

TECHNICAL MEMORANDUM

DATE September 1, 2020

TO Pamela P. Smith, Assistant Superintendent of Business Services
Sierra Sands Unified School District
113 W. Felspar Avenue
Ridgecrest, California 93555

FROM Steve Bush, P.E., Senior Engineer

SUBJECT Richmond Elementary School Replacement
Health Risk Assessment Technical Memorandum
SSSD-06

1. Introduction

PlaceWorks prepared a health risk assessment for the Sierra Sands Unified School District (District) for the proposed new location for Richmond Elementary School (project). The Health Risk Assessment (HRA) was conducted as required by Public Resources Code Section 21151.8 and Education Code Section 17213 and in accordance with relevant and appropriate procedures of the U.S. Environmental Protection Agency (USEPA), California Environmental Protection Agency (CalEPA), and Office of Environmental Health and Hazard Assessment (OEHHA).

1.1 PROJECT LOCATION

The project site is northwest of the intersection of Richmond Road and Ridgecrest Boulevard in the City of Ridgecrest, in the northeast corner of Kern County, California. The site is outside of the Naval Air Weapons Station (NAWS) China Lake secured area. The project site is bordered by Gold Canyon Street to the north, Richmond Road to the east, Ridgecrest Boulevard to the south, and Gateway Boulevard to the west. The site and surrounding area are shown in Figure 1.

2. Health Risk Assessment

2.1. SOURCE IDENTIFICATION

No freeways or busy traffic corridors were identified within a quarter-mile (1,320 feet) of the site.¹ The Eastern Kern Air Pollution Control District (EKAPCD) was contacted to assist in the identification of

¹ PlaceWorks, 2020. Geologic and Environmental Hazards Assessment for Richmond Elementary School Replacement Project. Dated August 2020. A freeway or busy traffic corridor is defined as "Roadways with an average daily traffic in excess of 50,000 vehicles in a rural area and 100,000 daily vehicles in an urban area" (Education Code Section 17213(d)(9); Public Resources Code Section 21151.8(b)(9))

potential emission sources within a quarter-mile radius (1,320 feet) of the site. Only one site was identified by EKAPCD as a potential emission source:

» Minit Shop #349 – gasoline storage and dispensing facility at 843 E. Ridgecrest Boulevard²

No non-permitted emission sources or other mobile sources (i.e., railroad) were identified within the ¼-mile radius. Figure 1, Project Locations, shows the location of the gas station with respect to the project site

2.2. SOURCE CHARACTERIZATION

Gasoline stations emit volatile organic compounds (VOCs) during underground tank loading, storage tank venting due to temperature and pressure changes, refueling at the vehicle/nozzle interface, and spillage. Per California Air Resources Board (CARB) and California Air Pollution Control Officers Association (CAPCOA) recommendations, benzene is the most critical substance driving health risks from gasoline service stations.^{3 4} The emissions of toluene, xylene and other compounds do not begin to cause adverse acute health effects until the health risks from benzene emissions exceed air district cancer risk thresholds by more than 2 orders of magnitude. Therefore, health risks from benzene exposure were the focus of the evaluation. 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

Appendix A contains the emission rate calculations for each source considered in the assessment

2.3. AIR DISPERSION MODELING

Air quality modeling using the AERMOD atmospheric dispersion model was performed to assess the impact of emitted compounds on individuals who may work and/or attend the school. The model is a steady state Gaussian plume model and is recommended by EKAPCD for estimating ground level impacts from point and fugitive sources in simple and complex terrain. The model requires additional input parameters, including terrain data and local meteorology. Meteorological data obtained from CARB for the nearest representative meteorological station (China Lake) with the latest available years (2009-2013) of record were used to represent local weather conditions and prevailing winds.

² Eastern Kern Air Pollution Control District (EKAPCD), 2019. Correspondence between Mr. Gary Ray, Jr., Air Quality Administrative Manager, EKAPCD, and Mr. Mike Watson, PG, Associate Geologist, PlaceWorks on August 20, 2019.

³ California Air Pollution Control Officers Association (CAPCOA), 1997. *Air Toxics “Hot Spots” Program: Gasoline Service Station Industrywide Risk Assessment Guidelines*. Dated November 1997.

⁴ California Air Resources Board (CARB), 2013. *Revised Emission Factors for Gasoline Marketing Operations at California Gasoline Dispensing Facilities*. Dated December 23, 2013.

The modeling analysis also considered the spatial distribution and elevation of each emitting source in relation to the 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. The model's By-Day-of-Week (HRDOW) scalar option was invoked to predict ground-level concentrations during typical school hours (i.e., Monday to Friday 8:00AM to 4:00PM).

Appendix A contains a representation of the air dispersion model setup and wind rose for the meteorological data. The air dispersion model output is presented in Appendix B.

2.3. CARCINOGENIC RISK

A threshold of ten in a million (10×10^{-6}) 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 OEHHA 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. 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 school-based receptors, the following dose algorithm was used.

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

Where:

Dose_{AIR}	=	dose by inhalation ($\text{mg}/\text{kg}/\text{day}$), per age group/receptor
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. The default value of 1 was used for this assessment. To represent the unique characteristics of the school population, the assessment

employed the USEPA’s guidance to develop viable dose estimates 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 student population were adjusted to account for an exposure of 180 days per year for 6 years (kindergarten through 5th grade). In addition, the calculated risk for students is multiplied by an ASF weighting factor of 3 (for children ages 5 to 11 years) to account for early life sensitivity to pollutant exposures.⁵ To assess staff-related risk, exposures were adjusted to account for an employment period of 250 days per year for 25 years.

To calculate the overall cancer risk, the risk for each receptor type is calculated per the following equation:

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

Where:

Dose _{AIR}	=	dose by inhalation (mg/kg-day), per age group/receptor type
CPF	=	cancer potency factor, chemical-specific (mg/kg-day) ⁻¹
ASF	=	age sensitivity factor, per age group
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 cancer risk is calculated separately for the students and staff, because of age differences in sensitivity to carcinogens and age differences in intake rates. 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 1×10^6 (i.e. 1 million).

CARB’s Hotspots Analysis and Reporting Program (HARP2), Risk Assessment Standalone Tool was used to calculate the cancer risk values.⁶ The calculated results are provided in Appendix C.

2.4. NON-CARCINOGENIC HAZARDS

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

⁵ Office of Environmental Health Hazard Assessment (OEHHA), 2015. *Air Toxics Hot Spots Program Risk Assessment Guidelines – Guidance Manual for Preparation of Health Risk Assessments*. Dated February 2015

⁶ California Air Resources Board (CARB), 2019. Hotspots Analysis and Report Program (HARP2), Risk Assessment Standalone Tool (RAST), Version 19044.

The hazard index approach was used to quantify non-carcinogenic impacts. The hazard index assumes that chronic sub-threshold exposures adversely affect a specific organ or organ system (toxicological endpoint). Target organs presented in regulatory guidance were used for each discrete chemical exposure. Each chemical concentration or dose is divided by the appropriate toxicity value to calculate the hazard index. A health hazard is presumed to exist where the total equals or exceeds one. CARB's HARP2 Risk Assessment Standalone Tool was used to calculate the chronic, acute (1-hour), and 8-hour health risk values (CARB, 2019), and the determined hazard indices are provided in Appendix C.

2.5. RESULTS

The summary results of the HRA are provided in Table 1. The excess cancer risk was calculated to be 0.8 per million for adult school staff and 1.1 per million for students. In comparison to the threshold level of 10 in a million, carcinogenic risks are below the significance threshold value for both school staff and students. For chronic, acute (1-hour), and 8-hour non-carcinogenic effects, the hazard index identified for each toxicological endpoint totaled less than one at the project site. Therefore, non-carcinogenic hazards are also below the significance threshold.

Table 1 Health Risk Assessment Summary

EMISSION SOURCES	CANCER RISK (PER MILLION)		CHRONIC HAZARDS	ACUTE (1-HR) HAZARDS	8-HOUR HAZARDS
	STAFF	STUDENTS			
Minit Shop #349	0.8	1.1	0.002	0.029	0.002
EKAPCD Threshold	10	10	1.0	1.0	1.0
Exceeds Threshold?	No	No	No	No	No

3. Conclusions

Based on a comparison to the carcinogenic and non-carcinogenic thresholds established under the California Safe Drinking Water and Toxic Enforcement Act (Proposition 65) and OEHHA, hazardous air emissions generated from nearby emission sources are not anticipated to pose an actual or potential endangerment to occupants of the proposed school and no mitigation measures are required.

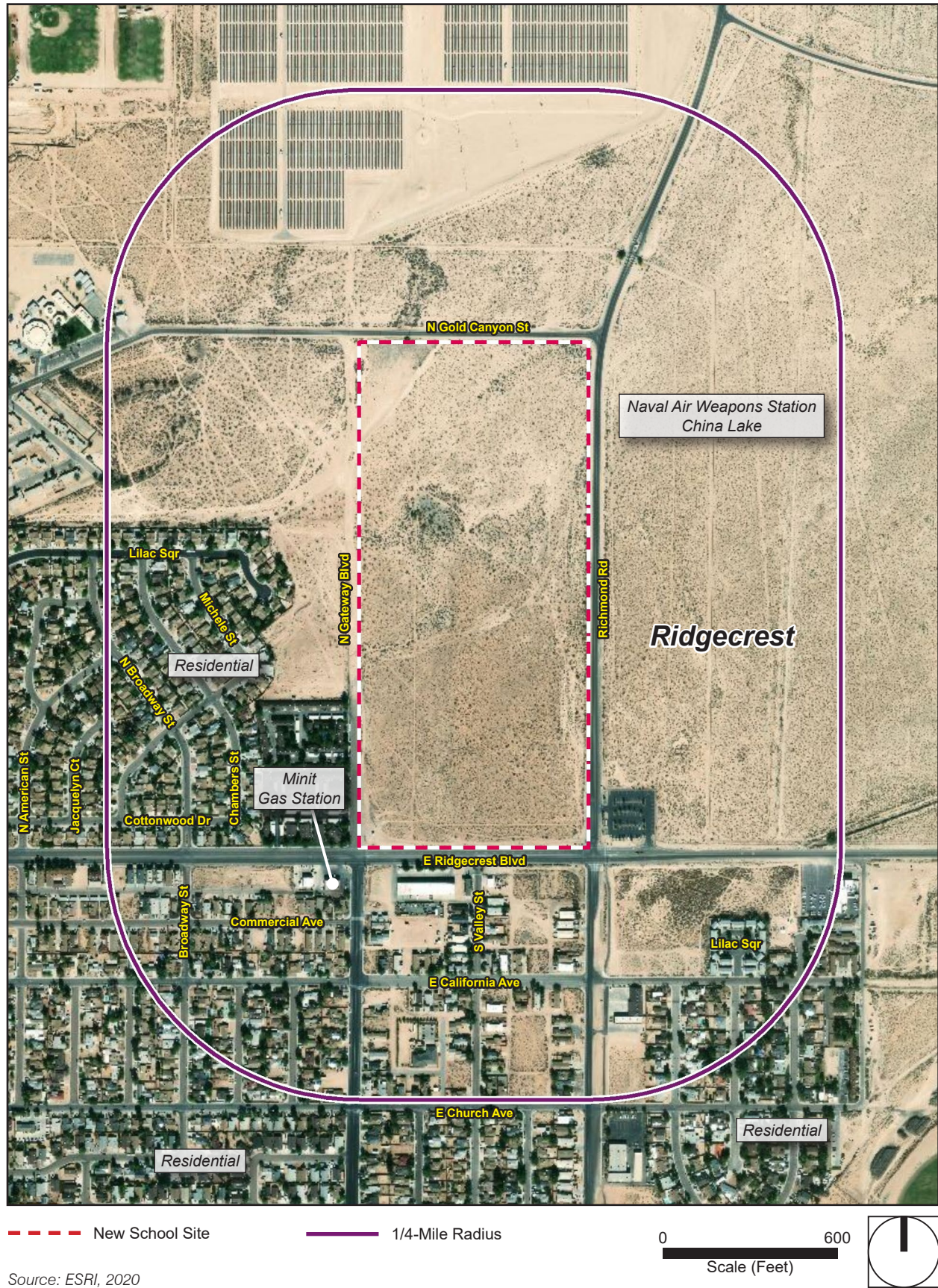
Respectfully submitted,

PlaceWorks



Steve Bush, PE
Senior Engineer

Figure 1 - Project Location



Appendix A – Emission Rate Calculations

Source
Minit Shop #349
843 E. Ridgecrest Boulevard
Ridgecrest, CA 93555

	hours	days	weeks
Temporal Profile:	24	7	52
	0	0	0

Materials: ⁽¹⁾

Unleaded Gasoline	1,037,012 gal/yr
	86,418 gal/mo

Emission Factor: ⁽²⁾

Phase II Fueling Non-ORVR	0.42 lbs VOC/1,000 gal
Phase II Fueling ORVR	0.021 lbs VOC/1,000 gal
Phase I Bulk Transfer Losses	0.15 lbs VOC/1,000 gal
Pressure Driven Losses	0.024 lbs VOC/1,000 gal
Phase II Fueling - Spillage	0.24 lbs VOC/1,000 gal
Hose Permeation (2017)	0.009 lbs VOC/1,000 gal

Area Source Emissions ⁽³⁾

Refueling ⁽⁴⁾	0.13 lbs VOC/1,000 gal
Refueling Emissions	1.59E-02 lbs/hr
	2.00E-03 g/s
Spillage ⁽⁵⁾	0.24 lbs VOC/1,000 gal
Spillage Emissions	2.85E-02 lbs/hr
	3.59E-03 g/s

Point Source Emissions ⁽⁶⁾

Transfer and Pressure Losses ⁽⁷⁾	0.17 lbs VOC/1,000 gal
Transfer and Pressure Emission	2.07E-02 lbs/hr
	2.60E-03 g/s

(1) Gasoline dispensed amount based on average annual gasoline dispensed between 2015 and 2019, provided by EKAPCD.

(2) Emission factors is based upon CARB's Revised Emission Factors for Gasoline Marketing Operations at California Gasoline Dispensing Facilities (CARB, 2013). TAC speciation: 0.3% benzene for transfer, pressure losses and refueling emissions; 1% benzene for spillage California Air Pollution Control Officers Association (CAPCOA) Gasoline Service Station Industrywide Risk Assessment Guidelines (CAPCOA, 1997).

(3) Fueling area modeled as area sources modeled as 50 ft long and 50 ft wide.

(4) Refueling emission include fueling non-ORVR and ORVR vehicles (74% of vehicles; CARB, 2013) and hose permeation (2017 emission rate). Release height 1 m (CAPCOA, 1997).

(5) Release height 0 m for spillage (CAPCOA, 1997).

(6) Point sources modeled as vertical stack with release height 12 feet, diameter 2 inches, temperature 60F, and exit velocity 0.01 m/s (CAPCOA, 1997).

(7) Transfer and pressure driven loss emissions modeling as a single vent pipe (CAPCOA, 1997).

Source
Minit Shop #349
843 E. Ridgecrest Boulevard
Ridgecrest, CA 93555
24 hours per day, 7 days per week



Chemical and Use Rate
Gasoline Dispensing: 1,037,012 gallons per year (throughput between 2015 and 2019)



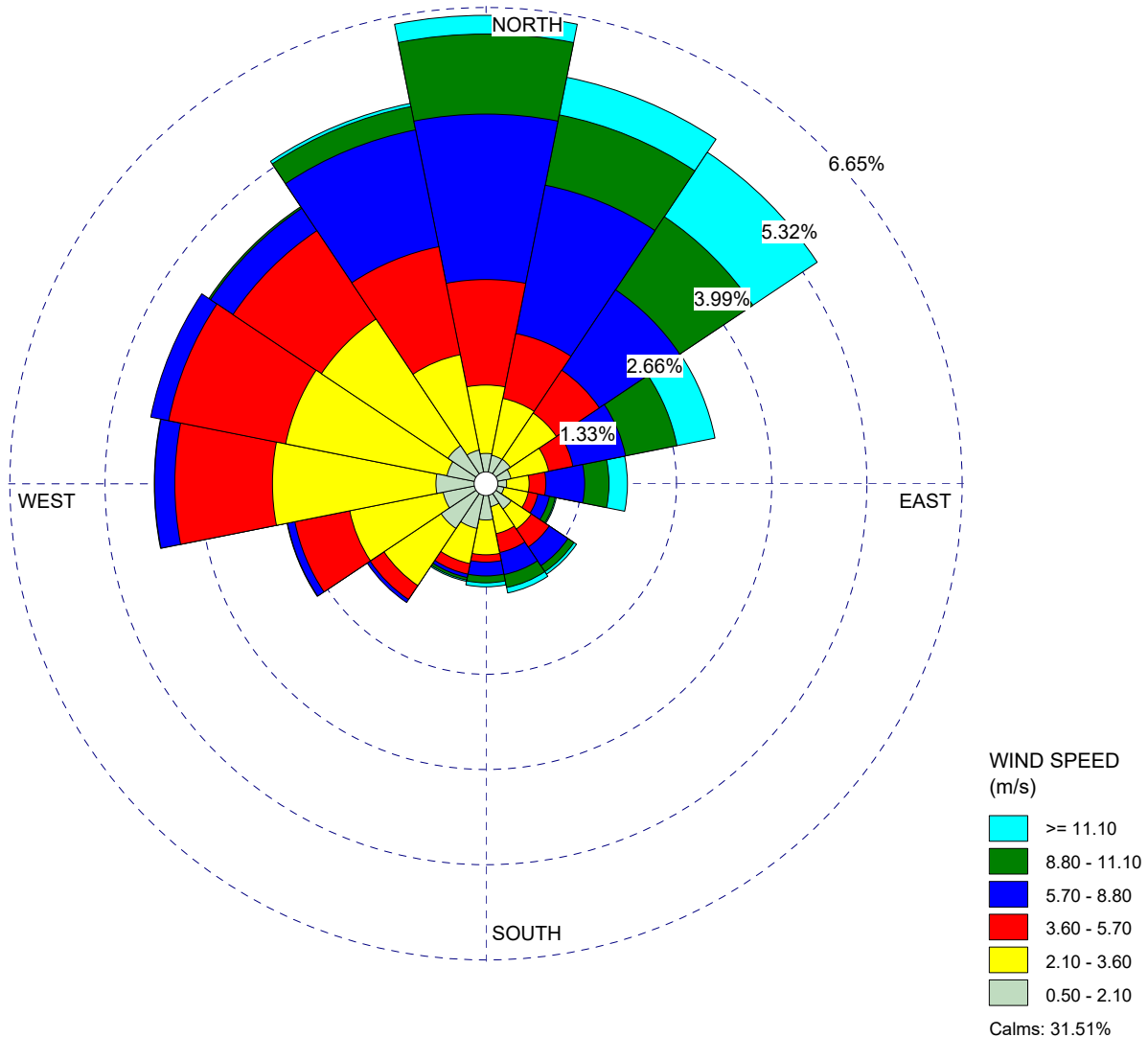
- Fueling area is based upon California Air Pollution Control Officers Association (CAPCOA) *Gasoline Service Station Industry-wide Risk Assessment Guidelines* (1997). Area source parameters: 50 ft x 50 ft area
- Area Source Modeling (Refueling and hose permeation): Release height of 1 m, and δz of 0.93 m are based upon CAPCOA guidance (1997).
- Area Source Modeling (Spillage): Release height of 0 m, and δz of 1.86 m are based upon CAPCOA guidance (1997).
- Point Source Modeling (Transfer and Pressure Driven Losses): Stack parameters based upon CAPCOA guidance (1997).

WIND ROSE PLOT:

China Lake Meteorological Station
2009-2013

DISPLAY:

Wind Speed
Flow Vector (blowing to)



COMMENTS:

School Hours (8AM-4PM)

DATA PERIOD:

Start Date: 1/1/2009 - 08:00
End Date: 1/2/2014 - 15:00

COMPANY NAME:

PlaceWorks

MODELER:

SB

CALM WINDS:

31.51%

TOTAL COUNT:

12535 hrs.

AVG. WIND SPEED:

3.23 m/s

DATE:

8/26/2020

PROJECT NO.:

SSSD-06

Appendix B – Air Dispersion Model Output

Results Summary

HRA for Richmond ES Replacement
Ridgecrest, CA

Concentration - Source Group: **ALL**

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	13.95410	ug/m^3	440980.88	3942293.18	689.72	0.00	689.72	1/4/2011, 9
PERIOD		0.14209	ug/m^3	440940.88	3942293.18	689.85	0.00	689.85	

Model Output

```
*** AERMOD - VERSION 19191 ***    *** HRA for Richmond ES Replacement    ***    08/31/20
*** AERMET - VERSION 14134 ***    *** Ridgecrest, CA                    ***    08:30:07
                                     ***    PAGE    1
```

```
*** MODELOPTs:    CONC    ELEV    RURAL
```

*** 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 RURAL Dispersion Only.
```

```
**Model Allows User-Specified 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. Option for Capped & Horiz Stacks Selected With:

```
        1 Capped Stack(s); and        0 Horizontal Stack(s)
```

```
**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:        3 Source(s);        1 Source Group(s); and        722 Receptor(s)
```

```
    with:        1 POINT(s), including
        1 POINTCAP(s) and        0 POINTHOR(s)
    and:        0 VOLUME source(s)
    and:        2 AREA type source(s)
    and:        0 LINE source(s)
    and:        0 RLINE/RLINEXT source(s)
    and:        0 OPENPIT source(s)
    and:        0 BUOYANT LINE source(s) with        0 line(s)
```

Model Output

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

**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) = 679.70 ; 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.

**Input Runstream File: aermod.inp

**Output Print File: aermod.out

**Detailed Error/Message File: RichmondES.err

**File for Summary of Results: RichmondES.sum

Model Output

```
*** AERMOD - VERSION 19191 *** *** HRA for Richmond ES Replacement *** 08/31/20
*** AERMET - VERSION 14134 *** *** Ridgecrest, CA *** 08:30:07
*** MODELOPTs: CONC ELEV RURAL PAGE 2
```

*** 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
3	0	0.26000E-02	440909.1	3942221.7	690.0	3.66	288.71	0.01	0.05	YES	NO	CAP	HRDOW

```
*** AERMOD - VERSION 19191 *** *** HRA for Richmond ES Replacement *** 08/31/20
*** AERMET - VERSION 14134 *** *** Ridgecrest, CA *** 08:30:07
*** MODELOPTs: CONC ELEV RURAL PAGE 3
```

*** AREA SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	COORD (SW CORNER) X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	X-DIM OF AREA (METERS)	Y-DIM OF AREA (METERS)	ORIENT. OF AREA (DEG.)	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
1	0	0.86111E-05	440911.7	3942224.3	690.0	1.00	15.24	15.24	0.00	0.00	NO	HRDOW
2	0	0.15457E-04	440911.7	3942224.3	690.0	0.00	15.24	15.24	0.00	0.00	NO	HRDOW

```
*** AERMOD - VERSION 19191 *** *** HRA for Richmond ES Replacement *** 08/31/20
*** AERMET - VERSION 14134 *** *** Ridgecrest, CA *** 08:30:07
*** MODELOPTs: CONC ELEV RURAL PAGE 4
```

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs
ALL	1, 3, 2,

Model Output

*** AERMOD - VERSION 19191 *** *** HRA for Richmond ES Replacement
 *** AERMET - VERSION 14134 *** *** Ridgecrest, CA

*** 08/31/20
 *** 08:30:07
 *** PAGE 5

*** MODELOPTs: CONC ELEV RURAL

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: 3

IFV	BH	BW	BL	XADJ	YADJ	IFV	BH	BW	BL	XADJ	YADJ
1	3.0,	25.1,	20.6,	-3.2,	11.2,	2	3.0,	26.9,	23.6,	-6.8,	12.3,
3	3.0,	28.0,	25.9,	-10.2,	13.0,	4	3.0,	28.1,	27.4,	-13.2,	13.2,
5	3.0,	27.4,	28.1,	-15.9,	13.1,	6	3.0,	25.9,	28.0,	-18.1,	12.6,
7	3.0,	23.6,	26.9,	-19.7,	11.7,	8	3.0,	20.6,	25.1,	-20.7,	10.5,
9	3.0,	16.9,	22.5,	-21.1,	8.9,	10	3.0,	20.6,	25.1,	-23.8,	7.0,
11	3.0,	23.6,	26.9,	-25.8,	5.0,	12	3.0,	25.9,	28.0,	-26.9,	2.8,
13	3.0,	27.4,	28.1,	-27.3,	0.5,	14	3.0,	28.1,	27.4,	-26.8,	-1.8,
15	3.0,	28.0,	25.9,	-25.6,	-4.1,	16	3.0,	26.9,	23.6,	-23.5,	-6.2,
17	3.0,	25.1,	20.6,	-20.7,	-8.2,	18	3.0,	22.5,	16.9,	-17.3,	-9.8,
19	3.0,	25.1,	20.6,	-17.3,	-11.2,	20	3.0,	26.9,	23.6,	-16.8,	-12.3,
21	3.0,	28.0,	25.9,	-15.7,	-13.0,	22	3.0,	28.1,	27.4,	-14.2,	-13.2,
23	3.0,	27.4,	28.1,	-12.2,	-13.1,	24	3.0,	25.9,	28.0,	-9.9,	-12.6,
25	3.0,	23.6,	26.9,	-7.3,	-11.7,	26	3.0,	20.6,	25.1,	-4.4,	-10.5,
27	3.0,	16.9,	22.5,	-1.4,	-8.9,	28	3.0,	20.6,	25.1,	-1.3,	-7.0,
29	3.0,	23.6,	26.9,	-1.2,	-5.0,	30	3.0,	25.9,	28.0,	-1.0,	-2.8,
31	3.0,	27.4,	28.1,	-0.8,	-0.5,	32	3.0,	28.1,	27.4,	-0.6,	1.8,
33	3.0,	28.0,	25.9,	-0.4,	4.1,	34	3.0,	26.9,	23.6,	-0.1,	6.2,
35	3.0,	25.1,	20.6,	0.2,	8.2,	36	3.0,	22.5,	16.9,	0.4,	9.8,

Model Output

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*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement   ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA                     ***   08:30:07
                                     PAGE 6

```

*** MODELOPTs: CONC ELEV RURAL

* SOURCE EMISSION RATE SCALARS WHICH VARY DIURNALLY AND BY DAY OF WEEK (HRDOW) *

```

SOURCE ID = 1 and 2           ; SOURCE TYPE = AREA      :
  HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR
-----
                                DAY OF WEEK = WEEKDAY
    1 .0000E+00   2 .0000E+00   3 .0000E+00   4 .0000E+00   5 .0000E+00   6 .0000E+00   7 .0000E+00   8 .0000E+00
    9 .1000E+01  10 .1000E+01  11 .1000E+01  12 .1000E+01  13 .1000E+01  14 .1000E+01  15 .1000E+01  16 .1000E+01
   17 .0000E+00  18 .0000E+00  19 .0000E+00  20 .0000E+00  21 .0000E+00  22 .0000E+00  23 .0000E+00  24 .0000E+00
                                DAY OF WEEK = SATURDAY
    1 .0000E+00   2 .0000E+00   3 .0000E+00   4 .0000E+00   5 .0000E+00   6 .0000E+00   7 .0000E+00   8 .0000E+00
    9 .0000E+00  10 .0000E+00  11 .0000E+00  12 .0000E+00  13 .0000E+00  14 .0000E+00  15 .0000E+00  16 .0000E+00
   17 .0000E+00  18 .0000E+00  19 .0000E+00  20 .0000E+00  21 .0000E+00  22 .0000E+00  23 .0000E+00  24 .0000E+00
                                DAY OF WEEK = SUNDAY
    1 .0000E+00   2 .0000E+00   3 .0000E+00   4 .0000E+00   5 .0000E+00   6 .0000E+00   7 .0000E+00   8 .0000E+00
    9 .0000E+00  10 .0000E+00  11 .0000E+00  12 .0000E+00  13 .0000E+00  14 .0000E+00  15 .0000E+00  16 .0000E+00
   17 .0000E+00  18 .0000E+00  19 .0000E+00  20 .0000E+00  21 .0000E+00  22 .0000E+00  23 .0000E+00  24 .0000E+00

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*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement   ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA                     ***   08:30:07
                                     PAGE 7

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*** MODELOPTs: CONC ELEV RURAL

* SOURCE EMISSION RATE SCALARS WHICH VARY DIURNALLY AND BY DAY OF WEEK (HRDOW) *

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SOURCE ID = 3           ; SOURCE TYPE = POINTCAP :
  HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR   HOUR   SCALAR
-----
                                DAY OF WEEK = WEEKDAY
    1 .0000E+00   2 .0000E+00   3 .0000E+00   4 .0000E+00   5 .0000E+00   6 .0000E+00   7 .0000E+00   8 .0000E+00
    9 .1000E+01  10 .1000E+01  11 .1000E+01  12 .1000E+01  13 .1000E+01  14 .1000E+01  15 .1000E+01  16 .1000E+01
   17 .0000E+00  18 .0000E+00  19 .0000E+00  20 .0000E+00  21 .0000E+00  22 .0000E+00  23 .0000E+00  24 .0000E+00
                                DAY OF WEEK = SATURDAY
    1 .0000E+00   2 .0000E+00   3 .0000E+00   4 .0000E+00   5 .0000E+00   6 .0000E+00   7 .0000E+00   8 .0000E+00
    9 .0000E+00  10 .0000E+00  11 .0000E+00  12 .0000E+00  13 .0000E+00  14 .0000E+00  15 .0000E+00  16 .0000E+00
   17 .0000E+00  18 .0000E+00  19 .0000E+00  20 .0000E+00  21 .0000E+00  22 .0000E+00  23 .0000E+00  24 .0000E+00
                                DAY OF WEEK = SUNDAY
    1 .0000E+00   2 .0000E+00   3 .0000E+00   4 .0000E+00   5 .0000E+00   6 .0000E+00   7 .0000E+00   8 .0000E+00
    9 .0000E+00  10 .0000E+00  11 .0000E+00  12 .0000E+00  13 .0000E+00  14 .0000E+00  15 .0000E+00  16 .0000E+00
   17 .0000E+00  18 .0000E+00  19 .0000E+00  20 .0000E+00  21 .0000E+00  22 .0000E+00  23 .0000E+00  24 .0000E+00

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Model Output

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*** AERMOD - VERSION 19191 ***    *** HRA for Richmond ES Replacement ***    08/31/20
*** AERMET - VERSION 14134 ***    *** Ridgecrest, CA ***                    08:30:07
                                     ***                                     PAGE 9

*** MODELOPTs:   CONC   ELEV   RURAL      *** DISCRETE CARTESIAN RECEPTORS ***
                                     (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                     (METERS)
( 440940.9, 3942293.2,    689.8,    689.8,    0.0); ( 440960.9, 3942293.2,    689.8,    689.8,    0.0);
( 440980.9, 3942293.2,    689.7,    689.7,    0.0); ( 441000.9, 3942293.2,    689.7,    689.7,    0.0);
( 441020.9, 3942293.2,    689.6,    689.6,    0.0); ( 441040.9, 3942293.2,    689.5,    689.5,    0.0);
( 441060.9, 3942293.2,    689.5,    689.5,    0.0); ( 441080.9, 3942293.2,    689.4,    689.4,    0.0);
( 441100.9, 3942293.2,    689.4,    689.4,    0.0); ( 441120.9, 3942293.2,    689.4,    689.4,    0.0);
( 441140.9, 3942293.2,    689.4,    689.4,    0.0); ( 441160.9, 3942293.2,    689.3,    689.3,    0.0);
( 441180.9, 3942293.2,    689.3,    689.3,    0.0); ( 441200.9, 3942293.2,    689.2,    689.2,    0.0);
( 441220.9, 3942293.2,    689.1,    689.1,    0.0); ( 441240.9, 3942293.2,    689.0,    689.0,    0.0);
( 441260.9, 3942293.2,    689.0,    689.0,    0.0); ( 441280.9, 3942293.2,    688.9,    688.9,    0.0);
( 441300.9, 3942293.2,    688.8,    688.8,    0.0); ( 440940.9, 3942313.2,    689.8,    689.8,    0.0);
( 440960.9, 3942313.2,    689.8,    689.8,    0.0); ( 440980.9, 3942313.2,    689.7,    689.7,    0.0);
( 441000.9, 3942313.2,    689.7,    689.7,    0.0); ( 441020.9, 3942313.2,    689.6,    689.6,    0.0);
( 441040.9, 3942313.2,    689.5,    689.5,    0.0); ( 441060.9, 3942313.2,    689.4,    689.4,    0.0);
( 441080.9, 3942313.2,    689.4,    689.4,    0.0); ( 441100.9, 3942313.2,    689.3,    689.3,    0.0);
( 441120.9, 3942313.2,    689.3,    689.3,    0.0); ( 441140.9, 3942313.2,    689.3,    689.3,    0.0);
( 441160.9, 3942313.2,    689.2,    689.2,    0.0); ( 441180.9, 3942313.2,    689.2,    689.2,    0.0);
( 441200.9, 3942313.2,    689.1,    689.1,    0.0); ( 441220.9, 3942313.2,    689.0,    689.0,    0.0);
( 441240.9, 3942313.2,    689.0,    689.0,    0.0); ( 441260.9, 3942313.2,    688.9,    688.9,    0.0);
( 441280.9, 3942313.2,    688.9,    688.9,    0.0); ( 441300.9, 3942313.2,    688.8,    688.8,    0.0);
( 440940.9, 3942333.2,    689.8,    689.8,    0.0); ( 440960.9, 3942333.2,    689.8,    689.8,    0.0);
( 440980.9, 3942333.2,    689.7,    689.7,    0.0); ( 441000.9, 3942333.2,    689.7,    689.7,    0.0);
( 441020.9, 3942333.2,    689.6,    689.6,    0.0); ( 441040.9, 3942333.2,    689.5,    689.5,    0.0);
( 441060.9, 3942333.2,    689.4,    689.4,    0.0); ( 441080.9, 3942333.2,    689.3,    689.3,    0.0);
( 441100.9, 3942333.2,    689.3,    689.3,    0.0); ( 441120.9, 3942333.2,    689.2,    689.2,    0.0);
( 441140.9, 3942333.2,    689.2,    689.2,    0.0); ( 441160.9, 3942333.2,    689.2,    689.2,    0.0);
( 441180.9, 3942333.2,    689.1,    689.1,    0.0); ( 441200.9, 3942333.2,    689.0,    689.0,    0.0);
( 441220.9, 3942333.2,    689.0,    689.0,    0.0); ( 441240.9, 3942333.2,    688.9,    688.9,    0.0);
( 441260.9, 3942333.2,    688.9,    688.9,    0.0); ( 441280.9, 3942333.2,    688.8,    688.8,    0.0);
( 441300.9, 3942333.2,    688.8,    688.8,    0.0); ( 440940.9, 3942353.2,    689.8,    689.8,    0.0);
( 440960.9, 3942353.2,    689.8,    689.8,    0.0); ( 440980.9, 3942353.2,    689.7,    689.7,    0.0);
( 441000.9, 3942353.2,    689.7,    689.7,    0.0); ( 441020.9, 3942353.2,    689.6,    689.6,    0.0);
( 441040.9, 3942353.2,    689.5,    689.5,    0.0); ( 441060.9, 3942353.2,    689.4,    689.4,    0.0);
( 441080.9, 3942353.2,    689.3,    689.3,    0.0); ( 441100.9, 3942353.2,    689.3,    689.3,    0.0);
( 441120.9, 3942353.2,    689.2,    689.2,    0.0); ( 441140.9, 3942353.2,    689.1,    689.1,    0.0);
( 441160.9, 3942353.2,    689.1,    689.1,    0.0); ( 441180.9, 3942353.2,    689.1,    689.1,    0.0);
( 441200.9, 3942353.2,    689.0,    689.0,    0.0); ( 441220.9, 3942353.2,    688.9,    688.9,    0.0);
( 441240.9, 3942353.2,    688.8,    688.8,    0.0); ( 441260.9, 3942353.2,    688.8,    688.8,    0.0);
( 441280.9, 3942353.2,    688.7,    688.7,    0.0); ( 441300.9, 3942353.2,    688.7,    688.7,    0.0);
( 440940.9, 3942373.2,    689.8,    689.8,    0.0); ( 440960.9, 3942373.2,    689.8,    689.8,    0.0);
( 440980.9, 3942373.2,    689.7,    689.7,    0.0); ( 441000.9, 3942373.2,    689.6,    689.6,    0.0);
( 441020.9, 3942373.2,    689.5,    689.5,    0.0); ( 441040.9, 3942373.2,    689.4,    689.4,    0.0);
( 441060.9, 3942373.2,    689.4,    689.4,    0.0); ( 441080.9, 3942373.2,    689.3,    689.3,    0.0);
( 441100.9, 3942373.2,    689.2,    689.2,    0.0); ( 441120.9, 3942373.2,    689.2,    689.2,    0.0);
( 441140.9, 3942373.2,    689.1,    689.1,    0.0); ( 441160.9, 3942373.2,    689.0,    689.0,    0.0);
( 441180.9, 3942373.2,    689.0,    689.0,    0.0); ( 441200.9, 3942373.2,    688.9,    688.9,    0.0);

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Model Output

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*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement   ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA                     ***   08:30:07
                                     *** DISCRETE CARTESIAN RECEPTORS ***
*** MODELOPTs:   CONC   ELEV   RURAL   (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                     (METERS)
( 441220.9, 3942373.2, 688.8, 688.8, 0.0); ( 441240.9, 3942373.2, 688.8, 688.8, 0.0);
( 441260.9, 3942373.2, 688.8, 688.8, 0.0); ( 441280.9, 3942373.2, 688.7, 688.7, 0.0);
( 441300.9, 3942373.2, 688.7, 688.7, 0.0); ( 440940.9, 3942393.2, 689.8, 689.8, 0.0);
( 440960.9, 3942393.2, 689.8, 689.8, 0.0); ( 440980.9, 3942393.2, 689.7, 689.7, 0.0);
( 441000.9, 3942393.2, 689.6, 689.6, 0.0); ( 441020.9, 3942393.2, 689.5, 689.5, 0.0);
( 441040.9, 3942393.2, 689.4, 689.4, 0.0); ( 441060.9, 3942393.2, 689.3, 689.3, 0.0);
( 441080.9, 3942393.2, 689.3, 689.3, 0.0); ( 441100.9, 3942393.2, 689.2, 689.2, 0.0);
( 441120.9, 3942393.2, 689.1, 689.1, 0.0); ( 441140.9, 3942393.2, 689.0, 689.0, 0.0);
( 441160.9, 3942393.2, 689.0, 689.0, 0.0); ( 441180.9, 3942393.2, 688.9, 688.9, 0.0);
( 441200.9, 3942393.2, 688.9, 688.9, 0.0); ( 441220.9, 3942393.2, 688.8, 688.8, 0.0);
( 441240.9, 3942393.2, 688.7, 688.7, 0.0); ( 441260.9, 3942393.2, 688.7, 688.7, 0.0);
( 441280.9, 3942393.2, 688.6, 688.6, 0.0); ( 441300.9, 3942393.2, 688.6, 688.6, 0.0);
( 440940.9, 3942413.2, 689.8, 689.8, 0.0); ( 440960.9, 3942413.2, 689.7, 689.7, 0.0);
( 440980.9, 3942413.2, 689.7, 689.7, 0.0); ( 441000.9, 3942413.2, 689.6, 689.6, 0.0);
( 441020.9, 3942413.2, 689.5, 689.5, 0.0); ( 441040.9, 3942413.2, 689.3, 689.3, 0.0);
( 441060.9, 3942413.2, 689.3, 689.3, 0.0); ( 441080.9, 3942413.2, 689.2, 689.2, 0.0);
( 441100.9, 3942413.2, 689.2, 689.2, 0.0); ( 441120.9, 3942413.2, 689.1, 689.1, 0.0);
( 441140.9, 3942413.2, 689.0, 689.0, 0.0); ( 441160.9, 3942413.2, 688.9, 688.9, 0.0);
( 441180.9, 3942413.2, 688.9, 688.9, 0.0); ( 441200.9, 3942413.2, 688.9, 688.9, 0.0);
( 441220.9, 3942413.2, 688.7, 688.7, 0.0); ( 441240.9, 3942413.2, 688.6, 688.6, 0.0);
( 441260.9, 3942413.2, 688.6, 688.6, 0.0); ( 441280.9, 3942413.2, 688.6, 688.6, 0.0);
( 441300.9, 3942413.2, 688.5, 688.5, 0.0); ( 440940.9, 3942433.2, 689.7, 689.7, 0.0);
( 440960.9, 3942433.2, 689.7, 689.7, 0.0); ( 440980.9, 3942433.2, 689.6, 689.6, 0.0);
( 441000.9, 3942433.2, 689.5, 689.5, 0.0); ( 441020.9, 3942433.2, 689.4, 689.4, 0.0);
( 441040.9, 3942433.2, 689.3, 689.3, 0.0); ( 441060.9, 3942433.2, 689.2, 689.2, 0.0);
( 441080.9, 3942433.2, 689.2, 689.2, 0.0); ( 441100.9, 3942433.2, 689.1, 689.1, 0.0);
( 441120.9, 3942433.2, 689.0, 689.0, 0.0); ( 441140.9, 3942433.2, 688.9, 688.9, 0.0);
( 441160.9, 3942433.2, 688.8, 688.8, 0.0); ( 441180.9, 3942433.2, 688.8, 688.8, 0.0);
( 441200.9, 3942433.2, 688.8, 688.8, 0.0); ( 441220.9, 3942433.2, 688.7, 688.7, 0.0);
( 441240.9, 3942433.2, 688.6, 688.6, 0.0); ( 441260.9, 3942433.2, 688.6, 688.6, 0.0);
( 441280.9, 3942433.2, 688.5, 688.5, 0.0); ( 441300.9, 3942433.2, 688.5, 688.5, 0.0);
( 440940.9, 3942453.2, 689.7, 689.7, 0.0); ( 440960.9, 3942453.2, 689.6, 689.6, 0.0);
( 440980.9, 3942453.2, 689.6, 689.6, 0.0); ( 441000.9, 3942453.2, 689.4, 689.4, 0.0);
( 441020.9, 3942453.2, 689.4, 689.4, 0.0); ( 441040.9, 3942453.2, 689.3, 689.3, 0.0);
( 441060.9, 3942453.2, 689.2, 689.2, 0.0); ( 441080.9, 3942453.2, 689.1, 689.1, 0.0);
( 441100.9, 3942453.2, 689.0, 689.0, 0.0); ( 441120.9, 3942453.2, 688.9, 688.9, 0.0);
( 441140.9, 3942453.2, 688.8, 688.8, 0.0); ( 441160.9, 3942453.2, 688.7, 688.7, 0.0);
( 441180.9, 3942453.2, 688.7, 688.7, 0.0); ( 441200.9, 3942453.2, 688.7, 688.7, 0.0);
( 441220.9, 3942453.2, 688.6, 688.6, 0.0); ( 441240.9, 3942453.2, 688.5, 688.5, 0.0);
( 441260.9, 3942453.2, 688.5, 688.5, 0.0); ( 441280.9, 3942453.2, 688.4, 688.4, 0.0);
( 441300.9, 3942453.2, 688.4, 688.4, 0.0); ( 440940.9, 3942473.2, 689.7, 689.7, 0.0);
( 440960.9, 3942473.2, 689.6, 689.6, 0.0); ( 440980.9, 3942473.2, 689.5, 689.5, 0.0);
( 441000.9, 3942473.2, 689.4, 689.4, 0.0); ( 441020.9, 3942473.2, 689.3, 689.3, 0.0);
( 441040.9, 3942473.2, 689.2, 689.2, 0.0); ( 441060.9, 3942473.2, 689.1, 689.1, 0.0);
( 441080.9, 3942473.2, 689.1, 689.1, 0.0); ( 441100.9, 3942473.2, 689.0, 689.0, 0.0);

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Model Output

```

*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement   ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA                     ***   08:30:07
                                     *** DISCRETE CARTESIAN RECEPTORS ***
                                     (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                     (METERS)
( 441120.9, 3942473.2, 688.9, 688.9, 0.0); ( 441140.9, 3942473.2, 688.8, 688.8, 0.0);
( 441160.9, 3942473.2, 688.7, 688.7, 0.0); ( 441180.9, 3942473.2, 688.6, 688.6, 0.0);
( 441200.9, 3942473.2, 688.6, 688.6, 0.0); ( 441220.9, 3942473.2, 688.5, 688.5, 0.0);
( 441240.9, 3942473.2, 688.5, 688.5, 0.0); ( 441260.9, 3942473.2, 688.5, 688.5, 0.0);
( 441280.9, 3942473.2, 688.4, 688.4, 0.0); ( 441300.9, 3942473.2, 688.4, 688.4, 0.0);
( 440940.9, 3942493.2, 689.6, 689.6, 0.0); ( 440960.9, 3942493.2, 689.6, 689.6, 0.0);
( 440980.9, 3942493.2, 689.4, 689.4, 0.0); ( 441000.9, 3942493.2, 689.3, 689.3, 0.0);
( 441020.9, 3942493.2, 689.2, 689.2, 0.0); ( 441040.9, 3942493.2, 689.2, 689.2, 0.0);
( 441060.9, 3942493.2, 689.1, 689.1, 0.0); ( 441080.9, 3942493.2, 689.0, 689.0, 0.0);
( 441100.9, 3942493.2, 688.9, 688.9, 0.0); ( 441120.9, 3942493.2, 688.8, 688.8, 0.0);
( 441140.9, 3942493.2, 688.7, 688.7, 0.0); ( 441160.9, 3942493.2, 688.6, 688.6, 0.0);
( 441180.9, 3942493.2, 688.5, 688.5, 0.0); ( 441200.9, 3942493.2, 688.5, 688.5, 0.0);
( 441220.9, 3942493.2, 688.4, 688.4, 0.0); ( 441240.9, 3942493.2, 688.4, 688.4, 0.0);
( 441260.9, 3942493.2, 688.4, 688.4, 0.0); ( 441280.9, 3942493.2, 688.3, 688.3, 0.0);
( 441300.9, 3942493.2, 688.3, 688.3, 0.0); ( 440940.9, 3942513.2, 689.6, 689.6, 0.0);
( 440960.9, 3942513.2, 689.5, 689.5, 0.0); ( 440980.9, 3942513.2, 689.4, 689.4, 0.0);
( 441000.9, 3942513.2, 689.2, 689.2, 0.0); ( 441020.9, 3942513.2, 689.1, 689.1, 0.0);
( 441040.9, 3942513.2, 689.1, 689.1, 0.0); ( 441060.9, 3942513.2, 689.1, 689.1, 0.0);
( 441080.9, 3942513.2, 688.9, 688.9, 0.0); ( 441100.9, 3942513.2, 688.8, 688.8, 0.0);
( 441120.9, 3942513.2, 688.8, 688.8, 0.0); ( 441140.9, 3942513.2, 688.6, 688.6, 0.0);
( 441160.9, 3942513.2, 688.5, 688.5, 0.0); ( 441180.9, 3942513.2, 688.5, 688.5, 0.0);
( 441200.9, 3942513.2, 688.4, 688.4, 0.0); ( 441220.9, 3942513.2, 688.3, 688.3, 0.0);
( 441240.9, 3942513.2, 688.3, 688.3, 0.0); ( 441260.9, 3942513.2, 688.4, 688.4, 0.0);
( 441280.9, 3942513.2, 688.3, 688.3, 0.0); ( 441300.9, 3942513.2, 688.3, 688.3, 0.0);
( 440940.9, 3942533.2, 689.5, 689.5, 0.0); ( 440960.9, 3942533.2, 689.4, 689.4, 0.0);
( 440980.9, 3942533.2, 689.3, 689.3, 0.0); ( 441000.9, 3942533.2, 689.2, 689.2, 0.0);
( 441020.9, 3942533.2, 689.1, 689.1, 0.0); ( 441040.9, 3942533.2, 689.0, 689.0, 0.0);
( 441060.9, 3942533.2, 689.0, 689.0, 0.0); ( 441080.9, 3942533.2, 688.8, 688.8, 0.0);
( 441100.9, 3942533.2, 688.7, 688.7, 0.0); ( 441120.9, 3942533.2, 688.7, 688.7, 0.0);
( 441140.9, 3942533.2, 688.6, 688.6, 0.0); ( 441160.9, 3942533.2, 688.5, 688.5, 0.0);
( 441180.9, 3942533.2, 688.4, 688.4, 0.0); ( 441200.9, 3942533.2, 688.4, 688.4, 0.0);
( 441220.9, 3942533.2, 688.3, 688.3, 0.0); ( 441240.9, 3942533.2, 688.3, 688.3, 0.0);
( 441260.9, 3942533.2, 688.2, 688.2, 0.0); ( 441280.9, 3942533.2, 688.2, 688.2, 0.0);
( 441300.9, 3942533.2, 688.2, 688.2, 0.0); ( 440940.9, 3942553.2, 689.4, 689.4, 0.0);
( 440960.9, 3942553.2, 689.3, 689.3, 0.0); ( 440980.9, 3942553.2, 689.2, 689.2, 0.0);
( 441000.9, 3942553.2, 689.2, 689.2, 0.0); ( 441020.9, 3942553.2, 689.0, 689.0, 0.0);
( 441040.9, 3942553.2, 689.0, 689.0, 0.0); ( 441060.9, 3942553.2, 688.9, 688.9, 0.0);
( 441080.9, 3942553.2, 688.8, 688.8, 0.0); ( 441100.9, 3942553.2, 688.6, 688.6, 0.0);
( 441120.9, 3942553.2, 688.6, 688.6, 0.0); ( 441140.9, 3942553.2, 688.5, 688.5, 0.0);
( 441160.9, 3942553.2, 688.4, 688.4, 0.0); ( 441180.9, 3942553.2, 688.4, 688.4, 0.0);
( 441200.9, 3942553.2, 688.3, 688.3, 0.0); ( 441220.9, 3942553.2, 688.2, 688.2, 0.0);
( 441240.9, 3942553.2, 688.2, 688.2, 0.0); ( 441260.9, 3942553.2, 688.2, 688.2, 0.0);
( 441280.9, 3942553.2, 688.1, 688.1, 0.0); ( 441300.9, 3942553.2, 688.1, 688.1, 0.0);
( 440940.9, 3942573.2, 689.3, 689.3, 0.0); ( 440960.9, 3942573.2, 689.2, 689.2, 0.0);
( 440980.9, 3942573.2, 689.1, 689.1, 0.0); ( 441000.9, 3942573.2, 689.1, 689.1, 0.0);

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Model Output

```

*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA ***   08:30:07
                                     PAGE 12

*** MODELOPTs:   CONC   ELEV   RURAL   *** DISCRETE CARTESIAN RECEPTORS ***
                                     (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                     (METERS)
( 441020.9, 3942573.2,   689.0,   689.0,   0.0); ( 441040.9, 3942573.2,   688.9,   688.9,   0.0);
( 441060.9, 3942573.2,   688.8,   688.8,   0.0); ( 441080.9, 3942573.2,   688.7,   688.7,   0.0);
( 441100.9, 3942573.2,   688.6,   688.6,   0.0); ( 441120.9, 3942573.2,   688.5,   688.5,   0.0);
( 441140.9, 3942573.2,   688.4,   688.4,   0.0); ( 441160.9, 3942573.2,   688.4,   688.4,   0.0);
( 441180.9, 3942573.2,   688.3,   688.3,   0.0); ( 441200.9, 3942573.2,   688.3,   688.3,   0.0);
( 441220.9, 3942573.2,   688.2,   688.2,   0.0); ( 441240.9, 3942573.2,   688.1,   688.1,   0.0);
( 441260.9, 3942573.2,   688.1,   688.1,   0.0); ( 441280.9, 3942573.2,   688.1,   688.1,   0.0);
( 441300.9, 3942573.2,   688.1,   688.1,   0.0); ( 440940.9, 3942593.2,   689.2,   689.2,   0.0);
( 440960.9, 3942593.2,   689.1,   689.1,   0.0); ( 440980.9, 3942593.2,   689.0,   689.0,   0.0);
( 441000.9, 3942593.2,   689.0,   689.0,   0.0); ( 441020.9, 3942593.2,   688.9,   688.9,   0.0);
( 441040.9, 3942593.2,   688.8,   688.8,   0.0); ( 441060.9, 3942593.2,   688.7,   688.7,   0.0);
( 441080.9, 3942593.2,   688.6,   688.6,   0.0); ( 441100.9, 3942593.2,   688.5,   688.5,   0.0);
( 441120.9, 3942593.2,   688.4,   688.4,   0.0); ( 441140.9, 3942593.2,   688.3,   688.3,   0.0);
( 441160.9, 3942593.2,   688.3,   688.3,   0.0); ( 441180.9, 3942593.2,   688.3,   688.3,   0.0);
( 441200.9, 3942593.2,   688.2,   688.2,   0.0); ( 441220.9, 3942593.2,   688.2,   688.2,   0.0);
( 441240.9, 3942593.2,   688.1,   688.1,   0.0); ( 441260.9, 3942593.2,   688.1,   688.1,   0.0);
( 441280.9, 3942593.2,   688.1,   688.1,   0.0); ( 441300.9, 3942593.2,   688.0,   688.0,   0.0);
( 440940.9, 3942613.2,   689.1,   689.1,   0.0); ( 440960.9, 3942613.2,   689.0,   689.0,   0.0);
( 440980.9, 3942613.2,   688.9,   688.9,   0.0); ( 441000.9, 3942613.2,   688.9,   688.9,   0.0);
( 441020.9, 3942613.2,   688.8,   688.8,   0.0); ( 441040.9, 3942613.2,   688.7,   688.7,   0.0);
( 441060.9, 3942613.2,   688.6,   688.6,   0.0); ( 441080.9, 3942613.2,   688.5,   688.5,   0.0);
( 441100.9, 3942613.2,   688.4,   688.4,   0.0); ( 441120.9, 3942613.2,   688.3,   688.3,   0.0);
( 441140.9, 3942613.2,   688.2,   688.2,   0.0); ( 441160.9, 3942613.2,   688.2,   688.2,   0.0);
( 441180.9, 3942613.2,   688.2,   688.2,   0.0); ( 441200.9, 3942613.2,   688.2,   688.2,   0.0);
( 441220.9, 3942613.2,   688.1,   688.1,   0.0); ( 441240.9, 3942613.2,   688.1,   688.1,   0.0);
( 441260.9, 3942613.2,   688.1,   688.1,   0.0); ( 441280.9, 3942613.2,   688.0,   688.0,   0.0);
( 441300.9, 3942613.2,   688.0,   688.0,   0.0); ( 440940.9, 3942633.2,   689.0,   689.0,   0.0);
( 440960.9, 3942633.2,   688.9,   688.9,   0.0); ( 440980.9, 3942633.2,   688.8,   688.8,   0.0);
( 441000.9, 3942633.2,   688.7,   688.7,   0.0); ( 441020.9, 3942633.2,   688.6,   688.6,   0.0);
( 441040.9, 3942633.2,   688.6,   688.6,   0.0); ( 441060.9, 3942633.2,   688.5,   688.5,   0.0);
( 441080.9, 3942633.2,   688.5,   688.5,   0.0); ( 441100.9, 3942633.2,   688.4,   688.4,   0.0);
( 441120.9, 3942633.2,   688.3,   688.3,   0.0); ( 441140.9, 3942633.2,   688.2,   688.2,   0.0);
( 441160.9, 3942633.2,   688.1,   688.1,   0.0); ( 441180.9, 3942633.2,   688.2,   688.2,   0.0);
( 441200.9, 3942633.2,   688.2,   688.2,   0.0); ( 441220.9, 3942633.2,   688.1,   688.1,   0.0);
( 441240.9, 3942633.2,   688.1,   688.1,   0.0); ( 441260.9, 3942633.2,   688.0,   688.0,   0.0);
( 441280.9, 3942633.2,   688.0,   688.0,   0.0); ( 441300.9, 3942633.2,   688.0,   688.0,   0.0);
( 440940.9, 3942653.2,   688.8,   688.8,   0.0); ( 440960.9, 3942653.2,   688.8,   688.8,   0.0);
( 440980.9, 3942653.2,   688.7,   688.7,   0.0); ( 441000.9, 3942653.2,   688.6,   688.6,   0.0);
( 441020.9, 3942653.2,   688.5,   688.5,   0.0); ( 441040.9, 3942653.2,   688.5,   688.5,   0.0);
( 441060.9, 3942653.2,   688.5,   688.5,   0.0); ( 441080.9, 3942653.2,   688.4,   688.4,   0.0);
( 441100.9, 3942653.2,   688.3,   688.3,   0.0); ( 441120.9, 3942653.2,   688.2,   688.2,   0.0);
( 441140.9, 3942653.2,   688.1,   688.1,   0.0); ( 441160.9, 3942653.2,   688.1,   688.1,   0.0);
( 441180.9, 3942653.2,   688.1,   688.1,   0.0); ( 441200.9, 3942653.2,   688.1,   688.1,   0.0);
( 441220.9, 3942653.2,   688.1,   688.1,   0.0); ( 441240.9, 3942653.2,   688.1,   688.1,   0.0);
( 441260.9, 3942653.2,   688.0,   688.0,   0.0); ( 441280.9, 3942653.2,   688.0,   688.0,   0.0);

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Model Output

```

*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement   ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA                     ***   08:30:07
                                     *** DISCRETE CARTESIAN RECEPTORS ***
                                     (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                     (METERS)
( 441300.9, 3942653.2, 688.0, 688.0, 0.0); ( 440940.9, 3942673.2, 688.7, 688.7, 0.0);
( 440960.9, 3942673.2, 688.6, 688.6, 0.0); ( 440980.9, 3942673.2, 688.5, 688.5, 0.0);
( 441000.9, 3942673.2, 688.4, 688.4, 0.0); ( 441020.9, 3942673.2, 688.4, 688.4, 0.0);
( 441040.9, 3942673.2, 688.3, 688.3, 0.0); ( 441060.9, 3942673.2, 688.3, 688.3, 0.0);
( 441080.9, 3942673.2, 688.3, 688.3, 0.0); ( 441100.9, 3942673.2, 688.3, 688.3, 0.0);
( 441120.9, 3942673.2, 688.2, 688.2, 0.0); ( 441140.9, 3942673.2, 688.1, 688.1, 0.0);
( 441160.9, 3942673.2, 688.1, 688.1, 0.0); ( 441180.9, 3942673.2, 688.1, 688.1, 0.0);
( 441200.9, 3942673.2, 688.1, 688.1, 0.0); ( 441220.9, 3942673.2, 688.1, 688.1, 0.0);
( 441240.9, 3942673.2, 688.1, 688.1, 0.0); ( 441260.9, 3942673.2, 688.1, 688.1, 0.0);
( 441280.9, 3942673.2, 688.0, 688.0, 0.0); ( 441300.9, 3942673.2, 688.0, 688.0, 0.0);
( 440940.9, 3942693.2, 688.6, 688.6, 0.0); ( 440960.9, 3942693.2, 688.5, 688.5, 0.0);
( 440980.9, 3942693.2, 688.4, 688.4, 0.0); ( 441000.9, 3942693.2, 688.3, 688.3, 0.0);
( 441020.9, 3942693.2, 688.2, 688.2, 0.0); ( 441040.9, 3942693.2, 688.2, 688.2, 0.0);
( 441060.9, 3942693.2, 688.2, 688.2, 0.0); ( 441080.9, 3942693.2, 688.3, 688.3, 0.0);
( 441100.9, 3942693.2, 688.2, 688.2, 0.0); ( 441120.9, 3942693.2, 688.1, 688.1, 0.0);
( 441140.9, 3942693.2, 688.1, 688.1, 0.0); ( 441160.9, 3942693.2, 688.1, 688.1, 0.0);
( 441180.9, 3942693.2, 688.1, 688.1, 0.0); ( 441200.9, 3942693.2, 688.1, 688.1, 0.0);
( 441220.9, 3942693.2, 688.1, 688.1, 0.0); ( 441240.9, 3942693.2, 688.1, 688.1, 0.0);
( 441260.9, 3942693.2, 688.1, 688.1, 0.0); ( 441280.9, 3942693.2, 688.0, 688.0, 0.0);
( 441300.9, 3942693.2, 688.0, 688.0, 0.0); ( 440940.9, 3942713.2, 688.6, 688.6, 0.0);
( 440960.9, 3942713.2, 688.5, 688.5, 0.0); ( 440980.9, 3942713.2, 688.3, 688.3, 0.0);
( 441000.9, 3942713.2, 688.2, 688.2, 0.0); ( 441020.9, 3942713.2, 688.1, 688.1, 0.0);
( 441040.9, 3942713.2, 688.1, 688.1, 0.0); ( 441060.9, 3942713.2, 688.1, 688.1, 0.0);
( 441080.9, 3942713.2, 688.1, 688.1, 0.0); ( 441100.9, 3942713.2, 688.1, 688.1, 0.0);
( 441120.9, 3942713.2, 688.1, 688.1, 0.0); ( 441140.9, 3942713.2, 688.0, 688.0, 0.0);
( 441160.9, 3942713.2, 688.0, 688.0, 0.0); ( 441180.9, 3942713.2, 688.0, 688.0, 0.0);
( 441200.9, 3942713.2, 688.1, 688.1, 0.0); ( 441220.9, 3942713.2, 688.1, 688.1, 0.0);
( 441240.9, 3942713.2, 688.1, 688.1, 0.0); ( 441260.9, 3942713.2, 688.1, 688.1, 0.0);
( 441280.9, 3942713.2, 688.0, 688.0, 0.0); ( 441300.9, 3942713.2, 688.0, 688.0, 0.0);
( 440940.9, 3942733.2, 688.5, 688.5, 0.0); ( 440960.9, 3942733.2, 688.4, 688.4, 0.0);
( 440980.9, 3942733.2, 688.3, 688.3, 0.0); ( 441000.9, 3942733.2, 688.1, 688.1, 0.0);
( 441020.9, 3942733.2, 688.1, 688.1, 0.0); ( 441040.9, 3942733.2, 688.0, 688.0, 0.0);
( 441060.9, 3942733.2, 688.0, 688.0, 0.0); ( 441080.9, 3942733.2, 688.0, 688.0, 0.0);
( 441100.9, 3942733.2, 688.1, 688.1, 0.0); ( 441120.9, 3942733.2, 688.0, 688.0, 0.0);
( 441140.9, 3942733.2, 688.0, 688.0, 0.0); ( 441160.9, 3942733.2, 688.0, 688.0, 0.0);
( 441180.9, 3942733.2, 688.0, 688.0, 0.0); ( 441200.9, 3942733.2, 688.0, 688.0, 0.0);
( 441220.9, 3942733.2, 688.1, 688.1, 0.0); ( 441240.9, 3942733.2, 688.1, 688.1, 0.0);
( 441260.9, 3942733.2, 688.1, 688.1, 0.0); ( 441280.9, 3942733.2, 688.0, 688.0, 0.0);
( 441300.9, 3942733.2, 688.0, 688.0, 0.0); ( 440940.9, 3942753.2, 688.4, 688.4, 0.0);
( 440960.9, 3942753.2, 688.3, 688.3, 0.0); ( 440980.9, 3942753.2, 688.2, 688.2, 0.0);
( 441000.9, 3942753.2, 688.1, 688.1, 0.0); ( 441020.9, 3942753.2, 688.0, 688.0, 0.0);
( 441040.9, 3942753.2, 688.0, 688.0, 0.0); ( 441060.9, 3942753.2, 688.0, 688.0, 0.0);
( 441080.9, 3942753.2, 688.0, 688.0, 0.0); ( 441100.9, 3942753.2, 688.0, 688.0, 0.0);
( 441120.9, 3942753.2, 688.0, 688.0, 0.0); ( 441140.9, 3942753.2, 688.0, 688.0, 0.0);
( 441160.9, 3942753.2, 688.0, 688.0, 0.0); ( 441180.9, 3942753.2, 687.9, 687.9, 0.0);

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Model Output

```

*** AERMOD - VERSION 19191 ***    *** HRA for Richmond ES Replacement          ***    08/31/20
*** AERMET - VERSION 14134 ***    *** Ridgecrest, CA                        ***    08:30:07
                                     ***    PAGE 14

*** MODELOPTs:   CONC   ELEV   RURAL    *** DISCRETE CARTESIAN RECEPTORS ***
                                     (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                     (METERS)
( 441200.9, 3942753.2,    688.0,    688.0,    0.0); ( 441220.9, 3942753.2,    688.0,    688.0,    0.0);
( 441240.9, 3942753.2,    688.1,    688.1,    0.0); ( 441260.9, 3942753.2,    688.1,    688.1,    0.0);
( 441280.9, 3942753.2,    688.1,    688.1,    0.0); ( 441300.9, 3942753.2,    688.0,    688.0,    0.0);
( 440940.9, 3942773.2,    688.4,    688.4,    0.0); ( 440960.9, 3942773.2,    688.3,    688.3,    0.0);
( 440980.9, 3942773.2,    688.1,    688.1,    0.0); ( 441000.9, 3942773.2,    688.1,    688.1,    0.0);
( 441020.9, 3942773.2,    688.0,    688.0,    0.0); ( 441040.9, 3942773.2,    688.0,    688.0,    0.0);
( 441060.9, 3942773.2,    687.9,    687.9,    0.0); ( 441080.9, 3942773.2,    687.9,    687.9,    0.0);
( 441100.9, 3942773.2,    687.9,    687.9,    0.0); ( 441120.9, 3942773.2,    687.9,    687.9,    0.0);
( 441140.9, 3942773.2,    687.9,    687.9,    0.0); ( 441160.9, 3942773.2,    687.9,    687.9,    0.0);
( 441180.9, 3942773.2,    687.9,    687.9,    0.0); ( 441200.9, 3942773.2,    688.0,    688.0,    0.0);
( 441220.9, 3942773.2,    688.1,    688.1,    0.0); ( 441240.9, 3942773.2,    688.1,    688.1,    0.0);
( 441260.9, 3942773.2,    688.1,    688.1,    0.0); ( 441280.9, 3942773.2,    688.1,    688.1,    0.0);
( 441300.9, 3942773.2,    688.0,    688.0,    0.0); ( 440940.9, 3942793.2,    688.4,    688.4,    0.0);
( 440960.9, 3942793.2,    688.3,    688.3,    0.0); ( 440980.9, 3942793.2,    688.1,    688.1,    0.0);
( 441000.9, 3942793.2,    688.1,    688.1,    0.0); ( 441020.9, 3942793.2,    688.0,    688.0,    0.0);
( 441040.9, 3942793.2,    688.0,    688.0,    0.0); ( 441060.9, 3942793.2,    687.9,    687.9,    0.0);
( 441080.9, 3942793.2,    687.9,    687.9,    0.0); ( 441100.9, 3942793.2,    687.9,    687.9,    0.0);
( 441120.9, 3942793.2,    687.9,    687.9,    0.0); ( 441140.9, 3942793.2,    687.9,    687.9,    0.0);
( 441160.9, 3942793.2,    687.9,    687.9,    0.0); ( 441180.9, 3942793.2,    687.9,    687.9,    0.0);
( 441200.9, 3942793.2,    688.0,    688.0,    0.0); ( 441220.9, 3942793.2,    688.1,    688.1,    0.0);
( 441240.9, 3942793.2,    688.1,    688.1,    0.0); ( 441260.9, 3942793.2,    688.1,    688.1,    0.0);
( 441280.9, 3942793.2,    688.1,    688.1,    0.0); ( 441300.9, 3942793.2,    687.9,    687.9,    0.0);
( 440940.9, 3942813.2,    688.4,    688.4,    0.0); ( 440960.9, 3942813.2,    688.3,    688.3,    0.0);
( 440980.9, 3942813.2,    688.2,    688.2,    0.0); ( 441000.9, 3942813.2,    688.1,    688.1,    0.0);
( 441020.9, 3942813.2,    688.0,    688.0,    0.0); ( 441040.9, 3942813.2,    687.9,    687.9,    0.0);
( 441060.9, 3942813.2,    687.9,    687.9,    0.0); ( 441080.9, 3942813.2,    687.8,    687.8,    0.0);
( 441100.9, 3942813.2,    687.8,    687.8,    0.0); ( 441120.9, 3942813.2,    687.8,    687.8,    0.0);
( 441140.9, 3942813.2,    687.8,    687.8,    0.0); ( 441160.9, 3942813.2,    687.8,    687.8,    0.0);
( 441180.9, 3942813.2,    687.8,    687.8,    0.0); ( 441200.9, 3942813.2,    687.9,    687.9,    0.0);
( 441220.9, 3942813.2,    688.1,    688.1,    0.0); ( 441240.9, 3942813.2,    688.1,    688.1,    0.0);
( 441260.9, 3942813.2,    688.1,    688.1,    0.0); ( 441280.9, 3942813.2,    688.0,    688.0,    0.0);
( 441300.9, 3942813.2,    687.9,    687.9,    0.0); ( 440940.9, 3942833.2,    688.3,    688.3,    0.0);
( 440960.9, 3942833.2,    688.2,    688.2,    0.0); ( 440980.9, 3942833.2,    688.1,    688.1,    0.0);
( 441000.9, 3942833.2,    688.1,    688.1,    0.0); ( 441020.9, 3942833.2,    688.0,    688.0,    0.0);
( 441040.9, 3942833.2,    687.9,    687.9,    0.0); ( 441060.9, 3942833.2,    687.9,    687.9,    0.0);
( 441080.9, 3942833.2,    687.8,    687.8,    0.0); ( 441100.9, 3942833.2,    687.8,    687.8,    0.0);
( 441120.9, 3942833.2,    687.8,    687.8,    0.0); ( 441140.9, 3942833.2,    687.7,    687.7,    0.0);
( 441160.9, 3942833.2,    687.8,    687.8,    0.0); ( 441180.9, 3942833.2,    687.8,    687.8,    0.0);
( 441200.9, 3942833.2,    687.9,    687.9,    0.0); ( 441220.9, 3942833.2,    688.0,    688.0,    0.0);
( 441240.9, 3942833.2,    688.0,    688.0,    0.0); ( 441260.9, 3942833.2,    688.0,    688.0,    0.0);
( 441280.9, 3942833.2,    688.0,    688.0,    0.0); ( 441300.9, 3942833.2,    687.9,    687.9,    0.0);
( 440940.9, 3942853.2,    688.2,    688.2,    0.0); ( 440960.9, 3942853.2,    688.2,    688.2,    0.0);
( 440980.9, 3942853.2,    688.1,    688.1,    0.0); ( 441000.9, 3942853.2,    688.1,    688.1,    0.0);
( 441020.9, 3942853.2,    688.0,    688.0,    0.0); ( 441040.9, 3942853.2,    687.9,    687.9,    0.0);
( 441060.9, 3942853.2,    687.8,    687.8,    0.0); ( 441080.9, 3942853.2,    687.8,    687.8,    0.0);

```

Model Output

```

*** AERMOD - VERSION 19191 ***    *** HRA for Richmond ES Replacement ***    08/31/20
*** AERMET - VERSION 14134 ***    *** Ridgecrest, CA ***                    08:30:07
                                           PAGE 15

*** MODELOPTs:   CONC   ELEV   RURAL      *** DISCRETE CARTESIAN RECEPTORS ***
                                   (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                   (METERS)
( 441100.9, 3942853.2,    687.8,    687.8,    0.0); ( 441120.9, 3942853.2,    687.7,    687.7,    0.0);
( 441140.9, 3942853.2,    687.7,    687.7,    0.0); ( 441160.9, 3942853.2,    687.7,    687.7,    0.0);
( 441180.9, 3942853.2,    687.8,    687.8,    0.0); ( 441200.9, 3942853.2,    687.8,    687.8,    0.0);
( 441220.9, 3942853.2,    687.8,    687.8,    0.0); ( 441240.9, 3942853.2,    687.9,    687.9,    0.0);
( 441260.9, 3942853.2,    687.9,    687.9,    0.0); ( 441280.9, 3942853.2,    687.8,    687.8,    0.0);
( 441300.9, 3942853.2,    687.8,    687.8,    0.0); ( 440940.9, 3942873.2,    688.1,    688.1,    0.0);
( 440960.9, 3942873.2,    688.1,    688.1,    0.0); ( 440980.9, 3942873.2,    688.1,    688.1,    0.0);
( 441000.9, 3942873.2,    688.0,    688.0,    0.0); ( 441020.9, 3942873.2,    687.9,    687.9,    0.0);
( 441040.9, 3942873.2,    687.8,    687.8,    0.0); ( 441060.9, 3942873.2,    687.8,    687.8,    0.0);
( 441080.9, 3942873.2,    687.8,    687.8,    0.0); ( 441100.9, 3942873.2,    687.7,    687.7,    0.0);
( 441120.9, 3942873.2,    687.7,    687.7,    0.0); ( 441140.9, 3942873.2,    687.7,    687.7,    0.0);
( 441160.9, 3942873.2,    687.7,    687.7,    0.0); ( 441180.9, 3942873.2,    687.7,    687.7,    0.0);
( 441200.9, 3942873.2,    687.7,    687.7,    0.0); ( 441220.9, 3942873.2,    687.7,    687.7,    0.0);
( 441240.9, 3942873.2,    687.8,    687.8,    0.0); ( 441260.9, 3942873.2,    687.8,    687.8,    0.0);
( 441280.9, 3942873.2,    687.7,    687.7,    0.0); ( 441300.9, 3942873.2,    687.6,    687.6,    0.0);
( 440940.9, 3942893.2,    688.0,    688.0,    0.0); ( 440960.9, 3942893.2,    688.1,    688.1,    0.0);
( 440980.9, 3942893.2,    688.1,    688.1,    0.0); ( 441000.9, 3942893.2,    688.0,    688.0,    0.0);
( 441020.9, 3942893.2,    687.9,    687.9,    0.0); ( 441040.9, 3942893.2,    687.8,    687.8,    0.0);
( 441060.9, 3942893.2,    687.8,    687.8,    0.0); ( 441080.9, 3942893.2,    687.8,    687.8,    0.0);
( 441100.9, 3942893.2,    687.7,    687.7,    0.0); ( 441120.9, 3942893.2,    687.7,    687.7,    0.0);
( 441140.9, 3942893.2,    687.7,    687.7,    0.0); ( 441160.9, 3942893.2,    687.6,    687.6,    0.0);
( 441180.9, 3942893.2,    687.6,    687.6,    0.0); ( 441200.9, 3942893.2,    687.6,    687.6,    0.0);
( 441220.9, 3942893.2,    687.6,    687.6,    0.0); ( 441240.9, 3942893.2,    687.6,    687.6,    0.0);
( 441260.9, 3942893.2,    687.7,    687.7,    0.0); ( 441280.9, 3942893.2,    687.6,    687.6,    0.0);
( 441300.9, 3942893.2,    687.5,    687.5,    0.0); ( 440940.9, 3942913.2,    687.9,    687.9,    0.0);
( 440960.9, 3942913.2,    688.0,    688.0,    0.0); ( 440980.9, 3942913.2,    688.1,    688.1,    0.0);
( 441000.9, 3942913.2,    688.0,    688.0,    0.0); ( 441020.9, 3942913.2,    687.9,    687.9,    0.0);
( 441040.9, 3942913.2,    687.8,    687.8,    0.0); ( 441060.9, 3942913.2,    687.8,    687.8,    0.0);
( 441080.9, 3942913.2,    687.8,    687.8,    0.0); ( 441100.9, 3942913.2,    687.7,    687.7,    0.0);
( 441120.9, 3942913.2,    687.6,    687.6,    0.0); ( 441140.9, 3942913.2,    687.6,    687.6,    0.0);
( 441160.9, 3942913.2,    687.5,    687.5,    0.0); ( 441180.9, 3942913.2,    687.5,    687.5,    0.0);
( 441200.9, 3942913.2,    687.5,    687.5,    0.0); ( 441220.9, 3942913.2,    687.5,    687.5,    0.0);
( 441240.9, 3942913.2,    687.5,    687.5,    0.0); ( 441260.9, 3942913.2,    687.5,    687.5,    0.0);
( 441280.9, 3942913.2,    687.4,    687.4,    0.0); ( 441300.9, 3942913.2,    687.4,    687.4,    0.0);
( 440940.9, 3942933.2,    687.8,    687.8,    0.0); ( 440960.9, 3942933.2,    688.0,    688.0,    0.0);
( 440980.9, 3942933.2,    688.1,    688.1,    0.0); ( 441000.9, 3942933.2,    688.1,    688.1,    0.0);
( 441020.9, 3942933.2,    687.9,    687.9,    0.0); ( 441040.9, 3942933.2,    687.9,    687.9,    0.0);
( 441060.9, 3942933.2,    687.8,    687.8,    0.0); ( 441080.9, 3942933.2,    687.7,    687.7,    0.0);
( 441100.9, 3942933.2,    687.6,    687.6,    0.0); ( 441120.9, 3942933.2,    687.5,    687.5,    0.0);
( 441140.9, 3942933.2,    687.5,    687.5,    0.0); ( 441160.9, 3942933.2,    687.5,    687.5,    0.0);
( 441180.9, 3942933.2,    687.5,    687.5,    0.0); ( 441200.9, 3942933.2,    687.4,    687.4,    0.0);
( 441220.9, 3942933.2,    687.3,    687.3,    0.0); ( 441240.9, 3942933.2,    687.4,    687.4,    0.0);
( 441260.9, 3942933.2,    687.4,    687.4,    0.0); ( 441280.9, 3942933.2,    687.2,    687.2,    0.0);
( 441300.9, 3942933.2,    687.2,    687.2,    0.0); ( 440940.9, 3942953.2,    687.7,    687.7,    0.0);
( 440960.9, 3942953.2,    687.9,    687.9,    0.0); ( 440980.9, 3942953.2,    688.1,    688.1,    0.0);

```

Model Output

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*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA ***   08:30:07
                                     PAGE 16

*** MODELOPTs:   CONC   ELEV   RURAL   *** DISCRETE CARTESIAN RECEPTORS ***
                                     (X-COORD, Y-COORD, ZELEV, ZHILL, ZFLAG)
                                     (METERS)
( 441000.9, 3942953.2, 688.1, 688.1, 0.0); ( 441020.9, 3942953.2, 687.9, 687.9, 0.0);
( 441040.9, 3942953.2, 687.8, 687.8, 0.0); ( 441060.9, 3942953.2, 687.7, 687.7, 0.0);
( 441080.9, 3942953.2, 687.6, 687.6, 0.0); ( 441100.9, 3942953.2, 687.6, 687.6, 0.0);
( 441120.9, 3942953.2, 687.5, 687.5, 0.0); ( 441140.9, 3942953.2, 687.5, 687.5, 0.0);
( 441160.9, 3942953.2, 687.4, 687.4, 0.0); ( 441180.9, 3942953.2, 687.4, 687.4, 0.0);
( 441200.9, 3942953.2, 687.3, 687.3, 0.0); ( 441220.9, 3942953.2, 687.3, 687.3, 0.0);
( 441240.9, 3942953.2, 687.3, 687.3, 0.0); ( 441260.9, 3942953.2, 687.3, 687.3, 0.0);
( 441280.9, 3942953.2, 687.1, 687.1, 0.0); ( 441300.9, 3942953.2, 687.1, 687.1, 0.0);
( 440940.9, 3942973.2, 687.6, 687.6, 0.0); ( 440960.9, 3942973.2, 687.8, 687.8, 0.0);
( 440980.9, 3942973.2, 688.0, 688.0, 0.0); ( 441000.9, 3942973.2, 688.0, 688.0, 0.0);
( 441020.9, 3942973.2, 687.9, 687.9, 0.0); ( 441040.9, 3942973.2, 687.8, 687.8, 0.0);
( 441060.9, 3942973.2, 687.7, 687.7, 0.0); ( 441080.9, 3942973.2, 687.5, 687.5, 0.0);
( 441100.9, 3942973.2, 687.5, 687.5, 0.0); ( 441120.9, 3942973.2, 687.4, 687.4, 0.0);
( 441140.9, 3942973.2, 687.4, 687.4, 0.0); ( 441160.9, 3942973.2, 687.3, 687.3, 0.0);
( 441180.9, 3942973.2, 687.3, 687.3, 0.0); ( 441200.9, 3942973.2, 687.2, 687.2, 0.0);
( 441220.9, 3942973.2, 687.2, 687.2, 0.0); ( 441240.9, 3942973.2, 687.2, 687.2, 0.0);
( 441260.9, 3942973.2, 687.2, 687.2, 0.0); ( 441280.9, 3942973.2, 687.1, 687.1, 0.0);
( 441300.9, 3942973.2, 687.1, 687.1, 0.0); ( 440940.9, 3942993.2, 687.5, 687.5, 0.0);
( 440960.9, 3942993.2, 687.6, 687.6, 0.0); ( 440980.9, 3942993.2, 687.8, 687.8, 0.0);
( 441000.9, 3942993.2, 687.8, 687.8, 0.0); ( 441020.9, 3942993.2, 687.8, 687.8, 0.0);
( 441040.9, 3942993.2, 687.6, 687.6, 0.0); ( 441060.9, 3942993.2, 687.5, 687.5, 0.0);
( 441080.9, 3942993.2, 687.4, 687.4, 0.0); ( 441100.9, 3942993.2, 687.3, 687.3, 0.0);
( 441120.9, 3942993.2, 687.3, 687.3, 0.0); ( 441140.9, 3942993.2, 687.3, 687.3, 0.0);
( 441160.9, 3942993.2, 687.2, 687.2, 0.0); ( 441180.9, 3942993.2, 687.1, 687.1, 0.0);
( 441200.9, 3942993.2, 687.1, 687.1, 0.0); ( 441220.9, 3942993.2, 687.1, 687.1, 0.0);
( 441240.9, 3942993.2, 687.1, 687.1, 0.0); ( 441260.9, 3942993.2, 687.1, 687.1, 0.0);
( 441280.9, 3942993.2, 687.0, 687.0, 0.0); ( 441300.9, 3942993.2, 687.0, 687.0, 0.0);
( 440940.9, 3943013.2, 687.4, 687.4, 0.0); ( 440960.9, 3943013.2, 687.4, 687.4, 0.0);
( 440980.9, 3943013.2, 687.5, 687.5, 0.0); ( 441000.9, 3943013.2, 687.5, 687.5, 0.0);
( 441020.9, 3943013.2, 687.5, 687.5, 0.0); ( 441040.9, 3943013.2, 687.5, 687.5, 0.0);
( 441060.9, 3943013.2, 687.4, 687.4, 0.0); ( 441080.9, 3943013.2, 687.3, 687.3, 0.0);
( 441100.9, 3943013.2, 687.3, 687.3, 0.0); ( 441120.9, 3943013.2, 687.2, 687.2, 0.0);
( 441140.9, 3943013.2, 687.2, 687.2, 0.0); ( 441160.9, 3943013.2, 687.1, 687.1, 0.0);
( 441180.9, 3943013.2, 687.0, 687.0, 0.0); ( 441200.9, 3943013.2, 687.0, 687.0, 0.0);
( 441220.9, 3943013.2, 687.0, 687.0, 0.0); ( 441240.9, 3943013.2, 687.0, 687.0, 0.0);
( 441260.9, 3943013.2, 687.1, 687.1, 0.0); ( 441280.9, 3943013.2, 687.0, 687.0, 0.0);
( 441300.9, 3943013.2, 686.9, 686.9, 0.0); ( 440940.9, 3943033.2, 687.3, 687.3, 0.0);
( 440960.9, 3943033.2, 687.3, 687.3, 0.0); ( 440980.9, 3943033.2, 687.3, 687.3, 0.0);
( 441000.9, 3943033.2, 687.2, 687.2, 0.0); ( 441020.9, 3943033.2, 687.3, 687.3, 0.0);
( 441040.9, 3943033.2, 687.3, 687.3, 0.0); ( 441060.9, 3943033.2, 687.2, 687.2, 0.0);
( 441080.9, 3943033.2, 687.2, 687.2, 0.0); ( 441100.9, 3943033.2, 687.2, 687.2, 0.0);
( 441120.9, 3943033.2, 687.2, 687.2, 0.0); ( 441140.9, 3943033.2, 687.1, 687.1, 0.0);
( 441160.9, 3943033.2, 687.0, 687.0, 0.0); ( 441180.9, 3943033.2, 687.0, 687.0, 0.0);
( 441200.9, 3943033.2, 687.0, 687.0, 0.0); ( 441220.9, 3943033.2, 687.0, 687.0, 0.0);
( 441240.9, 3943033.2, 687.0, 687.0, 0.0); ( 441260.9, 3943033.2, 687.0, 687.0, 0.0);

```

Model Output

```

*** AERMOT - VERSION 19191 *** *** HRA for Richmond ES Replacement *** 08/31/20
*** AERMET - VERSION 14134 *** *** Ridgecrest, CA *** 08:30:07
*** MODELOPTs: CONC ELEV RURAL *** PAGE 18

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*** 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

```
*** AERMOD - VERSION 19191 ***      *** HRA for Richmond ES Replacement
*** AERMET - VERSION 14134 ***      *** Ridgecrest, CA
```

*** 08/31/20
*** 08:30:07
PAGE 19

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*** MODELOPTs:      CONC  ELEV  RURAL
```

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

```
Surface file:      ..\Met\746120\746120.SFC
Profile file:     ..\Met\746120\746120.PFL
Surface format:   FREE
Profile format:   FREE
Surface station no.:    93104
                  Name: UNKNOWN
                  Year: 2009
```

```
Upper air station no.: 93214
                      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	-34.6	0.337	-9.000	-9.000	-999.	469.	92.1	0.10	1.44	1.00	4.36	211.	10.0	274.2	2.0			
09	01	01	1	02	-29.5	0.287	-9.000	-9.000	-999.	369.	66.8	0.10	1.44	1.00	3.86	208.	10.0	274.2	2.0			
09	01	01	1	03	-6.2	0.084	-9.000	-9.000	-999.	119.	8.1	0.15	1.44	1.00	1.76	294.	10.0	270.9	2.0			
09	01	01	1	04	-24.0	0.231	-9.000	-9.000	-999.	266.	42.9	0.23	1.44	1.00	2.86	173.	10.0	271.4	2.0			
09	01	01	1	05	-29.6	0.286	-9.000	-9.000	-999.	367.	66.2	0.10	1.44	1.00	3.86	213.	10.0	272.5	2.0			
09	01	01	1	06	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.20	1.44	1.00	0.00	0.	10.0	269.9	2.0			
09	01	01	1	07	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.20	1.44	1.00	0.00	0.	10.0	269.9	2.0			
09	01	01	1	08	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.20	1.44	0.57	0.00	0.	10.0	272.5	2.0			
09	01	01	1	09	20.1	-9.000	-9.000	-9.000	52.	-999.	-99999.0	0.20	1.44	0.34	0.00	0.	10.0	277.0	2.0			
09	01	01	1	10	75.2	-9.000	-9.000	-9.000	147.	-999.	-99999.0	0.20	1.44	0.26	0.00	0.	10.0	280.4	2.0			
09	01	01	1	11	114.1	-9.000	-9.000	-9.000	228.	-999.	-99999.0	0.20	1.44	0.23	0.00	0.	10.0	283.1	2.0			
09	01	01	1	12	133.0	-9.000	-9.000	-9.000	381.	-999.	-99999.0	0.20	1.44	0.22	0.00	0.	10.0	284.9	2.0			
09	01	01	1	13	131.9	-9.000	-9.000	-9.000	487.	-999.	-99999.0	0.20	1.44	0.22	0.00	0.	10.0	287.0	2.0			
09	01	01	1	14	109.9	-9.000	-9.000	-9.000	498.	-999.	-99999.0	0.20	1.44	0.23	0.00	0.	10.0	288.1	2.0			
09	01	01	1	15	68.8	-9.000	-9.000	-9.000	505.	-999.	-99999.0	0.20	1.44	0.27	0.00	0.	10.0	289.2	2.0			
09	01	01	1	16	12.1	-9.000	-9.000	-9.000	506.	-999.	-99999.0	0.20	1.44	0.37	0.00	0.	10.0	289.1	2.0			
09	01	01	1	17	-3.7	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.20	1.44	0.66	0.00	0.	10.0	286.1	2.0			
09	01	01	1	18	-19.4	0.185	-9.000	-9.000	-999.	191.	27.3	0.23	1.44	1.00	2.60	157.	10.0	281.1	2.0			
09	01	01	1	19	-999.0	-9.000	-9.000	-9.000	-999.	-999.	-99999.0	0.20	1.44	1.00	0.00	0.	10.0	279.1	2.0			
09	01	01	1	20	-27.3	0.258	-9.000	-9.000	-999.	314.	52.5	0.10	1.44	1.00	3.60	197.	10.0	279.1	2.0			
09	01	01	1	21	-11.4	0.112	-9.000	-9.000	-999.	107.	10.4	0.10	1.44	1.00	2.60	200.	10.0	279.1	2.0			
09	01	01	1	22	-999.																	

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	211.	4.36	274.3	99.0	-99.00	-99.00

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

Model Output

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*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement   ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA                     ***   08:30:07
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*** MODELOPTs: CONC ELEV RURAL

*** THE SUMMARY OF MAXIMUM PERIOD (43872 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	1ST HIGHEST VALUE IS	0.14209 AT (440940.88, 3942293.18, 689.85, 689.85, 0.00)	DC	
	2ND HIGHEST VALUE IS	0.09569 AT (440960.88, 3942293.18, 689.78, 689.78, 0.00)	DC	
	3RD HIGHEST VALUE IS	0.08858 AT (440940.88, 3942313.18, 689.85, 689.85, 0.00)	DC	
	4TH HIGHEST VALUE IS	0.06765 AT (440960.88, 3942313.18, 689.78, 689.78, 0.00)	DC	
	5TH HIGHEST VALUE IS	0.06186 AT (440980.88, 3942293.18, 689.72, 689.72, 0.00)	DC	
	6TH HIGHEST VALUE IS	0.05936 AT (440940.88, 3942333.18, 689.84, 689.84, 0.00)	DC	
	7TH HIGHEST VALUE IS	0.04896 AT (440960.88, 3942333.18, 689.78, 689.78, 0.00)	DC	
	8TH HIGHEST VALUE IS	0.04889 AT (440980.88, 3942313.18, 689.74, 689.74, 0.00)	DC	
	9TH HIGHEST VALUE IS	0.04195 AT (440940.88, 3942353.18, 689.84, 689.84, 0.00)	DC	
	10TH HIGHEST VALUE IS	0.03980 AT (441000.88, 3942293.18, 689.67, 689.67, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR

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*** AERMOD - VERSION 19191 ***   *** HRA for Richmond ES Replacement   ***   08/31/20
*** AERMET - VERSION 14134 ***   *** Ridgecrest, CA                     ***   08:30:07
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*** MODELOPTs: CONC ELEV RURAL

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	13.95410 ON 11010409:	AT (440980.88, 3942293.18, 689.72, 689.72, 0.00)	DC	

*** RECEPTOR TYPES: GC = GRIDCART
 GP = GRIDPOLR
 DC = DISCCART
 DP = DISCPOLR

Model Output

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*** AERMOD - VERSION 19191 ***    *** HRA for Richmond ES Replacement    ***    08/31/20
*** AERMET - VERSION 14134 ***    *** Ridgecrest, CA                      ***    08:30:07
                                     ***    PAGE 42

*** MODELOPTs:   CONC  ELEV  RURAL

*** Message Summary : AERMOD Model Execution ***

----- Summary of Total Messages -----

A Total of           0 Fatal Error Message(s)
A Total of           0 Warning Message(s)
A Total of        14394 Informational Message(s)

A Total of          43872 Hours Were Processed

A Total of           9878 Calm Hours Identified

A Total of          4516 Missing Hours Identified ( 10.29 Percent)

CAUTION!:  Number of Missing Hours Exceeds 10 Percent of Total!
           Data May Not Be Acceptable for Regulatory Applications.
           See Section 5.3.2 of "Meteorological Monitoring Guidance
           for Regulatory Modeling Applications" (EPA-454/R-99-005).

***** FATAL ERROR MESSAGES *****
          ***  NONE  ***

***** WARNING MESSAGES *****
          ***  NONE  ***

*****
*** AERMOD Finishes Successfully ***
*****
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Appendix C – Risk Calculations

*HARP - HRACalc v19044 8/31/2020 8:36:40 AM - Cancer Risk - Input File: C:\Users\sbush\Desktop\harp output\SSSD06\StaffHRAInput.hra

INDEX	GRP1	GRP2	POLID	POLABBRE\CONC	RISK_SUM	SCENARIO	DETAILS	INH_RISK	SOIL_RISK	DERMAL_R	MMILK_RIS
1			71432	Benzene	0.14209	7.99E-07	25YrCancel *	7.99E-07	0.00E+00	0.00E+00	0.00E+00

*HARP - HRACalc v19044 8/31/2020 8:37:34 AM - Cancer Risk - Input File: C:\Users\sbush\Desktop\harp output\SSSD06\StudentHRAInput.hra

INDEX	GRP1	GRP2	POLID	POLABBRE\CONC	RISK_SUM	SCENARIO	DETAILS	INH_RISK	SOIL_RISK	DERMAL_R	MMILK_RIS
1			71432	Benzene	0.14209	1.08E-06	6YrCancel *	1.08E-06	0.00E+00	0.00E+00	0.00E+00

*HARP - HRACalc v19044 8/27/2020 10:03:10 AM - Chronic Risk - Input File: C:\Users\sbush\Desktop\harp output\SSSD06\StaffHRAInput.hra

INDEX	GRP1	GRP2	POLID	POLABBRE' CONC	SCENARIO CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE' RESP	SKIN	EYE	BONE/TEE' ENDO	BLOOD	
1			71432	Benzene	0.00482 NonCancer	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	1.61E-03

*HARP - HRACalc v19044 8/27/2020 10:03:10 AM - Acute Risk - Input File: C:\Users\sbush\Desktop\harp output\SSSD06\StaffHRAInput.hra

INDEX	GRP1	GRP2	POLID	POLABBRE' CONC	SCENARIO CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE' RESP	SKIN	EYE	BONE/TEE' ENDO	BLOOD	
1			71432	Benzene	0.78171 NonCancer	0.00E+00	0.00E+00	2.90E-02	0.00E+00	0.00E+00	2.90E-02	0.00E+00	0.00E+00	0.00E+00	2.90E-02

*HARP - HRACalc v19044 8/27/2020 10:03:35 AM - 8-Hour Chronic Risk - Input File: C:\Users\sbush\Desktop\harp output\SSSD06\StaffHRAInput.hra

INDEX	GRP1	GRP2	POLID	POLABBRE' CONC	SCENARIO CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE' RESP	SKIN	EYE	BONE/TEE' ENDO	BLOOD	
1			71432	Benzene	0.00482 NonCancer	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	1.61E-03