0.00%	1.22E-04		lb/ton	boiler	3.92E-01	1.22E+00	5.36E+00	4.90E-03	4.90E-03	4.90E-03
TEU-1	7440-39-3	Barium and compounds	0.00%	8.21E-02		lb/ton	boiler	2.63E+02	8.21E+02	3.60E+03	3.28E+00	3.28E+00	3.28E+00
TEU-1	7440-41-7	Beryllium and compounds	0.00%	2.28E-06		lb/ton	boiler	7.29E-03	2.28E-02	9.98E-02	9.11E-05	9.11E-05	9.11E-05
TEU-1	7440-43-9	Cadmium and compounds	0.00%	8.48E-05		lb/ton	boiler	2.71E-01	8.48E-01	3.72E+00	3.39E-03	3.39E-03	3.39E-03
TEU-1	7782-50-5	Chlorine	0.00%	1.34E-02		lb/ton	boiler	4.30E+01	1.34E+02	5.88E+02	5.37E-01	5.37E-01	5.37E-01
TEU-1	18540-29-9	Chromium VI, chromate, and dichromate particula	0.00%	1.18E-04		lb/ton	boiler	3.79E-01	1.18E+00	5.19E+00	4.74E-03	4.74E-03	4.74E-03
TEU-1	7440-48-4	Cobalt and compounds	0.00%	2.84E-05		lb/ton	boiler	9.08E-02	2.84E-01	1.24E+00	1.14E-03	1.14E-03	1.14E-03
TEU-1	7440-50-8	Copper and compounds	0.00%	1.89E-03		lb/ton	boiler	6.04E+00	1.89E+01	8.27E+01	7.55E-02	7.55E-02	7.55E-02
TEU-1	4170-30-3	Crotonaldehyde	0.00%	7.63E-04		lb/ton	boiler	2.44E+00	7.63E+00	3.34E+01	3.05E-02	3.05E-02	3.05E-02
TEU-1	84-66-2	Diethylphthalate	0.00%	3.71E-04		lb/ton	boiler	1.19E+00	3.71E+00	1.62E+01	1.48E-02	1.48E-02	1.48E-02
TEU-1	84-74-2	Dibutyl phthalate	0.00%	5.66E-04		lb/ton	boiler	1.81E+00	5.66E+00	2.48E+01	2.26E-02	2.26E-02	2.26E-02
TEU-1	50-00-0	Formaldehyde	0.00%	1.73E-02		lb/ton	boiler	5.55E+01	1.73E+02	7.59E+02	6.94E-01	6.94E-01	6.94E-01
TEU-1	7647-01-0	Hydrochloric acid	0.00%	7.41E-02		lb/ton	boiler	2.37E+02	7.41E+02	3.25E+03	2.96E+00	2.96E+00	2.96E+00
TEU-1	7664-39-3	Hydrogen fluoride	0.00%	4.00E-03		lb/ton	boiler	1.28E+01	4.00E+01	1.75E+02	1.60E-01	1.60E-01	1.60E-01
TEU-1	7439-92-1	Lead and compounds	0.00%	5.29E-04		lb/ton	boiler	1.69E+00	5.29E+00	2.32E+01	2.11E-02	2.11E-02	2.11E-02
TEU-1	7439-96-5	Manganese and compounds	0.00%	4.69E-02		lb/ton	boiler	1.50E+02	4.69E+02	2.06E+03	1.88E+00	1.88E+00	1.88E+00
TEU-1	7439-97-6	Mercury and compounds	0.00%	3.01E-05		lb/ton	boiler	9.63E-02	3.01E-01	1.32E+00	1.20E-03	1.20E-03	1.20E-03
TEU-1	67-56-1	Methanol	0.00%	1.24E-02		lb/ton	boiler	3.98E+01	1.24E+02	5.45E+02	4.98E-01	4.98E-01	4.98E-01
TEU-1	1313-27-5	Molybdenum trioxide	0.00%	5.34E-05		lb/ton	boiler	1.71E-01	5.34E-01	2.34E+00	2.14E-03	2.14E-03	2.14E-03
TEU-1	7440-02-0	Nickel and compounds	0.00%	2.24E-04		lb/ton	boiler	7.18E-01	2.24E+00	9.83E+00	8.98E-03	8.98E-03	8.98E-03
TEU-1	108-95-2	Phenol	0.00%	2.72E-03		lb/ton	boiler	8.70E+00	2.72E+01	1.19E+02	1.09E-01	1.09E-01	1.09E-01
TEU-1	7723-14-0	Phosphorus and compounds	0.00%	9.27E-02		lb/ton	boiler	2.96E+02	9.27E+02	4.06E+03	3.71E+00	3.71E+00	3.71E+00
TEU-1	123-38-6	Propionaldehyde	0.00%	4.28E-03		lb/ton	boiler	1.37E+01	4.28E+01	1.88E+02	1.71E-01	1.71E-01	1.71E-01
TEU-1	7782-49-2	Selenium and compounds	0.00%	5.53E-05		lb/ton	boiler	1.77E-01	5.53E-01	2.42E+00	2.21E-03	2.21E-03	2.21E-03
TEU-1	7440-22-4	Silver and compounds	0.00%	1.59E-02		lb/ton	boiler	5.10E+01	1.59E+02	6.98E+02	6.37E-01	6.37E-01	6.37E-01
TEU-1	7440-62-2	Vanadium (fume or dust)	0.00%	1.01E-05		lb/ton	boiler	3.23E-02	1.01E-01	4.42E-01	4.04E-04	4.04E-04	4.04E-04
TEU-1	108-38-3	m-Xylene	0.00%	6.02E-05		lb/ton	boiler	1.93E-01	6.02E-01	2.64E+00	2.41E-03	2.41E-03	2.41E-03
TEU-1	106-42-3	p-Xylene	0.00%	6.02E-05		lb/ton	boiler	1.93E-01	6.02E-01	2.64E+00	2.41E-03	2.41E-03	2.41E-03
TEU-1	7440-66-6	Zinc and compounds	0.00%	2.19E-02		lb/ton	boiler	7.02E+01	2.19E+02	9.61E+02	8.77E-01	8.77E-01	8.77E-01
TEU-1	192-97-2	Benzo[e]pyrene	0.00%	3.59E-06		lb/ton	boiler	1.15E-02	3.59E-02	1.57E-01	1.43E-04	1.43E-04	1.43E-04
TEU-1	205-82-3	Benzo[j]fluoranthene	0.00%	2.65E-06		lb/ton	boiler	8.49E-03	2.65E-02	1.16E-01	1.06E-04	1.06E-04	1.06E-04
TEU-1	91-57-6	2-Methyl naphthalene	0.00%	2.38E-05		lb/ton	boiler	7.62E-02	2.38E-01	1.04E+00	9.52E-04	9.52E-04	9.52E-04
TEU-1	198-55-0	Perylene	0.00%	5.44E-07		lb/ton	boiler	1.74E-03	5.44E-03	2.38E-02	2.18E-05	2.18E-05	2.18E-05

Toxic Emissions Unit ID	Pollutant Information		Control Efficiency	Emission Factor Information				Annual - Chronic [lb/yr]			Max Daily - Acute [lb/day]		
				EF Values		Units	Reference/Notes						
	CAS or DEQ ID	Chemical Name		Annual - Chronic	Max Daily - Acute			Actual	Requested PTE	Capacity	Actual	Requested PTE	Capacity
			0.00%				Diesel fuel for Tier 4 engine						
TEU-2	71-43-2	Benzene	0.00%	1.86E-01		lb/Mgal	provided by DEQ	2.84E-01	8.87E-01	3.88E+00	3.55E-03	3.55E-03	3.55E-03
TEU-2	106-99-0	1,3-Butadiene	0.00%	2.17E-01		lb/Mgal	provided by DEQ	3.31E-01	1.03E+00	4.53E+00	4.14E-03	4.14E-03	4.14E-03
TEU-2	7440-43-9	Cadmium and compounds	0.00%	1.50E-03		lb/Mgal	provided by DEQ	2.28E-03	7.14E-03	3.13E-02	2.86E-05	2.86E-05	2.86E-05
TEU-2	50-00-0	Formaldehyde	0.00%	1.73E+00		lb/Mgal	provided by DEQ	2.63E+00	8.22E+00	3.60E+01	3.29E-02	3.29E-02	3.29E-02
TEU-2	1854-02-99	Chromium VI, chromate, and dichromate particula	0.00%	1.00E-04		lb/Mgal	provided by DEQ	1.52E-04	4.76E-04	2.08E-03	1.90E-06	1.90E-06	1.90E-06
TEU-2	7440-38-2	Arsenic and compounds	0.00%	1.60E-03		lb/Mgal	provided by DEQ	2.44E-03	7.62E-03	3.34E-02	3.05E-05	3.05E-05	3.05E-05
TEU-2	7439-92-1	Lead and compounds	0.00%	8.30E-03		lb/Mgal	provided by DEQ	1.26E-02	3.95E-02	1.73E-01	1.58E-04	1.58E-04	1.58E-04
TEU-2	7440-02-0	Nickel and compounds	0.00%	3.90E-03		lb/Mgal	provided by DEQ	5.94E-03	1.86E-02	8.13E-02	7.43E-05	7.43E-05	7.43E-05
TEU-2	91-20-3	Naphthalene	0.00%	1.97E-02		lb/Mgal	provided by DEQ	3.00E-02	9.38E-02	4.11E-01	3.75E-04	3.75E-04	3.75E-04
TEU-2	-	PAHs (excluding Naphtalene	0.00%	3.62E-02		lb/Mgal	provided by DEQ	5.51E-02	1.72E-01	7.55E-01	6.89E-04	6.89E-04	6.89E-04
TEU-2	50-32-8	Benzo[a]pyrene	0.00%	3.55000E-05		lb/Mgal	provided by DEQ	5.41E-05	1.69E-04	7.40E-04	6.76E-07	6.76E-07	6.76E-07
TEU-2	75-07-0	Acetaldehyde	0.00%	7.83E-01		lb/Mgal	provided by DEQ	1.19E+00	3.73E+00	1.63E+01	1.49E-02	1.49E-02	1.49E-02
TEU-2	107-02-8	Acrolein	0.00%	3.39E-02		lb/Mgal	provided by DEQ	5.16E-02	1.61E-01	7.07E-01	6.45E-04	6.45E-04	6.45E-04
TEU-2	7664-41-7	Ammonia	0.00%	2.90E+00		lb/Mgal	provided by DEQ	4.42E+00	1.38E+01	6.05E+01	5.52E-02	5.52E-02	5.52E-02
TEU-2	7440-50-8	Copper and compounds	0.00%	4.10E-03		lb/Mgal	provided by DEQ	6.25E-03	1.95E-02	8.55E-02	7.81E-05	7.81E-05	7.81E-05
TEU-2	100-41-4	Ethyl benzene	0.00%	1.09E-02		lb/Mgal	provided by DEQ	1.66E-02	5.19E-02	2.27E-01	2.08E-04	2.08E-04	2.08E-04
TEU-2	110-54-3	Hexane	0.00%	2.69E-02		lb/Mgal	provided by DEQ	4.10E-02	1.28E-01	5.61E-01	5.12E-04	5.12E-04	5.12E-04
TEU-2	7647-01-0	Hydrochloric acid	0.00%	1.86E-01		lb/Mgal	provided by DEQ	2.84E-01	8.87E-01	3.88E+00	3.55E-03	3.55E-03	3.55E-03
TEU-2	7439-96-5	Manganese and compounds	0.00%	3.10E-03		lb/Mgal	provided by DEQ	4.72E-03	1.48E-02	6.46E-02	5.90E-05	5.90E-05	5.90E-05
TEU-2	7439-97-6	Mercury and compounds	0.00%	2.00E-03		lb/Mgal	provided by DEQ	3.05E-03	9.52E-03	4.17E-02	3.81E-05	3.81E-05	3.81E-05
TEU-2	7782-49-2	Selenium and compounds	0.00%	2.20E-03		lb/Mgal	provided by DEQ	3.35E-03	1.05E-02	4.59E-02	4.19E-05	4.19E-05	4.19E-05
TEU-2	108-88-3	Toluene	0.00%	1.05E-01		lb/Mgal	provided by DEQ	1.61E-01	5.02E-01	2.20E+00	2.01E-03	2.01E-03	2.01E-03
TEU-2	1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-x	0.00%	4.24E-02		lb/Mgal	provided by DEQ	6.46E-02	2.02E-01	8.84E-01	8.07E-04	8.07E-04	8.07E-04
TEU-2	-	Diesel Particulate Matter	0.00%	1.202353991		lb/Mgal	Tier 4 engine standard for PM for 59 hp engine (0.022 g/bph-hr)*(59hp)*(1lb/453.592g)*(hr/2.38gal)*1000g/Mgal)	1.83E+00	5.72E+00	2.51E+01	2.29E-02	2.29E-02	2.29E-02

Appendix E: Risk Based Concentrations

Table E-1
Risk Based Concentrations
BBR Risk Assessment

Risk Based Concentrations (RBC) (ug/m3)								
CAS#	Chemical	Residential Cancer	Residential Noncancer	Child Cancer	Child Noncancer	Worker Cancer	Worker Noncancer	Acute
Air Curtain Incinerator Pollutants Emitted								
100-41-4	Ethyl benzene	0.4	260	10	1100	4.8	1100	22000
100-42-5	Styrene	--	1000	--	4400	--	4400	21000
100-44-7	Benzyl chloride	0.02	1	0.53	4.4	0.24	4.4	240
106-46-7	p-Dichlorobenzene (1,4-Dichlorobenzene)	0.091	60	2.4	260	1.1	260	12000
106-93-4	Ethylene dibromide (EDB, 1,2-Dibromoethane)	0.0017	9	0.043	40	0.02	40	--
106-99-0	1,3-Butadiene	0.033	2	0.86	8.8	0.4	8.8	660
107-02-8	Acrolein	--	0.35	--	1.5	--	1.5	6.9
107-06-2	Ethylene dichloride (EDC, 1,2-Dichloroethane)	0.038	7	1	31	0.46	31	--
107-13-1	Acrylonitrile	0.015	5	0.38	22	0.18	22	220
108-05-4	Vinyl acetate	--	200	--	880	--	880	200
108-67-8	1,3,5-Trimethylbenzene	--	60	--	260	--	260	--
108-88-3	Toluene	--	5000	--	22000	--	22000	7500
108-90-7	Chlorobenzene	--	50	--	220	--	220	--
110-54-3	Hexane	--	700	--	3100	--	3100	--
110-82-7	Cyclohexane	--	6000	--	26000	--	26000	--
120-12-7	Anthracene	Included as total PAHs						
120-82-1	1,2,4-Trichlorobenzene	No Assigned RBC						
123-91-1	1,4-Dioxane	0.2	30	5.2	130	2.4	130	7200
124-48-1	Dibromochloromethane	No Assigned RBC						
127-18-4	Tetrachloroethene (Perchloroethylene)	3.8	41	100	180	46	180	41
129-00-0	Pyrene	Included as total PAHs						
1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	--	220	--	970	--	970	8700
156-60-5	trans-1,2-dichloroethene	--	--	--	--	--	--	790
1634-04-4	Methyl tert-butyl ether	3.8	8000	100	35000	46	35000	8000
1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.000000001	0.00000013	9E-08	0.000026	4.2E-08	0.000026	--
191-24-2	Benzo[g,h,i]perylene	0.0047	--	0.17	--	0.34	--	--
193-39-5	Indeno[1,2,3-cd]pyrene	0.00061	--	0.022	--	0.043	--	--
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.00000001	0.0000013	9E-07	0.00026	4.2E-07	0.00026	--
205-99-2	Benzo[b]fluoranthene	0.000053	--	0.002	--	0.0038	--	--
206-44-0	Fluoranthene	0.00053	--	0.02	--	0.038	--	--
207-08-9	Benzo[k]fluoranthene	0.0014	--	0.052	--	0.1	--	--
208-96-8	Acenaphthylene	Included as total PAHs						
218-01-9	Chrysene	0.00043	--	0.016	--	0.03	--	--
3268-87-9	Octachlorodibenzo-p-dioxin (OCDD)	0.0000034	0.00042	0.0003	0.085	0.00014	0.085	--
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.0000001	0.000013	0.000009	0.0026	4.2E-06	0.0026	--
39001-02-0	Octachlorodibenzofuran (OCDF)	0.0000034	0.00042	0.0003	0.085	0.00014	0.085	--
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.00000001	0.0000013	9E-07	0.00026	4.2E-07	0.00026	--
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	0.000000001	0.00000013	9E-08	0.000026	4.2E-08	0.000026	--
50-32-8	Benzo[a]pyrene	0.000043	0.002	0.0016	0.0088	0.003	0.0088	0.002
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran (TcDF)	0.00000001	0.0000013	9E-07	0.00026	4.2E-07	0.00026	--
53-70-3	Dibenz[a,h]anthracene	0.0000043	--	0.00016	--	0.0003	--	--
541-73-1	1,3-Dichlorobenzene	No Assigned RBC						
542-75-6	1,3-Dichloropropene	0.25	32	6.5	140	3	140	36
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.0000001	0.000013	0.000009	0.0026	4.2E-06	0.0026	--
56-23-5	Carbon tetrachloride	0.17	100	4.3	440	2	440	1900
56-55-3	Benz[a]anthracene	0.00021	--	0.0078	--	0.015	--	--
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	3.4E-09	0.00000042	3E-07	0.000085	1.4E-07	0.000085	--
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.000000034	0.0000042	0.000003	0.00085	1.4E-06	0.00085	--
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.00000001	0.0000013	9E-07	0.00026	4.2E-07	0.00026	--
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.00000001	0.0000013	9E-07	0.00026	4.2E-07	0.00026	--
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.00000001	0.0000013	9E-07	0.00026	4.2E-07	0.00026	--
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.0000001	0.000013	0.000009	0.0026	4.2E-06	0.0026	--
67-63-0	Isopropyl alcohol	--	200	--	880	--	880	3200
67-64-1	Acetone	--	31000	--	140000	--	140000	62000
67-66-3	Chloroform	--	300	--	1300	--	1300	490
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.00000001	0.0000013	9E-07	0.00026	4.2E-07	0.00026	--
71-43-2	Benzene	0.13	3	3.3	13	1.5	13	29
71-55-6	1,1,1-Trichloroethane (Methyl chloroform)	--	5000	--	22000	--	22000	11000
72918-21-9	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.00000001	0.0000013	9E-07	0.00026	4.2E-07	0.00026	--
74-83-9	Bromomethane (Methyl bromide)	--	5	--	22	--	22	3900
74-87-3	Chloromethane (Methyl chloride)	--	90	--	400	--	400	1000
75-00-3	Chloroethane (Ethyl chloride)	--	30000	--	130000	--	130000	40000
75-01-4	Vinyl chloride	0.11	100	0.22	440	2.7	440	1300
75-05-8	Acetonitrile	--	60	--	260	--	260	--

Table E-1

Risk Based Concentrations

BBR Risk Assessment

Risk Based Concentrations (RBC) (ug/m3)								
CAS#	Chemical	Residential Cancer	Residential Noncancer	Child Cancer	Child Noncancer	Worker Cancer	Worker Noncancer	Acute
75-09-2	Dichloromethane (Methylene chloride)	59	600	620	2600	1200	2600	2100
75-15-0	Carbon disulfide	--	800	--	3500	--	3500	6200
75-25-2	Bromoform	0.91	--	24	--	11	--	--
75-27-4	Bromodichloromethane	No Assigned RBC						
75-34-3	1,1-Dichloroethane (Ethylidene dichloride)	0.63	--	16	--	7.5	--	--
75-69-4	Trichlorofluoromethane (Freon 11)	No Assigned RBC						
78-87-5	1,2-Dichloropropane (Propylene dichloride)	--	4	--	18	--	18	230
78-93-3	2-Butanone (Methyl ethyl ketone)	--	5000	--	22000	--	22000	5000
79-00-5	1,1,2-Trichloroethane (Vinyl trichloride)	0.063	--	1.6	--	0.75	--	--
79-01-6	Trichloroethene (TCE, Trichloroethylene)	0.2	2.1	3.5	9.2	2.9	9.2	2.1
79-34-5	1,1,2,2-Tetrachloroethane	0.017	--	0.45	--	0.21	--	--
80-62-6	Methyl methacrylate	--	700	--	3100	--	3100	--
83-32-9	Acenaphthene	Included as total PAHs						
85-01-8	Phenanthrene	Included as total PAHs						
86-73-7	Fluorene	No Assigned RBC						
87-68-3	Hexachlorobutadiene	0.045	--	1.2	--	0.55	--	--
91-20-3	Naphthalene	0.029	3.7	0.76	16	0.35	16	200
1330-20-7	o-Xylene (calculated as mixed xylenes)	--	220	--	970	--	970	8700
95-50-1	1,2-Dichlorobenzene	No Assigned RBC						
95-63-6	1,2,4-Trimethylbenzene	--	60	--	260	--	260	--
96-12-8	1,2-Dibromo-3-chloropropane (DBCP)	0.000098	0.2	0.001	0.88	0.002	0.88	1.9
98-82-8	Isopropylbenzene (Cumene)	--	400	--	1800	--	1800	--
75-07-0	Acetaldehyde	0.45	140	12	620	5.5	620	470
98-86-2	Acetophenone	No Assigned RBC						
7440-36-0	Antimony and compounds	--	0.3	--	1.3	--	1.3	1
7440-38-2	Arsenic and compounds	0.000024	0.00017	0.0013	0.0024	0.00062	0.0024	0.2
7440-39-3	Barium and compounds	NA	NA	NA	NA	NA	NA	NA
7440-41-7	Beryllium and compounds	0.00042	0.007	0.011	0.031	0.005	0.031	0.02
7440-43-9	Cadmium and compounds	0.00056	0.005	0.014	0.037	0.0067	0.037	0.03
7782-50-5	Chlorine	--	0.15	--	0.66	--	0.66	170
18540-29-9	Chromium VI, chromate, and dichromate particulate	0.000031	0.083	0.00052	0.88	0.001	0.88	0.3
7440-48-4	Cobalt and compounds	--	0.1	--	0.44	--	0.44	--
7440-50-8	Copper and compounds	--	--	--	--	--	--	100
4170-30-3	Crotonaldehyde	No Assigned RBC						
84-66-2	Diethylphthalate	No Assigned RBC						
84-74-2	Dibutyl phthalate	No Assigned RBC						
50-00-0	Formaldehyde	0.17	9	4.3	40	2	40	49
7647-01-0	Hydrochloric acid	--	20	--	88	--	88	2100
7664-39-3	Hydrogen fluoride	--	2.1	--	19	--	19	16
7439-92-1	Lead and compounds	--	0.15	--	0.66	--	0.66	0.15
7439-96-5	Manganese and compounds	--	0.09	--	0.4	--	0.4	0.3
7439-97-6	Mercury and compounds	--	0.077	--	0.63	--	0.63	0.6
67-56-1	Methanol	--	4000	--	18000	--	18000	28000
1313-27-5	Molybdenum trioxide	No Assigned RBC						
365	Nickel compounds, insoluble	0.0038	0.014	0.1	0.062	0.046	0.062	0.2
108-95-2	Phenol	--	200	--	880	--	880	5800
7723-14-0	Phosphorus and compounds							
123-38-6	Propionaldehyde	--	8	--	35	--	35	--
7782-49-2	Selenium and compounds	--	--	--	--	--	--	2
7440-22-4	Silver and compounds							
7440-62-2	Vanadium (fume or dust)	--	0.1	--	0.44	--	0.44	0.8
1330-20-7	m-Xylene (calculated as mixed xylenes)	--	220	--	970	--	970	8700
1330-20-7	p-Xylene (calculated as mixed xylenes)	--	220	--	970	--	970	8700
7440-66-6	Zinc and compounds	No Assigned RBC						
192-97-2	Benzo[e]pyrene	Included as total PAHs						
205-82-3	Benzo[j]fluoranthene	0.00014	--	0.0052	--	0.01	--	--
91-57-6	2-Methyl naphthalene	No Assigned RBC						
198-55-0	Perylene	Included as total PAHs						

Table E-1

Risk Based Concentrations

BBR Risk Assessment

Risk Based Concentrations (RBC) (ug/m3)								
CAS#	Chemical	Residential Cancer	Residential Noncancer	Child Cancer	Child Noncancer	Worker Cancer	Worker Noncancer	Acute
Diesel Engine Pollutants Emitted								
71-43-2	Benzene	0.13	3	3.3	13	1.5	13	29
106-99-0	1,3-Butadiene	0.033	2	0.86	8.8	0.4	8.8	660
7440-43-9	Cadmium and compounds	0.00056	0.005	0.014	0.037	0.0067	0.037	0.03
50-00-0	Formaldehyde	0.17	9	4.3	40	2	40	49
18540-29-9	Chromium VI, chromate, and dichromate particulate	0.000031	0.083	0.00052	0.88	0.001	0.88	0.3
7440-38-2	Arsenic and compounds	0.000024	0.00017	0.0013	0.0024	0.00062	0.0024	0.2
7439-92-1	Lead and compounds	--	0.15	--	0.66	--	0.66	0.15
365	Nickel compounds, insoluble	0.0038	0.014	0.1	0.062	0.046	0.062	0.2
91-20-3	Naphthalene	0.029	3.7	0.76	16	0.35	16	200
401	PAHs (excluding Naphtalene	0.000043	--	0.0016	--	0.003	--	--
50-32-8	Benzo[a]pyrene	0.000043	0.002	0.0016	0.0088	0.003	0.0088	0.002
75-07-0	Acetaldehyde	0.45	140	12	620	5.5	620	470
107-02-8	Acrolein	--	0.35	--	1.5	--	1.5	6.9
7664-41-7	Ammonia	--	500	--	2200	--	2200	1200
7440-50-8	Copper and compounds	--	--	--	--	--	--	100
100-41-4	Ethyl benzene	0.4	260	10	1100	4.8	1100	22000
110-54-3	Hexane	--	700	--	3100	--	3100	--
7647-01-0	Hydrochloric acid	--	20	--	88	--	88	2100
7439-96-5	Manganese and compounds	--	0.09	--	0.4	--	0.4	0.3
7439-97-6	Mercury and compounds	--	0.077	--	0.63	--	0.63	0.6
7782-49-2	Selenium and compounds	--	--	--	--	--	--	2
108-88-3	Toluene	--	5000	--	22000	--	22000	7500
1330-20-7	Xylene (mixture), including m-xylene, o-xylene, p-xylene	--	220	--	970	--	970	8700
200	Diesel Particulate Matter	0.1	5	2.6	22	1.2	22	--