Forest Energy Corporation
Wood Pellet Mill

Health Risk Assessment – Toxics

Modeling Report

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Sign-off Sheet

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Abbreviations

AB	Assembly Bill
ADMRT	Air Dispersion Modeling and Risk Assessment Tool
AERMAP	AERMOD Terrain Preprocessor
AERMET	AERMOD Meteorological Preprocessor
AERMOD	AMS/EPA Regulatory Model
AP-42	Compilation of Air Pollutant Emissions Factors, Fifth Edition
BPIPPRM	Building Profile Input Program for PRIME
CARB	California Air Resources Board
CD	Compact Disc
DEM	Digital Elevation Model
DPM	Diesel Particulate Matter
DTSC	Department of Toxic Substances Control
EMFAC	Emission Factor model (California)
EPA	Environmental Protection Agency
FEC	Forest Energy Corporation
HARP	Hotspots Analysis and Reporting Program
hr	Hour
HRA	Health Risk Assessment
MEIR	Maximally Exposed Individual Resident
MCAQMD	Mendocino County Air Quality Management District
MFP	Mendocino Forest Products, LLC
NAD83	North American Datum 1983
NED	National Elevation Dataset

OEHHA	Office of Environmental Health Hazard Assessment
PAB	Process Area Boundary
PRIME	Plume Rise Model Enhancements
PSD	Prevention of Significant Deterioration
PM	Particulate Matter
RAST	Risk Assessment Standalone Tool
RME	Reasonable Maximum Exposure
TAC	Toxic Air Contaminant
USGS	United States Geological Survey
°F	Degrees Fahrenheit

1.0 INTRODUCTION

Mendocino Forest Products, LLC (MFP) owns a wood pellet mill located at 6505 North State Street in Calpella, California. The pellet manufacturing process is operated by Forest Energy Corporation (FEC) personnel.

MFP requested that Stantec review the potential health risks associated with the highest emitting toxic pollutants associated with the rotary dryer and diesel exhaust. The dryer exhausts to the dryer cyclone for material recovery. A portion of the dryer cyclone exhaust returns to the dryer as makeup air while the remainder passes through a scrubber before being exhausted to the atmosphere. Therefore, the dryer exhaust with toxics exits through the scrubber. Diesel exhaust emissions were evaluated from the tailpipe from loaders and deliver trucks. Emissions factors were derived from EMFAC 2017 version 1.0.3

Appropriate stack parameters from the scrubber were derived from the most recent particulate matter source test conducted by TRC Environmental Corporation on November 14, 2019. All other modeling configurations remain consistent with the revised particulate matter (PM) modeling report conducted by Stantec in July 2019.

The ensuing sections of this document describe the methodology that was used to conduct the AMS/EPA Regulatory Model (AERMOD) modeling analysis. This report has been developed following applicable portions of the U.S. Environmental Protection Agency (EPA) Revisions to the *Guideline on Air Quality Models* (*Guidelines*, 40 CFR Part 51, Appendix W, January 2017) and incorporates the changes to the modeling protocol as requested by Mendocino County Air Quality Management District (MCAQMD). Also, all AERMOD modeling and subsequent risk analysis was conducted utilizing the California Air Resources Board (CARB) recommended Air Dispersion Modeling & Risk Tool (ADMRT) for Hot Spot Analysis.

Lastly, the health risk assessment (HRA) applied guidance from the Office of Environmental Health Hazard Assessment (OEHHA). Because this assessment was developed for internal use by MFP, worst-case emissions were applied for cancer, non-cancer chronic, non-cancer 8-hour (8-hr), and non-cancer acute risks. The worst-case emissions are associated with either the nearest residence to the west or north of the facility property boundary. Again, this portion was conducted using ADMRT as well.

Additionally, for this analysis, 26 toxic air contaminants (TACs) associated with emissions from wood drying activities were modeled. These highest ten include formaldehyde, methanol, acetaldehyde, phenol, acrolein, propionaldehyde, methyl isobutyl ketone, toluene, benzene and methylene chloride. Diesel particulate matter (DPM) exhaust emissions were also evaluated from loaders and haul truck traffic.

1.1 FACILITY DESCRIPTION

The MFP process produces wood pellets from sawdust and wood trimmings. Wet wood feedstocks are dried in a wood-fired, rotary kiln dryer. The exhaust air stream passes through a wet scrubber prior to being released to the atmosphere. The dried feedstock is sized and pressed into wood pellets without the addition of other materials. The wood pellets are cooled and packaged for distribution. The toxic emissions inventory is discussed further in Section 4.0.

1.2 SITE DESCRIPTION

The MFP facility is located in the town of Calpella, California which is approximately 6 miles north of the city of Ukiah, California as shown in Figure 1.1. It lies at an elevation of approximately 209 meters above sea level.

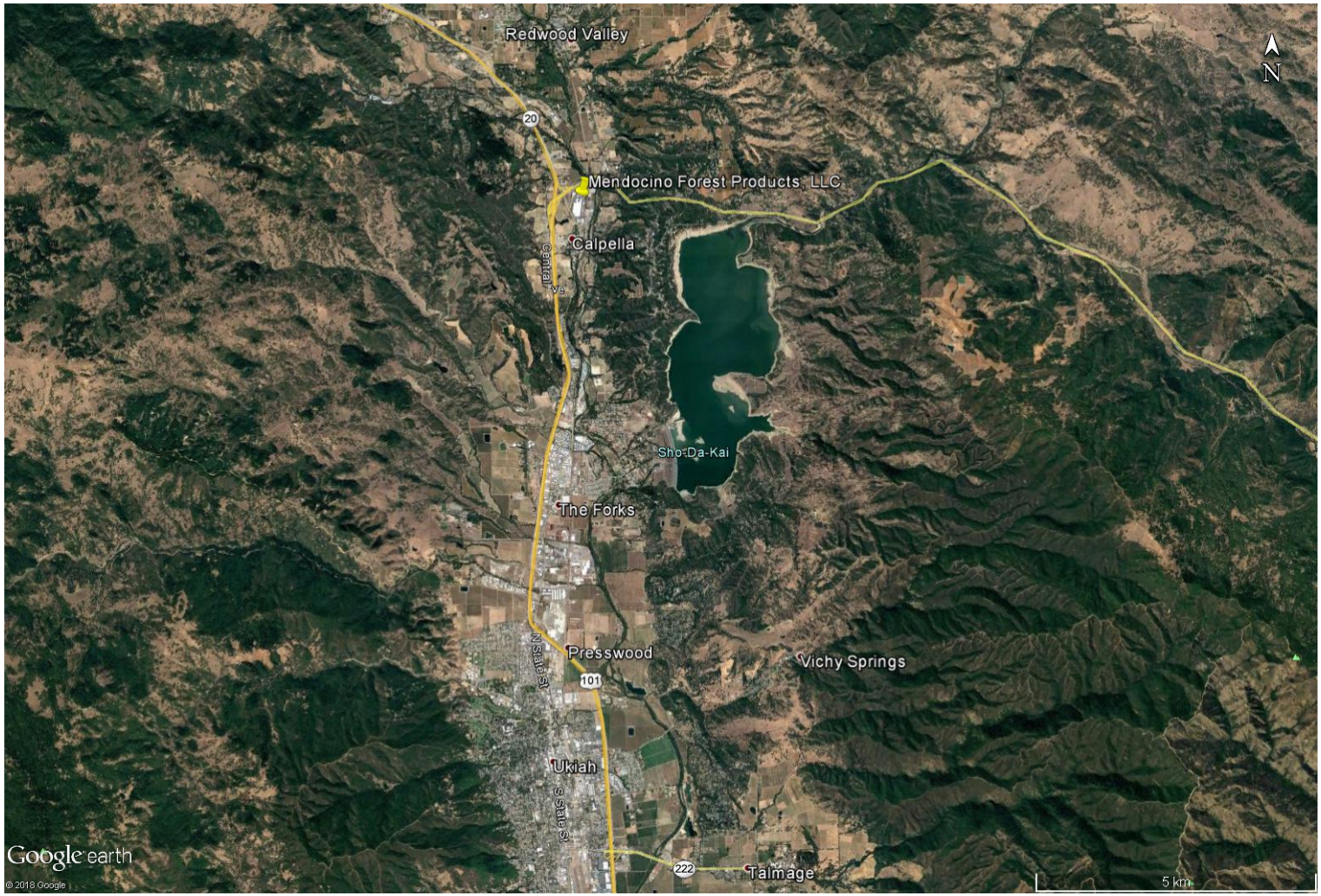

Figure 1.1 General location of the Mendocino Forest Products facility.

2.0 TOPOGRAPHY, CLIMATOLOGY, AND METEOROLOGY

2.1 REGIONAL TOPOGRAPHY

MFP is located approximately 6 miles north of Ukiah, California. Ukiah is located in California's geologically active costal range province, which consists of a series of north-south trending valleys, ridges, and faults. The distinctive topography often results in rivers running northward from their source, rather than directly west, and emptying into the ocean many miles away. The facility lies in a narrow valley, oriented north-south, and the Russian River runs along the east side of the facility. The topography of the region is illustrated in Figure 2.2.

2.2 REGIONAL CLIMATOLOGY

Ukiah is warm during the summer when the temperatures tend to be in the 90 degrees Fahrenheit (°F) range and mild during the winter when the temperatures tend to be in the 50 (°F) range. Ukiah's climate is best described as a Mediterranean climate, which is characterized as dry, warm to hot summers and rainy winters.

The period-of-record (01/01/1893 to 05/24/2013) average annual precipitation measured at the Ukiah, California Cooperative Weather Station was 37.26 inches (Western Region Climate Center (www.wrcc.dri.edu)). Precipitation is highest during the winter months of the year, with January being the wettest month with an average of 7.85 inches of rainfall. The period-of-record average annual snow fall measured at Ukiah was 0.4 inches. Snow may fall during the winter months from December to March.

The period-of-record monthly mean maximum temperatures at the Ukiah station vary from a low of 56.5°F in January to a high of 92.7°F in July. Monthly mean minimum temperatures range from a low of 35.5°F in January to a high of 53.5 °F in July.

2.3 MODELING METEOROLOGICAL DATA

The modeling was conducted using 5 years of data from the Ukiah Municipal Airport Weather Station. This station is the closest meteorological station to the MFP facility with available data (see Figure 2.1). The Ukiah Municipal Airport Site lies approximately 6 miles south of the MFP Calpella facility. This pre-processed meteorological data set was obtained from the CARB Meteorological files database (https://www.arb.ca.gov/toxics/harp/metfiles2.htm). This data set combines surface data from the Ukiah Municipal Airport Meteorological station and upper air data from the Oakland Metropolitan Airport Weather Station (see Figure 2.1) This dataset is the most representative available data for the conditions at the MFP Calpella facility. The Ukiah Municipal Airport data set is for the period 2009-2013. The wind rose for this dataset is illustrated in Figure 2.3. The wind rose shows significant flow of SSE-NNW wind, which is consistent with the orientation of the valley.

2.3.1 Meteorological Data Processing for AERMOD

The pre-processed dataset obtained from CARB was processed using the EPA AERMET computer program (*User's Guide for the AERMOD Meteorological Preprocessor (AERMET)*, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emissions, Monitoring, and Analysis Division, Research Triangle Park, North Carolina, EPA-454/B-16-010, December 2016). The AERMET program serves as the meteorological preprocessor for the guideline model developed by the EPA in conjunction with the American Meteorological Society called AERMOD. AERMOD is explained further below. AERMET is designed to combine and quality control National Weather Service surface and upper air data for use by AERMOD. AERMET version 14134 was used to process this dataset.

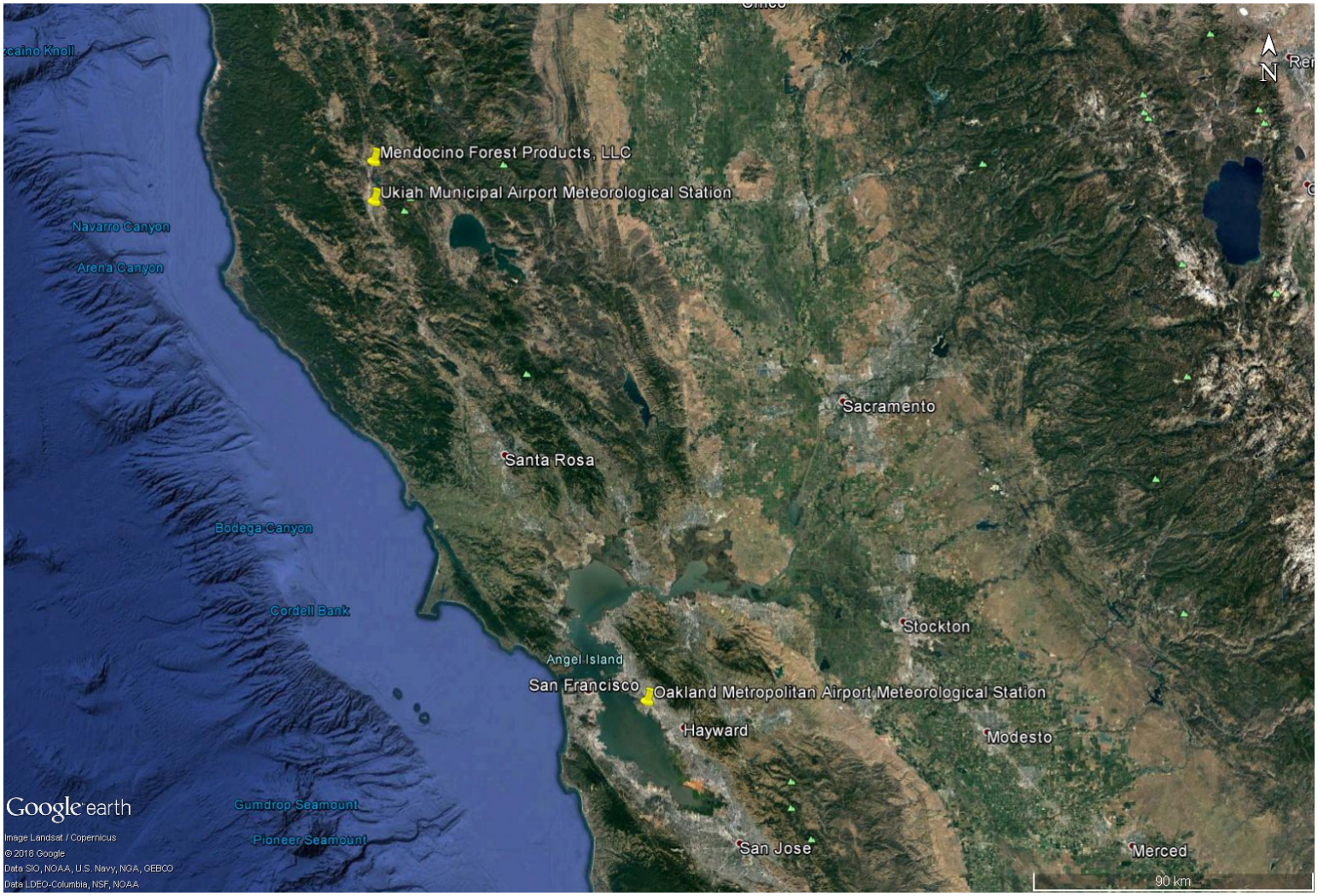

Figure 2.1 Meteorological station locations.

Figure 2.2 Regional topography surrounding the Mendocino Forest Products facility.

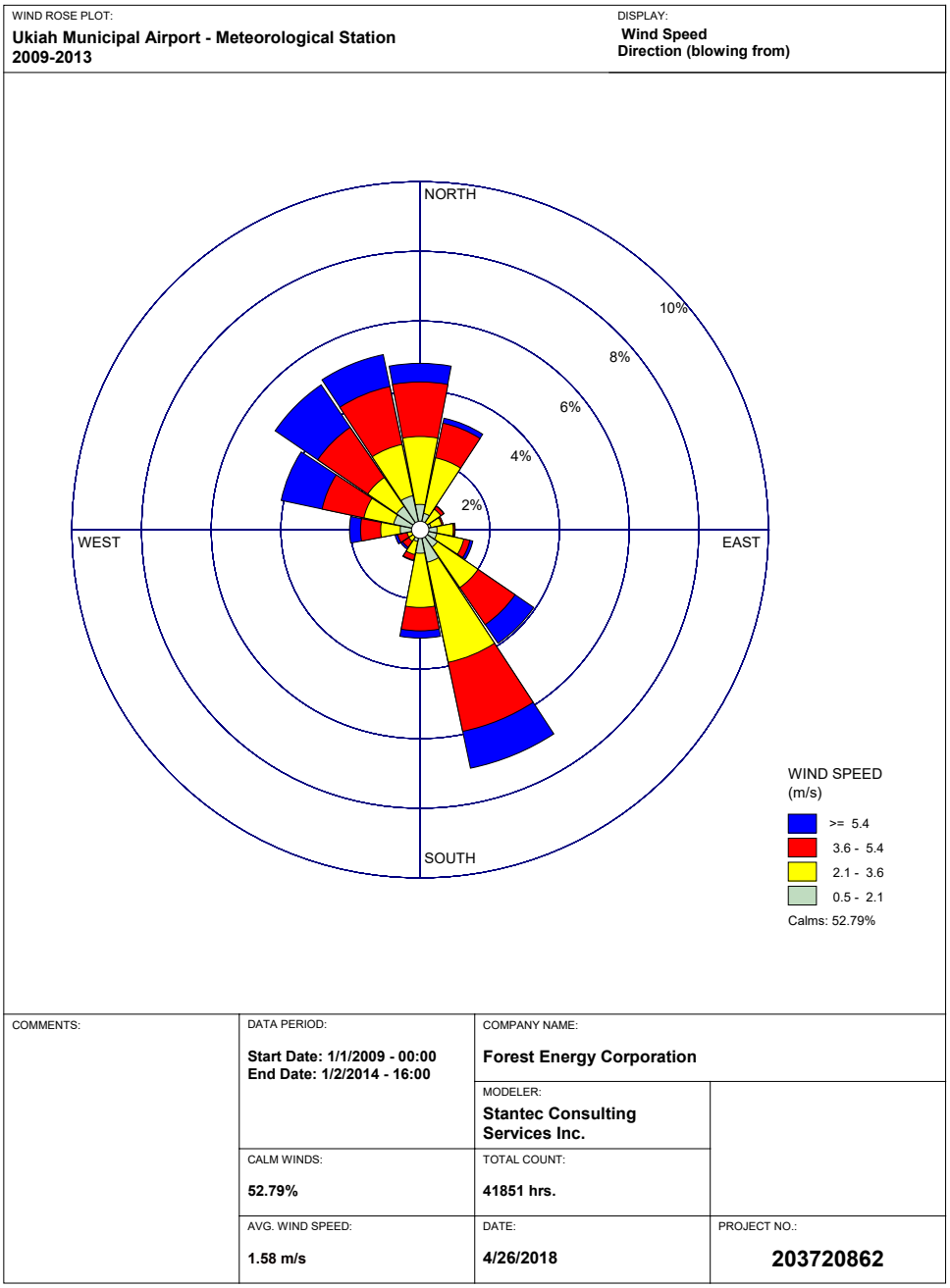

Figure 2.3 Wind Rose for 2009 to 2013 from the Ukiah Municipal Airport meteorological station.

3.0 MODELING ANALYSIS DESIGN

The dispersion modeling was conducted using the Prevention of Significant Deterioration (PSD) regulatory guideline dispersion model developed by the EPA in conjunction with the American Meteorological Society. Evaluation of the maximum ambient air quality impacts from the Forest Energy facility was conducted using the latest version of AERMOD within ADMRT.

EPA's *Guideline on Air Quality Models* addresses the regulatory application of air quality models for assessing criteria pollutants under the Clean Air Act[1]. Appendix A of the *Guideline* identifies AERMOD as the preferred model for a wide range of regulatory applications. The AERMOD modeling system consists of one main program (AERMOD) and two pre-processors (AERMET and AERMOD Terrain Preprocessor [AERMAP]). The major purpose of AERMET is to calculate boundary layer parameters for use by AERMOD. The major purpose of AERMAP is to calculate terrain heights and receptor grid elevations for AERMOD. Both AERMET and AERMAP require observational data to parameterize the growth and structure of the atmospheric boundary layer. AERMOD uses terrain, boundary layer and source data to model pollutant transport and dispersion for calculating temporally averaged air pollution concentrations.

AERMOD's three models and required model inputs are as follows:

1) AERMET: calculates boundary layer parameters for input to AERMOD

    a. Model inputs: wind speed; wind direction; cloud cover; ambient temperature; morning sounding; albedo; surface roughness; and Bowen ratio

    b. Model outputs for AERMOD: wind speed; wind direction; ambient temperature; lateral turbulence; vertical turbulence; sensible heat flux; friction velocity; and Monin-Obukhov Length

2) AERMAP: calculates terrain heights and receptor grid elevations for input to AERMOD

    a. Model inputs: Digital Elevation Model (DEM) data [x,y,z]; and design of receptor grid (pol., cart., disc.)

    b. Model outputs for AERMOD: [x,y,z] and hill height scale for each receptor

1 "Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions: Summary (Final Rule)." Federal Register 70:216 (9 November 2005) p. 68218

3) AERMOD: calculates temporally averaged air pollution concentrations at receptor locations for comparison to the NAAQS

   a. Model inputs: source parameters (from permit application); boundary layer meteorology (from AERMET); and receptor data (from AERMAP)

   b. Model outputs: temporally averaged ground-level air pollutant concentrations

3.1 MODEL INPUT DEFAULTS/OPTIONS

The recommended regulatory default options for AERMOD as stated in the *Guidelines* were used for the modeling runs. The regulatory default options in AERMOD include the use of stack-tip downwash, incorporation of the effects of elevated terrain, and calms and missing data processing routines.

The missing data processing routines that are included in AERMOD allow the model to handle missing meteorological data in the processing of short-term averages. The model treats missing meteorological data in the same way as the calms processing routine (i.e., it sets the concentration values to zero for that hour and calculates the short term averages according to EPA's calms policy, as set forth in the Guideline). Calms and missing values are tracked separately for the purpose of flagging the short-term averages. An average that includes a calm hour is flagged with a 'c', an average that includes a missing hour is flagged with an 'm', and an average that includes both calm and missing hours is flagged with a 'b'. If the number of hours of missing meteorological data exceeds 10 percent of the total number of hours for a given model run, a cautionary message is written to the main output file, and the user is referred to Section 5.3.2 of *On-site Meteorological Program Guidance for Regulatory Modeling Applications* (EPA, 1987).

3.2 RECEPTOR NETWORK

The receptor grid (see Figure 3.1) was adjusted based on recommendations from CARB. The following receptor grid was modeled:

- receptors spaced at 15 meters along the Process Area Boundary (PAB);
- receptors spaced at 10 meters from the PAB to 200 meters;
- receptors spaced at 60 meters from 200 meter to 1 kilometers;
- receptors spaced at 200 meters from 1 kilometer to 2 kilometers; and
- receptors spaced at 500 meters from 2 kilometers to 5 kilometers.

In addition to the receptor grid above, individual receptors were placed at sensitive locations in the immediate vicinity of the facility. The following five locations were identified as sensitive in nature due to their proximity to the Forest Energy facility:

1. Calpella Elementary School
2. The Waldorf School of Mendocino County
3. Consolidated Tribal Health Center
4. Nearest residence north of facility boundary
5. Nearest residence west of facility boundary

3.3 RECEPTOR ELEVATIONS

Receptor elevations were determined using appropriate Digital Elevation Model (DEM) files associated with the project area provided by the United States Geological Survey (USGS), based on North American Datum 1983 (NAD83). Four DEMs were included into HARP2 in ensure full coverage. These include: Orrs Springs, Redwood Valley, Ukiah and Laughlin Range.

The DEM data was processed with AERMAP. AERMAP, like AERMET, is a preprocessor program which was developed to process terrain data in conjunction with a layout of receptors and sources to be used in AERMOD. For complex terrain situations, AERMOD captures the essential physics of dispersion in complex terrain and therefore, needs elevation data that convey the features of the surrounding terrain. In response to this need, AERMAP first determines the base elevation at each receptor. AERMAP then searches for the terrain height and location that has the greatest influence on dispersion for each individual receptor. This height is referred to as the hill height scale. Both the base elevation and hill height scale data are produced by AERMAP as a file or files which are then inserted into an AERMOD input control file.

3.4 MODELING DOMAIN

The AERMAP terrain preprocessor requires the user to define a modeling domain. The modeling domain is defined as the area that contains all the receptors and sources being modeled with a buffer to accommodate any significant terrain elevations. Significant terrain elevations include all the terrain that is at or above a 10% slope from each and every receptor.

3.5 PROCESS AREA BOUNDARY

The process area boundary that was used in the modeling is shown in Figure 3.2. This boundary follows the MFP property line.

3.6 BUILDING DOWNWASH

Building downwash effects were evaluated by incorporating the appropriate building/structure dimensions into the AERMOD input files using providence Engineering's commercial version of EPA's Building Profile Input Program for Plume Rise Model Enhancements (PRIME) (BPIPPRM) software. The BPIPPRM program is EPA approved and includes the latest EPA building downwash algorithms. The downwash files generated by the BPIPPRM program are included in the modeling files compact disc (CD) accompanying this modeling report. A plan view map of the MFP facility, showing the building and source locations is shown in Figure 3.2. Building heights are shown in Table 3-1 below.

Table 3-1 Building Heights

Building ID	Building Description	Height (ft)
WashRack	Wash Rack	21
DieselTK	Diesel Tank	24
MainBldg	Main Building	32
CorpOffc	Corporate Office	24
FenceTV	Fence Tavern	26
PelMilB	Pellet Mill Building	18.4
SawDStrg	Saw Dust Storage Building	42.3

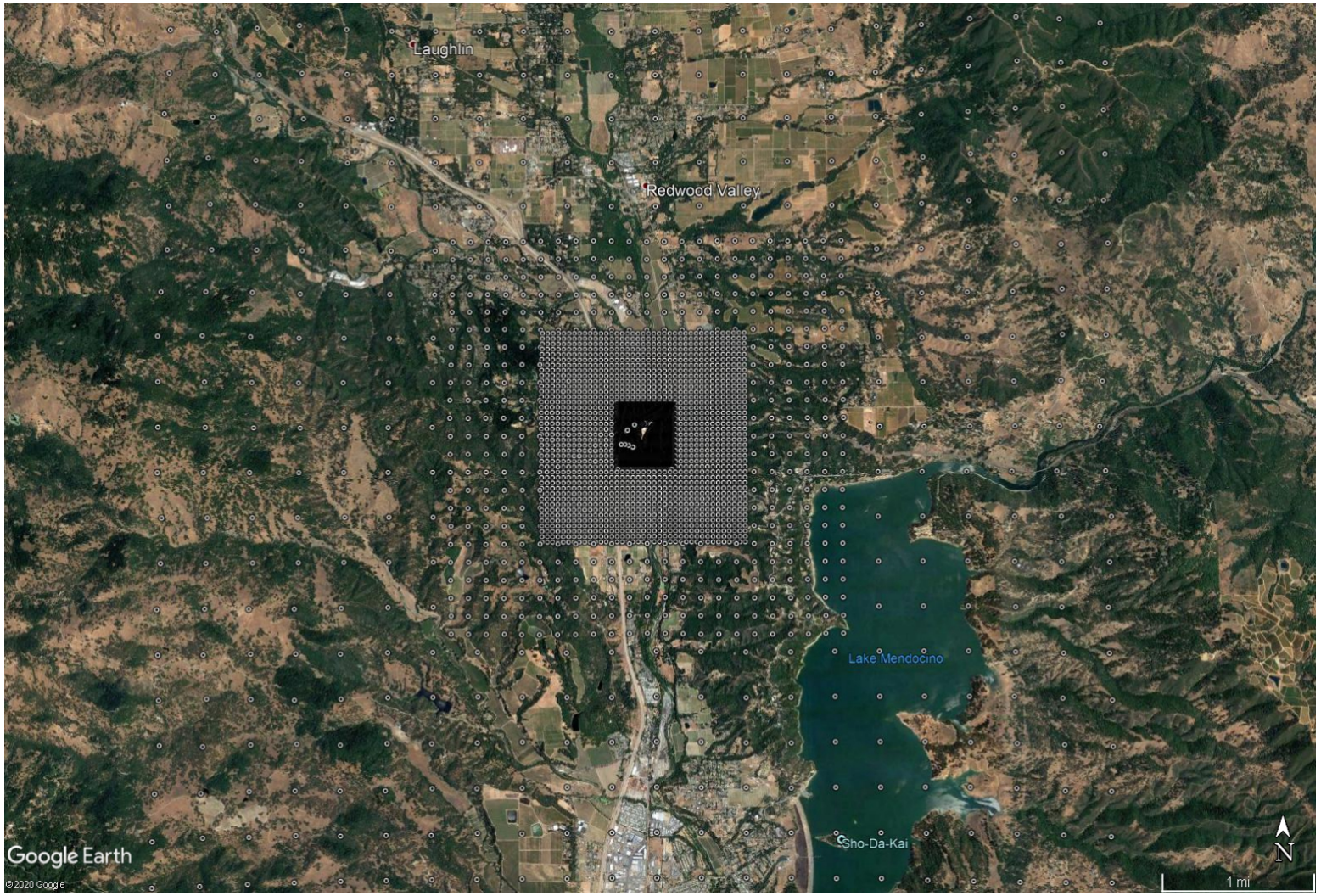

Figure 3.1 Receptor grid that was used for the MFP facility modeling.

3.7 SOURCE CHARACTERIZATION

Parameters for the emission sources at the MFP facility that were used in the modeling are listed in Table 3-2. The location of the scrubber source is shown in Figure 3.2. Note that the baghouse source is also shown but is assumed to only emits particulate matter. While it is theoretically possible that a small percentage of toxics could reach the baghouse, it is virtually impossible to establish the exact ratio. Additionally, the baghouse it nearly twice the stack height of scrubber. Therefore, it is reasonable that assuming 100% is released from the scrubber is representative and conservative regarding the potential emissions of toxics from the facility. It should also be noted that the few forklifts that are operated at the facility are used on a limited basis and run on propane, which has a limited amount of TACs. For the purpose of this analysis they are considered negligible. Additionally, MFP runs 6-10 truckloads a day during the work week. To ensure maximum conservative, 10 incoming and outgoing trucks was assumed. Emissions were calculated for driving and idling time on site. MFP also operates diesel powered loaders.

3.7.1 Point Sources

The MFP facility consists of the following point emissions sources:

- Scrubber
- Baghouse (no toxic pollutants emitted)

3.7.2 Volume Sources

The MFP facility consists of the following volume emissions sources:

- Loading/haul trucks
- Loaders

3.8 MODELING SCENARIOS

A single scenario consisting of continuous operation of the scrubber throughout the year, weekday truck travel (10 incoming and exiting loads driving and idling each workday of the year), and loader travel was modeled. All applicable emitting TACs were modeled at averaging periods of the maximum 1-hr and annually.

DPM exhaust emission rates from the tailpipe were established using the web-based Project Analysis EMFAC2017 v1.0.3. The EMFAC Input parameters are the appropriate air district, calendar year, vehicle type/category, model year, speed fuel and representative temperature and relative humidity. Mendocino County AQMD, 2020 were applied. Additionally, vehicle class for the haul trucks is a T6 Instate Heavy, while the loaders are T6 Instate Construction Small. Each are medium-heavy duty diesel trucks and construction equipment (for the loaders). EMFAC2017 allows the user to apply EMFAC 2011 categories which was selected for this analysis because it is the most up-to-date. The model year of the equipment was selected as "aggregate" to represent a variety of model years rather than a specific year(s). It was also estimated that the approximate average speed would be 10 mph. Lastly, an average temperature of 59 °F and 62% relative humidity was applied[2].

EMFAC provided PM2.5 rates of the following:

- Trucks T6 Instate Heavy – RUNEX 0.256 g/mile
- Loaders T6 Instate Construction Small – RUNEX 0.215 g/mile
- Trucks T6 Instate Heavy – IDLEX 0.287 g/hr idling

How these were applied to obtain DPM exhaust emission rates are described below in Section 4. Provided below in Table 3-1 and 3-2 are the modeling parameters associated with each source. The five sensitive receptors referenced in the July 2019 PM dispersion modeling were assumed for the HRA. These include:

- Calpella Elementary School
- The Waldorf School of Mendocino County
- Consolidated Tribal Health Center
- Nearest residence north of facility boundary
- Nearest residence west of facility boundary

2 Data from https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9122 and https://www.timeanddate.com/weather/usa/ukiah/climate average daily temperature and humidity.

Figure 3.2 Map of the MFP facility showing the buildings, point sources and the process area boundary.

Table 3-2 Point Source Parameters									
Source ID	**Source Description**	**Source Type**	**UTM Easting (m)**	**UTM Northing (m)**	**Base Elevation (m)**	**Stack Height (ft)**	**Temp. (°F)**	**Exit Flowrate (acfm)**	**Stack Diameter (ft)**
SCRUBBER	Scrubber	Vertical	482397	4343506	224.96	22.1	144.8	11,037	2.5
Stack parameters obtained from source test performed on November 26, 2019									

Table 3-3 Volume Source Parameters									
Source ID	**Source Description**	**Source Type**	**UTM Easting (m)**	**UTM Northing (m)**	**Base Elevation (m)**	**Release Height (m)**	**Sigma Y (m)**	**Sigma Z (m)**	**# of Sources**
Trk1-26	Haul Road Truck travel	Tailpipe emissions	Various	Various	Various	2.55	2.09	2.37	26
Trk_Idle	Haul Truck Idling	Tailpipe emissions	482368	4343458	223.24	2.55	2.09	2.37	1
Load1-10	Loader Travel	Tailpipe emissions	Various	Various	Various	2.55	2.02	2.37	10
Stack parameters established via EPA Haul Road Guidance and AERMOD User's Guide[3,4]									

The release height is equivalent to the 0.5 * the plume height. The plume height is the vehicle height (~3m) * 1.7. The sigma Z is plume height/2.15. The sigma Y is the width of the plume (vehicle width + 6m, for one-way road)/4.3. The width of the truck is ~3m and the loaders are 2.7 m.

3 AERMOD User's Guide https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf
4 EPA Haul Road Workgroup Final Report https://www3.epa.gov/scram001/reports/Haul_Road_Workgroup-Final_Report_Package-20120302.pdf

4.0 EMISSIONS INVENTORY

The modeling was based on the emission rates obtained from EPA's Compilation of Air Pollutant Emissions Factors, Fifth Edition (AP-42), Section 10.6.2, Table 10.6.2-3 for a rotary dryer with direct wood-fired, softwood. All emission factors are in pounds per oven-dried ton. Emission rates are illustrated for all pollutants in Table 4-1 below. It should be noted that the dryer is a direct-fired unit, therefore all products of combustions are routed to the scrubber and accounted for in the emission factors referenced above. Note that off these pollutants were cross referenced with the AB 2588AB list of toxics.

Table 4-1 Modeled Emission Rates

Pollutant	Source	lb/hr
Formaldehyde	Scrubber	1.00E-01
Methanol		5.60E-02
Acetaldehyde		5.20E-02
Phenol		2.64E-02
Acrolein		1.80E-02
Propionaldehyde		1.28E-02
Methyl Isobutyl Ketone		9.60E-03
Toluene		8.40E-03
Benzene		3.96E-03
Methylene Chloride		2.52E-03
m-,p-Xylene		2.20E-03
Bis-(2-ethylhexyl phthalate		1.28E-03
Styrene		4.80E-04
Chloromethane		4.40E-04
Cumene		2.76E-04
Acetophenone		2.56E-04
Hydroquinone		2.40E-04
Biphenyl		1.56E-04

Table 4-1 Modeled Emission Rates		
Pollutant	**Source**	**lb/hr**
Bromomethane		1.12E-04
Hexane	Scrubber	1.04E-04
Di-N-Butyl Phthalate		9.20E-05
Carbon Disulfide		7.20E-05
o-Xylene		5.60E-05
Carbon Tetrachloride		4.80E-05
111-Trichloroethane		4.80E-05
Ethyl Benzene		1.52E-05

4.1 MOBILE SOURCE EMISSIONS

The trucks arrive and exit the facility a maximum of 10 times daily (equivalent to 10 total truck trips), five days per week. The length of the travel one way is 300 yards or 600 yards each round trip. Therefore, 6,000 yards/day is traveled by the trucks, 260 days/yr. The RUNEX PM2.5 tailpipe rate is 0.256 g/mi. According to CARB, more than 90% of DPM is less than 1 micron. Therefore, it is appropriate to assume DPM and PM2.5 are equivalent[5]. The model assumed 2.50E-04 tpy DPM. The truck travel was modeled as a series of volume sources along the typical route the truck would take. Each source was spaced out by 9 meters. This resulted in 26 total volume sources. Each source was allocated 1/26th of the total DPM when driving. Idling assumed only one volume source near the loading area. Loader emissions were also based on potential length of travel which in this case was 400 yards per hour, average monthly operation hours of 558.5 (6702 hr/yr) and an EMFAC emission factor of 0.215 g/mile PM2.5 (equivalent to DPM). This results in 3.61E-04 tpy DPM. The loader travel was also modeled a series of volume sources spaced 9 meters apart along the typical route taken. The result was 10 total loader volume sources. Each source was allocated 1/10th of the total DPM when driving a loader.

The potential hourly maximum emission rates for the trucks were determined from the following assumptions.

- Each one-way trip takes 5 minutes; therefore, each roundtrip would be 10 minutes and 600 yards. If each truck drove and left one after the other 6 trucks could come and go in 1 hour or 3600 yards traveled. Converted to miles, applying the emission

5 CARB Diesel Exhaust Overview https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health

factor in g/mile and converting grams to pounds the total DPM is 1.15E-03 lb/hr or 4.44E-05 lb/hr per volume source.

- Truck idling has an emission factor in g/hr. Therefore, the maximum 1-hr assumes that a truck idles for the duration of 1 hr or 6.33E-04 lb/hr DPM.

- As discussed above, it was conservatively assumed that the loaders would be used continuously throughout an hour and cover 400 yards in length. Based on the EMFAC emission factor and appropriate unit conversions, the maximum hourly DPM rate is 1.08E-04 lb or 1.08E-05 lb/hr per source.

5.0 DISPERSION MODELING IMPACT ANALYSIS

The dispersion modeling analysis described in this report established the applicable hourly and annual concentrations associated with each sensitive receptor location. As shown below in Table 5.1, the maximum concentrations are provided the 1-hr and annual averaging periods.

5.1 TOXIC MODELING RESULTS

Amongst the five sensitive receptors, the 1-hr maximum results are associated with the nearest residence along the west border of the facility and the nearest residence to the north produced maximum impacts on an annual basis. This is expected because of the proximity (west is closer to facility) and general wind direction from the northwest/southeast. Thus, the short-term impacts are greater to the west, but over time the prevailing wind direction pushes annual impacts to the north.

Table 5-1 Modeled Toxic Pollutant Concentrations						
Pollutant	**Averaging Period**	**Total Ambient Concentrations (µg/m³)**				
		Calpella Elementary School	**The Waldorf School of Mendocino County**	**Consolidated Tribal Health Center**	**Nearest Residence north of facility boundary**	**Nearest Residence west of facility boundary**
Diesel Particulate	**1-hour[a]**	0.16739	0.14709	0.18289	0.22871	0.26738
	Annual[b]	0.00010	0.00017	0.00037	0.00096	0.00028
Formaldehyde	**1-hour[a]**	1.6	0.41540	0.7155	1.68	3.36
	Annual[b]	0.0131	0.01602	0.0457	0.07809	0.03556
Methanol	**1-hour[a]**	0.89458	0.23261	0.40068	0.945235	1.87946
	Annual[b]	0.00733	0.00897	0.0259	0.04373	0.01991
Acetaldehyde	**1-hour[a]**	0.83068	0.21600	0.37206	0.87547	1.74521
	Annual[b]	0.00681	0.00874	0.02377	0.04061	0.01849
Phenol	**1-hour[a]**	0.42173	0.10966	0.18889	0.44447	0.88603
	Annual[b]	0.00346	0.00423	0.01207	0.02062	0.00939
Acrolein	**1-hour[a]**	0.28754	0.41540	0.12879	0.30305	0.60411
	Annual[b]	0.00236	0.01602	0.00823	0.01406	0.00640
Propionaldehyde	**1-hour[a]**	0.20447	0.05317	0.09158	0.21550	0.42959
	Annual[b]	0.00168	0.00205	0.00585	0.0100	0.00455
Methyl Isobutyl Ketone	**1-hour[a]**	0.15336	0.03988	0.06869	0.16163	0.32219
	Annual[b]	0.00126	0.00154	0.00439	0.00750	0.00341
Toluene	**1-hour[a]**	0.13419	0.03489	0.06010	0.14142	0.28192
	Annual[b]	0.00110	0.00135	0.00374	0.00656	0.00299
Benzene	**1-hour[a]**	0.06326	0.01645	0.02833	0.06667	0.13290
	Annual[b]	0.00052	0.00063	0.00181	0.00309	0.00141
Methylene Chloride	**1-hour[a]**	0.04026	0.01047	0.01803	0.04243	0.08458
	Annual[b]	0.00033	0.00040	0.00115	0.00197	0.00090

Table 5-1 Modeled Toxic Pollutant Concentrations						
Pollutant	**Averaging Period**	**Total Ambient Concentrations (µg/m³)**				
		Calpella Elementary School	**The Waldorf School of Mendocino County**	**Consolidated Tribal Health Center**	**Nearest Residence north of facility boundary**	**Nearest Residence west of facility boundary**
m-,p-Xylene	**1-hour[a]**	0.03514	0.00914	0.01574	0.03704	0.07384
	Annual[b]	0.00029	0.00035	0.00101	0.00172	0.00078
Bis-(2-ethylhexyl phthalate Styrene	**1-hour[a]**	0.02045	0.00532	0.00916	0.02155	0.04296
	Annual[b]	0.00017	0.00021	0.00058	0.001	0.00046
Chloromethane	**1-hour[a]**	0.00703	0.00183	0.00315	0.00741	0.01407
	Annual[b]	0.00006	0.00007	0.0002	0.00034	0.00016
Cumene	**1-hour[a]**	0.00441	0.00115	0.00197	0.00465	0.00926
	Annual[b]	0.00004	0.00004	0.00013	0.00022	0.0001
Acetophenone	**1-hour[a]**	0.00409	0.00106	0.00183	0.00431	0.00859
	Annual[b]	0.00003	0.00004	0.00012	0.0002	0.00009
Hydroquinone	**1-hour[a]**	0.00383	0.001	0.00172	0.00404	0.00805
	Annual[b]	0.00003	0.00004	0.00011	0.00019	0.00009
Biphenyl	**1-hour[a]**	0.00249	0.00065	0.00112	0.00263	0.00524
	Annual[b]	0.00002	0.00002	0.00007	0.00012	0.00006
Bromomethane	**1-hour[a]**	0.00179	0.00047	0.0008	0.00189	0.00376
	Annual[b]	0.00001	0.00002	0.00005	0.00009	0.00004
Hexane	**1-hour[a]**	0.00166	0.00044	0.00074	0.00175	0.00349
	Annual[b]	0.00001	0.00002	0.00005	0.00008	0.00004
Di-N-Butyl Phthalate	**1-hour[a]**	0.00147	0.00038	0.00066	0.00155	0.00309
	Annual[b]	0.00001	0.00001	0.00004	0.00007	0.00003

Table 5-1 Modeled Toxic Pollutant Concentrations						
Pollutant	**Averaging Period**	**Total Ambient Concentrations (μg/m³)**				
		Calpella Elementary School	**The Waldorf School of Mendocino County**	**Consolidated Tribal Health Center**	**Nearest Residence north of facility boundary**	**Nearest Residence west of facility boundary**
Carbon Disulfide	**1-hour[a]**	0.00115	0.0003	0.00052	0.00121	0.00242
	Annual[b]	0.00001	0.00001	0.00003	0.00006	0.00003
o-Xylene	**1-hour[a]**	0.00089	0.00023	0.0004	0.00094	0.00188
	Annual[b]	0.00001	0.00001	0.00003	0.00004	0.00002
Carbon Tetrachloride	**1-hour[a]**	0.00074	0.00019	0.00034	0.00081	0.0016
	Annual[b]	0.00001	0.00001	0.00002	0.00004	0.00002
111-Trichloroethane	**1-hour[a]**	0.00077	0.00019	0.00034	0.00081	0.00161
	Annual[b]	0.00001	0.00001	0.00002	0.00004	0.00002
Ethyl Benzene	**1-hour[a]**	0.00024	0.00006	0.00011	0.00026	0.00051
	Annual[b]	Not detectable	Not detectable	0.00001	0.00001	0.00001

[a] 1st highest 1-hour average modeled concentration

[b] annual average modeled concentration

6.0 HEALTH RISK ASSESSMENT RESULTS

Potential health risks resulting from airborne emissions from the facility were assessed using exposure pathways in accordance with guidance established by the California OEHHA. The Assembly Bill (AB) 2588 "Hot Spots" law established a statewide program for the inventory of Toxic Air Contaminant (TAC) emissions from individual facilities as well as requirements for risk assessment and public notification of potential health risks.

This HRA report is based on methodology outlined in the Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2015).

The HRA was conducted in three basic steps:

- Hazard identification to determine pollutants of concern associated with MFP activities.
- Exposure assessment to quantify Site-generated emissions; identify ground-level receptor locations that may be affected by the emissions (including both a regular grid of receptors and any additional sensitive receptor locations such as schools, hospitals, convalescent homes, and/or daycare centers) and simulation of the transport of pollutants using atmospheric dispersion modeling to locations of predicted exposure (or "receptors"); and
- Risk characterization to estimate potential health risks from calculated exposures, including the locations of maximum potential cancer and non-cancer health risks.

6.1 HAZARD INDENTIFICATION

As discussed above, all applicable TAC associated with wood drying and DPM tailpipe were assessed. These were determined from AP-42 emission factors from Section 10.6, Table 3 or EMFAC as appropriate.

6.2 EXPOSURE ASSESSMENT

There are several potential health pathways associated with each toxic pollutant. This assessment included only the mandatory pathways which include inhalation, soil, dermal and Mother's milk. Additionally, because the scrubber is a control device, the deposition rate for all non-inhalation pathways is 0.02 meters per second (m/s). This is consistent with Hotspots Analysis and Reporting Program (HARP) guidelines. Non-inhalation pathways assumed all default values. Inhalation assessments did apply fractions of time at residence in the appropriate age bins less than or equal to and greater than 16 as defined by HARP. Lastly, the maximum exposed individual resident (MEIR) was applied to the cancer, non-cancer chronic and non-cancer 8-hr risks with a 30-year exposure duration. The annual concentrations were applied for each of these risk assessments. The acute risk implemented the maximum 1-hr concentration. Note that the worst-case receptors were evaluated at the nearest residence to the west (acute) and the nearest residence to the north (cancer, non-cancer chronic and non-cancer 8-hr risks).

The non-cancer chronic, non-cancer 8-hr and non-cancer acute risks evaluate a series of bodily systems. These include the cardiovascular, central nervous system, kidneys, gastrointestinal tract, reproductive system, respiratory system, immune system, eyes, endocrine systems and the hematological system. Also, Bis(2-ethylhexyl phthalate) has the potential to impact the soil and enter the body through the skin. All pollutants are aggregated together to obtain a total risk associated with each system. The cancer risk is also an aggregated total of each pollutant, but rather than breaking it into various systems of the body a risk summation value is calculated for each pollutant. All risk values were determined using the HARP Risk Assessment Standalone Tool (RAST) portion of ADMRT.

6.3 RISK CHARACTERIZATION

Mendocino County employs general thresholds for cancer and non-cancer risks from CARB guidelines. If the cancer risk does not exceed 10 in a million and the other assessments do not exceed a hazard index of 1, no action is required such as notification of neighbors or risk reduction. Again, of the five sensitive receptors, the highest impacts were evaluated for individual residences risk because the maximum impacts were located at individual homes. The exception being the 8-hr worker risk. Per OEHHA/ADMRT guidance, a worker adjustment factor of 4.2 and an exposure frequency of 250 days/yr were applied. Also, the nearest worker and schools (and health center) were evaluated for the 8-hr risk. The nearest worker was assumed to be at the min MFP building adjacent to the facility boundary. The following tables (Tables 6-1 through 6-4) compare the facility risk values to the county thresholds.

Table 6-1 Cancer Risk			
Pollutant	**Inhalation Risk Summation**	**Soil Risk Summation**	**Dermal Risk Summation**
Formaldehyde	1.02E-06	0.00E+00	0.00E+00
Methanol	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	2.52E-07	0.00E+00	0.00E+00
Phenol	0.00E+00	0.00E+00	0.00E+00
Acrolein	0.00E+00	0.00E+00	0.00E+00
Propionaldehyde	0.00E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	0.00E+00	0.00E+00
Benzene	1.92E-07	0.00E+00	0.00E+00
Methylene Chloride	4.27E-09	0.00E+00	0.00E+00
Acetophenone	0.00E+00	0.00E+00	0.00E+00
Biphenyl	0.00E+00	0.00E+00	0.00E+00
Methyl Bromide (bromomethane)	0.00E+00	0.00E+00	0.00E+00
Carbon Disulfide	0.00E+00	0.00E+00	0.00E+00
Carbon Tetrachloride	3.48E-09	0.00E+00	0.00E+00
Methyl Chloride (chloromethane)	0.00E+00	0.00E+00	0.00E+00
Cumene	0.00E+00	0.00E+00	0.00E+00
DiButyl Phthalate	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	6.25E-11	0.00E+00	0.00E+00
Hydroquinone	0.00E+00	0.00E+00	0.00E+00
p-Xylene	0.00E+00	0.00E+00	0.00E+00
o-Xylene	0.00E+00	0.00E+00	0.00E+00
Hexane	0.00E+00	0.00E+00	0.00E+00
Styrene	0.00E+00	0.00E+00	0.00E+00
111, Trichloroethane	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl phthalate)	5.20E-09	4.09E-10	2.50E-11
Diesel Particulate Matter	6.48E-07	0.00E+00	0.00E+00
Total	**2.12E-06**	**4.09E-10**	**2.50E-11**
X in a million	**2.12**	**4.09-04**	**2.50E-05**
Mendocino County	10	10	10
Compliant	Yes	Yes	Yes

Table 6-2 Non-Cancer Chronic Risk											
Pollutant	**CV Risk**	**CNS Risk**	**Kidney Risk**	**GI Risk**	**Repro Risk**	**Resp Risk**	**EYE Risk**	**Endo Risk**	**Blood Risk**	**Soil Dose**	**Dermal Dose**
Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.67E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methanol	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phenol	1.03E-04	1.03E-04	1.03E-04	1.03E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acrolein	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.01E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Propionaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-03	0.00E+00	0.00E+00
Methylene Chloride	4.92E-06	4.92E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetophenone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biphenyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Bromide (bromomethane)	0.00E+00	1.75E-05	0.00E+00	0.00E+00	1.75E-05	1.75E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon Disulfide	0.00E+00	7.02E-08	0.00E+00	0.00E+00	7.02E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon Tetrachloride	0.00E+00	9.36E-07	0.00E+00	9.36E-07	9.36E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Chloride (chloromethane)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cumene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DiButyl Phthalate	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	0.00E+00	0.00E+00	5.79E-09	5.79E-09	5.79E-09	0.00E+00	0.00E+00	5.79E-09	0.00E+00	0.00E+00	0.00E+00
Hydroquinone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
p-Xylene	0.00E+00	2.45E-06	0.00E+00	0.00E+00	0.00E+00	2.45E-06	2.45E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
o-Xylene	0.00E+00	6.24E-08	0.00E+00	0.00E+00	0.00E+00	6.24E-08	6.24E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane	0.00E+00	1.16E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Styrene	0.00E+00	4.16E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 6-2 Non-Cancer Chronic Risk											
Pollutant	**CV Risk**	**CNS Risk**	**Kidney Risk**	**GI Risk**	**Repro Risk**	**Resp Risk**	**EYE Risk**	**Endo Risk**	**Blood Risk**	**Soil Dose**	**Dermal Dose**
111, Trichloroethane	0.00E+00	3.74E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl phthalate)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-08	2.56E-09
Diesel Particulate Matter	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazard Index Total	**1.08E-04**	**1.29E-04**	**1.03E-04**	**1.04E-04**	**2.94E-05**	**4.93E-02**	**1.81E-05**	**5.79E-09**	**1.03E-03**	**1.53E-08**	**2.56E-09**
Mendocino County	1	1	1	1	1	1	1	1	1	1	1
Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6-3 Non-Cancer 8-hr Risk Worker[a]							
Pollutant	**CV Risk**	**CNS Risk**	**Kidney Risk**	**GI Risk**	**Eye Risk**	**Resp Risk**	**Blood Risk**
Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.4E-02	0.00E+00
Methanol	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.34E-04	0.00E+00
Phenol	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acrolein	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.96E-02	0.00E+00
Propionaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-05	0.00E+00	0.00E+00
Benzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.55E-03
Methylene Chloride	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetophenone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biphenyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Bromide (bromomethane)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon Disulfide	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon Tetrachloride	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Chloride (chloromethane)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cumene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DiButyl Phthalate	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hydroquinone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
p-Xylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
o-Xylene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Styrene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111, Trichloroethane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl phthalate)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel Particulate Matter	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazard Index Total	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**1.95E-05**	**7.14E-02**	**2.55-03**
Mendocino County	1	1	1	1	1	1	1
Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes

a. Note that the Consolidated Health Center produced a higher potential risk when compared to the nearest worker receptor (set at 482510m E and 4343260m N).

Table 6-4 Non-Cancer Acute Risk								
Pollutant	**CV Risk**	**CNS Risk**	**Immune Risk**	**Eyes Risk**	**Repro Risk**	**Resp Risk**	**Blood Risk**	**GI Risk**
Formaldehyde	0.00E+00	0.00E+00	0.00E+00	6.13E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methanol	0.00E+00	6.75E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	3.73E-03	0.00E+00	3.73E-03	0.00E+00	0.00E+00
Phenol	0.00E+00	0.00E+00	0.00E+00	1.54E-04	0.00E+00	1.43E-04	0.00E+00	0.00E+00
Acrolein	0.00E+00	0.00E+00	0.00E+00	2.43E-01	0.00E+00	2.43E-01	0.00E+00	0.00E+00
Propionaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Isobutyl Ketone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	0.00E+00	5.67E-05	0.00E+00	5.67E-05	0.00E+00	5.67E-05	0.00E+00	0.00E+00
Benzene	0.00E+00	0.00E+00	4.95E-03	0.00E+00	4.95E-03	0.00E+00	4.95E-03	0.00E+00
Methylene Chloride	6.07E-06	6.07E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acetophenone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biphenyl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methyl Bromide (bromomethane)	0.00E+00	9.69E-07	0.00E+00	0.00E+00	9.69E-07	9.69E-07	0.00E+00	0.00E+00
Carbon Disulfide	0.00E+00	3.92E-07	0.00E+00	0.00E+00	3.92E-07	0.00E+00	0.00E+00	0.00E+00
Carbon Tetrachloride	0.00E+00	8.52E-07	0.00E+00	0.00E+00	8.52E-07	0.00E+00	0.00E+00	8.52E-07
Methyl Chloride (chloromethane)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cumene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
DiButyl Phthalate	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ethyl Benzene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hydroquinone	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
p-Xylene	0.00E+00	3.37E-06	0.00E+00	3.37E-06	0.00E+00	3.37E-06	0.00E+00	0.00E+00
o-Xylene	0.00E+00	8.58E-08	0.00E+00	8.58E-08	0.00E+00	8.58E-08	0.00E+00	0.00E+00
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Styrene	0.00E+00	0.00E+00	0.00E+00	7.71E-07	7.71E-07	7.71E-07	0.00E+00	0.00E+00
111, Trichloroethane	0.00E+00	2.38E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Bis(2-ethylhexyl phthalate)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Diesel Particulate Matter	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hazard Index Total	**6.07E-06**	**1.36-04**	**4.95E-03**	**3.08E-01**	**4.95E-03**	**2.47E-01**	**4.95E-03**	**8.52E-07**
Mendocino County	1	1	1	1	1	1	1	1
Compliant	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Based on these results, the operations of the facility are less than the public notification thresholds. The AB 2588 law requires public notification in the area impacted by a given facility when individual cancer risk estimates exceed 10 in one million or a non-cancer hazard index exceeds 1.0. None of these levels have been exceeded at the MEIR locations. Therefore, estimated maximum health risks from MFP facility activities during typical operations indicate that no public notification is required. It should be also be noted that the absolute maximum receptor locations were evaluated too, and all are below the appropriate thresholds. Acute is 5.97E-01, 8-hr worker is 2.01E-01, chronic is 8.17E-02 and the cancer risk maximum is 4.66 in a 1,000,000.

7.0 LIMITATIONS

This document was prepared in accordance with the scope of work outlined in Stantec's contract and with generally accepted professional engineering and environmental consulting practices existing at the time this report was prepared and applicable to the location of the Site. It was prepared for the exclusive use of Forest Energy, for the express purpose stated above. Any re-use of this report for a different purpose or by others not identified above shall be at the user's sole risk without liability to Stantec. To the extent that this report is based on information provided to Stantec by third parties, Stantec may have made efforts to verify this third party information, but Stantec cannot guarantee the completeness or accuracy of this information. The opinions expressed and data collected are based on the conditions of the site existing at the time this document was prepared. No other warranties, express or implied are made by Stantec.

Appendix A HARP2 INPUT/OUTPUT RESULTS

See attached electronic files