Revised Air Toxics Health Risk Assessment for Aerocraft Heat Treating Co., Inc.

(SCAQMD Facility ID No. 23752)

MAY 18, 2018

ToxStrategies

Innovative solutions
Sound science

AEROCRAFT
HEAT TREATING CO., INC.

May 17, 2018

Jillian Wong Ph.D.
Planning and Rules Manager
Planning, Rule Development & Area Sources South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, California 91765-4182

RE: Aerocraft Heat Treating Co., Inc. Rule 1402 Revised Health Risk Assessment

Dear Dr. Wong:

In a letter dated February 9, 2018, SCAQMD requested revisions to the Air Toxics Inventory Report (ATIR), Health Risk Assessment (HRA), and Risk Reduction Plan (RRP) that had been submitted by Aerocraft Heat-Treating Company (Aerocraft) in May and June of 2017 and represented facility operations in 2016. The Revised ATIR was submitted on March 29, 2018. This letter and the attached report constitute submittal of the Revised HRA. The Revised RRP will be submitted under separate cover. In all cases, these documents are not representative of current operations at Aerocraft, and overestimate exposures and potential health risks, if any, posed by emissions in 2016.

The revision to the ATIR requested by SCAQMD in their letter dated February 9, 2018, unrealistically increased emissions of metals from direct-contact cooling towers. These direct-contact cooling towers are no longer in operation at Aerocraft. This revision to the ATIR necessitated revision of the HRA. The changes to the ATIR increased hexavalent chromium emissions such that predicted off-site concentrations from the modeled emissions were higher than those measured by SCAQMD in 2016, indicating that the modeling in the Revised HRA overestimates air concentrations.

The Revised HRA predicts acute, chronic and carcinogenic health effects estimated from 2016 facility emissions from the Revised ATIR. As you will see, the estimated acute and chronic non-cancer risk for both residents and workers are well below the District's action levels. While cancer risks exceed the action levels, we believe that the risk estimation process required to be used in preparing the HRA overstates the cancer risk posed by the facility.

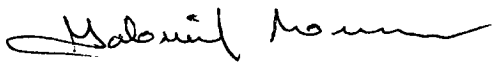
In addition to the increase created by the revision to the ATIR, the model estimating the emissions does not take into account fall-out of particles as they leave the facility. Given the mass of metal particles and aerosols from cooling-towers, we would anticipate significant fall-out very close to the facility as opposed to our emissions acting like a gas and remaining suspended indefinitely. In addition, the inhalation unit risk (or cancer potency) for hexavalent chromium used in this HRA was based on an analysis performed in 1985 which has not been updated since by OEHHA. More recent analyses of the inhalation unit risk for hexavalent

chromium developed by other states, the federal government and the European Union have relied on more recent and considerably improved epidemiological studies. The results of these studies indicate that the inhalation unit risk required to be used by OEHHA overestimates the cancer risk attributable to hexavalent chromium. Reliance on the out-of-date OEHHA inhalation unit risk in this HRA results in a material overstatement of the cancer risk posed by 2016 emissions.

Although we disagree with the characterization of the risk posed by our facility, we will be submitting under separate cover a Revised Risk Reduction Plan (RRP) assessing measures, many already completed, to comply with Rule 1402. Even with the very conservative assumptions incorporated into the District's risk assessment process, the risk posed by Aerocraft's as outlined in the Revised RRP drops orders of magnitude below the action level (an estimated maximum individual cancer risk of 0.0084 in one million as compared to the action level of 25 in one million).

Please let me know if you have any questions about the enclosed Rule 1402 Revised Health Risk Assessment.

Sincerely,



Gabriel Moreno
Operations Manager

Attachments

Cc: via email
James Wright
Deb Proctor
Peter Serrurier
Tom Wood

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

AB2588 AIR TOXICS DOCUMENT CERTIFICATION & APPLICATION FORM

Please check the appropriate boxes for purpose of submittal:

AIR TOXICS INVENTORY REPORT (ATIR) — **INVENTORY YEAR** _____

- [ ] **FIRST YEAR'S ATIR**
- [ ] **UPDATE**

HEALTH RISK ASSESSMENT (HRA) — **INVENTORY YEAR** 2016

- [ ] **INITIAL HRA**
- [x] **REVISED HRA**

Facility name
Aerocraft Heat Treating Co., Inc.

Company name
Aerocraft Heat Treating Co., Inc.

Facility address
15701 Minnesota Avenue
Paramount, CA 90723

Mailing address
15701 Minnesota Avenue
Paramount, CA 90723

SCAQMD Facility ID#
023752

Facility SIC #
3398

Contact Person (Company Official)
Juan Carlos Ruiz

Telephone (Contact Person)
(562) 862-8378 x332

Preparer (if different from above)

Name: Deborah Proctor

Title: Managing Principal Scientist

Company: ToxStrategies, Inc.

Telephone: 949-459-1676

I SWEAR UNDER PENALTY OF PERJURY THAT THE DATA SUBMITTED WITH THIS DOCUMENT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, AND CONFORM WITH THE INFORMATION REQUESTED BY THE SCAQMD. I FURTHER ACKNOWLEDGE THAT FAILURE TO SUBMIT THE REQUIRED INFORMATION OR KNOWINGLY SUPPLY FALSE INFORMATION IS SUBJECT TO CIVIL PENALTIES PURSUANT TO THE CALIFORNIA HEALTH AND SAFETY CODE SECTIONS 44381(a) AND 44381(b).

Signature Of Responsible Company Official

Date
May 17, 2018

Name Of Responsible Company Official (please print)
Gabriel Moreno

Title
Operations Manager

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

HEALTH RISK ASSESSMENT SUMMARY FORM

(Required in Executive Summary of HRA)

Facility Name : Aerocraft Heat Treating Company
Facility Address: 15701 Minnesota Avenue
Paramount, CA
Type of Business: Heat treating metal parts
SCAQMD ID No.: 23752

A. Cancer Risk

(One in a million means one chance in a million of getting cancer from being constantly exposed to a certain level of a chemical over a period of time)

1. Inventory Reporting Year : 2016
2. Maximum Cancer Risk to Receptors : *(Offsite and residence = 30-year exposure, worker = 25-year exposure)*
   a. Offsite 13,400 in a million Location: 392105, 3750632
   b. Residence 1,900 in a million Location: 392200; 3750700
   c. Worker 350 in a million Location: 392050, 3750600
3. Substances Accounting for 90% of Cancer Risk: Hexavalent chromium
   Processes Accounting for 90% of Cancer Risk: Furnace emissions from building; rack welding
4. Cancer Burden for a 70-yr exposure: *(Cancer Burden = [cancer risk] x [# of people exposed to specific cancer risk])*
   a. Cancer Burden 11
   b. Number of people exposed to >1 per million cancer risk for a 70-yr exposure 1,742,000
   c. Maximum distance to edge of 70-year, 1 x 10^{-6} cancer risk isopleth (meters) approximately 14 km (north, west, south) to 25 km (east)

B. Hazard Indices

[Long Term Effects (chronic) and Short Term Effects (acute)]
(non-carcinogenic impacts are estimated by comparing calculated concentration to identified Reference Exposure Levels, and expressing this comparison in terms of a "Hazard Index")

1. Maximum Chronic Hazard Indices:
   a. Residence HI: 0.10 Location: 392200; 3750700 toxicological endpoint: respiratory
   b. Worker HI : 0.15 Location: 392050, 3750600 toxicological endpoint: respiratory
2. Substances Accounting for 90% of Chronic Hazard Index: arsenic; hexavalent chromium
3. Maximum 8-hour Chronic Hazard Index:
   8-Hour Chronic HI: 0.003 Location: 392050; 3750600 toxicological endpoint: respiratory
4. Substances Accounting for 90% of 8-hour Chronic Hazard Index: Formaldehyde; nickel; acrolein
5. Maximum Acute Hazard Index:
   PMI: 2.9 Location: 392175; 3750677 toxicological endpoint: Immune system
6. Substances Accounting for 90% of Acute Hazard Index: nickel

C. Public Notification and Risk Reduction

1. Public Notification Required? Y Yes ____ No
   a. If 'Yes', estimated population exposed to risks > 10 in a million for a 30-year exposure, or an HI >1
   _____
2. Risk Reduction Required? Y Yes ____ No

Revised Air Toxics Health Risk Assessment for Aerocraft Heat Treating Co., Inc.

(SCAQMD Facility ID No. 23752)

MAY 18, 2018

PREPARED FOR:
Aerocraft Heat Treating Co., Inc.
15701 Minnesota Avenue
Paramount, California

PREPARED BY:
ToxStrategies, Inc.
20532 El Toro Road
Suite 206
Mission Viejo, California

Deborah Proctor
Managing Principal Health Scientist

Table of Contents

List of Figures

Figure ES-1 follows the Executive Summary, and Figures 1–6 follow the text of the report.

List of Tables

Tables ES-1 through ES-8 follow the Executive Summary, and Tables 1–13 follow the text of the report.

List of Appendices (provided on CD)

Definitions

Daily dose	A calculated amount of a substance estimated to be received by the subject as a result of exposure expressed in terms of chemical mass per unit body weight (mg/kg-day).
Dispersion factor (X/Q)	A site-specific quantity defined as a ratio of the ground-level concentration in air ($\mu g/m^3$) to the mass emission rate (g/s)
Exposure pathway	A route of exposure by which xenobiotics enter the human body (e.g., inhalation, ingestion, dermal absorption)
Fugitive emissions	Emissions not caught by a capture system, which are often due to equipment leaks, evaporative processes, and windblown disturbances
Hazard identification	The process of determining whether exposure to an agent can cause an increase in the incidence of an adverse health effect, including cancer
Hazard index	The sum of individual acute or chronic hazard quotients (HQs) for each substance affecting a particular toxicological endpoint
Hazard quotient	The estimated ground-level concentration divided by the reference exposure level of a single substance for a particular endpoint
Individual excess cancer risk	The theoretical probability of an individual person developing cancer as a result of lifetime exposure to carcinogenic substances— calculated by summing the potential cancer risks due to both inhalation and non-inhalation routes of exposure
Inhalation unit risk factor	The theoretical upper-bound probability of extra cancer cases occurring in the exposed population assuming a lifetime exposure to the chemical when the air concentration is expressed in exposure units of inverse micrograms per cubic meter $(\mu g/m^3)^{-1}$
Isopleth	A line on a map connecting points of equal value (e.g., risk, concentration)
Noncarcinogenic effects	Noncancer health effects, which may include birth defects, organ damage, irritation, morbidity, or death
Reference exposure level (REL)	An exposure level at or below which noncancer adverse health effects are not anticipated to occur in a human population— expressed in units of $\mu g/m^3$

Sensitive receptor	A location such as a hospital or daycare center where the human occupants are considered to be more sensitive to pollutants than "average"
Zone of impact	Area within which the cancer risk exceeds one in one million ($1x10^{-6}$) or a hazard index greater than 0.5

Acronyms and Abbreviations

AB2588	Assembly Bill 2588
ADMRT	Air Dispersion Modeling and Risk Assessment Tool (in HARP)
ATIR	Air Toxics Inventory Report
CARB	California Air Resources Board
CAS No.	Chemical Abstract Services (CAS) Registry Number
CSF	cancer slope factor
DEM	digital elevation model
HARP	Hot Spots Analysis and Reporting Program
HRA	health risk assessment
HI	hazard index
HQ	hazard quotient
MEIR	maximum exposed individual resident
MEIW	maximum exposed individual worker
MICR	maximum individual cancer risk
mg/kg-day	milligrams per kilogram per day
$\mu g/m^3$	microgram per cubic meter
OEHHA	Office of Environmental Health Hazard Assessment (California)
PMI	point of maximum impact
PTE	permanent total enclosure
REL	reference exposure level
RRP	risk reduction plan
SCAQMD	South Coast Air Quality Management District
RfD	reference dose
URF	unit risk factor
U.S. EPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator
ZOI	zone of impact

Executive Summary

As requested by the South Coast Air Quality Management District (SCAQMD) in letters dated February 9, 2018 and April 24, 2018, the Air Toxics Health Risk Assessment (HRA) submitted on June 13, 2017 has been revised on behalf of the Aerocraft Heat Treating Co., Inc. facility (Aerocraft). Aerocraft is located at 15701 Minnesota Avenue in Paramount, California (SCAQMD Facility ID No. 23752).

In a letter dated December 14, 2016, the SCAQMD designated Aerocraft as a potentially high-risk level facility under SCAQMD Rule 1402 and required preparation of an HRA within 180 days of receipt of the letter. The letter also requested that an Air Toxics Inventory Report for 2016 be submitted within 150 days, and a Risk Reduction Plan within 180 days. The HRA for 2016 operations was submitted on June 13, 2017. Based on subsequent correspondence with SCAQMD in February and April 2018, this Revised HRA has been prepared to incorporate revisions resulting from the revised Air Toxics Inventory Report (Revised ATIR; Associates Environmental, 2017b) for facility emissions in 2016 using the assumptions specified by SCAQMD.

The 2016 ATIR serves as the basis for estimating potential exposure in this risk assessment, although current and future facility operations are and will be significantly different and lower than those in 2016, based upon changes already made and to be made at the facility. In preparing the ATIR, Aerocraft worked closely with District staff to identify an approach that characterized emissions from the unique emission sources at the facility in a manner consistent with SCAQMD policies. Due to the complex nature of the emissions and the limited time available, many assumptions were made that likely cause the ATIR to overstate actual 2016 emissions. By assuming as a matter of SCAQMD policy that the 2016 emissions which are overestimated and have already been curtailed, will continue for 30 years, the risk estimates in this HRA for these hypothetical assumptions, will similarly be overestimated. As a result, this HRA and associated Risk Reduction Plan (RRP) are capable of showing the relative decrease in risk associated with the existing and proposed site improvements; it is not, however, an accurate means of estimating the actual risk posed by the facility in 2016.

The 2016 ATIR was prepared and submitted on May 16, 2017. SCAQMD requested changes to the ATIR in a letter dated February 9, 2018. The primary change to the ATIR was to increase emissions of metals in solution from direct-contact cooling towers which are no longer in operation. Rather than assume that large water droplets would not leave the vicinity of the cooling tower or some portion of which would not be respirable even if they did, the Revised ATIR assumes that all water droplets released from the cooling towers, regardless of size, would behave like volatile gases, which significantly overestimates potential emissions and dispersion. After further correspondence and discussion between SCAQMD and Aerocraft, the Revised 2016 ATIR was submitted on March 29, 2018.

The RRP is being submitted under separate cover. The RRP demonstrates that Aerocraft's risk reduction measures, many of which were implemented months ago, will reduce the facility's estimated residential risk at maximum production to 0.0083 in one million, (i.e.,

well below the action level of 25 in one million). As noted above, this value likely overstates the actual risk from the facility on a going forward basis.

Aerocraft is a commercial heat treater of steel, titanium, and high-temperature materials. Founded in 1959, Aerocraft processes forgings; castings; and bar, plate, and rough-machined parts. The process requires heating metal to temperatures from 450 to 2250 ºF for 2 to more than 24 hours to achieve specific alloy properties. In 2016, heated parts were cooled in a variety of ways, including oil quench, water quench, fan cool,[1] ambient cool, and oven cool. Parts are moved around the facility on large stainless-steel racks, which are repaired and welded on site. Furnaces were housed in four buildings; only two of the four buildings currently have operating furnaces. Limited grinding operations are also performed as part of inspecting treated parts, and a plasma arc cutter was used during 2016 on a limited basis to cut metal stock. The permit for the plasma arc cutter has been withdrawn and the cutter no longer operates.

As directed by SCAQMD, this HRA report has been prepared using the guidelines and tools developed by SCAQMD for Rule 1402 and AB2588, and by the California Air Resources Board (CARB) and Office of Environmental Health Hazard Assessment (OEHHA) for California's AB2588 Air Toxics Hot Spots Program. The goals for Rule 1402 are to collect emission data, to identify facilities that have localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels. Emissions of AB2588-listed chemicals from Aerocraft in 2016 were quantified in the Revised ATIR; a subset of these AB2588-listed chemicals for which toxicity criteria are available are evaluated in this HRA. The annual average and maximum hourly emission rates for the HRA chemicals emitted by Aerocraft are presented in Table ES-1.

The emissions in the Revised ATIR were modeled using the U.S. Environmental Protection Agency's (EPA's) AERMOD air dispersion model (version 16216r),[2] using detailed information about the facility emission sources and meteorological data collected by SCAQMD in Compton, California. The Compton meteorology data used in this Revised HRA are no longer available on the SCAQMD's website, and the following explanation is provided: The SCAQMD web page notes "The Compton (CMPT) station is not available for download as the station does not have 5 years of data that meets quality assurance procedures." In their letter dated April 30, 2018, SCAQMD indicated that they supported continued use of the same Compton data set (version 8 for years 2009, 2010 and 2012) in the Revised HRA.

The air dispersion model was used to predict annual average and maximum one-hour airborne concentrations of the chemicals emitted by Aerocraft for the surrounding area

---

[1] Cooling with unenclosed fans was stopped on or about December 16, 2016, and this cooling method is no longer used at Aerocraft.

[2] An updated version of AERMOD (Version 18081) was published between the initial and revised versions of the HRA. The results of modeling using the new version were substantially the same as the previous version so the previous version of AERMOD was used for consistency with the previous report.

during the calendar year 2016. Exposures to Aerocraft emissions at specific receptors located in the area surrounding Aerocraft were quantified subject to the qualifications stated in relation to the Revised ATIR above. The receptors evaluated in this HRA include

- Fence-line receptors surrounding the facility (properties are not contiguous and lie on both sides of Minnesota Avenue);
- Grid receptors located at 50-meter (m) spacing within 1 km of the facility, 100 m spacing from 1 kilometer (km) to 3 km, 200-m spacing from 3 to 5 km, and 500-m spacing from 5 to 10 km.
- Sensitive receptors (i.e., the locations of schools, hospitals, day-care centers); and
- Census-tract receptors located at the centroid of census tracts in the area surrounding the facility.

The HRA was prepared using the Hotspots Analysis and Reporting Program (HARP) version 17320 as required by SCAQMD. Specifically, the Air Dispersion Modeling and Risk Tool (ADMRT) was used to perform the analysis, incorporating AERMOD air dispersion modeling results and emission rates from the ATIR.

All chemicals were evaluated for inhalation exposures. Multi-pathway chemicals are those for which exposure must be assessed by other exposure pathways in addition to inhalation. Chemicals emitted by Aerocraft that are considered multi-pathway chemicals are arsenic, cadmium, hexavalent chromium, lead and nickel.

Given the urban development surrounding the facility, the following exposure pathways were considered relevant for residential exposure in this HRA:

- Inhalation
- Dermal absorption
- Soil ingestion
- Ingestion of home-grown produce
- Ingestion of mother's milk.

For worker exposure scenarios, these same exposure pathways were considered except for ingestion of homegrown produce. Exposure pathways relevant to each chemical are summarized on Table ES-2.

OEHHA has developed toxicity criteria specifically for use in AB2588 and Rule 1402 HRAs that quantify the relationship between exposure to a chemical and incidence of an adverse health effect in potentially exposed populations (OEHHA, 2016). Toxicity criteria for chemicals that are categorized as carcinogens are called unit risk factors (URFs) for inhalation exposure [expressed in units of inverse micrograms per cubic meter $(\mu g/m^3)^{-1}$] and oral cancer slope factors (CSF_O) for oral and other exposure pathways (expressed in units of inverse milligrams per kilogram per day $[mg/kg\text{-}day]^{-1}$). Examples of non-

inhalation exposure pathways relevant to Aerocraft include soil ingestion and dermal contact. Toxicity criteria for noncarcinogenic health effects are called reference exposure levels (RELs) expressed in units of $\mu g/m^3$ for inhalation exposures and oral RELs in units of mg/kg-day for oral exposures. Oral RELs are also referred to as oral reference doses (RfDs). While cancer risk is assumed to be cumulative across all chemicals, chronic and acute health effects are specific to target organs or systems. Table ES-3 presents the target organ systems evaluated in HRAs and those relevant to chemicals emitted from Aerocraft.

The results of the exposure assessment and toxicity criteria were used to calculate four different health effects measures: the theoretical lifetime excess cancer risk, the acute hazard index (1-hour exposure), the 8-hour chronic hazard index, and the chronic hazard index (lifetime exposure) for each receptor by chemical and by source, and for all chemicals and all sources combined. From these results, the health risk measures for maximum exposed individual resident (MEIR), maximum exposed individual worker (MEIW), and the point of maximum impact (PMI) were identified, as well as the zone of impact (ZOI)—which is the area within which the total excess lifetime cancer risk for a residential exposure scenario is greater than or equal to one in a million (10^{-6}), or an acute, 8-hour, or chronic hazard index is greater than or equal to 0.5.

The acute hazard index, chronic hazard index, 8-hour hazard index, and theoretical excess cancer risk for the MEIR, MEIW and PMI, as well as the locations of these receptors, are provided in Table ES-4 and shown on Figure ES-1. The results are summarized below:

- The maximum acute hazard indices are 1.15 for the MEIR, 1.72 for the MEIW, and 2.91 for the PMI (Tables ES-4, ES-5). The target organ/system with the highest acute hazard index is the immune system. The primary chemical contributing to the acute hazard index is nickel. These hazard indexes are above the notification level (1.0) but below the action level (3.0). The acute hazard index for the MEIR (1.15), MEIW (1.72) and the PMI (2.91) also exceed the public notification level of 1.0. The geographical area in which the acute hazard index is greater than 1.0 is a small area, encompassing a very limited number of buildings immediately across the street to the east and west from Aerocraft (Figure ES-1). It should be noted that acute health effects are evaluated based on the maximum off-site concentration in a single hour over the 3-year modeling period and are not representative of long-term conditions.
- The maximum chronic hazard indices are 0.10 for the MEIR, 0.16 for the MEIW, and 0.56 for the PMI (Tables ES-4; ES-6). The target organ/system with the highest chronic hazard index is the respiratory system. The primary chemicals and source contributing the chronic hazard index are arsenic and hexavalent chromium from inspection baghouse and buildings. These hazard indexes are below the notification level (1.0) and action level (3.0).
- The maximum 8-hour hazard index for the MEIW is 0.003 for the respiratory system, well below a hazard index of 1. This hazard index is below the notification level (1.0) and action level (3.0).

- The maximum excess cancer risk is $1.9x10^{-3}$ (1,900 in one million) for the MEIR, $3.5x10^{-4}$ (350 in one million) for the MEIW, and $1.3x10^{-2}$ (13,000 in one million) for the PMI (Table ES-4; ES-7). The primary chemical contributing to predicted cancer risk is hexavalent chromium, and the primary sources are emissions from the furnaces in the four buildings (including cooling tower emissions in Buildings 2 and 3) and the rack welding operations.

- The area where lifetime excess cancer risk exceeds 100 in one million ($1x10^{-4}$) and the acute hazard index is greater than 1.0 are presented on Figure ES-1. Figure 2C shows the extent of the ZOI. Based on the assessment performed herein the ZOI extends approximately 8 miles south, west and north of the facility and 15 miles west. The ZOI for lifetime excess cancer risk (1 in one million; $1x10^{-6}$) is shown on Figure 5A.

- The review of sensitive receptors was limited to a radius extending approximately 2 miles from the facility; 83 sensitive receptors (schools, hospitals, and day care centers) were identified within this area. Potential cancer risks at these locations range $3.7x10^{-6}$ to $1.6x10^{-4}$. The predicted risk at only nine locations was higher than the risk related to an average background concentration in Compton measured by SCAQMD (nearest monitor location to Paramount). (Figure 2C shows the locations of sensitive receptors and centroids.)

- The estimated cancer burden is calculated as the census tract-specific cancer risk at the census-tract centroid in the ZOI multiplied by the census-tract population (e.g., $1.7 \times 10^{-6} \times 4{,}480$), or 0.0077), which is summed across all census tracts within the zone of impact. The cancer burden summed across the 380 census tracts within the zone of impact was 11.

The model predicts air concentrations assuming that emitted particles of hexavalent chromium are all respirable, behave as particulate matter when contained in water droplets as a fraction of cooling tower drift, and, therefore, do not ever settle or deposit on surfaces. This is obviously not the case as metal particles have a significant mass and so exhibit a relatively high settling velocity. As a result, the model predictions of airborne concentrations are significantly overestimated. Additionally, the model assumes that hexavalent chromium is not converted to the non-toxic trivalent state in ambient air. Reduction of hexavalent chromium to trivalent chromium results in detoxification, and trivalent chromium is not considered to be carcinogenic. An extensive study of the half-life of hexavalent chromium in Los Angeles ambient air was conducted for the California Air Resources Board (CARB) (Grohse et al. 1988). This study investigated the reduction of hexavalent chromium to trivalent chromium in Los Angeles ambient air as well as in laboratory studies. The average half-life of hexavalent chromium in the field measured values was 14.4 hours (average 10 field studies, one was excluded as an outlier). In the laboratory studies, the predicted half-life was 13 hours, which is consistent with results measured in the field. Not accounting for reduction of hexavalent chromium to the trivalent form will exaggerate the model-predicted concentrations from Aerocraft emissions. Finally, these two conservative assumptions (i.e., no deposition and no reduction of hexavalent to trivalent chromium) will result in an over-prediction of the dispersion of

hexavalent chromium emissions from Aerocraft, and will expand the isopleths associated with potentially increased cancer risk.

As described in Section 5.5, model-predicted airborne concentrations of hexavalent chromium were compared to levels of hexavalent chromium measured by SCAQMD at five monitoring locations near Aerocraft in 2016. The measured airborne concentrations at SCAQMD monitors near Aerocraft were corrected for predicted background concentrations using the SCAQMD methodology. This comparison demonstrates that the model estimated concentrations over-predict airborne concentrations because model-predicted concentrations are greater than measured concentrations at all five locations. Concentrations of hexavalent chromium predicted by the model are 1.4 times higher than those measured by SCAQMD at the approximate MEIR location (Monitor 7) during the time the direct contact cooling towers were in operation. The concentration predicted by the model is 7.6 times higher than the concentration measured at Monitor 18. (Monitor locations are shown on Figure 6.) When the predicted concentration at all receptors is adjusted for the over prediction by the model, the estimated size of the zone of impact decreases significantly indicating the high degree of uncertainty in the predicted model results, particularly at distance from the source (Figure 7).

For the period March 2 to May 22, 2017, the average measured concentration of hexavalent chromium adjusted for background per the methods suggested by SCAQMD, at the monitor nearest the MEIR is 0.34 ng/m^3, which is much lower than previously measured. We expect that the ambient monitor overestimates hexavalent chromium concentrations in ambient air due to documented issues with the particular type of monitor (OMNI) used to collect these samples (ToxStrategies, 2018b). In addition, SCAQMD's Monitor 7 likely overstates the amount of hexavalent chromium to which an individual could be exposed because the particle size collected may include particles larger than PM10, which are not respirable.

Based on the results of the HRA, and as requested by SCAQMD, a risk reduction plan is being submitted under separate cover, and public notification will be required. Public notification is required if the acute or chronic hazard index at a MEIR or MEIW exceeds 1.0 (0.5 for lead) or if the excess cancer risk exceeds 10 in one million ($1.0x10^{-5}$). Remedial measures are required if the hazard indexes exceed 3.0 or if the excess cancer risk exceeds 25 in one million ($2.5x10^{-5}$). The calculated cancer risks at the MEIR (1.9×10^{-3}), MEIW ($3.5x10^{-4}$), and PMI ($1.3x10^{-2}$) exceed the public notification and remedial measures action level.

In summary, the results of this HRA suggest that the cancer and non-cancer acute health effect measures estimated for air emissions from Aerocraft in 2016 are above the notification levels. Only the cancer risk estimate exceeds the risk reduction threshold that requires remedial action. An Early Action Risk Reduction plan has been submitted and conditionally approved by the SCAQMD. A Revised Risk Reduction Plan addressing additional future measures is being submitted under separate cover. The result of these risk reduction measures will ensure that facility improvements will maintain risk related to emissions from Aerocraft at levels well below the SCAQMD risk reduction threshold.

Table ES-1. Summary of maximum hourly and annual average emissions of AB2588-listed substances

Substance	CAS #	Annual Emissions (lb/yr)	Annual Emissions (g/s)	Maximum Hourly Emissions (lb/hr)	Maximum Hourly Emissions (g/s)
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	1.29E-05	1.86E-10	9.41E-07	1.19E-07
1,1,2,2-Tetrachloroethane	79345	2.14E-05	3.08E-10	1.56E-06	1.97E-07
1,3-Butadiene	106990	5.61E-04	8.07E-09	4.08E-05	5.14E-06
Acetaldehyde	75070	5.84E-01	8.40E-06	4.75E-04	5.99E-05
Acrolein	107028	3.67E-01	5.28E-06	3.52E-04	4.44E-05
Ammonia	7664417	4.33E+02	6.23E-03	2.36E-01	2.98E-02
Antimony	7440360	6.90E-02	9.93E-07	3.40E-05	4.29E-06
Arsenic	1016	2.30E-02	3.31E-07	6.01E-06	7.58E-07
Benz(a)anthracene	56553	2.00E-02	2.88E-07	8.81E-06	1.11E-06
Benzene	71432	1.08E+00	1.56E-05	6.61E-04	8.32E-05
Benzo(a)pyrene	50328	2.00E-02	2.88E-07	8.81E-06	1.11E-06
Bis(2-ethylhexyl) phthalate	117817	1.10E-02	1.58E-07	4.85E-06	6.11E-07
Cadmium	7440439	4.23E-02	6.09E-07	1.30E-05	1.64E-06
Carbon Tetrachloride (Tetrachloromethane)	56235	1.50E-05	2.16E-10	1.09E-06	1.37E-07
Chloroform	67663	1.16E-05	1.67E-10	8.44E-07	1.06E-07
Chromium(VI)	18540299	4.62E+00	6.65E-05	9.46E-04	6.86E-05
Chrysene	218019	2.00E-02	2.88E-07	8.81E-06	1.11E-06
Copper	7440508	8.36E-02	1.20E-06	4.81E-05	6.01E-06
Ethyl Benzene	100414	1.30E+00	1.87E-05	9.71E-04	1.22E-04
Ethylene Dibromide (1,2-Dibromoethane)	106934	1.80E-05	2.59E-10	1.31E-06	1.65E-07
Ethylene Dichloride (1,2-Dichloroethane)	107062	9.55E-06	1.37E-10	6.93E-07	8.73E-08
Formaldehyde	50000	2.32E+00	3.33E-05	2.46E-03	3.10E-04
Hexane	110543	8.52E-01	1.23E-05	4.44E-04	5.59E-05
Isopropyl Alcohol	67630	5.81E+00	8.36E-05	1.13E-03	1.42E-04
Lead	1128	6.39E-02	9.19E-07	4.06E-05	5.12E-06
Manganese	7439965	1.62E-01	2.33E-06	3.46E-04	4.36E-05
Methanol	67561	2.59E-03	3.72E-08	1.88E-04	2.37E-05
Methylene Chloride (Dichloromethane)	75092	3.49E-04	5.01E-09	2.53E-05	3.19E-06
Naphthalene	91203	1.06E-01	1.52E-06	5.57E-05	7.02E-06
Nickel	7440020	1.57E-01	2.26E-06	4.71E-04	5.93E-05
Phenol	108952	1.20E-02	1.73E-07	1.04E-05	1.32E-06
Polycyclic Aromatic Hydrocarbons	1151	1.35E-02	1.95E-07	7.04E-06	8.87E-07
Styrene	100425	1.00E-05	1.44E-10	7.30E-07	9.20E-08
Toluene	108883	4.95E+00	7.12E-05	2.61E-03	3.29E-04
Vanadium	7440622	2.72E+00	3.91E-05	6.82E-04	8.59E-05
Vinyl Chloride (Chloroethylene)	75014	6.08E-06	8.75E-11	4.41E-07	5.56E-08
Xylenes	1330207	6.00E+00	8.63E-05	4.78E-02	6.02E-03

Abbreviations:
lb/yr = pounds per year
lb/hr = pounds per hour
g/s = grams per second

Table ES-2. Exposure Pathways of relevace to emitted substances

Substance	CAS #	Exposure Pathway				
		Dermal	Home-Grown Produce	Inhalation	Mothers' milk	Soil ingestion
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	X	--	--
1,1,2,2-Tetrachloroethane	79345	--	--	X	--	--
1,3-Butadiene	106990	--	--	X	--	--
Acetaldehyde	75070	--	--	X	--	--
Acrolein	107028	--	--	X	--	--
Ammonia	7664417	--	--	X	--	--
Antimony	7440360	X	X	X	--	X
Arsenic	1016	X	X	X	--	X
Benz(a)anthracene	56553	X	X	X	X	X
Benzene	71432	--	--	X	--	--
Benzo(a)pyrene	50328	X	X	X	X	X
Bis(2-ethylhexyl) phthalate	117817	X	X	X	--	X
Cadmium	7440439	X	X	X	--	X
Carbon Tetrachloride (Tetrachloromethane)	56235	--	--	X	--	--
Chloroform	67663	--	--	X	--	--
Chromium(VI)	18540299	X	X	X	--	X
Chrysene	218019	X	X	X	X	X
Copper	7440508	--	--	X	--	--
Ethyl Benzene	100414	--	--	X	--	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	X	--	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	X	--	--
Formaldehyde	50000	--	--	X	--	--
Hexane	110543	--	--	X	--	--
Isopropyl Alcohol	67630	X	X	X	--	X
Lead	1128	--	--	X	--	--
Manganese	7439965	--	--	X	--	--
Methanol	67561	--	--	X	--	--
Methylene Chloride (Dichloromethane)	75092	--	--	X	--	--
Naphthalene	91203	--	--	X	X	--
Nickel	7440020	X	X	X	--	X
Phenol	108952	--	--	X	--	--
Polycyclic Aromatic Hydrocarbons	1151	X	X	X	X	X
Styrene	100425	--	--	X	--	--
Toluene	108883	--	--	X	--	--
Vanadium	7440622	--	--	X	--	--
Vinyl Chloride (Chloroethylene)	75014	--	--	X	--	--
Xylenes	1330207	--	--	X	--	--

-- = not applicable

Table ES-3. Target organ systems evaluated for acute and chronic health effects

Substance	CAS #	Target Organ System												
		Bones	Cardio-vascular	Central Nervous System	Develop-mental	Endocrine	Eyes	Gastro-intestinal & Liver	Hematologic	Immune System	Kidneys	Reproductive	Respiratory	Skin
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79345	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Butadiene	106990	--	--	--	A	--	--	--	--	--	--	C 8	--	--
Acetaldehyde	75070	--	--	--	--	--	A	--	--	--	--	--	A C 8	--
Acrolein	107028	--	--	--	--	--	A	--	--	--	--	--	A C 8	--
Ammonia	7664417	--	--	--	--	--	A	--	--	--	--	--	A C	--
Antimony	7440360	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	1016	--	A C 8	A C 8	A C 8	--	--	--	--	--	--	A C	C 8	C 8
Benz(a)anthracene	56553	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzene	71432	--	--	--	A	--	--	--	A C 8	A	--	A	--	--
Benzo(a)pyrene	50328	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117817	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440439	--	--	--	--	--	--	--	--	--	C	--	C	--
Carbon Tetrachloride (Tetrachloromethane	56235	--	--	A C	A	--	--	A C	--	--	--	A	--	--
Chloroform	67663	--	--	A	A C	--	--	C	--	--	C	A	A	--
Chromium(VI)	18540299	--	--	--	--	--	--	--	--	--	--	--	C	--
Chrysene	218019	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	7440508	--	--	--	--	--	--	--	--	--	--	--	A	--
Ethyl Benzene	100414	--	--	--	C	C	--	C	--	--	C	C	--	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	--	--	--	--	--	--	--	--	C	--	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	--	--	--	--	C	--	--	--	--	--	--
Formaldehyde	50000	--	--	--	--	--	A	--	--	--	--	--	C 8	--
Hexane	110543	--	--	C	--	--	--	--	--	--	--	--	--	--
Isopropyl Alcohol	67630	--	--	--	C	--	A	--	--	--	C	--	A	--
Lead	1128	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	7439965	--	--	C 8	--	--	--	--	--	--	--	--	--	--
Methanol	67561	--	--	A	C	--	--	--	--	--	--	C	--	--
Methylene Chloride (Dichloromethane)	75092	--	A C	A C	--	--	--	--	--	--	--	--	--	--
Naphthalene	91203	--	--	--	--	--	--	--	--	--	--	--	C	--
Nickel	7440020	--	--	--	--	--	--	--	C	A 8	--	--	C 8	--
Phenol	108952	--	C	C	--	--	A	C	--	--	C	--	A	--
Polycyclic Aromatic Hydrocarbons	1151	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100425	--	--	C	A	--	A	--	--	--	--	A	A	--
Toluene	108883	--	--	A C	A C	--	A	--	--	--	--	A C	A C	--
Vanadium	7440622	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride (Chloroethylene)	75014	--	--	A	--	--	A	--	--	--	--	--	A	--
Xylenes	1330207	--	--	A C	--	--	A C	--	--	--	--	--	A C	--

A = acute exposures evaluated for this target organ system
C = chronic exposures evaluated for this target organ system
8 = 8-hour exposure evaluated for this target organ system
-- = not applicable

Table ES-4. Cancer risk, chronic and acute hazard indices and locations for the MEIR, MEIW, and PMI

Location	Receptor ID	UTM E (m)	UTM N (m)	Result
Cancer Risk				
MEIR	5135	392200	3750700	1.9E-03
MEIW	4895	392050	3750600	3.5E-04
PMI	20	392105	3750632	1.3E-02
Chronic Noncarciongenic Hazard Index				
MEIR	5135	392200	3750700	0.10
MEIW	4895	392050	3750600	0.15
PMI	17	392081	3750679	0.56
8-hour. Chronic Non-carcinogenic Hazard Index				
MEIW	4895	392050	3750600	0.0030
Aute Noncarciongenic Hazard Index				
MEIR	5135	392200	3750700	1.15
MEIW	5074	392150	3750700	1.72
PMI	34	392175	3750677	2.91

Abbreviations:
MEIR - Maximum exposed individual resident
MEIW - Maximum exposed inidividual worker
PMI - Point of maximum impact

Table ES-5. Chemical-specific contribution to acute hazard Index for MEIR, MEIW, and PMI

Substance	CAS #	Maximum Exposed Individual Resident (Receptor 5135)		Maximum Exposed Individual Worker (Receptor 5074)		Point of Maximum Impact (Receptor 34)	
		Immune System	Percent Contribution to Immune System Hazard Index	Immune System	Percent Contribution to Immune System Hazard Index	Immune System	Percent Contribution to Immune System Hazard Index
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79345	--	--	--	--	--	--
1,3-Butadiene	106990	--	--	--	--	--	--
Acetaldehyde	75070	--	--	--	--	--	--
Acrolein	107028	--	--	--	--	--	--
Ammonia	7664417	--	--	--	--	--	--
Antimony	7440360	--	--	--	--	--	--
Arsenic	1016	--	--	--	--	--	--
Benz(a)anthracene	56553	--	--	--	--	--	--
Benzene	71432	5.10E-04	0%	7.32E-04	0%	8.91E-04	0%
Benzo(a)pyrene	50328	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117817	--	--	--	--	--	--
Cadmium	7440439	--	--	--	--	--	--
Carbon Tetrachloride (Tetrachloromethane	56235	--	--	--	--	--	--
Chloroform	67663	--	--	--	--	--	--
Chromium(VI)	18540299	--	--	--	--	--	--
Chrysene	218019	--	--	--	--	--	--
Copper	7440508	--	--	--	--	--	--
Ethyl Benzene	100414	--	--	--	--	--	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	--	--	--	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	--	--	--	--
Formaldehyde	50000	--	--	--	--	--	--
Hexane	110543	--	--	--	--	--	--
Isopropyl Alcohol	67630	--	--	--	--	--	--
Lead	1128	--	--	--	--	--	--
Manganese	7439965	--	--	--	--	--	--
Methanol	67561	--	--	--	--	--	--
Methylene Chloride (Dichloromethane)	75092	--	--	--	--	--	--
Naphthalene	91203	--	--	--	--	--	--
Nickel	7440020	1.15E+00	100%	1.72E+00	100%	2.91E+00	100%
Phenol	108952	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	1151	--	--	--	--	--	--
Styrene	100425	--	--	--	--	--	--
Toluene	108883	--	--	--	--	--	--
Vanadium	7440622	--	--	--	--	--	--
Vinyl Chloride (Chloroethylene)	75014	--	--	--	--	--	--
Xylenes	1330207	--	--	--	--	--	--
Total	--	1.15E+00	100%	1.72E+00	100%	2.91E+00	100%

-- = not applicable

Table ES-6. Chemical-specific contribution to chronic hazard index for MEIR, MEIW, and PMI0

Substance	CAS #	Maximum Exposed Individual Resident (Receptor 5135)		Maximum Exposed Individual Worker (Receptor 4895)		Point of Maximum Impact (Receptor 17)	
		Respiratory System	Percent Contribution to Respiratory System Hazard Index	Respiratory System	Percent Contribution to Respiratory System Hazard Index	Respiratory System	Percent Contribution to Respiratory System Hazard Index
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79345	--	--	--	--	--	--
1,3-Butadiene	106990	--	--	--	--	--	--
Acetaldehyde	75070	2.69E-06	0.0%	1.00E-05	0.0%	1.55E-05	0.0%
Acrolein	107028	6.76E-04	0.7%	2.52E-03	1.6%	3.90E-03	0.7%
Ammonia	7664417	1.39E-03	1.4%	5.21E-03	3.4%	8.06E-03	1.4%
Antimony	7440360	--	--	--	--	--	--
Arsenic	1016	7.75E-02	75.9%	8.08E-02	52.1%	4.60E-01	82.3%
Benz(a)anthracene	56553	--	--	--	--	--	--
Benzene	71432	--	--	--	--	--	--
Benzo(a)pyrene	50328	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117817	--	--	--	--	--	--
Cadmium	7440439	1.15E-03	1.1%	3.48E-03	2.2%	6.41E-03	1.1%
Carbon Tetrachloride (Tetrachloromethane)	56235	--	--	--	--	--	--
Chloroform	67663	--	--	--	--	--	--
Chromium(VI)	18540299	1.70E-02	16.6%	5.89E-02	38.0%	7.49E-02	13.4%
Chrysene	218019	--	--	--	--	--	--
Copper	7440508	--	--	--	--	--	--
Ethyl Benzene	100414	--	--	--	--	--	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	--	--	--	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	--	--	--	--
Formaldehyde	50000	1.66E-04	0.2%	6.18E-04	0.4%	9.54E-04	0.2%
Hexane	110543	--	--	--	--	--	--
Isopropyl Alcohol	67630	--	--	--	--	--	--
Lead	1128	--	--	--	--	--	--
Manganese	7439965	--	--	--	--	--	--
Methanol	67561	--	--	--	--	--	--
Methylene Chloride (Dichloromethane)	75092	--	--	--	--	--	--
Naphthalene	91203	8.58E-06	0.0%	2.67E-05	0.0%	6.02E-05	0.0%
Nickel oxide	1313991	4.16E-03	4.1%	3.33E-03	2.2%	4.66E-03	0.8%
Phenol	108952	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	1151	--	--	--	--	--	--
Styrene	100425	--	--	--	--	--	--
Toluene	108883	1.06E-05	0.0%	3.97E-05	0.0%	6.15E-05	0.0%
Vanadium	7440622	--	--	--	--	--	--
Vinyl Chloride (Chloroethylene)	75014	--	--	--	--	--	--
Xylenes	1330207	5.00E-06	0.0%	1.89E-05	0.0%	2.60E-05	0.0%
Total	--	1.02E-01	100%	1.55E-01	100%	5.60E-01	100%

-- = not applicable

Table ES-7. Chemical-specific contribution to 8-hour chronic hazard index for the MEIW

Substance	CAS #	Maximum Exposed Individual Worker (Receptor 4895)	
		Respiratory System	Percent Contribution to Respiratory System Hazard Index
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--
1,1,2,2-Tetrachloroethane	79345	--	--
1,3-Butadiene	106990	--	--
Acetaldehyde	75070	4.68E-06	0.2%
Acrolein	107028	1.26E-03	53%
Ammonia	7664417	--	--
Antimony	7440360	--	--
Arsenic	1016	--	--
Benz(a)anthracene	56553	--	--
Benzene	71432	--	--
Benzo(a)pyrene	50328	--	--
Bis(2-ethylhexyl) phthalate	117817	--	--
Cadmium	7440439	--	--
Carbon Tetrachloride (Tetrachloromethane)	56235	--	--
Chloroform	67663	--	--
Chromium(VI)	18540299	--	--
Chrysene	218019	--	--
Copper	7440508	--	--
Ethyl Benzene	100414	--	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--
Formaldehyde	50000	6.18E-04	26%
Hexane	110543	--	--
Isopropyl Alcohol	67630	--	--
Lead	1128	--	--
Manganese	7439965	--	--
Methanol	67561	--	--
Methylene Chloride (Dichloromethane)	75092	--	--
Naphthalene	91203	--	--
Nickel	7440020	1.11E-03	20%
Phenol	108952	--	--
Polycyclic Aromatic Hydrocarbons	1151	--	--
Styrene	100425	--	--
Toluene	108883	--	--
Vanadium	7440622	--	--
Vinyl Chloride (Chloroethylene)	75014	--	--
Xylenes	1330207	--	--
Total	--	3.00E-03	100%

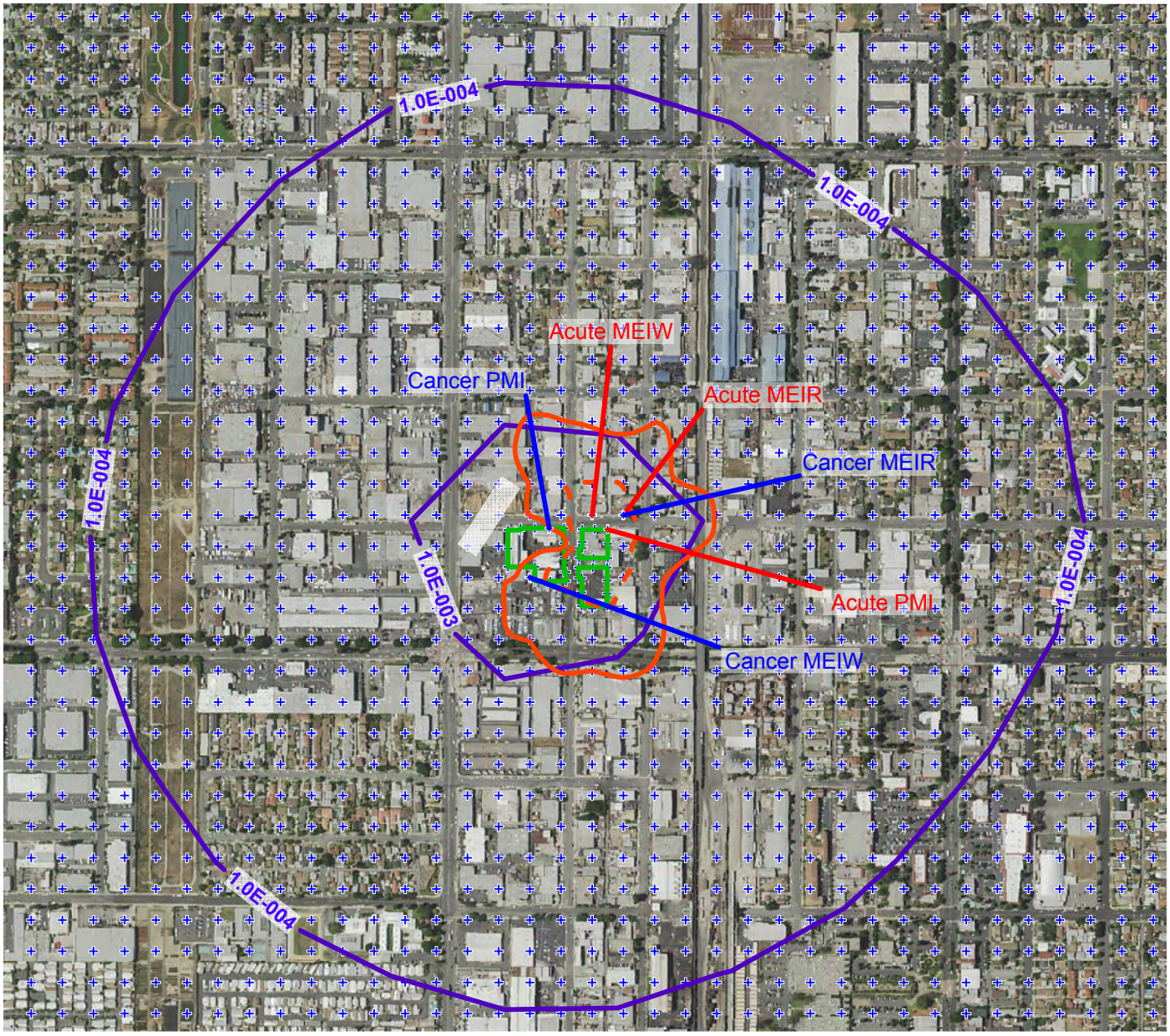
-- = not applicable

Table ES-8. Chemical-specific contribution to cancer risk for MEIR, MEIW, and PMI

Substance	CAS #	Maximum Exposed Individual Resident (Receptor 5135)		Maximum Exposed Individual Worker (Receptor 4895)		Point of Maximum Impact (Receptor 20)	
		Total	Percent Contribution to Cancer Risk	Total	Percent Contribution to Cancer Risk	Total	Percent Contribution to Cancer Risk
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	2.97E-13	0.00%	6.77E-14	0.00%	6.95E-13	0.00%
1,1,2,2-Tetrachloroethane	79345	1.73E-12	0.00%	3.94E-13	0.00%	4.05E-12	0.00%
1,3-Butadiene	106990	1.36E-10	0.00%	3.10E-11	0.00%	3.18E-10	0.00%
Acetaldehyde	75070	2.55E-09	0.00%	7.90E-10	0.00%	1.45E-08	0.00%
Acrolein	107028	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Ammonia	7664417	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Antimony	7440360	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Arsenic	1016	1.04E-06	0.06%	1.30E-07	0.04%	4.87E-06	0.04%
Benz(a)anthracene	56553	9.54E-08	0.01%	6.35E-09	0.00%	6.09E-07	0.00%
Benzene	71432	4.72E-08	0.00%	1.47E-08	0.00%	2.69E-07	0.00%
Benzo(a)pyrene	50328	9.54E-07	0.05%	6.35E-08	0.02%	6.09E-06	0.05%
Bis(2-ethylhexyl) phthalate	117817	2.56E-10	0.00%	1.19E-11	0.00%	1.63E-09	0.00%
Cadmium	7440439	2.34E-07	0.01%	5.88E-08	0.02%	1.03E-06	0.01%
Carbon Tetrachloride (Tetrachloromethane)	56235	9.08E-13	0.00%	2.07E-13	0.00%	2.13E-12	0.00%
Chloroform	67663	8.90E-14	0.00%	2.03E-14	0.00%	2.08E-13	0.00%
Chromium(VI)	18540299	1.87E-03	99.84%	3.45E-04	99.90%	1.34E-02	99.88%
Chrysene	218019	9.54E-09	0.00%	6.35E-10	0.00%	6.09E-08	0.00%
Copper	7440508	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Ethyl Benzene	100414	4.91E-09	0.00%	1.53E-09	0.00%	2.79E-08	0.00%
Ethylene Dibromide (1,2-Dibromoethane)	106934	1.82E-12	0.00%	4.14E-13	0.00%	4.26E-12	0.00%
Ethylene Dichloride (1,2-Dichloroethane)	107062	2.78E-13	0.00%	6.33E-14	0.00%	6.50E-13	0.00%
Formaldehyde	50000	2.12E-08	0.00%	6.57E-09	0.00%	1.20E-07	0.00%
Hexane	110543	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Isopropyl Alcohol	67630	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Lead	1128	6.67E-09	0.00%	1.51E-10	0.00%	8.29E-09	0.00%
Manganese	7439965	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Methanol	67561	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Methylene Chloride (Dichloromethane)	75092	4.93E-13	0.00%	1.12E-13	0.00%	1.15E-12	0.00%
Naphthalene	91203	6.27E-09	0.00%	1.62E-09	0.00%	3.86E-08	0.00%
Nickel	7440020	5.12E-08	0.00%	3.41E-09	0.00%	1.02E-07	0.00%
Phenol	108952	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Polycyclic Aromatic Hydrocarbons	1151	5.29E-07	0.03%	4.73E-08	0.01%	3.02E-06	0.02%
Styrene	100425	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Toluene	108883	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Vanadium	7440622	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Vinyl Chloride (Chloroethylene)	75014	6.63E-13	0.00%	1.51E-13	0.00%	1.55E-12	0.00%
Xylenes	1330207	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
Total	--	1.87E-03	100.00%	3.46E-04	100.00%	1.34E-02	100.00%

-- = not applicable

Figure ES-1 Predicted Zones of Impact and Key and Nearby Receptors Included in the Air Dispersion Model



Meters

0 100 200 300

N

Ambient Air Model Receptor Location

Cancer Unit Risk Isopleth[1]

Acute Isopleth for 0.5

Acute Isopleth for 1.0

PCC Areocraft Fence Lines

PMI = Point of Maximum Impact

MEIR = Maximum Exposed Individual Resident

MEIW = Maximum Exposed Individual Worker

[1] Zone of Impact (1x10-6 or 1 in one million) is shown on Figure 5A.

1 Introduction

On behalf of Aerocraft Heat Treating Co., Inc. (Aerocraft), ToxStrategies, Inc. (ToxStrategies) has prepared this Revised Air Toxics Health Risk Assessment (Revised HRA) for the Aerocraft facility located at 15701 Minnesota Ave., in Paramount, California (SCAQMD Facility ID No. 23752). The Revised HRA is a revision to the HRA submitted to SCAQMD on June 13, 2017.

In a letter dated December 14, 2016, the South Coast Air Quality Management District (SCAQMD) requested based on Rule 1402 that Aerocraft prepare an HRA within 180 days of receipt of the letter consistent with the Rule 1402 and AB2588[3] processes for HRAs. The letter also requested that an Air Toxics Inventory Report for 2016 be submitted within 150 days and a Risk Reduction Plan within 180 days. An Air Toxics Inventory Report for facility emissions in 2016 (2016 ATIR) was prepared and submitted on May 16, 2017 (Associates Environmental, 2017b). The 2016 ATIR served as the basis for estimating potential exposure in the HRA (ToxStrategies, 2018) although facility operations are significantly different now from what they were in 2016. The 2016 HRA was submitted on June 13, 2017.

Based on correspondence and discussion with SCAQMD in 2018, a Revised ATIR was submitted on March 29, 2018 (Associates Environmental, 2018). In addition to this Revised HRA, a Revised Risk Reduction Plan (Revised RRP) is being submitted under separate cover.

- In a February 9, 2018, letter, SCAQMD requested revisions to the ATIR, HRA and RRP (SCAQMD, 2018a).
- In letters dated February 16 and February 27. 2018, ToxStrategies, Inc. on behalf of Aerocraft provided responses to SCAQMD's comments (ToxStrategies, 2018a and b).
- After a discussion between representatives of Aerocraft and SCAQMD on March 7, 2018, ToxStrategies on behalf of Aerocraft proposed a schedule for submittal of the Revised ATIR, Revised HRA and Revised RRP in a letter dated March 16, 2018 (ToxStrategies, 2018c). The Revised ATIR was submitted consistent with that schedule on March 29, 2018 (Associates Environmental, 2018).
- On April 24, 2018, SCAQMD provided a response to Aerocraft's March 16, 2018, letter; the SCAQMD letter agreed with the changes to the ATIR but indicated that the ATIR was still being reviewed (SCAQMD, 2018b). SCAQMD also provided some additional comments on the HRA and RRP and

[3] The Air Toxics "Hot Spots" Information and Assessment Act (AB2588, 1987, Connelly) was enacted in 1987, and requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, to identify facilities having localized impacts, to ascertain health risks, to notify nearby residents of significant risks, and to reduce those significant risks to acceptable levels. (CARB, 2016)

requested that the Revised HRA and Revised RRP be provided by May 11, 2018.

- Aerocraft responded in a letter dated April 30, 2018 (Aerocraft, 2018), that it could not complete the HRA until the ATIR was approved, and that the SCAQMD's website indicated that the meteorology data set used in the HRA (Compton meteorology station) was no longer considered appropriate.
- In a letter dated May 9, 2018, SCAQMD indicated that the ATIR was approved and that continued use of the Compton meteorological data consistent with the 2016 HRA was acceptable (SCAQMD, 2018c). The letter set a deadline for submittal of the Revised HRA and RPP of May 18, 2018. A Revised HRA was submitted under separate cover on May 18, 2018 (ToxStrategies, 2018d).

The change to the ATIR requested by SCAQMD in its letter dated February 9, 2018 increased emissions of metals in solution from direct-contact cooling towers that are no longer in operation by 96%. The initial ATIR assumed the largest water droplets which are outside the respirable range, when emitted would precipitate and fall within buildings or to the ground on facility property. The Revised ATIR assumes that all water droplets released from the cooling towers, regardless of size, would behave like volatile gases and disperse for miles, which significantly overestimates potential emissions and dispersion of total suspended solids in water droplets, such as hexavalent chromium.

This Revised HRA evaluates whether the 2016 emissions from Aerocraft, estimated using these policies and assumptions, may result in off-site exposures subject to notification or risk reduction requirements, and if so, where notification or risk reduction would be required. As described in detail in this document, the potential health effects calculated in the HRA trigger the requirement for notification and development of an RRP.

This HRA report has been prepared using the guidelines and tools for HRAs published by California regulatory agencies, including:

- Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessment (OEHHA, 2015)
- SCAQMD's AB2588 & Rule 1402 Supplemental Guidelines for Preparing Risk Assessments and Risk Reduction Plans for the Air Toxics "Hot Spots" Information and Assessment Act (SCAQMD, 2016)
- Air Resources Board's Hot Spots Analysis Reporting Program (HARP), User Manual for the Hotspots Analysis and Reporting Program, Air Dispersion Modeling and Risk Assessment Tool, Version 2 (CARB, 2015).

1.1 Overview of Facility Operations

Aerocraft is a commercial heat treater of steel, titanium, and high-temperature materials. Founded in 1959, Aerocraft processes forgings; castings; and bar, plate, and rough-machined parts. Aerocraft provides a number of services for engine and structural

components relating to aircraft manufacture and maintenance. In 2016, operations were performed in 17 custom-built, batch-type, gas-fired furnaces with temperature ranges from 450 °F to 2250 °F. In 2016, 18 furnaces (one furnace has not operated in a very long time, possibly not for decades) were located throughout four main operations buildings (Buildings 1–4). Currently, eight furnaces are operated in Buildings 2 and 3, and the furnaces in Buildings 1 and 4 have been taken out of service. General practice is to place parts on stainless steel racks, which are placed into the furnaces along with the metals to be treated. The treated parts and racks are then cooled in one of five ways: submerged in an oil-quench tank, submerged in a water-quench tank, fan cooled, oven cooled, or ambient air cooled. Fan-cool operations are no longer occurring, and water quench operations are limited. In 2016, the facility operated three water-quench tanks, two oil-quench tanks, and one forced-air cooling station. They also used a caustic tank to remove oil from parts after oil quench. The water-quench tanks were cooled by direct-contact cooling towers, and the return discharge was reintroduced into the cooling bath. The direct-contact cooling towers for the water quench tank are no longer in use. The oil quench tanks were cooled by heat exchangers with indirect cooling from cooling towers using municipal water. A small sweeper/vacuum vehicle is used to mitigate dust from the various processes. Treated parts may also undergo grinding in a separate building across the street. Aerocraft also conducts limited welding to repair the stainless-steel racks. Several natural gas-fired water and space heaters as well as a natural gas-fired emergency internal combustion engine are located throughout the facility.

1.2 Health Risk Assessment Format and Definitions

HRAs involve a four-step process consisting of hazard identification, dose-response assessment, exposure assessment, and risk characterization. These four steps, as incorporated into the HRA process for Aerocraft, are described as follows:

- Hazard identification — Identify whether a potential hazard exists based on the air emissions from a facility. A specific list of chemical emissions has been developed in the ATIR; a subset of those emissions has quantitative toxicity criteria for the assessment of potential human health risks in an HRA. The hazard identification for Aerocraft is discussed in Section 2.0.
- Dose-response assessment — Quantify the relationship between exposure to a chemical and incidence of an adverse health effect in potentially exposed populations. OEHHA has developed toxicity criteria that describe the relationship between exposure and potential health effects specifically for use in HRAs. The dose-response assessment also is discussed in Section 2.0.

- Exposure assessment — Estimate the extent of public exposure to each substance for which potential cancer risk or acute and chronic noncancer effects will be evaluated. The exposure assessment is specific to the types of chemicals emitted from the facility and the land use around the facility and requires use of an air dispersion model to predict airborne concentrations beyond the facility. The exposure assessment for Aerocraft is discussed in Section 3.0.
- Risk characterization — Characterize the potential for adverse health effects based on the results of the dose-response and exposure assessments. In an HRA, potential carcinogenic, acute noncarcinogenic, 8-hour noncarcinogenic effects, and chronic noncarcinogenic health effects are quantified and reported. Potential cancer risk estimates quantify the theoretical probability of contracting cancer over a lifetime. Potential noncancer health effects range from mild temporary conditions, such as eye or throat irritations, to permanent and serious conditions, such as birth defects or damage to lungs, nerves, etc. Acute and 8-hour noncarcinogenic effects are associated with short-term exposure, and chronic noncarcinogenic effects are associated with long-term exposure. The risk characterization for Aerocraft is summarized in Section 4.0.

1.3 Significance Criteria and Notification Levels

Under the Rule 1402 program, the operator of a facility must provide notice to all exposed persons if the facility's HRA indicates that the facility's air toxic emissions are predicted to result in health risks greater than or equal to any of the following (notification risk level):

- Maximum individual (lifetime) cancer risk (MICR) of 10 in 1,000,000 (e.g., $1x10^{-5}$)
- Hazard index of 1.0 for acute, 8-hour, or chronic exposure (0.5 for lead).

The facility is also required to develop a risk reduction plan to implement risk reduction measures if the emissions from the facility cause an exceedance of any of the following action risk levels:

- MICR of 25 in 1,000,000 ($2.5x10^{-5}$)
- Cancer burden of 0.5
- Total acute, 8-hour, or chronic hazard index of 3.0.

2 Hazard Identification and Dose-Response Assessment

Aerocraft has prepared an air toxics inventory report (ATIR) that documents which chemicals are emitted from the various processes at the facility (Appendix A). Associates Environmental, on behalf of Aerocraft, prepared an initial ATIR Plan for 2016 emissions on January 13, 2017. SCAQMD provided comments on the initial ATIR Plan in an e-mail dated February 15, 2017. After working with SCAQMD to characterize emission sources, Associates Environmental, on behalf of Aerocraft, submitted the ATIR for 2016 emissions on May 16, 2017. In response to an e-mail from SCAQMD on May 26, 2017, Associates

Environmental provided more detailed backup for the ATIR to SCAQMD on June 2, 2017. SCAQMD requested better documentation for the calculations; the submittal did not result in changes to the emission estimates. As requested by SCAQMD in a letter dated February 9, 2017 (SCAQMD, 2017a), a Revised ATIR for 2016 emissions was submitted on March 29, 2018, which changed emission rates for the previously operated cooling towers to model the particles emitted as if they were a gas but did not change the list of chemicals to be evaluated. Of the 52 chemicals emitted by Aerocraft, as listed in the ATIR, 37 are required to be included in an HRA based on the hazard identification for Rule 1402. Table 1 lists the chemicals emitted by the facility that are required to be evaluated under Rule 1402. This section discusses the operations that use the listed chemicals, emissions from those operations, and the dose-response assessment for these chemicals.

2.1 Description of General Operations that Produce Air Emissions

Seven types of operations at the Aerocraft facility produced emissions of listed chemicals that require quantification:

- Natural gas combustion at the furnaces and Rule 219–exempt equipment
- Heat-treating processes at the furnaces
- Natural gas combustion in space and water heaters
- Stack emissions from the plasma arc cutting baghouse, inspection baghouse, and rack welding
- Process fugitive emissions from oil- and water-quench tanks, direct and indirect evaporative cooling, caustic tank, and forced-air cooling
- Portable coating equipment
- Part marking.

In 2016, Aerocraft operated 17 custom-built natural-gas-fired furnaces in four buildings (Buildings 1–4). Parts are placed on steel racks and heat treated in the furnaces at temperatures between 450 and 2250 ºF. Parts remain in the furnaces for anywhere from 2 to 24 or more hours. Following heat treating, parts were cooled by one of five methods (ordered from fastest to slowest: submerged in an oil tank [oil-quench], submerged in a water tank [water quench], fan cooled in ambient air, cooled at ambient temperature outside the furnace, and slowly cooled within the furnace as the furnace cools. The facility operated three water-quench tanks and two oil-quench tanks in 2016. In 2016, the water in the quench tanks was cooled directly through an evaporative cooling process, but this is being changed to an indirect process (currently, water quenching occurs infrequently, only in enclosed Building 2, and cools naturally without the use of a cooling tower). The oil in the quench tank is cooled indirectly by a heat exchanger and cooling towers using a municipal water supply. Parts cooled in an oil-quench tank are degreased in a caustic tank. In 2016, fan cooling occurred in the open area between Buildings 1 and 2, but fan cooling is not currently performed at the facility. In 2016, the furnaces generally operated 24 hours per day for 7 days per week, with 16 shut-down days. Other significant changes to the facility

since 2016 include shutting-down furnaces in Buildings 1 and 4, enclosing Building 2 (certified as a permanent total enclosure [PTE]), controlling emissions from Building 2 using two portable temporary baghouses, and managing hexavalent chromium concentrations in quench tanks. Building 3 is also currently controlled through a temporary baghouse, and will be certified as a PTE and vented through permanent baghouses that are being installed as part of the risk reduction plan.

Parts that have completed the heat treatment process are then sent to the inspection building across Minnesota Avenue (15720 Minnesota Avenue). For inspection, the facility uses hand grinders to remove a small area (typically, roughly postage-stamp sized) from the surface of the part for hardness testing. The inspection building is enclosed, and emissions are vented through a baghouse.

A plasma arc cutter was occasionally used in 2016 to cut steel to make the steel racks, and the cut steel is welded nearby to make the racks. Both of these activities occurred at 15700 Minnesota Avenue, across the street from the heat-treating operations. Emissions from the plasma arc cutting process are routed through a baghouse with HEPA after-filters. The plasma arc cutter has not operated since mid-2016, and the permit for this activity has been withdrawn. Rack welding now occurs within Building 2, which is equipped with a baghouse and is a PTE.

Additional natural-gas-fired equipment, including an emergency internal combustion engine, water heaters, and space heaters, are located throughout the facility.

2.2 Sources and Emission Estimates

Table 2 presents a summary of the maximum hourly and annual average emissions for all sources at the facility. This section provides a brief characterization of each source, and Figure 1B presents the location of each. Tables 3A and 3B summarize source characteristics relevant to air dispersion modeling. Tables 4A and 4B summarize maximum hourly emissions in pounds per hour and grams per second, respectively. Tables 4C and 4D summarize annual average emissions in pounds per hour and grams per second, respectively. Emission calculations are provided in the ATIR (Appendix A).

2.2.1 Point Sources

Emissions from 11 point sources are evaluated herein:

- Inspection Baghouse (Grinding Operation) (S0001; 34)
- PACS (Plasma Arc Cutter) (S0002; 60)
- IC Engine (S0003; 61)
- Water Heater (S0004; 100)
- Space Heater #1 (S0005; 101)
- Space Heater #2 (S0006; 102)

- Water Heater (S0007; 103)
- Space Heater (S0008; 104)
- Cooling Tower (S0009; 105)
- Rack Welding Filter (S0010; 106)
- Space Heater #3 (S0013; 109).

Five of these sources are across Minnesota Avenue from the primary facility operations: Inspection Baghouse [34], Plasma Arc Cutter [60], Water Heater [103], Space Heater [104], and Rack Welding Filter [106]. A small surface area of certain parts is removed for testing purposes through the use of a small hand-held grinder in the inspection building, from which emissions are exhausted through a baghouse. The plasma arc cutter and rack welding were used to repair the stainless-steel racks on which the parts are placed when they are put into the furnaces. The cooling tower was associated with the oil quench operations in Building 2. This cooling tower was evaluated as a point source, because emissions are vented vertically outside the building.

2.2.2 Volume Sources

Two types of volume sources are evaluated in this HRA; the cooling towers associated with the Building 1 oil-quench tank and the water-quench tank, which were located outside the walls of Building 1. The remaining four volume sources represent emissions from furnaces and other operations within each of the buildings. Each building was constructed with an opening at the apex, which is covered with an additional structure (i.e., doghouse) that covers the open section of the roof. Emissions are vented through the sides of the doghouse-like structure, which are open, and the roof prevents direct intrusion of rain from the outside. For the purpose of modeling, each roof was subdivided into individual volume sources across the length of the roof apex. The number of sources depended on the width and length of the roof opening. All sources within the building (e.g., furnaces, cooling towers) are considered to vent collectively through the roof vents. Emissions from each source were summed and then divided across the building roof sources.

The furnaces associated with each building during 2016 were as follows:

Building	Furnace	Usable?	Radiant tube
1	5	Y	
	8	Y	
	10	Y	
	13	N	
	21	Y	
	24	Y	
2	3	Y	
	9	Y	
	14	Y	
	22	Y	
3	1	Y	Y
	11	Y	
	12	Y	
	15	Y	
	20	N	Y
4	16	Y	
	17	Y	Y
	25	Y	

Note: Radiant tube furnaces contain the combustion process within a tube, such that the flames and gases do not come in direct contact with the metal part.

The Revised ATIR (Associates Environmental, 2018) provides more detail regarding the emissions estimated for each source (Appendix A).

2.3 Dose Response Assessment

The quantitative relationships between dose and response for each of the chemicals emitted from the facility have been assessed by the Office of Environmental Health Hazard Assessment (OEHHA) and are quantified as toxicity criteria (OEHHA, 2016). Table 1 presents a summary of the toxicity criteria developed for carcinogenic, chronic noncarcinogenic, and acute health effects.

Toxicity criteria for chemicals that are categorized as carcinogens are called cancer slope factors (CSFs) for inhalation exposure [expressed in units of inverse (milligrams per kilogram per day)$^{-1}$] and oral cancer slope factor (CSF_O) values for oral and other exposure pathways (expressed in units of inverse milligrams per kilogram per day [mg/kg-day]$^{-1}$). Examples of non-inhalation exposure pathways relevant to Aerocraft include soil ingestion

and dermal contact. Toxicity criteria for noncarcinogenic health effects are called reference exposure levels (RELs), expressed in units of μg/m^3 for inhalation exposures, and oral RELs in units of mg/kg-day for oral exposures. Oral RELs are also referred to as oral reference doses (RfDs). Oral CSFs and RELs were applied to non-inhalation exposures such as dermal absorption. OEHHA has developed RELs for acute (one hour), 8-hour, and chronic (long-term) exposure scenarios for most of the chemicals of interest for this assessment.

OEHHA has developed inhalation URFs for 25 chemicals emitted by Aerocraft, and eight are considered by OEHHA to pose a potential cancer risk via non-inhalation exposure pathways (e.g., soil ingestion, dermal contact). These chemicals are called multi-pathway chemicals and include arsenic, benzo(a)anthracene, benzo(a)pyrene, bis(2-ethylhexyl) phthalate, hexavalent chromium, chrysene, lead, and polynuclear aromatic hydrocarbons (PAHs). OEHHA has developed inhalation chronic RELs for 25 chemicals, acute RELs for 21 chemicals (Table 1), and 8-hour RELs for eight chemicals. Additionally, four noncarcinogenic chemicals are considered by OEHHA to be multi-pathway chemicals. The multi-pathway chemicals for chronic noncarcinogenic health effects are antimony, cadmium, chromium(VI), and nickel.

OEHHA has set chronic inhalation RELs for nickel and nickel compounds and for nickel oxide. The potential toxicity of nickel in metal alloys emitted from Aerocraft is more appropriately related to nickel oxide than the more bioavailable forms used in the toxicity testing for nickel (e.g., nickel sulfate hexahydrate). To assess nickel emissions from Aerocraft based on the toxicity of nickel oxide, the measured emissions of elemental nickel were scaled to account for the additional oxygen molecule in nickel oxide. This nickel oxide emission rate was then used in the Hotspots Analysis and Reporting Program (HARP) (details in Section 4)—instead of the nickel emission rate—so that the nickel oxide toxicity criteria would be applied correctly to the predicted air concentrations. The chronic REL for nickel and nickel compounds is 14 μg/m^3, and for nickel oxide (measured as nickel) is 20 μg/m^3. OEHHA has set the inhalation unit risk, oral REL, or acute REL for nickel oxide equal to that for nickel, so the values developed for nickel and nickel compounds were used for evaluating cancer risk, the potential for acute health effects by inhalation, and chronic effects via non-inhalation exposure pathways.

The emissions of hexavalent chromium appear to present the most significant contribution to the estimated cancer risk in this HRA. It is noteworthy that the inhalation unit risk (or cancer potency) for hexavalent chromium used in this HRA was based on an analysis performed in 1985 (CDHS 1985) that has not been updated since by OEHHA. More recent analyses of the inhalation unit risk for hexavalent chromium developed by the Occupational Health and Safety Administration (OSHA 2006), National Institute of Occupational Health and Safety (NIOSH 2013), Texas Commission for Environmental Quality (TCEQ 2014), and the Scientific Committee for Occupational Exposure Limits in the European Union (SCOEL 2017) have resulted in inhalation unit risk factors for hexavalent chromium that are based on more recent and considerably improved epidemiological studies. All of these regulatory and scientific authorities have developed

lower inhalation unit risk values than that used by OEHHA for inhalation exposures.[4] Therefore, the cancer risk estimates provided here are expected to overestimate the value that would be predicted based on the current and best available science.

3 Exposure Assessment

Detailed air dispersion modeling was performed using AERMOD software to estimate the ambient air concentrations of chemicals in the vicinity of the Aerocraft facility. The model included all sources of listed substances emitted from the facility. Concentrations were estimated at various receptor points, including fence-line receptors (Figure 2B), gridded receptors (Figures 2A and 2B), and a set of discrete receptors representing schools, hospitals, day-care facilities, and census tract centroids (Figure 2C). The domain of the gridded receptors is approximately 9 miles east and west of the facility and 9 miles north and south of the facility. This domain was designed to be larger than the ZOI so that the modeling run would include all receptors within the ZOI.

3.1 Site Characterization

Figure 1A illustrates the Aerocraft facility (SCAQMD ID #23752) and surrounding area. Land use in the immediate vicinity of the facility is primarily commercial/industrial, with limited residential use (Figure 1A). Based on an inspection of the Digital Elevation Models, the topography in the area is primarily flat. Aerial photography (2011) was obtained from U.S. Geological Survey (USGS) Earth Explorer (http://earthexplorer.usgs.gov/).

On-site and off-site building dimensions and heights were provided by Aerocraft on a plot plan. This plot plan was digitized using ArcMap, and Universal Transverse Mercator (UTM) coordinates for building corners were obtained. Building coordinate data, along with heights provided on the plot plan, were used to run BPIP Prime to obtain a building downwash file. A total of 16 structures (12 on site and 4 off site) were included in the building downwash calculations. Structures included in building downwash calculations are presented in Figure 1C.

3.2 Source Parameters

AERMOD utilizes several parameters specific to each emission source, including:

- Location
- Emission rate

[4] Although the OEHHA inhalation unit risk is for environmental exposures, and those developed by OSHA, NIOSH and SCOEL are for occupational exposures, all inhalation unit risks for hexavalent chromium are developed from occupational epidemiology studies and can be calculated for either the general population or worker populations. For the point of this comparison, occupational unit risks were converted to values consistent with continuous environmental exposures among the general population.

- Stack height
- Stack inner diameter
- Stack exit velocity
- Stack gas temperature.

Tables 3A and 3B provide the relevant information for point and volume sources, respectively. Each source parameter used in the model was developed from information provided by Aerocraft and the ATIR. Facility operating hours of 24 hours per day for 7 days per week were used in the model. Two modeling scenarios and sets of emission rates were run to calculate maximum hourly and annual average air concentrations. For the maximum hourly scenario, each source was modeled with a unit emission rate. For point sources and single volume sources, 1 g/s was run. For volume sources associated with the roof monitors, the emission rate was 1/n g/s for each volume source in a group, where n is equal to the total number of volume sources in a group.

For the annual average scenario, air dispersion modeling was carried out assuming that sources ran 24 hours per day for 7 days per week. Over the course of a full 52-week year in 2016, this amounts to 8,784 hours because it was a leap year. Emission rates were converted to grams per second for the purpose of modeling and were modeled over 8760 hours, consistent with the meteorological data sets.

3.3 Meteorology

AERMOD-ready meteorological data were obtained from the SCAQMD website (http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/aermod-table-1) in March 2017. These data were developed with AERMET version 14134. The meteorological station located at Compton, California, was chosen, because it is approximately 2.3 miles from the Aerocraft facility, and the land use is also urban, with a residential/industrial mix. There are no large topographical features between the Compton station and the site. Three years of meteorological data were available at this site (2009, 2010, and 2012). Therefore, full-period average results (which are used in this assessment to estimate long-term average) represent results averaged over a three-year period of meteorological data.[5]

[5] It should be noted that SCAQMD no longer provides these meteorological data for the Compton Station. The website indicates the data have been withdrawn, "The Compton (CMPT) station is not available for download as the station does not have 5 years of data that meets quality assurance procedures." Although using other validated meteorological data that has not been withdrawn may alter the HRA estimates, the revised HRA was completed using the previously available data with three years of data from the Compton Station (2009, 2010, and 2012), as directed by SCAQMD in their letter dated May 9, 2018.

3.4 Description of Receptors

Receptors are locations at which air concentrations are estimated. Four receptor sets were included in the model:

- Fence-line receptors: A receptor spacing of 20 meters (m) was used along the border of the Aerocraft facility, surrounding three non-contiguous parcels that make up the Aerocraft facility (Figure 2B). This information was obtained from the facility plot plan provided by Aerocraft. A total of 39 fence-line receptors were modeled.
- Grid receptors: The near-field grid receptors were based on a 50-m grid spacing extending 1 kilometer (km) from the site in all directions (Figure 2A). Beyond the near-field receptors, receptors with 100 meter spacing were placed from 1,000 m out to 3,000 m, receptors with 200 m spacing were placed from 3,000 m out to 5,000 m, and receptors with 500 m spacing were placed from 5,000 m out to 15,000 m. The near-field grid and all the outer grids include 11,096 receptors.
- Monitor receptors: Six receptors approximately co-located with SCAQMD's monitoring locations (7, 8, 9, 10, 11, and 18) were included.
- Sensitive receptors: For an HRA, sensitive receptors are schools, hospitals, and day-care centers. Sensitive receptors within an approximately 2-mile radius were identified to be included in the modeling domain. Schools were identified from the Paramount and Bellflower school district websites. Day-care centers were identified using the Community Care Licensing Division (CCLD) of the California Department of Social Services website (http://secure.dss.cahwnet.gov/ccld/securenet/ccld_search). Hospitals were identified using Google Maps. These sensitive receptors include 20 schools, 6 hospitals, and 57 child-care facilities (Figure 2C).
- Census-tract receptors: Census tract receptors for 2010 census data were obtained from the U.S. Census Bureau, Geography, Maps and Data, TIGER/Line with Selected Demographic and Economic Data, 2010 Census (https://www.census.gov/geo/reference/centersofpop.html). The population-based center of each census tract (centroid) and the population was provided with this data set. Census-tract centroid receptors for 380 census tracts were used in our model (Figure 2C). The number of census tract centroids was expanded from those evaluated in the original HRA.

In total, air dispersion analysis was performed for 11,141 fence line, grid, and monitor receptors. An additional run for sensitive and census tract receptors was conducted, which included 463 receptors.

3.5 Terrain Data

Four 1-minute National Elevation Datasets (http://ned.usgs.gov/about.html) were used to determine source and receptor elevations, and receptor hill heights. These data were

downloaded from the National map (https://viewer.nationalmap.gov/basic/) in GRIDFLOAT format and converted to GeoTIFF format. These data extended from 33N 119W (latitude longitude) in the southwest to 35N 117W in the northeast. Most of the terrain is simple (flat), but some terrain in the northeast section of the receptor domain was complex.

A surface roughness parameter of 0.547 m was used, following SCAQMD guidelines (http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/aermod-table-2, accessed 7/21/2014). This value is specific to the Compton meteorological station, located less than 2.5 miles from the Aerocraft facility.

3.6 Coordinate System

ToxStrategies used the UTM system of coordinates (Zone 11), GCS North American Datum (1983), as the location basis for the coordinates of model objects (sources, boundaries, receptors, etc.).

3.7 Air Dispersion Modeling

Air dispersion modeling was conducted using the EPA AERMOD air dispersion modeling program for all sources identified in the ATIR for the Aerocraft facility. AERMOD is a steady-state Gaussian plume model that incorporates air dispersion based on planetary boundary-layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources and both simple and complex terrain. AERMOD was selected, because it is preferred by EPA. AERMOD has been updated (Version 18081) since the original HRA was published in June 2017; however, the changes do not affect the analysis herein. For consistency with the previous submittal, the previous air dispersion modeling results for grid receptors were used. To predict air concentrations for the expanded census tract and sensitive receptor list, Version 16216r of AERMOD was used.

Per SCAQMD guidelines (SCAQMD, 2016), the following options were selected in the AERMOD model:

- Regulatory default options
- Urban area
- Buoyancy-induced dispersion
- Stack-tip downwash
- Building downwash
- No deposition

All emission sources (point sources and volume sources) were modeled in three runs: a 1-hour and 3-year period run for fence line, grid, and monitor receptor locations, and a 3-year period run for sensitive and centroid receptors. The AERMOD model was run in two batches to address fence-line and grid receptors separately from sensitive receptors (e.g.,

schools, hospitals, and day-care centers). Emissions for both runs were based on the facility operating 24 hours per day and 365 days per year over the entire model period. In this case, each individual emissions source (point source or volume source) was modeled at an emission rate of 1 g/s, operating constantly. A 1-g/sec emission rate for buildings, representing emissions from the roof vents on the buildings, was divided by the number of area sources across the building roof vents to develop a source-specific emission rate.

Source emission rates were applied to the air modeling results using the ADMRT component of HARP, and air concentrations for each chemical at each receptor were calculated for the exposure assessment phase of this health risk assessment (Section 4.0). Air concentrations for key receptors for each chemical are presented in Table 5A for maximum hourly emissions and Table 5B for annual average emissions. Air concentrations for other receptors for maximum hourly and annual average emissions are provided in Appendix B.

As required by SCAQMD, the model predicts air concentrations assuming that emitted particles of hexavalent chromium do not behave as particles and do not deposit on surfaces. As a result, the model predictions of airborne concentrations will be overestimated. Additionally, the model assumes that hexavalent chromium is not converted to the non-toxic trivalent state in ambient air. Reduction of hexavalent chromium to trivalent chromium results in detoxification, and trivalent chromium is not considered to be carcinogenic. An extensive study of the half-life of hexavalent chromium in Los Angeles ambient air was conducted for the California Air Resources Board (CARB) (Grohse et al. 1988). This study investigated the reduction of hexavalent chromium to trivalent chromium in Los Angeles ambient air as well as in laboratory studies. The average half-life of hexavalent chromium in the field measure value was 14.4 hours (average 10 field studies; one was excluded as an outlier). In the laboratory studies, the predicted half-life was 13 hours, which is consistent with results measured in the field. Not accounting for reduction of hexavalent chromium to the trivalent form will exaggerate the model-predicted concentrations from Aerocraft emissions. Finally, these two conservative assumptions (i.e., no deposition and no reduction) will result in an over-prediction of the dispersion of hexavalent chromium emissions from Aerocraft, and widen the isopleths associated with potentially increased cancer risk.

4 Health Risk Assessment Modeling

This HRA was prepared using HARP, as required by SCAQMD. This program uses the estimated emission rates from the facility and the results of the air dispersion analysis to compute the estimated air concentrations, exposure, and risk at each receptor location for all chemical emissions.

4.1 HARP Risk Analysis Module

The most recent version of HARP (Version 2), Air Dispersion Modeling and Risk Assessment Tool (ADMRT; version 17320) was used to prepare this HRA. HARP included the health table dated May 2, 2017.

The following information was imported to ADMRT.[6]

- Sources (all sources and their coordinates)
- Receptors (Run 1: all grid receptors or Run 2: census-tract centroids and sensitive receptors and their coordinates)
- Emissions estimates from each source (maximum hourly and annual average emissions from each source by substance)
- AERMOD air concentration output files (annual average and hourly maximum X/Q values[7] for every source-receptor pair).

To complete the risk analysis, these files were imported into HARP's risk analysis module (ADMRT). HARP computed the annual average and maximum hourly ground-level concentrations for all substances in the ATIR emitted from all emission sources at all receptors. HARP then used this information, with its database of toxicity values and exposure assumptions, to estimate the potential cancer risk, chronic hazard index, and acute hazard index at each receptor location.

Consistent with SCAQMD guidance, background concentrations of toxics were not included in this HRA but are discussed further in Section 5.4.

4.2 Exposure Pathways

The following exposure pathways are included in the HARP model, which were evaluated for their relevance in the vicinity of Aerocraft: inhalation, dermal exposure, water ingestion, crop ingestion (direct deposition and root uptake), soil ingestion, mother's milk ingestion, fish ingestion, dairy products ingestion, and meat and egg ingestion. Given the urban development surrounding the facility, the following exposure pathways were considered relevant for residential exposure in this HRA:

- Inhalation
- Dermal absorption
- Soil ingestion
- Ingestion of homegrown produce—used the urban default setting, where the portion of produce consumed from the contaminated area is 5.2%
- Ingestion of mother's milk.

Because the drinking-water supply in the vicinity is not derived from local surface water, the water ingestion pathway is not relevant in this case. Also, because the Aerocraft facility

---

[6] All files are included on the CD.

[7] X/Q values represent the predicted air concentration at each receptor for each source, assuming a 1-g/sec emission rate, except where adjusted as described previously for volume sources representing the roof monitors.

is located in an urban area, exposure through ingestion of fish, dairy, meat, eggs, and agricultural products is negligible for populations surrounding the facility.

The following multi-pathway chemicals emitted from Aerocraft are assessed for non-inhalation exposures (dermal adsorption, soil ingestion, ingestion of homegrown produce, and ingestion of mother's milk):

- Arsenic
- Antimony
- Benz(a)anthracene
- Benzo(a)pyrene
- Bis(2-ethylhexyl) phthalate
- Cadmium
- Chromium VI (hexavalent chromium)
- Chrysene
- Lead
- Nickel
- Polycyclic aromatic hydrocarbons

For multi-pathway chemicals, HARP calculates deposition of the particles to soil and subsequent accumulation in soil over 70 years of operation. As recommended by SCAQMD for urban areas and controlled emission sources, the deposition rate was assumed to be 0.02 m/sec.

4.3 Receptors and Exposure Assumptions

HRAs evaluate two types of receptors: a resident and a worker. Residential exposure assumptions are used to estimate residential exposure, define the ZOI, evaluate sensitive receptors, and estimate exposure at census-tract centroids. Worker exposures are used to estimate exposure for off-site workers at facilities neighboring Aerocraft.

4.3.1 Residential Exposure Assumptions

In this evaluation, residents are assumed to live 30 years out of 70 years at the same location near the potential sources; cancer burden is, however, calculated based on a 70-year exposure assumption. Exposure frequency for a resident is assumed to be 350 days/year, which assumes 2 weeks of vacation per year. Because of the complexity, inhalation exposure assumptions are explained in more detail below. Default exposure assumptions for the remaining exposure pathways are provided in OEHHA's guidelines (OEHHA, 2015) and are implemented through HARP. HARP modeling files in Appendix C present the exposure information.

For the purpose of estimating carcinogenic exposure for a resident, calculations in HARP are based on the Risk Management Policy (RMP) using the derived adjusted methodology for calculating exposure via multiple exposure pathways, which means:

- RMP - Per the CARB's Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk (RMP; CARB, 2003), the 80th percentile inhalation rate is used to estimate cancer risk when inhalation is one of the two highest exposure pathways for evaluating cancer risk. The 80th percentile inhalation rate is 302 L/kg-day (OEHHA, 2015).

- Derived Adjusted Methodology - To calculate total exposure, the two highest exposure pathways are included, using maximum exposure assumptions, and the remaining exposure pathways are included using average exposure assumptions.

For the purpose of estimating noncarcinogenic chronic exposures for a resident in HARP, calculations are based on exposure assumptions consistent with the OEHHA Derived Method, which means:

- Similar to carcinogenic exposures, to calculate total exposure, the two highest exposure pathways are included, using maximum exposure assumptions, and the remaining exposure pathways are included using average exposure assumptions.
- The 95th percentile inhalation rate recommended in OEHHA's guidance is used (393 L/kg-day) (OEHHA, 2015).

Residential acute exposures are based solely on inhalation exposures using the 95th percentile inhalation rate. These exposure assessment approaches are designed to overestimate typical exposure conditions.

4.3.2 Worker Exposure

Worker exposure is assumed to occur over a 25-year exposure duration. Workers are assumed to attend their jobs on 5 days per week for 8 hours per day over 49 weeks per year (assumes 3 weeks of vacation and holidays). The inhalation rate assumed for workers is 149 L/kg-day for both carcinogenic and noncarcinogenic health effects. Annual average air concentrations predicted using the air dispersion model are averaged over a 24-hour period, because the facility is assumed to operate 24 hours per day for 7 days per week.

4.4 Exposure Quantification

The HARP model quantifies exposures for each receptor modeled, representing residents, workers, sensitive receptors, and census-tract centroids. In the risk characterization, the resulting chemical doses are evaluated separately for inhalation and non-inhalation exposures.

5 Risk Characterization

Risk characterization, the final step in health risk analysis, utilizes information from previous steps to describe any theoretically increased health risk that may result from exposure to chemicals emitted from Aerocraft. Carcinogenic risks, chronic noncarcinogenic health effects, and acute noncarcinogenic health effects are evaluated separately. Results are reported for all receptors in the electronic files (Appendix C).

The results reported in this section are focused on the maximum exposed individual resident (MEIR), maximum exposed individual worker (MEIW), and the point of maximum impact (PMI). The MEIR and MEIW are located in areas where residents live or workers are present, respectively. The PMI represents the maximum estimated risk at a

location that is not used for residential or commercial/industrial purposes, such as the fence-line receptors at Aerocraft, which are at the property boundary and across major streets from the nearest actual off-site receptors. Tables 5A and 5B present the model-predicted maximum hourly concentrations and annual average concentrations of chemicals emitted from Aerocraft, respectively, for the MEIR, MEIW, and PMI. Multiple locations are presented because acute, chronic, and carcinogenic exposures may occur at different locations for each receptor type. These airborne concentrations are used to calculate health-based measures of exposure, including the acute and chronic noncancer hazard indices and potential cancer risk, as discussed in Sections 5.1, 5.2, and 5.3, respectively.

5.1 Acute Noncarcinogenic Health Effects

The potential acute noncarcinogenic effects were evaluated by comparing inhalation exposure (in this case, air concentration) to the REL. This ratio of exposure concentration to toxicity is referred to as a hazard quotient (HQ), which is calculated as follows:

$$HQ_i = MHACi/RELa_i$$

where:

MHACi	maximum hourly air concentration for chemical "i" ($\mu g/m^3$)
RELai	acute reference exposure level for chemical "i" ($\mu g/m^3$).

In cases where individual chemicals potentially act on the same organs or result in the same health endpoint (e.g., respiratory irritants), potential additive effects can be addressed by calculating a hazard index (HI) as follows:

$$HI = Sum\ (HQ_1, HQ_2, HQ_3 \ldots HQ_i)$$

where:

HI = hazard index
HQ_i = hazard quotient for chemical "i" with the same health endpoint.

A hazard index less than or equal to 1 indicates levels of exposure without adverse health effects for all chemicals that have an additive effect.

5.1.1 Potential Acute Hazard Indexes Estimated for Residential Exposures

The potential acute hazard index estimated for the MEIR is 1.15 (Table 6A), which occurred at receptor #5135 located to the east on Madison Avenue (Figure 3). The associated target organ is the immune system. The primary source contributing to the acute hazard index (Table 6B) is the plasma arc cutter, which is no longer in use. The only chemical contributing significantly to the acute hazard index is nickel (essentially 100%). The acute REL for nickel is based on a study of the toxicity of nickel chloride, which is freely water soluble (OEHHA 2016). The relevance of this REL to the nickel alloys emitted from Aerocraft's use of a plasma arc cutter is not known, but it is expected that nickel chloride is more bioavailable than nickel emissions from cutting stainless steel and, therefore, is of greater potential toxicity. As a result, it is likely that the potential for health

effects related to emissions of nickel from the facility is overstated. Appendix C presents the predicted acute hazard index for all receptors within the ZOI shown on Figure 3.

5.1.2 Potential Acute Hazard Indexes Estimated for Worker Exposures

The potential acute hazard index estimated for the MEIW is 1.72 (Table 6A), which occurred at receptor #5074 located to the west of the facility (Figure 3). The primary sources contributing to the acute hazard index (Table 6B) are the plasma arc cutting operations. The only chemical contributing significantly to the acute hazard index is nickel (essentially 100%), and the associated target organ is the immune system. As noted in relation to the MEIR, it is likely that the potential for health effects related to emissions of nickel from the facility is overstated.

5.1.3 Potential Acute Hazard Indexes Estimated at the Point of Maximum Impact

The potential acute hazard index estimated for the PMI is 2.92 (Table 6A), which occurred at receptor #34 on the northeastern corner of the facility, at the facility fence line (Figure 3). The primary sources contributing to the acute hazard index are plasma arc cutting operations (Table 6B). The only chemical contributing significantly to the acute hazard index is nickel (94%), and the associated target organ is the immune system. As noted in relation to the MEIR, it is likely that the potential for health effects related to emissions of nickel from the facility is overstated.

5.2 Chronic Non-Carcinogenic Health Effects

Potential chronic noncarcinogenic effects are evaluated similarly to the acute hazard index, using a hazard quotient/index. However, chronic health effects are evaluated based on inhalation and non-inhalation exposures. Chronic health effects were evaluated by comparing exposure concentration or dose to the REL appropriate for the type of exposure (inhalation or oral RELs). This ratio of exposure to toxicity is referred to as an HQ, which is calculated for inhalation and non-inhalation exposures.

For inhalation exposures, the HQ is calculated as follows:

$$HQ_i = AACi/RELci$$

where:

AACi	=	annual average concentration for chemical "i" ($\mu g/m^3$)
RELci		chronic inhalation reference exposure level for chemical "i" ($\mu g/m^3$).

For non-inhalation exposures, the HQ is calculated as follows:

$$HQ_i = AADD_i/REL_{oral}$$

where:

$AADD_i$	annual average non-inhalation daily dose for chemical "i" (mg/kg-day)

RELi oral reference exposure level for chemical "i" (mg/kg-day).

Similar to acute hazard indexes, cases in which individual chemicals potentially act on the same organs or result in the same health endpoint (e.g., respiratory irritants), potential additive effects can be addressed by calculating a hazard index as follows:

$$HI = Sum (HQ_1, HQ_2, HQ_3 \ldots HQ_i)$$

where:

HI = hazard index

HQ_i = hazard quotient for chemical "i" with the same health endpoint.

A hazard index less than or equal to 1 indicates levels of exposure that are without adverse health effects for all chemicals having an additive effect. As described below, the chronic hazard indexes for the MEIR, MEIW, and PMI were all less than one.

OEHHA has set a chronic REL for nickel oxide of 0.02 μg/m^3 (OEHHA, 2016). The chronic REL for nickel and nickel compounds, except nickel oxide, is 0.014 μg/m^3, and is based on the toxicity of nickel sulfate hexahydrate (OEHHA, 2016). Aerocraft emits nickel from its operations in the form of alloys and oxides. Thus, the OEHHA REL for nickel oxide is the most applicable to nickel emitted by Aerocraft and is used in this assessment to calculate the chronic hazard quotient for nickel.

5.2.1 Potential Chronic Hazard Indexes Estimated for Residential Exposures

The potential chronic hazard index estimated for the MEIR is 0.10 (Table 7A), which occurred at receptor #5135, located east of the facility on Madison Avenue from the facility (Figure 4). The primary sources contributing to the chronic hazard index are emissions from the roof monitors on the four buildings (12% to 29%) and the inspection building baghouse (13%) (Table 7B). The primary chemicals contributing to the chronic hazard index are arsenic (76%) and hexavalent chromium (17%). The target organ associated with the maximum predicted hazard index is the respiratory system.

5.2.2 Potential Chronic Hazard Indexes Estimated for Worker Exposures

The potential chronic hazard index estimated for the MEIW is 0.15 (Table 7A), which occurred at receptor #4895, adjacent to the facility to the southwest (Figure 4). The primary sources contributing to the chronic hazard index are emissions from the roof monitors on the four buildings (12% to 44%) (Table 7B). The primary chemicals contributing to the chronic hazard index are arsenic (52%) and hexavalent chromium (38%). The associated target organ is the respiratory system.

5.2.3 Potential Chronic Hazard Indexes Estimated at the Point of Maximum Impact

The potential chronic hazard index estimated for the PMI is 0.56 (Table 7A), which occurred at receptor #17 located at the facility fence north of Building 1 (Figure 4). The primary sources contributing to the chronic hazard index are emissions from the roof monitors on the four buildings (6% to 66%) (Table 7B). The primary chemicals

contributing to the chronic hazard index are arsenic (82%) and hexavalent chromium (13%).

5.2.4 Evaluation of Lead Emissions

Lead was included as one of the chemicals emitted from sources at Aerocraft. The maximum predicted lead concentration (PMI) using maximum hourly emissions was 0.017 μg/m^3 (Appendix B; Receptor 5081), which is well below the recommended public notification and significant risk level for lead presented in the California's Air Resources Board guidance (0.30 μg/m^3) (ARB, 2001).

5.3 Non-Carcinogenic Health Effects Using 8-hour RELs

Potential noncarcinogenic effects based on 8-hour RELs are evaluated similarly to acute and chronic hazard indexes, using a hazard quotient/index.

For inhalation exposures, the HQ is calculated as follows:

$$HQ_i = AACi/REL_{8i}$$

where:

AACi = 8-hour average concentration for chemical "i" (μg/m^3)
REL_{8i} = 8-hour inhalation reference exposure level for chemical "i" (μg/m^3)$^{-1}$.

Similar to acute hazard indexes, cases where individual chemicals potentially act on the same organs or result in the same health endpoint (e.g., respiratory irritants), potential additive effects can be addressed by calculating a hazard index as follows:

$$HI = Sum\ (HQ_1, HQ_2, HQ_3 \ldots HQ_i)$$

where:

HI = hazard index
HQ_i = hazard quotient for chemical "i" with the same health endpoint.

A hazard index less than or equal to 1 indicates levels of exposure that are without adverse health effects for all chemicals that have an additive effect.

As recommended in guidance, the 8-hour RELs were developed to assess worker exposure (OEHHA, 2015). The potential chronic hazard index estimated for the MEIW is 0.0030 (Table 8), which occurred at receptor 4895, located adjacent to the facility to the southwest (Figure 4). The primary chemicals contributing to the chronic hazard index are acrolein (53%), formaldehyde (26%), and nickel (20%). The associated target organ is the respiratory system.

5.4 Potential Cancer Risk

Carcinogenic risks are calculated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen and are calculated

using conservative modeling approaches that overestimate risk at the low exposure range predicted by the model. The oral and inhalation cancer slope factors are used to calculate the theoretical increased risk of an individual developing cancer based on the estimated daily exposure or dose, averaged over a lifetime.

Cancer risk for non-inhalation exposure is calculated as follows:

$$\text{Lifetime Excess Cancer Risk}_i = \text{LADD}_i \times \text{CSF}_i$$

where:

LADD_i	lifetime average daily dose for chemical "i" (mg/kg-day)
CSF_i	cancer slope factor (inhalation or oral as appropriate) for chemical "i" $(\text{mg/kg-day})^{-1}$.

The estimated excess cancer risks for each chemical and exposure route are summed, regardless of toxic endpoint, to estimate the total excess cancer risk for the exposed individual. For HRAs, a cancer risk of $1x10^{-6}$ is used to define the ZOI, and a cancer risk of $1x10^{-5}$ is used to define the level above which notification is required. It should be noted that cancer risks of $1x10^{-6}$ or $1x10^{-5}$ or higher do not mean that adverse health effects or an increase in cancer will be observed, because of the conservative assumptions used to develop the toxicity criteria and exposure estimates.

Figure 5A presents the estimated ZOI for the Aerocraft facility, defined as the area within the $1x10^{-6}$ risk isopleth. Appendix C presents the predicted cancer risks for all receptors within the ZOI. It is important to note that the average urban background hexavalent chromium concentration in Compton[8] (0.11 ng/m^3) is associated with a $6.1x10^{-5}$ residential risk, assuming a 30-year exposure duration and other assumptions consistent with the risk assessment performed herein. The average background concentration in Paramount based on SCAQMD monitoring data between October and December 2016 was similar, but higher, at 0.15 ng/m^3. Figure 5A shows that concentrations of hexavalent chromium across the majority of the ZOI area are consistent with urban background concentrations of hexavalent chromium.

5.4.1 Potential Cancer Risk Estimated for Residential Exposures

The potential lifetime excess cancer risk calculated for the MEIR is $1.9x10^{-3}$, which occurred at receptor #5135, located across Madison Street from the facility (Table 9A, Figure 5B). The primary sources contributing to the predicted risk are the emissions from the roof monitors on the four buildings (6% to 67%) and the rack welding filter system (6.5%) (Table 9B), which account for essentially 100% of the predicted excess cancer risk. The chemical contributing most significantly to the predicted cancer risk is hexavalent chromium (99.8%).

[8] The nearest SCAQMD permanent monitoring station (SCAQMD, 2015).

5.4.2 Potential Cancer Risk Estimated for Worker Exposures

The potential excess cancer risk estimated for the MEIW is $3.5x10^{-4}$, which occurs at receptor #4895, located southwest of Building 4 (Table 9A, Figure 5B). The primary sources contributing to the predicted risk are the emissions from the roof monitors on the four buildings (5.9% to 71%) (Table 9B), which account for 99% of the predicted excess cancer risk. The chemical contributing most significantly to the predicted cancer risk is hexavalent chromium (99.9%).

5.4.3 Potential Cancer Risk Estimated at the Point of Maximum Impact

The potential excess cancer risk estimated for the PMI is $1.3x10^{-2}$, which occurs at receptor #17 at the northern facility fence line (Table 9A, Figure 5B). The primary sources contributing to the predicted risk are the emissions from the roof monitors on the four buildings (2.2% to 84%) (Table 9B), which account for 99% of the predicted excess cancer risk. The chemical contributing most significantly to the predicted cancer risk is hexavalent chromium (100%).

5.4.4 Sensitive Receptors

The review of sensitive receptors was limited to an area within approximately 2 miles of the facility (SCAQMD, 2016); 83 sensitive receptors (schools, hospitals, and day-care centers) were identified within this area, and potential risks at these locations range from $3.7x10^{-6}$ to $1.6x10^{-4}$ (Table 10 and Figure 2C). The predicted risk at 27 locations exceeded the action level of $2.5x10^{-5}$. The action level is lower than the risk associated with background concentrations of hexavalent chromium in air at the Compton monitoring station ($6.1x10^{-5}$ at the station nearest to Paramount); only nine sensitive receptor locations are predicted to have risks greater than background. Because the chronic hazard index is less than 1 at the point of maximum impact, an analysis for sensitive receptors and chronic hazard index was not conducted.

5.4.5 Population Cancer Burden

The ZOI for Aerocraft intersected or included 380 census tracts. According to data from the U.S. Census Bureau, approximately 1,742,000 people live within these census tracts. To estimate population cancer burden, the predicted cancer risk at the centroid (population center) of each census tract that is within or intersected by the ZOI is multiplied by the population within that census tract. The estimated cancer burden for all census tracts is 11, which is higher than SCAQMD's public notification level of 0.5. Based on the annual average hexavalent chromium concentration in Compton at SCAQMD's permanent monitoring station—0.11 ng/m^3—and the associated residential risk consistent with the calculations herein, 2 of the 380 census tracts have risks greater than the predicted risk based on local urban background concentrations. In other words, if the air dispersion model can accurately predict air concentrations miles from the facility, those concentrations are consistent with or less than the local urban background concentrations. The cancer burden associated with the census tracts with risks greater than local urban background is 0.00075. Table 11 presents the cancer burden results for each of the census tracts.

5.5 Comparisons to 2016 Monitoring

SCAQMD requested that Aerocraft compare local monitoring results to results predicted by the ambient air models to assess whether there are significant fugitive emissions that are not incorporated in the assessment. Although short-term monitoring results from less than three months in 2016 are not comparable to long-term air modeling results for a 3-year period (2009, 2010, and 2012), a comparison is provided herein to address this request.

Utilizing results from the OMNI monitors used by SCAQMD prior to June 2017 for any quantitative exercise is not technically sound and is likely to produce misleading results. SCAQMD has been conducting ambient air monitoring, generally every third day, in the vicinity of Aerocraft since October 2016, using OMNI particulate monitors. As described previously, OMNI particulate monitors were not intended by the manufacturer to measure hexavalent chromium and are likely to generate high-biased results. This is demonstrated by the fact that monitors operated by Aerocraft and specifically intended for use in the monitoring of hexavalent chromium, generated substantially lower results that the collocated SCAQMD OMNI monitor operated at location 8 and were subject to intermittent outlier measurements when compared to results from other monitors (ToxStrategies, 2018b).

Notwithstanding serious concerns regarding the high bias associated with SCAQMD's OMNI monitors, Aerocraft modeled hexavalent chromium concentrations for 2016 emissions and compared those results to concentrations measured by SCAQMD at five monitors nearest to Aerocraft (Monitors 7, 8, 9, 10, and 18) using the results from October 15 to December 29, 2016 (Figure 6).[9] The monitored concentrations were adjusted using the approach developed by SCAQMD to account for background conditions and for upwind sources for Monitor 8, depending on the prevailing wind direction (Table 12). These adjusted SCAQMD concentrations are intended to reflect potential contributions from Aerocraft operations at the monitors. Modeled concentrations are 1.4 to 7.6 times higher than the measured concentrations, indicating that the model over predicts off-site hexavalent chromium concentrations at every location. Table 12 presents the adjusted SCAQMD measurements compared to the modeling results.

Figure 7 presents a comparison of the zone of impact ($1x10^{-6}$ risk) based on the modeled concentrations to the zone of impact adjusted by a factors of 1.4 and 7.6 to be consistent with the range of adjustments indicated by the SCAQMD monitoring results. As shown on Figure 7, the ZOI would decrease substantially if the modeled results were adjusted to match the actual measured concentrations, and the difference between the adjusted ZOIs indicates the level of uncertainty. It also should be noted that the monitors used to calibrate the model are all within a block of Aerocraft so that the ability of the model to predict air concentrations throughout the ZOI at distance from Aerocraft would require further calibration for which data is not available.

[9] SCAQMD Monitor 11 was influenced by a known source to the west so that Aerocraft's potential effect on this monitor could not be discerned. SCAQMD Monitor 11 was not included in this evaluation.

5.6 Current Conditions

Aerocraft has implemented numerous risk reduction measures since 2016, including reducing operations, removing furnaces from Buildings 1 and 4, enclosing Building 2, adding exhaust ports and two baghouses to Building 2, partially enclosing and adding a baghouse to Building 3, and taking other actions documented in the Early Action Risk Reduction Report. Therefore, conditions are very different from those modeled for 2016 in this HRA. Table 13 presents the measured concentrations of hexavalent chromium in air shortly after initial mitigation measures were implemented (March 2 to May 22, 2017), adjusted for background and upwind sources as described for Table 12. The early 2017 measured results are compared to the measured concentrations for 2016 (from Table 12). As shown, the measured concentrations for early 2017 are five to ten times lower than prior to implementation of risk reduction measures.

6 Summary

Using estimates of 2016 emissions, including discontinued operations, the calculated chronic non-cancer and 8-hour hazard indices at the PMI, MEIR, and MEIW do not exceed the public notification levels (i.e., hazard index greater than 1). The acute hazard index for the MEIR (1.15) slightly exceeds the public notification level of 1.0 and is below the action level of 3.0, but the associated source is no longer in operation at Aerocraft (Table 6A). The carcinogenic risk at the MEIR ($1.9x10^{-3}$ or $1{,}900x10^{-6}$) exceeds the public notification level of ten in one million ($10x10^{-6}$) and the risk reduction level of 25 in one million ($25x10^{-6}$). The estimated cancer burden is 11, which is above the risk reduction level of 0.5. Aerocraft has significantly modified its operations and instituted early-action risk reduction measures, that have reduced the potential off-site impact. A Risk Reduction Plan has been submitted under separate cover that describes previous risk reduction measures and those planned for the future, such that off-site risk predicted for this facility will be less than 25 in one million ($25x10^{-6}$).

7 References

Aerocraft Heat Treating Co., Inc. 2018. Response to the District's Comments Dated April 24, 2018 SCAQMD Facility ID: 023752. Letter to Dr. Jillian Wong. April 30.

Associates Environmental. 2017a. South Coast Air Quality Management District Air Toxics Inventory Report Plan covering Aerocraft Heat Treating Co., Inc., Paramount facility, Facility ID 023752, January 13.

Associates Environmental. 2017b. South Coast Air Quality Management District Air Toxics Inventory Report covering Aerocraft Heat Treating Co., Inc., Paramount facility, Facility ID 023752, May 16.

Associates Environmental. 2017. South Coast Air Quality Management District Air Toxics Inventory Report covering Aerocraft Heat Treating Co., Inc., Paramount facility, Facility ID 023752, May 16.

Associates Environmental. 2018. South Coast Air Quality Management District Air Toxics Inventory Report covering Aerocraft Heat Treating Co., Inc., Paramount facility, Facility ID 023752, March 29.

CDHS, 1985, Health Assessment for Chromium. California Department of Health Services (later OEHHA, California Environmental Protection Agency), Berkeley and Sacramento, CA.

CARB. 2001. Risk Management Guidelines for New, Modified, and Existing Sources of Lead, California Air Resources Board. Stationary Source Division, March.

CARB. 2003. Recommended interim risk management policy for inhalation-based residential cancer risk. California Air Resources Board, October.

CARB. 2015. User manual for the Hotspots Analysis and Reporting Program air dispersion modeling and risk assessment tool, Version 2. California Air Resources Board, https://www.arb.ca.gov/toxics/harp/docs2/harp2admrtuserguide.pdf

CARB, 2016. Overview of the Air Toxics "Hot Spots" Information and Assessment Act. California Air Resources Board, August. https://www.arb.ca.gov/ab2588/overview.htm.

Grohse et al. 1988. The Fate of Hexavalent Chromium in the Atmosphere. Research Triangle Institute. Research Triangle Park, NC.

NIOHS, 2013. Criteria for a Recommended Standard, Occupational Exposure to Hexavalent Chromium. National Institute of Occupational Health and Safety, Centers for Disease Control, Department of Health and Human Services.

OEHHA. 2012. Nickel reference exposure levels. Nickel and nickel compounds, Nickel oxide, reference exposure levels (RELs). California Office of Environmental Health Hazard Assessment, February, https://oehha.ca.gov/media/downloads/crnr/032312nirelfinal.pdf

OEHHA. 2015. Risk assessment guidelines, guidance manual for preparation of health risk assessments. California Office of Environmental Health Hazard Assessment, February.

OEHHA. 2016. All OEHHA acute, 8-hour and chronic reference exposure levels (chRELs) as of June 2016. California Office of Environmental Health Hazard Assessment, http://www.oehha.ca.gov/air/Allrels.html.

OSHA, 2006, Occupational Exposure to Hexavalent Chromium, Final Rule. Occupational Health and Safety Administration Federal Register 71(39):10100-10385.

SCAQMD, 2015, Final Report, Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES IV, South Coast Air Quality Management District. May.

SCAQMD. 2016. Supplemental guidelines for preparing risk assessments and risk reduction plans for the Air Toxics "Hot Spots" Information and Assessment Act. South Coast Air Quality Management District, November 4.

SCOEL, 2017. SCOEL/REC/384 Chromium VI Compounds, Recommendation from the Scientific Committee for Occupational Exposure Limits (SOEL). May 22.

South Coast Air Quality Management District, 2016. Notice of Designation of Aerocraft Heat Treating Company, Inc. (Facility ID 23752) as a Potentially High Risk Level Facility. December 14.

South Coast Air Quality Management District, 2018a, SCAQMD Comments on the Air Toxics Inventory Report (ATIR), Health Risk Assessment (HRA), and Risk Reduction Plan (RRP) for Aerocraft Heat Treating Company (SCAQMD Facility ID: 023752). Letter to Gabriel Moreno. February 9.

South Coast Air Quality Management District, 2018b, Follow-up on SCAQMD Comments on the Air Toxics Inventory Report, Health Risk Assessment, and Risk Reduction Plan for Aerocraft Heat Treating Company (SCAQMD Facility ID: 023752). Letter to Gabriel Moreno. April 24.

South Coast Air Quality Management District, 2018c, Approval of the Air Toxics Inventory Report and Follow-up Comments on Health Risk Assessment and Risk Reduction Plan for Aerocraft Heat Treating Company (Facility ID: 023752). Letter to Gabriel Moreno. May 9.

TCEQ, 2014. Hexavalent Chromium (Particulate Compounds), Texas Commission on Environmental Quality. August 4.

ToxStrategies, Inc. 2017a. Air Toxics Health Risk Assessment for Aerocraft (SCAQMD Facility ID No. 23752), June 13.

ToxStrategies, Inc. 2017b. Risk Reduction Plan for Aerocraft Heat Treating Company, Inc., (SCAQMD Facility ID No. 23752), June 13.

ToxStrategies, Inc. 2018a. Initial Responses to the District's Comments Dated February 9, 2018, on the Air Toxics Inventory Report (ATIR), Health Risk Assessment (HRA), and Risk Reduction Plan (RRP) for Aerocraft Heat Treating Company (SCAQMD Facility ID: 023752), February 16.

ToxStrategies, Inc. 2018b. Additional Responses to the District's Comments dated February 9, 2018, on the Air Toxics Inventory Report (ATIR), Health Risk Assessment (HRA), and Risk Reduction Plan (RRP) for Aerocraft Heat Treating Company (SCAQMD Facility ID: 023752). Letter to Dr. Jillian Wong. February 27.

ToxStrategies, Inc. Follow-up to March 7, 2018c, Discussion regarding the District's comments, dated February 9, 2018, on the Air Toxics Inventory Report (ATIR), Health Risk Assessment (HRA), and Risk Reduction Plan (RRP) for Aerocraft Heat Treating Company (SCAQMD Facility ID: 023752). Letter to Dr. Jillian Wong. March 16

ToxStrategies, Inc. 2018d. Revised Air Toxics Health Risk Assessment for Aerocraft (SCAQMD Facility ID No. 23752), May 18.

U.S. EPA. 2018. User's Guide for the AMS/EPA Regulatory Model (AERMOD), U.S Environmental Protection Agency. April.

U.S. Census Bureau. 2017. Centers of Population, 2010 Census. https://www.census.gov/geo/reference/centersofpop.html),

Figures

Figure 1A. Nearby Residential Areas

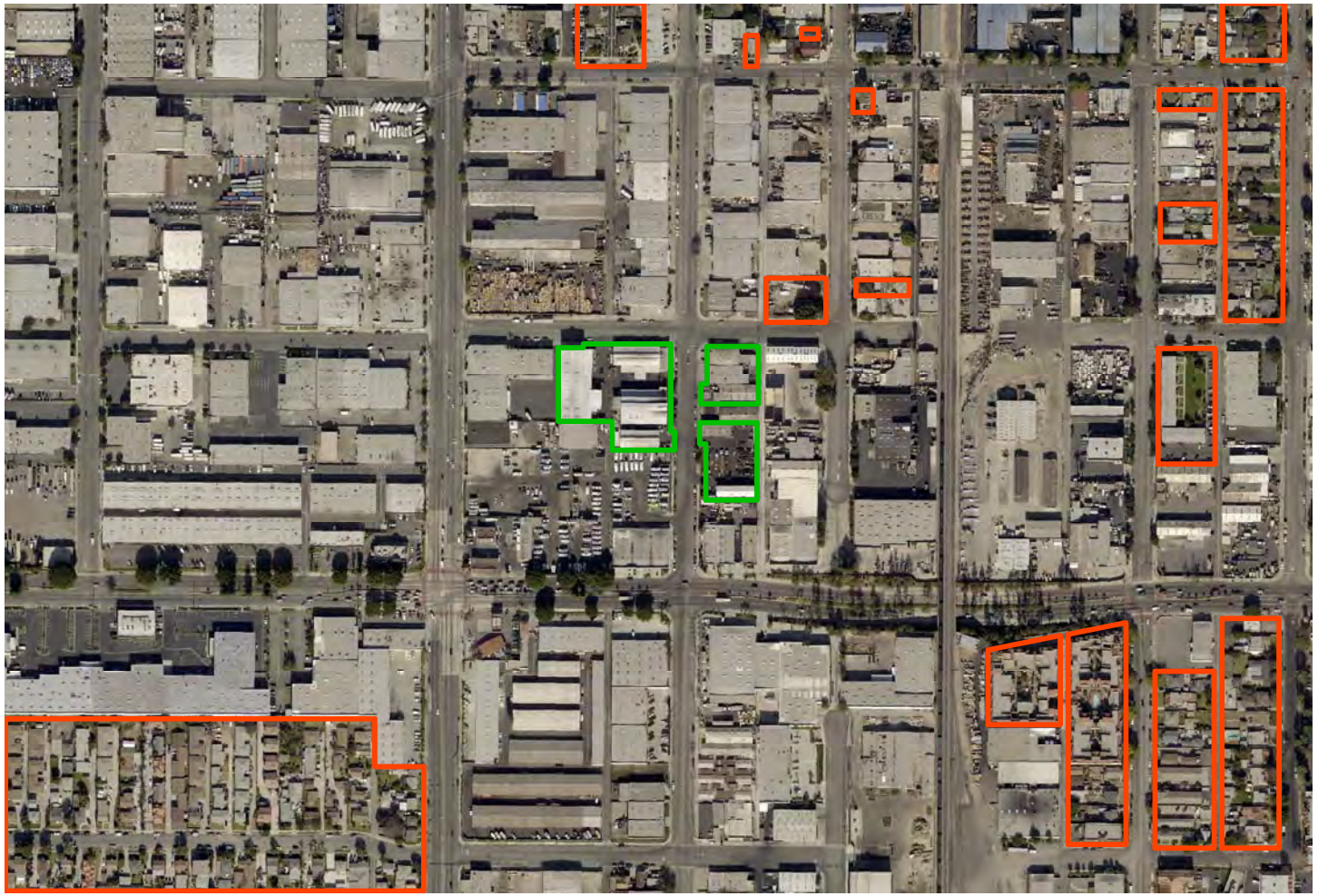
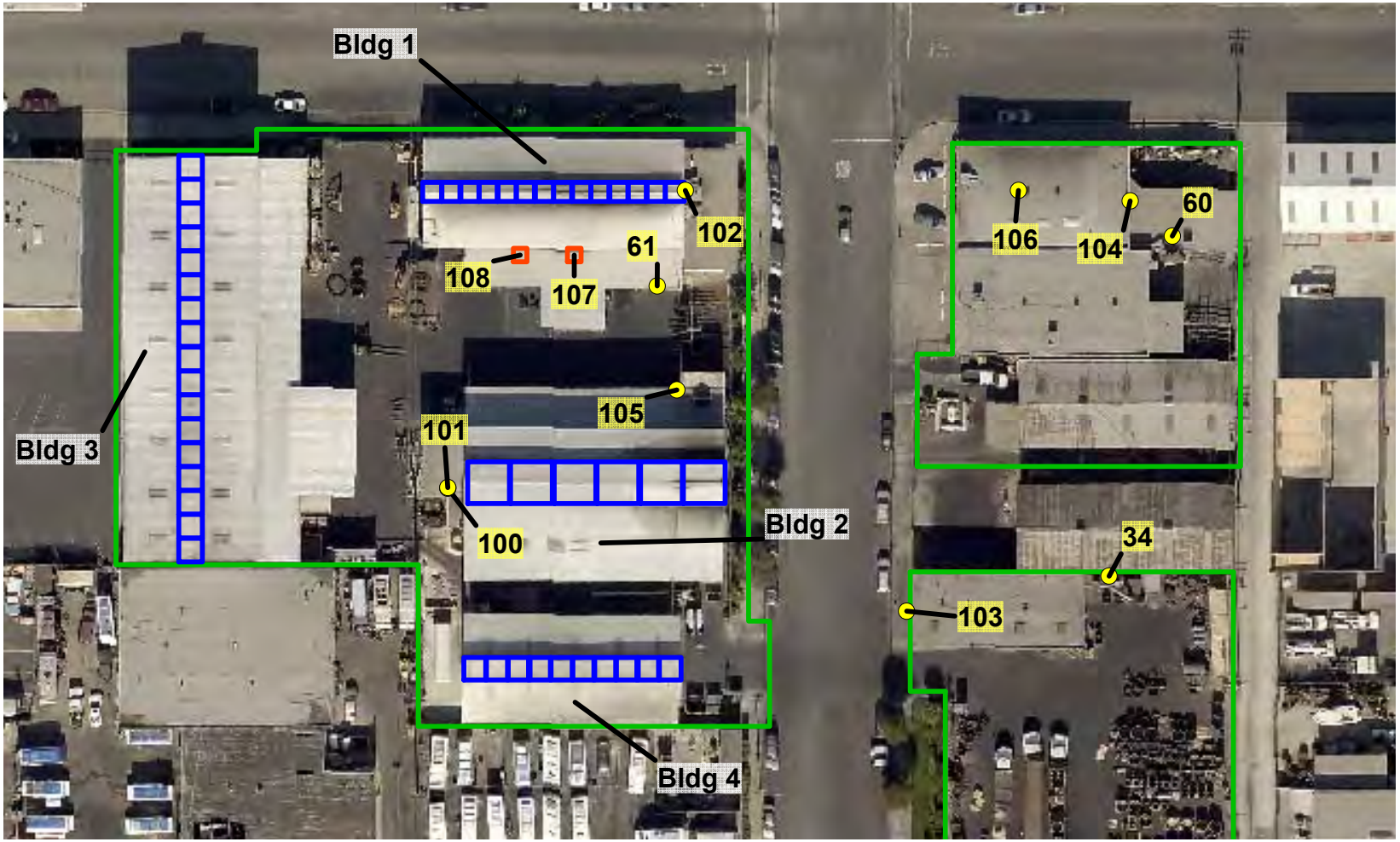


Figure 1B. Air Emission Source Locations Included in the Air Dispersion Model



Point Source Legend

ID	Description
34	Inspection Baghouse (Grinding Operaion)
60	APCS (Plasma Arc Cutter)
61	IC Engine
100	Water Heater (15701 Minnesota)
101	Space Heater #1 (15701 Minnesota)
102	Space Heater #2 (15701 Minnesota)
103	Water Heater (15720 Minnesota)
104	Space Heater (15700 Minnesota)
105	Cooling Tower (Bldg 2 Oil Quench Tank)
106	Filter (Rack Welding)
107	Cooling Tower (Bldg 1 Oil Quench Tank)
108	Cooling Tower (Bldg 1 Water Quench Tank)

Figure 1C. Buildings/Structures Included in the Air Dispersion Model

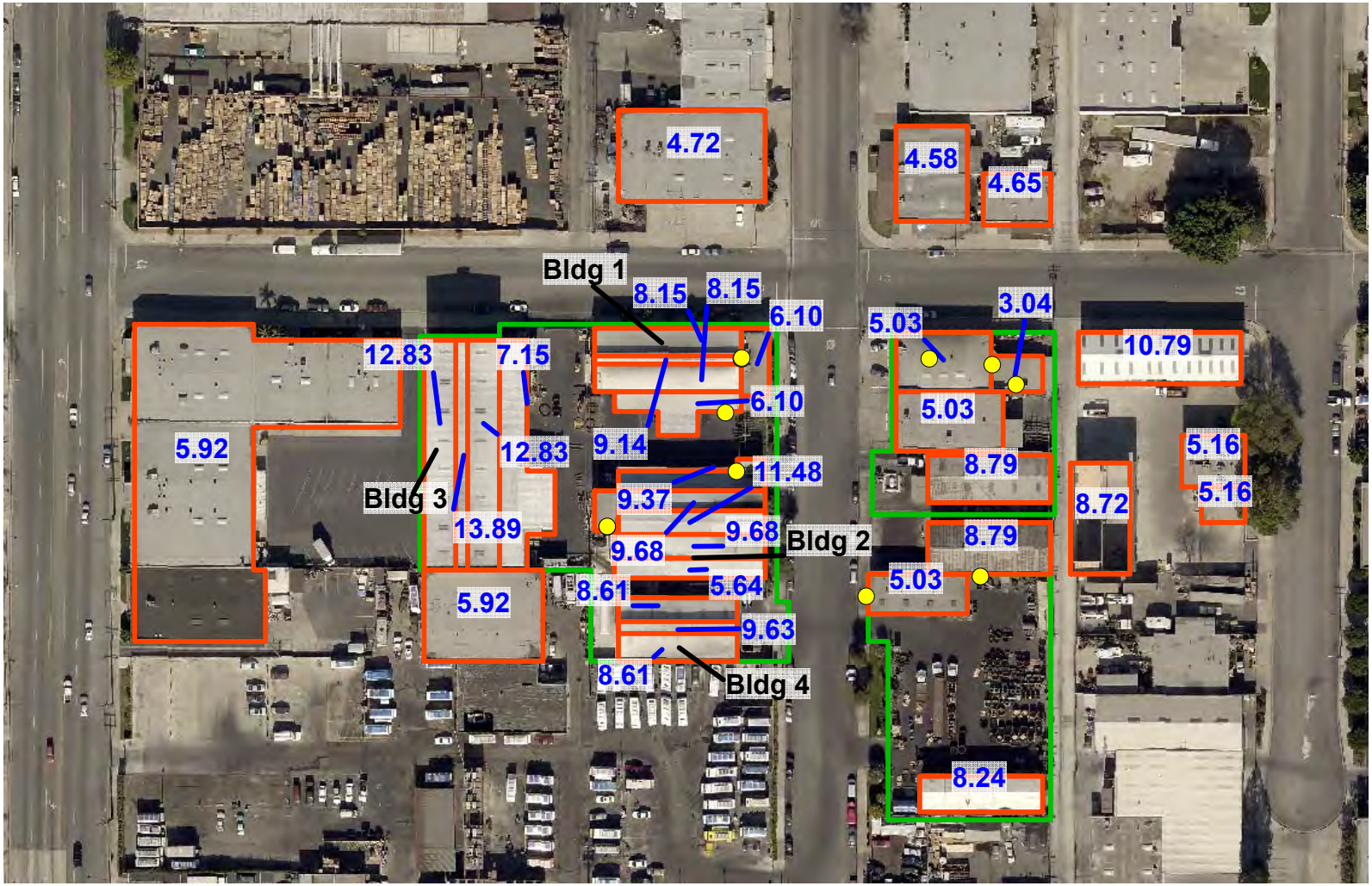


Figure 2A. Grid Receptors Included in the Air Dispersion Model

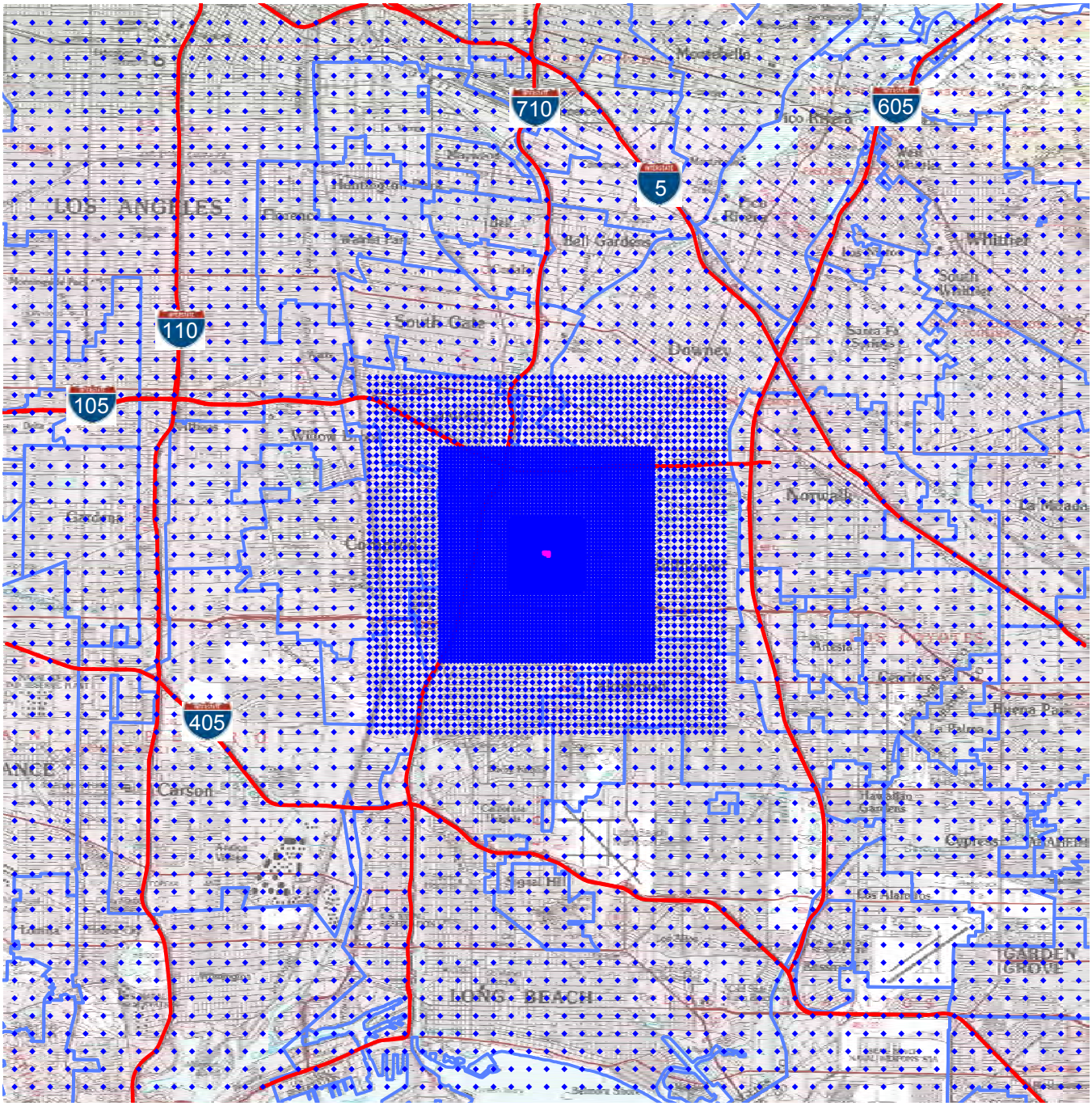


Figure 2B. Grid Receptors and Fence-Line Receptors Near Aerocraft

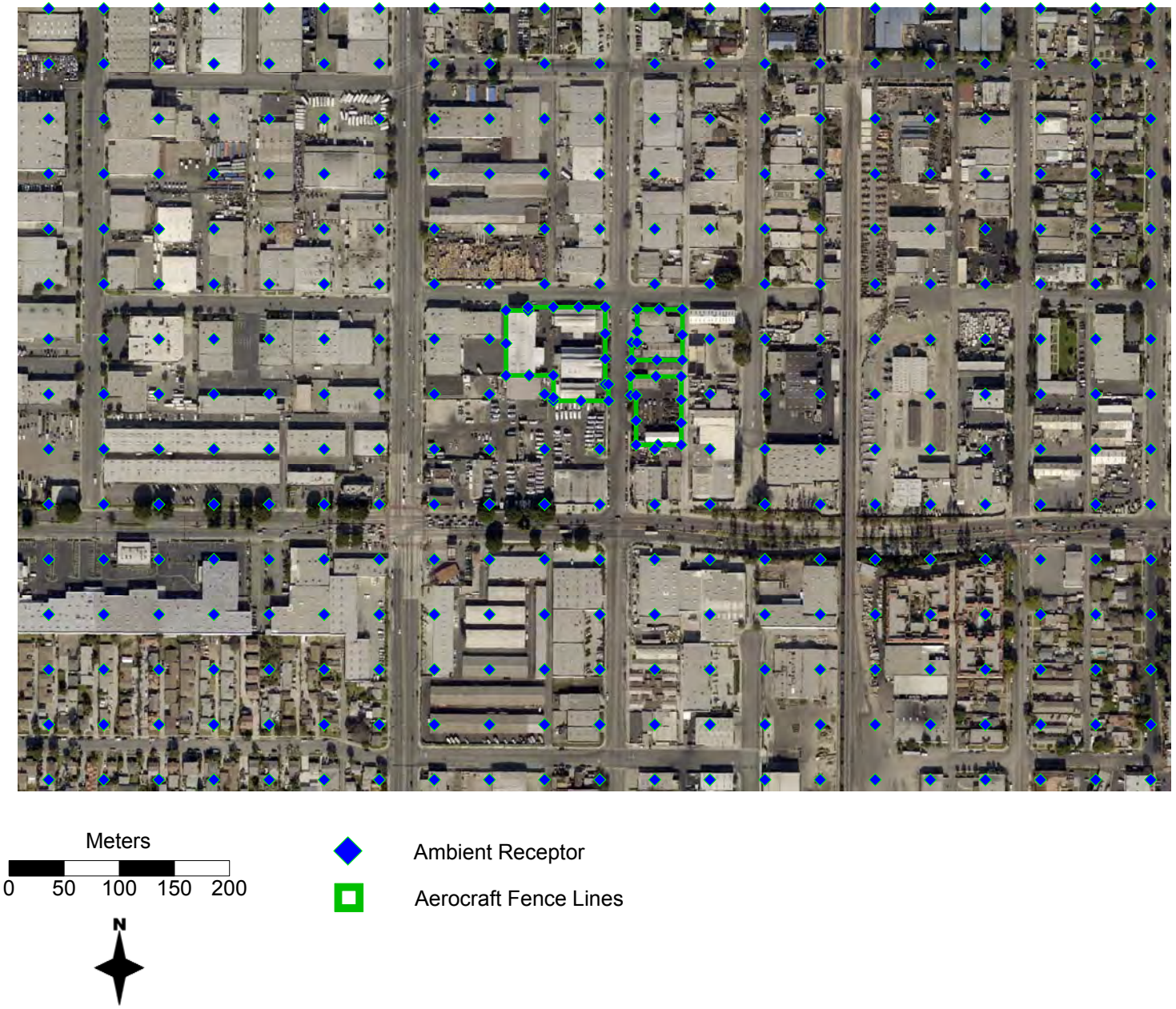


Figure 2C. Sensitive Receptors and Census-Tract Centroid Receptors Included in the Air Dispersion Model

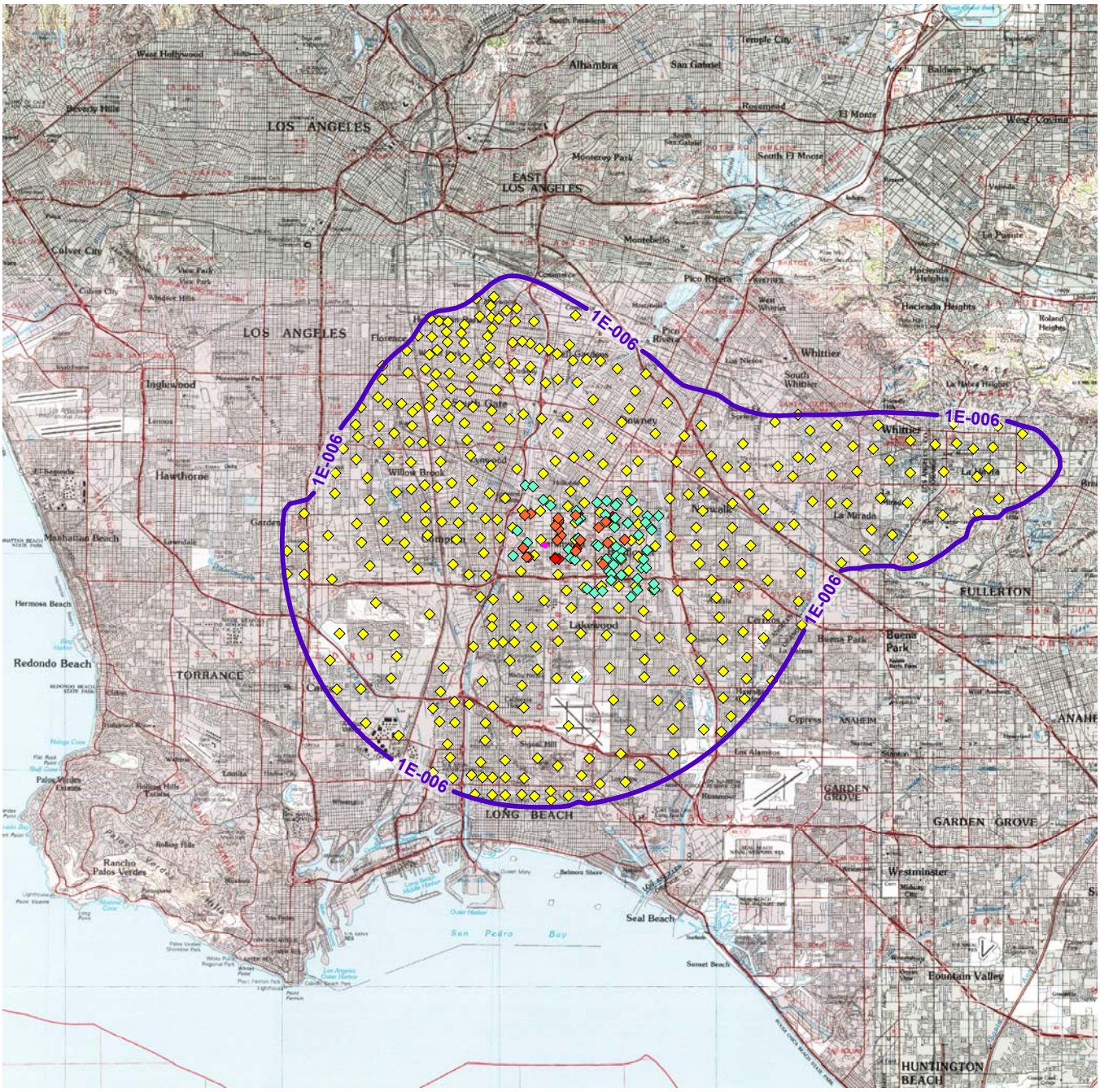


Figure 3. Predicted Acute Noncarcinogenic Hazard Index Results

Meters

0 50 100 150

N

- Point of Maximum Impact (PMI)
- Maximum Exposed Individual Resident (MEIR)
- Maximum Exposed Individual Worker (MEIW)
- Isopleth Boundary for 0.5 for Acute Hazard Index
- Isopleth Boundary for 1.0 Acute Hazard Index
- Aerocraft Fence Lines

Figure 4. Predicted Chronic Hazard Index Results

Meters

0 50 100 150

N

Point of Maximum Impact (PMI)

Aerocraft Fence Lines

Note: PMI is only location where the chronic hazard index was above 0.5. MEIR and MEIW were below 0.5.

Figure 5A. Predicted Lifetime Excess Cancer Risk and Zone of Impact

Kilometers

0 3 5 8 10

N

PCC Aerocraft Property Boundary

Unit Risk Isopleth

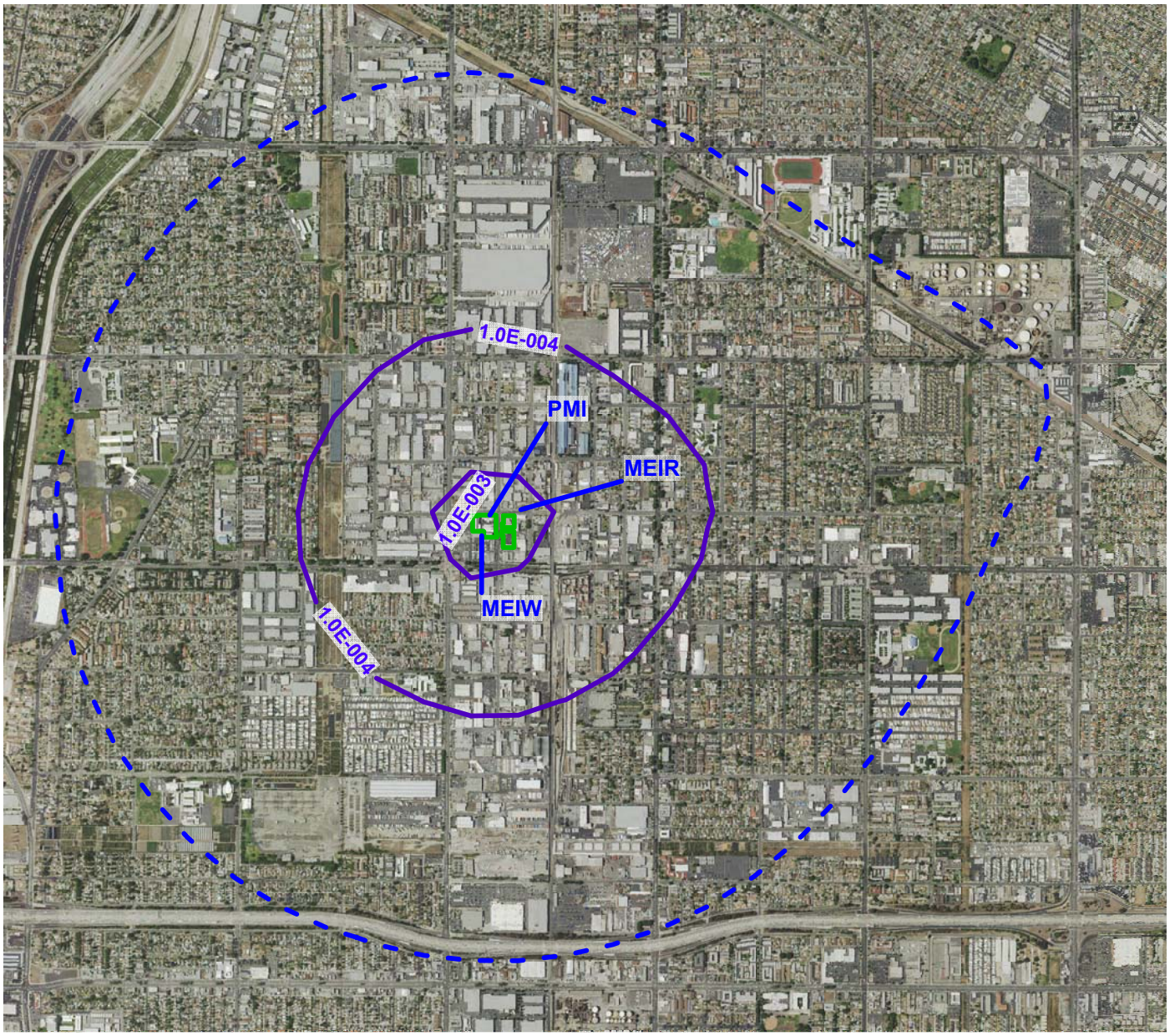
Risk Isopleth Equivalent to Background Concentrations of Hexavalent Chromium (0.11 ng/m³)

25 in 1 Million Risk Isopleth

Region above background

Region below background

Figure 5B. Cancer Risk Isopleths and MEIR, MEIW, and PMI



Meters

0 200 400 600 800

N

Cancer Risk Isopleths (e.g., 1e-004 is 100 in one million)

25 in 1 Million Risk Isopleth

Aerocraft Fence Lines

PMI = Point of Maximum Impact

MEIR = Maximum Exposed Individual Resident

MEIW = Maximum Exposed Individual Worker

Figure 6. SCAQMD Nearby Monitor Locations

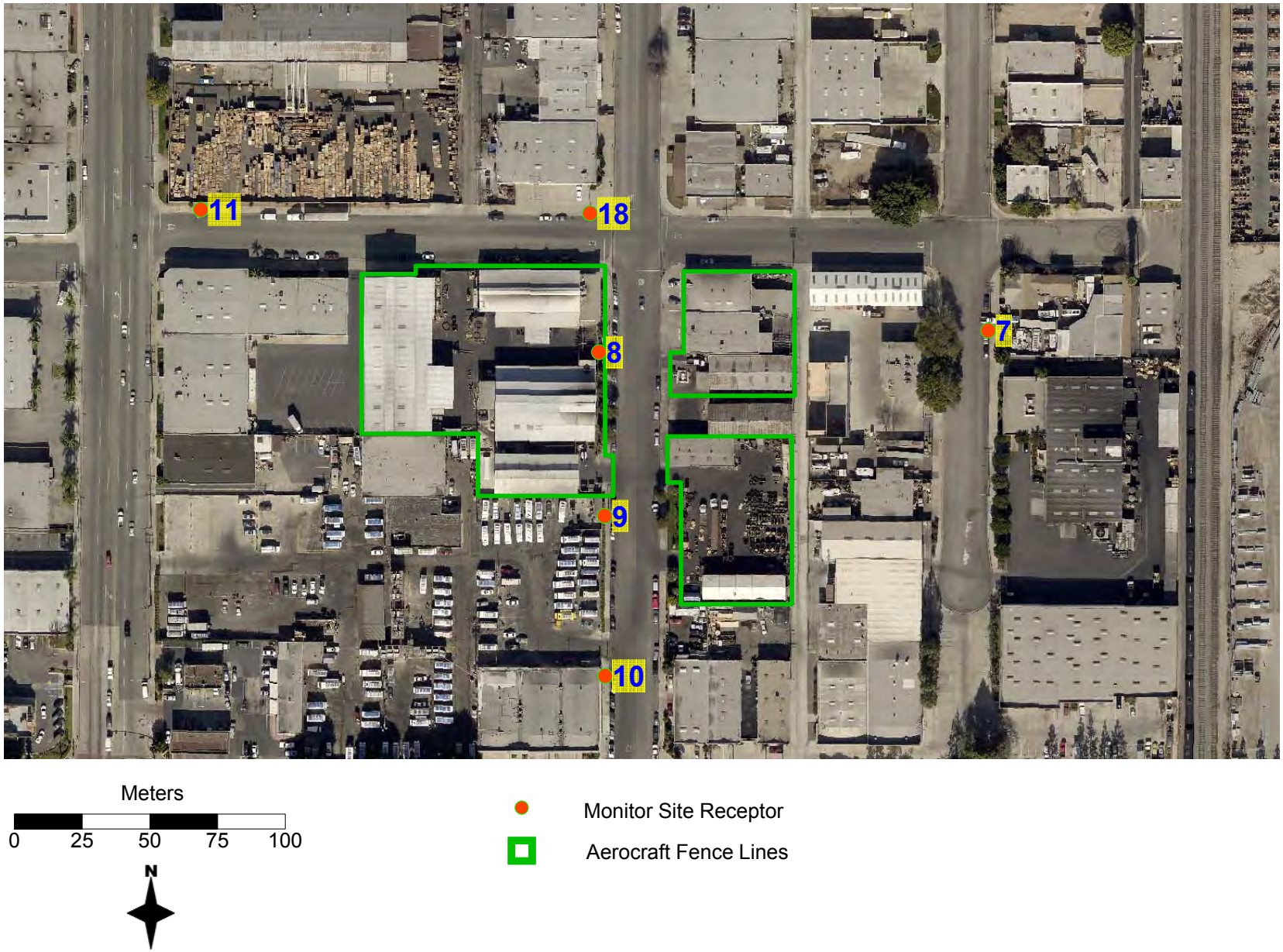
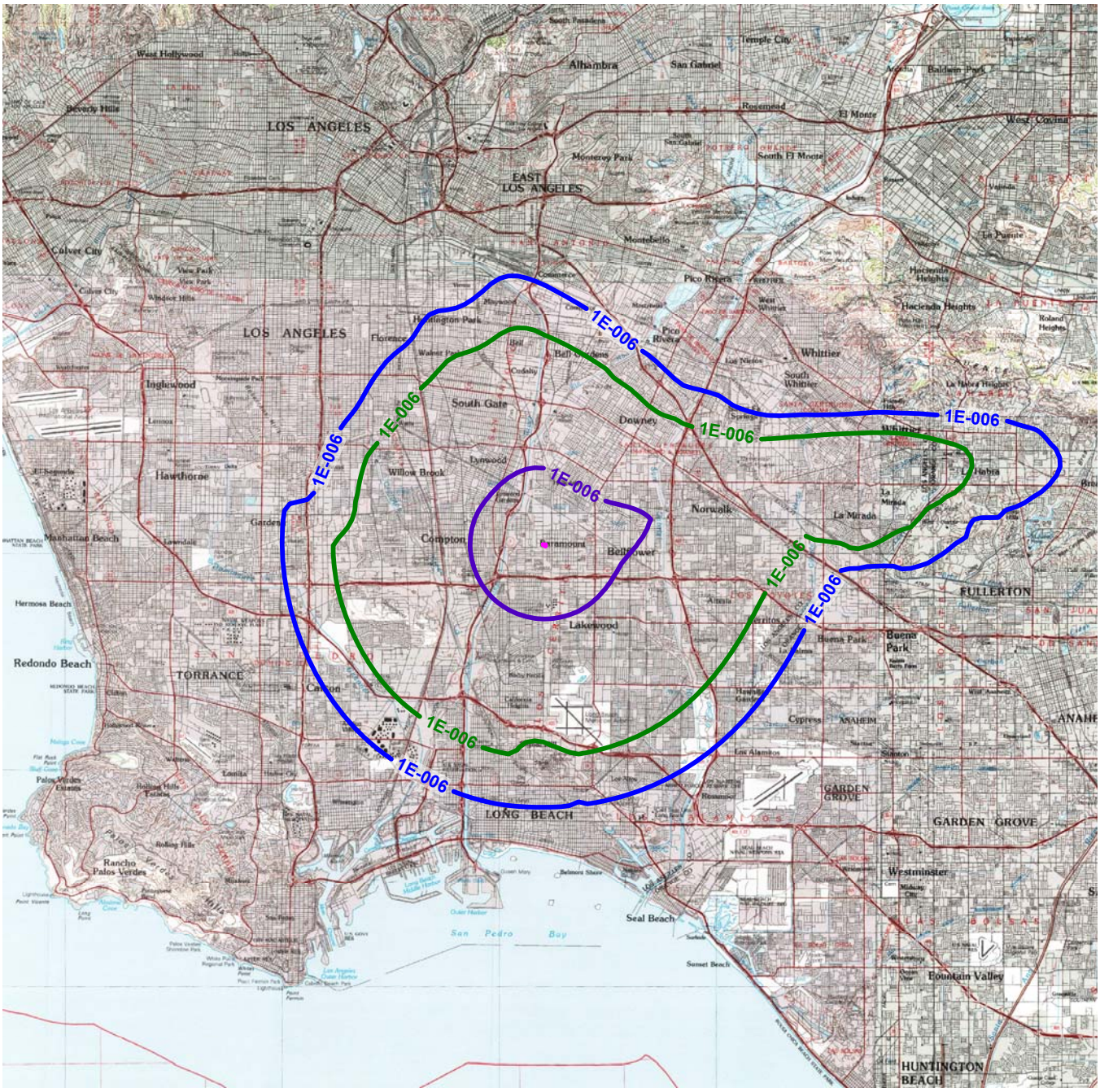


Figure 7. Comparison of Zones of Impact when Modeled Results are Adjusted using Measured Results



Tables

Table 1. Toxicity criteria for chemicals emitted from Aerocraft operations

Substance	CAS	Toxicity Criteria by Health Effect						
		Carcinogenic Health Effects			Acute Health Effects	Short-term Health Effects	Chronic Health Effects	
		Inhalation Cancer URF $(\mu g/m^3)^{-1}$	Inhalation Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	Acute REL $\mu g/m^3$	8-hour Inhalation REL $\mu g/m^3$	Chronic Inhalation REL $\mu g/m^3$	Oral chronic REL mg/kg-day
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	1.60E-05	0.057	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79345	5.80E-05	0.2	--	--	--	--	--
1,3-Butadiene	106990	1.70E-04	0.6		660	9	2	
Acetaldehyde	75070	2.70E-06	0.01	--	470	300	140	--
Acrolein	107028	--	--	--	2.5	0.7	0.35	--
Ammonia	7664417	--	--	--	3200	--	200	--
Antimony	7440360	--	--	--	0.2	0.015	0.015	3.50E-06
Arsenic	1016	3.30E-03	12	1.5				
Benz(a)anthracene	56553	1.10E-04	0.39	1.2	--	--	--	--
Benzene	71432	2.90E-05	0.1	--	27	3	3	--
Benzo(a)pyrene	50328	1.10E-03	3.9	12	--	--	--	--
Bis(2-ethylhexyl) phthalate	117817	2.40E-06	8.40E-03	8.40E-03	--	--	--	--
Cadmium	7440439	4.20E-03	1.50E+01	--	--	--	2.00E-02	5.00E-04
Carbon Tetrachloride (Tetrachloromethane)	56235	4.20E-05	0.15	--	1900	--	40	--
Chloroform	67663	5.30E-06	0.019	--	150	--	300	--
Chromium(VI)	18540299	1.50E-01	510	0.5	--	--	0.2	0.02
Chrysene	218019	1.10E-05	0.039	0.12	--	--	--	--
Copper	7440508	--	--	--	100	--	--	--
Ethyl Benzene	100414	2.50E-06	0.0087	--	--	--	2000	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	7.10E-05	0.25	--	--	--	0.8	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	2.10E-05	0.072	--	--	--	400	--
Formaldehyde	50000	6.00E-06	0.021	--	55	9	9	--
Hexane	110543	--	--	--	--	--	7000	--
Isopropyl Alcohol	67630	--	--	--	3200	--	7000	--
Lead	1128	1.20E-05	0.042	0.0085	--	--	--	--
Manganese	7439965	--	--	--	--	0.17	0.09	--
Methanol	67561	--	--	--	28000	--	4000	--
Methylene Chloride (Dichloromethane)	75092	1.00E-06	0.0035	--	14000	--	400	--
Naphthalene	91203	3.40E-05	0.12	--	--	--	9	--
Nickel	7440020	2.60E-04	0.91	--	0.2	0.06	0.02	0.011
Phenol	108952	3.00E-04	1.1	--	5800	--	35	--
Polycyclic Aromatic Hydrocarbons	1151	1.10E-03	3.9	12	--	--	--	--
Styrene	100425	--	--	--	21000	--	900	--
Toluene	108883	--	--	--	37000	--	300	--
Vanadium	7440622	--	--	--	30	--	--	--
Vinyl Chloride (Chloroethylene)	75014	7.80E-05	0.027	--	180000	--	--	--
Xylenes	1330207	--	--	--	22000	--	700	--

Abbreviations:
-- = not applicable
(µg/m3) = microgram per cubic meter
mg/kg-day = milligrams per kilogram per day
REL = Reference exposure level
* Note: the chronic inhalation REL for nickel is the value developed by OEHHA for nickel oxide.

Table 2. Summary of maximum hourly and annual average emissions

Substance	CAS #	Average Annual Emissions (lb/yr)	Average Annual Emissions (g/s)	Maximum Hourly Emissions (lb/hr)	Maximum Hourly Emissions (g/s)
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	1.29E-05	1.86E-10	9.41E-07	1.19E-07
1,1,2,2-Tetrachloroethane	79345	2.14E-05	3.08E-10	1.56E-06	1.97E-07
1,2,4-Trimethylbenzene	95636	1.39E+00	2.00E-05	2.67E-02	3.36E-03
1,3-Butadiene	106990	5.61E-04	8.07E-09	4.08E-05	5.14E-06
Acetaldehyde	75070	5.84E-01	8.40E-06	4.75E-04	5.99E-05
Acrolein	107028	3.67E-01	5.28E-06	3.52E-04	4.44E-05
Aluminum	7429905	1.21E+01	1.74E-04	6.51E-03	8.20E-04
Ammonia	7664417	4.33E+02	6.23E-03	2.36E-01	2.98E-02
Anthracene	120127	5.50E-02	7.92E-07	2.42E-05	3.05E-06
Antimony	7440360	6.90E-02	9.93E-07	3.40E-05	4.29E-06
Arsenic	1016	2.30E-02	3.31E-07	6.01E-06	7.58E-07
Barium	7440393	1.50E-01	2.16E-06	9.25E-05	1.17E-05
Benz(a)anthracene	56553	2.00E-02	2.88E-07	8.81E-06	1.11E-06
Benzene	71432	1.08E+00	1.56E-05	6.61E-04	8.32E-05
Benzo(a)pyrene	50328	2.00E-02	2.88E-07	8.81E-06	1.11E-06
Bis(2-ethylhexyl) phthalate	117817	1.10E-02	1.58E-07	4.85E-06	6.11E-07
Cadmium	7440439	4.23E-02	6.09E-07	1.30E-05	1.64E-06
Carbon Tetrachloride (Tetrachloromethane)	56235	1.50E-05	2.16E-10	1.09E-06	1.37E-07
Chloroform	67663	1.16E-05	1.67E-10	8.44E-07	1.06E-07
Chromium	7440473	5.70E+00	8.20E-05	2.00E-03	1.32E-04
Chromium(VI)	18540299	4.62E+00	6.65E-05	9.46E-04	6.86E-05
Chrysene	218019	2.00E-02	2.88E-07	8.81E-06	1.11E-06
Cobalt	7440484	1.43E-02	2.06E-07	9.06E-03	1.14E-03
Copper	7440508	8.36E-02	1.20E-06	4.81E-05	6.01E-06
Cumene	98828	1.39E-01	2.00E-06	2.67E-03	3.37E-04
Dichlorobenzene	25321226	4.04E-06	5.82E-11	1.78E-09	2.24E-10
Ethyl Benzene	100414	1.30E+00	1.87E-05	9.71E-04	1.22E-04
Ethylene Dibromide (1,2-Dibromoethane)	106934	1.80E-05	2.59E-10	1.31E-06	1.65E-07
Ethylene Dichloride (1,2-Dichloroethane)	107062	9.55E-06	1.37E-10	6.93E-07	8.73E-08
Formaldehyde	50000	2.32E+00	3.33E-05	2.46E-03	3.10E-04
Hexane	110543	8.52E-01	1.23E-05	4.44E-04	5.59E-05
Isopropyl Alcohol	67630	5.81E+00	8.36E-05	1.13E-03	1.42E-04
Lead	1128	6.39E-02	9.19E-07	4.06E-05	5.12E-06
Manganese	7439965	1.62E-01	2.33E-06	3.46E-04	4.36E-05
Methanol	67561	2.59E-03	3.72E-08	1.88E-04	2.37E-05
Methylene Chloride (Dichloromethane)	75092	3.49E-04	5.01E-09	2.53E-05	3.19E-06
Naphthalene	91203	1.06E-01	1.52E-06	5.57E-05	7.02E-06
Nickel	7440020	1.57E-01	2.26E-06	4.71E-04	5.93E-05
Phenanthrene	85018	5.51E-02	7.92E-07	2.42E-05	3.05E-06
Phenol	108952	1.20E-02	1.73E-07	1.04E-05	1.32E-06
Phosphoric Acid	7664382	1.76E-01	2.53E-06	3.41E-05	4.30E-06
Phosphorus	7723140	3.56E+00	5.11E-05	1.96E-03	2.46E-04
Polycyclic Aromatic Hydrocarbons	1151	1.35E-02	1.95E-07	7.04E-06	8.87E-07
Pyrene	129000	3.55E-02	5.11E-07	1.56E-05	1.97E-06
Silver	7440224	8.21E-03	1.18E-07	4.41E-06	5.55E-07
Styrene	100425	1.00E-05	1.44E-10	7.30E-07	9.20E-08
Thallium	7440280	2.34E-03	3.37E-08	7.35E-07	9.26E-08
Toluene	108883	4.95E+00	7.12E-05	2.61E-03	3.29E-04
Trimethylbenzene	25551137	2.78E-01	3.99E-06	5.34E-03	6.73E-04
Vanadium	7440622	2.72E+00	3.91E-05	6.82E-04	8.59E-05
Vinyl Chloride (Chloroethylene)	75014	6.08E-06	8.75E-11	4.41E-07	5.56E-08
Xylenes	1330207	6.00E+00	8.63E-05	4.78E-02	6.02E-03
Zinc	7440666	1.21E+00	1.74E-05	4.35E-04	5.48E-05

Note

Shading indicates chemicals for which toxicity criteria are not available for this health risk assessment.

Abbreviations:

lb/yr = pounds per year

lb/hr = pounds per hour

g/s = grams per second

Table 3A. Summary of source parameters for point sources

Source Description	Source ID	Device ID/ Modeling ID	UTM E (m)	UTM N (m)	Base Elevation (m)	Stack Height (m)	Stack Temperature (°F)	Stack Temperature (K)	Stack Exit Velocity (m/sec)	Stack Diameter (m)	Capped (C), Horizontal (H), or Whirlybird (W)?	Notes	Modeled emission rate, acute health effects (g/s)	Modeled emission rate, cancer and chronic health effects (g/s)
Inspection Baghouse (Grinding Operation)	S0001	34	392156.3	3750615.4	21.7	4.60	74	301	12.7	0.762	Vertical		1.00	1.00
PACS (Plasma Arc Cutter)	S0002	60	392165.3	3750663.8	21.7	3.84	68	293	0.01	1.38	H	Diameter = 4'x4'	1.00	1.00
IC Engine	S0003	61	392092	3750656.7	21.7	3.96	870	739	739	0.076	Vertical	velocity = 310 cfm	1.00	1.00
Water Heater (15701 Minnesota)	S0004	100	392062.2	3750627.9	21.7	6.40	160	344	0.01	0.076	C		1.00	1.00
Space Heater #1 (15701 Minnesota)	S0005	101	392062.2	3750628	21.7	6.40	68	293	0.01	0.076	C		1.00	1.00
Space Heater #2 (15701 Minnesota)	S0006	102	392096	3750670.3	21.7	7.01	68	293	0.01	0.076	C		1.00	1.00
Water Heater (15720 Minnesota)	S0007	103	392127.5	3750610.4	21.7	4.88	160	344	0.01	0.076	C		1.00	1.00
Space Heater (15700 Minnesota)	S0008	104	392159.3	3750668.8	21.7	3.66	68	293	0.01	0.076	C		1.00	1.00
Cooling Tower (Bldg 2 Oil Quench Tank)	S0009	105	392094.8	3750641.9	21.7	6.10	68	293	10	2.59	Vertical	velocity = 116,900 cfm	1.00	1.00
Rack Welding	S0010	106	392143.4	3750670.3	21.7	8.53	68	293	0.01	0.43	W		1.00	1.00
Space Heater #3 (15701 Minnesota)	S0013	109	392096.1	3750670.5	21.7	7.01	68	293	0.01	0.076	C		1.00	1.00

Abbreviations:
g - grams
K - Kelvin
m - meters
sec - second

Table 3B. Summary of source parameters for volume sources

Source Description	Source ID	Device ID	Modeling ID	Number of Volume Sources in Group	UTM E (m)	UTM N (m)	Base elevation (m)	Release height (m)	Initial sigma-y (m)	Initial sigma-z (m)	Modeled Emission Rate for Acute Health Effects (g/s)	Modeled Emission Rate for Cancer Risk and Chronic Health Effects (g/s)
Cooling Tower (Bldg 1 Oil Quench Tank)	S0011	107	107	1	392080.2	3750661.1	21.7	1.92	0.43	2.84	1.000	1.000
Cooling Tower (Bldg 1 Water Quench Tank)	S0012	108	108	1	392072.5	3750661.1	21.7	1.92	0.43	2.84	1.000	1.000
Roof Vent Bldg 1 [1]	S0014-S0027	301-314	dh_1_1 to dh_1_14	14	See below	See below	21.7	8.65	1.27	4.25	0.071	0.071
Roof Vent Bldg 2 [1]	S0028-S0033	401-408	dh_2_1 to dh_2_8	6	See below	See below	21.7	10.58	2.76	5.34	0.167	0.167
Roof Vent Bldg 3 [1]	S0034-S0050	501-517	dh_3_1 to dh_3_17	17	See below	See below	21.7	13.36	1.57	6.46	0.059	0.059
Roof Vent Bldg 4 [1]	S0051-S0060	601-610	dh_4_1 to dh_4_10	10	See below	See below	21.7	9.12	1.49	4.48	0.100	0.100

Abbreviations

g - grams
K - Kelvin
m - meters
sec - second

Notes

1. Table shows an individual segment for each building. All the segments (group) on each building have identical source parameters (except location, which is provided below).

Modeled Volume Source	Roof Vent Bldg 1 (dh_1)		Roof Vent Bldg 2 (dh_2)		Roof Vent Bldg 3 (dh_3)		Roof Vent Bldg 4 (dh_4)	
	UTM E (m)	UTM N (m)	UTM E (m)	UTM N (m)	UTM E (m)	UTM N (m)	UTM E (m)	UTM N (m)
dh_x_1	392060.0	3750670.1	392068.0	3750628.7	392025.6	3750673.6	392066.1	3750602.2
dh_x_2	392062.7	3750670.1	392074.1	3750628.7	392025.6	3750670.2	392069.2	3750602.2
dh_x_3	392065.3	3750670.1	392080.3	3750628.7	392025.6	3750666.8	392072.3	3750602.2
dh_x_4	392068.0	3750670.1	392086.4	3750628.7	392025.6	3750663.4	392075.3	3750602.2
dh_x_5	392070.6	3750670.1	392092.6	3750628.7	392025.6	3750660.0	392078.4	3750602.2
dh_x_6	392073.3	3750670.1	392098.7	3750628.7	392025.6	3750656.6	392081.5	3750602.2
dh_x_7	392075.9	3750670.1			392025.6	3750653.2	392084.6	3750602.2
dh_x_8	392078.6	3750670.1			392025.6	3750649.8	392087.7	3750602.2
dh_x_9	392081.2	3750670.1			392025.6	3750646.3	392090.7	3750602.2
dh_x_10	392083.9	3750670.1			392025.6	3750642.9	392093.8	3750602.2
dh_x_11	392086.5	3750670.1			392025.6	3750639.5		
dh_x_12	392089.2	3750670.1			392025.6	3750636.1		
dh_x_13	392091.8	3750670.1			392025.6	3750632.7		
dh_x_14	392094.5	3750670.1			392025.6	3750629.3		
dh_x_15					392025.6	3750625.9		
dh_x_16					392025.6	3750622.5		
dh_x_17					392025.6	3750619.1		

Table 4A. Summary of maximum hourly emissions for point and volume sources (pounds per hour)

Substance	CAS #	Maximum Hourly Emissions Rates by Source and Substance (lb/hr)																	
		Point Sources											Volume Sources (Fugitive Releases)		Volume Sources Grouped by Area (Furnaces and Fugitive Releases)				Total Facility Emissions (lb/hr)
		34	60	61	100	101	102	103	104	105	106	109	107	108	301-314	401-408	501-517	601-610	
		Inspection Baghouse (15720 Minnesota)	Plasma Arc Cutter (15700 Minnesota)	IC Engine (15701 Minnesota)	Water Heater (15701 Minnesota)	Space Heater #1 (15701 Minnesota)	Space Heater #2 (15701 Minnesota)	Water Heater (15720 Minnesota)	Space Heater (15700 Minnesota)	Cooling Tower (Bldg 2 Oil Quench Tank)	Rack Welding (15700 Minnesota)	Space Heater #3 (15701 Minnesota)	Cooling Tower (Bldg 1 Oil Quench Tank)	Cooling Tower (Bldg 1 Water Quench Tank)	Building 1	Building 2	Building 3	Building 4	
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	9.41E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.41E-07
1,1,2,2-Tetrachloroethane	79345	--	--	1.56E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.56E-06
1,3-Butadiene	106990	--	--	4.08E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.08E-05
Acetaldehyde	75070	--	--	1.72E-04	1.64E-07	1.02E-07	2.87E-07	1.64E-07	2.29E-07	--	--	2.29E-07	--	--	5.99E-05	8.64E-05	1.17E-04	3.84E-05	4.75E-04
Acrolein	107028	--	--	1.62E-04	1.03E-07	6.43E-08	1.80E-07	1.03E-07	1.44E-07	--	--	1.44E-07	--	--	3.77E-05	5.42E-05	7.36E-05	2.41E-05	3.52E-04
Ammonia	7664417	--	--	1.09E-02	1.22E-04	7.62E-05	2.13E-04	1.22E-04	1.71E-04	--	--	1.71E-04	--	--	4.46E-02	6.42E-02	8.72E-02	2.86E-02	2.36E-01
Antimony	7440360	3.16E-05	--	--	--	--	--	--	--	--	--	--	--	9.27E-08	7.10E-07	6.68E-07	7.84E-07	4.26E-07	3.40E-05
Arsenic	1016	3.94E-06	--	--	--	--	--	--	--	--	--	--	--	--	6.10E-07	4.88E-07	6.10E-07	3.66E-07	6.01E-06
Benz(a)anthracene	56553	--	--	--	--	--	--	--	--	--	--	--	--	--	4.41E-06	4.40E-06	--	--	8.81E-06
Benzene	71432	--	--	9.71E-05	3.05E-07	1.90E-07	5.33E-07	3.05E-07	4.27E-07	--	--	4.27E-07	--	--	1.12E-04	1.61E-04	2.18E-04	7.14E-05	6.61E-04
Benzo(a)pyrene	50328	--	--	--	--	--	--	--	--	--	--	--	--	--	4.41E-06	4.40E-06	--	--	8.81E-06
Bis(2-ethylhexyl) phthalate	117817	--	--	--	--	--	--	--	--	--	--	--	--	--	2.42E-06	2.42E-06	--	--	4.85E-06
Cadmium	7440439	9.63E-06	--	--	--	--	--	--	--	--	--	--	--	--	9.86E-07	7.86E-07	9.84E-07	5.91E-07	1.30E-05
Carbon Tetrachloride (Tetrachloromethane)	56235	--	--	1.09E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.09E-06
Chloroform	67663	--	--	8.44E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.44E-07
Chromium(VI)	18540299	--	4.81E-07	--	--	--	--	--	--	--	2.29E-04	--	--	4.79E-05	8.81E-05	4.34E-04	9.38E-05	5.28E-05	5.45E-04
Chrysene	218019	--	--	--	--	--	--	--	--	--	--	--	--	--	4.41E-06	4.40E-06	--	--	8.81E-06
Copper	7440508	3.46E-05	9.61E-06	--	--	--	--	--	--	--	--	--	--	1.71E-07	1.01E-06	9.94E-07	1.14E-06	6.06E-07	4.77E-05
Ethyl Benzene	100414	--	--	1.53E-06	3.62E-07	2.26E-07	6.33E-07	3.62E-07	5.07E-07	--	--	5.07E-07	--	--	1.32E-04	1.91E-04	5.59E-04	8.48E-05	9.71E-04
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	1.31E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.31E-06
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	6.93E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.93E-07
Formaldehyde	50000	--	--	1.26E-03	6.48E-07	4.05E-07	1.13E-06	6.48E-07	9.07E-07	--	--	9.07E-07	--	--	2.37E-04	3.41E-04	4.64E-04	1.52E-04	2.46E-03
Hexane	110543	--	--	--	2.40E-07	1.50E-07	4.20E-07	2.40E-07	3.36E-07	--	--	3.36E-07	--	--	8.78E-05	1.27E-04	1.72E-04	5.62E-05	4.44E-04
Isopropyl Alcohol	67630	--	--	--	--	--	--	--	--	5.62E-04	--	--	5.66E-04	--	--	--	--	--	1.13E-03
Lead	1128	4.02E-05	--	--	--	--	--	--	--	--	--	--	--	1.28E-07	--	1.38E-07	1.01E-07	--	4.02E-05
Manganese	7439965	5.90E-05	1.92E-05	--	--	--	--	--	--	--	2.68E-04	--	--	--	--	--	--	--	3.46E-04
Methanol	67561	--	--	1.88E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.88E-04
Methylene Chloride (Dichloromethane)	75092	--	--	2.53E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.53E-05
Naphthalene	91203	--	--	5.97E-06	1.14E-08	7.14E-09	2.00E-08	1.14E-08	1.60E-08	--	--	1.60E-08	--	--	1.85E-05	2.03E-05	8.18E-06	2.68E-06	5.57E-05
Nickel	7440020	8.63E-05	3.56E-04	--	--	--	--	--	--	--	2.39E-05	--	--	1.71E-06	--	1.84E-06	1.35E-06	--	4.66E-04
Phenol	108952	--	--	--	--	--	--	--	--	--	--	--	--	--	2.65E-06	7.80E-06	--	--	1.04E-05
Polycyclic Aromatic Hydrocarbons	1151	--	--	--	3.81E-09	2.38E-09	6.67E-09	3.81E-09	5.33E-09	--	--	5.33E-09	--	--	1.39E-06	2.00E-06	2.72E-06	8.93E-07	7.04E-06
Styrene	100425	--	--	7.30E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.30E-07
Toluene	108883	--	--	3.43E-05	1.39E-06	8.71E-07	2.44E-06	1.39E-06	1.95E-06	--	--	1.95E-06	--	--	5.11E-04	7.34E-04	9.98E-04	3.27E-04	2.61E-03
Vanadium	7440622	--	--	--	--	--	--	--	--	--	--	--	--	2.00E-04	3.23E-05	2.40E-04	1.90E-04	1.94E-05	1.37E-04
Vinyl Chloride (Chloroethylene)	75014	--	--	4.41E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.41E-07
Xylenes	1330207	--	--	1.20E-05	1.04E-06	6.48E-07	1.81E-06	1.04E-06	1.45E-06	--	--	1.45E-06	--	--	1.08E-02	1.10E-02	1.53E-02	1.07E-02	4.78E-02

Abbreviations:
lb/hr = pounds per hour
-- = not applicable

Table 4B. Summary of maximum hourly emissions for point and volume sources (grams/second)

Substance	CAS #	Maximum Hourly Emissions Rates by Source and Substance (g/s)																	
		Point Sources											Volume Sources (Fugitive Releases)		Volume Sources Grouped by Area (Furnaces and Fugitive Releases)				Total Facility Emissions (g/s)
		34	60	61	100	101	102	103	104	105	106	109	107	108	301-314	401-408	501-517	601-610	
		Inspection Baghouse (15720 Minnesota)	Plasma Arc Cutter (15700 Minnesota)	IC Engine (15701 Minnesota)	Water Heater (15701 Minnesota)	Space Heater #1 (15701 Minnesota)	Space Heater #2 (15701 Minnesota)	Water Heater (15720 Minnesota)	Space Heater (15700 Minnesota)	Cooling Tower (Bldg 2 Oil Quench Tank)	Rack Welding (15700 Minnesota)	Space Heater #3 (15701 Minnesota)	Cooling Tower (Bldg 1 Oil Quench Tank)	Cooling Tower (Bldg 1 Water Quench Tank)	Building 1	Building 2	Building 3	Building 4	
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	1.19E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.19E-07
1,1,2,2-Tetrachloroethane	79345	--	--	1.97E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.97E-07
1,3-Butadiene	106990	--	--	5.14E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.14E-06
Acetaldehyde	75070	--	--	2.17E-05	2.07E-08	1.29E-08	3.62E-08	2.07E-08	2.89E-08	--	--	2.89E-08	--	--	7.55E-06	1.09E-05	1.48E-05	4.84E-06	5.99E-05
Acrolein	107028	--	--	2.04E-05	1.30E-08	8.10E-09	2.27E-08	1.30E-08	1.81E-08	--	--	1.81E-08	--	--	4.75E-06	6.83E-06	9.27E-06	3.04E-06	4.44E-05
Ammonia	7664417	--	--	1.37E-03	1.54E-05	9.60E-06	2.68E-05	1.54E-05	2.15E-05	--	--	2.15E-05	--	--	5.62E-03	8.09E-03	1.10E-02	3.60E-03	2.98E-02
Antimony	7440360	3.98E-06	--	--	--	--	--	--	--	--	--	--	--	1.17E-08	8.94E-08	8.42E-08	9.88E-08	5.37E-08	4.29E-06
Arsenic	1016	4.96E-07	--	--	--	--	--	--	--	--	--	--	--	--	7.69E-08	6.15E-08	7.69E-08	4.61E-08	7.58E-07
Benz(a)anthracene	56553	--	--	--	--	--	--	--	--	--	--	--	--	--	5.56E-07	5.55E-07	--	--	1.11E-06
Benzene	71432	--	--	1.22E-05	3.84E-08	2.39E-08	6.72E-08	3.84E-08	5.38E-08	--	--	5.38E-08	--	--	1.41E-05	2.03E-05	2.74E-05	9.00E-06	8.32E-05
Benzo(a)pyrene	50328	--	--	--	--	--	--	--	--	--	--	--	--	--	5.56E-07	5.55E-07	--	--	1.11E-06
Bis(2-ethylhexyl) phthalate	117817	--	--	--	--	--	--	--	--	--	--	--	--	--	3.05E-07	3.05E-07	--	--	6.11E-07
Cadmium	7440439	1.21E-06	--	--	--	--	--	--	--	--	--	--	--	--	1.24E-07	9.90E-08	1.24E-07	7.45E-08	1.64E-06
Carbon Tetrachloride (Tetrachloromethane)	56235	--	--	1.37E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.37E-07
Chloroform	67663	--	--	1.06E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.06E-07
Chromium(VI)	18540299	--	6.06E-08	--	--	--	--	--	--	--	2.89E-05	--	--	6.03E-06	1.11E-05	5.47E-05	1.18E-05	6.65E-06	6.86E-05
Chrysene	218019	--	--	--	--	--	--	--	--	--	--	--	--	--	5.56E-07	5.55E-07	--	--	1.11E-06
Copper	7440508	4.36E-06	1.21E-06	--	--	--	--	--	--	--	--	--	--	2.16E-08	1.27E-07	1.25E-07	1.44E-07	7.64E-08	6.01E-06
Ethyl Benzene	100414	--	--	1.93E-07	4.56E-08	2.85E-08	7.98E-08	4.56E-08	6.39E-08	--	--	6.39E-08	--	--	1.67E-05	2.40E-05	7.05E-05	1.07E-05	1.22E-04
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	1.65E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.65E-07
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	8.73E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.73E-08
Formaldehyde	50000	--	--	1.59E-04	8.16E-08	5.10E-08	1.42E-07	8.16E-08	1.14E-07	--	--	1.14E-07	--	--	2.98E-05	4.30E-05	5.85E-05	1.92E-05	3.10E-04
Hexane	110543	--	--	--	3.02E-08	1.89E-08	5.29E-08	3.02E-08	4.23E-08	--	--	4.23E-08	--	--	1.11E-05	1.60E-05	2.16E-05	7.08E-06	5.59E-05
Isopropyl Alcohol	67630	--	--	--	--	--	--	--	--	7.08E-05	--	--	7.13E-05	--	--	--	--	--	1.42E-04
Lead	1128	5.07E-06	--	--	--	--	--	--	--	--	--	--	--	1.62E-08	--	1.74E-08	1.27E-08	--	5.07E-06
Manganese	7439965	7.43E-06	2.42E-06	--	--	--	--	--	--	--	3.38E-05	--	--	--	--	--	--	--	4.36E-05
Methanol	67561	--	--	2.37E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.37E-05
Methylene Chloride (Dichloromethane)	75092	--	--	3.19E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.19E-06
Naphthalene	91203	--	--	7.52E-07	1.44E-09	9.00E-10	2.52E-09	1.44E-09	2.02E-09	--	--	2.02E-09	--	--	2.33E-06	2.56E-06	1.03E-06	3.38E-07	7.02E-06
Nickel	7440020	1.09E-05	4.48E-05	--	--	--	--	--	--	--	3.01E-06	--	--	2.16E-07	--	2.32E-07	1.70E-07	--	5.87E-05
Phenol	108952	--	--	--	--	--	--	--	--	--	--	--	--	--	3.33E-07	9.83E-07	--	--	1.32E-06
Polycyclic Aromatic Hydrocarbons	1151	--	--	--	4.80E-10	3.00E-10	8.40E-10	4.80E-10	6.72E-10	--	--	6.72E-10	--	--	1.76E-07	2.52E-07	3.43E-07	1.13E-07	8.87E-07
Styrene	100425	--	--	9.20E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.20E-08
Toluene	108883	--	--	4.32E-06	1.75E-07	1.10E-07	3.07E-07	1.75E-07	2.46E-07	--	--	2.46E-07	--	--	6.44E-05	9.25E-05	1.26E-04	4.12E-05	3.29E-04
Vanadium	7440622	--	--	--	--	--	--	--	--	--	--	--	--	2.52E-05	4.07E-06	3.02E-05	2.39E-05	2.44E-06	1.73E-05
Vinyl Chloride (Chloroethylene)	75014	--	--	5.56E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.56E-08
Xylenes	1330207	--	--	1.51E-06	1.31E-07	8.16E-08	2.28E-07	1.31E-07	1.83E-07	--	--	1.83E-07	--	--	1.36E-03	1.38E-03	1.93E-03	1.34E-03	6.02E-03

Table 4C. Summary of annual average emissions for point and volume sources (pounds per year)

Substance	CAS #	Annual Average Emissions Rates by Source and Substance (lb/year)																	
		Point Sources											Volume Sources (Fugitive Releases)		Volume Sources Grouped by Area (Furnaces and Fugitive Releases)				Total Facility Emissions (lb/year)
		34	60	61	100	101	102	103	104	105	106	109	107	108	301-314	401-408	501-517	601-610	
		Inspection Baghouse (15720 Minnesota)	Plasma Arc Cutter (15700 Minnesota)	IC Engine (15701 Minnesota)	Water Heater (15701 Minnesota)	Space Heater #1 (15701 Minnesota)	Space Heater #2 (15701 Minnesota)	Water Heater (15720 Minnesota)	Space Heater (15700 Minnesota)	Cooling Tower (Bldg 2 Oil Quench Tank)	Rack Welding (15700 Minnesota)	Space Heater #3 (15701 Minnesota)	Cooling Tower (Bldg 1 Oil Quench Tank)	Cooling Tower (Bldg 1 Water Quench Tank)	Building 1	Building 2	Building 3	Building 4	
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	1.29E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00
1,1,2,2-Tetrachloroethane	79345	--	--	2.14E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00
1,3-Butadiene	106990	--	--	5.61E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.00E-04
Acetaldehyde	75070	--	--	2.37E-03	1.08E-03	4.31E-04	1.18E-03	1.36E-04	2.75E-05	--	--	9.64E-04	--	--	1.17E-01	1.89E-01	1.93E-01	7.81E-02	5.84E-01
Acrolein	107028	--	--	2.22E-03	6.78E-04	2.70E-04	7.39E-04	8.51E-05	1.73E-05	--	--	6.06E-04	--	--	7.33E-02	1.19E-01	1.21E-01	4.90E-02	3.67E-01
Ammonia	7664417	--	--	1.49E-01	8.03E-01	3.20E-01	8.76E-01	1.01E-01	2.05E-02	--	--	7.18E-01	--	--	8.69E+01	1.41E+02	1.44E+02	5.81E+01	4.33E+02
Antimony	7440360	4.93E-02	--	--	--	--	--	--	--	--	--	--	--	1.67E-04	5.96E-03	5.54E-03	5.42E-03	3.58E-03	6.90E-02
Arsenic	1016	6.10E-03	--	--	--	--	--	--	--	--	--	--	--	--	5.12E-03	4.10E-03	4.61E-03	3.07E-03	2.30E-02
Benz(a)anthracene	56553	--	--	--	--	--	--	--	--	--	--	--	--	--	8.51E-03	1.15E-02	--	--	2.00E-02
Benzene	71432	--	--	1.34E-03	2.01E-03	8.01E-04	2.19E-03	2.52E-04	5.12E-05	--	--	1.79E-03	--	--	2.17E-01	3.52E-01	3.60E-01	1.45E-01	1.08E+00
Benzo(a)pyrene	50328	--	--	--	--	--	--	--	--	--	--	--	--	--	8.51E-03	1.15E-02	--	--	2.00E-02
Bis(2-ethylhexyl) phthalate	117817	--	--	--	--	--	--	--	--	--	--	--	--	--	4.68E-03	6.33E-03	--	--	1.10E-02
Cadmium	7440439	1.50E-02	--	--	--	--	--	--	--	--	--	--	--	--	8.27E-03	6.62E-03	7.45E-03	4.96E-03	4.23E-02
Carbon Tetrachloride (Tetrachloromethane)	56235	--	--	1.50E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.50E-05
Chloroform	67663	--	--	1.16E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00
Chromium(VI)	18540299	--	9.68E-07	--	--	--	--	--	--	--	2.80E-02	--	--	1.49E-02	5.31E-01	3.22E+00	4.67E-01	3.27E-01	1.87E+00
Chrysene	218019	--	--	--	--	--	--	--	--	--	--	--	--	--	8.51E-03	1.15E-02	--	--	2.00E-02
Copper	7440508	5.40E-02	3.03E-05	--	--	--	--	--	--	--	--	--	--	5.34E-05	8.48E-03	8.21E-03	7.72E-03	5.09E-03	8.21E-02
Ethyl Benzene	100414	--	--	2.10E-05	2.38E-03	9.51E-04	2.60E-03	2.99E-04	6.08E-05	--	--	2.13E-03	--	--	2.58E-01	4.19E-01	4.43E-01	1.73E-01	1.30E+00
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	1.80E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	9.55E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00
Formaldehyde	50000	--	--	1.73E-02	4.27E-03	1.70E-03	4.65E-03	5.36E-04	1.09E-04	--	--	3.81E-03	--	--	4.62E-01	7.49E-01	7.64E-01	3.09E-01	2.32E+00
Hexane	110543	--	--	--	1.58E-03	6.31E-04	1.72E-03	1.99E-04	4.03E-05	--	--	1.41E-03	--	--	1.71E-01	2.78E-01	2.83E-01	1.14E-01	8.52E-01
Isopropyl Alcohol	67630	--	--	--	--	--	--	--	--	4.93E+00	--	--	8.83E-01	--	--	--	--	--	5.81E+00
Lead	1128	6.27E-02	--	--	--	--	--	--	--	--	--	--	--	4.00E-05	--	1.07E-03	6.32E-05	--	6.28E-02
Manganese	7439965	9.20E-02	4.05E-05	--	--	--	--	--	--	--	2.33E-02	--	--	--	--	--	--	--	1.15E-01
Methanol	67561	--	--	2.59E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.60E-03
Methylene Chloride (Dichloromethane)	75092	--	--	3.49E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.00E-04
Naphthalene	91203	--	--	8.22E-05	7.53E-05	3.00E-05	8.21E-05	9.45E-06	1.92E-06	--	--	6.73E-05	--	--	3.58E-02	5.06E-02	1.35E-02	5.45E-03	1.06E-01
Nickel	7440020	1.35E-01	6.14E-04	--	--	--	--	--	--	--	1.99E-03	--	--	5.34E-04	--	1.42E-02	8.43E-04	--	1.38E-01
Phenol	108952	--	--	--	--	--	--	--	--	--	--	--	--	--	5.10E-03	6.91E-03	--	--	1.20E-02
Polycyclic Aromatic Hydrocarbons	1151	--	--	--	2.51E-05	1.00E-05	2.74E-05	3.15E-06	6.40E-07	--	--	2.24E-05	--	--	2.72E-03	4.41E-03	4.50E-03	1.82E-03	1.35E-02
Styrene	100425	--	--	1.00E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00
Toluene	108883	--	--	4.72E-04	9.19E-03	3.66E-03	1.00E-02	1.15E-03	2.34E-04	--	--	8.21E-03	--	--	9.94E-01	1.61E+00	1.65E+00	6.65E-01	4.95E+00
Vanadium	7440622	--	--	--	--	--	--	--	--	--	--	--	--	6.23E-02	2.72E-01	1.88E+00	3.43E-01	1.63E-01	9.92E-01
Vinyl Chloride (Chloroethylene)	75014	--	--	6.08E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.00E+00
Xylenes	1330207	--	--	1.65E-04	6.83E-03	2.72E-03	7.44E-03	8.57E-04	1.74E-04	--	--	6.10E-03	--	--	8.43E-01	1.30E+00	3.13E+00	7.02E-01	6.00E+00

Abbreviations:
lb/year = pounds per year
-- = not applicable

Table 4D. Summary of annual emissions for point and volume sources (grams/second)

Substance	CAS #	Annual Average Emissions Rates by Source and Substance (g/s)																	
		Point Sources											Volume Sources (Fugitive Releases)		Volume Sources Grouped by Area (Furnaces and Fugitive Releases)				Total Facility Emissions (g/s)
		34	60	61	100	101	102	103	104	105	106	109	107	108	301-314	401-408	501-517	601-610	
		Inspection Baghouse (15720 Minnesota)	Plasma Arc Cutter (15700 Minnesota)	IC Engine (15701 Minnesota)	Water Heater (15701 Minnesota)	Space Heater #1 (15701 Minnesota)	Space Heater #2 (15701 Minnesota)	Water Heater (15720 Minnesota)	Space Heater (15700 Minnesota)	Cooling Tower (Bldg 2 Oil Quench Tank)	Rack Welding (15700 Minnesota)	Space Heater #3 (15701 Minnesota)	Cooling Tower (Bldg 1 Oil Quench Tank)	Cooling Tower (Bldg 1 Water Quench Tank)	Building 1	Building 2	Building 3	Building 4	
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	1.85E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.85E-10
1,1,2,2-Tetrachloroethane	79345	--	--	3.08E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.08E-10
1,3-Butadiene	106990	--	--	8.06E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.06E-09
Acetaldehyde	75070	--	--	3.40E-08	1.55E-08	6.19E-09	1.69E-08	1.95E-09	3.95E-10	--	--	1.39E-08	--	--	1.68E-06	2.72E-06	2.78E-06	1.12E-06	8.39E-06
Acrolein	107028	--	--	3.20E-08	9.74E-09	3.88E-09	1.06E-08	1.22E-09	2.49E-10	--	--	8.70E-09	--	--	1.05E-06	1.71E-06	1.74E-06	7.05E-07	5.28E-06
Ammonia	7664417	--	--	2.15E-06	1.15E-05	4.60E-06	1.26E-05	1.45E-06	2.94E-07	--	--	1.03E-05	--	--	1.25E-03	2.03E-03	2.07E-03	8.35E-04	6.22E-03
Antimony	7440360	7.08E-07	--	--	--	--	--	--	--	--	--	--	--	4.16E-10	8.57E-08	7.97E-08	7.80E-08	5.14E-08	9.92E-07
Arsenic	1016	8.77E-08	--	--	--	--	--	--	--	--	--	--	--	--	7.36E-08	5.89E-08	6.63E-08	4.42E-08	3.31E-07
Benz(a)anthracene	56553	--	--	--	--	--	--	--	--	--	--	--	--	--	1.22E-07	1.65E-07	--	--	2.88E-07
Benzene	71432	--	--	1.92E-08	2.89E-08	1.15E-08	3.15E-08	3.62E-09	7.36E-10	--	--	2.58E-08	--	--	3.12E-06	5.06E-06	5.17E-06	2.09E-06	1.56E-05
Benzo(a)pyrene	50328	--	--	--	--	--	--	--	--	--	--	--	--	--	1.22E-07	1.65E-07	--	--	2.88E-07
Bis(2-ethylhexyl) phthalate	117817	--	--	--	--	--	--	--	--	--	--	--	--	--	6.72E-08	9.10E-08	--	--	1.58E-07
Cadmium	7440439	2.16E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.19E-07	9.52E-08	1.07E-07	7.13E-08	6.08E-07
Carbon Tetrachloride (Tetrachloromethane)	56235	--	--	2.16E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.16E-10
Chloroform	67663	--	--	1.67E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.67E-10
Chromium(VI)	18540299	--	1.39E-11	--	--	--	--	--	--	--	4.02E-07	--	--	2.15E-07	7.63E-06	4.63E-05	6.72E-06	4.69E-06	2.69E-05
Chrysene	218019	--	--	--	--	--	--	--	--	--	--	--	--	--	1.22E-07	1.65E-07	--	--	2.88E-07
Copper	7440508	7.76E-07	4.35E-10	--	--	--	--	--	--	--	--	--	--	7.68E-10	1.22E-07	1.18E-07	1.11E-07	7.32E-08	1.18E-06
Ethyl Benzene	100414	--	--	3.02E-10	3.43E-08	1.37E-08	3.74E-08	4.30E-09	8.74E-10	--	--	3.06E-08	--	--	3.71E-06	6.01E-06	6.36E-06	2.48E-06	1.87E-05
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	2.59E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.59E-10
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	1.37E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.37E-10
Formaldehyde	50000	--	--	2.49E-07	6.13E-08	2.45E-08	6.68E-08	7.70E-09	1.56E-09	--	--	5.48E-08	--	--	6.63E-06	1.08E-05	1.10E-05	4.44E-06	3.33E-05
Hexane	110543	--	--	--	2.27E-08	9.06E-09	2.48E-08	2.85E-09	5.79E-10	--	--	2.03E-08	--	--	2.46E-06	3.99E-06	4.07E-06	1.64E-06	1.22E-05
Isopropyl Alcohol	67630	--	--	--	--	--	--	--	--	7.08E-05	--	--	1.27E-05	--	--	--	--	--	8.35E-05
Lead	1128	9.01E-07	--	--	--	--	--	--	--	--	--	--	--	5.46E-10	--	1.54E-08	9.09E-10	--	9.02E-07
Manganese	7439965	1.32E-06	5.81E-10	--	--	--	--	--	--	--	3.35E-07	--	--	--	--	--	--	--	1.66E-06
Methanol	67561	--	--	3.72E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.72E-08
Methylene Chloride (Dichloromethane)	75092	--	--	5.01E-09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.01E-09
Naphthalene	91203	--	--	1.18E-09	1.08E-09	4.31E-10	1.18E-09	1.36E-10	2.76E-11	--	--	9.67E-10	--	--	5.14E-07	7.28E-07	1.94E-07	7.83E-08	1.52E-06
Nickel	7440020	1.93E-06	8.82E-09	--	--	--	--	--	--	--	2.87E-08	--	--	7.68E-09	--	2.04E-07	1.21E-08	--	1.98E-06
Phenol	108952	--	--	--	--	--	--	--	--	--	--	--	--	--	7.33E-08	9.93E-08	--	--	1.73E-07
Polycyclic Aromatic Hydrocarbons	1151	--	--	--	3.61E-10	1.44E-10	3.94E-10	4.53E-11	9.20E-12	--	--	3.22E-10	--	--	3.90E-08	6.33E-08	6.46E-08	2.61E-08	1.94E-07
Styrene	100425	--	--	1.44E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.44E-10
Toluene	108883	--	--	6.79E-09	1.32E-07	5.27E-08	1.44E-07	1.66E-08	3.37E-09	--	--	1.18E-07	--	--	1.43E-05	2.32E-05	2.37E-05	9.55E-06	7.11E-05
Vanadium	7440622	--	--	--	--	--	--	--	--	--	--	--	--	8.96E-07	3.91E-06	2.70E-05	4.93E-06	2.35E-06	1.43E-05
Vinyl Chloride (Chloroethylene)	75014	--	--	8.74E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.74E-11
Xylenes	1330207	--	--	2.37E-09	9.81E-08	3.91E-08	1.07E-07	1.23E-08	2.50E-09	--	--	8.77E-08	--	--	1.21E-05	1.87E-05	4.49E-05	1.01E-05	8.62E-05

Abbreviations:
g/s = grams per second
-- = not applicable

Table 5A. Maximum hourly air concentrations (µg/m^3) for MEIR, MEIW, PMI

Substance	CAS #	MEIW Receptor for Max Cancer/Chronic Risk (Receptor 4895)	MEIW Receptor for Max Acute Risk (Receptor 5074)	PMI Receptor for Max Cancer/Chronic Risk (Receptor 17)	PMI Receptor for Max Acute Risk (Receptor 34)	MEIR Receptor for Max Cancer/Chronic/Acute Risk (Receptor 5135)
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	2.15E-04	2.28E-05	1.28E-04	2.18E-05	1.93E-05
1,1,2,2-Tetrachloroethane	79345	3.56E-04	3.79E-05	2.13E-04	3.61E-05	3.19E-05
1,2,4-Trimethylbenzene	95636	1.90E+00	5.90E-01	1.44E+00	6.02E-01	4.07E-01
1,3-Butadiene	106990	9.32E-03	9.91E-04	5.56E-03	9.44E-04	8.35E-04
Acetaldehyde	75070	7.03E-02	1.35E-02	5.68E-02	1.57E-02	9.85E-03
Acrolein	107028	5.64E-02	9.81E-03	4.30E-02	1.11E-02	7.29E-03
Aluminum	7429905	2.14E-01	4.83E-01	4.64E-01	4.28E-01	4.83E-01
Ammonia	7664417	2.55E+01	7.23E+00	2.63E+01	8.97E+00	4.93E+00
Anthracene	120127	2.56E-03	1.01E-03	4.42E-03	1.06E-03	5.88E-04
Antimony	7440360	1.20E-03	2.49E-03	2.52E-03	2.22E-03	2.48E-03
Arsenic	1016	3.24E-04	3.68E-04	5.35E-04	3.37E-04	3.45E-04
Barium	7440393	2.97E-03	6.86E-03	6.75E-03	6.07E-03	6.89E-03
Benz(a)anthracene	56553	9.31E-04	3.66E-04	1.61E-03	3.85E-04	2.14E-04
Benzene	71432	7.98E-02	1.98E-02	7.54E-02	2.40E-02	1.38E-02
Benzo(a)pyrene	50328	9.31E-04	3.66E-04	1.61E-03	3.85E-04	2.14E-04
Bis(2-ethylhexyl) phthalate	117817	5.12E-04	2.01E-04	8.83E-04	2.12E-04	1.18E-04
Cadmium	7440439	6.20E-04	8.43E-04	1.09E-03	7.63E-04	8.08E-04
Carbon Tetrachloride (Tetrachloromethane)	56235	2.49E-04	2.65E-05	1.49E-04	2.52E-05	2.23E-05
Chloroform	67663	1.93E-04	2.05E-05	1.15E-04	1.95E-05	1.73E-05
Chromium	7440473	2.81E-01	6.97E-01	4.07E-01	9.18E-01	3.38E-01
Chromium(VI)	18540299	1.35E-01	3.04E-01	1.71E-01	3.12E-01	1.00E-01
Chrysene	218019	9.31E-04	3.66E-04	1.61E-03	3.85E-04	2.14E-04
Cobalt	7440484	3.01E-04	8.22E-04	6.75E-04	7.48E-04	7.23E-04
Copper	7440508	4.19E-03	1.11E-02	5.17E-03	1.72E-02	8.55E-03
Cumene	98828	1.90E-01	5.91E-02	1.44E-01	6.02E-02	4.07E-02
Dichlorobenzene	25321226	1.88E-07	7.38E-08	3.24E-07	7.77E-08	4.32E-08
Ethyl Benzene	100414	9.02E-02	2.74E-02	9.01E-02	3.27E-02	1.86E-02
Ethylene Dibromide (1,2-Dibromoethane)	106934	2.99E-04	3.18E-05	1.79E-04	3.03E-05	2.68E-05
Ethylene Dichloride (1,2-Dichloroethane)	107062	1.58E-04	1.68E-05	9.44E-05	1.60E-05	1.42E-05
Formaldehyde	50000	4.10E-01	6.76E-02	3.04E-01	7.55E-02	5.08E-02
Hexane	110543	4.54E-02	1.37E-02	4.89E-02	1.72E-02	9.28E-03
Isopropyl Alcohol	67630	5.82E-02	3.82E-02	3.35E-01	3.35E-02	2.06E-02
Lead	1128	1.23E-03	3.07E-03	2.82E-03	2.71E-03	3.10E-03
Manganese	7439965	6.50E-02	3.51E-01	1.05E-01	3.71E-01	1.17E-01
Methanol	67561	4.29E-02	4.56E-03	2.56E-02	4.35E-03	3.85E-03
Methylene Chloride (Dichloromethane)	75092	5.78E-03	6.14E-04	3.45E-03	5.85E-04	5.18E-04
Naphthalene	91203	6.55E-03	1.98E-03	8.35E-03	2.20E-03	1.26E-03
Nickel	7440020	1.11E-01	3.45E-01	9.93E-02	5.81E-01	2.31E-01
Phenanthrene	85018	2.56E-03	1.01E-03	4.42E-03	1.06E-03	5.88E-04
Phenol	108952	1.31E-03	3.64E-04	1.42E-03	3.91E-04	2.30E-04
Phosphoric Acid	7664382	1.76E-03	1.15E-03	1.01E-02	1.01E-03	6.22E-04
Phosphorus	7723140	6.51E-02	1.54E-01	1.41E-01	1.39E-01	1.49E-01
Polycyclic Aromatic Hydrocarbons	1151	7.20E-04	2.17E-04	7.76E-04	2.72E-04	1.47E-04
Pyrene	129000	1.65E-03	6.49E-04	2.85E-03	6.83E-04	3.80E-04
Silver	7440224	1.44E-04	3.27E-04	3.14E-04	2.90E-04	3.28E-04
Styrene	100425	1.67E-04	1.77E-05	9.95E-05	1.69E-05	1.49E-05
Thallium	7440280	6.74E-05	1.99E-05	1.32E-04	2.05E-05	1.32E-05
Toluene	108883	2.72E-01	8.05E-02	2.89E-01	1.01E-01	5.46E-02
Trimethylbenzene	25551137	3.80E-01	1.18E-01	2.87E-01	1.20E-01	8.13E-02
Vanadium	7440622	6.35E-02	1.90E-02	1.17E-01	1.98E-02	1.25E-02
Vinyl Chloride (Chloroethylene)	75014	1.01E-04	1.07E-05	6.01E-05	1.02E-05	9.03E-06
Xylenes	1330207	4.94E+00	1.44E+00	5.37E+00	1.56E+00	9.29E-01
Zinc	7440666	1.85E-02	2.97E-02	3.46E-02	2.66E-02	2.89E-02

Abbreviations:
MEIW = Maximum exposed individual worker
MEIR = Maximum exposed individual resident
PMI = Point of maximum impact (off site)
µg/m^3 = micrograms per cubic meter

Table 5B. Annual average air concentrations (µg/m^3) for MEIR, MEIW, and PMI

Substance	CAS #	MEIW Receptor for Max Cancer/Chronic Risk (Receptor 4895)	MEIW Receptor for Max Acute Risk (Receptor 5074)	PMI Receptor for Max Cancer/Chronic Risk (Receptor 17)	PMI Receptor for Max Acute Risk (Receptor 34)	MEIR Receptor for Max Cancer/Chronic/Acute Risk (Receptor 5135)
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	2.11E-08	8.82E-09	1.70E-08	9.71E-09	7.70E-09
1,1,2,2-Tetrachloroethane	79345	3.50E-08	1.46E-08	2.81E-08	1.61E-08	1.28E-08
1,2,4-Trimethylbenzene	95636	2.07E-03	8.92E-04	2.01E-03	7.87E-04	6.14E-04
1,3-Butadiene	106990	9.18E-07	3.83E-07	7.38E-07	4.22E-07	3.35E-07
Acetaldehyde	75070	1.40E-03	6.21E-04	2.17E-03	5.48E-04	3.76E-04
Acrolein	107028	8.83E-04	3.90E-04	1.36E-03	3.45E-04	2.37E-04
Aluminum	7429905	7.26E-03	6.46E-03	1.32E-02	7.49E-03	4.69E-03
Ammonia	7664417	1.04E+00	4.61E-01	1.61E+00	4.07E-01	2.79E-01
Anthracene	120127	1.20E-04	7.72E-05	3.30E-04	6.52E-05	4.32E-05
Antimony	7440360	5.73E-05	4.22E-05	1.03E-04	4.62E-05	2.93E-05
Arsenic	1016	4.27E-05	2.17E-05	7.87E-05	1.98E-05	1.32E-05
Barium	7440393	4.75E-05	6.51E-05	6.43E-05	8.55E-05	5.19E-05
Benz(a)anthracene	56553	4.38E-05	2.81E-05	1.20E-04	2.37E-05	1.57E-05
Benzene	71432	2.61E-03	1.15E-03	4.03E-03	1.02E-03	6.98E-04
Benzo(a)pyrene	50328	4.38E-05	2.81E-05	1.20E-04	2.37E-05	1.57E-05
Bis(2-ethylhexyl) phthalate	117817	2.41E-05	1.54E-05	6.61E-05	1.30E-05	8.64E-06
Cadmium	7440439	6.96E-05	3.70E-05	1.28E-04	3.46E-05	2.30E-05
Carbon Tetrachloride (Tetrachloromethane)	56235	2.45E-08	1.03E-08	1.97E-08	1.13E-08	8.95E-09
Chloroform	67663	1.90E-08	7.93E-09	1.53E-08	8.73E-09	6.92E-09
Chromium	7440473	1.39E-02	6.66E-03	2.01E-02	6.82E-03	4.11E-03
Chromium(VI)	18540299	1.18E-02	5.47E-03	1.50E-02	5.58E-03	3.39E-03
Chrysene	218019	4.38E-05	2.81E-05	1.20E-04	2.37E-05	1.57E-05
Cobalt	7440484	3.17E-06	6.17E-06	4.65E-06	8.60E-06	4.92E-06
Copper	7440508	8.03E-05	5.45E-05	1.44E-04	5.86E-05	3.70E-05
Cumene	98828	2.07E-04	8.92E-05	2.01E-04	7.87E-05	6.15E-05
Dichlorobenzene	25321226	8.83E-09	5.67E-09	2.43E-08	4.79E-09	3.18E-09
Ethyl Benzene	100414	3.12E-03	1.38E-03	4.81E-03	1.22E-03	8.35E-04
Ethylene Dibromide (1,2-Dibromoethane)	106934	2.94E-08	1.23E-08	2.37E-08	1.35E-08	1.07E-08
Ethylene Dichloride (1,2-Dichloroethane)	107062	1.56E-08	6.53E-09	1.26E-08	7.19E-09	5.70E-09
Formaldehyde	50000	5.56E-03	2.46E-03	8.59E-03	2.17E-03	1.49E-03
Hexane	110543	2.05E-03	9.07E-04	3.17E-03	8.00E-04	5.49E-04
Isopropyl Alcohol	67630	3.70E-03	2.87E-03	2.60E-02	2.40E-03	1.60E-03
Lead	1128	1.10E-05	2.50E-05	1.69E-05	3.43E-05	2.06E-05
Manganese	7439965	1.14E-04	5.41E-04	2.07E-04	1.07E-03	3.06E-04
Methanol	67561	4.24E-06	1.77E-06	3.41E-06	1.95E-06	1.55E-06
Methylene Chloride (Dichloromethane)	75092	5.70E-07	2.38E-07	4.58E-07	2.62E-07	2.08E-07
Naphthalene	91203	2.40E-04	1.34E-04	5.42E-04	1.15E-04	7.73E-05
Nickel	7440020	6.67E-05	1.20E-04	9.32E-05	2.16E-04	8.32E-05
Phenanthrene	85018	1.20E-04	7.72E-05	3.31E-04	6.52E-05	4.32E-05
Phenol	108952	2.62E-05	1.68E-05	7.21E-05	1.42E-05	9.43E-06
Phosphoric Acid	7664382	1.12E-04	8.67E-05	7.85E-04	7.24E-05	4.83E-05
Phosphorus	7723140	1.95E-03	1.85E-03	3.55E-03	2.18E-03	1.35E-03
Polycyclic Aromatic Hydrocarbons	1151	3.26E-05	1.44E-05	5.04E-05	1.27E-05	8.71E-06
Pyrene	129000	7.76E-05	4.98E-05	2.13E-04	4.21E-05	2.79E-05
Silver	7440224	4.83E-06	4.35E-06	8.78E-06	5.06E-06	3.16E-06
Styrene	100425	1.64E-08	6.83E-09	1.31E-08	7.53E-09	5.97E-09
Thallium	7440280	5.96E-06	2.53E-06	6.93E-06	2.49E-06	1.64E-06
Toluene	108883	1.19E-02	5.27E-03	1.84E-02	4.65E-03	3.19E-03
Trimethylbenzene	25551137	4.13E-04	1.78E-04	4.02E-04	1.57E-04	1.23E-04
Vanadium	7440622	6.87E-03	3.00E-03	9.50E-03	2.81E-03	1.88E-03
Vinyl Chloride (Chloroethylene)	75014	9.95E-09	4.15E-09	7.99E-09	4.58E-09	3.63E-09
Xylenes	1330207	1.32E-02	5.62E-03	1.82E-02	4.97E-03	3.50E-03
Zinc	7440666	1.69E-03	9.59E-04	3.11E-03	9.31E-04	6.12E-04

Abbreviations:
MEIW = Maximum exposed individual worker
MEIR = Maximum exposed individual resident
PMI = Point of maximum impact (off site)
µg/m^3 = micrograms per cubic meter

Table 6A. Chemical-specific contribution to acute hazard index for MEIR, MEIW, and PMI

Substance	CAS #	Maximum Exposed Individual Resident (5135)															
		Target Organ System														Max HI	Percent Contribution to Immune System Hazard Index
		Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/Teeth	Endocrine	Blood	Odor	General		
1,3-Butadiene	106990	--	--	--	--	--	1.27E-06	--	--	--	--	--	--	--	--	1.27E-06	--
Acetaldehyde	75070	--	--	--	--	--	--	2.10E-05	--	2.10E-05	--	--	--	--	--	2.10E-05	--
Acrolein	107028	--	--	--	--	--	--	2.92E-03	--	2.92E-03	--	--	--	--	--	2.92E-03	--
Ammonia	7664417	--	--	--	--	--	--	1.54E-03	--	1.54E-03	--	--	--	--	--	1.54E-03	--
Arsenic	1016	1.73E-03	1.73E-03	--	--	--	1.73E-03	--	--	--	--	--	--	--	--	1.73E-03	--
Benzene	71432	--	--	5.10E-04	--	--	5.10E-04	--	--	--	--	--	5.10E-04	--	--	5.10E-04	0.0%
Carbon Tetrachloride (Tetrachloromethane)	56235	--	1.17E-08	--	--	1.17E-08	1.17E-08	--	--	--	--	--	--	--	--	1.17E-08	--
Chloroform	67663	--	1.15E-07	--	--	--	1.15E-07	1.15E-07	--	--	--	--	--	--	--	1.15E-07	--
Copper	7440508	--	--	--	--	--	--	8.55E-05	--	--	--	--	--	--	--	8.55E-05	--
Formaldehyde	50000	--	--	--	--	--	--	--	--	9.24E-04	--	--	--	--	--	9.24E-04	--
Isopropyl Alcohol	67630	--	--	--	--	--	--	6.43E-06	--	6.43E-06	--	--	--	--	--	6.43E-06	--
Methanol	67561	--	1.37E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.37E-07	--
Methylene Chloride (Dichloromethane)	75092	3.70E-08	3.70E-08	--	--	--	--	--	--	--	--	--	--	--	--	3.70E-08	--
Nickel	7440020	--	--	1.15E+00	--	--	--	--	--	--	--	--	--	--	--	1.15E+00	100.0%
Phenol	108952	--	--	--	--	--	--	3.96E-08	--	3.96E-08	--	--	--	--	--	3.96E-08	--
Styrene	100425	--	--	--	--	--	7.12E-10	7.12E-10	--	7.12E-10	--	--	--	--	--	7.12E-10	--
Toluene	108883	--	1.48E-06	--	--	--	1.48E-06	1.48E-06	--	1.48E-06	--	--	--	--	--	1.48E-06	--
Vanadium	7440622	--	--	--	--	--	--	4.18E-04	--	4.18E-04	--	--	--	--	--	4.18E-04	--
Vinyl Chloride (Chloroethylene)	75014	--	5.01E-11	--	--	--	--	5.01E-11	--	5.01E-11	--	--	--	--	--	5.01E-11	--
Xylenes	1330207	--	4.22E-05	--	--	--	--	4.22E-05	--	4.22E-05	--	--	--	--	--	4.22E-05	--
Total	--	1.73E-03	1.77E-03	1.15E+00	--	1.17E-08	2.24E-03	5.03E-03	--	5.87E-03	--	--	5.10E-04	--	--	1.15E+00	100%

-- = not applicable

Table 6A. Chemical-specific contribution to acute hazard index for MEIR, MEIW, and PMI

Substance	CAS #	Maximum Exposed Individual Worker (Receptor 5074)															
		Target Organ System														Max HI	Percent Contribution to Immune System Hazard Index
		Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/Teeth	Endocrine	Blood	Odor	General		
1,3-Butadiene	106990	--	--	--	--	--	1.50E-06	--	--	--	--	--	--	--	--	1.50E-06	--
Acetaldehyde	75070	--	--	--	--	--	--	2.88E-05	--	2.88E-05	--	--	--	--	--	2.88E-05	--
Acrolein	107028	--	--	--	--	--	--	3.92E-03	--	3.92E-03	--	--	--	--	--	3.92E-03	--
Ammonia	7664417	--	--	--	--	--	--	2.26E-03	--	2.26E-03	--	--	--	--	--	2.26E-03	--
Arsenic	1016	1.84E-03	1.84E-03	--	--	--	1.84E-03	--	--	--	--	--	--	--	--	1.84E-03	--
Benzene	71432	--	--	7.32E-04	--	--	7.32E-04	0.00E+00	--	--	--	--	7.32E-04	--	--	7.32E-04	0.042%
Carbon Tetrachloride (Tetrachloromethane)	56235	--	1.39E-08	--	--	1.39E-08	1.39E-08	--	--	--	--	--	--	--	--	1.39E-08	--
Chloroform	67663	--	1.37E-07	--	--	--	1.37E-07	1.37E-07	--	--	--	--	--	--	--	1.37E-07	--
Copper	7440508	--	--	--	--	--	--	1.11E-04	--	--	--	--	--	--	--	1.11E-04	--
Formaldehyde	50000	--	--	--	--	--	--	--	--	1.23E-03	--	--	--	--	--	1.23E-03	--
Isopropyl Alcohol	67630	--	--	--	--	--	--	1.19E-05	--	1.19E-05	--	--	--	--	--	1.19E-05	--
Methanol	67561	--	1.63E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.63E-07	--
Methylene Chloride (Dichloromethane)	75092	4.39E-08	4.39E-08	--	--	--	--	--	--	--	--	--	--	--	--	4.39E-08	--
Nickel	7440020	--	--	1.72E+00	--	--	--	--	--	--	--	--	--	--	--	1.72E+00	99.958%
Phenol	108952	--	--	--	--	--	--	6.27E-08	--	6.27E-08	--	--	--	--	--	6.27E-08	--
Styrene	100425	--	--	--	--	--	8.44E-10	8.44E-10	--	8.44E-10	--	--	--	--	--	8.44E-10	--
Toluene	108883	--	2.18E-06	--	--	--	2.18E-06	2.18E-06	--	2.18E-06	--	--	--	--	--	2.18E-06	--
Vanadium	7440622	--	--	--	--	--	--	6.35E-04	--	6.35E-04	--	--	--	--	--	6.35E-04	--
Vinyl Chloride (Chloroethylene)	75014	--	5.95E-11	--	--	--	--	5.95E-11	--	5.95E-11	--	--	--	--	--	5.95E-11	--
Xylenes	1330207	--	6.56E-05	--	--	--	--	6.56E-05	--	6.56E-05	--	--	--	--	--	6.56E-05	--
Total	--	1.84E-03	1.91E-03	1.72E+00	--	1.39E-08	2.57E-03	7.04E-03	--	8.16E-03	--	--	7.32E-04	--	--	1.72E+00	100%

-- = not applicable

Table 6A. Chemical-specific contribution to acute hazard index for MEIR, MEIW, and PMI

Substance	CAS #	Point of Maximum Impact (Receptor 34)															
		Target Organ System														Max HI	Percent Contribution to Immune System Hazard Index
		Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/Teeth	Endocrine	Blood	Odor	General		
1,3-Butadiene	106990	--	--	--	--	--	1.43E-06	--	--	--	--	--	--	--	--	1.43E-06	--
Acetaldehyde	75070	--	--	--	--	--	--	3.34E-05	--	3.34E-05	--	--	--	--	--	3.34E-05	--
Acrolein	107028	--	--	--	--	--	--	4.44E-03	--	4.44E-03	--	--	--	--	--	4.44E-03	--
Ammonia	7664417	--	--	--	--	--	--	2.80E-03	--	2.80E-03	--	--	--	--	--	2.80E-03	--
Arsenic	1016	1.68E-03	1.68E-03	--	--	--	1.68E-03	--	--	--	--	--	--	--	--	1.68E-03	--
Benzene	71432	--	--	8.91E-04	--	--	8.91E-04	--	--	--	--	--	8.91E-04	--	--	8.91E-04	0.031%
Carbon Tetrachloride (Tetrachloromethane)	56235	--	1.33E-08	--	--	1.33E-08	1.33E-08	--	--	--	--	--	--	--	--	1.33E-08	--
Chloroform	67663	--	1.30E-07	--	--	--	1.30E-07	1.30E-07	--	--	--	--	--	--	--	1.30E-07	--
Copper	7440508	--	0.00E+00	--	--	--	--	1.72E-04	--	--	--	--	--	--	--	1.72E-04	--
Formaldehyde	50000	--	--	--	--	--	--	--	--	1.37E-03	--	--	--	--	--	1.37E-03	--
Isopropyl Alcohol	67630	--	--	--	--	--	--	1.05E-05	--	1.05E-05	--	--	--	--	--	1.05E-05	--
Methanol	67561	--	1.55E-07	--	--	--	--	--	--	--	--	--	--	--	--	1.55E-07	--
Methylene Chloride (Dichloromethane)	75092	4.18E-08	4.18E-08	--	--	--	--	--	--	--	--	--	--	--	--	4.18E-08	--
Nickel	7440020	--	--	2.91E+00	--	--	--	--	--	--	--	--	--	--	--	2.91E+00	99.969%
Phenol	108952	--	--	--	--	--	--	6.75E-08	--	6.75E-08	--	--	--	--	--	6.75E-08	--
Styrene	100425	--	--	--	--	--	8.04E-10	8.04E-10	--	8.04E-10	--	--	--	--	--	8.04E-10	--
Toluene	108883	--	2.72E-06	--	--	--	2.72E-06	2.72E-06	--	2.72E-06	--	--	--	--	--	2.72E-06	--
Vanadium	7440622	--	--	--	--	--	--	6.60E-04	--	6.60E-04	--	--	--	--	--	6.60E-04	--
Vinyl Chloride (Chloroethylene)	75014	--	5.67E-11	--	--	--	--	5.67E-11	--	5.67E-11	--	--	--	--	--	5.67E-11	--
Xylenes	1330207	--	7.08E-05	--	--	--	--	7.08E-05	--	7.08E-05	--	--	--	--	--	7.08E-05	--
Total	--	1.68E-03	1.76E-03	2.91E+00	--	1.33E-08	2.58E-03	8.20E-03	--	9.40E-03	--	--	8.91E-04	--	--	2.92E+00	100%

-- = not applicable

Table 6B. Source-specific contribution to acute hazard index for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Maximum Exposed Individual Resident (Receptor 5135)														
			Target Organ System														Percent Contribution to Immune System Hazard Index
			Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/teeth	Endocrine	Blood	Odor	General	Max HI	
S0001	34	Inspection Building Baghouse	1.51E-03	1.51E-03	3.32E-02	--	--	1.51E-03	2.66E-05	--	--	--	--	--	--	--	3.32E-02	2.9%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	--	--	1.08E+00	--	--	--	5.81E-05	--	--	--	--	--	--	--	1.08E+00	93.2%
S0003	61	Emergency IC Engine	3.70E-08	3.32E-07	7.36E-05	--	1.17E-08	7.50E-05	1.40E-03	--	1.87E-03	--	--	7.36E-05	--	--	1.87E-03	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	--	2.34E-08	3.12E-06	--	--	3.13E-06	2.20E-05	--	2.53E-05	--	--	3.12E-06	--	--	2.53E-05	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	--	1.27E-08	1.69E-06	--	--	1.70E-06	1.20E-05	--	1.37E-05	--	--	1.69E-06	--	--	1.37E-05	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	--	5.11E-09	6.81E-07	--	--	6.83E-07	4.81E-06	--	5.52E-06	--	--	6.81E-07	--	--	5.52E-06	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	--	2.84E-08	3.78E-06	--	--	3.80E-06	2.67E-05	--	3.07E-05	--	--	3.78E-06	--	--	3.07E-05	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	--	1.98E-07	2.64E-05	--	--	2.65E-05	1.86E-04	--	2.13E-04	--	--	2.64E-05	--	--	2.13E-04	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	--	--	--	2.96E-06	--	2.96E-06	--	--	--	--	--	2.96E-06	--
S0010	106	Rack Welding	--	--	4.48E-02	--	--	--	--	--	--	--	--	--	--	--	4.48E-02	3.9%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	0.00E+00	--	--	--	3.47E-06	--	3.47E-06	--	--	--	--	--	3.47E-06	0.0%
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	--	--	1.57E-04	--	--	--	1.23E-04	--	1.23E-04	--	--	--	--	--	1.57E-04	0.0%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	--	4.11E-09	5.47E-07	--	--	5.49E-07	3.86E-06	--	4.43E-06	--	--	5.47E-07	--	--	4.43E-06	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	8.81E-05	1.03E-04	1.19E-04	0.00E+00	0.00E+00	2.08E-04	8.87E-04	--	1.01E-03	--	--	1.19E-04	--	--	1.01E-03	0.0%
S0028-S0033	401-406	Building 2 Roof Monitor	4.80E-05	5.82E-05	2.98E-04	0.00E+00	0.00E+00	1.66E-04	9.93E-04	--	1.12E-03	--	--	1.17E-04	--	--	1.12E-03	0.0%
S0034-S0050	501-517	Building 3 Roof Monitor	4.65E-05	5.75E-05	2.26E-04	0.00E+00	0.00E+00	1.70E-04	9.75E-04	--	1.10E-03	--	--	1.23E-04	--	--	1.10E-03	0.0%
S0051-S0060	601-610	Building 4 Roof Monitor	2.81E-05	3.57E-05	4.07E-05	0.00E+00	0.00E+00	6.90E-05	3.04E-04	--	3.47E-04	--	--	4.07E-05	--	--	3.47E-04	0.0%
Total			1.73E-03	1.77E-03	1.15E+00	0.00E+00	1.17E-08	2.24E-03	5.03E-03	--	5.87E-03	--	--	5.10E-04	--	--	1.15E+00	100%

-- = not applicable

Table 6B. Source-specific contribution to acute hazard index for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Maximum Exposed Individual Worker (Receptor 5074)														
			Target Organ System														Percent Contribution to Immune System Hazard Index
			Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/teeth	Endocrine	Blood	Odor	General	Max HI	
S0001	34	Inspection Building Baghouse	1.50E-03	1.50E-03	3.29E-02	--	--	1.50E-03	2.64E-05	--	--	--	--	--	--	--	3.29E-02	1.9%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	--	--	1.54E+00	--	--	--	8.34E-05	--	--	--	--	--	--	--	1.54E+00	89.5%
S0003	61	Emergency IC Engine	4.39E-08	3.93E-07	8.73E-05	--	1.39E-08	8.90E-05	1.66E-03	--	2.22E-03	--	--	8.73E-05	--	--	2.22E-03	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	--	2.75E-08	3.66E-06	--	--	3.67E-06	2.58E-05	--	2.97E-05	--	--	3.66E-06	--	--	2.97E-05	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	--	1.72E-08	2.29E-06	--	--	2.30E-06	1.62E-05	--	1.86E-05	--	--	2.29E-06	--	--	1.86E-05	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	--	1.07E-08	1.43E-06	--	--	1.43E-06	1.01E-05	--	1.15E-05	--	--	1.43E-06	--	--	1.15E-05	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	--	5.88E-08	7.82E-06	--	--	7.85E-06	5.52E-05	--	6.34E-05	--	--	7.82E-06	--	--	6.34E-05	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	--	4.73E-08	6.31E-06	--	--	6.33E-06	4.45E-05	--	5.11E-05	--	--	6.31E-06	--	--	5.11E-05	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	--	--	--	5.84E-06	--	5.84E-06	--	--	--	--	--	5.84E-06	--
S0010	106	Rack Welding	--	--	1.47E-01	--	--	--	--	--	--	--	--	--	--	--	1.47E-01	8.5%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	--	--	--	--	6.09E-06	--	6.09E-06	--	--	--	--	--	6.09E-06	--
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	--	--	2.56E-04	--	--	--	2.00E-04	--	1.99E-04	--	--	--	--	--	2.56E-04	0.0%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	--	8.63E-09	1.15E-06	--	--	1.15E-06	8.12E-06	--	9.32E-06	--	--	1.15E-06	--	--	9.32E-06	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	1.68E-04	1.96E-04	2.28E-04	--	--	3.97E-04	1.69E-03	--	1.93E-03	--	--	2.28E-04	--	--	1.93E-03	0.0%
S0028-S0033	401-406	Building 2 Roof Monitor	6.81E-05	8.26E-05	4.23E-04	--	--	2.35E-04	1.41E-03	--	1.58E-03	--	--	1.66E-04	--	--	1.58E-03	0.0%
S0034-S0050	501-517	Building 3 Roof Monitor	6.75E-05	8.35E-05	3.28E-04	--	--	2.46E-04	1.42E-03	--	1.60E-03	--	--	1.78E-04	--	--	1.60E-03	0.0%
S0051-S0060	601-610	Building 4 Roof Monitor	3.45E-05	4.39E-05	4.99E-05	--	--	8.46E-05	3.74E-04	--	4.26E-04	--	--	4.99E-05	--	--	4.26E-04	0.0%
Total			1.84E-03	1.91E-03	1.72E+00	--	1.39E-08	2.57E-03	7.04E-03	--	8.16E-03	--	--	7.32E-04	--	--	1.72E+00	100%

-- = not applicable

Table 6B. Source-specific contribution to acute hazard index for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Point of Maximum Impact (Receptor 34)														
			Target Organ System														Percent Contribution to Immune System Hazard Index
			Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/teeth	Endocrine	Blood	Odor	General	Max HI	
S0001	34	Inspection Building Baghouse	1.32E-03	1.32E-03	2.90E-02	--	--	1.32E-03	2.33E-05	--	--	--	--	--	--	--	2.90E-02	1.0%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	--	--	2.73E+00	--	--	--	1.47E-04	--	--	--	--	--	--	--	2.73E+00	93.8%
S0003	61	Emergency IC Engine	4.18E-08	3.75E-07	8.32E-05	--	1.33E-08	8.48E-05	1.59E-03	--	2.12E-03	--	--	8.32E-05	--	--	2.12E-03	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	--	2.63E-08	3.50E-06	--	--	3.51E-06	2.47E-05	--	2.83E-05	--	--	3.50E-06	--	--	2.83E-05	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	--	1.37E-08	1.82E-06	--	--	1.83E-06	1.29E-05	--	1.48E-05	--	--	1.82E-06	--	--	1.48E-05	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	--	1.11E-08	1.48E-06	--	--	1.49E-06	1.05E-05	--	1.20E-05	--	--	1.48E-06	--	--	1.20E-05	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	--	3.76E-08	5.01E-06	--	--	5.02E-06	3.53E-05	--	4.06E-05	--	--	5.01E-06	--	--	4.06E-05	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	--	1.00E-06	1.33E-04	--	--	1.34E-04	9.40E-04	--	1.08E-03	--	--	1.33E-04	--	--	1.08E-03	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	--	--	--	5.04E-06	--	5.04E-06	--	--	--	--	--	5.04E-06	--
S0010	106	Rack Welding	--	--	1.50E-01	--	--	--	--	--	--	--	--	--	--	--	1.50E-01	5.2%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	--	--	--	--	5.44E-06	--	5.44E-06	--	--	--	--	--	5.44E-06	--
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	--	--	2.47E-04	--	--	--	1.92E-04	--	1.92E-04	--	--	--	--	--	2.47E-04	0.0%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	--	8.94E-09	1.19E-06	--	--	1.20E-06	8.41E-06	--	9.66E-06	--	--	1.19E-06	--	--	9.66E-06	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	1.72E-04	2.00E-04	2.33E-04	--	--	4.05E-04	1.73E-03	--	1.97E-03	--	--	2.33E-04	--	--	1.97E-03	0.0%
S0028-S0033	401-406	Building 2 Roof Monitor	7.58E-05	9.19E-05	4.70E-04	--	--	2.62E-04	1.57E-03	--	1.76E-03	--	--	1.85E-04	--	--	1.76E-03	0.0%
S0034-S0050	501-517	Building 3 Roof Monitor	6.88E-05	8.51E-05	3.34E-04	--	--	2.51E-04	1.44E-03	--	1.63E-03	--	--	1.82E-04	--	--	1.63E-03	0.0%
S0051-S0060	601-610	Building 4 Roof Monitor	4.26E-05	5.41E-05	6.16E-05	--	--	1.04E-04	4.61E-04	--	5.25E-04	--	--	6.16E-05	--	--	5.25E-04	0.0%
Total			1.68E-03	1.76E-03	2.91E+00	--	1.33E-08	2.58E-03	8.20E-03	--	9.40E-03	--	--	8.91E-04	--	--	2.92E+00	100%

-- = not applicable

Table 7A. Chemical-specific contribution to chronic hazard index for MEIR, MEIW, and PMI

Substance	CAS #	Maximum Exposed Individual Resident (Receptor 5135)															
		Target Organ System															Percent Contribution to Respiratory Hazard Index
		Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/Teeth	Endocrine	Blood	Odor	General	Max HI	
1,3-Butadiene	106990	--	--	--	--	--	1.67E-07	--	--	--	--	--	--	--	--	1.67E-07	--
Acetaldehyde	75070	--	--	--	--	--	--	2.69E-06	--	--	--	--	--	--	--	2.69E-06	0.0%
Acrolein	107028	--	--	--	--	--	--	6.76E-04	--	--	--	--	--	--	--	6.76E-04	0.7%
Ammonia	7664417	--	--	--	--	--	--	1.39E-03	--	--	--	--	--	--	--	1.39E-03	1.4%
Arsenic	1016	7.75E-02	7.75E-02	--	--	--	7.75E-02	7.75E-02	7.75E-02	--	--	--	--	--	--	7.75E-02	75.9%
Benzene	71432	--	--	--	--	--	--	--	--	--	--	--	2.33E-04	--	--	2.33E-04	--
Cadmium	7440439	--	--	--	2.27E-03	--	--	1.15E-03	--	--	--	--	--	--	--	2.27E-03	1.1%
Carbon Tetrachloride (Tetrachloromethane)	56235	--	2.24E-10	--	--	2.24E-10	2.24E-10	--	--	--	--	--	--	--	--	2.24E-10	--
Chloroform	67663	--	--	--	2.31E-11	2.31E-11	2.31E-11	--	--	--	--	--	--	--	--	2.31E-11	--
Chromium(VI)	18540299	--	--	--	--	--	--	1.70E-02	--	--	--	--	4.13E-02	--	--	4.13E-02	16.6%
Ethyl Benzene	100414	--	--	--	4.17E-07	4.17E-07	4.17E-07	--	--	--	--	4.17E-07	--	--	--	4.17E-07	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	--	--	--	1.34E-08	--	--	--	--	--	--	--	--	1.34E-08	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	--	--	1.42E-11	--	--	--	--	--	--	--	--	--	1.42E-11	--
Formaldehyde	50000	--	--	--	--	--	--	1.66E-04	--	--	--	--	--	--	--	1.66E-04	0.2%
Hexane	110543	--	7.84E-08	--	--	--	--	--	--	--	--	--	--	--	--	7.84E-08	--
Isopropyl Alcohol	67630	--	--	--	2.29E-07	--	2.29E-07	--	--	--	--	--	--	--	--	2.29E-07	--
Manganese	7439965	--	3.40E-03	--	--	--	--	--	--	--	--	--	--	--	--	3.40E-03	--
Methanol	67561	--	--	--	--	--	3.86E-10	--	--	--	--	--	--	--	--	3.86E-10	--
Methylene Chloride (Dichloromethane)	75092	5.20E-10	5.20E-10	--	--	--	--	--	--	--	--	--	--	--	--	5.20E-10	--
Naphthalene	91203	--	--	--	--	--	--	8.58E-06	--	--	--	--	--	--	--	8.58E-06	0.0%
Nickel oxide	1313991	--	--	--	--	--	1.11E-04	4.16E-03	--	--	--	--	--	--	--	4.16E-03	4.1%
Phenol	108952	4.71E-08	4.71E-08	--	4.71E-08	4.71E-08	--	--	--	--	--	--	--	--	--	4.71E-08	--
Phosphoric Acid	7664382	--	--	--	--	--	--	6.91E-06	--	--	--	--	--	--	--	6.91E-06	0.0%
Styrene	100425	--	6.63E-12	--	--	--	--	--	--	--	--	--	--	--	--	6.63E-12	--
Toluene	108883	--	1.06E-05	--	--	--	1.06E-05	1.06E-05	--	--	--	--	--	--	--	1.06E-05	0.0%
Xylenes	1330207	--	5.00E-06	--	--	--	--	5.00E-06	--	5.00E-06	--	--	--	--	--	5.00E-06	0.0%
Total	--	7.75E-02	8.09E-02	--	2.27E-03	4.65E-07	7.76E-02	1.02E-01	7.75E-02	5.00E-06	0.00E+00	4.17E-07	4.16E-02	--	--	1.02E-01	100%

-- = not applicable

Table 7A. Chemical-specific contribution to chronic hazard index for MEIR, MEIW, and PMI

Substance	CAS #	Maximum Exposed Individual Worker (Receptor 4895)															
		Target Organ System															Percent Contribution to Respiratory Hazard Index
		Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/Teeth	Endocrine	Blood	Odor	General	Max HI	
1,3-Butadiene	106990	--	--	--	--	--	4.59E-07	--	--	--	--	--	--	--	--	4.59E-07	--
Acetaldehyde	75070	--	--	--	--	--	--	1.00E-05	--	--	--	--	--	--	--	1.00E-05	0.0%
Acrolein	107028	--	--	--	--	--	--	2.52E-03	--	--	--	--	--	--	--	2.52E-03	1.6%
Ammonia	7664417	--	--	--	--	--	--	5.21E-03	--	--	--	--	--	--	--	5.21E-03	3.4%
Arsenic	1016	8.08E-02	8.08E-02	--	--	--	8.08E-02	8.08E-02	8.08E-02	--	--	--	--	--	--	8.08E-02	52.1%
Benzene	71432	--	--	--	--	--	--	--	--	--	--	--	8.69E-04	--	--	8.69E-04	--
Cadmium	7440439	--	--	--	4.18E-03	--	--	3.48E-03	--	--	--	--	--	--	--	4.18E-03	2.2%
Carbon Tetrachloride (Tetrachloromethane)	56235	--	6.13E-10	--	--	6.13E-10	6.13E-10	--	--	--	--	--	--	--	--	6.13E-10	--
Chloroform	67663	--	--	--	6.32E-11	6.32E-11	6.32E-11	--	--	--	--	--	--	--	--	6.32E-11	--
Chromium(VI)	18540299	--	--	--	--	--	--	5.89E-02	--	--	--	--	3.20E-03	--	--	5.89E-02	38.0%
Ethyl Benzene	100414	--	--	--	1.56E-06	1.56E-06	1.56E-06	--	--	--	--	1.56E-06	--	--	--	1.56E-06	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	--	--	--	3.68E-08	--	--	--	--	--	--	--	--	3.68E-08	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	--	--	3.91E-11	--	--	--	--	--	--	--	--	--	3.91E-11	--
Formaldehyde	50000	--	--	--	--	--	--	6.18E-04	--	--	--	--	--	--	--	6.18E-04	0.4%
Hexane	110543	--	2.93E-07	--	--	--	--	--	--	--	--	--	--	--	--	2.93E-07	--
Isopropyl Alcohol	67630	--	--	--	5.28E-07	--	5.28E-07	--	--	--	--	--	--	--	--	5.28E-07	--
Manganese	7439965	--	1.27E-03	--	--	--	--	--	--	--	--	--	--	--	--	1.27E-03	--
Methanol	67561	--	--	--	--	--	1.06E-09	--	--	--	--	--	--	--	--	1.06E-09	--
Methylene Chloride (Dichloromethane)	75092	1.43E-09	1.43E-09	--	--	--	--	--	--	--	--	--	--	--	--	1.43E-09	--
Naphthalene	91203	--	--	--	--	--	--	2.67E-05	--	--	--	--	--	--	--	2.67E-05	0.0%
Nickel oxide	1313991	--	--	--	--	--	3.30E-05	3.33E-03	--	--	--	--	--	--	--	3.33E-03	2.2%
Phenol	108952	1.31E-07	1.31E-07	--	1.31E-07	1.31E-07	--	--	--	--	--	--	--	--	--	1.31E-07	--
Phosphoric Acid	7664382	--	--	--	--	--	--	1.59E-05	--	--	--	--	--	--	--	1.59E-05	0.0%
Styrene	100425	--	1.82E-11	--	--	--	--	--	--	--	--	--	--	--	--	1.82E-11	--
Toluene	108883	--	3.97E-05	--	--	--	3.97E-05	3.97E-05	--	--	--	--	--	--	--	3.97E-05	0.0%
Xylenes	1330207	--	1.89E-05	--	--	--	--	1.89E-05	--	1.89E-05	--	--	--	--	--	1.89E-05	0.0%
Total	--	8.08E-02	8.21E-02	--	4.18E-03	1.69E-06	8.09E-02	1.55E-01	8.08E-02	1.89E-05	--	1.56E-06	4.07E-03	--	--	1.55E-01	100.0%

-- = not applicable

Table 7A. Chemical-specific contribution to chronic hazard index for MEIR, MEIW, and PMI

Substance	CAS #	Point of Maximum Impact (Receptor 17)															
		Target Organ System															Percent Contribution to Respiratory Hazard Index
		Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/Teeth	Endocrine	Blood	Odor	General	Max HI	
1,3-Butadiene	106990	--	--	--	--	--	3.69E-07	--	--	--	--	--	--	--	--	3.69E-07	--
Acetaldehyde	75070	--	--	--	--	--	--	1.55E-05	--	--	--	--	--	--	--	1.55E-05	0.0%
Acrolein	107028	--	--	--	--	--	--	3.90E-03	--	--	--	--	--	--	--	3.90E-03	0.7%
Ammonia	7664417	--	--	--	--	--	--	8.06E-03	--	--	--	--	--	--	--	8.06E-03	1.4%
Arsenic	1016	4.60E-01	4.60E-01	--	--	--	4.60E-01	4.60E-01	4.60E-01	--	--	--	--	--	--	4.60E-01	82.3%
Benzene	71432	--	--	--	--	--	--	--	--	--	--	--	1.34E-03	--	--	1.34E-03	--
Cadmium	7440439	--	--	--	1.27E-02	--	--	6.41E-03	--	--	--	--	--	--	--	1.27E-02	1.1%
Carbon Tetrachloride (Tetrachloromethane)	56235	--	4.93E-10	--	--	4.93E-10	4.93E-10	--	--	--	--	--	--	--	--	4.93E-10	--
Chloroform	67663	--	--	--	5.08E-11	5.08E-11	5.08E-11	--	--	--	--	--	--	--	--	5.08E-11	--
Chromium(VI)	18540299	--	--	--	--	--	--	7.49E-02	--	--	--	--	1.82E-01	--	--	1.82E-01	13.4%
Ethyl Benzene	100414	--	--	--	2.40E-06	2.40E-06	2.40E-06	--	--	--	--	2.40E-06	--	--	--	2.40E-06	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	--	--	--	2.96E-08	--	--	--	--	--	--	--	--	2.96E-08	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	--	0.00E+00	3.14E-11	--	--	--	--	--	--	--	--	--	3.14E-11	--
Formaldehyde	50000	--	--	--	--	--	--	9.54E-04	--	--	--	--	--	--	--	9.54E-04	0.2%
Hexane	110543	--	4.54E-07	--	--	--	--	--	--	--	--	--	--	--	--	4.54E-07	--
Isopropyl Alcohol	67630	--	--	--	3.72E-06	--	3.72E-06	--	--	--	--	--	--	--	--	3.72E-06	--
Manganese	7439965	--	2.30E-03	--	--	--	--	--	--	--	--	--	--	--	--	2.30E-03	--
Methanol	67561	--	--	--	--	--	8.51E-10	--	--	--	--	--	--	--	--	8.51E-10	--
Methylene Chloride (Dichloromethane)	75092	1.15E-09	1.15E-09	--	--	--	--	--	--	--	--	--	--	--	--	1.15E-09	--
Naphthalene	91203	--	--	--	--	--	--	6.02E-05	--	--	--	--	--	--	--	6.02E-05	0.0%
Nickel oxide	1313991	--	--	--	--	--	1.24E-04	4.66E-03	--	--	--	--	--	--	--	4.66E-03	0.8%
Phenol	108952	3.61E-07	3.61E-07	--	3.61E-07	3.61E-07	--	--	--	--	--	--	--	--	--	3.61E-07	--
Phosphoric Acid	7664382	--	--	--	--	--	--	1.12E-04	--	--	--	--	--	--	--	1.12E-04	0.0%
Styrene	100425	--	1.46E-11	--	--	--	--	--	--	--	--	--	--	--	--	1.46E-11	--
Toluene	108883	--	6.15E-05	--	--	--	6.15E-05	6.15E-05	--	--	--	--	--	--	--	6.15E-05	0.0%
Xylenes	1330207	--	2.60E-05	--	--	--	--	2.60E-05	--	2.60E-05	--	--	--	--	--	2.60E-05	0.0%
Total	--	4.60E-01	4.63E-01	--	1.27E-02	2.77E-06	4.61E-01	5.60E-01	4.60E-01	2.60E-05	--	2.40E-06	1.84E-01	--	--	5.60E-01	100.0%

-- = not applicable

Table 7B. Source-specific contribution to chronic hazard index for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Maximum Exposed Individual Resident (Receptor 5135)														
			Target Organ System														Percent Contribution to Respiratory System Hazard Index
			Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/teeth	Endocrine	Blood	Odor	General	Max HI	
S0001	34	Inspection Building Baghouse	1.13E-02	1.16E-02	--	4.68E-04	--	1.13E-02	1.36E-02	1.13E-02	--	--	--	0.00E+00	--	--	1.36E-02	13.4%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	--	4.53E-06	--	--	--	8.23E-06	3.09E-04	--	--	--	--	1.19E-07	--	--	3.09E-04	0.3%
S0003	61	Emergency IC Engine	5.20E-10	1.83E-09	--	2.93E-11	2.67E-10	1.82E-07	5.40E-06	--	1.41E-10	--	6.27E-12	2.66E-07	--	--	5.40E-06	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	--	5.19E-08	--	1.52E-09	1.52E-09	4.06E-08	8.28E-06	--	1.25E-08	--	1.52E-09	8.55E-07	--	--	8.28E-06	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	--	1.97E-08	--	5.80E-10	5.80E-10	1.55E-08	3.15E-06	--	4.74E-09	--	5.80E-10	3.26E-07	--	--	3.15E-06	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	--	5.18E-08	--	1.52E-09	1.52E-09	4.06E-08	8.27E-06	--	1.24E-08	--	1.52E-09	8.54E-07	--	--	8.27E-06	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	--	7.91E-09	--	2.32E-10	2.32E-10	6.20E-09	1.26E-06	--	1.90E-09	--	2.32E-10	1.30E-07	--	--	1.26E-06	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	--	7.01E-09	--	2.06E-10	2.06E-10	5.49E-09	1.12E-06	--	1.68E-09	--	2.06E-10	1.16E-07	--	--	1.12E-06	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	1.12E-07	--	1.12E-07	3.40E-06	--	--	--	--	--	--	--	3.40E-06	0.0%
S0010	106	Rack Welding	--	3.07E-03	--	--	--	3.14E-05	2.28E-03	--	--	--	--	2.69E-03	--	--	3.07E-03	2.2%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	--	1.16E-07	--	1.16E-07	3.51E-06	--	--	--	--	--	--	--	3.51E-06	0.0%
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	--	--	--	--	--	5.96E-07	8.50E-05	--	--	--	--	1.53E-04	--	--	1.53E-04	0.1%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	--	4.25E-08	--	1.25E-09	1.25E-09	3.33E-08	6.79E-06	--	1.02E-08	--	1.25E-09	7.01E-07	--	--	6.79E-06	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	2.66E-02	2.66E-02	--	7.25E-04	1.37E-07	2.66E-02	2.99E-02	2.66E-02	1.07E-06	--	1.14E-07	5.80E-03	--	--	2.99E-02	29.3%
S0028-S0033	401-406	Building 2 Roof Monitor	1.70E-02	1.70E-02	--	4.64E-04	1.73E-07	1.70E-02	3.00E-02	1.70E-02	1.32E-06	--	1.49E-07	2.79E-02	--	--	3.00E-02	29.4%
S0034-S0050	501-517	Building 3 Roof Monitor	1.19E-02	1.20E-02	--	3.26E-04	9.80E-08	1.19E-02	1.37E-02	1.19E-02	1.98E-06	--	9.80E-08	2.57E-03	--	--	1.37E-02	13.4%
S0051-S0060	601-610	Building 4 Roof Monitor	1.07E-02	1.07E-02	--	2.91E-04	5.11E-08	1.07E-02	1.21E-02	1.07E-02	5.95E-07	--	5.11E-08	2.39E-03	--	--	1.21E-02	11.8%
Total			7.75E-02	8.09E-02	--	2.27E-03	4.65E-07	7.76E-02	1.02E-01	7.75E-02	5.00E-06	--	4.17E-07	4.16E-02	--	--	1.02E-01	100%

-- = not applicable

Table 7B. Source-specific contribution to chronic hazard index for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Maximum Exposed Individual Worker (Receptor 4895)														
			Target Organ System														Percent Contribution to Respiratory System Hazard Index
			Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/teeth	Endocrine	Blood	Odor	General	Max HI	
S0001	34	Inspection Building Baghouse	1.47E-03	1.60E-03	--	1.15E-04	--	1.48E-03	2.43E-03	1.47E-03	--	--	--	0.00E+00	--	--	2.43E-03	1.6%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	--	7.23E-07	--	--	--	4.88E-07	4.94E-05	--	--	--	--	4.23E-10	--	--	4.94E-05	0.0%
S0003	61	Emergency IC Engine	1.43E-09	5.02E-09	--	8.04E-11	7.33E-10	5.00E-07	1.48E-05	--	3.86E-10	--	1.72E-11	7.29E-07	--	--	1.48E-05	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	--	3.75E-07	--	1.10E-08	1.10E-08	2.94E-07	5.98E-05	--	9.00E-08	--	1.10E-08	6.18E-06	--	--	5.98E-05	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	--	1.49E-07	--	4.38E-09	4.38E-09	1.17E-07	2.38E-05	--	3.58E-08	--	4.38E-09	2.46E-06	--	--	2.38E-05	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	--	1.51E-07	--	4.43E-09	4.43E-09	1.18E-07	2.41E-05	--	3.62E-08	--	4.43E-09	2.49E-06	--	--	2.41E-05	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	--	1.04E-08	--	3.07E-10	3.07E-10	8.18E-09	1.67E-06	--	2.51E-09	--	3.07E-10	1.72E-07	--	--	1.67E-06	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	--	1.35E-09	--	3.96E-11	3.96E-11	1.06E-09	2.15E-07	--	3.24E-10	--	3.96E-11	2.22E-08	--	--	2.15E-07	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	2.06E-07	--	2.06E-07	6.23E-06	--	--	--	--	--	--	--	6.23E-06	0.0%
S0010	106	Rack Welding	--	1.14E-03	--	--	--	4.33E-06	8.48E-04	--	--	--	--	2.23E-05	--	--	1.14E-03	0.5%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	--	3.22E-07	--	3.22E-07	9.70E-06	--	--	--	--	--	--	--	9.70E-06	0.0%
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	--	--	--	--	--	7.32E-07	2.81E-04	--	--	--	--	1.13E-05	--	--	2.81E-04	0.2%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	--	1.30E-07	--	3.82E-09	3.82E-09	1.02E-07	2.08E-05	--	3.13E-08	--	3.82E-09	2.15E-06	--	--	2.08E-05	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	1.57E-02	1.58E-02	--	8.07E-04	2.51E-07	1.58E-02	2.19E-02	1.57E-02	1.96E-06	--	2.10E-07	3.52E-04	--	--	2.19E-02	14.1%
S0028-S0033	401-406	Building 2 Roof Monitor	2.02E-02	2.02E-02	--	1.03E-03	6.34E-07	2.02E-02	6.78E-02	2.02E-02	4.84E-06	--	5.44E-07	2.59E-03	--	--	6.78E-02	43.7%
S0034-S0050	501-517	Building 3 Roof Monitor	1.30E-02	1.30E-02	--	6.67E-04	3.30E-07	1.30E-02	1.88E-02	1.30E-02	6.65E-06	--	3.30E-07	3.68E-04	--	--	1.88E-02	12.2%
S0051-S0060	601-610	Building 4 Roof Monitor	3.04E-02	3.04E-02	--	1.56E-03	4.51E-07	3.04E-02	4.27E-02	3.04E-02	5.25E-06	--	4.51E-07	7.18E-04	--	--	4.27E-02	27.6%
Total			8.08E-02	8.21E-02	--	4.18E-03	1.69E-06	8.09E-02	1.55E-01	8.08E-02	1.89E-05	--	1.56E-06	4.07E-03	--	--	1.55E-01	100%

-- = not applicable

Table 7B. Source-specific contribution to chronic hazard index for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Point of Maximum Impact (Receptor 17)														
			Target Organ System														
			Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/teeth	Endocrine	Blood	Odor	General	Max HI	Percent Contribution to Respiratory System Hazard Index
S0001	34	Inspection Building Baghouse	7.65E-03	7.87E-03	--	3.18E-04	--	7.69E-03	9.25E-03	7.65E-03	--	--	--	0.00E+00	--	--	9.25E-03	1.7%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	--	1.53E-06	--	--	--	2.79E-06	1.05E-04	--	--	--	--	4.02E-08	--	--	1.05E-04	0.0%
S0003	61	Emergency IC Engine	1.15E-09	4.03E-09	--	6.46E-11	5.89E-10	4.02E-07	1.19E-05	--	3.10E-10	--	1.38E-11	5.86E-07	--	--	1.19E-05	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	--	2.49E-07	--	7.32E-09	7.32E-09	1.95E-07	3.98E-05	--	5.99E-08	--	7.32E-09	4.11E-06	--	--	3.98E-05	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	--	1.01E-07	--	2.98E-09	2.98E-09	7.95E-08	1.62E-05	--	2.44E-08	--	2.98E-09	1.67E-06	--	--	1.62E-05	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	--	6.15E-07	--	1.80E-08	1.80E-08	4.82E-07	9.81E-05	--	1.48E-07	--	1.80E-08	1.01E-05	--	--	9.81E-05	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	--	1.47E-08	--	4.33E-10	4.33E-10	1.16E-08	2.35E-06	--	3.54E-09	--	4.33E-10	2.43E-07	--	--	2.35E-06	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	--	2.00E-09	--	5.86E-11	5.86E-11	1.56E-09	3.19E-07	--	4.80E-10	--	5.86E-11	3.29E-08	--	--	3.19E-07	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	3.51E-07	--	3.51E-07	1.06E-05	--	--	--	--	--	--	--	1.06E-05	0.0%
S0010	106	Rack Welding	--	2.08E-03	--	--	--	2.13E-05	1.55E-03	--	--	--	--	1.82E-03	--	--	2.08E-03	0.3%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	--	3.37E-06	--	3.37E-06	1.01E-04	--	--	--	--	--	--	--	1.01E-04	0.0%
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	--	--	--	--	--	1.60E-05	2.29E-03	--	--	--	--	4.11E-03	--	--	4.11E-03	0.4%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	--	4.95E-07	--	1.45E-08	1.45E-08	3.88E-07	7.90E-05	--	1.19E-07	--	1.45E-08	8.15E-06	--	--	7.90E-05	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	3.30E-01	3.30E-01	--	8.99E-03	1.70E-06	3.30E-01	3.71E-01	3.30E-01	1.32E-05	--	1.42E-06	7.20E-02	--	--	3.71E-01	66.3%
S0028-S0033	401-406	Building 2 Roof Monitor	5.54E-02	5.54E-02	--	1.51E-03	5.64E-07	5.55E-02	9.78E-02	5.54E-02	4.30E-06	--	4.84E-07	9.11E-02	--	--	9.78E-02	17.5%
S0034-S0050	501-517	Building 3 Roof Monitor	3.91E-02	3.91E-02	--	1.07E-03	3.21E-07	3.91E-02	4.48E-02	3.91E-02	6.47E-06	--	3.21E-07	8.42E-03	--	--	4.48E-02	8.0%
S0051-S0060	601-610	Building 4 Roof Monitor	2.87E-02	2.87E-02	--	7.83E-04	1.38E-07	2.87E-02	3.25E-02	2.87E-02	1.60E-06	--	1.38E-07	6.43E-03	--	--	3.25E-02	5.8%
Total			4.60E-01	4.63E-01	--	1.27E-02	2.77E-06	4.61E-01	5.60E-01	4.60E-01	2.60E-05	--	2.40E-06	1.84E-01	--	--	5.60E-01	100%

-- = not applicable

Table 8. Chemical-specific contribution to 8-hour chronic hazard index for the MEIW

Substance	CAS #	Maximum Exposed Individual Worker (Receptor 4895)															
		Target Organ System															Percent Contribution to Respiratory Hazard Index
		Cardio-vascular	Central Nervous System	Immune System	Kidneys	Gastro-intestinal & Liver	Repro-ductive	Respira-tory	Skin	Eyes	Bone/Teeth	Endocrine	Blood	Odor	General	Max HI	
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	79345	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Butadiene	106990	--	--	--	--	--	1.02E-07	--	--	--	--	--	--	--	--	1.02E-07	--
Acetaldehyde	75070	--	--	--	--	--	--	4.68E-06	--	--	--	--	--	--	--	4.68E-06	0.20%
Acrolein	107028	--	--	--	--	--	--	1.26E-03	--	--	--	--	--	--	--	1.26E-03	53%
Ammonia	7664417	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	7440360	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	1016	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benz(a)anthracene	56553	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzene	71432	--	--	--	--	--	--	--	--	--	--	--	8.69E-04	--	--	8.69E-04	--
Benzo(a)pyrene	50328	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	117817	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	7440439	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon Tetrachloride (Tetrachloromethane)	56235	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	67663	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium(VI)	18540299	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	218019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	7440508	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethyl Benzene	100414	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylene Dibromide (1,2-Dibromoethane)	106934	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylene Dichloride (1,2-Dichloroethane)	107062	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Formaldehyde	50000	--	--	--	--	--	--	6.18E-04	--	--	--	--	--	--	--	6.18E-04	26%
Hexane	110543	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isopropyl Alcohol	67630	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	1128	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	7439965	--	6.72E-04	--	--	--	--	--	--	--	--	--	--	--	--	6.72E-04	--
Methanol	67561	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride (Dichloromethane)	75092	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	91203	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	7440020	--	--	1.11E-03	--	--	--	1.11E-03	--	--	--	--	--	--	--	1.11E-03	20%
Phenol	108952	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons	1151	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100425	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	108883	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	7440622	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride (Chloroethylene)	75014	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes	1330207	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	--	--	6.72E-04	1.11E-03	--	--	1.02E-07	3.00E-03	--	--	--	--	8.69E-04	--	--	3.00E-03	100%

Bold indicates endpoint with highest hazard index

-- = not applicable

Table 9A. Chemical-specific contribution to cancer risk for MEIR, MEIW, and PMI

Substance	CAS #	Maximum Exposed Individual Resident (Receptor 5135)						
		Exposure Pathway					Total	Percent Contribution to Cancer Risk
		Inhalation	Soil Ingestion	Dermal	Mother's Milk	Home-Grown Vegetables		
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	2.97E-13	--	--	--	--	2.97E-13	0.0%
1,1,2,2-Tetrachloroethane	79345	1.73E-12	--	--	--	--	1.73E-12	0.0%
1,3-Butadiene	106990	1.36E-10	--	--	--	--	1.36E-10	0.0%
Acetaldehyde	75070	2.55E-09	--	--	--	--	2.55E-09	0.0%
Arsenic	1016	7.59E-08	5.72E-07	2.33E-08	--	3.69E-07	1.04E-06	0.1%
Benz(a)anthracene	56553	2.93E-09	1.09E-08	2.27E-09	2.59E-08	5.34E-08	9.54E-08	0.0%
Benzene	71432	4.72E-08	--	--	--	--	4.72E-08	0.0%
Benzo(a)pyrene	50328	2.93E-08	1.09E-07	2.27E-08	2.59E-07	5.34E-07	9.54E-07	0.1%
Bis(2-ethylhexyl) phthalate	117817	4.91E-11	1.50E-12	2.16E-13	--	2.06E-10	2.56E-10	0.0%
Cadmium	7440439	2.34E-07	--	--	--	--	2.34E-07	0.0%
Carbon Tetrachloride (Tetrachloromethane)	56235	9.08E-13	--	--	--	--	9.08E-13	0.0%
Chloroform	67663	8.90E-14	--	--	--	--	8.90E-14	0.0%
Chromium(VI)	18540299	1.17E-03	2.07E-05	6.63E-07	--	6.77E-04	1.87E-03	99.8%
Chrysene	218019	2.93E-10	1.09E-09	2.27E-10	2.59E-09	5.34E-09	9.54E-09	0.0%
Ethyl Benzene	100414	4.91E-09	--	--	--	--	4.91E-09	0.0%
Ethylene Dibromide (1,2-Dibromoethane)	106934	1.82E-12	--	--	--	--	1.82E-12	0.0%
Ethylene Dichloride (1,2-Dichloroethane)	107062	2.78E-13	--	--	--	--	2.78E-13	0.0%
Formaldehyde	50000	2.12E-08	--	--	--	--	2.12E-08	0.0%
Lead	1128	4.14E-10	5.05E-09	1.03E-10	9.15E-11	1.01E-09	6.67E-09	0.0%
Methylene Chloride (Dichloromethane)	75092	4.93E-13	--	--	--	--	4.93E-13	0.0%
Naphthalene	91203	6.27E-09	--	--	--	--	6.27E-09	0.0%
Nickel	7440020	5.12E-08	--	--	--	--	5.12E-08	0.0%
Polycyclic Aromatic Hydrocarbons	1151	1.62E-08	6.04E-08	1.26E-08	1.44E-07	2.96E-07	5.29E-07	0.0%
Vinyl Chloride (Chloroethylene)	75014	6.63E-13	--	--	--	--	6.63E-13	0.0%
Total	--	1.17E-03	2.14E-05	7.24E-07	4.31E-07	6.79E-04	1.87E-03	100%

-- = not applicable

Table 9A. Chemical-specific contribution to cancer risk for MEIR, MEIW, and PMI

Substance	CAS #	Maximum Exposed Individual Worker (Receptor 4895)						
		Exposure Pathway					Total	Percent Contribution to Cancer Risk
		Inhalation	Soil Ingestion	Dermal	Mother's Milk	Home-Grown Vegetables		
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	6.77E-14	--	--	--	--	6.77E-14	0.0%
1,1,2,2-Tetrachloroethane	79345	3.94E-13	--	--	--	--	3.94E-13	0.0%
1,3-Butadiene	106990	3.10E-11	--	--	--	--	3.10E-11	0.0%
Acetaldehyde	75070	7.90E-10	--	--	--	--	7.90E-10	0.0%
Arsenic	1016	2.13E-08	7.78E-08	3.11E-08	--	--	1.30E-07	0.0%
Benz(a)anthracene	56553	7.10E-10	3.02E-09	2.62E-09	--	--	6.35E-09	0.0%
Benzene	71432	1.47E-08	--	--	--	--	1.47E-08	0.0%
Benzo(a)pyrene	50328	7.10E-09	3.02E-08	2.62E-08	--	--	6.35E-08	0.0%
Bis(2-ethylhexyl) phthalate	117817	1.14E-11	4.16E-13	1.30E-13	--	--	1.19E-11	0.0%
Cadmium	7440439	5.88E-08	--	--	--	--	5.88E-08	0.0%
Carbon Tetrachloride (Tetrachloromethane)	56235	2.07E-13	--	--	--	--	2.07E-13	0.0%
Chloroform	67663	2.03E-14	--	--	--	--	2.03E-14	0.0%
Chromium(VI)	18540299	3.38E-04	7.15E-06	4.96E-07	--	--	3.45E-04	99.9%
Chrysene	218019	7.10E-11	3.02E-10	2.62E-10	--	--	6.35E-10	0.0%
Ethyl Benzene	100414	1.53E-09	--	--	--	--	1.53E-09	0.0%
Ethylene Dibromide (1,2-Dibromoethane)	106934	4.14E-13	--	--	--	--	4.14E-13	0.0%
Ethylene Dichloride (1,2-Dichloroethane)	107062	6.33E-14	--	--	--	--	6.33E-14	0.0%
Formaldehyde	50000	6.57E-09	--	--	--	--	6.57E-09	0.0%
Lead	1128	2.60E-11	1.13E-10	1.18E-11	--	--	1.51E-10	0.0%
Methylene Chloride (Dichloromethane)	75092	1.12E-13	--	--	--	--	1.12E-13	0.0%
Naphthalene	91203	1.62E-09	--	--	--	--	1.62E-09	0.0%
Nickel	7440020	3.41E-09	--	--	--	--	3.41E-09	0.0%
Polycyclic Aromatic Hydrocarbons	1151	5.28E-09	2.25E-08	1.95E-08	--	--	4.73E-08	0.0%
Vinyl Chloride (Chloroethylene)	75014	1.51E-13	--	--	--	--	1.51E-13	0.0%
Total	--	3.38E-04	7.29E-06	5.76E-07	--	--	3.46E-04	100%

-- = not applicable

Table 9A. Chemical-specific contribution to cancer risk for MEIR, MEIW, and PMI

Substance	CAS #	Point of Maximum Impact (Receptor 20)						
		Target Organ System					Total	Percent Contribution to Cancer Risk
		Inhalation	Soil Ingestion	Dermal	Mother's Milk	Home-Grown Vegetables		
1,1,2-Trichloroethane (Vinyl Trichloride)	79005	6.95E-13	--	--	--	--	6.95E-13	0.0%
1,1,2,2-Tetrachloroethane	79345	4.05E-12	--	--	--	--	4.05E-12	0.0%
1,3-Butadiene	106990	3.18E-10	--	--	--	--	3.18E-10	0.0%
Acetaldehyde	75070	1.45E-08	--	--	--	--	1.45E-08	0.0%
Arsenic	1016	3.55E-07	2.68E-06	1.09E-07	--	1.73E-06	4.87E-06	0.0%
Benz(a)anthracene	56553	1.87E-08	6.95E-08	1.45E-08	1.65E-07	3.41E-07	6.09E-07	0.0%
Benzene	71432	2.69E-07	--	--	--	--	2.69E-07	0.0%
Benzo(a)pyrene	50328	1.87E-07	6.95E-07	1.45E-07	1.65E-06	3.41E-06	6.09E-06	0.0%
Bis(2-ethylhexyl) phthalate	117817	3.13E-10	9.56E-12	1.38E-12	--	1.31E-09	1.63E-09	0.0%
Cadmium	7440439	1.03E-06	--	--	--	--	1.03E-06	0.0%
Carbon Tetrachloride (Tetrachloromethane)	56235	2.13E-12	--	--	--	--	2.13E-12	0.0%
Chloroform	67663	2.08E-13	--	--	--	--	2.08E-13	0.0%
Chromium(VI)	18540299	8.38E-03	1.48E-04	4.75E-06	--	4.85E-03	1.34E-02	99.9%
Chrysene	218019	1.87E-09	6.95E-09	1.45E-09	1.65E-08	3.41E-08	6.09E-08	0.0%
Ethyl Benzene	100414	2.79E-08	--	--	--	--	2.79E-08	0.0%
Ethylene Dibromide (1,2-Dibromoethane)	106934	4.26E-12	--	--	--	--	4.26E-12	0.0%
Ethylene Dichloride (1,2-Dichloroethane)	107062	6.50E-13	--	--	--	--	6.50E-13	0.0%
Formaldehyde	50000	1.20E-07	--	--	--	--	1.20E-07	0.0%
Lead	1128	5.14E-10	6.27E-09	1.28E-10	1.14E-10	1.26E-09	8.29E-09	0.0%
Methylene Chloride (Dichloromethane)	75092	1.15E-12	--	--	--	--	1.15E-12	0.0%
Naphthalene	91203	3.86E-08	--	--	--	--	3.86E-08	0.0%
Nickel	7440020	1.02E-07	--	--	--	--	1.02E-07	0.0%
Polycyclic Aromatic Hydrocarbons	1151	9.26E-08	3.45E-07	7.18E-08	8.19E-07	1.69E-06	3.02E-06	0.0%
Vinyl Chloride (Chloroethylene)	75014	1.55E-12	--	--	--	--	1.55E-12	0.0%
Total	--	8.38E-03	1.52E-04	5.09E-06	2.65E-06	4.86E-03	1.34E-02	100%

-- = not applicable

Table 9B. Source-specific contribution to cancer risk for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Maximum Exposed Individual Resident (Receptor 5135)						
			Exposure Pathway					Total	Percent Contribution to Cancer Hazard Index
			Inhalation	Soil Ingestion	Dermal	Mother's Milk	Home-Grown Vegetables		
S0001	34	Inspection Building Baghouse	8.57E-08	8.81E-08	3.49E-09	8.78E-11	5.46E-08	2.32E-07	0.0%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	7.17E-09	5.94E-11	1.91E-12	0.00E+00	1.95E-09	9.18E-09	0.0%
S0003	61	Emergency IC Engine	3.57E-10	--	--	--	--	3.57E-10	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	3.46E-10	2.22E-10	4.63E-11	5.28E-10	1.09E-09	2.23E-09	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	1.32E-10	8.46E-11	1.76E-11	2.01E-10	4.14E-10	8.49E-10	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	3.45E-10	2.22E-10	4.63E-11	5.28E-10	1.09E-09	2.23E-09	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	5.27E-11	3.39E-11	7.06E-12	8.05E-11	1.66E-10	3.40E-10	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	4.67E-11	3.01E-11	6.26E-12	7.14E-11	1.47E-10	3.02E-10	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	--	--	--	--
S0010	106	Rack Welding	7.63E-05	1.35E-06	4.32E-08	0.00E+00	4.41E-05	1.22E-04	6.5%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	--	--	--	--	--
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	4.32E-06	7.64E-08	2.45E-09	1.49E-13	2.50E-06	6.90E-06	0.4%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	2.84E-10	1.82E-10	3.80E-11	4.33E-10	8.93E-10	1.83E-09	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	1.63E-04	3.14E-06	1.16E-07	1.78E-07	9.46E-05	2.61E-04	13.9%
S0028-S0033	401-406	Building 2 Roof Monitor	7.90E-04	1.42E-05	4.70E-07	2.01E-07	4.57E-04	1.26E-03	67.4%
S0034-S0050	501-517	Building 3 Roof Monitor	7.15E-05	1.36E-06	4.69E-08	3.28E-08	4.14E-05	1.14E-04	6.1%
S0051-S0060	601-610	Building 4 Roof Monitor	6.69E-05	1.27E-06	4.26E-08	1.77E-08	3.87E-05	1.07E-04	5.7%
Total	--	--	1.17E-03	2.14E-05	7.24E-07	4.31E-07	6.79E-04	1.87E-03	100%

-- = not applicable

Table 9B. Source-specific contribution to cancer risk for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Maximum Exposed Individual Worker (Receptor 4895)						
			Exposure Pathway					Total	Percent Contribution to Cancer Hazard Index
			Inhalation	Soil Ingestion	Dermal	Mother's Milk	Home-Grown Vegetables		
S0001	34	Inspection Building Baghouse	2.90E-09	1.50E-09	5.77E-10	--	--	4.98E-09	0.0%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	9.52E-11	9.46E-13	6.56E-14	--	--	9.62E-11	0.0%
S0003	61	Emergency IC Engine	8.13E-11	--	--	--	--	8.13E-11	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	2.09E-10	1.60E-10	1.39E-10	--	--	5.08E-10	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	8.33E-11	6.36E-11	5.51E-11	--	--	2.02E-10	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	8.43E-11	6.45E-11	5.59E-11	--	--	2.05E-10	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	5.84E-12	4.46E-12	3.87E-12	--	--	1.42E-11	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	7.53E-13	5.76E-13	4.99E-13	--	--	1.83E-12	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	--	--	--	--
S0010	106	Rack Welding	2.35E-06	4.98E-08	3.46E-09	--	--	2.40E-06	0.7%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	--	--	--	--	--
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	1.19E-06	2.52E-08	1.74E-09	--	--	1.22E-06	0.4%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	7.28E-11	5.56E-11	4.82E-11	--	--	1.77E-10	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	2.48E-05	5.53E-07	5.43E-08	--	--	2.54E-05	7.3%
S0028-S0033	401-406	Building 2 Roof Monitor	2.41E-04	5.14E-06	3.88E-07	--	--	2.46E-04	71.2%
S0034-S0050	501-517	Building 3 Roof Monitor	2.00E-05	4.40E-07	3.84E-08	--	--	2.05E-05	5.9%
S0051-S0060	601-610	Building 4 Roof Monitor	4.91E-05	1.07E-06	8.94E-08	--	--	5.02E-05	14.5%
Total	--	--	3.38E-04	7.29E-06	5.76E-07	--	--	3.46E-04	100%

-- = not applicable

Table 9B. Source-specific contribution to cancer risk for MEIR, MEIW, and PMI

Source ID	Device ID	Device Name	Point of Maximum Impact (Receptor 20)						
			Target Organ System					Total	Percent Contribution to Cancer Hazard Index
			Inhalation	Soil Ingestion	Dermal	Mother's Milk	Home-Grown Vegetables		
S0001	34	Inspection Building Baghouse	8.04E-08	8.26E-08	3.27E-09	8.24E-11	5.12E-08	2.18E-07	0.0%
S0002	60	Plasma Arc Cutter Air Pollution Control System (APCS)	3.60E-09	2.98E-11	9.56E-13	0.00E+00	9.76E-10	4.60E-09	0.0%
S0003	61	Emergency IC Engine	8.36E-10	--	--	--	--	8.36E-10	0.0%
S0004	100	Water Heater (15701 Minnesota Ave)	1.74E-09	1.12E-09	2.33E-10	2.66E-09	5.48E-09	1.12E-08	0.0%
S0005	101	Space Heater #1 (15701 Minnesota Ave)	6.91E-10	4.44E-10	9.26E-11	1.06E-09	2.18E-09	4.46E-09	0.0%
S0006	102	Space Heater #2 (15701 Minnesota Ave)	2.15E-09	1.38E-09	2.88E-10	3.28E-09	6.77E-09	1.39E-08	0.0%
S0007	103	Water Heater (15720 Minnesota Ave)	4.31E-10	2.77E-10	5.77E-11	6.58E-10	1.36E-09	2.78E-09	0.0%
S0008	104	Space Heater (15700 Minnesota Ave)	2.73E-11	1.76E-11	3.66E-12	4.17E-11	8.61E-11	1.76E-10	0.0%
S0009	105	Cooling Tower – Connected to Building 2 Oil Quench Tank	--	--	--	--	--	--	--
S0010	106	Rack Welding	9.44E-05	1.67E-06	5.34E-08	0.00E+00	5.46E-05	1.51E-04	1.1%
S0011	107	Cooling Tower – Connected to Building 1 Oil Quench Tank	--	--	--	--	--	--	--
S0012	108	Cooling Tower – Connected to Building 1 Water Quench Tank	2.93E-05	5.18E-07	1.66E-08	1.01E-12	1.70E-05	4.68E-05	0.3%
S0013	109	Space Heater #3 (15701 Minnesota Ave)	1.76E-09	1.13E-09	2.36E-10	2.69E-09	5.55E-09	1.14E-08	0.0%
S0014-S0027	301-314	Building 1 Roof Monitor	5.94E-04	1.15E-05	4.22E-07	6.49E-07	3.45E-04	9.52E-04	7.1%
S0028-S0033	401-406	Building 2 Roof Monitor	7.03E-03	1.26E-04	4.18E-06	1.79E-06	4.07E-03	1.12E-02	83.8%
S0034-S0050	501-517	Building 3 Roof Monitor	1.82E-04	3.48E-06	1.20E-07	8.36E-08	1.06E-04	2.91E-04	2.2%
S0051-S0060	601-610	Building 4 Roof Monitor	4.60E-04	8.71E-06	2.93E-07	1.22E-07	2.67E-04	7.36E-04	5.5%
Total	--	--	8.39E-03	1.52E-04	5.09E-06	2.65E-06	4.86E-03	1.34E-02	100%

-- = not applicable

Table 10. Sensitive receptors with predicted cancer risk greater than 10 in one million

Receptor ID	UTM E	UTM N	Type	Name	Street Address	City, State Zip Code	Predicted Risk
382	392763.822	3749993	Hospital	Mercy Medical Center	16444 Paramount Blvd	Paramount, CA 90723	***6.64E-05***
383	392591.557	3750032	Hospital	Nu Yu Aesthetics Medical Center	16415 Colorado Ave	Paramount, CA 90723	***8.76E-05***
384	393652.082	3752075	Hospital	Paramount Convalescent	8558 Rosecrans Ave	Paramount, CA 90723	1.77E-05
385	392592.88	3749994	Hospital	Promise Hospital-E Los Angeles: Sulochana Trivedi MD	16453 Colorado Ave	Paramount, CA 90723	***8.23E-05***
386	393584.882	3750468	Hospital	S & L Medical Center	8527 Alondra Blvd	Paramount, CA 90723	***3.60E-05***
398	3.91E+05	3.75E+06	Childcare	Small Family Child Care	13567 Rancho Camino Drive	Paramount, CA 90723	1.08E-05
401	392380.258	3752456	Childcare	Roache Family Child Care	14005 Arthur Avenue Unit 15	Paramount, CA 90723	2.24E-05
402	394913.966	3752017	Childcare	Aviles Family Child Care	14333 Cerritos Avenue	Bellflower, CA 90706	1.09E-05
404	393757.453	3751847	Childcare	Reece Family Child Care	14515 Passage Avenue	Paramount, CA 90723	1.94E-05
407	395338.722	3751454	Childcare	Morehead Family Child Care	14716 Ardis Avenue	Bellflower, CA 90706	1.09E-05
409	393662.292	3750942	Childcare	Aguilar Family Child Care	15345 Naranja Avenue	Paramount, CA 90723	***3.60E-05***
410	392692.715	3750857	Childcare	Volunteers Of America Of Los Angeles	15509 Paramount Boulevard	Paramount, CA 90723	***1.53E-04***
411	391301.636	3750733	Childcare	Hall Family Child Care	15546 Brayton St.	Paramount, CA 90723	***8.65E-05***
412	391118.046	3750491	Childcare	Zamboni Preschool	15733 Orange Avenue	Paramount, CA 90723	***6.06E-05***
413	393212.501	3750438	Childcare	Emmanuel Preschool	15941 Virginia Ave.	Paramount, CA 90723	***5.54E-05***
415	393294.398	3750034	Childcare	Casillas Family Child Care	16402 Parkshire Court	Paramount, CA 90723	***3.74E-05***
416	393502.536	3749941	Childcare	Gonzalez Family Child Care	16433 Downey Avenue	Paramount, CA 90723	***2.89E-05***
421	390651.305	3750137	Childcare	Davis Family Child Care	6535 72nd Street #2	Paramount, CA 90723	***2.91E-05***
422	390843.379	3751287	Childcare	Volunteers Of America, Paramount Head Start	6719 Somerset Boulevard	Paramount, CA 90723	***3.36E-05***
423	391570.343	3753336	Childcare	Valdez Family Child Care	7303 Lugo Avenue	Paramount, CA 90723	1.18E-05
424	392046.078	3752716	Childcare	Diaz Family Day Care	7534 Mendy St	Paramount, CA 90723	1.86E-05
425	393573.633	3752201	Childcare	Davis Family Child Care	8504 Elburg #B	Paramount, CA 90723	1.70E-05
426	393628.001	3751790	Childcare	Jackson Child Development Center	8535 Contreras St.	Paramount, CA 90723	2.17E-05
427	394066.638	3748603	Childcare	Creative Day Academy	8740 Ramona Street	Bellflower, CA 90706	1.06E-05
429	394494.509	3750644	Childcare	Mendoza Family Day Care	9047 Rendalia Street	Bellflower, CA 90706	1.77E-05
431	394585.76	3750584	Childcare	Van Leeuwen Family Child Care	9112 Rendalia St.	Bellflower, CA 90706	1.65E-05
434	394950.755	3749970	Childcare	Velez Family Child Care	9307 Oak St.	Bellflower, CA 90706	1.11E-05
437	395401.326	3750546	Childcare	Olmos Family Child Care	9514 Rendalia Street	Bellflower, CA 90706	1.03E-05
444	394601.687	3751437	School	Albert Baxter Elementary School	14929 Cerritos Ave	Bellflower, CA 90706	1.57E-05
445	391465.983	3752074	School	Howard Tanner Elementary school	7210 Rosecrans Ave	Paramount, CA 90723	***2.93E-05***
446	393751.574	3750859	School	Jefferson Elementary School	8600 Jefferson St	Paramount, CA 90723	***3.33E-05***
447	392864.974	3751071	School	Lincoln Elementary School	15324 California Ave	Paramount, CA	***8.43E-05***
448	391197.256	3752010	School	Los Cerritos Elementary School	14626 Gundry Av	Paramount, CA	***2.68E-05***
449	392743.233	3751367	School	Major Lynn Mokler Elementary School	8571 Flower St	Paramount, CA 90723	***6.30E-05***
451	391362.377	3750071	School	Wesley Gaines Elementary School	7340 Jackson Street	Paramount, CA	***6.66E-05***
452	392742.816	3751668	School	Paramount High School - West Campus	14708 Paramount Blvd	Paramount, CA 90723	***4.29E-05***
453	393538.948	3752000	School	Paramount High School Senior Campus	14429 Downey Ave	Paramount, CA 90723	1.97E-05
454	391118.046	3750491	School	Frank J Zamboni Middle School	15733 Orange Ave	Paramount, CA 90723	***6.06E-05***
455	391276.506	3750072	School	Leona Jackson Middle School	7220 Jackson St	Paramount, CA 90723	***5.92E-05***
456	393539.92	3750348	School	Alondra Middle School	16200 Downey Ave	Paramount, CA 90723	***3.55E-05***
457	392751.827	3751765	School	Paramount Park Middle School	14608 Paramount Blvd.	Paramount, CA 90723	***3.83E-05***
458	392692.58	3750842	School	CDI Head Start	15513 Paramount Blvd	Paramount, CA 90723	***1.56E-04***
459	395016.191	3750728	School	Adventist Union School	15548 Santa Ana Ave	Bellflower, CA 90706	1.31E-05
460	394931.713	3751710	School	California Missionary Baptist	9246 Rosser St	Bellflower, CA 90706	1.37E-05
461	392607.399	3751519	School	Our Lady of the Rosary Catholic School	14813 Paramount Blvd	Paramount, CA 90723	***5.73E-05***
462	392735.572	3751871	School	Paramount Unified Community Day School	14507 Paramount Blvd	Paramount, CA 90723	***3.46E-05***
463	394796.432	3749749	School	Somerset Continuation High School	9242 E Laurel St	Bellflower, CA 90706	1.12E-05

Notes:

Green shading indicates locations with risk less than background risk (30-year) associated with a background air concentration of 0.11 ng/m3 in Compton (6.1x10-5).

Bold-italic font indicates locations with risk greater than the action level ($2.5x10^{-5}$).

Table 11. Predicted risk at census-tract centroids and population risks

Receptor ID	UTM E	UTM N	Census Tract	Population	70-Yr Predicted Risk	Cancer Burden
1	411135.53	3755329.5	1103	4489	1.7E-06	0.0077
2	410143.06	3755267.5	1102	3144	1.8E-06	0.0057
3	414112.09	3754199.25	1404	3972	1.4E-06	0.0057
4	413077.25	3752770.75	1705	4343	1.4E-06	0.0059
5	403979.88	3746933.5	110115	3613	1.3E-06	0.0046
6	410995.09	3756227.5	1101	4523	1.4E-06	0.0064
7	402620.34	3744355.25	110111	5736	1.2E-06	0.0071
8	414174.47	3755761	1402	5185	1.3E-06	0.0070
9	412805.62	3755143.75	1202	3586	1.6E-06	0.0056
10	410491.31	3752010.5	1707	7482	1.4E-06	0.0106
11	409101.16	3750063	110604	8117	1.4E-06	0.0110
12	410538.78	3754015	1301	6423	1.9E-06	0.0124
13	411906.34	3755078.75	1201	5505	1.7E-06	0.0093
14	412078.91	3753793	1303	5752	1.7E-06	0.0096
15	412602.59	3754180.25	1304	3803	1.6E-06	0.0062
16	412124.06	3752079.25	1708	3786	1.3E-06	0.0049
17	413036.12	3756123.5	1401	5013	1.4E-06	0.0068
18	388721.66	3740008.75	573003	1802	1.4E-06	0.0025
19	390181.06	3746152.25	571704	4107	5.3E-06	0.0216
20	388606.28	3749267	570403	4587	8.1E-06	0.0372
21	393308.44	3753114.25	553503	2768	1.3E-05	0.0354
22	402208.53	3752295	552302	3648	3.3E-06	0.0121
23	403564.66	3753802.75	503104	2719	3.1E-06	0.0084
24	396295.19	3757747.75	550602	4211	1.7E-06	0.0072
25	396784.78	3758534.75	550601	5639	1.4E-06	0.0079
26	399274.53	3753962.75	550202	5496	3.4E-06	0.0185
27	399806.19	3754739.25	550201	2941	2.4E-06	0.0070
28	387298.16	3743855	544002	3142	2.2E-06	0.0071
29	387435.47	3744951	544001	4791	2.7E-06	0.0131
30	383848.03	3742414.25	543905	4510	1.3E-06	0.0059
31	401263.75	3755303.75	502802	1380	1.9E-06	0.0026
32	385009.41	3744475.75	543306	7214	1.9E-06	0.0134
33	390051.38	3750973.25	542106	3373	2.2E-05	0.0733
34	389127.5	3750962.5	542105	5200	1.2E-05	0.0616
35	395282.91	3743471.25	573601	6114	2.5E-06	0.0151
36	391772.94	3744888	571504	4699	4.0E-06	0.0186
37	391704.91	3745937.5	571503	3700	5.6E-06	0.0206
38	389396.69	3749216.5	570404	3501	1.1E-05	0.0399
39	397106.28	3748588.5	554406	4875	4.7E-06	0.0229
40	396302.81	3748724.5	554405	3040	6.0E-06	0.0183
41	393925.91	3748665.25	554302	3916	1.4E-05	0.0555
42	394057.19	3749691.5	554301	3554	2.1E-05	0.0738
43	391120.03	3756669.25	536104	4052	4.0E-06	0.0160
44	391869.59	3759694.5	533806	4165	2.0E-06	0.0083
45	391443.38	3759942.25	533805	3604	1.9E-06	0.0070
46	395634.59	3749950.25	554204	4391	9.9E-06	0.0435
47	395987.06	3749444.25	554203	3689	7.7E-06	0.0284
48	396443.56	3750085.75	554105	4569	7.7E-06	0.0352
49	396479.59	3750871.75	554104	2600	9.8E-06	0.0254
50	393176.75	3752416.75	553504	5368	2.1E-05	0.1127
51	385272.84	3745481.5	980025	0	2.1E-06	0.0000
52	405376.56	3753841.75	503106	3795	3.0E-06	0.0112
53	404384.56	3754609.5	503105	3634	2.5E-06	0.0093
54	403810.19	3754679.75	503103	5004	2.6E-06	0.0128
55	399345.88	3756147.25	502801	6186	1.7E-06	0.0103
56	399455.5	3753055.25	552002	3721	4.9E-06	0.0182
57	398756.59	3752979.25	552001	4105	5.3E-06	0.0216
58	393452.84	3754667.75	551502	4250	5.9E-06	0.0249
59	392712.81	3755811.25	551501	4869	4.6E-06	0.0224
60	394096.91	3756256.75	551402	4468	3.2E-06	0.0145
61	393170.03	3756550.5	551401	4290	3.5E-06	0.0150
62	396419.06	3754507.75	551102	5503	3.5E-06	0.0192
63	395897.59	3754058.75	551101	3926	4.4E-06	0.0171
64	396025.31	3756929	550902	5572	2.0E-06	0.0113
65	395668.44	3756305.75	550901	3762	2.4E-06	0.0092
66	386789.69	3759426	534803	4930	1.5E-06	0.0073
67	393414.84	3759145.75	533902	4051	1.9E-06	0.0078
68	387139.84	3759633.5	534802	2875	1.5E-06	0.0044
69	391445.94	3758869.5	534406	4609	2.4E-06	0.0110
70	390712.56	3759020.25	534405	4292	2.3E-06	0.0098
71	391614.66	3760959	533703	4236	1.6E-06	0.0069
72	390346.25	3761454	533403	2973	1.5E-06	0.0045
73	389611.44	3761677	533402	4105	1.4E-06	0.0057
74	388948.03	3762008.25	533300	3558	1.2E-06	0.0044
75	407623.12	3752795.25	503602	3793	2.5E-06	0.0093
76	384310	3747965.25	543321	5418	1.8E-06	0.0099
77	386571.88	3753390.25	541500	5836	3.5E-06	0.0206
78	398200.53	3754473	550300	7727	2.8E-06	0.0219

Table 11. Predicted risk at census-tract centroids and population risks

Receptor ID	UTM E	UTM N	Census Tract	Population	70-Yr Predicted Risk	Cancer Burden
79	388031.66	3750881.25	542401	4912	7.1E-06	0.0349
80	383430.47	3751614	541100	3321	1.8E-06	0.0060
81	390487.12	3756440.5	536103	5516	3.9E-06	0.0217
82	388248.84	3760422.75	533202	2762	1.5E-06	0.0041
83	389635.41	3761140	533502	2143	1.5E-06	0.0032
84	388402.62	3760808.25	533201	2805	1.4E-06	0.0039
85	389982.94	3761082.75	533503	1920	1.6E-06	0.0030
86	390755.75	3760963.25	533702	3585	1.7E-06	0.0059
87	390627.06	3759990	533803	6309	1.9E-06	0.0121
88	392720.47	3758284	534202	5790	2.5E-06	0.0143
89	386607.91	3758753.5	534804	3878	1.6E-06	0.0061
90	393252.66	3759876	533901	6065	1.7E-06	0.0103
91	394046.81	3759193	534001	5613	1.8E-06	0.0100
92	388800.41	3756998.5	535804	5498	2.9E-06	0.0158
93	388182.34	3757059.5	535803	4458	2.6E-06	0.0116
94	387714.38	3758552.25	535502	4958	1.9E-06	0.0094
95	388744.66	3758394.25	535701	6050	2.2E-06	0.0131
96	386940.41	3758006.75	535603	3493	1.8E-06	0.0064
97	387086.12	3758523	535501	3866	1.7E-06	0.0067
98	387784.44	3757859	535503	2497	2.1E-06	0.0054
99	386888.12	3757361.5	535604	4435	2.0E-06	0.0088
100	386775	3757028.25	535606	1860	2.1E-06	0.0039
101	389486.25	3756079.5	535902	6519	3.8E-06	0.0250
102	388655.56	3757740.75	535702	5522	2.5E-06	0.0136
103	389663.47	3756833.75	535901	5757	3.3E-06	0.0188
104	395907.28	3753100	551800	7533	6.4E-06	0.0479
105	380205.19	3750358	603101	4244	1.3E-06	0.0054
106	380212.47	3749292.75	603102	4084	1.3E-06	0.0051
107	388407.47	3756255	535802	6814	3.1E-06	0.0211
108	389998.34	3755149	540101	6483	5.3E-06	0.0344
109	391969.03	3756465.25	536102	3164	4.1E-06	0.0131
110	389870.19	3757792	536000	3720	2.7E-06	0.0099
111	387587.62	3757143.5	535605	4153	2.3E-06	0.0096
112	401337.25	3743522.5	555212	4561	1.3E-06	0.0061
113	401442.75	3745435	555103	4727	1.5E-06	0.0073
114	400354.75	3744796.5	555102	6526	1.7E-06	0.0109
115	385949.12	3753210.25	541400	7312	3.1E-06	0.0226
116	399314.41	3745284.25	555001	5411	2.0E-06	0.0109
117	393332.12	3747727.75	570100	2837	1.1E-05	0.0306
118	395528.19	3747723	570002	2699	6.1E-06	0.0165
119	399455.22	3742107.25	980006	0	1.4E-06	0.0000
120	380995.72	3752084.75	291130	3582	1.3E-06	0.0045
121	386482	3755370.5	540400	2384	2.5E-06	0.0059
122	387153.09	3756390.25	535607	4775	2.4E-06	0.0116
123	387812.72	3753503	540502	6552	4.7E-06	0.0308
124	388525.59	3755476.25	540202	6845	3.7E-06	0.0253
125	387297.41	3754477.25	540501	6943	3.4E-06	0.0239
126	387700.69	3756524.25	540201	2370	2.6E-06	0.0062
127	396670.78	3747578.75	570001	4463	4.4E-06	0.0198
128	396290.5	3746448	570902	3616	3.9E-06	0.0141
129	392726.81	3746193.25	570702	2433	6.0E-06	0.0147
130	393769.66	3746549	570701	6569	6.2E-06	0.0410
131	396720.75	3745339.5	571101	4574	3.0E-06	0.0135
132	393587.25	3744524.75	571300	4414	3.5E-06	0.0154
133	394532.22	3747728.25	570003	4447	8.1E-06	0.0358
134	396707.12	3744530	571102	3877	2.6E-06	0.0100
135	400351.44	3743568.5	555211	5818	1.5E-06	0.0087
136	391009.88	3749410.25	570202	6415	***3.2E-05***	0.2049
137	407211.06	3751331.5	503802	5054	2.0E-06	0.0102
138	408162.94	3751094.25	503801	4080	1.7E-06	0.0069
139	405809.19	3749810.75	503902	4636	1.2E-06	0.0058
140	405335.31	3752569.75	504002	5383	2.9E-06	0.0158
141	406898.12	3750392.5	503901	2702	1.7E-06	0.0046
142	404472.91	3752647.5	504101	5126	2.8E-06	0.0143
143	385354.5	3741824.25	980002	0	1.4E-06	0.0000
144	390820.59	3761549	533701	3934	1.5E-06	0.0060
145	387624.97	3760002	533107	3645	1.5E-06	0.0056
146	391384.44	3758272.25	534302	3673	2.7E-06	0.0100
147	390001.94	3759051.5	534404	3647	2.1E-06	0.0078
148	389764.03	3762095.5	533401	5004	1.3E-06	0.0067
149	392150	3758116.75	534201	4439	2.7E-06	0.0120
150	385742.53	3759604.25	534900	6569	1.3E-06	0.0084
151	386701.75	3751088.75	542502	4284	4.5E-06	0.0191
152	398073.56	3744833.25	571000	5747	2.3E-06	0.0130
153	393118.62	3748523.75	570204	4130	1.8E-05	0.0727
154	389683.88	3747234	570303	4247	6.8E-06	0.0290
155	401427.88	3744458	555104	4239	1.4E-06	0.0061
156	392078.47	3748074	570502	6616	1.5E-05	0.0998

Table 11. Predicted risk at census-tract centroids and population risks

Receptor ID	UTM E	UTM N	Census Tract	Population	70-Yr Predicted Risk	Cancer Burden
157	389133.47	3748227	570402	3496	7.9E-06	0.0276
158	390889.41	3748223	570501	7419	1.4E-05	0.1033
159	392480	3746927.25	570603	4435	8.2E-06	0.0362
160	389727.62	3748116	570301	7330	9.3E-06	0.0680
161	391497.03	3746825.75	570602	6356	7.7E-06	0.0490
162	389668.88	3746864.75	570304	5171	6.1E-06	0.0313
163	403620.75	3751588	504102	22	2.3E-06	0.0000
164	387357.91	3751711	541606	2506	5.3E-06	0.0134
165	394682.06	3759135.5	534002	4352	1.7E-06	0.0072
166	388381.66	3759961.5	533203	1827	1.6E-06	0.0029
167	390486.59	3758350.75	534301	4636	2.6E-06	0.0119
168	389403.25	3759272	534403	2948	1.9E-06	0.0057
169	387772.44	3759305	534700	4283	1.7E-06	0.0074
170	387878.44	3749730.5	542402	3152	6.4E-06	0.0203
171	384035.41	3749672.75	543100	6759	2.1E-06	0.0140
172	394669.47	3752137.75	553300	3390	1.4E-05	0.0478
173	400045.84	3748200.25	554802	6165	2.4E-06	0.0148
174	400171	3747297.25	554900	6991	2.2E-06	0.0152
175	393943.78	3752573.75	553400	3861	1.3E-05	0.0491
176	395176.94	3750789.75	554002	5659	1.7E-05	0.0937
177	390753.16	3746921.25	570601	5421	7.4E-06	0.0403
178	397410.34	3746347.5	570901	5647	3.1E-06	0.0176
179	394971.22	3746470.5	570800	5540	5.0E-06	0.0278
180	395110.44	3744948	571200	7828	3.4E-06	0.0266
181	392664	3744477.75	571400	4770	3.6E-06	0.0171
182	390821.09	3742035.5	573401	1439	1.8E-06	0.0027
183	387249.97	3742481.5	572500	3365	1.8E-06	0.0061
184	390497.53	3745288	571502	4661	4.2E-06	0.0198
185	390707.34	3746138	571600	2039	5.6E-06	0.0114
186	387279.69	3755460.5	540300	5267	2.9E-06	0.0151
187	388679.78	3754771.5	540203	5594	4.5E-06	0.0249
188	382283.25	3749045.25	541002	3209	1.7E-06	0.0054
189	388429.75	3759234.5	534501	5201	1.8E-06	0.0095
190	386259.16	3760302.25	533103	3577	1.3E-06	0.0045
191	384613.47	3758282	535102	4517	1.3E-06	0.0059
192	384413.44	3757456.5	535200	5820	1.4E-06	0.0080
193	386207.25	3756975.25	535400	3495	1.9E-06	0.0067
194	394737.34	3749860.25	554201	4108	1.5E-05	0.0608
195	395533.62	3748728.25	554404	4447	7.8E-06	0.0345
196	394729.88	3748732.25	554403	5483	1.0E-05	0.0575
197	402220.5	3746333.5	554519	3613	1.5E-06	0.0054
198	403933.94	3749328	554511	4029	1.5E-06	0.0060
199	403833.28	3748032	554518	5435	1.4E-06	0.0075
200	401225.75	3749765	554513	2507	2.3E-06	0.0058
201	398873.25	3746317	554522	4787	2.4E-06	0.0116
202	395837.47	3739678.5	574901	3725	1.3E-06	0.0049
203	394136.22	3738992	575002	4627	1.3E-06	0.0059
204	389372.88	3742417	572201	6197	2.1E-06	0.0130
205	385790.78	3758584.75	535300	6251	1.5E-06	0.0092
206	389070.62	3758966	534502	4257	2.0E-06	0.0084
207	387229.66	3760965.5	532606	4284	1.3E-06	0.0056
208	386834.28	3761085	532605	3715	1.3E-06	0.0047
209	393608.56	3758138.5	534203	3204	2.3E-06	0.0073
210	387577.69	3760475	533106	1743	1.4E-06	0.0025
211	402414.94	3748991.5	554512	6108	1.8E-06	0.0109
212	402423.72	3747393	554517	4883	1.6E-06	0.0077
213	400329.03	3746277	554515	3703	1.9E-06	0.0072
214	395203.75	3755559	551300	5422	3.2E-06	0.0172
215	399108.75	3751435.25	552800	6401	5.3E-06	0.0341
216	399103.75	3750629.5	552900	6881	4.2E-06	0.0287
217	402932.09	3751468.75	552400	2794	2.5E-06	0.0070
218	397914.97	3751015.75	553000	4825	6.5E-06	0.0314
219	396081.16	3742082	574100	5098	1.8E-06	0.0094
220	398043.25	3740992	574400	5141	1.4E-06	0.0071
221	383620.31	3743980.5	543903	3804	1.5E-06	0.0056
222	389363.31	3741612	572202	3609	1.8E-06	0.0066
223	392684.38	3759460.5	534102	6263	1.9E-06	0.0121
224	386894.34	3760246.75	533104	4356	1.4E-06	0.0061
225	387641.72	3760924.75	533105	2580	1.3E-06	0.0034
226	389688.22	3760635.5	533601	4484	1.6E-06	0.0072
227	389471.72	3760272.25	533602	5420	1.7E-06	0.0090
228	389107.34	3761193	533501	3090	1.4E-06	0.0043
229	391074.06	3760034.75	533804	4543	1.9E-06	0.0088
230	401620.28	3750605.25	552602	4191	2.5E-06	0.0105
231	400772.12	3751430.25	552700	6985	3.9E-06	0.0269
232	400354.72	3750626.5	552601	5720	3.2E-06	0.0180
233	397215.03	3750577.75	553100	6298	6.9E-06	0.0433
234	401071.91	3748712.75	554514	4322	2.1E-06	0.0092

Table 11. Predicted risk at census-tract centroids and population risks

Receptor ID	UTM E	UTM N	Census Tract	Population	70-Yr Predicted Risk	Cancer Burden
235	401270.06	3746626	554516	3902	1.7E-06	0.0068
236	399266.97	3749788.75	554600	4374	3.3E-06	0.0145
237	398252.41	3748523	554521	5752	3.5E-06	0.0203
238	388822.31	3745939	571701	6352	4.1E-06	0.0258
239	388626.88	3743281	572100	1045	2.3E-06	0.0024
240	386952.09	3743090.25	572301	3833	1.9E-06	0.0074
241	387965.28	3742433.75	572302	3483	1.9E-06	0.0067
242	383406.66	3754585.5	241002	3606	1.6E-06	0.0057
243	382805.34	3755078.75	241001	4285	1.4E-06	0.0058
244	393209.03	3739047.75	575103	5119	1.3E-06	0.0067
245	388886.72	3739114.75	575401	5155	1.3E-06	0.0065
246	392400.94	3738859.25	575102	4510	1.3E-06	0.0058
247	391051.44	3739104.75	575201	4667	1.3E-06	0.0062
248	391637.16	3739029.25	575202	4916	1.3E-06	0.0065
249	404360.53	3755916.75	503202	4462	1.6E-06	0.0070
250	408999.91	3755452.5	503401	6529	1.9E-06	0.0122
251	396401	3752184	553200	7055	9.7E-06	0.0684
252	400415.34	3749848.75	554700	4874	2.7E-06	0.0130
253	399816.5	3749027.25	554801	3366	2.7E-06	0.0092
254	391081.91	3752241.5	553701	4176	***2.6E-05***	0.1083
255	391932	3750874	553801	4174	***6.1E-04***	2.5555
256	393527.84	3751665	553502	4183	***3.1E-05***	0.1305
257	391901.47	3752200.75	553601	4750	***3.6E-05***	0.1727
258	393532.44	3750867	553901	6896	***5.1E-05***	0.3549
259	399212.78	3744419	555002	3475	1.9E-06	0.0065
260	391054	3744143	571900	5509	3.0E-06	0.0164
261	387949.53	3743395.75	572400	1152	2.2E-06	0.0026
262	389724.25	3743178.25	572002	4409	2.3E-06	0.0101
263	391146.09	3743121.75	572001	5278	2.4E-06	0.0128
264	397330.34	3743446	573700	4554	2.0E-06	0.0093
265	398353.12	3743207.75	573800	4284	1.8E-06	0.0076
266	400268.97	3742003.5	573902	2091	1.3E-06	0.0027
267	393206.12	3742270.25	980018	1	2.2E-06	0.0000
268	389685.56	3739091.5	575402	4065	1.3E-06	0.0052
269	389694.84	3739896.25	573002	3990	1.4E-06	0.0057
270	391779.06	3740783.25	573402	6430	1.4E-06	0.0089
271	389232.25	3744337.5	571800	3190	2.8E-06	0.0089
272	392717.94	3740430	573403	3208	1.3E-06	0.0040
273	390286.03	3752792.5	541802	5431	1.3E-05	0.0719
274	384891.59	3754598.75	540700	3014	2.1E-06	0.0062
275	382443.88	3753954.5	540901	4994	1.3E-06	0.0067
276	383921.12	3753731	540800	5042	1.9E-06	0.0094
277	382423.91	3753013.75	540902	4506	1.4E-06	0.0064
278	388122.06	3751654.5	541605	5323	7.0E-06	0.0375
279	408987.88	3753965	503702	5040	2.2E-06	0.0111
280	407511.47	3756158	503402	4273	1.5E-06	0.0066
281	406344.03	3755194.25	503501	6481	2.1E-06	0.0138
282	407281.5	3755072.5	503502	4130	2.2E-06	0.0089
283	406533.97	3754024.5	503601	4168	2.7E-06	0.0113
284	390630.22	3751425.5	553702	4902	***3.1E-05***	0.1543
285	396105.19	3750839.25	554101	3799	1.1E-05	0.0425
286	391624.56	3750155.75	553802	6342	***1.4E-04***	0.8995
287	395314.66	3751541.5	554001	4171	1.6E-05	0.0670
288	394172.62	3740775.75	574202	2161	1.7E-06	0.0036
289	395622.25	3740988.5	574201	3117	1.6E-06	0.0050
290	380982.19	3750559.75	291210	4967	1.4E-06	0.0070
291	392720.5	3749270.75	570203	3973	***3.7E-05***	0.1458
292	381000.59	3749278.5	291220	3353	1.4E-06	0.0047
293	387625.91	3741432.25	572600	5370	1.6E-06	0.0086
294	391160.72	3739858	573300	4323	1.5E-06	0.0064
295	390289	3739084.5	575300	4947	1.3E-06	0.0065
296	387864.41	3739867.5	572900	5250	1.3E-06	0.0070
297	390280.34	3740680.75	573201	4930	1.6E-06	0.0081
298	389150.84	3740607.75	573100	7165	1.6E-06	0.0112
299	387745.31	3740813.5	572700	5499	1.5E-06	0.0082
300	386950.94	3740129.25	572800	839	1.3E-06	0.0011
301	389296.34	3750260	542200	6962	1.3E-05	0.0902
302	390298.94	3739889.5	573202	6230	1.5E-06	0.0091
303	387154.25	3753288.75	541603	2983	4.1E-06	0.0123
304	395467.22	3758765.75	550700	6921	1.6E-06	0.0109
305	392600.06	3754507.5	551600	31	7.5E-06	0.0002
306	398552.94	3755664	550400	1534	2.0E-06	0.0030
307	394141.25	3754772.5	551201	3588	4.9E-06	0.0174
308	394801	3754375.75	551202	7666	4.8E-06	0.0369
309	393931.69	3753572.25	551700	6547	7.9E-06	0.0515
310	392350.16	3752673.5	553602	4730	2.3E-05	0.1079
311	383622.19	3756995.5	240700	6161	1.3E-06	0.0078
312	384623.44	3758914.25	535101	7306	1.2E-06	0.0090

Table 11. Predicted risk at census-tract centroids and population risks

Receptor ID	UTM E	UTM N	Census Tract	Population	70-Yr Predicted Risk	Cancer Burden
313	393532.75	3761234.5	532304	3987	1.3E-06	0.0053
314	408866.59	3752579.25	503703	7876	2.1E-06	0.0165
315	392042.91	3753927.75	536200	7289	1.1E-05	0.0780
316	388763.62	3752333.75	542000	5732	8.2E-06	0.0467
317	389617.44	3754282	540102	6972	6.3E-06	0.0441
318	382110.59	3751073.75	541001	1164	1.7E-06	0.0019
319	398033.75	3742131.25	574000	5277	1.6E-06	0.0084
320	401358.69	3754236	550000	1146	2.9E-06	0.0033
321	400537	3754220.75	550100	7518	2.9E-06	0.0222
322	397218.5	3755777	551000	7200	2.2E-06	0.0159
323	400786.06	3752554	552200	6835	4.6E-06	0.0311
324	399404.78	3752207.75	552100	5891	5.5E-06	0.0324
325	397883.09	3752787.25	551900	5344	6.2E-06	0.0329
326	393369.44	3750019	553902	5809	***4.2E-05***	0.2467
327	383488.72	3755629.25	240900	5620	1.4E-06	0.0081
328	383381.06	3756187.75	240800	4377	1.3E-06	0.0059
329	386000.5	3756787	242100	2714	1.9E-06	0.0051
330	384459.75	3756127.5	242000	3938	1.6E-06	0.0062
331	406069.5	3752554	504001	5709	2.7E-06	0.0156
332	408048.72	3754553.75	503701	4717	2.3E-06	0.0108
333	383718.69	3746517.5	543322	6611	1.9E-06	0.0123
334	382192.31	3745308	543801	5263	1.4E-06	0.0073
335	382506.41	3743959.75	543802	7126	1.3E-06	0.0093
336	385266.28	3753073.5	541300	6044	2.7E-06	0.0160
337	384033.53	3752700.75	541200	5662	2.0E-06	0.0112
338	387960.12	3752601.5	541604	6207	5.8E-06	0.0361
339	402742	3756306.5	502902	4043	1.3E-06	0.0053
340	400714.47	3742724.25	555202	3399	1.3E-06	0.0045
341	385491.84	3757155.5	242200	6554	1.7E-06	0.0110
342	384851.19	3757145.75	242300	4586	1.5E-06	0.0069
343	384447.94	3755361.75	242600	4409	1.7E-06	0.0077
344	385155.16	3755794.25	242700	5273	1.8E-06	0.0097
345	385987.19	3756135.25	243000	6769	2.1E-06	0.0139
346	385848.69	3755391.5	243100	5350	2.2E-06	0.0118
347	403808.53	3756654	502901	5413	1.2E-06	0.0066
348	394350.69	3757341.75	550800	7170	2.4E-06	0.0175
349	397770.16	3757193	550500	7809	1.5E-06	0.0118
350	390828.94	3754139.25	540000	6973	8.8E-06	0.0613
351	388761.91	3753610.75	541700	6366	5.9E-06	0.0377
352	389557.38	3753019.5	541801	4903	9.1E-06	0.0448
353	386791.47	3747434.25	543305	2666	3.0E-06	0.0080
354	386598.19	3752389.25	542601	3016	4.0E-06	0.0121
355	386617.53	3751702	542602	5496	4.2E-06	0.0234
356	384671.59	3751716	542800	3123	2.4E-06	0.0075
357	385717.06	3751903.25	542700	5720	3.3E-06	0.0187
358	384844.25	3750865.75	542900	3285	2.5E-06	0.0083
359	389238.53	3739902.25	573004	5153	1.4E-06	0.0073
360	389748.97	3746087.75	571703	3667	4.9E-06	0.0179
361	392386.53	3739271.75	575101	4754	1.4E-06	0.0065
362	393807.84	3739985	575001	3608	1.5E-06	0.0053
363	394664.16	3739602.75	574902	4783	1.4E-06	0.0066
364	396503	3740480	574300	5795	1.4E-06	0.0083
365	402870.56	3754264.5	503000	6057	3.0E-06	0.0180
366	405113.91	3755145.5	503201	3912	2.2E-06	0.0084
367	405612.47	3756155	503302	6271	1.5E-06	0.0093
368	385927.78	3754454.75	540600	4271	2.6E-06	0.0110
369	385639.56	3750725.5	542501	4307	3.2E-06	0.0137
370	383649.97	3750746	543000	4345	1.9E-06	0.0084
371	386246.22	3749516.25	543202	4867	3.8E-06	0.0185
372	382630.69	3746539.5	543400	4090	1.6E-06	0.0065
373	385161.91	3746466.75	543304	6061	2.3E-06	0.0142
374	385819.91	3750081.25	543201	3607	3.2E-06	0.0117
375	396430.34	3751599.5	554103	1572	1.1E-05	0.0174
376	401561	3752980.5	552301	4900	3.9E-06	0.0192
377	389918.56	3751799	542104	3524	1.6E-05	0.0576
378	389375.66	3751848	542103	4114	1.2E-05	0.0492
379	389599.62	3759747.25	533603	6617	1.8E-06	0.0120
380	392303.5	3759646	534101	2295	1.9E-06	0.0044
TOTALS				**1,742,028**		**11**
Cancer Burden for Centroids where risk is greater than background ($7.1x10^{-5}$)						**0.0008**

Notes

Potential carcinogenic risks in shaded cells are less than the risk associated with exposure to background hexavalent chromium concentrations in Compton (0.11 ng/m3) for a 70-year lifetime ($7.19x10^{-5}$).

Bold-italic font indicates locations with risk greater than the action level ($2.5x10^{-5}$).

Table 12. Comparison of hexavalent chromium [Cr(VI)] ambient monitoring results adjusted for background and upwind sources (October 15 to December 29, 2016) to AB2588 modeled results

	Site #7	Adj #7 [1]	Site #8	Adj #8 [2]	Site #9	Adj #9 [1]	Site #10	Adj #10 [1]	Site #18	Adj #18 [1]	Background (lowest amongst all stations)	Nearest upwind monitor	Upwind Contribution	Primary wind direction	Secondary wind direction	Wind Speed	Percent calm (<1 mph)
	ng/m^3	ng/m^3	ng/m^3	ng/m^3	ng/m^3	ng/m^3	ng/m^3	ng/m^3	ng/m^3	ng/m^3						(mph)	(<1 mph)
10/15/16	7.90	7.84	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.06	11	N/A	SSW	SW	3.8	6.5
10/18/16	Invalid	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.20	11	N/A	SSW	ENE	2.3	31.7
10/21/16	1.10	0.99	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.11	11	N/A	NNW	SSW	2.0	40.0
10/24/16	4.20	3.96	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.24	11	N/A	SSW	SW	3.2	6.0
10/27/16	5.00	4.80	26.00	22.44	2.70	2.50	1.40	1.20	N/A	N/A	0.20	11	3.36	SSW	NW	2.5	23.3
10/30/16	4.80	4.72	25.00	24.91	1.10	1.02	0.31	0.23	N/A	N/A	0.08	11	0.01	SSW	SW	2.6	14.2
11/2/16	2.70	2.59	12.00	9.71	2.40	2.29	1.30	1.19	N/A	N/A	0.11	11	2.18	NNW	NW	2.0	39.6
11/5/16	3.60	3.35	14.00	12.44	1.20	0.95	0.79	0.54	N/A	N/A	0.25	11	1.31	SSW	SW	2.0	36.9
11/8/16	3.40	3.24	13.00	11.59	1.80	1.64	0.97	0.81	N/A	N/A	0.16	11	1.25	NW	NNW	2.3	32.7
11/11/16	2.60	2.30	17.00	16.28	2.40	2.10	1.80	1.50	N/A	N/A	0.30	9	0.42	SSE	NNW	2.1	28.3
11/14/16	2.70	2.49	12.00	9.93	0.87	0.66	0.43	0.22	N/A	N/A	0.21	11	1.86	SSW	NNW	1.9	35.6
11/17/16	1.10	0.85	17.00	16.12	2.60	2.35	1.20	0.95	N/A	N/A	0.25	11	0.63	NNW	NW	2.1	28.3
11/20/16	0.42	0.31	4.70	4.53	0.76	0.65	N/A	N/A	N/A	N/A	0.11	7	0.06	ESE	SSE	2.1	24.0
11/24/16	0.06	0.02	7.60	7.55	6.30	6.26	N/A	N/A	0.06	0.02	0.04	11	0.01	NW	WNW	4.0	5.2
11/26/16	NSD	N/A	NSD	N/A	NSD	N/A	N/A	N/A	NSD	N/A	0.06	7	N/A	ENE	SSE	1.6	55.1
11/29/16	1.80	1.70	12.00	N/A	1.50	1.40	N/A	N/A	Invalid	N/A	0.10	11	N/A	NW	NNW	1.9	34.0
12/2/16	0.84	0.77	4.90	4.68	1.70	1.63	N/A	N/A	3.80	3.73	0.07	7	0.15	ESE	NNW	2.32	25.50
12/5/16	0.44	0.33	0.15	-0.03	0.17	0.06	N/A	N/A	0.17	0.06	0.11	7	0.07	ENE	SSE	1.72	36.00
12/8/16	0.75	0.54	1.30	0.15	0.47	0.26	N/A	N/A	1.50	1.29	0.21	11	0.94	SSW	WSW	1.65	47.50
12/11/16	0.23	0.12	2.30	2.17	0.32	0.21	N/A	N/A	2.20	2.09	0.11	7	0.02	ESE	SSE	1.66	36.40
12/14/16	2.50	2.25	12.00	10.64	1.90	1.65	N/A	N/A	1.60	1.35	0.25	11	1.11	NNW	SSW	1.67	40.90
12/17/16	0.16	0.08	0.27	N/A	0.25	0.17	N/A	N/A	0.28	0.20	0.08	11	N/A	WNW	NNW	2.88	22.00
12/20/16	1.01	0.86	3.01	2.78	1.97	1.82	N/A	N/A	0.31	0.16	0.15	11	0.08	NW	NNW	3.64	12.30
12/25/16	0.05	0.01	0.08	0.04	0.05	0.01	N/A	N/A	0.06	0.02	0.04	7	0.00	SE	WNW	1.56	45.50
12/29/16	0.23	0.08	Invalid	N/A	0.23	0.08	N/A	N/A	0.41	0.26	0.15	11	0.13	NW	NNW	2.60	15.60
Average Concentration from October 15 to December 29		1.92		9.17		1.39		0.83		0.92							
Predicted Concentration based on Modeling for 2016		2.7		16.6		8.7		3.3		7.0							
Ratio (Predicted to Measured)		1.4		1.8		6.3		4.0		7.6							

Notes

1. Measured concentrations at monitors 7 and 9 were adjusted by subtracting ambient background.
2. The measured concentration at monitor 8 was adjusted by subtracting background and 20% of the nearest upwind monitor after background is subtracted from that location as well. On three days, meteorological data were not available, so no adjustment was made for upwind sources.
3. SCAQMD collected monitoring data from several of 20 monitoring locations on the same day that samples were collected at monitors in Paramount. The lowest concentration among these locations was used to represent ambient background.
4. Nearest upwind monitors were determined according to the primary wind direction and SCAQMD's monitoring data corresponding to each sampling date. Selected SCAQMD monitors based on wind direction: 7 (NE, ENE, E, ESE, SE), 9 (SSE, S,), 11 (NNW, NW, WNW, W, SW, WSW, SSW), 18 (NNW, N, NNE). If meteorological data were not available, then the sample was not adjusted for contributions from upwind sources.

* Primary wind direction based on windroses published by SCAQMD for the Compton meteorological station for the dates when samples were collected.

Abbreviations

Invalid = For any of a number of reasons, a valid sample was not collected.

mph = miles per hour

ng/m^3 = nanograms per cubic meter

N/A = no sample collected.

NSD = Samplers were not operating due to a variety of reasons, such as limited access, weather, samplers under repair, etc.

NC = not calculated

Table 13. Comparison of ambient monitoring results adjusted for background and upwind sources (October 15 to December 29, 2016, and March 2 to May 22, 2017)

Sample Date	Site #7	Adj #7[1]	Site #8	Adj #8 [2]	Site #9	Adj #9 [1]	Ambient Air Background (lowest among all stations)[3]	Nearest upwind monitor[4]	Upwind Contribution	Primary wind direction
	(ng/m^3)	(ng/m^3)	(ng/m^3)	(ng/m^3)	(ng/m^3)	(ng/m^3)				
Thu, Mar 2, 2017	0.75	0.62	1.13	1.00	1.02	0.89	0.13	11	0.15	NNW
Sun, Mar 5, 2017	0.16	0.10	0.15	0.09	0.15	0.09	0.06	11	0.01	SW
Wed, Mar 8, 2017	0.57	0.39	0.93	0.75	0.54	0.36	0.18	NC	FALSE	Insufficient Data
Sat, Mar 11, 2017	1.66	1.35	4.08	3.77	1.17	0.86	0.31	NC	FALSE	Insufficient Data
Tue, Mar 14, 2017	1.59	1.16	6.67	6.24	1.47	1.04	0.43	NC	FALSE	Insufficient Data
Fri, Mar 17, 2017	0.71	0.49	0.44	0.22	1.05	0.83	0.22	11	0.12	SW
Mon, Mar 20, 2017	0.94	0.87	0.14	0.07	0.16	0.09	0.07	7	0.17	SE
Thu, Mar 23, 2017	0.13	0.00	0.90	0.77	0.16	0.03	0.13	7	0.00	NE
Sun, Mar 26, 2017	0.07	0.03	0.14	0.10	0.08	0.04	0.04	11	0.01	WSW
Wed, Mar 29, 2017	0.40	0.21	0.54	0.35	0.30	0.11	0.19	11	0.03	WSW
Sat, Apr 1, 2017	0.06	0.04	0.42	0.40	0.06	0.04	0.02	11	0.05	SW
Tue, Apr 4, 2017	0.19	0.08	0.16	0.05	0.14	0.03	0.11	7	0.02	ESE
Fri, Apr 7, 2017	0.14	0.05	0.32	0.23	0.11	0.02	0.09	11	0.00	SW
Thu, Apr 13, 2017	0.54	0.42	0.91	0.79	0.12	0.00	0.12	11	0.01	SW
Sun, Apr 16, 2017	0.18	0.13	0.37	0.32	0.16	0.11	0.05	11	0.00	SW
Wed, Apr 19, 2017	0.32	0.18	1.22	1.08	Invalid	--	0.14	11	0.03	SSW
Sat, Apr 22, 2017^	0.13	0.10	0.73	0.70	0.64	0.61	0.03	11	0.18	SW
Tue, Apr 25, 2017	0.22	0.06	0.42	0.26	1.27	1.11	0.16	11	N/A	SW
Fri, Apr 28, 2017	0.66	0.54	0.69	0.57	0.48	0.36	0.12	11	0.01	NW
Mon, May 1, 2017	0.35	0.26	0.30	0.21	0.13	0.04	0.09	11	0.01	SSW
Thu, May 4, 2017	1.21	1.09	2.79	2.67	0.12	0.00	0.12	11	0.02	SSW
Sun, May 7, 2017	0.09	0.02	0.11	0.04	0.12	0.05	0.07	7	0.00	ENE
Wed, May 10, 2017	0.58	0.46	0.42	0.30	0.13	0.01	0.12	7	0.09	ESE
Sat, May 13, 2017	0.07	0.04	0.58	0.55	0.14	0.11	0.03	11	0.02	SSW
Tue, May 16, 2017	Invalid	--	0.46	0.46	Invalid	--	--	7	N/A	SE
Fri, May 19, 2017	0.22	0.12	0.38	0.28	0.22	0.12	0.10	11	0.02	WSW
Mon, May 22, 2017	0.18		1.12		0.21		0.18	11	-0.04	SW
Average Concentration from March 2 to May 22 [5]	0.35		0.86		0.29					
Average Concentration from October 15 to December 29	1.9		9.2		1.4					

Notes

1. Measured concentrations at monitors 7 and 9 were adjusted by subtracting ambient background.
2. The measured concentration at monitor 8 was adjusted by subtracting background and 20% of the nearest upwind monitor after background is subtracted from that location as well. On three days, meteorological data were not available, so no adjustment was made for upwind sources.
3. SCAQMD collected monitoring data from several of 20 monitoring locations on the same day that samples were collected at monitors in Paramount. The lowest concentration among these locations was used to represent ambient background.
4. Nearest upwind monitors were determined according to the primary wind direction and SCAQMD's monitoring data corresponding to each sampling date. Selected SCAQMD monitors based on wind direction: 7 (NNE, NE, ENE, E, ESE, SE), 9 (SSE, S,), 11 (NNW, NW, WNW, W, SW, WSW, SSW). If meteorological data were not available, then the sample was not adjusted for contributions from upwind sources.
5. Data were excluded from the data set on days when fewer than five samples were collected, because there wasn't a good representation of background concentrations (March 1, April 10, April 12, and May 3).

Green shading indicates calculated values related to 2017 ambient air measurements.

Abbreviations

N/A = no sample collected.
NSD = samplers were not operating due to a variety of reasons, such as limited access, weather, samplers under repair, etc.
NC = not calculated

Appendices provided on CD and available at South Coast Air Quality Management District Offices