

Appendices

Appendix 5.1-2 Health Risk Assessment

Appendices

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1. Health Risk Assessment

1.1 HEALTH RISK ASSESSMENT

The proposed project is an amendment to the Mission Bay Master Plan to update the Fiesta Island Concept Plan (project site). The Fiesta Island Concept Plan includes several diagrams and supporting policies that will guide future recreational improvements on the approximately 448.9-acre island. Campgrounds and beach areas typically allow fire pits so visitors can utilize these wood-burning devices for campfires. The existing project site includes 77 fire pits associated with 34 youth camp sites and 43 open beach pits. An additional 61 fire pits associated with 31 new primitive camp sites and 30 new group day-use sites are included in the update to the Fiesta Island Concept Plan. PlaceWorks has prepared a health risk assessment (HRA) to identify potential impacts to sensitive receptors from new and existing fire pits in beach areas and at campgrounds.

The San Diego Air Pollution Control District (SDAPCD) *Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs)* requires facilities submitting HRAs to evaluate the impacts of operational emissions on sensitive receptors (SDAPCD, 2015). The nearest off-site sensitive receptors proximate to the project site include residences approximately 1,000 feet to the north across Fiesta Bay and approximately 2,000 feet to the east across the Enchanted and Northern Coves and Interstate 5. The nearest off-site worker receptors are located at the Hilton San Diego Resort & Spa approximately 700 feet to the east.

This HRA considers the health impact to off-site sensitive receptors (adults and children in the nearby residences) and workers from toxic air contaminants (TACs) emitted by fire pits in beach areas and at campgrounds. It should be noted that these health impacts are based on conservative (i.e., health protective) assumptions. The United States Environmental Protection Agency (USEPA, 2005) and the Office of Environmental Health Hazard Assessment (OEHHA, 2015) note that conservative assumptions used in a risk assessment are intended to ensure that the estimated risks do not underestimate the actual risks. Therefore, the estimated risks may not necessarily represent actual risks experienced by populations at or near a site. The use of conservative assumptions tends to produce upper-bound estimates of exposure and thus risk.

For the residential-based risk assessment, the following conservative assumptions were used:

- It was assumed that maximum-exposed off-site residential receptors (both children and adults) stood outdoors and are subject to camp fire emissions at their residence for 24 hours per day, and approximately 350 days per year. In reality, California residents typically will spend on average 2 hours per day outdoors at their residences (USEPA, 2011). This would result in lower exposures to camp fire emissions and lower estimated risk values.

- The calculated risk for infants from third trimester to age 2 is multiplied by age sensitivity factors of 10 to account for early life exposure and uncertainty in child versus adult exposure impacts (OEHHA, 2015).

For worker-based risk assessment, the following conservative assumptions were used:

- It was assumed that maximum-exposed off-site worker receptors stood outdoors and are subject to camp fire emissions at their place of employment for 24 hours per day, and approximately 250 work days per year. In reality, California workers typically will spend on average 35-40 hours per week at their place of employment (USEPA, 2011). This would result in lower exposures to camp fire emissions and lower estimated risk values.

In addition to the nearby residential receptors, a survey of additional sensitive receptor types was conducted. Several early child care and pre-school receptors are located over 2,200 feet east and northeast of the site. In general, preschool-based sensitive receptors would be present on-site fewer days per year (i.e. typically 180-250 preschool days per year) as compared to residential receptors (i.e. 350 days per year). Additionally, health risk calculations for preschool children would use a different age range (i.e. ages 2 to 5, age sensitivity factor of 3) than child residents (i.e. third trimester pregnancy to age 2, age sensitivity factor of 10). Thus, the determined health risks for child residents would be multiplied by the larger factor of 10 to account for early life exposure as compared to preschool students. Given the distance to the preschools, shorter exposure frequency of preschool occupants compared to residents, and smaller age sensitivity factor for preschool students, the health risk determination was conservatively based on the nearby residential receptors. The preschool receptors were omitted from the evaluation.

1.2 METHODOLOGY AND SIGNIFICANCE THRESHOLDS

For this HRA, the SDAPCD significance thresholds were deemed to be appropriate and the thresholds that were used for this project are shown below:

- Excess cancer risk of more than 10 in a million
- Non-cancer hazard index (chronic or acute) greater than 1.0

The methodology used in this HRA is consistent with the following SDAPCD and the OEHHA guidance documents:

- SDAPCD, 2015. *Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs)*. June 2015.
- OEHHA. 2015. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*. February, 2015.

Potential exposures to TACs from camp fires were evaluated for off-site sensitive receptors in close proximity to the site. Pollutant concentrations were estimated using an air dispersion model, and excess lifetime cancer risks and chronic non-cancer hazard indexes were calculated. These risks were then compared to the significance thresholds adopted for this HRA.

1.3 CAMP FIRE EMISSIONS

Operational emission sources evaluated in the HRA include the burning of wood bundles in fire pits. To the degree practical, all contaminant emissions generated from each source were considered. The limiting factor for the inclusion of a compound was the availability of published exposure factors and other toxicity data enabling risks to be quantified and, where appropriate, target organs identified. Emissions generated from wood combustion are based on burning emission factors for total non-methane hydrocarbon (TNMHC) published by the California Air Resources Board (CARB, 2008). The difference between TNMHC and volatile organic compounds (VOCs) is that TNMHC includes exempt compounds (per Title 40 Code of Federal Regulations [CFR] 51.100(s)), while VOC excludes exempt compounds. PlaceWorks assumed VOC and TNMHC are interchangeable for the calculation of VOC emissions from open burning, per SDAPCD recommendations (SDAPCD, 2017). The evaluated TAC species emitted from the wood combustion include acetaldehyde, acrolein, benzene, 1,3-butadiene, ethyl benzene, formaldehyde, cresols, naphthalene, propylene, toluene, and xylenes (USEPA, 2004).

Camp fire emissions were calculated based on the following information and assumptions:

- 34 youth camp sites, 1 fire pit per camp site
- 43 beach open fire pits
- 30 primitive camp sites, 1 fire pit per camp site
- 31 group day-use sites, 1 fire pit per site
- 2 bundles of wood burned per pit, per day
- 100 percent occupancy of campgrounds during summer months (June through September)
- 75 percent occupancy of campgrounds during non-summer months, Saturday and Sunday
- 25 percent occupancy of campgrounds during non-summer months, week days

Average annual and average daily emission rates from camp fires were determined and are presented in the Air Quality Appendix.

1.4 AIR DISPERSION MODELING

To assess the impact of emitted compounds on sensitive receptors near the project, air quality modeling using the AERMOD atmospheric dispersion model was performed. The model is a steady state Gaussian plume model and is an approved model by SDAPCD for estimating ground level impacts from point and fugitive sources in simple and complex terrain. The on-site campgrounds were modeled as poly-area sources and the beach fire pits were modeled as point-sources. The model requires additional input parameters, including chemical emission data and local meteorology. Inputs for the emission rates are those described in Section 1.3. Meteorological data obtained from CARB for the nearest representative meteorological station (San Diego International Airport) with the latest available years (2009-2013) of record were used to represent local weather conditions and prevailing winds.

The modeling analysis also considered the spatial distribution and elevation of each emitting source in relation to the sensitive receptors. To accommodate the model's Cartesian grid format, direction-dependent calculations were obtained by identifying the Universal Transverse Mercator (UTM) coordinates for each

source location. In addition, digital elevation model (DEM) data for the area were obtained and included in the model runs to account for complex terrain. A ground release height was used as representative of the fire pits. A graphical representation of emitting sources is presented in HRA Appendix A.

The residential maximum exposed receptor (MER) is mobile home residence approximately 1,800 feet to the east of the project site across Interstate 5 and Morena Boulevard. The worker MER location is at the Hilton Resort and Spa approximately 680 feet east of the site. The air dispersion model output for the emission sources is presented in HRA Appendix B.

1.5 RISK CHARACTERIZATION

1.5.1 Carcinogenic Chemical Risk

A threshold of ten in a million ($10E^{-06}$) has been established as a level posing no significant risk for exposures to carcinogens. Health risks associated with exposure to carcinogenic compounds can be defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. The cancer risk probability is determined by multiplying the chemical's annual concentration by its cancer potency factor (CPF), a measure of the carcinogenic potential of a chemical when a dose is received through the inhalation pathway. It is an upper-limit estimate of the probability of contracting cancer as a result of continuous exposure to an ambient concentration of one microgram per cubic meter ($\mu\text{g}/\text{m}^3$) over a lifetime of 70 years.

Recent guidance from OEHHHA recommends a refinement to the standard point estimate approach with the use of age-specific breathing rates and age sensitivity factors (ASFs) to assess risk for susceptible subpopulations such as children. For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose for each age group. Once determined, contaminant dose is multiplied by the cancer potency factor in units of inverse dose expressed in milligrams per kilogram per day ($\text{mg}/\text{kg}/\text{day}$)⁻¹ to derive the cancer risk estimate. Therefore, to accommodate the unique exposures associated with the residential receptors, the following dose algorithm was used.

$$\text{Dose}_{\text{AIR,per age group}} = (C_{\text{air}} \times \text{EF} \times [\frac{\text{BR}}{\text{BW}}] \times A \times \text{CF})$$

Where:

Dose_{AIR}	=	dose by inhalation ($\text{mg}/\text{kg}/\text{day}$), per age group
C_{air}	=	concentration of contaminant in air ($\mu\text{g}/\text{m}^3$)
EF	=	exposure frequency (number of days/365 days)
BR/BW	=	daily breathing rate normalized to body weight ($\text{L}/\text{kg}/\text{day}$)
A	=	inhalation absorption factor (default = 1)
CF	=	conversion factor (1×10^{-6} , μg to mg , L to m^3)

The inhalation absorption factor (A) is a unitless factor that is only used if the cancer potency factor included a correction for absorption across the lung. For this assessment, the default value of 1 was used. For residential receptors, the exposure frequency (EF) of 0.96 is used to represent 350 days per year to allow for a two week period away from home each year (OEHHHA, 2015). The 95th percentile daily breathing rates

(BR/BW), exposure duration (ED), age sensitivity factors (ASFs), and fraction of time at home (FAH) for the various age groups are provided herein:

<u>Age Groups</u>	<u>BR/BW (L/kg-day)</u>	<u>ED</u>	<u>ASF</u>	<u>FAH</u>
Third trimester	361	0.25	10	0.85
0-2 age group	1,090	2	10	0.85
2-9 age group	861	7	3	0.72
2-16 age group	745	14	3	0.72
16-30 age group	335	14	1	0.73
16-70 age group	290	54	1	0.73

To calculate the overall cancer risk, the risk for each appropriate age group is calculated per the following equation:

$$\text{Cancer Risk}_{\text{AIR}} = \text{Dose}_{\text{AIR}} \times \text{CPF} \times \text{ASF} \times \text{FAH} \times \frac{\text{ED}}{\text{AT}}$$

Where:

Dose _{AIR}	=	dose by inhalation (mg/kg-day), per age group
CPF	=	cancer potency factor, chemical-specific (mg/kg-day) ⁻¹
ASF	=	age sensitivity factor, per age group
FAH	=	fraction of time at home, per age group (for residential receptors only)
ED	=	exposure duration (years)
AT	=	averaging time period over which exposure duration is averaged (70 years)

The CPFs used in the assessment were obtained from OEHHA guidance. The excess lifetime cancer risks during the construction period to the maximally exposed resident were calculated based on the factors provided above. The cancer risks for each age group are summed to estimate the total cancer risk for each toxic chemical species. The final step converts the cancer risk in scientific notation to a whole number that expresses the cancer risk in “chances per million” by multiplying the cancer risk by a factor of 1x10⁶ (i.e. 1 million).

The assessment was based on reasonable maximum exposure, defined as the “highest exposure that is reasonably expected to occur” for a given receptor population. Lifetime risk values for the adult residents were calculated for an exposure of 350 days per year for 30 years (high-end estimate) in accordance with OEHHA’s guidance. Additionally, the maximum lifetime residency exposure (70-year scenario) and the average residency exposure (9-year scenario) risk values were determined for informational purposes. It was assumed that the MER spent 24 hours/day, 7 days/week, 350 days/year outside near the residence, as per default exposure parameters. The exposure duration for the worker scenario is 25 years (OEHHA, 2015).

CARB’s Hotspots Analysis and Reporting Program (HARP2), Risk Assessment Standalone Tool was used to calculate the cancer risk values (CARB, 2017). The calculated results are provided in Section 1.6 and HRA Appendix C.

1.5.2 Non-Carcinogenic Hazards

An evaluation of the potential non-cancer effects of chronic and acute chemical exposures was also conducted. Adverse health effects are evaluated by comparing the annual receptor level (ground) concentration of each chemical compound with the appropriate reference exposure limit (REL). Available RELs promulgated by OEHHA were considered in the assessment.

To quantify non-carcinogenic impacts, the hazard index approach was used. The hazard index assumes that chronic and acute sub-threshold exposures adversely affect a specific organ or organ system (toxicological endpoint). For each discrete chemical exposure, target organs presented in regulatory guidance were used. To calculate the hazard index, each chemical concentration or dose is divided by the appropriate toxicity value. For compounds affecting the same toxicological endpoint, this ratio is summed. Where the total equals or exceeds one, a health hazard is presumed to exist.

CARB's HARP2, Risk Assessment Standalone Tool was used to calculate the chronic and acute 1-hour health risk values (CARB, 2017). The chronic and acute hazard analysis from TAC exposure is provided Section 1.6 and in HRA Appendix C.

1.6 HRA RESULTS

The calculated results are provided in HRA Appendix C and the results are summarized in Table 1.

TABLE 1. RISK SUMMARY

Receptor	Cancer Risk (per million)	Chronic Hazards	Acute Hazards
Residential MER	0.69	0.002	0.010
Worker MER	0.12	0.004	0.016
SDAPCD Threshold	10	1.0	0.3
Exceeds Threshold?	No	No	No

Source: HARP2 Risk Assessment Standalone Tool, version 17023 (CARB, 2017).

Cancer risk for the maximum exposed off-site resident MER and off-site worker MER from fire pit emissions was calculated to be 0.69 in a million and 0.12 in a million, which are below the 10 in a million significance threshold. For non-carcinogenic effects, the chronic and acute hazard indices identified for each toxicological endpoint totaled less than one for both off-site residents and workers. Therefore, chronic and acute non-carcinogenic hazards are within acceptable limits.

Based on a comparison to the carcinogenic and non-carcinogenic thresholds established by OEHHA and SDAPCD, hazardous air emissions generated from operation of the fire pits in beach areas and at campgrounds are not anticipated to pose an actual or potential endangerment to the surrounding sensitive receptors and no mitigation measures are required.

2. References

- California Air Resources Board (CARB). 2017. Hotspots Analysis and Report Program (HARP), Risk Assessment Standalone Tool (RAST), Version 2.
- _____. 2009-2013. Meteorological Data Set for San Diego International Airport Meteorological Station. <https://www.arb.ca.gov/toxics/harp/metfiles2.htm> (accessed September 21, 2017).
- _____. 2008. Smoke Emission Estimator, Table 2 Prescribed Burning Emission Factors by Fuel Component for Wood 3+ in. <https://www.arb.ca.gov/ei/see/see.htm> (accessed September 21, 2017).
- Office of Environmental Health Hazard Assessment (OEHHA). 2015. *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments*. Dated February 2015.
- San Diego Air Pollution Control District (SDAPCD), 2015. *Supplemental Guidelines for Submission of Air Toxics "Hot Spots" Program Health Risk Assessments (HRAs)*. Dated June 2015.
- _____. 2017. Email correspondence between Angela Ortega, Rule Development Supervisor of SDAPCD and John Vang, JD, Associate Planner of PlaceWorks, Dated September 14, 2017.
- United States Environmental Protection Agency (USEPA). 2011. *Exposure Factors Handbook 2011 Edition (Final)*. EPA/600/R-09/052F, 2011.
- _____. 2005. *Guideline on Air Quality Models* (Revised). EPA-450/2-78-027R.
- _____. 2004. SPECIATE Data Browser, Fireplace Wood Combustion - Pine Wood. https://cfpub.epa.gov/speciate/ehpa_speciate_browse_details.cfm?ptype=G&pnumber=4642 (accessed September 21, 2017).

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Appendix A. Graphical Representation of Emitting Sources

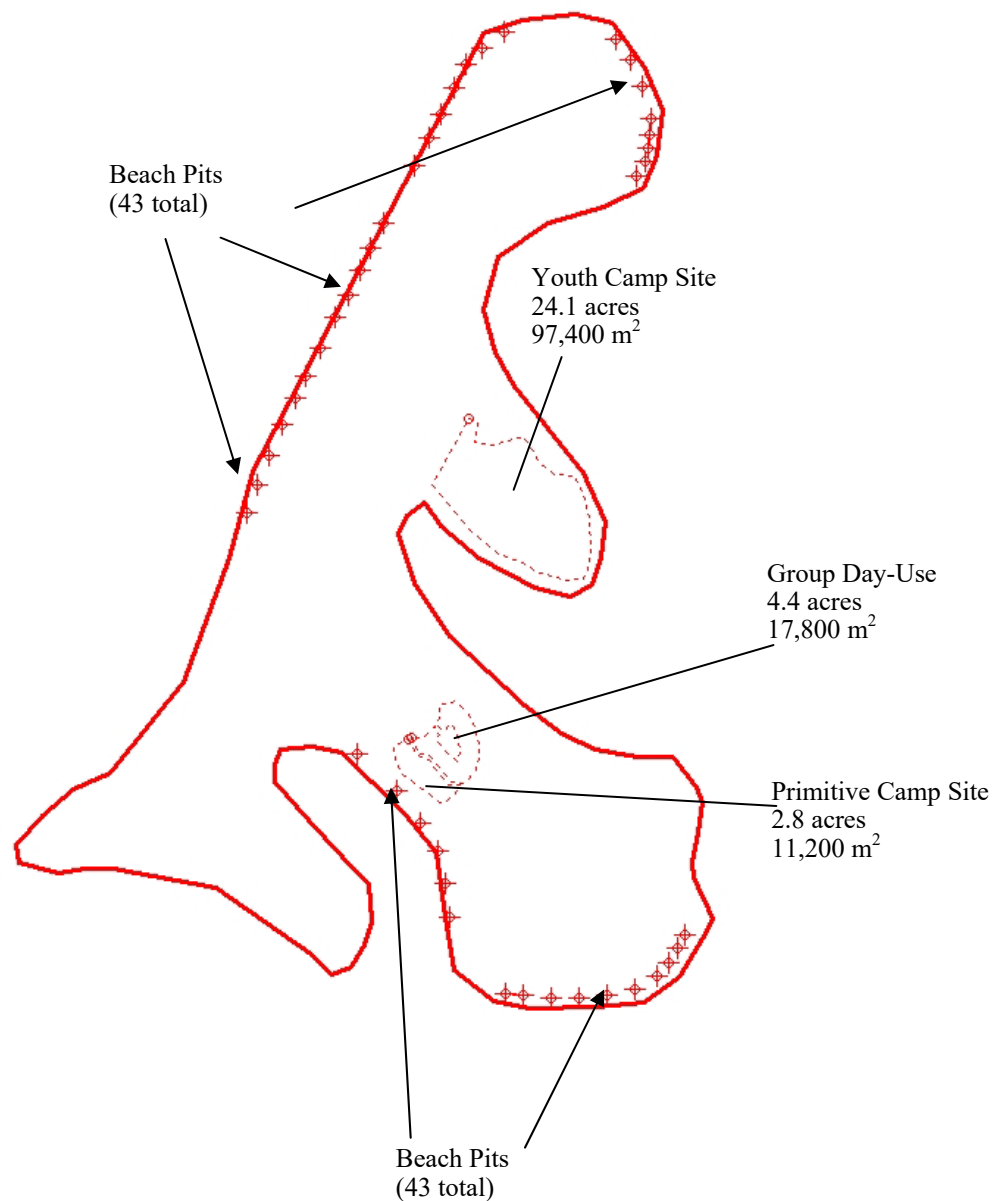
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Source Fiesta Island

Youth Camp: 34 existing fire pits
Open Beach Pits: 43 existing fire pits
Primitive Camp: 30 proposed fire pits
Group Day-Use Sites: 31 proposed fire pits
2 buddies of wood per pit per day



Occupation rates: 100% during the summer; 75% during non-summer weekend,
25% during non-summer weekday



- Lot area is based upon Google Earth Pro, Version 7.3.

Campfire Emissions - Fiesta Island

Assumptions

2 buddle of wood/pit 32 lbs
0.016 tons

Source: SCAQMD Staff Report - Amendment to Rule 444 for Regulating Beach Bonfires. <http://www.aqmd.gov/hb/attachments/2011-2015/2013-Jul/2013-Jul5-030.pdf>

Existing No. of Fire Rings:* 77 34 youth camp sites, 43 beach pits
Proposed No. of Fire Rings:* 138 61 new; 30 primitive camp sites, 31 group day-use sites

*Based on counts

Emission Rates

CARB Table 2 Prescribed Burning Emission Factors by Fuel Component for Moderate Wood 3+ in

Source California Air Resources Board Smoke Emission Estimation. <https://www.arb.ca.gov/ei/see/see.htm>

		VOC	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	Biogenic CO ₂
	lbs/ton	14.4	0.04	205.8	2.3	21.6	18.3	3196.8
	lbs/campsite	2.3E-01	6.4E-04	3.3E+00	3.7E-02	3.5E-01	2.9E-01	51
Existing - Worst-case day (77 pits)	lbs/day	18	0	254	3	27	23	3,938
Project - Worst-case day (138 pits)	lbs/day	32	0	454	5	48	40	7,059

Existing (77 Campsites)

	Days	VOC	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	Biogenic CO ₂
		lbs/year						
25% occupied non-winter weekday	179	794	2	11,346	127	1,191	1,009	176,246
75% occupied non-winter weekend	64	852	2	12,170	136	1,277	1,082	189,046
100% occupied summer (June-Sept)	122	2,164	6	30,933	346	3,247	2,751	480,492
Total	lbs/year	3,810	11	54,449	609	5,715	4,842	845,784
Total	Tons/year	1.9	0.01	27	0.30	2.9	2.4	423
						MTCO₂e		384

Project (138 Campsites)

	Days	VOC	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	Biogenic CO ₂
		lbs/year						
25% occupied non-winter weekday	179	1,423	4	20,335	227	2,134	1,808	315,869
75% occupied non-winter weekend	64	1,526	4	21,812	244	2,289	1,940	338,810
100% occupied summer (June-Sept)	122	3,879	11	55,438	620	5,819	4,930	861,141
Total	lbs/year	6,828	19	97,584	1,091	10,242	8,677	1,515,820
Total	Tons/year	3.4	0.01	49	0.55	5.1	4.3	758
						MTCO₂e		688

Project Emission Rates	lbs/day	18.7	Youth	Primitive	Group	Beach	
			24.1	2.8	4.4	43	pits
	lbs/hr	0.78	9.74E+04	1.12E+04	1.78E+04		
	g/s	0.098	2.48E-07	1.90E-06	1.24E-06	7.12E-04	g/s/pit
			77.1%	8.9%	14.1%		

While Campsites may include other sources of emissions, such as campstoves (propane and butane), campfires are assumed to be the greatest source of emissions associated with campgrounds. Consequently, these other minor sources of emissions are nominal in comparison. Other sources of energy use are included in the CalEEMod inventory and include natural gas use from the general park facilities.

Appendix B. Air Dispersion Model Output

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Model Output Residential Receptors

Results Summary

Fiesta Island HRA
Camp Fires

Concentration - Source Group: ALL

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
PERIOD		0.09288	ug/m^3	480616.29	3626450.55	4.97	0.00	4.97	

Concentration - Source Group: BEACHPIT

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	0.33044	ug/m^3	480916.29	3628050.55	18.78	0.00	18.78	12/12/2013, 17
PERIOD		0.03195	ug/m^3	479675.75	3628303.26	1.74	0.00	1.74	

Concentration - Source Group: DAYUSE

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	1.15132	ug/m^3	480716.29	3626650.55	15.26	0.00	15.26	12/12/2013, 17
PERIOD		0.01807	ug/m^3	480766.29	3626050.55	3.89	0.00	3.89	

Concentration - Source Group: PRIMITIV

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	1.04228	ug/m^3	480816.29	3626650.55	18.26	0.00	18.26	12/12/2013, 17
PERIOD		0.01268	ug/m^3	480766.29	3626050.55	3.89	0.00	3.89	

Model Output
Residential Receptors

Results Summary

Fiesta Island HRA
Camp Fires

Concentration - Source Group: YOUTH

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	1.40065	ug/m^3	480616.29	3626650.55	12.81	0.00	12.81	1/9/2011, 19
PERIOD		0.05730	ug/m^3	480616.29	3626450.55	4.97	0.00	4.97	

Model Output Residential Receptors

*** AERMOD - VERSION 16216r *** *** Fiesta Island HRA *** 09/26/17
*** AERMET - VERSION 14134 *** *** Camp Fires *** 14:30:45
PAGE 1

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** MODEL SETUP OPTIONS SUMMARY ***

**Model Is Setup For Calculation of Average CONCentration Values.

-- DEPOSITION LOGIC --

**NO GAS DEPOSITION Data Provided.

**NO PARTICLE DEPOSITION Data Provided.

**Model Uses NO DRY DEPLETION. DRYDPLT = F

**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for 46 Source(s),
for Total of 1 Urban Area(s):
Urban Population = 1400000.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:

1. Stack-tip Downwash.
2. Model Accounts for ELEVated Terrain Effects.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.
5. No Exponential Decay.
6. Urban Roughness Length of 1.0 Meter Assumed.

**Other Options Specified:

CCVR_Sub - Meteorological data includes CCVR substitutions

TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of: OTHER

**Model Calculates 1 Short Term Average(s) of: 1-HR
and Calculates PERIOD Averages

**This Run Includes: 46 Source(s); 5 Source Group(s); and 471 Receptor(s)

with: 43 POINT(s), including
 0 POINTCAP(s) and 0 POINTHOR(s)
and: 0 VOLUME source(s)
and: 3 AREA type source(s)
and: 0 LINE source(s)
and: 0 OPENPIT source(s)
and: 0 BUOYANT LINE source(s) with 0 line(s)

**Model Set To Continue RUNning After the Setup Testing.

Model Output Residential Receptors

**The AERMET Input Meteorological Data Version Date: 14134

**Output Options Selected:

Model Outputs Tables of PERIOD Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 4.60 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 3.7 MB of RAM.

**Detailed Error/Message File: fiesta.err

**File for Summary of Results: fiesta.sum

Model Output Residential Receptors

*** AERMOD - VERSION 16216r ***
 *** AERMET - VERSION 14134 ***

*** Fiesta Island HRA
 *** Camp Fires

*** 09/29/17
 *** 14:28:09
 *** PAGE 2

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
STCK1	0	0.71200E-03	479062.4	3626725.8	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK2	0	0.71200E-03	479088.8	3626796.5	1.9	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK3	0	0.71200E-03	479121.2	3626874.4	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK4	0	0.71200E-03	479154.2	3626953.1	1.6	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK5	0	0.71200E-03	479186.6	3627021.1	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK6	0	0.71200E-03	479213.0	3627076.6	1.7	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK7	0	0.71200E-03	479252.0	3627147.9	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK8	0	0.71200E-03	479289.0	3627224.6	1.7	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK9	0	0.71200E-03	479322.0	3627284.4	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK10	0	0.71200E-03	479350.9	3627346.8	1.6	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK11	0	0.71200E-03	479377.7	3627402.6	1.5	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK12	0	0.71200E-03	479413.4	3627467.2	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK13	0	0.71200E-03	480091.9	3627690.7	2.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK14	0	0.71200E-03	479491.4	3627612.2	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK15	0	0.71200E-03	479529.3	3627683.5	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK16	0	0.71200E-03	479558.3	3627745.9	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK17	0	0.71200E-03	479591.7	3627810.6	1.9	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK18	0	0.71200E-03	479622.9	3627870.8	1.4	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK19	0	0.71200E-03	479663.1	3627913.1	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK20	0	0.71200E-03	479721.0	3627955.5	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK21	0	0.71200E-03	480006.4	3627935.4	2.2	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK22	0	0.71200E-03	480044.3	3627881.9	2.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK23	0	0.71200E-03	480073.3	3627817.3	2.5	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK24	0	0.71200E-03	480095.6	3627732.5	2.5	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK25	0	0.71200E-03	480086.7	3627656.7	2.7	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK26	0	0.71200E-03	480057.7	3627585.4	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK27	0	0.71200E-03	480080.0	3627623.3	2.3	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK28	0	0.71200E-03	480182.5	3625650.2	3.9	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK29	0	0.71200E-03	480164.7	3625614.5	4.2	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK30	0	0.71200E-03	480140.2	3625578.9	4.4	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK31	0	0.71200E-03	480111.2	3625543.2	3.3	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK32	0	0.71200E-03	480055.5	3625512.0	2.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK33	0	0.71200E-03	479981.9	3625496.4	2.9	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK34	0	0.71200E-03	479912.8	3625489.7	2.5	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK35	0	0.71200E-03	479841.4	3625487.5	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK36	0	0.71200E-03	479770.1	3625496.4	2.4	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK37	0	0.71200E-03	479723.3	3625498.6	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK38	0	0.71200E-03	479580.6	3625694.8	1.4	0.00	873.15	0.01	1.22	NO	YES	NO	

Model Output Residential Receptors

STCK39	0	0.71200E-03	479571.7	3625779.5	1.6	0.00	873.15	0.01	1.22	NO	YES	NO
STCK40	0	0.71200E-03	479549.4	3625862.0	2.0	0.00	873.15	0.01	1.22	NO	YES	NO
STCK41	0	0.71200E-03	479507.0	3625933.4	1.5	0.00	873.15	0.01	1.22	NO	YES	NO
STCK42	0	0.71200E-03	479444.6	3626015.8	1.6	0.00	873.15	0.01	1.22	NO	YES	NO
STCK43	0	0.71200E-03	479346.5	3626110.8	2.6	0.00	873.15	0.01	1.22	NO	YES	NO

*** AERMOD - VERSION 16216r *** *** Fiesta Island HRA
 *** AERMET - VERSION 14134 *** *** Camp Fires

*** 09/29/17
 *** 14:28:09
 PAGE 4

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X Y (METERS) (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PAREA1	0	0.24800E-06	479629.3 3626968.6	6.2	0.00	20	0.00	YES	
PAREA2	0	0.19000E-05	479474.9 3626148.5	6.1	0.00	11	0.00	YES	
PAREA3	0	0.12400E-05	479483.2 3626150.9	6.1	0.00	26	0.00	YES	

Model Output

Residential Receptors

```
*** AERMOD - VERSION 16216r ***    *** Fiesta Island HRA
*** AERMET - VERSION 14134 ***    *** Camp Fires
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*** 09/26/17
*** 14:30:45
PAGE 5

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID

SOURCE IDs

[illegible]

Model Output

Residential Receptors

```

*** AERMOD - VERSION 16216r ***   *** Fiesta Island HRA
*** AERMET - VERSION 14134 ***   *** Camp Fires

*** MODELOPTs:   RegDFAULT  CONC  ELEV  URBAN

```

*** 09/26/17
*** 14:30:45
*** PAGE 6

*** SOURCE IDs DEFINED AS URBAN SOURCES ***

URBAN ID	URBAN POP	SOURCE IDS							
-----	-----								
STCK8	1400000.	STCK1	, STCK2	, STCK3	, STCK4	, STCK5	, STCK6	, STCK7	,
	,								
	STCK9	, STCK10	, STCK11	, STCK12	, STCK13	, STCK14	, STCK15	, STCK16	,
	STCK17	, STCK18	, STCK19	, STCK20	, STCK21	, STCK22	, STCK23	, STCK24	,
	STCK25	, STCK26	, STCK27	, STCK28	, STCK29	, STCK30	, STCK31	, STCK32	,
	STCK33	, STCK34	, STCK35	, STCK36	, STCK37	, STCK38	, STCK39	, STCK40	,
	STCK41	, STCK42	, STCK43	, PAREA1	, PAREA2	, PAREA3	,		

Model Output Residential Receptors

```
*** AERMOD - VERSION 16216r ***    *** Fiesta Island HRA
*** AERMET - VERSION 14134 ***    *** Camp Fires
```

*** 09/26/17
*** 14:30:45
*** PAGE 13

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

```
*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
      (1=YES; 0=NO)
```

[illegible]

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

Model Output Residential Receptors

*** AERMOD - VERSION 16216r ***
 *** AERMET - VERSION 14134 ***

*** Fiesta Island HRA
 *** Camp Fires

*** 09/26/17
 *** 14:30:45
 *** PAGE 14

*** MODELOPTs: RegDEFAULT CONC ELEV URBAN

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\met data\722900.SFC
 Profile file: ..\met data\722900.PFL
 Surface format: FREE
 Profile format: FREE
 Surface station no.: 23188

Upper air station no.: 3190
 Name: SAN_DIEGO/LINDBERGH_FIELD
 Year: 2009

Met Version: 14134

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O	LEN	Z0	BOWEN	ALBEDO	REF	WS	WD	HT	REF	TA	HT
09	01	01	1	01	-7.9	0.118	-9.000	-9.000	-999.	97.	18.6	0.37	0.37	0.95	1.00	1.76	11.	10.0	282.5	2.0		
09	01	01	1	02	-18.0	0.318	-9.000	-9.000	-999.	430.	161.4	0.37	0.37	0.95	1.00	2.86	18.	10.0	282.5	2.0		
09	01	01	1	03	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	282.5	2.0		
09	01	01	1	04	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	282.0	2.0		
09	01	01	1	05	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	281.4	2.0		
09	01	01	1	06	-8.3	0.146	-9.000	-9.000	-999.	134.	33.9	0.35	0.35	0.95	1.00	1.76	342.	10.0	280.9	2.0		
09	01	01	1	07	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	280.4	2.0		
09	01	01	1	08	-7.4	0.166	-9.000	-9.000	-999.	163.	56.6	0.35	0.35	0.95	0.49	1.76	343.	10.0	280.9	2.0		
09	01	01	1	09	38.3	0.459	0.419	0.007	70.	746.	-229.2	0.47	0.47	0.95	0.29	3.36	297.	10.0	281.4	2.0		
09	01	01	1	10	58.3	0.348	0.576	0.007	119.	501.	-65.6	0.47	0.47	0.95	0.22	2.36	291.	10.0	283.1	2.0		
09	01	01	1	11	118.8	0.342	0.880	0.007	208.	479.	-30.5	0.35	0.35	0.95	0.20	2.36	304.	10.0	286.4	2.0		
09	01	01	1	12	129.3	0.429	1.007	0.007	286.	674.	-55.3	0.47	0.47	0.95	0.19	2.86	286.	10.0	287.5	2.0		
09	01	01	1	13	127.0	0.505	1.111	0.007	391.	861.	-91.9	0.35	0.35	0.95	0.19	3.86	303.	10.0	287.5	2.0		
09	01	01	1	14	107.2	0.482	1.111	0.007	463.	803.	-94.3	0.47	0.47	0.95	0.20	3.36	289.	10.0	288.1	2.0		
09	01	01	1	15	70.3	0.491	1.009	0.007	529.	825.	-152.0	0.35	0.35	0.95	0.23	3.86	312.	10.0	288.1	2.0		
09	01	01	1	16	25.7	0.532	0.734	0.007	556.	931.	-530.7	0.35	0.35	0.95	0.32	4.36	304.	10.0	287.0	2.0		
09	01	01	1	17	-35.6	0.430	-9.000	-9.000	-999.	686.	202.2	0.35	0.35	0.95	0.59	3.86	301.	10.0	284.9	2.0		
09	01	01	1	18	-23.2	0.414	-9.000	-9.000	-999.	639.	276.3	0.47	0.47	0.95	1.00	3.36	277.	10.0	284.9	2.0		
09	01	01	1	19	-14.0	0.249	-9.000	-9.000	-999.	319.	99.9	0.37	0.37	0.95	1.00	2.36	4.	10.0	284.9	2.0		
09	01	01	1	20	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	284.2	2.0		
09	01	01	1	21	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	284.2	2.0		
09	01	01	1	22	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	283.1	2.0		
09	01	01	1	23	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	283.1	2.0		
09	01	01	1	24	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.46	0.95	1.00	0.00	0.	10.0	283.1	2.0		

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
09	01	01	01	10.0	1	11.	1.76	282.6	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

Results Summary

Fiesta Island HRA
Camp Fires

Concentration - Source Group: ALL

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
PERIOD		0.20576	ug/m^3	480224.41	3626640.00	2.72	0.00	2.72	

Concentration - Source Group: BEACHPIT

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	0.21976	ug/m^3	478845.17	3625385.59	10.06	0.00	14.47	1/19/2010, 7
PERIOD		0.02872	ug/m^3	480124.41	3626990.00	2.78	0.00	2.78	

Concentration - Source Group: DAYUSE

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	1.65897	ug/m^3	479195.17	3625385.59	4.41	0.00	4.41	1/8/2010, 22
PERIOD		0.02261	ug/m^3	480174.41	3626740.00	2.72	0.00	2.72	

Concentration - Source Group: PRIMITIV

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	1.80850	ug/m^3	479195.17	3625385.59	4.41	0.00	4.41	12/26/2013, 21
PERIOD		0.02702	ug/m^3	479195.17	3625385.59	4.41	0.00	4.41	

Results Summary

Fiesta Island HRA
Camp Fires

Concentration - Source Group: YOUTH

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	2.56361	ug/m^3	480174.41	3626740.00	2.72	0.00	2.72	1/13/2009, 19
PERIOD		0.14468	ug/m^3	480224.41	3626640.00	2.72	0.00	2.72	

Model Output Worker Receptors

*** AERMOD - VERSION 16216r *** *** Fiesta Island HRA *** 09/28/17
*** AERMET - VERSION 14134 *** *** Camp Fires *** 10:36:52
*** MODELOPTs: RegDFAULT CONC ELEV URBAN *** PAGE 1

*** MODEL SETUP OPTIONS SUMMARY ***

**Model Is Setup For Calculation of Average CONCentration Values.

-- DEPOSITION LOGIC --

**NO GAS DEPOSITION Data Provided.

**NO PARTICLE DEPOSITION Data Provided.

**Model Uses NO DRY DEPLETION. DRYDPLT = F

**Model Uses NO WET DEPLETION. WETDPLT = F

**Model Uses URBAN Dispersion Algorithm for the SBL for 46 Source(s),
for Total of 1 Urban Area(s):
Urban Population = 1400000.0 ; Urban Roughness Length = 1.000 m

**Model Uses Regulatory DEFAULT Options:

1. Stack-tip Downwash.
2. Model Accounts for ELEvated Terrain Effects.
3. Use Calms Processing Routine.
4. Use Missing Data Processing Routine.
5. No Exponential Decay.
6. Urban Roughness Length of 1.0 Meter Assumed.

**Other Options Specified:

CCVR_Sub - Meteorological data includes CCVR substitutions

TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of: OTHER

**Model Calculates 1 Short Term Average(s) of: 1-HR
and Calculates PERIOD Averages

**This Run Includes: 46 Source(s); 5 Source Group(s); and 187 Receptor(s)

with: 43 POINT(s), including
 0 POINTCAP(s) and 0 POINTHOR(s)
and: 0 VOLUME source(s)
and: 3 AREA type source(s)
and: 0 LINE source(s)
and: 0 OPENPIT source(s)
and: 0 BUOYANT LINE source(s) with 0 line(s)

**Model Set To Continue RUNning After the Setup Testing.

Model Output Worker Receptors

**The AERMET Input Meteorological Data Version Date: 14134

**Output Options Selected:

Model Outputs Tables of PERIOD Averages by Receptor
Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE: The Following Flags May Appear Following CONC Values: c for Calm Hours
m for Missing Hours
b for Both Calm and Missing Hours

**Misc. Inputs: Base Elev. for Pot. Temp. Profile (m MSL) = 4.60 ; Decay Coef. = 0.000 ; Rot. Angle = 0.0
Emission Units = GRAMS/SEC ; Emission Rate Unit Factor = 0.10000E+07
Output Units = MICROGRAMS/M**3

**Approximate Storage Requirements of Model = 3.6 MB of RAM.

**Detailed Error/Message File: fiestaworker.err

**File for Summary of Results: fiestaworker.sum

Model Output Worker Receptors

*** AERMOD - VERSION 16216r ***
 *** AERMET - VERSION 14134 ***

*** Fiesta Island HRA
 *** Camp Fires

*** 09/29/17
 *** 15:34:04
 *** PAGE 2

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BLDG EXISTS	URBAN SOURCE	CAP/ HOR	EMIS RATE SCALAR VARY BY
STCK1	0	0.71200E-03	479062.4	3626725.8	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK2	0	0.71200E-03	479088.8	3626796.5	1.9	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK3	0	0.71200E-03	479121.2	3626874.4	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK4	0	0.71200E-03	479154.2	3626953.1	1.6	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK5	0	0.71200E-03	479186.6	3627021.1	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK6	0	0.71200E-03	479213.0	3627076.6	1.7	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK7	0	0.71200E-03	479252.0	3627147.9	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK8	0	0.71200E-03	479289.0	3627224.6	1.7	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK9	0	0.71200E-03	479322.0	3627284.4	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK10	0	0.71200E-03	479350.9	3627346.8	1.6	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK11	0	0.71200E-03	479377.7	3627402.6	1.5	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK12	0	0.71200E-03	479413.4	3627467.2	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK13	0	0.71200E-03	480091.9	3627690.7	2.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK14	0	0.71200E-03	479491.4	3627612.2	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK15	0	0.71200E-03	479529.3	3627683.5	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK16	0	0.71200E-03	479558.3	3627745.9	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK17	0	0.71200E-03	479591.7	3627810.6	1.9	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK18	0	0.71200E-03	479622.9	3627870.8	1.4	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK19	0	0.71200E-03	479663.1	3627913.1	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK20	0	0.71200E-03	479721.0	3627955.5	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK21	0	0.71200E-03	480006.4	3627935.4	2.2	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK22	0	0.71200E-03	480044.3	3627881.9	2.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK23	0	0.71200E-03	480073.3	3627817.3	2.5	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK24	0	0.71200E-03	480095.6	3627732.5	2.5	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK25	0	0.71200E-03	480086.7	3627656.7	2.7	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK26	0	0.71200E-03	480057.7	3627585.4	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK27	0	0.71200E-03	480080.0	3627623.3	2.3	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK28	0	0.71200E-03	480182.5	3625650.2	3.9	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK29	0	0.71200E-03	480164.7	3625614.5	4.2	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK30	0	0.71200E-03	480140.2	3625578.9	4.4	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK31	0	0.71200E-03	480111.2	3625543.2	3.3	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK32	0	0.71200E-03	480055.5	3625512.0	2.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK33	0	0.71200E-03	479981.9	3625496.4	2.9	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK34	0	0.71200E-03	479912.8	3625489.7	2.5	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK35	0	0.71200E-03	479841.4	3625487.5	2.0	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK36	0	0.71200E-03	479770.1	3625496.4	2.4	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK37	0	0.71200E-03	479723.3	3625498.6	1.8	0.00	873.15	0.01	1.22	NO	YES	NO	
STCK38	0	0.71200E-03	479580.6	3625694.8	1.4	0.00	873.15	0.01	1.22	NO	YES	NO	

Model Output Worker Receptors

STCK39	0	0.71200E-03	479571.7	3625779.5	1.6	0.00	873.15	0.01	1.22	NO	YES	NO
STCK40	0	0.71200E-03	479549.4	3625862.0	2.0	0.00	873.15	0.01	1.22	NO	YES	NO
STCK41	0	0.71200E-03	479507.0	3625933.4	1.5	0.00	873.15	0.01	1.22	NO	YES	NO
STCK42	0	0.71200E-03	479444.6	3626015.8	1.6	0.00	873.15	0.01	1.22	NO	YES	NO
STCK43	0	0.71200E-03	479346.5	3626110.8	2.6	0.00	873.15	0.01	1.22	NO	YES	NO

*** AERMOD - VERSION 16216r ***	*** Fiesta Island HRA	***	09/29/17
*** AERMET - VERSION 14134 ***	*** Camp Fires	***	15:34:04
*** MODELOPTs: RegDFAULT CONC ELEV URBAN			PAGE 4

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X Y (METERS) (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PAREA1	0	0.24800E-06	479629.3 3626968.6	6.2	0.00	20	0.00	YES	
PAREA2	0	0.19000E-05	479474.9 3626148.5	6.1	0.00	11	0.00	YES	
PAREA3	0	0.12400E-05	479483.2 3626150.9	6.1	0.00	26	0.00	YES	

Model Output Worker Receptors

```
*** AERMOD - VERSION 16216r ***    *** Fiesta Island HRA
*** AERMET - VERSION 14134 ***    *** Camp Fires
```

*** 09/28/17
*** 10:36:52
*** PAGE 5

*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID

SOURCE IDs

YOUTH	PAREA1	,
PRIMITIV	PAREA2	,
DAYUSE	PAREA3	,
BEACHPIT	STCK1 , STCK2 , STCK3 , STCK4 , STCK5 , STCK6 , STCK7 , STCK8 ,	
	STCK9 , STCK10 , STCK11 , STCK12 , STCK13 , STCK14 , STCK15 , STCK16 ,	
	STCK17 , STCK18 , STCK19 , STCK20 , STCK21 , STCK22 , STCK23 , STCK24 ,	
	STCK25 , STCK26 , STCK27 , STCK28 , STCK29 , STCK30 , STCK31 , STCK32 ,	
	STCK33 , STCK34 , STCK35 , STCK36 , STCK37 , STCK38 , STCK39 , STCK40 ,	
	STCK41 , STCK42 , STCK43 ,	
ALL	STCK1 , STCK2 , STCK3 , STCK4 , STCK5 , STCK6 , STCK7 , STCK8 ,	
	STCK9 , STCK10 , STCK11 , STCK12 , STCK13 , STCK14 , STCK15 , STCK16 ,	
	STCK17 , STCK18 , STCK19 , STCK20 , STCK21 , STCK22 , STCK23 , STCK24 ,	
	STCK25 , STCK26 , STCK27 , STCK28 , STCK29 , STCK30 , STCK31 , STCK32 ,	
	STCK33 , STCK34 , STCK35 , STCK36 , STCK37 , STCK38 , STCK39 , STCK40 ,	
	STCK41 , STCK42 , STCK43 , PAREA1 , PAREA2 , PAREA3 ,	

Model Output Worker Receptors

*** AERMOD - VERSION 16216r ***
*** AERMET - VERSION 14134 ***
*** MODELOPTs: RegDFAULT CONC ELEV URBAN

*** Fiesta Island HRA
*** Camp Fires

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*** SOURCE IDs DEFINED AS URBAN SOURCES ***

URBAN ID	URBAN POP	SOURCE IDs
-----	-----	-----
STCK8	1400000.	STCK1 , STCK2 , STCK3 , STCK4 , STCK5 , STCK6 , STCK7 ,
		STCK9 , STCK10 , STCK11 , STCK12 , STCK13 , STCK14 , STCK15 , STCK16 ,
		STCK17 , STCK18 , STCK19 , STCK20 , STCK21 , STCK22 , STCK23 , STCK24 ,
		STCK25 , STCK26 , STCK27 , STCK28 , STCK29 , STCK30 , STCK31 , STCK32 ,
		STCK33 , STCK34 , STCK35 , STCK36 , STCK37 , STCK38 , STCK39 , STCK40 ,
		STCK41 , STCK42 , STCK43 , PAREA1 , PAREA2 , PAREA3 ,

Model Output Worker Receptors

```
*** AERMOD - VERSION 16216r ***    *** Fiesta Island HRA
*** AERMET - VERSION 14134 ***    *** Camp Fires
```

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*** 10:36:52
*** PAGE 10

*** MODELOPTs: RegDFault CONC ELEV URBAN

```
*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
      (1=YES; 0=NO)
```

[illegible]

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

Model Output Worker Receptors

*** AERMOD - VERSION 16216r ***
 *** AERMET - VERSION 14134 ***

*** Fiesta Island HRA
 *** Camp Fires

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*** MODELOPTs: RegDEFAULT CONC ELEV URBAN

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: ..\met data\722900.SFC
 Profile file: ..\met data\722900.PFL
 Surface format: FREE
 Profile format: FREE
 Surface station no.: 23188

Upper air station no.: 3190
 Name: UNKNOWN
 Year: 2009

Met Version: 14134

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O	LEN	Z0	BOWEN	ALBEDO	REF	WS	WD	HT	REF	TA	HT
09	01	01	1	01	-7.9	0.118	-9.000	-9.000	-999.	97.	18.6	0.37	0.95	1.00	1.76	11.	10.0	282.5	2.0			
09	01	01	1	02	-18.0	0.318	-9.000	-9.000	-999.	430.	161.4	0.37	0.95	1.00	2.86	18.	10.0	282.5	2.0			
09	01	01	1	03	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	282.5	2.0			
09	01	01	1	04	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	282.0	2.0			
09	01	01	1	05	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	281.4	2.0			
09	01	01	1	06	-8.3	0.146	-9.000	-9.000	-999.	134.	33.9	0.35	0.95	1.00	1.76	342.	10.0	280.9	2.0			
09	01	01	1	07	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	280.4	2.0			
09	01	01	1	08	-7.4	0.166	-9.000	-9.000	-999.	163.	56.6	0.35	0.95	0.49	1.76	343.	10.0	280.9	2.0			
09	01	01	1	09	38.3	0.459	0.419	0.007	70.	746.	-229.2	0.47	0.95	0.29	3.36	297.	10.0	281.4	2.0			
09	01	01	1	10	58.3	0.348	0.576	0.007	119.	501.	-65.6	0.47	0.95	0.22	2.36	291.	10.0	283.1	2.0			
09	01	01	1	11	118.8	0.342	0.880	0.007	208.	479.	-30.5	0.35	0.95	0.20	2.36	304.	10.0	286.4	2.0			
09	01	01	1	12	129.3	0.429	1.007	0.007	286.	674.	-55.3	0.47	0.95	0.19	2.86	286.	10.0	287.5	2.0			
09	01	01	1	13	127.0	0.505	1.111	0.007	391.	861.	-91.9	0.35	0.95	0.19	3.86	303.	10.0	287.5	2.0			
09	01	01	1	14	107.2	0.482	1.111	0.007	463.	803.	-94.3	0.47	0.95	0.20	3.36	289.	10.0	288.1	2.0			
09	01	01	1	15	70.3	0.491	1.009	0.007	529.	825.	-152.0	0.35	0.95	0.23	3.86	312.	10.0	288.1	2.0			
09	01	01	1	16	25.7	0.532	0.734	0.007	556.	931.	-530.7	0.35	0.95	0.32	4.36	304.	10.0	287.0	2.0			
09	01	01	1	17	-35.6	0.430	-9.000	-9.000	-999.	686.	202.2	0.35	0.95	0.59	3.86	301.	10.0	284.9	2.0			
09	01	01	1	18	-23.2	0.414	-9.000	-9.000	-999.	639.	276.3	0.47	0.95	1.00	3.36	277.	10.0	284.9	2.0			
09	01	01	1	19	-14.0	0.249	-9.000	-9.000	-999.	319.	99.9	0.37	0.95	1.00	2.36	4.	10.0	284.9	2.0			
09	01	01	1	20	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	284.2	2.0			
09	01	01	1	21	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	284.2	2.0			
09	01	01	1	22	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	283.1	2.0			
09	01	01	1	23	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	283.1	2.0			
09	01	01	1	24	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.46	0.95	1.00	0.00	0.	10.0	283.1	2.0			

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
09	01	01	01	10.0	1	11.	1.76	282.6	99.0	-99.00	-99.00

F indicates top of profile (=1) or below (=0)

Appendix C. Risk Calculations

Table C1
MER Concentration Worksheet
Residential Scenario

Source No.	Source	Contaminant	Weight Fraction	AERMOD Output ¹ Annual Avg	Annual Average MER Concentration	AERMOD Output ¹ 1-Hour	Acute (1-Hour) MER Concentration
(a)	(b)	(c)	(d)	(µg/m ³) (e)	(µg/m ³) (f)	(µg/m ³) (g)	(µg/m ³) (h)
1	Youth Camps (VOC)	Acetaldehyde	8.95E-02	5.73E-02	5.13E-03	1.40E+00	1.25E-01
		Acrolein	3.30E-03		1.89E-04		4.62E-03
		Benzene	2.00E-02		1.15E-03		2.80E-02
		1,3-Butadiene	6.10E-03		3.50E-04		8.54E-03
		Ethyl benzene	1.20E-03		6.88E-05		1.68E-03
		Formaldehyde	6.12E-02		3.51E-03		8.57E-02
		Cresol	2.47E-02		1.42E-03		3.46E-02
		Naphthalene	1.20E-02		6.88E-04		1.68E-02
		Propylene	2.30E-02		1.32E-03		3.22E-02
		Toluene	8.30E-03		4.76E-04		1.16E-02
		Xylenes	1.32E-02		7.56E-04		1.85E-02
2	Primitive Camps (VOC)	Acetaldehyde	8.95E-02	1.27E-02	1.13E-03	1.04E+00	9.33E-02
		Acrolein	3.30E-03		4.18E-05		3.44E-03
		Benzene	2.00E-02		2.54E-04		2.08E-02
		1,3-Butadiene	6.10E-03		7.73E-05		6.36E-03
		Ethyl benzene	1.20E-03		1.52E-05		1.25E-03
		Formaldehyde	6.12E-02		7.76E-04		6.38E-02
		Cresol	2.47E-02		3.13E-04		2.57E-02
		Naphthalene	1.20E-02		1.52E-04		1.25E-02
		Propylene	2.30E-02		2.92E-04		2.40E-02
		Toluene	8.30E-03		1.05E-04		8.65E-03
		Xylenes	1.32E-02		1.67E-04		1.38E-02
3	Group Day-Use Sites (VOC)	Acetaldehyde	8.95E-02	1.81E-02	1.62E-03	1.15E+00	1.03E-01
		Acrolein	3.30E-03		5.96E-05		3.80E-03
		Benzene	2.00E-02		3.61E-04		2.30E-02
		1,3-Butadiene	6.10E-03		1.10E-04		7.02E-03
		Ethyl benzene	1.20E-03		2.17E-05		1.38E-03
		Formaldehyde	6.12E-02		1.11E-03		7.05E-02
		Cresol	2.47E-02		4.46E-04		2.84E-02
		Naphthalene	1.20E-02		2.17E-04		1.38E-02
		Propylene	2.30E-02		4.16E-04		2.65E-02
		Toluene	8.30E-03		1.50E-04		9.56E-03
		Xylenes	1.32E-02		2.39E-04		1.52E-02
4	Beach Pits (VOC)	Acetaldehyde	8.95E-02	3.20E-02	2.86E-03	3.30E-01	2.96E-02
		Acrolein	3.30E-03		1.05E-04		1.09E-03
		Benzene	2.00E-02		6.39E-04		6.61E-03
		1,3-Butadiene	6.10E-03		1.95E-04		2.02E-03
		Ethyl benzene	1.20E-03		3.83E-05		3.97E-04
		Formaldehyde	6.12E-02		1.96E-03		2.02E-02
		Cresol	2.47E-02		7.89E-04		8.16E-03
		Naphthalene	1.20E-02		3.83E-04		3.97E-03
		Propylene	2.30E-02		7.35E-04		7.60E-03
		Toluene	8.30E-03		2.65E-04		2.74E-03
		Xylenes	1.32E-02		4.22E-04		4.36E-03
Note: Maximum Exposed Receptor (MER)					For Cancer/Chronic Calculation		For Acute Calculation

TOG Speciation based on USEPA SPECIATE Data Browser, Fireplace Wood Combustion - Pine Wood (2004).
https://cfpub.epa.gov/speciate/ehpa_speciate_browse_details.cfm?ptype=G&number=4642

¹ AERMOD Output (Appendix B) at the maximum exposed receptor (MER).

Table C2
HARP2 Results for Cancer Risk and Chronic Hazards
Residential Scenario

No.	Source	Contaminant	Carcinogenic Risks	Chronic Non-Cancer Risks ² - Toxicological Endpoints*											
			Residential 30-year ¹	CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD
(a)	(b)	(c)	per million (d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
1	Youth Camps (VOC)	Acetaldehyde	3.2E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.66E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Acrolein	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Benzene	7.1E-02	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	3.82E-04
		1,3-Butadiene	1.3E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Ethyl benzene	3.7E-04	0.00E+00	0.00E+00	0.00E+00	3.44E-08	3.44E-08	3.44E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.44E-08	0.00E+00
		Formaldehyde	4.6E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Cresol	0.0E+00	0.00E+00	2.36E-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	0.00E+00
		Naphthalene	5.1E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.64E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Propylene	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.39E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Toluene	0.0E+00	0.00E+00	1.59E-06	0.00E+00	0.00E+00	0.00E+00	1.59E-06	1.59E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.0E+00	0.00E+00	1.08E-06	0.00E+00	0.00E+00	0.00E+00	1.08E-06	1.08E-06	0.00E+00	1.08E-06	0.00E+00	0.00E+00	0.00E+00
2	Primitive Camps (VOC)	Acetaldehyde	7.0E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.11E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Acrolein	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Benzene	1.6E-02	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	8.45E-05
		1,3-Butadiene	2.9E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.87E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Ethyl benzene	8.2E-05	0.00E+00	0.00E+00	0.00E+00	7.61E-09	7.61E-09	7.61E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.61E-09	0.00E+00
		Formaldehyde	1.0E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.62E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Cresol	0.0E+00	0.00E+00	5.22E-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	0.00E+00
		Naphthalene	1.1E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.69E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Propylene	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.72E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Toluene	0.0E+00	0.00E+00	3.51E-07	0.00E+00	0.00E+00	0.00E+00	3.51E-07	3.51E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.0E+00	0.00E+00	2.39E-07	0.00E+00	0.00E+00	0.00E+00	2.39E-07	2.39E-07	0.00E+00	2.39E-07	0.00E+00	0.00E+00	0.00E+00
3	Group Day-Use Sites (VOC)	Acetaldehyde	1.0E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Acrolein	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Benzene	2.2E-02	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	1.20E-04
		1,3-Butadiene	4.1E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.51E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Ethyl benzene	1.2E-04	0.00E+00	0.00E+00	0.00E+00	1.08E-08	1.08E-08	1.08E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-08	0.00E+00
		Formaldehyde	1.4E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Cresol	0.0E+00	0.00E+00	7.44E-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	0.00E+00
		Naphthalene	1.6E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.41E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Propylene	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Toluene	0.0E+00	0.00E+00	5.00E-07	0.00E+00	0.00E+00	0.00E+00	5.00E-07	5.00E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.0E+00	0.00E+00	3.41E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.41E-07	0.00E+00	3.41E-07	0.00E+00	0.00E+00	0.00E+00

Table C2
HARP2 Results for Cancer Risk and Chronic Hazards
Residential Scenario

No.	Source	Contaminant	Carcinogenic Risks	Chronic Non-Cancer Risks ² - Toxicological Endpoints*												
			Residential 30-year ¹	CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD	
			per million	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	
4	Beach Pits (VOC)	Acetaldehyde	1.8E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Acrolein	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Benzene	4.0E-02	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	0.00E+00	2.13E-04
		1,3-Butadiene	7.2E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.74E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Ethyl benzene	2.1E-04	0.00E+00	0.00E+00	0.00E+00	1.92E-08	1.92E-08	1.92E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E-08	0.00E+00	0.00E+00
		Formaldehyde	2.5E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.17E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Cresol	0.0E+00	0.00E+00	1.32E-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	0.00E+00	0.00E+00
		Naphthalene	2.9E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Propylene	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.45E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Toluene	0.0E+00	0.00E+00	8.84E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.84E-07	8.84E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.0E+00	0.00E+00	6.02E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.02E-07	0.00E+00	6.02E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total - All Sources			0.69	0.00E+00	1.05E-05	0.00E+00	7.20E-08	7.20E-08	3.69E-04	2.19E-03	0.00E+00	2.26E-06	0.00E+00	7.20E-08	8.00E-04	

Note: Health risks calculated using HARP2, Risk Assessment Standalone Tool, version 17023 (CARB, 2017).

using HARP2, Risk Assessment Standalone 2017).			Total Cancer Risk		Staff	0.69	per million
			Maximum Chronic Hazard Index			0.002	RESP
	3rd Trimester	0 < 2 years	2 < 16 years	16 < 30 years	age bin		
Dose Exposure Factors:	350	350	350	350	exposure frequency (days/year)		
	361	1090	745	335	inhalation rate (L/kg-day) ²		
	1	1	1	1	inhalation absorption factor		
Risk Calculation Factors:	10	10	3	1	age sensitivity factor		
	0.25	2	14	14	exposure duration (years)		
	70	70	70	70	averaging time (years)		
	0.85	0.85	0.72	0.73	fraction of time at home		

* Key to Toxicological Endpoints
 CV Cardiovascular System
 CNS Central Nervous System
 IMMUN Immune System
 KIDN Kidneys
 GILV Gastrointestinal Tract and Liver/Alimentary Tract
 RESP Respiratory System
 REPRO Reproductive System
 SKIN Skin irritation and/or other effects
 EYE Eye irritation and/or other effects
 BONE Bones and Teeth
 ENDO Endocrine System
 BLOOD Hematological System

¹ For informational purposes, the 70-year and 9-year cancer risks are 0.8 and 0.5 in a million, respectively.

² Inhalation rate taken as the 95th percentile breathing rates (OEHHA, 2015).

Table C3
HARP2 Results for Acute Hazards
Residential Scenario

Source No.	Source	Contaminant	Acute Non-Cancer Risks - Toxicological Endpoints*											
			CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)
1	Youth Camps (VOC)	Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.67E-04	0.00E+00	2.67E-04	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	0.00E+00	1.85E-03	0.00E+00	1.85E-03	0.00E+00	0.00E+00	0.00E+00
		Benzene	0.00E+00	0.00E+00	1.04E-03	0.00E+00	0.00E+00	1.04E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-03
		1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.29E-05	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-03	0.00E+00	0.00E+00	0.00E+00
		Cresol	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	0.00E+00
		Naphthalene	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	0.00E+00
		Propylene	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	0.00E+00
		Toluene	0.00E+00	3.14E-07	0.00E+00	0.00E+00	0.00E+00	3.14E-07	3.14E-07	0.00E+00	3.14E-07	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.00E+00	8.40E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.40E-07	0.00E+00	8.40E-07	0.00E+00	0.00E+00	0.00E+00
2	Primitive Camps (VOC)	Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.98E-04	0.00E+00	1.98E-04	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	0.00E+00	1.38E-03	0.00E+00	1.38E-03	0.00E+00	0.00E+00	0.00E+00
		Benzene	0.00E+00	0.00E+00	7.72E-04	0.00E+00	0.00E+00	7.72E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.72E-04
		1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.63E-06	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E-03	0.00E+00	0.00E+00	0.00E+00
		Cresol	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	0.00E+00
		Naphthalene	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	0.00E+00
		Propylene	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	0.00E+00
		Toluene	0.00E+00	2.34E-07	0.00E+00	0.00E+00	0.00E+00	2.34E-07	2.34E-07	0.00E+00	2.34E-07	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.00E+00	6.25E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.25E-07	0.00E+00	6.25E-07	0.00E+00	0.00E+00	0.00E+00
3	Group Day-Use Sites (VOC)	Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E-04	0.00E+00	2.19E-04	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	0.00E+00	1.52E-03	0.00E+00	1.52E-03	0.00E+00	0.00E+00	0.00E+00
		Benzene	0.00E+00	0.00E+00	8.53E-04	0.00E+00	0.00E+00	8.53E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.53E-04
		1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-05	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-03	0.00E+00	0.00E+00	0.00E+00
		Cresol	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	0.00E+00
		Naphthalene	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	0.00E+00
		Propylene	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	0.00E+00
		Toluene	0.00E+00	2.58E-07	0.00E+00	0.00E+00	0.00E+00	2.58E-07	2.58E-07	0.00E+00	2.58E-07	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.00E+00	6.91E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.91E-07	0.00E+00	6.91E-07	0.00E+00	0.00E+00	0.00E+00

Table C3
HARP2 Results for Acute Hazards
Residential Scenario

Source No.	Source	Contaminant	Acute Non-Cancer Risks - Toxicological Endpoints*												
			CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	
4	Beach Pits (VOC)	Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.29E-05	0.00E+00	6.29E-05	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	0.00E+00	0.00E+00	4.36E-04	0.00E+00	4.36E-04	0.00E+00	0.00E+00	0.00E+00
		Benzene	0.00E+00	0.00E+00	2.45E-04	0.00E+00	0.00E+00	2.45E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.45E-04
		1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.05E-06	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Formaldehyde	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	3.68E-04	0.00E+00	0.00E+00	0.00E+00
		Cresol	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	0.00E+00	0.00E+00
		Naphthalene	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	0.00E+00	0.00E+00
		Propylene	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	0.00E+00	0.00E+00
		Toluene	0.00E+00	7.41E-08	0.00E+00	0.00E+00	0.00E+00	7.41E-08	7.41E-08	0.00E+00	7.41E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.00E+00	1.98E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.98E-07	0.00E+00	1.98E-07	0.00E+00	0.00E+00	0.00E+00
Total - All Sources			0.00E+00	3.24E-06	2.91E-03	0.00E+00	0.00E+00	2.94E-03	5.93E-03	0.00E+00	1.03E-02	0.00E+00	0.00E+00	2.91E-03	

Note: Health risks calculated using HARP2, Risk Assessment Standalone Tool, version 17023 (CARB, 2017).

Maximum Acute Hazard Index 0.010 Eye

* Key to Toxicological Endpoints

CV	Cardiovascular System	RESP	Respiratory System
CNS	Central Nervous System	SKIN	Skin irritation and/or other effects
IMMUN	Immune System	EYE	Eye irritation and/or other effects
KIDN	Kidneys	BONE	Bones and Teeth
GILV	Gastrointestinal Tract and Liver/Alimentary Tract	ENDO	Endocrine System
REPRO	Reproductive System	BLOOD	Hematological System

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Table C4
MER Concentration Worksheet
Worker Scenario

Source No.	Source	Contaminant	Weight Fraction	AERMOD Output ¹ Annual Avg	Annual Average MER Concentration	AERMOD Output ¹ 1-Hour	Acute (1-Hour) MER Concentration
(a)	(b)	(c)	(d)	(µg/m ³) (e)	(µg/m ³) (f)	(µg/m ³) (g)	(µg/m ³) (h)
1	Youth Camps (VOC)	Acetaldehyde	8.95E-02	1.45E-01	1.29E-02	2.56E+00	2.29E-01
		Acrolein	3.30E-03		4.77E-04		8.46E-03
		Benzene	2.00E-02		2.89E-03		5.13E-02
		1,3-Butadiene	6.10E-03		8.83E-04		1.56E-02
		Ethyl benzene	1.20E-03		1.74E-04		3.08E-03
		Formaldehyde	6.12E-02		8.85E-03		1.57E-01
		Cresol	2.47E-02		3.57E-03		6.33E-02
		Naphthalene	1.20E-02		1.74E-03		3.08E-02
		Propylene	2.30E-02		3.33E-03		5.90E-02
		Toluene	8.30E-03		1.20E-03		2.13E-02
		Xylenes	1.32E-02		1.91E-03		3.38E-02
2	Primitive Camps (VOC)	Acetaldehyde	8.95E-02	2.70E-02	2.42E-03	1.81E+00	1.62E-01
		Acrolein	3.30E-03		8.92E-05		5.97E-03
		Benzene	2.00E-02		5.40E-04		3.62E-02
		1,3-Butadiene	6.10E-03		1.65E-04		1.10E-02
		Ethyl benzene	1.20E-03		3.24E-05		2.17E-03
		Formaldehyde	6.12E-02		1.65E-03		1.11E-01
		Cresol	2.47E-02		6.67E-04		4.47E-02
		Naphthalene	1.20E-02		3.24E-04		2.17E-02
		Propylene	2.30E-02		6.21E-04		4.16E-02
		Toluene	8.30E-03		2.24E-04		1.50E-02
		Xylenes	1.32E-02		3.57E-04		2.39E-02
3	Group Day-Use Sites (VOC)	Acetaldehyde	8.95E-02	2.26E-02	2.02E-03	1.66E+00	1.48E-01
		Acrolein	3.30E-03		7.46E-05		5.47E-03
		Benzene	2.00E-02		4.52E-04		3.32E-02
		1,3-Butadiene	6.10E-03		1.38E-04		1.01E-02
		Ethyl benzene	1.20E-03		2.71E-05		1.99E-03
		Formaldehyde	6.12E-02		1.38E-03		1.02E-01
		Cresol	2.47E-02		5.58E-04		4.10E-02
		Naphthalene	1.20E-02		2.71E-04		1.99E-02
		Propylene	2.30E-02		5.20E-04		3.82E-02
		Toluene	8.30E-03		1.88E-04		1.38E-02
		Xylenes	1.32E-02		2.98E-04		2.19E-02
4	Beach Pits (VOC)	Acetaldehyde	8.95E-02	2.87E-02	2.57E-03	2.20E-01	1.97E-02
		Acrolein	3.30E-03		9.48E-05		7.25E-04
		Benzene	2.00E-02		5.74E-04		4.40E-03
		1,3-Butadiene	6.10E-03		1.75E-04		1.34E-03
		Ethyl benzene	1.20E-03		3.45E-05		2.64E-04
		Formaldehyde	6.12E-02		1.76E-03		1.34E-02
		Cresol	2.47E-02		7.09E-04		5.43E-03
		Naphthalene	1.20E-02		3.45E-04		2.64E-03
		Propylene	2.30E-02		6.61E-04		5.05E-03
		Toluene	8.30E-03		2.38E-04		1.82E-03
		Xylenes	1.32E-02		3.79E-04		2.90E-03
Note: Maximum Exposed Receptor (MER) - Worker					For Cancer/Chronic Calculation		For Acute Calculation

TOG Speciation based on USEPA SPECIATE Data Browser, Fireplace Wood Combustion - Pine Wood (2004).
https://cfpub.epa.gov/speciate/ehpa_speciate_browse_details.cfm?ptype=G&number=4642

¹ AERMOD Output (Appendix B) at the maximum exposed receptor (MER).

Table C5
HARP2 Results for Cancer Risk and Chronic Hazards
Worker Scenario

No.	Source	Contaminant	Carcinogenic Risks	Chronic Non-Cancer Risks - Toxicological Endpoints*											
			Worker 25-year	CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD
			per million	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
1	Youth Camps (VOC)	Acetaldehyde	7.3E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.25E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Acrolein	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Benzene	1.6E-02	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	9.65E-04
		1,3-Butadiene	3.0E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Ethyl benzene	8.5E-05	0.00E+00	0.00E+00	0.00E+00	8.68E-08	8.68E-08	8.68E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.68E-08	0.00E+00
		Formaldehyde	1.0E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Cresol	0.0E+00	0.00E+00	5.96E-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	0.00E+00
		Naphthalene	1.2E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Propylene	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Toluene	0.0E+00	0.00E+00	4.00E-06	0.00E+00	0.00E+00	0.00E+00	4.00E-06	4.00E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.0E+00	0.00E+00	2.73E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.73E-06	0.00E+00	2.73E-06	0.00E+00	0.00E+00	0.00E+00
2	Primitive Camps (VOC)	Acetaldehyde	1.4E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Acrolein	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.55E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Benzene	3.0E-03	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	1.80E-04
		1,3-Butadiene	5.6E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.24E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Ethyl benzene	1.6E-05	0.00E+00	0.00E+00	0.00E+00	1.62E-08	1.62E-08	1.62E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-08	0.00E+00
		Formaldehyde	2.0E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Cresol	0.0E+00	0.00E+00	1.11E-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	0.00E+00
		Naphthalene	2.2E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.60E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Propylene	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.07E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Toluene	0.0E+00	0.00E+00	7.48E-07	0.00E+00	0.00E+00	0.00E+00	7.48E-07	7.48E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.0E+00	0.00E+00	5.10E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.10E-07	0.00E+00	5.10E-07	0.00E+00	0.00E+00	0.00E+00
3	Group Day-Use Sites (VOC)	Acetaldehyde	1.1E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Acrolein	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Benzene	2.5E-03	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	1.51E-04
		1,3-Butadiene	4.7E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.90E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Ethyl benzene	1.3E-05	0.00E+00	0.00E+00	0.00E+00	1.36E-08	1.36E-08	1.36E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-08	0.00E+00
		Formaldehyde	1.6E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Cresol	0.0E+00	0.00E+00	9.31E-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	0.00E+00
		Naphthalene	1.8E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.01E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Propylene	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Toluene	0.0E+00	0.00E+00	6.26E-07	0.00E+00	0.00E+00	0.00E+00	6.26E-07	6.26E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.0E+00	0.00E+00	4.26E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.26E-07	0.00E+00	4.26E-07	0.00E+00	0.00E+00	0.00E+00

Table C5
HARP2 Results for Cancer Risk and Chronic Hazards
Worker Scenario

No.	Source	Contaminant	Carcinogenic Risks	Chronic Non-Cancer Risks - Toxicological Endpoints*											
			Worker 25-year	CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD
			per million												
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
4	Beach Pits (VOC)	Acetaldehyde	1.4E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Acrolein	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.71E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Benzene	3.2E-03	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	1.91E-04
		1,3-Butadiene	5.9E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.76E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Ethyl benzene	1.7E-05	0.00E+00	0.00E+00	0.00E+00	1.72E-08	1.72E-08	1.72E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-08	0.00E+00
		Formaldehyde	2.1E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Cresol	0.0E+00	0.00E+00	1.18E-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	0.00E+00
		Naphthalene	2.3E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.83E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Propylene	0.0E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Toluene	0.0E+00	0.00E+00	7.95E-07	0.00E+00	0.00E+00	0.00E+00	7.95E-07	7.95E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.0E+00	0.00E+00	5.42E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.42E-07	0.00E+00	5.42E-07	0.00E+00	0.00E+00	0.00E+00
Total - All Sources			0.12	0.00E+00	1.96E-05	0.00E+00	1.34E-07	1.34E-07	6.87E-04	4.07E-03	0.00E+00	4.21E-06	0.00E+00	1.34E-07	1.49E-03
Note: Health risks calculated using HARP2, Risk Assessment Standalone Tool, version 17023 (CARB, 2017).					Total Cancer Risk		Staff	0.12	per million						
					Maximum Chronic Hazard Index		0.004	RESP	* Key to Toxicological Endpoints						

Note: Health risks calculated using HARP2, Risk Assessment Standalone Tool, version 17023 (CARB, 2017).

Total Cancer Risk **Staff** **0.12** per million
Maximum Chronic Hazard Index **0.004** **RESP**

* Key to Toxicological Endpoints
CV Cardiovascular System
CNS Central Nervous System
IMMUN Immune System
KIDN Kidneys
GILV Gastrointestinal Tract and Liver/Alimentary Tract
RESP Respiratory System
REPRO Reproductive System
SKIN Skin irritation and/or other effects
EYE Eye irritation and/or other effects
BONE Bones and Teeth
ENDO Endocrine System
BLOOD Hematological System

16 < 70 years age bin
Dose Exposure Factors: 250 exposure frequency (days/year)
 230 inhalation rate (L/kg-8-hours) ¹
 1 inhalation absorption factor
Risk Calculation Factors: 1 age sensitivity factor
 25 exposure duration (years)
 70 averaging time (years)
 1 fraction of time at home (not applicable)

¹ Inhalation rate (8-hour) taken as the 95th percentile breathing rates for moderate intensity activities (OEHH, 2015).

Table C6
HARP2 Results for Acute Hazards
Worker Scenario

Source No.	Source	Contaminant	Acute Non-Cancer Risks - Toxicological Endpoints*											
			CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)
1	Youth Camps (VOC)	Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.88E-04	0.00E+00	4.88E-04	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	0.00E+00	3.38E-03	0.00E+00	3.38E-03	0.00E+00	0.00E+00	0.00E+00
		Benzene	0.00E+00	0.00E+00	1.90E-03	0.00E+00	0.00E+00	1.90E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-03
		1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.37E-05	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.85E-03	0.00E+00	0.00E+00	0.00E+00
		Cresol	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	0.00E+00
		Naphthalene	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	0.00E+00
		Propylene	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	0.00E+00
		Toluene	0.00E+00	5.75E-07	0.00E+00	0.00E+00	0.00E+00	5.75E-07	5.75E-07	0.00E+00	5.75E-07	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.00E+00	1.54E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-06	0.00E+00	1.54E-06	0.00E+00	0.00E+00	0.00E+00
2	Primitive Camps (VOC)	Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.44E-04	0.00E+00	3.44E-04	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	0.00E+00	2.39E-03	0.00E+00	2.39E-03	0.00E+00	0.00E+00	0.00E+00
		Benzene	0.00E+00	0.00E+00	1.34E-03	0.00E+00	0.00E+00	1.34E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-03
		1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-05	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.01E-03	0.00E+00	0.00E+00	0.00E+00
		Cresol	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	0.00E+00
		Naphthalene	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	0.00E+00
		Propylene	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	0.00E+00
		Toluene	0.00E+00	4.06E-07	0.00E+00	0.00E+00	0.00E+00	4.06E-07	4.06E-07	0.00E+00	4.06E-07	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.00E+00	1.09E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-06	0.00E+00	1.09E-06	0.00E+00	0.00E+00	0.00E+00
3	Group Day-Use Sites (VOC)	Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.16E-04	0.00E+00	3.16E-04	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	0.00E+00	2.19E-03	0.00E+00	2.19E-03	0.00E+00	0.00E+00	0.00E+00
		Benzene	0.00E+00	0.00E+00	1.23E-03	0.00E+00	0.00E+00	1.23E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-03
		1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-05	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-03	0.00E+00	0.00E+00	0.00E+00
		Cresol	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	0.00E+00
		Naphthalene	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	0.00E+00
		Propylene	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	0.00E+00
		Toluene	0.00E+00	3.72E-07	0.00E+00	0.00E+00	0.00E+00	3.72E-07	3.72E-07	0.00E+00	3.72E-07	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.00E+00	9.95E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.95E-07	0.00E+00	9.95E-07	0.00E+00	0.00E+00	0.00E+00

Table C6
HARP2 Results for Acute Hazards
Worker Scenario

Source No.	Source	Contaminant	Acute Non-Cancer Risks - Toxicological Endpoints*												
			CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD	
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	
4	Beach Pits (VOC)	Acetaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.18E-05	0.00E+00	4.18E-05	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	0.00E+00	0.00E+00	2.90E-04	0.00E+00	2.90E-04	0.00E+00	0.00E+00	0.00E+00
		Benzene	0.00E+00	0.00E+00	1.63E-04	0.00E+00	0.00E+00	1.63E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.63E-04
		1,3-Butadiene	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-06	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Formaldehyde	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.45E-04	0.00E+00	0.00E+00	0.00E+00
		Cresol	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	0.00E+00	0.00E+00
		Naphthalene	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	0.00E+00	0.00E+00
		Propylene	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	0.00E+00	0.00E+00
		Toluene	0.00E+00	4.93E-08	0.00E+00	0.00E+00	0.00E+00	4.93E-08	4.93E-08	0.00E+00	4.93E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00
		Xylenes	0.00E+00	1.32E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32E-07	0.00E+00	1.32E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total - All Sources			0.00E+00	5.15E-06	4.63E-03	0.00E+00	0.00E+00	4.69E-03	9.45E-03	0.00E+00	1.64E-02	0.00E+00	0.00E+00	4.63E-03	

Note: Health risks calculated using HARP2, Risk Assessment Standalone Tool, version 17023 (CARB, 2017).

Maximum Acute Hazard Index 0.016 Eye

* Key to Toxicological Endpoints

CV	Cardiovascular System	RESP	Respiratory System
CNS	Central Nervous System	SKIN	Skin irritation and/or other effects
IMMUN	Immune System	EYE	Eye irritation and/or other effects
KIDN	Kidneys	BONE	Bones and Teeth
GILV	Gastrointestinal Tract and Liver/Alimentary Tract	ENDO	Endocrine System
REPRO	Reproductive System	BLOOD	Hematological System