INTEROFFICE MEMORANDUM
January 25, 2022

TO: **Art Valla**

VIA: **Damian Breen**
            Pamela Leong
            Nicholas Maiden
            Carol Allen   *esa* **1/25/2022**
            Daphne Chong

FROM: **Ted Hull**

SUBJECT: **Results of Revised Health Risk Assessment (HRA) for Valero Refinery (Benicia, CA) P# 12626, RE: NOV A58465, S-1004 & S-1010 Reformer and Hydrogen Plant Venting**

SUMMARY: Per your request, a revised health risk assessment (HRA) was completed in support of the above referenced Enforcement Action. The HRA estimates the potential health risks associated with uncontrolled discharges of contaminated hydrogen from the Catalytic Reforming operation S-1004 and Hydrogen Plant S-1010. The contaminated hydrogen has been shown to contained Benzene, Ethylbenzene, Toluene, and Xylene (BETX) and may have been discharged into the atmosphere for several years. This HRA revision accounts for emission reductions that have occurred since the initial HRA report dated August 19, 2019 and is updated from the previous version dated December 20, 2021 to include a refinement of the Acute HI findings.

The revised HRA results for the provided release estimates are as follows:

- **Cancer Risk (Resident):**   **0.68 in a million**
- **Chronic HI (Off-site Worker):**   **0.0097**
- **Acute HI (Maximum):**   **2.0**
- **Acute HI (Resident)**   **1.7**

Although reduced since the initial HRA, Acute HI risk would exceed the Significant Source Threshold in Regulation 11-18-221; and would not meet the requirements for permitting under Regulation 2-5-302. Benzene is the overwhelming risk driver in all evaluated categories.

The Acute HI value is above regulatory standards, but the chance of actual exposure at this level is low. The maximum value of 2.0 is on a remote hilltop north of Lake Herman Road and occurred on December 19th of the meteorological data set at 5:00 am. Potential residential Acute HI exposure was found to have a maximum value of 1.7 and occurred January 30th at 2:00 am. These values assume worst case emissions and meteorological conditions are occurring at the same time. For example: assuming that the maximum reported potential hourly benzene emissions from reformer hydrogen venting at the Valero Refinery occurred at the 10 worst case 1-hour meteorological periods in a 5-year set of meteorological data, there is the potential for (2) one hour periods to exceed the Acute Hazard Index limit of 1.0. The attached table "Res_AcuteHI_Max10" shows the potential Acute HI values for the highest residential location at the 10 worst case hours in the AERMET "Valero Admin" data set (2013 – 2017).

TAC EMISSIONS: The toxic air contaminant (TAC) emissions values used in the HRA are those from your December 17, 2021 memo. These daily emissions were broken down into the following categories for the purposes of the HRA:

1. **Cancer Risk / Chronic HI**: Annual Average (lb/yr) values of provided BETX emissions.
2. **Acute HI:** Highest single hour of released BETX (max hourly).

Scenario:	Benzene	Ethylbenzene	Toluene	Xylene
Annual Average (lb/year)	2518	600	5105	1856
Highest 1-Hour (lb/hour)	17.04	6.16	34.73	18.35

HEALTH RISK ASSESSMENT: The HARP2 Air Dispersion Modeling and Risk Tool (ADMRT) was used to evaluate cancer risk and chronic HI for Residential and Off-site Worker receptors; and acute HI for the highest 1-hour receptor locations. Chronic exposure assumptions are based on average annual emission rates and pollutant concentrations that are annual average values; acute exposure is based on the highest hourly concentration value that occurs in the entire meteorological data set. Dispersion modeling for the ADMRT is based on unit emission rates of 1.0 grams per second for each source and determines 1-hour and annual average unit concentrations in micrograms per cubic meter per gram per second (X/Q).

MODELING: The AERMOD air dispersion computer model (Version 19191) was used to estimate the annual average and maximum 1-hour pollutant concentrations from the modeled sources. Model runs were made with 5 consecutive years of Valero Admin meteorological data (2013-2017), processed into AERMET sets by BAAQMD meteorological staff. This is on-site meteorological data. Upper air data coincident with the local met data was taken from the Oakland International Airport station, Cloud Cover data is from Concord-Buchanan Field, and the Climate Station is the Martinez Water Plant. Land use parameters including surface roughness length, albedo, and Bowen ratio were evaluated using the USEPA AERSURFACE tool. The model is referenced in NAD 83 UTM coordinates and uses 10-meter resolution terrain data from Solano County (1/3 arc second NED files). A flagpole height of 1.5 meters was used at each receptor to represent the human breathing zone. Default (rural) dispersion coefficients were used to best represent the land use of the area surrounding the facility. The model includes (2) point sources to represent different conditions in the same stack (ST-302). Stacks are identified as S1004_T (Typical Conditions) and A1004_M (Maximum Conditions). Typical exhaust stack parameters were used to assess annual average TAC emission rates and chronic exposure. Maximum exhaust stack parameters were used to assess maximum hourly TAC emission rates and acute exposure.

HEALTH RISK: Health risk estimates were calculated in accordance with the BAAQMD's Air Toxics NSR Program HRA Guidelines, dated December 2016. Estimates of residential risk assume potential exposure to annual average TAC concentrations occur 350 days per year, for 30 years. In addition, residential risk estimates assume a 95th percentile breathing rate for age groups younger than two years old, and 80th percentile breathing rate for age groups that are older than or equal to two years of age. Risk estimates for offsite workers assume potential exposure occurs 8 hours per day, 250 days per year, for 25 years. For offsite workers, the 95th percentile 8-hour breathing rate based on moderate activity was assumed. Residential cancer risk estimates include age sensitivity factors (ASFs) and fraction of time at home (FAH) adjustments. The ASFs are age-specific weighting factors used in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. A Worker Adjustment Factor (WAF) multiplier is applied to cancer risk estimates in cases where source operation is not continuous to account for higher than estimated coincident exposure to source emissions. A similar exposure adjustment factor (EAF) is used for students while attending school. The estimated health risks for this permit application are presented in the table below.

Receptor	NAD 83 UTM Coordinates (meters)		Cancer Risk (in a million)	Chronic HI	Acute HI
	Easting (x)	Northing (y)			
Resident	574,465	4,213,140	0.68	0.0033	NA
Worker (WAF = 1.0)	576,065	4,214,140	0.17	0.0097	NA
PMI (Max 1-hour)	577,265	4,216,740	NA	NA	**2.0**
PMI (Resident)	573,965	4,214,640	NA	NA	**1.7**

Health Risk Analysis
Facility: Valero Refinery P# 14626
NOV #58465
Contributions at Highest Receptor
12-20-21 Revision

Residential Cancer Risk

*HARP - HRACalc v21081 12/20/2021 11:26:57 AM - Cancer Risk - Input File: C:\HRSA - New\P#12626\NOV_A58465\12_20_T\hra\ResCaHRAInput.hra

REC	GRP	NETID	X	Y	CONC	POLID	POLABBR	RISK_SUM	SCENARIO	DETAILS	INH_RISK	SOIL_RISK	DERMAL_	MMILK_RIS	WATER_R	FISH_RISK	CROP_RIS	BEEF_RIS	DAIRY_RIS	PIG_RISK	CHICKEN_	EGG_RISK
374	ALL		574465	4213140	0.009873	71432	Benzene	6.68E-07	30YrCance	97.97%	6.68E-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	0.00E+00
374	ALL		574465	4213140	0.002353	100414	Ethyl Benz	1.38E-08	30YrCance	2.03%	1.38E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
374	ALL		574465	4213140	0.020017	108883	Toluene	0.00E+00	30YrCance	0.00%	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
374	ALL		574465	4213140	0.007277	1330207	Xylenes	0.00E+00	30YrCance	0.00%	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
								6.82E-07		100.00%												

Residential Chronic HI

*HARP - HRACalc v21081 12/20/2021 11:27:37 AM - Chronic Risk - Input File: C:\HRSA - New\P#12626\NOV_A58465\12_20_T\hra\ResChHRAInput.hra

REC	GRP	NETID	X	Y	CONC	POLID	POLABBR	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	DETAILS	ODOR	GENERAL
374	ALL		574465	4213140	0.009873	71432	Benzene	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	0.00E+00	0.00E+00	3.29E-03	100.00%	0.00E+00	0.00E+00
374	ALL		574465	4213140	0.002353	100414	Ethyl Benz	NonCancer	0.00E+00	0.00E+00	0.00E+00	1.18E-06	1.18E-06	1.18E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-06	0.00E+00	0.00%	0.00E+00	0.00E+00
374	ALL		574465	4213140	0.020017	108883	Toluene	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	4.77E-05	0.00E+00	0.00E+00	0.00E+00	0.00%	0.00E+00	0.00E+00
374	ALL		574465	4213140	0.007277	1330207	Xylenes	NonCancer	0.00E+00	1.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.04E-05	0.00E+00	1.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00%	0.00E+00	0.00E+00
									0.00E+00	1.04E-05	0.00E+00	1.18E-06	1.18E-06	1.18E-06	1.04E-05	0.00E+00	5.81E-05	0.00E+00	1.18E-06	3.29E-03	100.00%	0.00E+00	0.00E+00

Worker Cancer Risk

*HARP - HRACalc v21081 12/20/2021 11:30:03 AM - Cancer Risk - Input File: C:\HRSA - New\P#12626\NOV_A58465\12_20_T\hra\WkrCaHRAInput.hra

REC	GRP	NETID	X	Y	CONC	POLID	POLABBR	RISK_SUM	SCENARIO	DETAILS	INH_RISK	SOIL_RISK	DERMAL_	MMILK_RIS	WATER_R	FISH_RISK	CROP_RIS	BEEF_RIS	DAIRY_RIS	PIG_RISK	CHICKEN_	EGG_RISK
606	ALL		576065	4214140	0.029097	71432	Benzene	1.64E-07	25YrCance	97.97%	1.64E-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	0.00E+00
606	ALL		576065	4214140	0.006933	100414	Ethyl Benz	3.39E-09	25YrCance	2.03%	3.39E-09	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
606	ALL		576065	4214140	0.058991	108883	Toluene	0.00E+00	25YrCance	0.00%	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
606	ALL		576065	4214140	0.021447	1330207	Xylenes	0.00E+00	25YrCance	0.00%	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
								1.67E-07		100.00%												

Worker Chronic HI

*HARP - HRACalc v21081 12/20/2021 11:30:33 AM - Chronic Risk - Input File: C:\HRSA - New\P#12626\NOV_A58465\12_20_T\hra\WkrChHRAInput.hra

REC	GRP	NETID	X	Y	CONC	POLID	POLABBR	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	DETAILS	ODOR	GENERAL
606	ALL		576065	4214140	0.029097	71432	Benzene	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	0.00E+00	0.00E+00	9.70E-03	100.00%	0.00E+00	0.00E+00
606	ALL		576065	4214140	0.006933	100414	Ethyl Benz	NonCancer	0.00E+00	0.00E+00	0.00E+00	3.47E-06	3.47E-06	3.47E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.47E-06	0.00E+00	0.00%	0.00E+00	0.00E+00
606	ALL		576065	4214140	0.058991	108883	Toluene	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	1.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00%	0.00E+00	0.00E+00
606	ALL		576065	4214140	0.021447	1330207	Xylenes	NonCancer	0.00E+00	3.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.06E-05	0.00E+00	3.06E-05	0.00E+00	0.00E+00	0.00E+00	0.00%	0.00E+00	0.00E+00
									0.00E+00	3.06E-05	0.00E+00	3.47E-06	3.47E-06	3.47E-06	3.06E-05	0.00E+00	1.71E-04	0.00E+00	3.47E-06	9.70E-03	100.00%	0.00E+00	0.00E+00

PMI (1-hour) Acute HI

*HARP - HRACalc v21081 12/20/2021 1:01:00 PM - Acute Risk - Input File: C:\HRSA - New\P#12626\NOV_A58465\12_20_M\hra\PMIHRAInput.hra

REC	GRP	NETID	X	Y	CONC	POLID	POLABBR	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	DETAILS	ODOR	GENERAL
732	ALL		573965	4214640	47.17804	71432	Benzene	NonCancer	0.00E+00	0.00E+00	1.75E+00	0.00E+00	0.00E+00	1.75E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E+00	100.00%	0.00E+00	0.00E+00
732	ALL		573965	4214640	17.05497	100414	Ethyl Benz	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	0.00E+00	0.00E+00	0.00E+00	0.00%	0.00E+00	0.00E+00
732	ALL		573965	4214640	96.15571	108883	Toluene	NonCancer	0.00E+00	1.92E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E-02	0.00E+00	1.92E-02	0.00E+00	0.00E+00	0.00E+00	0.00%	0.00E+00	0.00E+00
732	ALL		573965	4214640	50.80499	1330207	Xylenes	NonCancer	0.00E+00	2.31E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-03	0.00E+00	2.31E-03	0.00E+00	0.00E+00	0.00E+00	0.00%	0.00E+00	0.00E+00
									0.00E+00	2.15E-02	1.75E+00	0.00E+00	0.00E+00	1.75E+00	2.15E-02	0.00E+00	2.15E-02	0.00E+00	0.00E+00	1.75E+00	100.00%	0.00E+00	0.00E+00

Health Risk Analysis
Facility: Valero Refinery P# 14626
NOV #58465
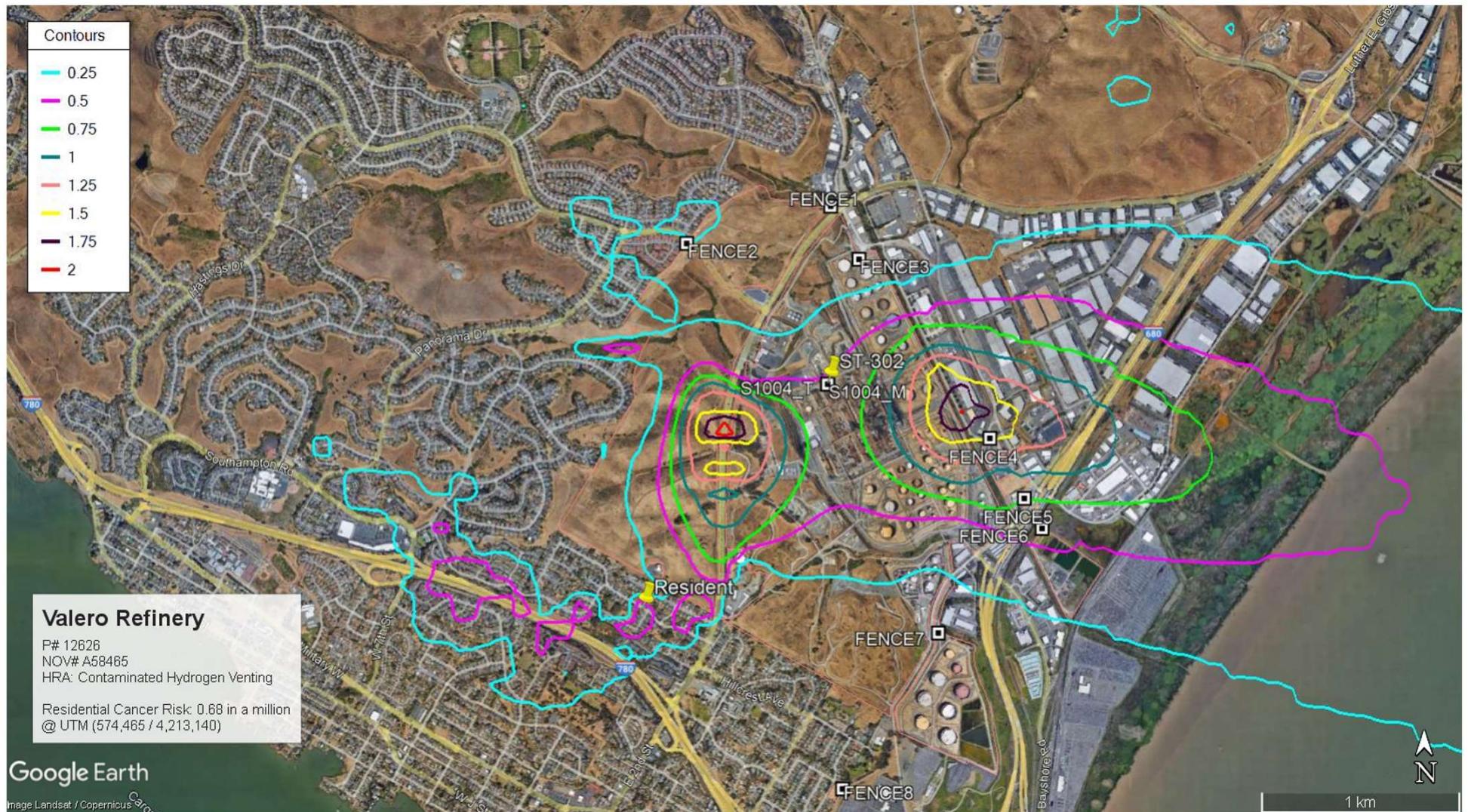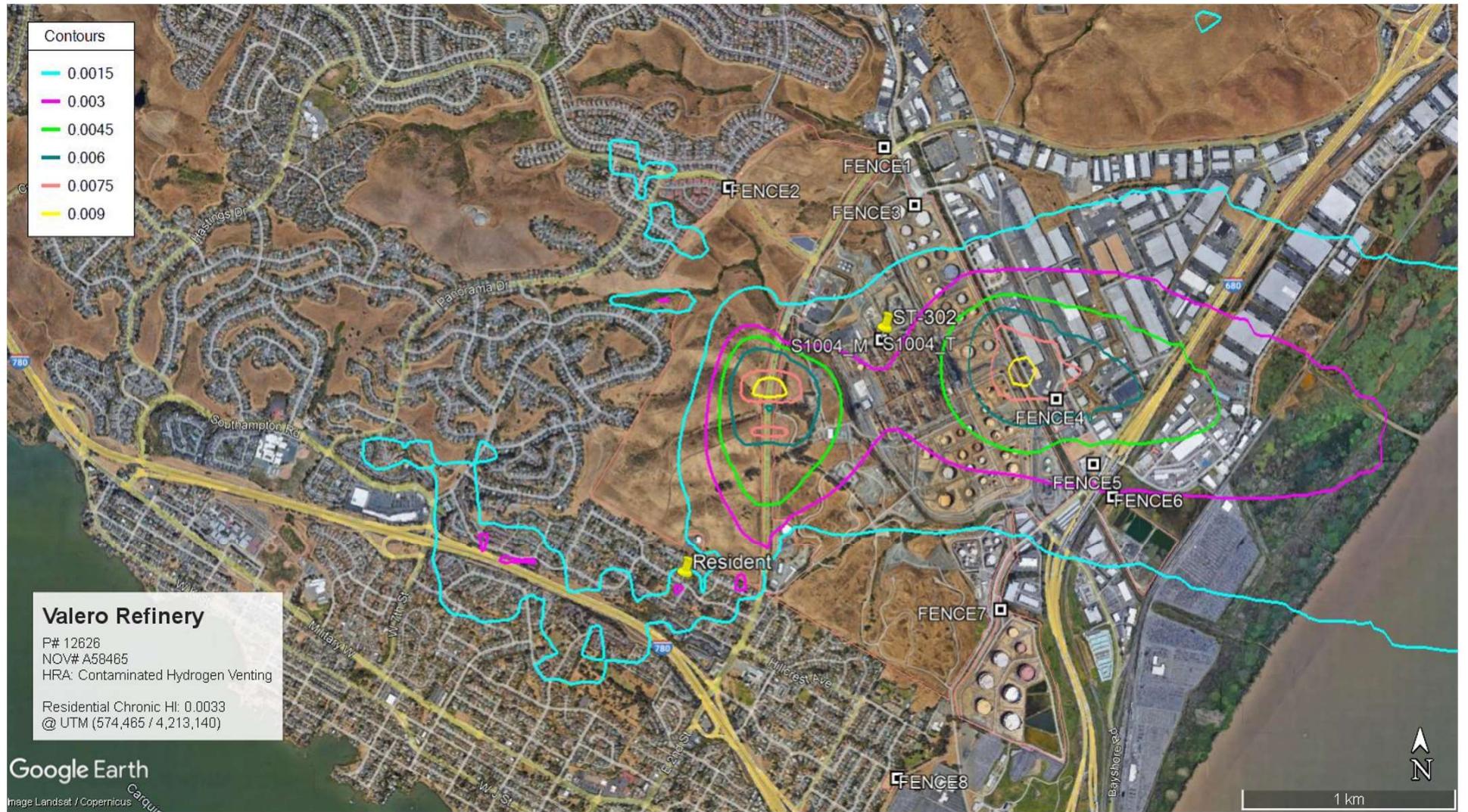**Max 10 Individual Acute HI Values at Highest Residential Receptor**
1/3/2022

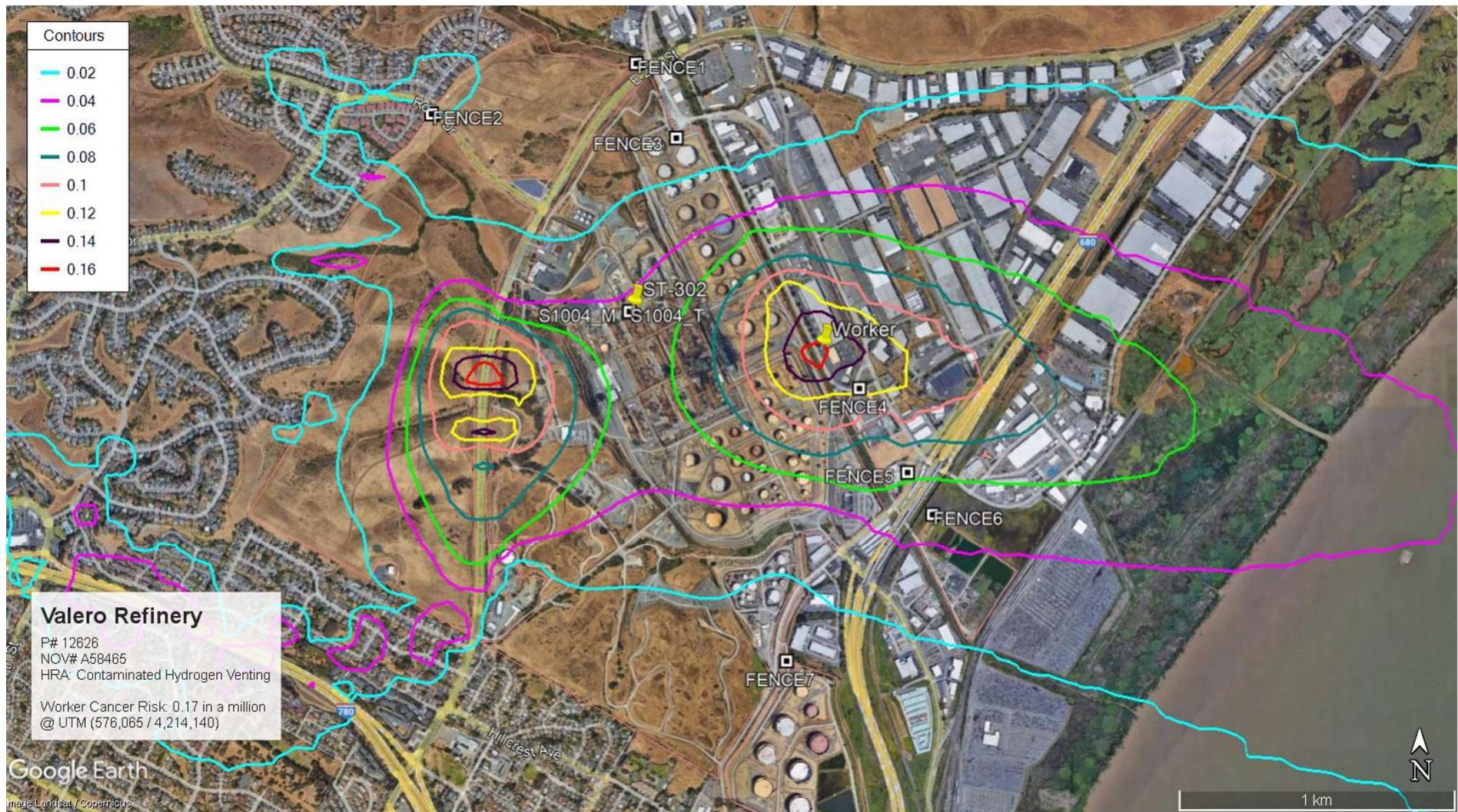**PMI Resident (1-hour) Acute HI: Max 10 Occurences in 5-year Meteorological Data Set**

*HARP - HRACalc v21081 1/3/2022 12:26:41 PM - Acute Risk by Receptor and Source - Input File: C:\HRSA - New\P#12626\NOV_A58465\01_03_M\hra\M1.MaxEachHRAInput.hra

SRC	REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN	KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEE	ENDO	BLOOD	ODOR	GENERAL	MAXHI
M1	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	1.75E+00	0.00E+00	0.00E+00	1.75E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E+00	0.00E+00	0.00E+00	1.75E+00
M2	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	1.07E+00	0.00E+00	0.00E+00	1.07E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E+00	0.00E+00	0.00E+00	1.07E+00
M3	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	8.03E-01	0.00E+00	0.00E+00	8.03E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.03E-01	0.00E+00	0.00E+00	8.03E-01
M4	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	7.79E-01	0.00E+00	0.00E+00	7.79E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.79E-01	0.00E+00	0.00E+00	7.79E-01
M5	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	7.23E-01	0.00E+00	0.00E+00	7.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.23E-01	0.00E+00	0.00E+00	7.23E-01
M6	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	6.52E-01	0.00E+00	0.00E+00	6.52E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.52E-01	0.00E+00	0.00E+00	6.52E-01
M7	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	5.66E-01	0.00E+00	0.00E+00	5.66E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.66E-01	0.00E+00	0.00E+00	5.66E-01
M8	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	5.32E-01	0.00E+00	0.00E+00	5.32E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.32E-01	0.00E+00	0.00E+00	5.32E-01
M9	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	4.78E-01	0.00E+00	0.00E+00	4.78E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.78E-01	0.00E+00	0.00E+00	4.78E-01
M10	1	ALL		573965	4214640	NonCancer	0.00E+00	0.00E+00	4.60E-01	0.00E+00	0.00E+00	4.60E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.60E-01	0.00E+00	0.00E+00	4.60E-01

Contours
- 0.2
- 0.4
- 0.6
- 0.8
- 1
- 1.2
- 1.4
- 1.6
- 1.8

PMI (Max 1-hour)

PMI (Resident)

ST-302
S1004_M
S1004_T

Valero Refinery

P# 12626
NOV# A58465
HRA: Contaminated Hydrogen Venting

PMI (Max 1-hour) Acute HI: 2.0
@ UTM (577,265 / 4,216,740)

PMI (Resident) Acute HI: 1.7
@ UTM (573,965 / 4,214,640)

Google Earth

Image Landsat / Copernicus

2 km

Contours

- 0.25
- 0.5
- 0.75
- 1
- 1.25
- 1.5
- 1.75
- 2

FENCE1
FENCE2
FENCE3
ST-302
S1004_T
S1004_M
FENCE4
FENCE5
FENCE6
Resident
FENCE7
FENCE8

Valero Refinery

P# 12626
NOV# A58465
HRA: Contaminated Hydrogen Venting

Residential Cancer Risk: 0.68 in a million
@ UTM (574,465 / 4,213,140)

Google Earth

Image Landsat / Copernicus

1 km

Contours

— 0.0015
— 0.003
— 0.0045
— 0.006
— 0.0075
— 0.009

FENCE1
FENCE2
FENCE3
ST-302
S1004_M S1004_T
FENCE4
FENCE5
FENCE6
Resident
FENCE7
FENCE8

Valero Refinery

P# 12626
NOV# A58465
HRA: Contaminated Hydrogen Venting

Residential Chronic HI: 0.0033
@ UTM (574,465 / 4,213,140)

Google Earth

Image Landsat / Copernicus

N

1 km

Contours
- 0.02
- 0.04
- 0.06
- 0.08
- 0.1
- 0.12
- 0.14
- 0.16

FENCE1
FENCE2
FENCE3
ST-302
S1004_M S1004_T
Worker
FENCE4
FENCE5
FENCE6
FENCE7

Valero Refinery
P# 12626
NOV# A58465
HRA: Contaminated Hydrogen Venting

Worker Cancer Risk: 0.17 in a million
@ UTM (576,065 / 4,214,140)

Google Earth

Image Landsat / Copernicus

Hillcrest Ave

N

1 km

Contours
- 0.0015
- 0.003
- 0.0045
- 0.006
- 0.0075
- 0.009

FENCE1
FENCE2
FENCE3
ST-302
S1004_M S1004_T
Worker
FENCE4
FENCE5
FENCE6
FENCE7

Valero Refinery

P# 12626
NOV# A58465
HRA: Contaminated Hydrogen Venting

Worker Chronic HI: 0.0097
@ UTM (576,065 / 4,214,140)

Panorama Dr
Hillcrest Ave

Google Earth
Image Landsat / Copernicus

1 km

N

```
*** AERMOD - VERSION  19191 ***   *** Valero Refinery                                                    ***        12/20/21
*** AERMET - VERSION  18081 ***   *** P# 12626                                                           ***        10:15:17
                                                                                                                    PAGE   1
*** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

                                   ***     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 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.


**Other Options Specified:
        TEMP_Sub - Meteorological data includes TEMP substitutions


**Model Accepts 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:     2 Source(s);      2 Source Group(s); and    3082 Receptor(s)

                 with:     2 POINT(s), including
                           0 POINTCAP(s) and      0 POINTHOR(s)
                   and:     0 VOLUME source(s)
                   and:     0 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 Set To Continue RUNning After the Setup Testing.


**The AERMET Input Meteorological Data Version Date:  18081


**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) =    54.90 ; 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.

**Input Runstream File:           C:\HRSA - New\P#12626\NOV_A58465\12_20_Rev_2013-2017_OTHER_1.DTA
**Output Print File:              C:\HRSA - New\P#12626\NOV_A58465\12_20_Rev_2013-2017_OTHER_1.LST

**File for Summary of Results:    C:\HRSA - New\P#12626\NOV_A58465\12_20_Rev_2013-2017_OTHER_1.SUM


*** AERMOD - VERSION  19191 ***   *** Valero Refinery                                     ***        12/20/21
*** AERMET - VERSION  18081 ***   *** P# 12626                                            ***        10:15:17
                                                                                                     PAGE   2
*** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

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


     1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
     1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
     1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
     1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
     1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
     1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
     1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
     1 1 1 1 1 1 1 1 1 1   1 1 1 1 1

          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,


*** AERMOD - VERSION  19191 ***   *** Valero Refinery                                     ***        12/20/21
*** AERMET - VERSION  18081 ***   *** P# 12626                                            ***        10:15:17
                                                                                                     PAGE   3
*** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

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

   Surface file:   C:\HRSA - New\AERMET-New\VALERO_ADMIN_2013_2017.SFC                    Met Version:  18081
```

```
     Profile file:   C:\HRSA - New\AERMET-New\VALERO_ADMIN_2013_2017.PFL
     Surface format: FREE
     Profile format: FREE
     Surface station no.:   23254              Upper air station no.:   23230
               Name: CONCORD/BUCHANAN, CA                Name: UNKNOWN
               Year:   2013                              Year:   2013

 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
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
 13 01 01   1 01    -8.1   0.108  -9.000  -9.000  -999.   86.     14.2  0.05   0.89   1.00    3.30  331.   23.3  277.5  13.7
 13 01 01   1 02    -5.8   0.088  -9.000  -9.000  -999.   63.     10.6  0.04   0.89   1.00    2.80  254.   23.3  278.0  13.7
 13 01 01   1 03    -4.2   0.078  -9.000  -9.000  -999.   52.     10.4  0.07   0.89   1.00    2.30    7.   23.3  277.4  13.7
 13 01 01   1 04    -3.3   0.087  -9.000  -9.000  -999.   61.     17.7  0.29   0.89   1.00    1.90   40.   23.3  277.4  13.7
 13 01 01   1 05   -17.3   0.300  -9.000  -9.000  -999.  394.    141.7  0.29   0.89   1.00    3.90   95.   23.3  278.1  13.7
 13 01 01   1 06   -13.1   0.227  -9.000  -9.000  -999.  261.     80.7  0.29   0.89   1.00    3.30   78.   23.3  277.2  13.7
 13 01 01   1 07   -12.3   0.142  -9.000  -9.000  -999.  131.     20.9  0.29   0.89   1.00    3.10   72.   23.3  276.9  13.7
 13 01 01   1 08   -11.0   0.137  -9.000  -9.000  -999.  122.     21.2  0.29   0.89   1.00    3.00   60.   23.3  277.1  13.7
 13 01 01   1 09    -2.1   0.082  -9.000  -9.000  -999.   57.     24.2  0.29   0.89   0.39    1.80  119.   23.3  277.6  13.7
 13 01 01   1 10    46.8   0.338   0.541   0.005  123.  472.    -74.9  0.29   0.89   0.26    3.20   95.   23.3  278.6  13.7
 13 01 01   1 11    79.3   0.327   0.837   0.005  268.  449.    -39.9  0.29   0.89   0.21    2.90   89.   23.3  279.9  13.7
 13 01 01   1 12    97.7   0.400   1.236   0.008  701.  607.    -59.3  0.29   0.89   0.20    3.70   67.   23.3  280.5  13.7
 13 01 01   1 13    99.3   0.541   1.346   0.006  892.  956.   -144.9  0.29   0.89   0.19    5.40   67.   23.3  282.4  13.7
 13 01 01   1 14    86.4   0.630   1.298   0.005  919. 1199.   -262.8  0.29   0.89   0.20    6.50   70.   23.3  283.4  13.7
 13 01 01   1 15    57.5   0.664   1.140   0.005  936. 1297.   -461.7  0.29   0.89   0.24    7.00   66.   23.3  283.8  13.7
 13 01 01   1 16    15.4   0.514   0.736   0.007  941.  909.   -801.4  0.29   0.89   0.32    5.50   61.   23.3  283.8  13.7
 13 01 01   1 17   -26.0   0.269  -9.000  -9.000  -999.  403.     67.8  0.29   0.89   0.56    4.10   67.   23.3  283.1  13.7
 13 01 01   1 18   -14.1   0.151  -9.000  -9.000  -999.  158.     22.0  0.29   0.89   1.00    3.30   70.   23.3  282.5  13.7
 13 01 01   1 19    -9.4   0.123  -9.000  -9.000  -999.  104.     18.0  0.29   0.89   1.00    2.70   73.   23.3  281.9  13.7
 13 01 01   1 20    -1.8   0.049  -9.000  -9.000  -999.   29.      6.1  0.05   0.89   1.00    1.50  322.   23.3  281.0  13.7
 13 01 01   1 21    -1.6   0.046  -9.000  -9.000  -999.   24.      5.7  0.05   0.89   1.00    1.40  316.   23.3  281.0  13.7
 13 01 01   1 22    -1.8   0.049  -9.000  -9.000  -999.   26.      6.1  0.05   0.89   1.00    1.50  333.   23.3  278.9  13.7
 13 01 01   1 23    -2.3   0.056  -9.000  -9.000  -999.   32.      6.9  0.05   0.89   1.00    1.70  344.   23.3  278.8  13.7
 13 01 01   1 24    -4.1   0.075  -9.000  -9.000  -999.   49.      9.4  0.07   0.89   1.00    2.20   27.   23.3  278.9  13.7


 First hour of profile data
 YR MO DY HR HEIGHT F  WDIR    WSPD  AMB_TMP sigmaA  sigmaW  sigmaV
 13 01 01 01   13.7 0 -999.   -99.00   277.6  999.0  -99.00  -99.00
 13 01 01 01   23.3 1  331.    3.30  -999.0   15.7  -99.00    0.87


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


 *** AERMOD - VERSION  19191 ***   *** Valero Refinery                                          ***        12/20/21
 *** AERMET - VERSION  18081 ***   *** P# 12626                                                 ***        10:15:17
                                                                                                           PAGE   4
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

                        *** THE SUMMARY OF MAXIMUM PERIOD ( 43824 HRS) RESULTS ***


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

```
                                                                              NETWORK
GROUP ID                      AVERAGE CONC           RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


S1004_T   1ST HIGHEST VALUE IS       0.84853 AT (  574865.00,  4214040.00,    68.04,   136.37,    1.50)  DC
          2ND HIGHEST VALUE IS       0.80340 AT (  576065.00,  4214140.00,     2.66,     2.66,    1.50)  DC
          3RD HIGHEST VALUE IS       0.74013 AT (  576065.00,  4214240.00,     3.25,     3.25,    1.50)  DC
          4TH HIGHEST VALUE IS       0.71906 AT (  576165.00,  4214140.00,     4.05,     4.05,    1.50)  DC
          5TH HIGHEST VALUE IS       0.69961 AT (  574865.00,  4213840.00,    72.76,   125.64,    1.50)  DC
          6TH HIGHEST VALUE IS       0.65103 AT (  576165.00,  4214240.00,     4.84,     4.84,    1.50)  DC
          7TH HIGHEST VALUE IS       0.64982 AT (  576265.00,  4214140.00,     7.02,     7.02,    1.50)  DC
          8TH HIGHEST VALUE IS       0.64961 AT (  576165.00,  4214040.00,     2.98,     2.98,    1.50)  DC
          9TH HIGHEST VALUE IS       0.64502 AT (  575965.00,  4214340.00,     2.57,     2.57,    1.50)  DC
         10TH HIGHEST VALUE IS       0.61412 AT (  576265.00,  4214040.00,     4.57,     4.57,    1.50)  DC


S1004_M   1ST HIGHEST VALUE IS       0.40973 AT (  576065.00,  4214140.00,     2.66,     2.66,    1.50)  DC
          2ND HIGHEST VALUE IS       0.38342 AT (  576065.00,  4214240.00,     3.25,     3.25,    1.50)  DC
          3RD HIGHEST VALUE IS       0.36983 AT (  576165.00,  4214140.00,     4.05,     4.05,    1.50)  DC
          4TH HIGHEST VALUE IS       0.34010 AT (  576165.00,  4214240.00,     4.84,     4.84,    1.50)  DC
          5TH HIGHEST VALUE IS       0.33455 AT (  576265.00,  4214140.00,     7.02,     7.02,    1.50)  DC
          6TH HIGHEST VALUE IS       0.32810 AT (  575965.00,  4214340.00,     2.57,     2.57,    1.50)  DC
          7TH HIGHEST VALUE IS       0.32321 AT (  576165.00,  4214040.00,     2.98,     2.98,    1.50)  DC
          8TH HIGHEST VALUE IS       0.30790 AT (  576265.00,  4214040.00,     4.57,     4.57,    1.50)  DC
          9TH HIGHEST VALUE IS       0.30293 AT (  576265.00,  4214240.00,     6.46,     6.46,    1.50)  DC
         10TH HIGHEST VALUE IS       0.30180 AT (  576065.00,  4214340.00,     3.71,     3.71,    1.50)  DC



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




  *** AERMOD - VERSION  19191 ***   *** Valero Refinery                                   ***        12/20/21
  *** AERMET - VERSION  18081 ***   *** P# 12626                                          ***        10:15:17
                                                                                                     PAGE   5
  *** MODELOPTs:   RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

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


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

                                            DATE                                                          NETWORK
GROUP ID                      AVERAGE CONC  (YYMMDDHH)         RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


S1004_T  HIGH   1ST HIGH VALUE IS       95.78510  ON 14033101: AT (  576665.00,  4216340.00,    75.66,   143.26,    1.50)  DC
S1004_M  HIGH   1ST HIGH VALUE IS       24.99487  ON 15121905: AT (  577265.00,  4216740.00,   107.76,   178.75,    1.50)  DC

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

```
*** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

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

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

A Total of           0 Fatal Error Message(s)
A Total of           5 Warning Message(s)
A Total of        1175 Informational Message(s)

A Total of       43824 Hours Were Processed

A Total of           1 Calm Hours Identified

A Total of        1174 Missing Hours Identified (  2.68 Percent)


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


    ********   WARNING MESSAGES   ********
SO W320     54        PPARM: Input Parameter May Be Out-of-Range for Parameter        VS
MX W403   1641        PFLCNV: Turbulence data is being used w/o ADJ_U* option     SigA Data
MX W403      1        PFLCNV: Turbulence data is being used w/o ADJ_U* option     SigA Data
CN W305      1        WAKFLG: Stack height > or = EPA formula height for SRCID:     S1004_T
CN W305      1        WAKFLG: Stack height > or = EPA formula height for SRCID:     S1004_M
```

HARP Project Summary Report 12/20/2021 1:08:36 PM

PROJECT INFORMATION
HARP Version: 21081
Project Name: 12_20_M
Project Output Directory: C:\HRSA - New\P#12626\NOV_A58465\12_20_M
HARP Database: NA

FACILITY INFORMATION
Origin
X (m):575382
Y (m):4214275
Zone:10
No. of Sources:0
No. of Buildings:0

EMISSION INVENTORY
No. of Pollutants:4
No. of Background Pollutants:0

Emissions

ScrID	StkID	ProID		PolID	PolAbbrev	
Multi	Annual Ems	MaxHr Ems		MWAF		
	(lbs/yr)	(lbs/hr)				
S1004_M	0	0		71432	Benzene	1
	2518	17.04	1			
S1004_M	0	0		100414	Ethyl Benzene	1
	600	6.16	1			
S1004_M	0	0		108883	Toluene	1
	5105	34.73	1			
S1004_M	0	0		1330207	Xylenes	1
	1856	18.35	1			

Background

PolID	PolAbbrev	Conc (ug/m^3)	MWAF

Ground level concentration files (\glc\)

100414MAXHR.txt
100414PER.txt
108883MAXHR.txt
108883PER.txt
1330207MAXHR.txt
1330207PER.txt
71432MAXHR.txt
71432PER.txt

```
***POLLUTANT HEALTH INFORMATION***
Health Database: C:\HARP2\Tables\HEALTH17320.mdb
Health Table Version: HEALTH20276
Official: True
```

| PolID | PolAbbrev | InhCancer | OralCancer | AcuteREL | |
InhChronicREL	OralChronicREL	InhChronic8HRREL			
71432	Benzene	0.1		27	3
		3			
100414	Ethyl Benzene	0.0087			2000
108883	Toluene			5000	420
		830			
1330207	Xylenes			22000	700

```
 *** AERMOD - VERSION  19191 ***   *** Valero Refinery                                        ***        01/03/22
 *** AERMET - VERSION  18081 ***   *** P# 12626                                                ***        11:28:02
                                                                                                          PAGE   1
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data
```

```
                                    ***      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 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.

**Other Options Specified:
        TEMP_Sub - Meteorological data includes TEMP substitutions


**Model Accepts 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:      2 Source(s);       2 Source Group(s); and       1 Receptor(s)


                with:      2 POINT(s), including
                           0 POINTCAP(s) and       0 POINTHOR(s)
                 and:      0 VOLUME source(s)
                 and:      0 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 Set To Continue RUNning After the Setup Testing.


**The AERMET Input Meteorological Data Version Date:  18081
```

```
**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) =    54.90 ; 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 =      3.5 MB of RAM.

**Input Runstream File:          C:\HRSA - New\P#12626\NOV_A58465\RR_Acute_2013-2017_OTHER_1.DTA
**Output Print File:             C:\HRSA - New\P#12626\NOV_A58465\RR_Acute_2013-2017_OTHER_1.LST

**File for Summary of Results:   C:\HRSA - New\P#12626\NOV_A58465\RR_Acute_2013-2017_OTHER_1.SUM
```

```
*** AERMOD - VERSION  19191 ***   *** Valero Refinery                                       ***        01/03/22
*** AERMET - VERSION  18081 ***   *** P# 12626                                              ***        11:28:02
                                                                                                       PAGE   2
*** MODELOPTs:   RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data
```

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


      1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1   1 1 1 1 1 1 1 1 1 1
      1 1 1 1 1 1 1 1 1 1   1 1 1 1 1

        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,
```

```
*** AERMOD - VERSION  19191 ***   *** Valero Refinery                                       ***        01/03/22
*** AERMET - VERSION  18081 ***   *** P# 12626                                              ***        11:28:02
                                                                                                       PAGE   3
*** MODELOPTs:   RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data
```

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

```
     Surface file:   C:\HRSA - New\AERMET-New\VALERO_ADMIN_2013_2017.SFC                                    Met Version: 18081
     Profile file:   C:\HRSA - New\AERMET-New\VALERO_ADMIN_2013_2017.PFL
     Surface format: FREE
     Profile format: FREE
     Surface station no.:   23254                  Upper air station no.:    23230
                  Name: CONCORD/BUCHANAN, CA                       Name: UNKNOWN
                  Year:  2013                                      Year:  2013

  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
 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
   13 01 01   1 01   -8.1  0.108 -9.000 -9.000 -999.   86.    14.2  0.05  0.89  1.00   3.30  331.   23.3  277.5  13.7
   13 01 01   1 02   -5.8  0.088 -9.000 -9.000 -999.   63.    10.6  0.04  0.89  1.00   2.80  254.   23.3  278.0  13.7
   13 01 01   1 03   -4.2  0.078 -9.000 -9.000 -999.   52.    10.4  0.07  0.89  1.00   2.30    7.   23.3  277.4  13.7
   13 01 01   1 04   -3.3  0.087 -9.000 -9.000 -999.   61.    17.7  0.29  0.89  1.00   1.90   40.   23.3  277.4  13.7
   13 01 01   1 05  -17.3  0.300 -9.000 -9.000 -999.  394.   141.7  0.29  0.89  1.00   3.90   95.   23.3  278.1  13.7
   13 01 01   1 06  -13.1  0.227 -9.000 -9.000 -999.  261.    80.7  0.29  0.89  1.00   3.30   78.   23.3  277.2  13.7
   13 01 01   1 07  -12.3  0.142 -9.000 -9.000 -999.  131.    20.9  0.29  0.89  1.00   3.10   72.   23.3  276.9  13.7
   13 01 01   1 08  -11.0  0.137 -9.000 -9.000 -999.  122.    21.2  0.29  0.89  1.00   3.00   60.   23.3  277.1  13.7
   13 01 01   1 09   -2.1  0.082 -9.000 -9.000 -999.   57.    24.2  0.29  0.89  0.39   1.80  119.   23.3  277.6  13.7
   13 01 01   1 10   46.8  0.338  0.541  0.005  123.  472.   -74.9  0.29  0.89  0.26   3.20   95.   23.3  278.6  13.7
   13 01 01   1 11   79.3  0.327  0.837  0.005  268.  449.   -39.9  0.29  0.89  0.21   2.90   89.   23.3  279.9  13.7
   13 01 01   1 12   97.7  0.400  1.236  0.008  701.  607.   -59.3  0.29  0.89  0.20   3.70   67.   23.3  280.5  13.7
   13 01 01   1 13   99.3  0.541  1.346  0.006  892.  956.  -144.9  0.29  0.89  0.19   5.40   67.   23.3  282.4  13.7
   13 01 01   1 14   86.4  0.630  1.298  0.005  919. 1199.  -262.8  0.29  0.89  0.20   6.50   70.   23.3  283.4  13.7
   13 01 01   1 15   57.5  0.664  1.140  0.005  936. 1297.  -461.7  0.29  0.89  0.24   7.00   66.   23.3  283.8  13.7
   13 01 01   1 16   15.4  0.514  0.736  0.007  941.  909.  -801.4  0.29  0.89  0.32   5.50   61.   23.3  283.8  13.7
   13 01 01   1 17  -26.0  0.269 -9.000 -9.000 -999.  403.    67.8  0.29  0.89  0.56   4.10   67.   23.3  283.1  13.7
   13 01 01   1 18  -14.1  0.151 -9.000 -9.000 -999.  158.    22.0  0.29  0.89  1.00   3.30   70.   23.3  282.5  13.7
   13 01 01   1 19   -9.4  0.123 -9.000 -9.000 -999.  104.    18.0  0.29  0.89  1.00   2.70   73.   23.3  281.9  13.7
   13 01 01   1 20   -1.8  0.049 -9.000 -9.000 -999.   29.     6.1  0.05  0.89  1.00   1.50  322.   23.3  281.0  13.7
   13 01 01   1 21   -1.6  0.046 -9.000 -9.000 -999.   24.     5.7  0.05  0.89  1.00   1.40  316.   23.3  281.0  13.7
   13 01 01   1 22   -1.8  0.049 -9.000 -9.000 -999.   26.     6.1  0.05  0.89  1.00   1.50  333.   23.3  278.9  13.7
   13 01 01   1 23   -2.3  0.056 -9.000 -9.000 -999.   32.     6.9  0.05  0.89  1.00   1.70  344.   23.3  278.8  13.7
   13 01 01   1 24   -4.1  0.075 -9.000 -9.000 -999.   49.     9.4  0.07  0.89  1.00   2.20   27.   23.3  278.9  13.7


  First hour of profile data
  YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
  13 01 01 01   13.7 0 -999.  -99.00  277.6  999.0  -99.00  -99.00
  13 01 01 01   23.3 1  331.    3.30 -999.0   15.7  -99.00    0.87


  F indicates top of profile (=1) or below (=0)
  *** AERMOD - VERSION  19191 ***    *** Valero Refinery                                            ***        01/03/22
  *** AERMET - VERSION  18081 ***    *** P# 12626                                                   ***        11:28:02
                                                                                                               PAGE    4
  *** MODELOPTs:     RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

                              *** THE SUMMARY OF MAXIMUM PERIOD ( 43824 HRS) RESULTS ***
```

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

                                                                                              NETWORK
GROUP ID                        AVERAGE CONC            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG) OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


S1004_T   1ST HIGHEST VALUE IS        0.01413 AT (   573965.00,  4214640.00,    129.99,    174.86,     1.50)  DC
          2ND HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          3RD HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          4TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          5TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          6TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          7TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          8TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          9TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
         10TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)


S1004_M   1ST HIGHEST VALUE IS        0.04623 AT (   573965.00,  4214640.00,    129.99,    174.86,     1.50)  DC
          2ND HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          3RD HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          4TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          5TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          6TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          7TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          8TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
          9TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)
         10TH HIGHEST VALUE IS        0.00000 AT (        0.00,        0.00,      0.00,      0.00,     0.00)


  *** RECEPTOR TYPES:  GC = GRIDCART
                       GP = GRIDPOLR
                       DC = DISCCART
                       DP = DISCPOLR
 *** AERMOD - VERSION  19191 ***   *** Valero Refinery                                       ***       01/03/22
 *** AERMET - VERSION  18081 ***   *** P# 12626                                              ***       11:28:02
                                                                                                       PAGE   5
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

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


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

                                                 DATE                                         NETWORK
GROUP ID                        AVERAGE CONC    (YYMMDDHH)       RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)  OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -


S1004_T  HIGH   1ST HIGH VALUE IS       3.52442  ON 17013109: AT (   573965.00,  4214640.00,    129.99,    174.86,     1.50)  DC
         HIGH   2ND HIGH VALUE IS       2.84831  ON 17021409: AT (   573965.00,  4214640.00,    129.99,    174.86,     1.50)  DC
         HIGH   3RD HIGH VALUE IS       2.41685  ON 17021309: AT (   573965.00,  4214640.00,    129.99,    174.86,     1.50)  DC
```

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                  HIGH    4TH HIGH VALUE IS       2.29623  ON 17030809: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
                  HIGH    5TH HIGH VALUE IS       2.17121  ON 17030309: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
                  HIGH    6TH HIGH VALUE IS       2.09686  ON 17012817: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
                  HIGH    7TH HIGH VALUE IS       1.96227  ON 17021417: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
                  HIGH    8TH HIGH VALUE IS       1.93608  ON 17030209: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
                  HIGH    9TH HIGH VALUE IS       1.84586  ON 17013017: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
                  HIGH   10TH HIGH VALUE IS       1.81411  ON 17030311: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC

 S1004_M  HIGH    1ST HIGH VALUE IS      21.98277  ON 17013002: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH    2ND HIGH VALUE IS      13.49406  ON 17021408: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH    3RD HIGH VALUE IS      10.10119  ON 17021423: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH    4TH HIGH VALUE IS       9.79904  ON 17012607: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH    5TH HIGH VALUE IS       9.09565  ON 17013001: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH    6TH HIGH VALUE IS       8.20193  ON 17013003: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH    7TH HIGH VALUE IS       7.12213  ON 17021805: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH    8TH HIGH VALUE IS       6.68749  ON 16021008: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH    9TH HIGH VALUE IS       6.00882  ON 17020804: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC
          HIGH   10TH HIGH VALUE IS       5.77954  ON 17021418: AT (   573965.00,  4214640.00,   129.99,   174.86,    1.50)  DC


    *** RECEPTOR TYPES:  GC = GRIDCART
                         GP = GRIDPOLR
                         DC = DISCCART
                         DP = DISCPOLR
 *** AERMOD - VERSION  19191 ***   *** Valero Refinery                                              ***        01/03/22
 *** AERMET - VERSION  18081 ***   *** P# 12626                                                     ***        11:28:02
                                                                                                              PAGE   6
 *** MODELOPTs:    RegDFAULT  CONC  ELEV  FLGPOL  NODRYDPLT  NOWETDPLT  RURAL  SigA Data

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

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

 A Total of         0 Fatal Error Message(s)
 A Total of         5 Warning Message(s)
 A Total of      1175 Informational Message(s)

 A Total of     43824 Hours Were Processed

 A Total of         1 Calm Hours Identified

 A Total of      1174 Missing Hours Identified (  2.68 Percent)


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


     ********   WARNING MESSAGES   ********
 SO W320      53       PPARM: Input Parameter May Be Out-of-Range for Parameter         VS
 MX W403     100       PFLCNV: Turbulence data is being used w/o ADJ_U* option       SigA Data
```

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MX W403      1         PFLCNV: Turbulence data is being used w/o ADJ_U* option      SigA Data
CN W305      1         WAKFLG: Stack height > or = EPA formula height for SRCID:      S1004_T
CN W305      1         WAKFLG: Stack height > or = EPA formula height for SRCID:      S1004_M
```

HARP Project Summary Report 1/24/2022 10:45:48 AM

PROJECT INFORMATION
HARP Version: 21081
Project Name: 01_03_M
Project Output Directory: C:\HRSA - New\P#12626\NOV_A58465\01_03_M
HARP Database: NA

FACILITY INFORMATION
Origin
X (m):575382
Y (m):4214275
Zone:10
No. of Sources:0
No. of Buildings:0

EMISSION INVENTORY
No. of Pollutants:10
No. of Background Pollutants:0

Emissions

ScrID	StkID	ProID		PolID	PolAbbrev	
Multi	Annual Ems	MaxHr Ems		MWAF		
	(lbs/yr)	(lbs/hr)				
M1	0	0		71432	Benzene	1
	2518	17.04	1			
M2	0	0		71432	Benzene	1
	2518	17.04	1			
M3	0	0		71432	Benzene	1
	2518	17.04	1			
M4	0	0		71432	Benzene	1
	2518	17.04	1			
M5	0	0		71432	Benzene	1
	2518	17.04	1			
M6	0	0		71432	Benzene	1
	2518	17.04	1			
M7	0	0		71432	Benzene	1
	2518	17.04	1			
M8	0	0		71432	Benzene	1
	2518	17.04	1			
M9	0	0		71432	Benzene	1
	2518	17.04	1			
M10	0	0		71432	Benzene	1
	2518	17.04	1			

Background

PolID	PolAbbrev	Conc (ug/m^3)	MWAF

_____

Ground level concentration files (\glc\)
_____

71432MAXHR.txt
71432PER.txt

POLLUTANT HEALTH INFORMATION
Health Database: C:\HARP2\Tables\HEALTH17320.mdb
Health Table Version: HEALTH20276
Official: True

PolID	PolAbbrev	InhCancer	OralCancer	AcuteREL	
InhChronicREL	OralChronicREL	InhChronic8HRREL			
71432	Benzene	0.1		27	3
		3			