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November 16, 2020

By E-Mail

Jocelyn Wong, Clerk of the Board of Supervisors
1 Dr. Carlton B. Goodlett Place, Room 244
San Francisco, CA 94102
Board.of.Supervisors@sfgov.org
bos.legislation@sfgov.org

Re: File No. 201127 – Appeal of CEQA "Common Sense" Exemption Determination 2019-004110ENV – 2675 Geary Boulevard
BOS Record No. 2019-004110APL
Supplemental Submittal from Appellants

Dear Ms. Wong:

On behalf of the Appellants in the referenced appeal, please find attached an updated Technical Memorandum and Health Risk Assessment from Environmental Planning Specialists (EPS) addressing air quality/human health impacts of the Project in question. Please include in the file for this matter and distribute as appropriate in advance of the November 17, 2020 appeal hearing.

Thank you for your kind cooperation.

Most sincerely,

M. R. WOLFE & ASSOCIATES, P.C

Mark R. Wolfe
On behalf of Appellants Julie Fisher, Tony Vargas, and UFCW Local 5

MRW:sa
attachment

ENVIRONMENTAL PERMITTING SPECIALISTS
Air Quality • Permitting • OHSA • RMP/PSM

TECHNICAL MEMORANDUM

To: John Farrow
M.R. Wolfe & Associates

Date: November 15, 2020

From: Ray Kapahi RK
Tel: 916-687-8352
Tel: 916-687-8352
E-Mail: ray.kapahi@gmail.com

Subject: Health Risk Analysis of Emissions from Proposed Whole Foods Market Located on Geary Boulevard, San Francisco, CA

Environmental Permitting Specialists (EPS) previously completed a screening level health risk evaluation of toxic air contaminants (TACs) for the above noted project and evaluated the cumulative sources TACs in the immediate vicinity of the project. The results of that screening level analysis were reported in our October 30, 2020 technical memorandum. The objectives in completing that evaluation were to determine whether the health impacts associated with exposure to TACs and PM-2.5 were significant from the project by itself or in combination with other projects affecting the same area. We found that the excess cancer risks from the project would exceed the threshold of significance of ten excess cancers for an individual project analyzed by itself. We also found that the surrounding area in the vicinity of the project would suffer a significant cumulative impact because cancer risks exceed the 100 excess cancer threshold. We noted that under the Bay Area Air Quality Management District's (BAAQMD's) CEQA guidance, any contribution by a project should be considered significant in areas where the background cancer risk exceeds 100 cancers per million.

The applicant's consultant, ESA, also provided a screening level health risk assessment of the project in an October 30, 2020 memorandum. Unlike the screening level assessment in our October 30, 2020 memo, ESA's health risk assessment was based on projected concentrations of TACs calculated using AERSCREEN, the screening-level version of the USEPA AERMOD dispersion model. This approach would generate a more refined health risk assessment than

the Risk Prioritization Tool we used in our October 30, 2020 memo; however, AERSCREEN still relies on hypothetical meteorological data, and numerous other simplifying assumption that do not reflect the actual movement of TACs near the project site. More problematically, ESA's health risk assessment was limited to a single TAC, diesel particulate matter (DPM) from truck idling and transport refrigeration units (TRUs). ESA's health risk assessment did not include any assessment of the cancer risk from the passenger vehicles that would travel to and from the project. In addition, ESA's health risk assessment reduced the DPM from delivery vehicles by subtracting the amounts of DPM that would have been generated by the Best Buy store that discontinued operations at the site in 2017.

EPS has prepared a refined risk assessment using assumptions similar to those used in the ESA analysis. However, our analysis included TACs associated with passenger (customer) vehicles. We also separately evaluated a scenario assuming zero baseline emissions, i.e., without reducing the TACs by the amounts that would have been generated if the Best Buy operations were ongoing.

1. Passenger vehicles generate TACs.

ESA's analysis excluded TACs from light-duty vehicles, arguing that most auto traffic is gasoline-powered and generates considerably less health risk than diesel engines.[1] Although the emission rates of TACs from light-duty vehicles is lower than emission rates from trucks, there is a greater number of TACs emitted and the number of trips (light-duty vs trucks) is much greater. As a result of their greater numbers, gasoline-powered vehicles are a substantial source of cancer risk. While the California Air Resources Board (CARB) identifies diesel exhaust as "60 percent of the current estimated inhalation cancer risk," CARB explains that "the combustion and evaporation of gasoline used in vehicles, lawn and garden equipment, recreational watercraft, etc. produce other prevalent air toxics."[2]

TACs emitted by gasoline-powered vehicles include benzene, 1,3-butadiene, formaldehyde, and acetaldehyde, which CARB identifies as the 3rd, 4th, 5th, and 7th largest sources of inhalation cancer risk in California.[3] CARB's apportionment of risk by various toxic pollutants is shown below:

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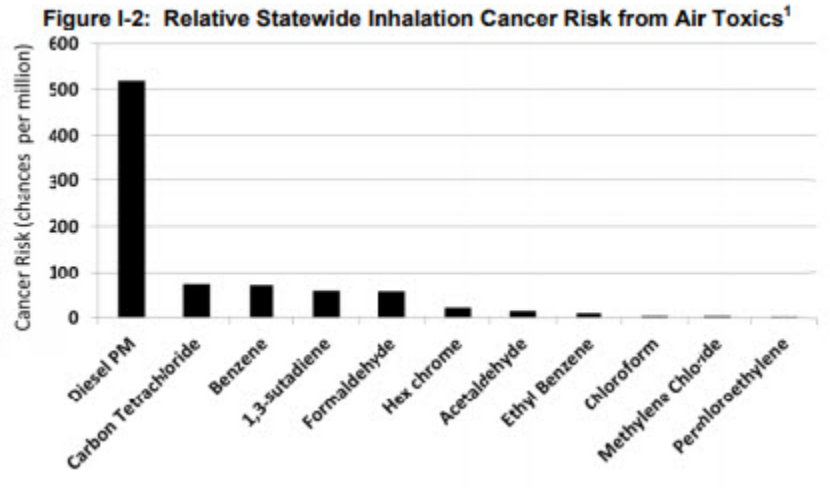
[1] ESA, Air Quality Technical Memorandum – 2675 Geary Boulevard Project, Oct. 30, 2020, pp. 3, 4.

[2] California Air Resource Board, Risk Management Guidance for Stationary Sources of Air Toxics, July 23, 2015, p. 6, available at https://ww2.arb.ca.gov/sites/default/files/classic//toxics/rma/rmgssat.pdf.

[3] Id. at 7.



When the City of San Francisco modeled cancer risk to identify its Air Pollutant Exposure Zone, the area in which cancer risk is elevated from cumulative sources, it included not just diesel-emissions but also the "total organic gasses (TOG) from tailpipe and evaporative losses" from "non-diesel (gasoline) fueled vehicles," which include "light duty auto (LDA), light duty autos less than 3750 lbs (LDA1), light duty autos weighing between 3751 lbs and 5750 lbs (LDA2), motorcycles (MCY), and motor homes (MH)."[4] These gasoline-powered vehicles were included because:

> "On-road, non-diesel cars and trucks emit toxic organic gases, such as benzene and 1,3-butadiene, that add to the incremental potential cancer risk in San Francisco. Cancer risk estimates from gasoline-powered vehicles included contributions from total organic gases (TOG) present in the exhaust emissions and those from running evaporative losses."[5]

Because cancer risks from gasoline-powered vehicles attracted to the project is not negligible, we included TACs generated by passenger vehicles in our health risk assessment.

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[4] San Francisco Department of Public Health, San Francisco Planning Department, and Ramboll, *Draft San Francisco Citywide Health Risk Assessment: Technical Support Documentation*, February 2020, p. 6,, available at *https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf.*

[5] Id. at 29.

2. Health Risk Assessment

Preparation of risk assessments is a three-step process. The first step is to identify sources of toxic air contaminants that may lead to public health risks (Hazard Identification). The second step is to assess the amount and concentration of contaminants that may reach the public (Exposure Assessment). The last step is to calculate the magnitude of the health risk as a result of exposure to harmful contaminants (Risk Characterization).

The Office of Environmental Health Hazard Assessment (OEHHA) has provided guidance on the procedures that should be used, including, the types of risks to be evaluated for each TAC, toxicological data for individual contaminants and recommended exposure pathways. The current HRA focuses on public health risks attributable to diesel delivery vehicles and passenger vehicles associated with the project.

We evaluated two scenarios. In the first scenario, we included the TACs from diesel-powered delivery vehicles and from passenger vehicles and that would be generated by the Whole Foods project. This scenario assumes zero baseline.

In the second scenario, we reduced the Whole Foods TAC emissions by the amounts that would have been generated if the Best Buy store were operating. This scenario assumes avoided emissions from future Best Buy operations.

a. Hazard identification

For the purposes of this assessment, we used the same assumptions regarding the amounts of diesel particulate matter that were developed by ESA in its October 30, 2020 memorandum. Thus, for the first scenario we assumed that the DPM from Whole Foods delivery vehicles and TRUs would amount to $2.05x10^{-04}$ tons/yr from truck idling and $5.44x10^{-03}$ tons/yr from TRUs.[6] For the second scenario, we reduced DPM emissions by $1.03x10^{-04}$ tons/yr, representing delivery truck idling for the Best Buy operations.[7] We note that ESA omitted truck emissions on roadways adjacent to the site and emissions from on-site truck maneuvering. Inclusion of these sources would have increased the cancer risk, especially at residences South of O'Farrell Street. However, we did not correct these two omissions so that we could focus our analysis on the effects of ESA's omission of light-duty vehicles and ESA's baseline assumption of continued operation of Best Buy, holding ESA's other assumptions constant.

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[6] ESA, Air Quality Technical Memorandum – 2675 Geary Boulevard Project, Oct. 30, 2020, App. B ["New Operations Whole Foods"].

[7] Id. ["Prior Operations (Best Buy)"].

We estimated light-duty vehicle traffic using the same traffic volumes assumed by ESA in its analysis of criteria pollutants. ESA assumed that the Whole Foods would generate 5,907 daily weekday trips, 10,264 Saturday trips, and 9,620 Sunday trips, for an average daily trip rate of 7,061.[8] ESA assumed that the Best Buy operations generated 2,603 daily trips.[9] The net increase in number of vehicles was estimated to equal 7,061 – 2,603 = 4,458 vehicles per day. This is the net increase in vehicles assumed by ESA in its assessment of criteria pollutants.[10]

We calculated emissions for light-duty vehicle traffic based on the running emissions within 1,000 feet of the project because that is the distance recommended for analysis by BAAQMD. We used CARB's on-road vehicle EMissions FACtor (EMFAC) model to determine the total organic gasses (TOG) emitted as tail-pipe running emissions (TOG_RUNEX). We also used EMFAC to determine evaporative emissions generated by recently parked vehicle (TOG_HOTSOAK) and to determine tailpipe emissions at vehicle startup (TOG_STREX).

We then determined the amounts of eight specific TACs present in those emissions by using CARB speciation profiles, which provide the percent of constituent compounds in TOG by weight from RUNEX, HOTSOAK, and STREX.[11]

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[8] Id., CalEEMod output for 2675 Geary Boulevard - Whole Foods - Bay Area AQMD Air District, Annual, page 22 of 31, section 4.2, Trip Summary information.

[9] Id., CalEEMod output for 2675 Geary Boulevard - Best Buy - Bay Area AQMD Air District, Annual, page page 22 of 31, section 4.2, Trip Summary information.

[10] Id., p. 3.

[11] Wenli Yang, PhD, PE, CARB, Air Quality Planning and Science Division, Organic Gas Speciation Profiles for Gasoline-Powered Vehicle Hot Soak Evaporations—E6 Fuel (OG2305 & OG2306), Aug. 18, 2014 [applicable to TOG_HOTSOAK], available at https://ww3.arb.ca.gov/ei/speciate/profilereference/e6hotsoak_og2305&06.pdf?_ga=2.143235 70.498150344.1605112464-1470358659.1594663568; Wenli Yang, PhD, PE, CARB, Air Quality Planning and Science Division, Organic Gas Speciation Profiles for Catalyzed Gasoline-Powered Vehicle Stabilized Running Exhaust—E6 Fuel (OG2303 & OG2304), Dec. 12, 2013 [applicable to TOG_RUNEX], available at https://ww3.arb.ca.gov/ei/speciate/profilereference/cate6running_og2303&04.pdf?_ga=2.216 786387.498150344.1605112464-1470358659.1594663568; Wenli Yang, PhD, PE, CARB, Air Quality Planning and Science Division, Organic Gas Speciation Profiles for Catalyzed Gasoline-Powered Vehicle Start Exhaust—E6 Fuel (OG2301 & OG2302), Oct. 30, 2013 [applicable to TOG_STREX], available at https://ww3.arb.ca.gov/ei/speciate/profilereference/cate6start_og2301&02.pdf?_ga=2.252346 828.498150344.1605112464-1470358659.1594663568. These speciation profiles are numbers 66, 67, and 68 on CARB's Consolidated List for Speciation Profiles, available at https://ww2.arb.ca.gov/consolidated-list-speciation-profiles.

b. Exposure Assessment

Exposure assessment involves translating the emission rate (e.g., lbs/yr) of individual toxic air contaminants into their respective concentration, for example in terms of micrograms per cubic meter (ug/m3). An atmospheric dispersion model is used to determine these concentrations. The dispersion model may incorporate the local meteorological data (wind speed, wind direction, local temperature, inversion heights, etc.), distance between the source and receptor, stack height, and exhaust flow characteristics into its determination of the concentration of individual air contaminants.

We note that ESA modeled pollutant concentrations using USEPA AERSCREEN model (version 16216) to estimate DPM and PM2.5 concentrations. As ESA explains, AERSCREEN is the screening-level version of the USEPA AERMOD dispersion model (version 19191), which uses worst-case wind angles to predict the highest pollutant concentration at a receptor, regardless of the source-receptor direction.[12]

In contrast to a screening level assessment, a refined health risk assessment uses actual meteorological data instead of hypothetical worst-case assumptions. Accordingly, we used the EPA recommended AERMOD[13] dispersion model that allows the use of local meteorological conditions in the current exposure assessment and meteorological data from Mission Bay (2008 to 2013).

This section discusses the model set-up, the extent of the modeling area, and the choice and duration of meteorological data.

b.1 Model Set-Up

The following regulatory default options were used. They are based on the latest EPA guidance on running AERMOD.

- Model Version - 19191
- Use of Calm Wind Processing

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[12] ESA, Air Quality Technical Memorandum – 2675 Geary Boulevard Project, Oct. 30, 2020, p. 4.

[13] Model description and Information available at US EPA, Support Center for Regulatory Atmospheric Modeling (SCRAM), https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models.

- Use of Missing Data Processing
- Use of Terrain Adjustment
- Source Geometry
  Loading Dock (56 ft x 58 feet), 2 meter release height
  Parking Lot – Polygon area source 3,200 sq feet), 2 meter release height
- Line Source (volume) – 5 meters wide 2 meter release height
- Source Groups – a separate source group was assigned to each of the 3 sources to create plot files for exporting to the HARP2 risk model

Emissions were modeled as a 2 area sources (loading dock, parking lot) and a line source as shown in Figure 1, Adjustment due to changes in elevation in the modeling area were included using the digital elevation model (DEM)[14] terrain data from United States Geological Survey (USGS).

b.2 Modeling Grid

A rectangular (x-y) Cartesian coordinate system was used. A region 725 meters x 725 meters (0.45 miles x 0.45 miles) was used. The modeling region divided into 25 meter cells for a total of 900 individual receptors at ground level in the vicinity of the project area. See Figure 2.

b.3 Meteorological Data

Six years of hourly meteorological data for the period 2008 to 2013 were used in the exposure assessment. The surface data (wind speed, wind direction, temperature, etc.) were recorded at Mission Bay in San Francisco.

In addition to surface meteorological data, hourly inversion height data are also required. Four years of data from the nearest upper air station (Oakland) were used to develop hourly inversion heights.

c. Risk Characterization

Risk characterization integrates the results of exposure assessment along with toxicity data and recommended exposure duration for TACs to determine cancer risk. Consistent with OEHHA Guidance, a multi-pathway exposure was used. The choice of exposure pathway depends on the specific TAC and is incorporated in the risk model (HARP2).

[14] Information on digital elevation models is available at USGS, What are digital elevation models (DEMs)? https://www.usgs.gov/faqs/what-are-digital-elevation-models-dems?qt-news_science_products=0#qt-news_science_products.

EPS employed the HARP2 risk model[15] to calculate cancer risk from exposure to project TACs. HARP incorporates the information presented in the 2015 air toxics hotspots program guidance manual[16] for the preparation of health risk assessments. This model incorporates the toxicity of the TACs generated by the project and allows risk assessment for exposure durations from 0 to 30 years. The HARP2 risk model accounts for age adjusted risk factors. For example, individuals below 10 years are much more sensitive and susceptible to exposure to TACs.

The results of the HARP2 model appear in tables that give the cancer risk at each receptor grid point and discrete receptor. The numerical values in this table can be exported into a contouring program and then overlaid onto base maps such as Google Earth to depict the spatial distribution of cancer risk. See Figures 3 and 4 for the cancer risks for the two scenarios.

The results of the analysis indicate that the project would cause increased cancer risk over 25 cancers per million at locations near homes located adjacent to O'Farrell Avenue. The maximum individual residential risk is estimated to equal 18.96 excess cancers per million for the zero baseline scenario and 14.1 excess cancers per million for the Whole Foods less emissions from Best Buy scenario. Increased cancer risks in excess of 10 cancers per million would occur over a much wider area, which includes residential uses. The maximum exposed individual receptor is identified in Figures 3 and 4.

In addition, ESA reports that there is an existing child-care center at the shopping center where the Whole Foods project would be located, which is not part of the project. Even though worker and child receptors at that site would be exposed for fewer hours than residential receptors, they would still be exposed to increased cancer risk that would likely exceed CEQA significance thresholds.

Typically, the significance of TAC cancer risks is assessed with reference to the project-caused rate of excess cancers in one million persons. Ten excess cancers in one million is the CEQA threshold of significance recommended by many California air districts in their CEQA guidance documents, e.g., South Coast Air Quality Management District, San Luis Obispo County Air Pollution Control District, Bay Area Air Quality Control District, and Sacramento Metropolitan Air Quality Management District.[17]

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[15] (HARP) Hotspots Analysis and Reporting Program Version 19121, available at: https://ww2.arb.ca.gov/our-work/programs/hot-spots-analysis-reporting-program.

[16] OEHHA "Guidance Manual for Preparation of Health Risk Assessments", February 2015, available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.

[17] South Coast Air Quality Management District, South Coast AQMD Air Quality Significance Thresholds, Revised April 2019, available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf; San Luis Obispo County Air Pollution Control District, CEQA Air Quality Handbook, April 2012, page 3-7, available at

As explained in our October 30, 2020 technical memo, BAAQMD identifies 100 excess cancers as a significant cumulative impact. The project is in the Air Pollutant Exposure Zone (APEZ) which the City has defined and mapped as the area that suffers over 100 excess cancers from TACs. BAAQMD's Thresholds of Significance Justification explains that its threshold of 100 excess cancers from all sources "sets a level beyond which any additional risk is significant."[18] Accordingly, the project would be deemed to have a significant cumulative impact even if it did not cause an additional ten excess cancers.

Finally, ESA identifies a risk threshold for the Air Pollutant Exposure Zone of 7 excess cancers in one million. Our analysis indicates that this project would exceed that threshold.[19]

https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/CEQA_Handbook_2012_v2%20%28Updated%20Map2019%29_LinkedwithMemo.pdf; Bay Area Air Quality Control District, CEQA Air Quality Guidelines, May 2017, page 2-5, available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en; Sacramento Metropolitan Air Quality Management District, SMAQMD Thresholds of Significance Table, April 2020, available at http://www.airquality.org/LandUseTransportation/Documents/CH2ThresholdsTable4-2020.pdf.

[18] BAAQMD, CEQA Guidelines, May 2017, Appendix D, Thresholds of Significance Justification, p. D-34, emphasis added, available at https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

[19] As support for its claim that the significance threshold for projects in the APEZ is 7 excess cancers, ESA cites San Francisco Department of Public Health, San Francisco Planning Department, and Ramboll, *Draft San Francisco Citywide Health Risk Assessment: Technical Support Documentation*, February 2020, *https://www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf*, accessed February 2020. We note that the cited document does not identify a significance threshold.

Figure 1

Emission Sources Modeled

Figure 2

Layout of Modeling Grid

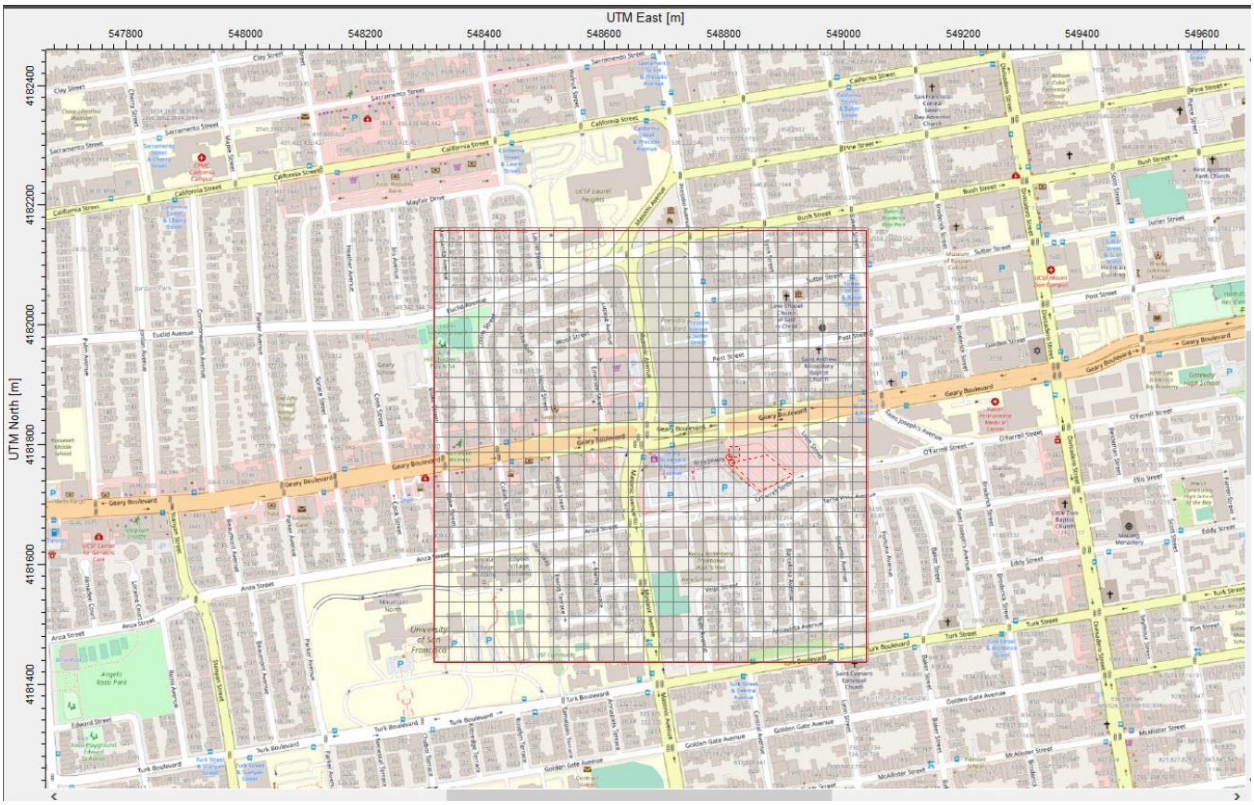

Figure 3

Spatial Distribution of 30-Year Cancer Residential Risk
Scenario: Whole Foods Project Only (Zero Baseline)
(Numbers Represent Cancer Risk per Million)

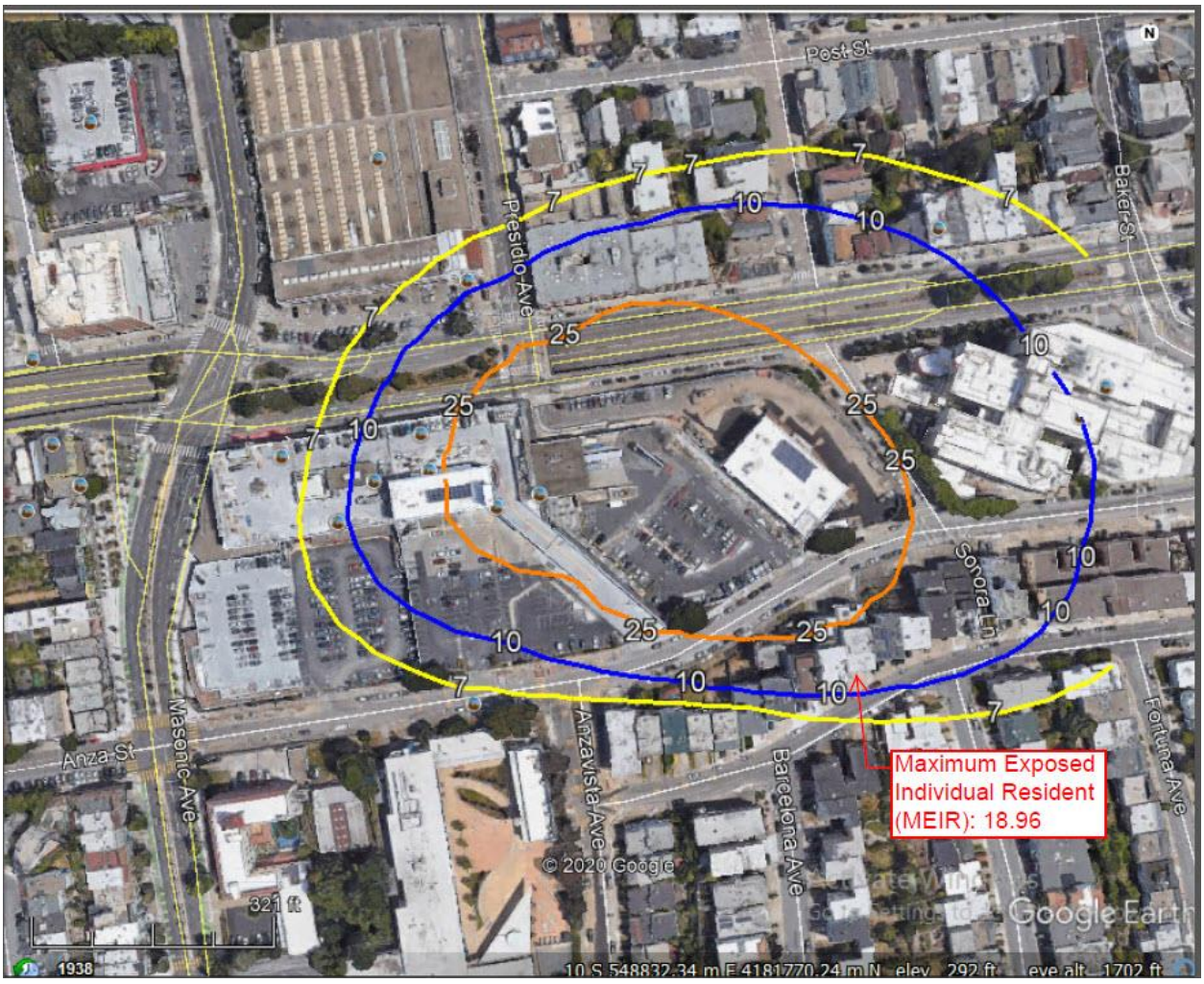

Figure 4

Spatial Distribution of 30-Year Cancer Residential Risk
Scenario: Whole Foods Project Minus Emissions from Best Buy
(Numbers Represent Cancer Risk per Million)

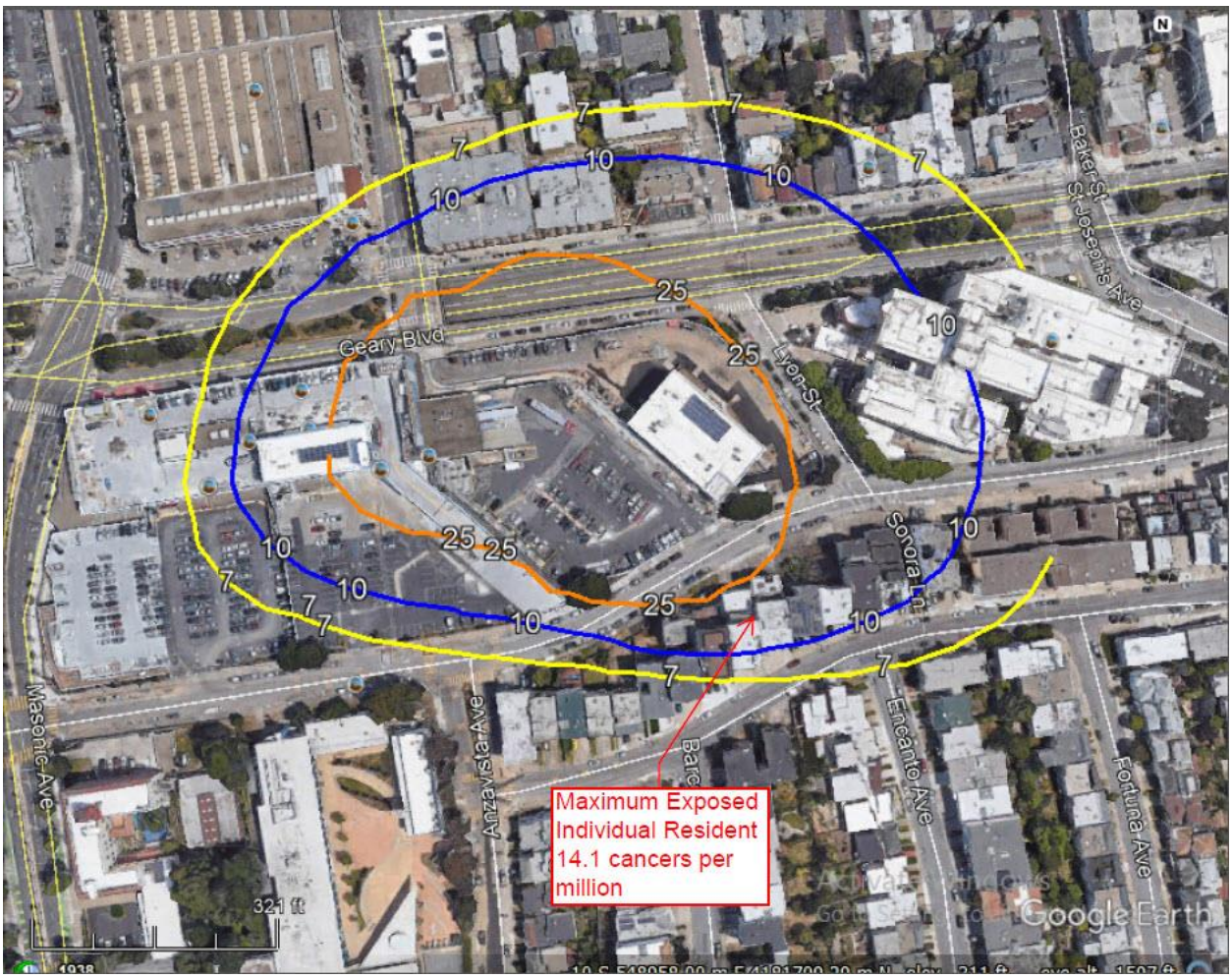

EXHIBIT 1

Tables 1 to 4

Emissions from Light Duty Vehicles

Scenario: Whole Foods – Emissions from Best Buy

Table 1: Running Emissions (RUNNEX)

Table 2: Hotsoak Emissions (HOTSOAK)

Table 3: Start-Up Emissions (STREX)

Table 4: Hotsoak + Start-Up Emissions

Table 1
Calculation of Toxic Emissions from Light Duty Vehicles within 0.23 mile of Whole Foods Site
Running Exhaust Emissions (RUNEX)

Average No. of Vehicles per Day	4,458	veh/day total
[Ref.CalEEMod Section 4.2 (PDF Page 66)	1,627,170	veh/yr total
Length of Roadway	0.23	mile
Annual Miles per Roadway Segment	374,249	miles/yr

		Emission Rate (Vehicle Travel)			
TAC	% By Wt	(g/mile)	(g/yr)	(lb/yr)	
1,3 Butadiene	0.242726	3.95E-05	14.797	0.033	
Acetaldehyde	0.90012	1.47E-04	54.873	0.121	
Benzene	3.890986	6.34E-04	237.200	0.522	
Formaldehyde	2.148524	3.50E-04	130.977	0.288	
Styrene	0.218529	3.56E-05	13.322	0.029	
Toluene	4.754084	7.74E-04	289.816	0.638	
o-Xylene	1.611576	2.63E-04	98.244	0.216	
p-Xylene	1.195047	1.95E-04	72.852	0.160	

NOTES

1. THC Emissions in Grams/mile 0.016289 g/mile

[From EMFAC 2017 for CY 2021 for Bay Area Shown Below]

2. Speciation data (% By Wt) from "Organic Gas Speciation Profiles for Catalyzed Gasoline Powered Vehicle Stabilized Running Exhaust (Dec 12, 2013)

Available at: https://ww3.arb.ca.gov/ei/speciate/profilereference/cate6running_og2303&04.pdf

EMFAC2017 (v1.0.2) Emission Rates
Region Type: Air District
Region: BAY AREA AQMD
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN. Note

Region	Calendar Year	Vehicle Cate	Model Year	Speed	Fuel	TOG_RUNEX	TOG_IDLEX	TOG_STREX	TOG_HOTSOAK	TOG_RUNLOSS	TOG_R
BAY AREA	2021	LDA	Aggregated	Aggregated	GAS	0.016289004	0	0.308359909	0.114499554	0.239266064	0.1

Table 2
Calculation of Toxic Emissions from Light Duty Vehicles
HOTSOAK Emissions

Average No. of Trips per Day	4,458	trips/day
[Ref.CalEEMod Section 4.2 (PDF Page 66)	1,627,170	trips/yr

		Emission Rate (Hot Soak)			
TAC	% By Wt	(g/trip)	(g/yr)	(lb/yr)	
Benzene	1.517855	1.74E-03	2827.919	6.229	
Styrene	0.033139	3.79E-05	61.741	0.136	
Toluene	9.993516	1.14E-02	18618.943	41.011	
o-Xylene	1.791203	2.05E-03	3337.195	7.351	

NOTES

1. THC Emissions in Grams/trip 0.1144996 g/trip

[From EMFAC 2017 for CY 2021 for Bay Area Shown Below]

2. Speciation data (% By Wt) from "Organic Gas Speciation Profiles for Catalyzed Gasoline Powered Vehicle Hot Soak Evaporation (Aug 18, 2014)

Available at:

https://ww3.arb.ca.gov/ei/speciate/profilereference/e6hotsoak_og2305&06.pdf?_ga=2.89130203.1540730670.1605110241-1255759141.1605013967

3. Calculations

gram/trip = THC Emissions (g/trip) x(By Wt)

gram/yr = Speciated Emissions (g/trip) x (number ot trips/yr))

lbs/yr = (gram/yr) /454 (grams per lb)

Table 3
Calculation of Toxic Emissions from Light Duty Vehicles
Start-Up (STREX) Emissions

Average No. of Trips per Day 4,458 trips/day
[Ref.CalEEMod Section 4.2 (PDF Page 96) 1,627,170 trips/yr

		Startup (STREX)			
TAC	% By Wt	(g/trip)	(g/yr)	(lb/yr)	
Benzene	2.83552	8.74E-03	14227.335	31.338	
Styrene	0.282979	8.73E-04	1419.858	3.127	
Toluene	8.025091	2.47E-02	40266.215	88.692	
o-Xylene	1.95345	6.02E-03	9801.513	21.589	
ethylbenzene	1.417089	4.37E-03	7110.301	15.661	
Formaldehyde	1.541993	4.75E-03	7737.011	17.042	
Naphthalene	0.063994	1.97E-04	321.092	0.707	
p-Xylene	1.766653	5.45E-03	8864.252	19.525	

NOTES

1. THC Emissions in Grams/trip 0.3083599 g/trip
[From EMFAC 2017 for CY 2021 for Bay Area Shown Below]
2. Speciation data (% By Wt) from "Organic Gas Speciation Profiles for Catalyzed Gasoline Powered Vehicle Start-Up Emissions (Oct 30, 2013)
Available at: https://ww2.arb.ca.gov/consolidated-list-speciation-profiles
3. Calculations
    gram/trip = THC Emissions (g/trip) x(By Wt)
    gram/yr = Speciated Emissions (g/trip) x (number ot trips/yr))
    lbs/yr = (gram/yr) /454 (grams per lb)

Table 4
Calculation of Toxic Emissions from Light Duty Vehicles
Start-Up (STREX) Emissions + HOTSOAK Emissions

	From Table 3	From Table 2			
TAC	STREX	HOTSOAK		Total	
	(lbs/yr)	(lbs/yr)		(lbs/yr)	
Benzene	31.34	6.229		37.567	
Styrene	3.13	0.136		3.263	
Toluene	88.69	41.011		129.703	
o-Xylene	21.59	7.351		28.940	
Ethylbenzene	15.66	Negl		15.661	
Formaldehyde	17.04	Negl		17.042	
Naphthalene	0.71	Negl		0.707	
p-Xylene	19.52	Negl		19.525	

Excerpts of AERMOD Dispersion Model Report

```
**
**************************************
**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.9.0
** Lakes Environmental Software Inc.
** Date: 11/11/2020
** File: C:\Lakes\AERMOD View\WF_NOx\WF_NOx.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Lakes\AERMOD\wf_NOx. ISC
   TITLETWO Run to create plot files to export to HARP (3 Sources)
   MODELOPT CONC
   AVERTIME 1 PERIOD
   URBANOPT 2500
   POLLUTID GENERIC
   RUNORNOT RUN
   ERRORFIL WF_NOx.err
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
** ------------------------------------------------------------------------
** Line Source Represented by Area Sources
** LINE AREA Source ID = ARLN1
** DESCRSRC Road Emissions
** PREFIX
** Length of Side = 5.00
** Ratio = 10
** Vertical Dimension = 5.00
** Emission Rate = 1.0475E-08
** Nodes = 6
** 548660.775, 4181672.245, 83.01, 0.00
** 548851.222, 4181707.614, 93.01, 0.00
** 548922.866, 4181743.889, 87.04, 0.00
** 548861.198, 4181794.675, 79.49, 0.00
** 548825.829, 4181791.954, 81.80, 0.00
** 548824.015, 4181792.861, 81.82, 0.00
** ------------------------------------------------------------------------
   LOCATION A0000001     AREA     548661.231 4181669.787 82.92
```

```
   LOCATION A0000002     AREA     548708.843 4181678.629 86.40
   LOCATION A0000003     AREA     548756.455 4181687.471 90.43
   LOCATION A0000004     AREA     548804.067 4181696.313 94.15
   LOCATION A0000005     AREA     548852.351 4181705.383 93.65
   LOCATION A0000006     AREA     548888.173 4181723.521 91.23
   LOCATION A0000007     AREA     548924.455 4181745.819 86.76
   LOCATION A0000008     AREA     548893.621 4181771.212 85.07
   LOCATION A0000009     AREA     548861.006 4181797.168 80.41
   LOCATION A0000010     AREA     548826.947 4181794.190 82.74
** End of LINE AREA Source ID = ARLN1
   LOCATION PARKING_LOT  AREAPOLY   548812.607  4181769.320       86.730
** DESCRSRC Parking Laot
   LOCATION LOADING_DOCK AREA       548808.890  4181779.730       84.700
** Source Parameters **
** LINE AREA Source ID = ARLN1
   SRCPARAM A0000001     1.0475E-08     0.000    48.426     5.000   -10.521     5.000
   SRCPARAM A0000002     1.0475E-08     0.000    48.426     5.000   -10.521     5.000
   SRCPARAM A0000003     1.0475E-08     0.000    48.426     5.000   -10.521     5.000
   SRCPARAM A0000004     1.0475E-08     0.000    48.426     5.000   -10.521     5.000
   SRCPARAM A0000005     1.0475E-08     0.000    40.152     5.000   -26.854     5.000
   SRCPARAM A0000006     1.0475E-08     0.000    40.152     5.000   -26.854     5.000
   SRCPARAM A0000007     1.0475E-08     0.000    39.944     5.000  -140.528     5.000
   SRCPARAM A0000008     1.0475E-08     0.000    39.944     5.000  -140.528     5.000
   SRCPARAM A0000009     1.0475E-08     0.000    35.473     5.000   175.601     5.000
   SRCPARAM A0000010     1.0475E-08     0.000     2.028     5.000  -153.435     5.000
** ----------------------------------------------------------------------
   SRCPARAM PARKING_LOT  0.0003118279     2.000         4
   AREAVERT PARKING_LOT  548812.607 4181769.320 548872.837 4181781.961
   AREAVERT PARKING_LOT  548913.734 4181748.499 548860.940 4181720.987
   SRCPARAM LOADING_DOCK 0.0032761643     2.000    17.100    17.850     0.000
   URBANSRC A0000001
   URBANSRC A0000002
   URBANSRC A0000003
   URBANSRC A0000004
   URBANSRC A0000005
   URBANSRC A0000006
   URBANSRC A0000007
   URBANSRC A0000008
   URBANSRC A0000009
   URBANSRC A0000010
   URBANSRC LOADING_DOCK
   URBANSRC PARKING_LOT
   SRCGROUP ARNL1    A0000001 A0000002 A0000003 A0000004 A0000005 A0000006
   SRCGROUP ARNL1    A0000007 A0000008 A0000009 A0000010
   SRCGROUP LOADING_ LOADING_DOCK
   SRCGROUP PARKING_ PARKING_LOT
   SRCGROUP ALL
SO FINISHED
**
**************************************
** AERMOD Receptor Pathway
**************************************
**
**
```

```
RE STARTING
   INCLUDED WF_NOx.rou
RE FINISHED
**
**************************************
** AERMOD Meteorology Pathway
**************************************
**
**
ME STARTING
   SURFFILE miss_bay.sfc
   PROFFILE miss_bay.pfl
   SURFDATA 23234 2008 Mission_Bay
   UAIRDATA 23230 2008 OAKLAND/WSO_AP
   SITEDATA 803 2008
   PROFBASE 246.06 FEET
   STARTEND 2008 1 1 1 2008 12 31 24
ME FINISHED
**
**************************************
** AERMOD Output Pathway
**************************************
**
**
OU STARTING
   RECTABLE ALLAVE 1ST
   RECTABLE 1 1ST
** Auto-Generated Plotfiles
   PLOTFILE 1 ALL 1ST WF_NOX.AD\01H1GALL.PLT 31
   PLOTFILE 1 ARNL1 1ST WF_NOX.AD\01H1G001.PLT 32
   PLOTFILE 1 LOADING_ 1ST WF_NOX.AD\01H1G002.PLT 33
   PLOTFILE 1 PARKING_ 1ST WF_NOX.AD\01H1G003.PLT 34
   PLOTFILE PERIOD ALL WF_NOX.AD\PE00GALL.PLT 35
   PLOTFILE PERIOD ARNL1 WF_NOX.AD\PE00G001.PLT 36
   PLOTFILE PERIOD LOADING_ WF_NOX.AD\PE00G002.PLT 37
   PLOTFILE PERIOD PARKING_ WF_NOX.AD\PE00G003.PLT 38
   FILEFORM EXP
   SUMMFILE WF_NOx.sum
OU FINISHED


  *** Message Summary For AERMOD Model Setup ***

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

 A Total of            0 Fatal Error Message(s)
 A Total of            4 Warning Message(s)
 A Total of            0 Informational Message(s)


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

```
   ********   WARNING MESSAGES   ********
CO W320      23       URBOPT: Input Parameter May Be Out-of-Range for Parameter       URB-POP
ME W187     126       MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET
MX W401     126       PFLCNV: Use of turbulence data with ADJ_U* is NonDFAULT       SigA Data
MX W402     126       PFLCNV: Turbulence data being used with ADJ_U* w/o DFAULT        Option

**********************************
*** SETUP Finishes Successfully ***
**********************************
```

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* 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 URBAN Dispersion Algorithm for the SBL for   12 Source(s),
  for Total of   1 Urban Area(s):
  Urban Population =   2500.0 ; Urban Roughness Length = 1.000 m

**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. Urban Roughness Length of 1.0 Meter Used.

**Other Options Specified:
        ADJ_U*   - Use ADJ_U* option for SBL in AERMET
        TEMP_Sub - Meteorological data includes TEMP substitutions

**Model Assumes No FLAGPOLE Receptor Heights.

**The User Specified a Pollutant Type of: GENERIC

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

**This Run Includes: 12 Source(s);   4 Source Group(s); and   900 Receptor(s)

               with: 0 POINT(s), including
                          0 POINTCAP(s) and   0 POINTHOR(s)
                and: 0 VOLUME source(s)
                and: 12 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: 16216

```
**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: Option for EXPonential format used in formatted output result files (FILEFORM 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) =    75.00 ;  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:          aermod.inp
**Output Print File:             aermod.out

**Detailed Error/Message File:   WF_NOx.err
**File for Summary of Results:   WF_NOx.sum
```

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** 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
A0000001	0	0.10475E-07	548661.2	4181669.8	82.9	0.00	48.43	5.00	-10.52	5.00	YES	
A0000002	0	0.10475E-07	548708.8	4181678.6	86.4	0.00	48.43	5.00	-10.52	5.00	YES	
A0000003	0	0.10475E-07	548756.5	4181687.5	90.4	0.00	48.43	5.00	-10.52	5.00	YES	
A0000004	0	0.10475E-07	548804.1	4181696.3	94.1	0.00	48.43	5.00	-10.52	5.00	YES	
A0000005	0	0.10475E-07	548852.4	4181705.4	93.6	0.00	40.15	5.00	-26.85	5.00	YES	
A0000006	0	0.10475E-07	548888.2	4181723.5	91.2	0.00	40.15	5.00	-26.85	5.00	YES	
A0000007	0	0.10475E-07	548924.5	4181745.8	86.8	0.00	39.94	5.00	-140.53	5.00	YES	
A0000008	0	0.10475E-07	548893.6	4181771.2	85.1	0.00	39.94	5.00	-140.53	5.00	YES	
A0000009	0	0.10475E-07	548861.0	4181797.2	80.4	0.00	35.47	5.00	175.60	5.00	YES	
A0000010	0	0.10475E-07	548826.9	4181794.2	82.7	0.00	2.03	5.00	-153.44	5.00	YES	
LOADING_DOCK	0	0.32762E-02	548808.9	4181779.7	84.7	2.00	17.10	17.85	0.00	0.00	YES	

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** AREAPOLY SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC /METER**2)	LOCATION OF AREA X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	NUMBER OF VERTS.	INIT. SZ (METERS)	URBAN SOURCE	EMISSION RATE SCALAR VARY BY
PARKING_LOT	0	0.31183E-03	548812.6	4181769.3	86.7	2.00	4	0.00	YES	

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** SOURCE IDs DEFINING SOURCE GROUPS ***

SRCGROUP ID	SOURCE IDs
ARNL1	A0000001 , A0000002 , A0000003 , A0000004 , A0000005 , A0000006 , A0000007 , A0000008 , A0000009 , A0000010 ,
LOADING_	LOADING_DOCK,
PARKING_	PARKING_LOT ,
ALL	A0000001 , A0000002 , A0000003 , A0000004 , A0000005 , A0000006 , A0000007 , A0000008 , A0000009 , A0000010 , PARKING_LOT , LOADING_DOCK,

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

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

URBAN ID	URBAN POP	SOURCE IDs

2500.   A0000001   , A0000002   , A0000003   , A0000004   , A0000005   , A0000006   , A0000007   , A0000008   ,

A0000009   , A0000010   , PARKING_LOT , LOADING_DOCK,

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** GRIDDED RECEPTOR NETWORK SUMMARY ***

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

*** X-COORDINATES OF GRID ***
(METERS)

548315.6, 548340.6, 548365.6, 548390.6, 548415.6, 548440.6, 548465.6, 548490.6, 548515.6, 548540.6,
548565.6, 548590.6, 548615.6, 548640.6, 548665.6, 548690.6, 548715.6, 548740.6, 548765.6, 548790.6,
548815.6, 548840.6, 548865.6, 548890.6, 548915.6, 548940.6, 548965.6, 548990.6, 549015.6, 549040.6,

*** Y-COORDINATES OF GRID ***
(METERS)

4181437.5, 4181462.5, 4181487.5, 4181512.5, 4181537.5, 4181562.5, 4181587.5, 4181612.5, 4181637.5, 4181662.5,
4181687.5, 4181712.5, 4181737.5, 4181762.5, 4181787.5, 4181812.5, 4181837.5, 4181862.5, 4181887.5, 4181912.5,
4181937.5, 4181962.5, 4181987.5, 4182012.5, 4182037.5, 4182062.5, 4182087.5, 4182112.5, 4182137.5, 4182162.5,

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

* ELEVATION HEIGHTS IN METERS *

Y-COORD (METERS)	X-COORD (METERS)								
	548315.56	548340.56	548365.56	548390.56	548415.56	548440.56	548465.56	548490.56	548515.56
4182162.50	83.00	84.40	85.40	87.00	88.60	89.90	90.70	91.70	94.10
4182137.50	84.40	85.40	87.00	87.90	89.40	91.70	92.20	91.70	94.10
4182112.50	85.50	86.90	87.90	88.70	90.30	92.50	94.00	94.60	95.60
4182087.50	85.80	87.40	88.80	90.10	91.30	93.30	95.00	96.00	97.40
4182062.50	85.80	87.50	89.20	91.20	92.90	95.10	96.60	97.50	99.50
4182037.50	85.70	87.20	89.20	91.40	94.60	97.50	99.00	99.60	101.00
4182012.50	85.20	86.50	88.90	90.50	94.70	98.80	101.20	101.50	100.70
4181987.50	83.80	85.50	87.20	88.90	90.60	96.20	100.00	99.80	99.00
4181962.50	81.70	83.90	85.50	87.20	89.40	92.50	94.70	95.10	94.90
4181937.50	79.70	81.70	83.90	85.50	87.40	89.40	90.80	91.40	91.50
4181912.50	77.70	79.30	81.80	84.20	85.30	86.40	87.70	88.60	88.60
4181887.50	75.90	77.30	79.30	82.40	83.00	83.80	84.90	85.80	86.10
4181862.50	74.60	76.00	77.00	79.30	80.40	81.80	82.60	82.80	83.80
4181837.50	73.40	74.50	76.10	77.00	78.50	79.60	80.10	80.50	82.10
4181812.50	72.60	73.70	75.30	76.10	77.10	78.00	78.70	79.70	81.30
4181787.50	71.80	72.70	73.80	74.60	75.50	76.60	77.80	78.70	79.80
4181762.50	71.40	72.10	72.60	73.90	74.70	76.10	77.40	78.20	79.10
4181737.50	71.20	72.10	72.40	73.80	74.70	76.00	77.20	78.20	79.10
4181712.50	70.90	72.30	73.20	74.00	74.80	75.60	76.80	78.20	79.10
4181687.50	71.40	72.50	74.00	74.90	75.00	75.60	76.80	78.20	79.10
4181662.50	72.20	73.10	74.10	74.90	75.60	75.90	76.80	78.40	79.90
4181637.50	73.40	73.70	74.10	74.90	75.70	76.70	78.10	79.80	81.40
4181612.50	74.70	74.80	74.50	75.40	75.90	77.90	80.40	82.40	83.90
4181587.50	78.70	78.50	77.50	77.80	77.90	80.30	83.60	85.90	86.90
4181562.50	88.30	86.50	84.60	83.50	83.30	85.00	87.70	89.70	89.10
4181537.50	100.40	97.70	94.50	92.00	91.00	92.50	94.20	93.90	90.80
4181512.50	116.30	112.60	109.30	106.10	103.20	101.70	100.40	97.50	92.40
4181487.50	123.20	120.90	116.60	113.20	109.40	106.30	103.20	99.30	94.60
4181462.50	125.00	123.60	118.80	115.80	111.50	107.70	104.40	100.90	97.10
4181437.50	123.90	121.80	117.30	114.80	110.30	106.70	103.90	101.30	98.40

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

* HILL HEIGHT SCALES IN METERS *

Y-COORD (METERS)	X-COORD (METERS)		
	548990.56	549015.56	549040.56
4182162.50	102.00	102.00	102.00
4182137.50	102.00	102.00	102.00
4182112.50	102.00	102.00	102.00
4182087.50	102.00	102.00	102.00
4182062.50	102.00	102.00	102.00
4182037.50	102.00	102.00	102.00
4182012.50	102.00	102.00	102.00
4181987.50	102.00	102.00	102.00
4181962.50	102.00	102.00	102.00
4181937.50	102.00	102.00	102.00
4181912.50	102.00	102.00	102.00
4181887.50	102.00	102.00	102.00
4181862.50	102.00	102.00	102.00
4181837.50	102.00	102.00	102.00
4181812.50	102.00	102.00	102.00
4181787.50	102.00	102.00	102.00
4181762.50	102.00	102.00	102.00
4181737.50	101.00	101.00	102.00
4181712.50	92.20	100.00	101.00
4181687.50	100.00	96.00	101.00
4181662.50	100.00	94.10	94.00
4181637.50	100.00	95.20	95.00
4181612.50	101.00	95.70	93.60
4181587.50	98.30	96.00	94.20
4181562.50	98.20	96.50	94.90
4181537.50	98.20	96.50	94.90
4181512.50	97.30	95.70	94.10
4181487.50	96.40	95.40	93.90
4181462.50	94.60	94.20	93.20
4181437.50	92.20	92.10	91.50

```
*** AERMOD - VERSION  19191 ***   *** C:\Lakes\AERMOD\wf_NOx. ISC                                       ***        11/11/20
*** AERMET - VERSION  16216 ***   *** Run to create plot files to export to HARP (3 Sources)            ***        11:23:30
                                                                                                                   PAGE  15
*** MODELOPTs:    NonDFAULT  CONC  ELEV  URBAN  ADJ_U*  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 1

                     METEOROLOGICAL DATA PROCESSED BETWEEN START DATE: 2008   1  1  1
                                                         AND END DATE: 2008  12 31 24

              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,
```

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

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

  Surface file: miss_bay.sfc   Met Version: 16216
  Profile file: miss_bay.pfl
  Surface format: FREE
  Profile format: FREE
  Surface station no.:   23234   Upper air station no.:   23230
                Name: MISSION_BAY   Name: OAKLAND/WSO_AP
                Year: 2008   Year: 2008

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
08	01	01	1	01	-32.4	0.321	-9.000	-9.000	-999.	436.	113.2	0.28	0.32	1.00	3.80	59.	24.4	283.5	20.1
08	01	01	1	02	-4.8	0.122	-9.000	-9.000	-999.	147.	34.6	0.28	0.32	1.00	1.40	96.	24.4	281.8	20.1
08	01	01	1	03	-6.0	0.133	-9.000	-9.000	-999.	117.	36.0	0.28	0.32	1.00	1.60	99.	24.4	281.8	20.1
08	01	01	1	04	-11.6	0.189	-9.000	-9.000	-999.	197.	52.8	0.58	0.32	1.00	1.90	8.	24.4	281.9	20.1
08	01	01	1	05	-12.1	0.187	-9.000	-9.000	-999.	194.	49.3	0.28	0.32	1.00	2.30	17.	24.4	281.5	20.1
08	01	01	1	06	-14.3	0.204	-9.000	-9.000	-999.	221.	54.3	0.28	0.32	1.00	2.50	29.	24.4	281.5	20.1
08	01	01	1	07	-9.1	0.162	-9.000	-9.000	-999.	156.	42.5	0.28	0.32	1.00	2.00	87.	24.4	280.8	20.1
08	01	01	1	08	-5.8	0.136	-9.000	-9.000	-999.	121.	39.8	0.60	0.32	1.00	1.30	132.	24.4	280.4	20.1
08	01	01	1	09	0.6	0.188	0.058	0.016	11.	196.	-949.7	0.60	0.32	0.38	1.70	138.	24.4	280.9	20.1
08	01	01	1	10	25.9	0.233	0.370	0.015	71.	270.	-44.6	0.60	0.32	0.25	1.70	116.	24.4	281.6	20.1
08	01	01	1	11	42.6	0.198	0.513	0.016	115.	213.	-16.8	0.28	0.32	0.20	1.60	112.	24.4	282.4	20.1
08	01	01	1	12	52.2	0.229	0.653	0.014	195.	262.	-20.9	0.28	0.32	0.19	1.90	95.	24.4	283.2	20.1
08	01	01	1	13	55.6	0.263	0.717	0.015	242.	324.	-29.9	0.28	0.32	0.18	2.30	60.	24.4	284.2	20.1
08	01	01	1	14	48.0	0.260	0.793	0.017	379.	317.	-33.2	0.28	0.32	0.19	2.30	64.	24.4	285.4	20.1
08	01	01	1	15	25.5	0.254	0.659	0.019	408.	308.	-58.8	0.28	0.32	0.22	2.40	48.	24.4	286.0	20.1
08	01	01	1	16	11.0	0.191	0.500	0.019	413.	202.	-57.8	0.28	0.32	0.31	1.80	23.	24.4	286.8	20.1
08	01	01	1	17	-5.9	0.138	-9.000	-9.000	-999.	123.	40.4	0.28	0.32	0.54	1.70	24.	24.4	286.1	20.1
08	01	01	1	18	-7.3	0.146	-9.000	-9.000	-999.	134.	39.0	0.28	0.32	1.00	1.80	51.	24.4	285.0	20.1
08	01	01	1	19	-2.6	0.104	-9.000	-9.000	-999.	80.	39.1	0.28	0.32	1.00	0.90	102.	24.4	284.2	20.1
08	01	01	1	20	-2.3	0.101	-9.000	-9.000	-999.	77.	41.8	0.28	0.32	1.00	0.80	100.	24.4	283.8	20.1
08	01	01	1	21	-2.0	0.105	-9.000	-9.000	-999.	82.	51.5	0.60	0.32	1.00	0.60	187.	24.4	283.4	20.1
08	01	01	1	22	-4.4	0.124	-9.000	-9.000	-999.	105.	39.0	0.60	0.32	1.00	1.10	160.	24.4	283.0	20.1
08	01	01	1	23	-13.1	0.201	-9.000	-9.000	-999.	216.	56.6	0.60	0.32	1.00	2.00	145.	24.4	282.4	20.1
08	01	01	1	24	-22.6	0.267	-9.000	-9.000	-999.	331.	78.5	0.60	0.32	1.00	2.60	139.	24.4	282.4	20.1

First hour of profile data

YR	MO	DY	HR	HEIGHT	F	WDIR	WSPD	AMB_TMP	sigmaA	sigmaW	sigmaV
08	01	01	01	20.1	0	-999.	-99.00	283.6	999.0	-99.00	-99.00
08	01	01	01	24.4	1	59.	3.80	-999.0	20.8	-99.00	1.29

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

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** THE PERIOD (8784 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ARNL1   ***
INCLUDING SOURCE(S):   A0000001   , A0000002   , A0000003   , A0000004   , A0000005   ,
A0000006   , A0000007   , A0000008   , A0000009   , A0000010   ,

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

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

Y-COORD (METERS)	X-COORD (METERS)								
	548315.56	548340.56	548365.56	548390.56	548415.56	548440.56	548465.56	548490.56	548515.56
4182162.50	0.00003	0.00003	0.00004	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005
4182137.50	0.00003	0.00003	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005	0.00005
4182112.50	0.00003	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005	0.00005	0.00005
4182087.50	0.00003	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005	0.00005	0.00006
4182062.50	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005	0.00005	0.00006	0.00006
4182037.50	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005	0.00006	0.00006	0.00006
4182012.50	0.00004	0.00004	0.00004	0.00005	0.00005	0.00005	0.00006	0.00006	0.00007
4181987.50	0.00004	0.00004	0.00004	0.00005	0.00005	0.00006	0.00006	0.00007	0.00007
4181962.50	0.00004	0.00004	0.00005	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008
4181937.50	0.00004	0.00004	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00008
4181912.50	0.00004	0.00005	0.00005	0.00005	0.00006	0.00007	0.00007	0.00008	0.00009
4181887.50	0.00004	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00009	0.00010
4181862.50	0.00004	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00009	0.00010
4181837.50	0.00005	0.00005	0.00005	0.00006	0.00007	0.00007	0.00008	0.00009	0.00011
4181812.50	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00009	0.00010	0.00011
4181787.50	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00009	0.00010	0.00012
4181762.50	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00009	0.00011	0.00013
4181737.50	0.00005	0.00005	0.00006	0.00007	0.00007	0.00008	0.00010	0.00011	0.00013
4181712.50	0.00005	0.00005	0.00006	0.00007	0.00007	0.00008	0.00010	0.00011	0.00014
4181687.50	0.00005	0.00005	0.00006	0.00007	0.00007	0.00008	0.00010	0.00012	0.00014
4181662.50	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00010	0.00012	0.00014
4181637.50	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00010	0.00012	0.00014
4181612.50	0.00005	0.00005	0.00006	0.00007	0.00007	0.00009	0.00010	0.00012	0.00014
4181587.50	0.00005	0.00005	0.00006	0.00007	0.00008	0.00009	0.00010	0.00012	0.00014
4181562.50	0.00005	0.00006	0.00006	0.00007	0.00008	0.00009	0.00010	0.00011	0.00013
4181537.50	0.00005	0.00005	0.00006	0.00007	0.00008	0.00009	0.00009	0.00010	0.00011
4181512.50	0.00004	0.00005	0.00005	0.00006	0.00007	0.00007	0.00008	0.00009	0.00010
4181487.50	0.00004	0.00004	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00009
4181462.50	0.00004	0.00004	0.00004	0.00005	0.00005	0.00006	0.00006	0.00007	0.00007
4181437.50	0.00003	0.00004	0.00004	0.00004	0.00005	0.00005	0.00006	0.00006	0.00006

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** THE PERIOD (8784 HRS) AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ARNL1   ***
INCLUDING SOURCE(S):   A0000001   , A0000002   , A0000003   , A0000004   , A0000005   ,
A0000006   , A0000007   , A0000008   , A0000009   , A0000010   ,

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

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

Y-COORD (METERS)	X-COORD (METERS)								
	548540.56	548565.56	548590.56	548615.56	548640.56	548665.56	548690.56	548715.56	548740.56
4182162.50	0.00005	0.00005	0.00005	0.00005	0.00005	0.00006	0.00006	0.00006	0.00006
4182137.50	0.00005	0.00006	0.00006	0.00006	0.00006	0.00006	0.00006	0.00006	0.00006
4182112.50	0.00006	0.00006	0.00006	0.00006	0.00007	0.00007	0.00007	0.00007	0.00007
4182087.50	0.00006	0.00006	0.00007	0.00007	0.00007	0.00007	0.00008	0.00008	0.00008
4182062.50	0.00006	0.00007	0.00007	0.00008	0.00008	0.00008	0.00008	0.00009	0.00009
4182037.50	0.00007	0.00007	0.00008	0.00008	0.00009	0.00009	0.00009	0.00010	0.00010
4182012.50	0.00007	0.00008	0.00008	0.00009	0.00010	0.00010	0.00011	0.00011	0.00011
4181987.50	0.00008	0.00008	0.00009	0.00010	0.00011	0.00011	0.00012	0.00013	0.00013
4181962.50	0.00008	0.00009	0.00010	0.00011	0.00012	0.00013	0.00014	0.00015	0.00016
4181937.50	0.00009	0.00010	0.00011	0.00012	0.00013	0.00014	0.00015	0.00017	0.00018
4181912.50	0.00010	0.00011	0.00012	0.00013	0.00014	0.00016	0.00018	0.00019	0.00021
4181887.50	0.00011	0.00012	0.00013	0.00015	0.00016	0.00018	0.00020	0.00023	0.00026
4181862.50	0.00011	0.00013	0.00015	0.00017	0.00019	0.00021	0.00024	0.00027	0.00031
4181837.50	0.00012	0.00014	0.00016	0.00019	0.00021	0.00024	0.00028	0.00032	0.00038
4181812.50	0.00013	0.00015	0.00018	0.00021	0.00024	0.00028	0.00033	0.00039	0.00048
4181787.50	0.00014	0.00017	0.00020	0.00024	0.00028	0.00034	0.00040	0.00050	0.00063
4181762.50	0.00015	0.00018	0.00022	0.00027	0.00034	0.00042	0.00053	0.00068	0.00088
4181737.50	0.00016	0.00019	0.00025	0.00032	0.00043	0.00057	0.00078	0.00107	0.00140
4181712.50	0.00017	0.00021	0.00027	0.00038	0.00057	0.00089	0.00146	0.00220	0.00293
4181687.50	0.00017	0.00022	0.00030	0.00045	0.00081	0.00209	0.00527	0.00891	0.01310
4181662.50	0.00017	0.00022	0.00031	0.00048	0.00093	0.00193	0.00291	0.00282	0.00255
4181637.50	0.00018	0.00023	0.00031	0.00043	0.00059	0.00073	0.00086	0.00098	0.00097
4181612.50	0.00018	0.00022	0.00027	0.00033	0.00039	0.00044	0.00047	0.00050	0.00051
4181587.50	0.00016	0.00019	0.00022	0.00025	0.00028	0.00030	0.00031	0.00032	0.00033
4181562.50	0.00015	0.00016	0.00018	0.00020	0.00021	0.00022	0.00023	0.00023	0.00024
4181537.50	0.00013	0.00014	0.00015	0.00016	0.00017	0.00017	0.00018	0.00018	0.00018
4181512.50	0.00011	0.00011	0.00012	0.00013	0.00014	0.00014	0.00014	0.00014	0.00014
4181487.50	0.00009	0.00010	0.00010	0.00011	0.00011	0.00012	0.00012	0.00012	0.00012
4181462.50	0.00008	0.00008	0.00009	0.00009	0.00010	0.00010	0.00010	0.00010	0.00010
4181437.50	0.00007	0.00007	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008	0.00008

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** THE   1ST HIGHEST 1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL   ***
INCLUDING SOURCE(S):   A0000001   , A0000002   , A0000003   , A0000004   , A0000005   ,
A0000006   , A0000007   , A0000008   , A0000009   , A0000010   , PARKING_LOT , LOADING_DOCK,

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

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

Y-COORD (METERS)	X-COORD (METERS) 548690.56	548715.56	548740.56	548765.56	548790.56
4182162.5	434.92246 (08061206)	507.29603 (08061206)	536.69864 (08061206)	512.61927 (08061206)	438.95836 (08061206)
4182137.5	439.42085 (08061206)	534.06003 (08061206)	582.14953 (08061206)	566.75390 (08061206)	493.75171 (08061206)
4182112.5	442.77680 (08111308)	557.04349 (08061206)	629.38853 (08061206)	629.95231 (08061206)	556.89018 (08061206)
4182087.5	483.37990 (08111308)	575.80614 (08061206)	679.44231 (08061206)	702.12849 (08061206)	632.08565 (08061206)
4182062.5	523.34865 (08111308)	587.49723 (08061206)	730.09566 (08061206)	783.40124 (08061206)	722.07887 (08061206)
4182037.5	559.51321 (08111308)	613.35172 (08111308)	780.22999 (08061206)	877.69867 (08061206)	835.08452 (08061206)
4182012.5	719.87103 (08062106)	678.21658 (08111308)	826.11321 (08061206)	989.98224 (08061206)	977.30092 (08061206)
4181987.5	967.81499 (08062106)	757.36257 (08062106)	856.95686 (08061206)	1109.83780 (08061206)	1147.61460 (08061206)
4181962.5	1232.12356 (08062106)	1084.95111 (08062106)	936.97838 (08111308)	1235.67323 (08061206)	1354.94313 (08061206)
4181937.5	1449.13846 (08062106)	1474.27150 (08062106)	1199.00827 (08062106)	1355.70264 (08061206)	1622.38391 (08061206)
4181912.5	1509.88696 (08062106)	1839.39774 (08062106)	1783.21955 (08062106)	1449.26536 (08061206)	1975.28999 (08061206)
4181887.5	1306.87359 (08062106)	1981.88868 (08062106)	2433.72724 (08062106)	2155.18115 (08062106)	2456.57125 (08061206)
4181862.5	1144.41621 (08111723)	1657.87547 (08062106)	2774.17843 (08062106)	3461.32614 (08062106)	3110.65106 (08061206)
4181837.5	1364.09399 (08041103)	1593.24996 (08041103)	2182.95909 (08062106)	4448.87738 (08062106)	5437.07842 (08062106)
4181812.5	1444.43820 (08041103)	1922.21944 (08041103)	2640.65363 (08041103)	3802.64671 (08041103)	10250.07783 (08062106)
4181787.5	1473.31337 (08011006)	1953.09771 (08011006)	2752.86801 (08011006)	4433.07177 (08011006)	10084.98736 (08102507)
4181762.5	1441.16787 (08102507)	1864.01274 (08062006)	2690.95411 (08062006)	4025.55964 (08062006)	6035.95445 (08041204)
4181737.5	1480.15284 (08062006)	1838.39203 (08062006)	2206.43565 (08062006)	2778.32773 (08011121)	3130.27441 (08041304)
4181712.5	1272.42525 (08062006)	1466.82891 (08030623)	1727.36576 (08041204)	1943.17328 (08112202)	2242.98492 (08021308)
4181687.5	1109.56095 (08011306)	1279.36373 (08010118)	1407.49256 (08010118)	1637.92037 (08123009)	1687.01715 (08100103)
4181662.5	998.28701 (08010118)	1095.36517 (08010118)	1164.08138 (08123009)	1331.40022 (08123009)	1387.57951 (08122818)
4181637.5	869.81671 (08010118)	895.19907 (08123009)	1087.48619 (08123009)	1093.45870 (08011908)	1116.22470 (08122818)
4181612.5	710.71399 (08121003)	836.43671 (08123009)	903.37273 (08123009)	920.43381 (08010117)	924.65951 (08121105)
4181587.5	680.53839 (08123009)	747.25618 (08123009)	733.16340 (08123009)	794.56364 (08010117)	798.17520 (08121006)
4181562.5	627.07729 (08123009)	647.18958 (08123009)	627.15850 (08010117)	635.91870 (08121006)	694.23813 (08121006)
4181537.5	563.62529 (08123009)	549.68489 (08123009)	528.00767 (08120309)	555.85081 (08121006)	598.36963 (08121006)
4181512.5	492.36355 (08123009)	457.12716 (08120309)	465.72188 (08010117)	463.38277 (08121006)	481.64972 (08121006)
4181487.5	421.99657 (08123009)	411.03468 (08120309)	411.59692 (08010117)	414.69561 (08121006)	420.84669 (08121006)
4181462.5	363.20986 (08120309)	368.77251 (08010117)	363.26114 (08010117)	372.25553 (08121006)	369.54875 (08121006)
4181437.5	331.74361 (08120309)	332.63413 (08010117)	330.93311 (08121006)	334.48048 (08121006)	320.53297 (08121006)

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** THE   1ST HIGHEST 1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL   ***
INCLUDING SOURCE(S):   A0000001   , A0000002   , A0000003   , A0000004   , A0000005   ,
A0000006   , A0000007   , A0000008   , A0000009   , A0000010   , PARKING_LOT , LOADING_DOCK,

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

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

Y-COORD (METERS)	X-COORD (METERS)				
	548815.56	548840.56	548865.56	548890.56	548915.56
4182162.5	339.22133 (08061206)	319.61176 (08101504)	326.95308 (08120902)	326.10636 (08120902)	306.73944 (08120902)
4182137.5	383.92272 (08061206)	348.01674 (08101504)	356.80226 (08120902)	353.91604 (08120902)	330.61281 (08101704)
4182112.5	433.53828 (08061206)	382.29322 (08101504)	392.01728 (08120902)	384.37967 (08120902)	364.61294 (08101704)
4182087.5	496.81652 (08061206)	423.17640 (08101504)	433.83149 (08120902)	420.16712 (08120902)	403.52456 (08101704)
4182062.5	573.08414 (08061206)	471.23602 (08101504)	483.72699 (08120902)	461.02211 (08120902)	446.93330 (08101704)
4182037.5	668.66829 (08061206)	528.51743 (08101504)	542.41971 (08120902)	507.45085 (08120902)	495.71278 (08101704)
4182012.5	785.20203 (08061206)	602.12004 (08120902)	612.30910 (08120902)	572.30687 (08101704)	555.90507 (08111804)
4181987.5	936.40524 (08061206)	699.90599 (08120902)	701.04841 (08120902)	657.96541 (08101704)	622.67537 (08111804)
4181962.5	1131.77700 (08061206)	827.36949 (08120902)	809.76880 (08120902)	759.29931 (08101704)	724.86004 (08032204)
4181937.5	1406.60574 (08061206)	1004.89263 (08120902)	951.37050 (08120902)	889.49715 (08111804)	904.91278 (08070806)
4181912.5	1778.39291 (08061206)	1251.15063 (08120902)	1151.02481 (08101704)	1082.02613 (08070806)	1120.97035 (08070806)
4181887.5	2330.54562 (08061206)	1614.76236 (08120902)	1441.48348 (08111804)	1442.62863 (08070806)	1359.72799 (08061906)
4181862.5	3301.65064 (08061206)	2201.56925 (08120902)	2023.30697 (08070806)	1842.55161 (08061906)	1551.62663 (08061906)
4181837.5	5498.27663 (08061206)	3418.89313 (08070806)	2871.46282 (08061906)	2106.29809 (08061906)	1652.71491 (08061906)
4181812.5	14001.25473 (08061206)	7342.65125 (08061906)	3047.00129 (08041006)	2280.70850 (08051406)	1930.77871 (08051406)
4181787.5	17137.87155 (08041103)	10081.80802 (08102204)	4854.01251 (08061206)	3632.05059 (08061906)	2664.13222 (08030302)
4181762.5	8648.27650 (08021308)	6652.85256 (08011022)	6322.87293 (08090303)	6619.96593 (08090303)	4113.45332 (08102204)
4181737.5	3830.19890 (08021308)	4969.16045 (08041204)	5438.15832 (08110505)	6445.20326 (08011022)	3735.02357 (08041224)
4181712.5	2546.24999 (08021307)	3080.25588 (08021307)	3709.17893 (08110505)	3294.27469 (08120420)	2647.67939 (08120420)
4181687.5	1905.12933 (08021307)	2119.43732 (08112501)	2077.88193 (08110505)	2039.25252 (08122819)	1992.67590 (08120420)
4181662.5	1477.47582 (08021307)	1637.08015 (08112501)	1475.00496 (08122822)	1463.49615 (08122819)	1363.73866 (08122819)
4181637.5	1200.90175 (08112501)	1316.55472 (08112501)	1154.30967 (08122822)	1101.63003 (08021205)	1120.39834 (08122819)
4181612.5	1015.35081 (08112501)	1087.71165 (08112501)	943.89817 (08112501)	904.57817 (08122822)	906.47091 (08122819)
4181587.5	870.23831 (08112501)	921.97665 (08112501)	800.14978 (08112501)	775.72108 (08122822)	749.72562 (08021205)
4181562.5	754.03085 (08112501)	792.69790 (08112501)	696.70151 (08112501)	678.81703 (08122822)	636.51548 (08111518)
4181537.5	649.45471 (08112501)	689.92729 (08112501)	613.00162 (08112501)	598.89288 (08122822)	559.44999 (08111518)
4181512.5	560.29165 (08112501)	600.37337 (08112501)	546.07084 (08112501)	533.54000 (08122822)	509.43637 (08122822)
4181487.5	484.01364 (08112501)	523.43347 (08112501)	480.03146 (08112501)	461.84054 (08122822)	449.22589 (08122822)
4181462.5	396.10518 (08112501)	445.22819 (08112501)	409.73408 (08112501)	385.18930 (08122822)	378.62657 (08122822)
4181437.5	341.67679 (08112501)	345.80478 (08112501)	322.29312 (08112501)	312.06489 (08110505)	306.64709 (08110505)

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** THE   1ST HIGHEST 1-HR AVERAGE CONCENTRATION   VALUES FOR SOURCE GROUP: ALL   ***
INCLUDING SOURCE(S):   A0000001   , A0000002   , A0000003   , A0000004   , A0000005   ,
A0000006   , A0000007   , A0000008   , A0000009   , A0000010   , PARKING_LOT , LOADING_DOCK,

*** NETWORK ID: UCART1   ; NETWORK TYPE: GRIDCART ***

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

Y-COORD (METERS)	X-COORD (METERS)				
	548940.56	548965.56	548990.56	549015.56	549040.56
4182162.5	305.25420 (08101704)	303.80473 (08102208)	308.37225 (08102208)	298.36237 (08102208)	289.79766 (08070806)
4182137.5	330.34536 (08101704)	321.91783 (08102208)	321.00574 (08102208)	304.69008 (08032204)	327.36652 (08070806)
4182112.5	358.96039 (08111804)	342.98128 (08102224)	340.25827 (08032204)	349.99526 (08070806)	363.90182 (08070806)
4182087.5	392.08752 (08111804)	378.87355 (08032204)	373.44489 (08070806)	397.56634 (08070806)	398.80930 (08070806)
4182062.5	427.92188 (08111804)	418.42470 (08032204)	436.41868 (08070806)	444.53468 (08070806)	434.61191 (08061906)
4182037.5	474.33567 (08032204)	473.37077 (08070806)	501.91182 (08070806)	488.21251 (08070806)	478.77517 (08061906)
4182012.5	537.11488 (08032204)	563.91328 (08070806)	565.85873 (08070806)	549.40733 (08061906)	513.82780 (08061906)
4181987.5	632.31741 (08070806)	654.71634 (08070806)	637.94835 (08061906)	599.96848 (08061906)	529.21578 (08061906)
4181962.5	767.20029 (08070806)	745.83900 (08061906)	708.44653 (08061906)	627.74860 (08061906)	521.50797 (08061906)
4181937.5	904.75673 (08070806)	855.14603 (08061906)	754.70372 (08061906)	622.23765 (08061906)	508.29325 (08041006)
4181912.5	1066.58000 (08061906)	932.35577 (08061906)	763.42633 (08061906)	611.77822 (08041006)	538.67018 (08042605)
4181887.5	1190.77116 (08061906)	955.20147 (08061906)	756.74243 (08041006)	659.79267 (08042605)	597.35262 (08051406)
4181862.5	1236.51537 (08061906)	960.18626 (08041006)	835.09569 (08051406)	743.20781 (08051406)	649.36669 (08051406)
4181837.5	1292.48490 (08042605)	1116.60861 (08051406)	931.22167 (08051406)	797.19473 (08030302)	720.04634 (08030302)
4181812.5	1584.17282 (08051406)	1297.98952 (08030302)	1106.01022 (08030302)	937.30688 (08030302)	795.15093 (08030302)
4181787.5	2023.80051 (08030302)	1538.01727 (08030302)	1214.98987 (08102204)	986.09762 (08102204)	810.47560 (08102204)
4181762.5	2347.02360 (08090303)	1629.01641 (08090303)	1245.45912 (08090303)	994.30933 (08090303)	813.58072 (08090303)
4181737.5	2174.09704 (08041224)	1523.01937 (08111718)	1167.49756 (08111718)	936.92680 (08111718)	770.40189 (08111718)
4181712.5	2034.78210 (08101322)	1520.78674 (08081102)	1209.81096 (08081102)	844.49276 (08041224)	712.09411 (08041224)
4181687.5	1681.82774 (08120420)	1424.14435 (08101322)	1127.24027 (08101322)	904.58549 (08081102)	627.96059 (08081102)
4181662.5	1404.08609 (08120420)	1225.93096 (08120420)	1071.75506 (08101322)	913.74595 (08101322)	642.74956 (08101322)
4181637.5	994.06328 (08120420)	1067.12505 (08120420)	957.56853 (08120420)	818.39788 (08101322)	700.97870 (08101322)
4181612.5	865.81864 (08122819)	803.72356 (08120420)	863.97436 (08120420)	766.15154 (08120420)	621.72185 (08101322)
4181587.5	754.34658 (08122819)	686.50376 (08122819)	702.68706 (08120420)	701.82050 (08120420)	613.13337 (08120420)
4181562.5	647.96290 (08122819)	631.76305 (08122819)	549.01834 (08122819)	596.98176 (08120420)	576.24090 (08120420)
4181537.5	551.51696 (08122819)	565.46157 (08122819)	518.78777 (08122819)	475.59497 (08120420)	500.89365 (08120420)
4181512.5	465.38200 (08021205)	491.27884 (08122819)	471.48684 (08122819)	414.99735 (08122819)	410.25775 (08120420)
4181487.5	405.18047 (08122822)	419.37537 (08122819)	419.53206 (08122819)	387.03336 (08122819)	335.26602 (08022623)
4181462.5	354.63114 (08122822)	353.60632 (08122819)	358.94300 (08122819)	344.77380 (08122819)	309.24046 (08122819)
4181437.5	290.11358 (08110505)	293.12001 (08122819)	293.07236 (08122819)	288.13650 (08122819)	247.37597 (08122819)

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

*** THE SUMMARY OF MAXIMUM PERIOD (8784 HRS) RESULTS ***

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

GROUP ID		AVERAGE CONC	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ARNL1	1ST HIGHEST VALUE IS	0.01348	AT (548865.56, 4181712.50, 93.20, 93.20, 0.00)	GC	UCART1
	2ND HIGHEST VALUE IS	0.01310	AT (548740.56, 4181687.50, 89.20, 94.00, 0.00)	GC	UCART1
	3RD HIGHEST VALUE IS	0.01241	AT (548915.56, 4181737.50, 88.50, 97.00, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	0.00955	AT (548765.56, 4181687.50, 91.60, 94.00, 0.00)	GC	UCART1
	5TH HIGHEST VALUE IS	0.00919	AT (548915.56, 4181762.50, 84.70, 100.00, 0.00)	GC	UCART1
	6TH HIGHEST VALUE IS	0.00903	AT (548840.56, 4181712.50, 93.30, 93.30, 0.00)	GC	UCART1
	7TH HIGHEST VALUE IS	0.00891	AT (548715.56, 4181687.50, 87.20, 94.00, 0.00)	GC	UCART1
	8TH HIGHEST VALUE IS	0.00796	AT (548865.56, 4181787.50, 82.40, 96.00, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	0.00693	AT (548890.56, 4181737.50, 89.50, 93.00, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	0.00689	AT (548890.56, 4181787.50, 81.60, 100.00, 0.00)	GC	UCART1
LOADING_	1ST HIGHEST VALUE IS	3202.90415	AT (548815.56, 4181787.50, 83.90, 95.00, 0.00)	GC	UCART1
	2ND HIGHEST VALUE IS	1876.50755	AT (548840.56, 4181787.50, 83.30, 95.00, 0.00)	GC	UCART1
	3RD HIGHEST VALUE IS	789.95664	AT (548840.56, 4181812.50, 79.80, 96.00, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	646.35119	AT (548815.56, 4181812.50, 81.30, 95.00, 0.00)	GC	UCART1
	5TH HIGHEST VALUE IS	551.67345	AT (548790.56, 4181787.50, 83.90, 95.00, 0.00)	GC	UCART1
	6TH HIGHEST VALUE IS	523.71828	AT (548865.56, 4181787.50, 82.40, 96.00, 0.00)	GC	UCART1
	7TH HIGHEST VALUE IS	485.08043	AT (548840.56, 4181762.50, 87.90, 93.00, 0.00)	GC	UCART1
	8TH HIGHEST VALUE IS	395.78549	AT (548865.56, 4181812.50, 77.40, 101.00, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	327.70548	AT (548815.56, 4181762.50, 88.30, 93.00, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	319.75290	AT (548865.56, 4181762.50, 87.20, 93.00, 0.00)	GC	UCART1
PARKING_	1ST HIGHEST VALUE IS	1583.78436	AT (548865.56, 4181762.50, 87.20, 93.00, 0.00)	GC	UCART1
	2ND HIGHEST VALUE IS	1407.58548	AT (548890.56, 4181762.50, 86.30, 93.00, 0.00)	GC	UCART1
	3RD HIGHEST VALUE IS	1288.59754	AT (548840.56, 4181762.50, 87.90, 93.00, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	1126.43441	AT (548890.56, 4181737.50, 89.50, 93.00, 0.00)	GC	UCART1
	5TH HIGHEST VALUE IS	1065.73184	AT (548865.56, 4181737.50, 90.60, 93.00, 0.00)	GC	UCART1
	6TH HIGHEST VALUE IS	635.06888	AT (548915.56, 4181762.50, 84.70, 100.00, 0.00)	GC	UCART1
	7TH HIGHEST VALUE IS	516.89955	AT (548915.56, 4181737.50, 88.50, 97.00, 0.00)	GC	UCART1
	8TH HIGHEST VALUE IS	493.08761	AT (548865.56, 4181787.50, 82.40, 96.00, 0.00)	GC	UCART1
	9TH HIGHEST VALUE IS	466.94178	AT (548890.56, 4181787.50, 81.60, 100.00, 0.00)	GC	UCART1
	10TH HIGHEST VALUE IS	394.28462	AT (548840.56, 4181737.50, 91.70, 91.70, 0.00)	GC	UCART1
ALL	1ST HIGHEST VALUE IS	3344.33341	AT (548815.56, 4181787.50, 83.90, 95.00, 0.00)	GC	UCART1
	2ND HIGHEST VALUE IS	2181.28779	AT (548840.56, 4181787.50, 83.30, 95.00, 0.00)	GC	UCART1
	3RD HIGHEST VALUE IS	1903.54052	AT (548865.56, 4181762.50, 87.20, 93.00, 0.00)	GC	UCART1
	4TH HIGHEST VALUE IS	1773.68029	AT (548840.56, 4181762.50, 87.90, 93.00, 0.00)	GC	UCART1
	5TH HIGHEST VALUE IS	1601.66610	AT (548890.56, 4181762.50, 86.30, 93.00, 0.00)	GC	UCART1
	6TH HIGHEST VALUE IS	1234.63337	AT (548890.56, 4181737.50, 89.50, 93.00, 0.00)	GC	UCART1
	7TH HIGHEST VALUE IS	1164.76443	AT (548865.56, 4181737.50, 90.60, 93.00, 0.00)	GC	UCART1

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         8TH HIGHEST VALUE IS    1016.81385 AT (  548865.56,  4181787.50,    82.40,    96.00,    0.00)  GC  UCART1
         9TH HIGHEST VALUE IS     891.92695 AT (  548840.56,  4181812.50,    79.80,    96.00,    0.00)  GC  UCART1
        10TH HIGHEST VALUE IS     763.05344 AT (  548915.56,  4181762.50,    84.70,   100.00,    0.00)  GC  UCART1


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

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* SigA Data

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

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

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZHILL, ZFLAG)	OF TYPE	NETWORK GRID-ID
ARNL1	HIGH 1ST HIGH VALUE IS	0.07142	ON 08041102:	AT (548740.56, 4181687.50, 89.20, 94.00, 0.00)	GC	UCART1
LOADING_	HIGH 1ST HIGH VALUE IS	16658.24738	ON 08041307:	AT (548815.56, 4181787.50, 83.90, 95.00, 0.00)	GC	UCART1
PARKING_	HIGH 1ST HIGH VALUE IS	6536.59302	ON 08062106:	AT (548840.56, 4181762.50, 87.90, 93.00, 0.00)	GC	UCART1
ALL	HIGH 1ST HIGH VALUE IS	17137.87155	ON 08041103:	AT (548815.56, 4181787.50, 83.90, 95.00, 0.00)	GC	UCART1

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

*** MODELOPTs: NonDFAULT CONC ELEV URBAN ADJ_U* 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   93 Informational Message(s)

A Total of   8784 Hours Were Processed

A Total of   1 Calm Hours Identified

A Total of   91 Missing Hours Identified (1.04 Percent)

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

   ********   WARNING MESSAGES   ********
CO W320   23   URBOPT: Input Parameter May Be Out-of-Range for Parameter   URB-POP
ME W187   126   MEOPEN: ADJ_U* Option for Stable Low Winds used in AERMET
MX W401   126   PFLCNV: Use of turbulence data with ADJ_U* is NonDFAULT   SigA Data
MX W402   126   PFLCNV: Turbulence data being used with ADJ_U* w/o DFAULT   Option
MX W401   1   PFLCNV: Use of turbulence data with ADJ_U* is NonDFAULT   SigA Data

   ****
   *** AERMOD Finishes Successfully ***
   ****

Excerpts of HARP2 Risk Model

HARP2 - Air Dispersion & Risk Tool (dated 19121)

File Tools Help

- Calculate Risk
  - Select Risk Scenario
  - Select Pathways to Evaluate and
  - Press Calculate
- View Risk Results
- Refined Acute Analysis
- Spatial Averaging Risk (Optional)
- Project Summary Report

Air Dispersion | Import/Calc GLCs | Risk Analysis

Select Risk Scenario

Analysis Type

- (●) Cancer Risk
- ( ) Chronic Risk (Non-cancer)
- ( ) 8-Hour Chronic Risk (Non-cancer)
- ( ) Acute Risk (Non-cancer)
- ( ) Cancer, Chronic, and Acute

Help me choose

Receptor Type

- (●) Individual Resident
- ( ) Population-Wide
- ( ) Worker

Help me choose

Exposure Duration

- ( ) 70 Year
- (●) 30 Year
- ( ) 25 Year (Worker)
- ( ) 9 Year
- ( ) User Defined (Tier 2) 70

Start Age (years) 3rd Trimester

Help me choose

Intake Rate Percentile

- (●) OEHHA Derived Method
- ( ) 95th (High End)
- ( ) 65th (Mean)
- ( ) Risk Management Policy (RMP) - *Inhalation Only*
- ( ) RMP using the Derived Method

Help me choose

HARP2 - Air Dispersion & Risk Tool (dated 19121)

File Tools Help

- GLC Calc Setup
  - PLOTFILE List (non-pollutant spe
  - Emission Inventory
  - Background Concentrations
  - Screening Adjustment Factors
- Calculate\Import GLCs
- Pathway\Spatial Avg GLCs
- Contour GLCs (AERPLOT.EXE)
- Post Process
  - Max 30-Day Rolling Ave for Pb
  - Daily 8-Hr Ave GLCs for 8-Hr RE
  - Refined Worker Period Ave for C

Air Dispersion | Import/Calc GLCs | Risk Analysis

Emission Inventory

Add Import Export Delete All Options Filter: All All

SrcID	StkID	ProID	PolID	PolAbbrev	Multiplier	Annual Ems (lbs/yr)	Max Hr Ems (lbs/hr)	MWAF
LOADING	0	0	9901	DieselExhPM	1	11.08	0	1
PARKING	0	0	71432	Benzene	1	37.567	0	1
PARKING	0	0	100425	Styrene	1	3.263	0	1
PARKING	0	0	108883	Toluene	1	129.703	0	1
PARKING	0	0	95476	o-Xylene	1	28.9	0	1
PARKING	0	0	100414	Ethyl Benzene	1	15.661	0	1
PARKING	0	0	50000	Formaldehyde	1	17.042	0	1
PARKING	0	0	91203	Naphthalene	1	0.707	0	1
PARKING	0	0	106423	p-Xylene	1	19.525	0	1
ARNL1	0	0	106990	1,3-Butadiene	1	0.033	0	1
ARNL1	0	0	75070	Acetaldehyde	1	0.121	0	1
ARNL1	0	0	71432	Benzene	1	0.522	0	1
ARNL1	0	0	100425	Styrene	1	0.288	0	1
ARNL1	0	0	108883	Toluene	1	0.638	0	1
ARNL1	0	0	95476	o-Xylene	1	0.216	0	1
ARNL1	0	0	106423	p-Xylene	1	0.15	0	1
ARNL1	0	0	50000	Formaldehyde	1	0.288	0	1

HARP2 - Air Dispersion & Risk Tool (dated 19121)

File Tools Help

- Calculate Risk
  - Select Risk Scenario
  - Select Pathways to Evaluate and
  - Press Calculate
- View Risk Results
- Refined Acute Analysis
- Spatial Averaging Risk (Optional)
- Project Summary Report

Air Dispersion | Import/Calc GLCs | Risk Analysis

Select Pathways to Evaluate and Define Site Parameters

Pathways to Evaluate | Inh | Soil | Derm | MMilk | Drink Water | Fish | HG Produce | Beef & Dairy | Pig, Chicke

- ( ) Inhalation Only
- (•) Mandatory Minimum Pathways
- ( ) Worker Pathways
- ( ) User Defined
  - [✓] Inhalation (Always On)
  - [ ] Soil Ingestion
  - [ ] Dermal
  - [ ] Mother's Milk
  - [ ] Drinking Water
  - [ ] Fish
  - [ ] Homegrown Produce
  - [ ] Beef
  - [ ] Dairy Cows
  - [ ] Pigs
  - [ ] Chickens
  - [ ] Eggs

Deposition Rate (for noninhalation pathways only)

- (•) 0.05 m/s (uncontrolled sources)
- ( ) 0.02 m/s (controlled sources)
- ( ) Other

Advanced Options (Tier 2) - For noninhalation pathways only

[ ] Change exposure frequency (days/year): 350 What's this do?

Help me choose

Click to select SCAQMD mandatory minimum pathways

HARP2 - Air Dispersion & Risk Tool (dated 19121)

File Tools Help

- Calculate Risk
  - Select Risk Scenario
  - Select Pathways to Evaluate and
  - Press Calculate
- View Risk Results
- Refined Acute Analysis
- Spatial Averaging Risk (Optional)
- Project Summary Report

Air Dispersion | Import/Calc GLCs | Risk Analysis

View Risk Results

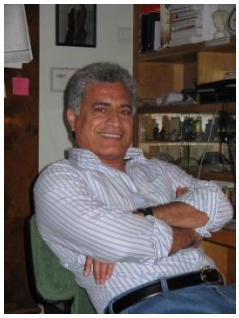
Cancer | Chronic | 8-hour | Acute

Load File | Risk Views | Options | Export

	REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO
	1	ALL	UCART1	548315.56	4181437.5	2.3652e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	2	ALL	UCART1	548340.56	4181437.5	2.4883e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	3	ALL	UCART1	548365.56	4181437.5	2.7258e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	4	ALL	UCART1	548390.56	4181437.5	2.9013e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	5	ALL	UCART1	548415.56	4181437.5	3.2180e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	6	ALL	UCART1	548440.56	4181437.5	3.5115e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	7	ALL	UCART1	548465.56	4181437.5	3.7710e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	8	ALL	UCART1	548490.56	4181437.5	4.0357e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	9	ALL	UCART1	548515.56	4181437.5	4.3387e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	10	ALL	UCART1	548540.56	4181437.5	4.6632e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	11	ALL	UCART1	548565.56	4181437.5	4.9686e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	12	ALL	UCART1	548590.56	4181437.5	5.2985e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	13	ALL	UCART1	548615.56	4181437.5	5.5342e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	14	ALL	UCART1	548640.56	4181437.5	5.6597e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	15	ALL	UCART1	548665.56	4181437.5	5.7436e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	16	ALL	UCART1	548690.56	4181437.5	5.7929e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	17	ALL	UCART1	548715.56	4181437.5	5.7924e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	18	ALL	UCART1	548740.56	4181437.5	5.7394e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	19	ALL	UCART1	548765.56	4181437.5	5.6408e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	20	ALL	UCART1	548790.56	4181437.5	5.5100e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	21	ALL	UCART1	548815.56	4181437.5	5.3178e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	22	ALL	UCART1	548840.56	4181437.5	5.1354e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	23	ALL	UCART1	548865.56	4181437.5	4.9837e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
	24	ALL	UCART1	548890.56	4181437.5	4.8623e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70
▶	25	ALL	UCART1	548915.56	4181437.5	4.7861e-07	30YrCancerDerived_InhSoilDermMMilk_FAH16to70

Ray Kapahi

Senior Air Quality
Consulting Engineer



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Practice Areas

- Air Quality Permitting
- Odor Investigation and Control
- Health Risk Assessment
- Computational Fluid Dynamics
- Greenhouse Gas Analysis
- Atmospheric Dispersion Modeling

Industries

- Solid Waste
- Energy Production
- Construction and Mining
- Cannabis Cultivation
- Oil and Gas Production
- Food Industries

Education and Training

- BSc. Physics (1972)
- MEng. Chemical Engineering (1975)
- CARB Accredited Green House Gas (GHG) Lead Verifier with Specialization in Process Emissions and Electricity Transactions (2009)

News

- Presentation "Numerical Modeling of Landfill Gas and Odors" 33rd International Conference on Solid Waste Technology and Management. March 11 to 14, 2018, Annapolis, MD.

- Presentation "Integrated Approach to Effective Odor Control at Landfills and Composting Facilities" Wastecon 2016, Indianapolis, IN.

EXPERIENCE

Over 30 years of experience in analyzing air quality and odor impacts, permitting of stationary sources, and preparation of environmental impact documents. Mr. Kapahi assists a broad range of clients and assists them to identify and meet their regulatory obligations.

The scope of his experience includes siting of new landfills, waste to energy plants, obtaining conditional use permits from City and County Governments for new projects or expansion of existing projects. Specific experience and skills include preparation of emission inventories, analysis and measurements of odors, dispersion modeling, oversight of air quality monitoring, analysis of impacts to public health, responding to public comments, and appearing before City and County Planning Boards and Commissions as an expert witness on behalf of clients.

Following approvals for new facilities or expansion of existing facilities, Mr. Kapahi continues to work with clients to ensure on-going compliance.

REPRESENTATIVE PROJECTS

Air Quality Modeling and Permitting

- **Permitting of a Powdered Milk Plant (Turlock, CA)**

Evaluate emissions of various air pollutants from the proposed 30 million gallons per year mild processing/drying facility. Demonstrate compliance with local and state air quality regulations, including regulation of toxic air pollutants.

- **Permit Revisions for an Existing Fruit Dehydration Facility (Yuba City, CA)**

Assisted a major food processor in revising their operating permits to allow for additional steam production. Worked cooperatively with the local air district to ensure timely issuance of the revised permits.

- **Permitting of a Waste to Energy Plant (Fort Irwin, CA)**

Quantify emissions from a proposed 34 tons per day solid waste to energy project. Analyze emissions associated with pyrolysis and subsequent utilization of synthetic gas to generate 1.5 MW of electric power. Prepare the necessary permit applications and supporting documentation.

- **Permitting of a CBD Oil Extraction Facility (Mendota, CA)**

Quantify emissions from a proposed solvent extraction process. Assist in design of an RTO VOC control system. The facility was permitting in 2019 and is currently operating.

Publications and Presentations

Presentation "Use of Advanced Models to Control Fugitive Odors from Composting Sites". US Compost Council Annual Meeting, January 2015, Austin, TX.

"Air Emissions from Landfills and Transfer Stations – Do they Increase Public Health Risks?" Presented at Quad State Environmental Conference, Pigeon Forge TN, Sept 2015.

"Risks of Carbon Credit Invalidation Under California's Cap-and-Trade Program", Presented at the 2014 Air and Waste Management Association Annual Conference. June 24-27, 2014. Long Beach, CA

"Estimate of VOC Emissions from Sludge Drying", Presented at the 1995 SWANA Conference. November 1995, Baltimore, MD.

"Use of Biofilters to Control VOCs", Biocycle, February 1995.

"Impacts of the 1990 Clean Air Act Amendments", San Jose Business Journal, March 24, 1994.

"Modeling Fine Particulates" in Municipal Waste Incineration Risk Assessment, Edited by Curtis Travis, Plenum Press, 1990.

Specialized Training

Calculating Tank Emissions. Trinity Consultants. Los Angeles, CA February 1-2, 2020.

Accidental Release Modeling Workshop. Trinity Consultants. Dallas, TX November 1-2, 2018.

HARP2 (Risk Assessment Model) Training at California Air Resources Board. Redding, CA

Hearing Board Variance Training – California Air Resources Board (1995)

Air Emissions and Odors from Wastewater – University of Texas, Austin (1994)

Professional Affiliations

Air and Waste Management Association (Board Member)

American Institute of Chemical Engineers (Member)

Odor Analysis and Mitigation

- **Ventilation System for Odor Control (Anaheim, CA)**

Advanced computational fluid mechanics (CFD) models were used to predict the air flow and building pressure to identify the location, size and number of exhaust fans required to remove odors from the transfer station building.

- **Migration of Odors and Aerosol from Leachate Evaporation Pond (Bi-County Landfill, Montgomery County, TN)**

Analyze the movement of odors and aerosols from leachate evaporators. Demonstrate that evaporators were ineffective in reducing volume of leachate, but were release odors and VOCs to nearby homes.

- **Analysis and Control of Fugitive Dust and Odors from a Soil Blending Facility (Stockton, CA)**

Advanced computational fluid mechanics (CFD) models were used to predict the air flow and movement of fugitive dust at a soil blending facility. With this information, the client was able to install? appropriate mitigation services to mitigate off-site migration of fugitive dust. View how the movement of dust occurs at:
https://www.youtube.com/watch?v=wXEX6IT-54U

- **Review of Odor Control Systems for Cannabis Cultivation and Distribution Facilities (Palm Springs, CA)**

EPS evaluated the odor control system for over 15 different odor cultivation and distribution facilities in Palm Springs. The effectiveness of the proposed system was evaluated and recommendations were made to the City to Palm Springs.

Analysis of Public Health Risks

- **Analysis of Public Health Risks Associated with Composting Operations (Napa County, CA)**

Estimate the types and amounts of toxic air contaminants (TAC) released from green waste and food waste composting. An air dispersion model was used with local wind data to determine the concentration of each TAC. The concentration estimates were supplemented with toxicity data to quantify public health risks from exposure to the various toxic pollutants.

- **Analysis of Public Health Risks from Proposed Asphalt Plant (Kern County, California)**

Analyze emissions of any toxic air pollutants from a proposed 250 tons per day asphalt plant. Emissions from aggregate drying, propane combustion and asphalt oil were quantified. Acute and chronic public health risks from exposure to various toxic pollutants were calculated and compared with regulatory thresholds of significance.