apcd air pollution control district
SANTA BARBARA COUNTY

Health Risk Assessment Report

Lockheed Martin Missiles and Fire Control
Santa Barbara Focalplane

AB 2588 Air Toxics "Hot Spots"
Inventory Year 2018

1.0 SUMMARY

The Santa Barbara County Air Pollution Control District (District) reviewed an air toxics Health Risk Assessment (HRA) for the Lockheed Martin Missiles and Fire Control Santa Barbara Focalplane (LMC) under the AB 2588 Air Toxics "Hot Spots" Program. The HRA was completed using Hotspots Analysis and Reporting Program (HARP 2) software, Build 22118. LMC submitted the HRA for inventory year 2018, and the District revised the modeling and completed the final HRA and report. Cancer risk and non-cancer Hazard Index (HI) risk values were calculated and compared to *significance thresholds* adopted by the District's Board of Directors. The calculated risk values and applicable thresholds are as follows (with significant risks shown in **bold**):

	LMC Max Risks	Significance Threshold
Cancer risk:	0.8/million	≥10/million
Chronic non-cancer risk:	<0.1	>1
8-Hour Chronic non-cancer risk:	<0.1	>1
Acute non-cancer risk:	**1.2**	>1

Based on these results, the operations at the Lockheed Martin - SB Focalplane stationary source in 2018 did not present a significant cancer or chronic non-cancer risk to the surrounding community. However, there is a significant acute non-cancer risk on two public roadways immediately adjacent to LMC. For that reason, LMC is required to submit a risk reduction plan to reduce the risk and conduct a public notification.

2.0 BACKGROUND

2.1 Facility Overview

The LMC facility is comprised of two buildings located at 336 and 346 Bollay Drive in the City of Goleta, California. The facility is located in the Santa Barbara Business Park and is immediately surrounded by similar commercial and light industrial facilities.

LMC fabricates and assembles infrared components and imaging systems with an emphasis on Indium Antimonide Focal Plane Arrays in linear and large staring formats. Production consists of placing components on a circuit board, soldering, wet-chemistry processing and cleaning. Finished assemblies are sprayed with a clear, encapsulating conformal coating. Circuit boards are heat-treated in a curing oven before and after coating applications. Some assemblies involve attaching ancillary mechanical components. Metal parts are only a minor portion of the assembly surfaces being coated. Reactive Organic Compound (ROC)-emitting processes include wipe cleaning, the application of adhesives, sealants and coatings, and the application and stripping of photoresist materials which are used during various steps of the manufacturing process.

Some of the ROC emitting processes and equipment at this facility are controlled by a regenerative thermal oxidizer (RTO) capable of 98% destruction efficiency. All ROC emitting processes vented by Exhaust Fan 3 (EF-3), Exhaust Fan 4 (EF-4), Exhaust Fan 5 (EF-5) and Exhaust Fan 6 (EF-6) are uncontrolled. The automated vacuum soldering unit vents to the Purex Fume Extraction System, which uses a series of HEPA and carbon filters to control formic acid emissions.

In addition, LMC operates five stacked Raypak boilers, each with a rated capacity less than 2.0 MMBtu/hr, and a 284-bhp diesel-fired internal combustion engine (DICE).

2.2 Health Risk

As used in this report, the term "health risk" addresses the likelihood that exposure to a given toxic air contaminant under a given set of conditions will result in an adverse health effect. Health risk is affected by several factors, such as: the amount, toxicity, and concentration of the contaminant; the meteorological conditions; the distance from emission sources to people; the distance between emission sources; the age, health, and lifestyle of the people living or working at a location; and the duration of exposure to the toxic air contaminant.

Health effects are divided into cancer and non-cancer risks. "Cancer risk" refers to the increased chance of contracting cancer as a result of an exposure, and is expressed as a probability: chances-in-a-million. The values expressed for cancer risk do not predict actual cases of cancer that will result from exposure to toxic air contaminants. Rather, they state a possible risk of contracting cancer over and above the background level.

For non-cancer health effects, risk is characterized by a "Hazard Index" (HI), which is a sum of all hazard quotients (HQs) for each toxic air contaminant (TAC). The HQ for a TAC is obtained by dividing the predicted concentration of the TAC by its Reference Exposure Level (REL), which has been determined by health professionals from the Office of Environmental Health Hazard Assessment (OEHHA) and the California Air Resources Board (CARB). RELs are used as indicators of the potential adverse effects of chemicals. An REL is the concentration at or below which no adverse health effects are anticipated for specific exposure duration. Thus, the HQ is a measure of the exposure relative to a level of safety and is appropriately protective of public health. The TACs emitted by a facility can have different emission rates and different RELs. An HQ is calculated separately for each TAC at each modeled receptor location. A composite HI at each receptor is then calculated as the sum of HQs for each individual TAC. A HI of one or less indicates that no adverse health effects are anticipated and is therefore considered safe.

2.3 LMC in the AB 2588 Air Toxics "Hot Spots" Program

The Air Toxics "Hot Spots" Information and Assessment Act requires businesses and industries throughout the state to: 1) quantify and report their emissions of listed air toxics; 2) assess the possible health risks from their emissions; 3) notify members of the public who are exposed to significant risks attributable to their emissions; and, 4) take steps to reduce this risk.

The HRA described in this report was conducted as part of the AB 2588 Air Toxics "Hot Spots" Program for inventory year (IY) 2018. LMC criteria pollutant emissions are less than 10 tons per year. However, LMC is subject to AB 2588 due to Appendix E of CARB's *Emission Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program* (EICG*)*, Section 16, Phase 1, Solvent cleaning and degreasing, and Sector 53, Facilities identified by districts under Section II.E.(3)(a). On March 19, 2019, the District notified LMC that their facility was subject to AB 2588 and required to submit an Air Toxics Emission Inventory Plan (ATEIP).

2.4 Historical Submittals and District Correspondence for Inventory Year 2018

LMC's submittals regarding the 2018 IY AB 2588 documents are listed below, along with the District's review correspondence on each submittal. Informal submittals and informal correspondence (e.g., emails) are not included.

- **LMC ATEIP Submittal (November 26, 2019).** This was the first ATEIP submittal. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\ATEIP Submitted 11-26-19

- **District Correspondence (January 29, 2020).** The District provided comments on the ATEIP. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Comments on Lockheed 2018 ATEIP Submitted 26Nov19_Original Printed Ltr.pdf

- **LMC Revised ATEIP Submittal (March 31, 2020).** LMC submitted a revised ATEIP and response to the District's January 29, 2020 comment letter. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Revised ATEIP Submitted 3-31-2020

- **District Correspondence (July 2, 2020).** The District issued a conditional approval letter for LMC's March 31, 2020 revised ATEIP. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Conditional Approval Letter on Lockheed 2018 ATEIP.pdf

- **LMC ATEIR Submittal (February 8, 2021).** This was the first ATEIR submittal, and also included revisions to the ATEIP. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\ATEIR and final ATEIP Submitted 2-8-2021

- **District Correspondence (January 31, 2022).** The District issued a conditional approval letter for LMC's February 8, 2021 ATEIR and revised ATEIP. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Conditional Approval of 2018 ATEIR and Final ATEIP for Lockheed IY 2018.pdf

- **LMC Draft HRA Submittal (August 1, 2022).** This was the first HRA submittal. However, it was considered a draft as LMC identified that source testing would be performed to refine the emissions from the risk driving device, followed with an updated HRA. This submittal also included the final ATEIP (dated August 1, 2022) and a revised ATEIR submittal (written document dated August 1, 2022 and Excel spreadsheet, *Material Calculations_7-25-22-District copy.xlsm*). However, the ATEIP and ATEIR dated August 1, 2022 did not include source testing of the laser welders. An updated ATEIR spreadsheet, *Material Calculations_5-23-24.xlsm*, revised the emission calculations based on the source test results was part of the July 1, 2024 HRA submittal. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\HRA Submittal - 1Aug2022

- **LMC Source Test Protocol for Laser Welding (December 19, 2022).** This submittal was for toxic metals testing of the risk driving device (Amada laser welder) identified in LMC's August 1, 2022 draft HRA. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Source Test - Laser Welding\Source Test Protocol\Source Test Protocol_LockheedMartin_Metals Testing_2022.pdf

- **District Correspondence (January 12, 2023).** The District issued a comment letter on LMC's December 19, 2022 source test protocol of the Amada laser welder. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Source Test - Laser Welding\Source Test Protocol\Comments on Source Test Plan for AB 2588 - Laser Welding.pdf

- **LMC Revised Source Test Protocol for Laser Welding (February 13, 2023).** LMC submitted a revised source test protocol for the Amada laser welder in response to the District's January 12, 2023 comment letter. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Source Test - Laser Welding\Source Test Protocol\Source Test Protocol_LockheedMartin_Metals Testing_2022 Chrom VI Rev.pdf

- **District Correspondence (March 23, 2023).** The District issued a conditional approval letter for LMC's February 13, 2023 revised source test protocol for the Amada laser welder. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Source Test - Laser Welding\Conditional Approval of Source Test Plan for AB 2588 - Laser Welding.pdf

- **LMC Source Test Report for Laser Welding (September 6, 2023).** LMC submitted a source test report for the Amada laser welder (dated August 17, 2023) on September 6, 2023. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Source Test - Laser Welding\Source Test Report Submittal - 6Sept2023\

- **District Correspondence (November 13, 2023).** The District provided comments on the September 6, 2023 source test report submittal. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Source Test - Laser Welding\Comments on Source Test Report for Lockheed AB 2588 IY 2018.pdf

- **LMC Source Test Report for Laser Welding (January 12, 2024).** LMC submitted a revised source test report for the Amada laser welder (dated January 10, 2024) on January 12, 2024. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Source Test - Laser Welding\Revised Source Test Report Submittal - 12Jan2024

- **District Correspondence (February 6, 2024).** The District issued an approval letter for LMC's January 2024 revised source test report for the Amada laser welder. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Approval of Source Test Report for HRA for IY 2018 Lockheed Martin.pdf

- **LMC Revised HRA Submittal (July 1, 2024).** This submittal included the revised HRA based on the source test results for the Amada laser welder. It also included LMC's July 1, 2024 *Revised Health Risk Assessment Report*, which is referenced throughout this document. In addition, this submittal includes the final ATEIR spreadsheet, *Material Calculations_5-23-24.xlsm*. \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\Revised HRA - 1July2024 Submittal

3.0 FACILITY INFORMATION

EQUIPMENT OWNER/OPERATOR:	LMC
SOURCE IDENTIFICATION NUMBER:	09313
EQUIPMENT LOCATION:	336 and 346 Bollay Drive in the City of Goleta, California in the Santa Barbara Business Park, about 16 km west of downtown Santa Barbara and about 1 km west of the Santa Barbara Airport.
FACILITY UTM COORDINATES:	LMC provided the UTM coordinates of the facility's property boundaries, buildings, emission release points, and receptor locations. UTM Zone 11 Easting: 236485 m Northing: 3813210 m Datum: NAD83
EQUIPMENT DESCRIPTION:	The HRA includes emissions from numerous pieces of equipment at 76 different emission points. This includes emissions from an internal combustion engine, boilers, a regenerative thermal oxidizer, laser welders, and fugitive emissions related to semiconductor manufacturing and solvent usage.

4.0 STACKS AND MODELING PARAMETERS (A.K.A. EMISSION RELEASE POINTS)

Ducted emission sources included in the LMC HRA require input parameters of stack diameter, stack height, exhaust temperature, and exhaust velocity. Actual stack diameters and heights were based on permitted equipment specifications, Google Earth imagery, and data provided by the facility. Exhaust temperatures and velocities/flowrates were obtained by LMC from equipment permits and manufacturer specification sheets, where available. Exhaust stack parameters, including diameter, exhaust gas temperatures, and exhaust gas exit velocities for the DICE were based on defaults for engines rated 251-500 bhp from Appendix D of the District's *Modeling Guidelines for Health Risk Assessments* (Form-15i). Exhaust stack parameters for the boilers were obtained by LMC from the California Air Pollution Control

Officers Association's *Air Toxic "Hot Spots" Program Facility Prioritization Guidelines* screening tool defaults for natural gas boilers rated 0-5 MMBtu/hr. Fugitive emissions, such as emissions occurring at non-vented workstations within the buildings, were modeled using volume sources. Volume sources were sized based on building dimensions, with the release height equal to half of the building height.

The source location UTM coordinates and modeling parameters for all sources are listed in Attachment E of LMC's July 1, 2024 *Revised Health Risk Assessment Report* (LMC's Revised HRA Report), and LMC's spreadsheet included with the revised HRA submittal, *Modeling-Protocol-Tables-for-HRA-Report_LMC7-1-24.xlsx*. Note that Table 2 of LMC's Revised HRA Report contains outdated source parameters, which were not used in the AERMOD runs for the final HRA.

The District reviewed, but did not change, the source modeling parameters used in LMC submitted. Although Table 2 of LMC's Revised HRA Report contained outdated source parameters, the parameters used in LMC's AERMOD runs were correct. The source location UTM coordinates and modeling parameters used in the dispersion modeling for the HRA are found in the AERMOD input and out files ending in *.inp* and *.out* located in the *LMC2018HRA.zip* file referenced in the Attachments section of this report. All UTM coordinates in this report are in Zone 11 and the datum is NAD83.

5.0 EMISSIONS

A summary of the TAC emissions from LMC for reporting year 2018 are presented in Attachment F of this report. Pursuant to Section VIII.E.(3) of CARB's EICG, all pollutants emitted on a facility-wide basis exceeding one-half the degree of accuracy listed in Appendix A-1 of CARB's EICG are quantified in the ATEIR, and risk is evaluated in the HRA. The emissions used in the HRA are shown in the HARP 2 emissions file*, LMC_Ops_Emissions_APCD_Revision_16Dec2024.csv,* which is included in the *LMC2018HRA.zip* file referenced in the Attachments section of this report.

The emission estimate techniques were presented in the ATEIP for inventory year 2018. Emissions were quantified in the 2018 ATEIR: LMC's final ATEIR spreadsheet, *Material Calculations_5-23-24.xlsm.* Emissions from the 2018 inventory year for LMC were used to perform the HRA as described in the August 1, 2022 ATEIP and written August 1, 2022 ATEIR, with the following revisions, copied from Section 2 of LMC's Revised HRA Report, and additional revisions by the District discussed in Section 5.1 of this report:

1. *The Unitek laser welder hours of operation were revised based on recipe run times and production rate. A unit is produced in 35 minutes and no more than one unit can (23 hours in total), or 480 units per year (280 hours per year).*

2. *The Amada laser welder hours of operation were revised based on recipe run times and production rate. A unit (either stainless steel or Inconel) is produced in 10 minutes. More than one unit can be produced in an hour, therefore the emission rates for both have been summed. LMC produces 40 units per month (6.67 hours in total), or 480 units per year (80 hours per year).*

3. *LMC conducted a source test on the Amada laser welder on April 21, 2023. The source test report was approved by SBCAPCD on February 6, 2024. The maximum pound per hour rate for each pollutant was used for the acute risk calculations and the average pound per hour rate of the three test runs for each pollutant multiplied by the hours of operation per year was used for the cancer and chronic non-cancer risk calculations. Per agreement with SBCAPCD, these emission rates were also applied to the Unitek Laser Welder, using the hours of operations per year for this source.*

4. *The IPG laser welder hours of operation were revised based on recipe run times and production rate. A unit is produced in 58 minutes and no more than one unit can be produced in an hour. LMC produces 40 units per month (38.67 hours in total), or 480 units per year (464 hours per year). A BOFA AD Oracle iQ fume collector is attached to the IPG laser welder that collects 99.997% of the emissions.*

5.1 District Revisions to TAC Emissions for HRA

The District's changes to the TAC emissions used in the HRA are described below. The District revised the ATEIR spreadsheet and renamed it to: *Material Calculations_5-23-24 - Revised Laser Welders by APCD.xlsm*. The HARP 2 emissions file with these revisions was renamed to: *LMC_Ops_Emissions_APCD_Revision_16Dec2024.csv*.

1. LMC incorrectly calculated the annual operating hours for the Amada laser welder. Item 2 above in Section 5.0 notes that 40 units are produced in 6.67 hours, or 480 units per year for 80 hours/year, which results in 6 units/hour. However, the source test results were based on an average of 4.3 units/hour. Lockheed confirmed on November 27, 2024 via email (To: Robin Cobbs and Amy Estrella, From: Mary Kaplan, Subject: *RE: LMC HRA - Double counting Amada Laser Welder Emissions?*) that 4.4 units is the maximum number that can be produced in one hour. Using the average from the source test report of 4.3 units/hour, it takes 9.3 hours to produce 40 units, or 111.6 hours/year to produce 480 units/year. The District updated the annual emissions from the Amada laser welder to be based on 111.6 hours/year instead of 80 hours/year.

2. Metal emissions from the Amada laser welder and Unitek laser welder (Source IDs EF9_1 and EF9_2) were revised in the HARP 2 emissions file. Upon review of the ATEIR spreadsheet, *Material Calculations_5-23-24.xlsm*, the District determined that LMC had double counted emissions from most of the metals emitted by the Amada laser welder and Unitek laser welder. LMC used the source test results in lb/hour, but applied them on a material-basis instead of a device-basis. During the source test, both the Stainless Steel, 300 series material and the Inconel material were used in the typical manner of operations. Furthermore, the maximum number of units possible to produce during a two-hour period were made during each two-hour source test run. For the ATEIR emission calculations, LMC applied the metal emission factors to both metals from the Stainless Steel, 300 series material and the Inconel material. For example, both the Stainless Steel, 300 series material and the Inconel material contain arsenic. LMC applied the lb/hour source test result to the arsenic in the Stainless Steel, 300 series material, and in the Inconel material, resulting in twice the emissions that were measured during the source test. The District contacted LMC regarding this discrepancy and received clarifying information from LMC that confirmed that the emissions were double counted. For that reason, the District revised the metal emissions for the Amada laser welder and Unitek laser welder to apply the source test value on a device-basis instead of material-basis.

3. The pollutant ID for polycyclic aromatic hydrocarbons (PAHs) was revised to 1151 instead of 1150 in the HARP 2 emissions file submitted by LMC. There are no health values associated with pollutant ID 1150. Therefore, no risk was calculated from PAHs in LMC's July 1, 2024 HRA.

4. Pursuant to Section VIII.E.(3) of CARB's EICG, all pollutants emitted on a facility-wide basis exceeding one-half the degree of accuracy listed in Appendix A-1 of CARB's EICG are quantified in the ATEIR, and risk is evaluated in the HRA. However, if facility-wide emissions of

a pollutant are lower than half the applicable degree of accuracy, reporting and inclusion of that pollutant in the HRA is not required. While cancer risk from lead emissions can be evaluated in the primary HRA, non-cancer risk from lead cannot. Instead, a separate lead HRA is required, as outlined in Appendix K of Form-15i. Due to the extensive time and resources required for conducting and reviewing this type of analysis, a lead HRA is not required by the District when lead emissions are negligible (i.e., below the reporting limit of one half the degree of accuracy). To avoid confusion that all lead impacts (cancer and non-cancer) were evaluated in the HRA, no lead emissions were included in the HARP 2 emissions file. Instead, an advisory was added to the Facility Emissions Summary clarifying that pollutants emitted on a facility-wide basis exceeding one-half the degree of accuracy listed in Appendix A-1 of CARB's EICG are quantified in the ATEIR, and risk is evaluated in the HRA.

6.0 BUILDING INFORMATION

Building downwash was selected as a control option in the air dispersion analysis and all structures were included in the HRA. UTM coordinates and dimensions for buildings and structures were submitted by LMC and included on the *Building Parameters* tab of *Modeling-Protocol-Tables-for-HRA-Report_LMC7-1-24.xlsx.* Figure 1 in Attachment A of LMC's Revised HRA Report shows the facility property boundary, as well as seven of the eight buildings/structures that were included as part of the building downwash analysis.

7.0 MET DATA & DEM FILES

Meteorological data used in the air dispersion analyses were acquired at the Santa Barbara Airport from 2012-2016. These files, *SBA12-16Ustar.PFL* and *SBA12-16Ustar.SFC*, were processed by the District using AERMET version 16216 and can be found in the *LMC2018HRA.zip* file. The PROFBASE parameter was set to 4.0 m for the base elevation above mean sea level of the primary met tower at the Santa Barbara Airport; this value comes from the District's Form-15i.

Terrain files for the modeling domain, Goleta and Dos Pueblos Canyon, were obtained from the California Resources Board (CARB) and utilized in the USEPA's AERMAP (Version 18081) terrain processor to assign all source and building elevations. Terrain files for Goleta and Dos Pueblos Canyon are also located in the *LMC2018HRA.zip* file

8.0 MODEL INFORMATION

The air dispersion modeling for the HRA was conducted using AERMOD (Version 23132), executed with AERMOD View from Lakes Environmental Software, Version 12.0.0. The regulatory default control options were enabled, and the rural option was selected. The risk assessment was conducted using the California Air Resources Board Hotspots Analysis and Reporting Program, Version 2 (Build 22118). The health database file used in HARP 2 was *HEALTH17320.MDB*, released by CARB on October 6, 2023.

8.1 Variable Emissions

LMC's HRA submittal included 70 variable emissions scenarios. The District reviewed the variable emissions scenarios with the devices' operating schedules and found many discrepancies. However, the District determined (by rerunning AERMOD, reviewing LMC's results, and looking at the risk drivers) that only six of the variable emissions scenarios would have a considerable impact on the risk results. For that reason, the District included variable emissions scenarios for only the following Source IDs: 346_10, EF5_1, EF5_3, EF5_10, EF9_2, and EF9_1. Of the six variable emissions scenarios included in the final HRA, only EF9_1 required a correction from LMC's submittal. The total number of hours assigned was correct for EF9_1. However, the variable emissions scenario showed no operations at hour 14 and operations at hour 15; the device schedule showed operations at hour 14, but no operations at hour 15. The District revised this variable emission scenario to match the device schedule.

LMC's devices' operating schedules are listed in Attachment B of LMC's Revised HRA Report. LMC's variable emission scenarios are found in Attachment C of LMC's Revised HRA Report. The variable emissions scenarios used in this HRA may be found in the AERMOD output files ending in *.ADO* located in the *LMC2018HRA.zip* file referenced in the Attachments section of this report.

8.2 Receptor Placement

The receptors were placed 25 meters apart in a 2000-meter by 2000-meter grid out to a distance of 2 km from the facility's fenceline. In addition to the grid receptors, sensitive receptors, such as daycare centers, schools, and senior care facilities were included in HARP 2. The sensitive receptors included in the analysis are listed in Table 3 of LMC's Revised HRA Report, and in Attachment H of LMC's Revised HRA Report. Boundary receptors were generated along the property boundary 25 meters apart. No onsite receptors are present at this facility. All receptors had a flagpole height of 1.5 meters. Grid and receptor data may be found in the AERMOD output files ending in *.ADO* located in the *LMC2018HRA.zip* file referenced in the Attachments section of this report.

8.3 Residential Exposure and Pathways

The cancer risks for the residential receptors and the point of maximum impact (PMI) were determined using the "individual resident" receptor type, 30-year exposure duration and the intake rate from the "RMP using the Derived Method." The chronic non-cancer hazard indices for the residential receptors and the PMI were determined using the "individual resident" receptor type and the intake rate from the "OEHHA Derived Method."

The initial risk analysis was done with the following pathways evaluated: inhalation, soil, dermal, mother's milk, homegrown produce, chicken and egg. The default deposition rate of 0.05 m/s was selected. No fraction of time at home (FAH) values were selected. No inputs are required for the soil and mother's milk pathways. "Warm" climate was selected for the dermal pathway. The default values in HARP 2 for households that farm were used for the homegrown produce pathway, and the default values in HARP 2 for households that raise/hunt were used for the chicken and egg pathways. The default values from Tables 3.4.9.1 and 3.4.9.2 of the District's Form-15i were used for the fractions of animal diet from contaminated source and the fractions of contaminated feed for the chickens and eggs. The results of the initial risk analysis showed that there are no lakes, ponds or water bodies in the one in a million residential risk isopleth or the 0.1 hazard index isopleth for residential chronic risk.

The final risk analysis for residential cancer and chronic non-cancer risks were conducted with the following pathways evaluated: inhalation, soil, dermal, mother's milk, homegrown produce, chicken and egg. The default deposition rate of 0.05 m/s was selected. The fraction of time at home (FAH) value for ages over 16 years was applied for residential cancer risk (FAH does not apply for chronic non-cancer risk). "Warm" climate was selected for the dermal pathway. The default values in HARP 2 for households that farm were used for the homegrown produce pathway, and the default values in HARP 2 for households that raise/hunt were used for the chicken and egg pathways. The default values from Tables 3.4.9.1 and 3.4.9.2 of the District's Form-15i were used for the fractions of animal diet from contaminated source and the fractions of contaminated feed for the chickens and eggs. Chickens do not consume drinking water from a contaminated source (e.g., lake or pond) within the initial one in a million residential risk isopleth or the initial 0.1 hazard index isopleth for residential chronic risk; therefore, the fraction of drinking water from contaminated sources was set to zero. The beef, dairy, and pig pathways were excluded from the risk analyses because there were no pastures for cattle and no pig farms within the modeling domain.

8.4 Worker Exposure and Pathways

The cancer risk for the worker receptors were determined using the "worker" receptor type, 25-year exposure duration and the intake rate from the "OEHHA Derived Method." LMC selected a worker adjustment factor (WAF) for cancer risk of 1.6 based on the facility operating for 21 hours per day, 5 days per week. However, the District revised this factor due to the risk driving devices operating significantly less than that (i.e., Amada laser welder and Unitek laser welder). The Amada laser welder operates for approximately 9.3 hours per month and the Unitek laser welder operates 23 hours per month. For that reason, the District used the default adjustment factor of 4.2 for when the emitting source and worker's schedules are the same: (24 hours per day/8 hours per shift) * (7 days in a week/5 days in a work week).

The chronic non-cancer hazard indices for the worker receptors were determined using the "worker" receptor type and the intake rate from the "OEHHA Derived Method." The worker pathways (i.e., inhalation, soil and dermal) were enabled for the worker receptors for cancer and chronic non-cancer risk. All of the worker receptors used the default moderate intensity 8-hour breathing rate, and the FAH does not apply.

8.5 8-Hour Chronic Non-Cancer Analysis

Per OEHHA's Air Toxics Hot Spots Program: Risk Assessment Guidelines, the 8-hour chronic non-cancer hazard indices were calculated for worker receptors, residential receptors and sensitive receptors because the facility does not operate continuously. The default moderate intensity 8-hour breathing rate was used for the worker 8-hour chronic non-cancer risk analysis. The District calculated the 8-hour HI WAF in the same way as for the cancer WAF, described above in Section 8.4:
4.2 = (24 hours per day/8 hours per shift) * (7 days in a week/5 days in a work week).

8.6 Acute Non-Cancer Analysis

The acute hazard indices were calculated for all receptors using the simple screening analysis. The screening acute risk is a timesaving approximation that is conservative in nature. It is calculated by assuming that the contribution of risk from each source is at its maximum at the same instant in time. The maximum hourly risk from each source is summed to give the screening value, as if they had all occurred at the same time. In reality, the time that the risk from each source is at a maximum will differ depending on location and meteorology. Because the simple acute risk exceeded an HI of 1.0, the refined acute risk analysis was performed.

The only health endpoint that exceeded one was the immune system. Refined acute modeling was conducted for nickel as it was the only pollutant that contributed meaningfully (i.e., 99.97% contribution for all receptors with an acute HI > 1) to the immune system endpoint. The District conducted a separate

AERMOD run for the refined acute modeling that excluded all sources that did not emit nickel. In addition, only 59 receptors were included in the air dispersion run. The refined acute risk analysis was based on the nickel-only AERMOD run.

9.0 RESULTS

Risk assessment results at the point of maximum impact (PMI) and the maximally exposed individual resident (MEIR) and worker (MEIW) receptor locations for cancer and for chronic, 8-hour chronic, and acute non-cancer health effects are shown in Tables 9.1 through 9.5. The highest risk values for sensitive receptors are also shown in these tables. Risk management decisions are based on the bolded values.

Table 9.1: Cancer Risk at PMI, MEIR and MEIW Receptors

Type of Receptor	Receptor Number	Cancer Risk (in a million)	UTME (m)	UTMN (m)
PMI (Boundary Receptor)	25633	8.77	236439.00	3813195.00
MEIR	10634	0.74	236330.03	3812885.91
MEIW	12232	0.27	236405.03	3813135.91
Sensitive: Montessori Preschool	10791	**0.77**	236255.03	3812910.91
Sensitive: IVCC	25570	0.42	236521.93	3812892.94

Table 9.2: Chronic Non-Cancer Risk at PMI, MEIR and MEIW Receptors

Type of Receptor	Receptor Number	Chronic Non-Cancer HI	Health Endpoints	UTME (m)	UTMN (m)
PMI (Boundary Receptor)	25633	0.47	RESP	236439.00	3813195.00
MEIR	10634	0.042	RESP	236330.03	3812885.91
MEIW	12232	**0.05**	RESP	236405.03	3813135.91
Sensitive: Montessori Preschool	10791	0.043	RESP	236255.03	3812910.91
Sensitive: IVCC	25570	0.03	RESP	236521.93	3812892.94

Table 9.3: 8-Hour Chronic Non-Cancer Risk at PMI, MEIR and MEIW Receptors

Type of Receptor	Receptor Number	8-Hour Non-Cancer HI	Health Endpoints	UTME (m)	UTMN (m)
PMI: Worker Analysis (Boundary Receptor)	25633	0.0407	RESP	236439.00	3813195.00
MEIR	10634	0.0007	RESP	236330.03	3812885.91
MEIW	12232	**0.0117**	RESP	236405.03	3813135.91
Sensitive: Montessori Preschool	10791	0.0027	RESP	236255.03	3812910.91
Sensitive: IVCC	25570	0.0019	RESP	236521.93	3812892.94

Table 9.4: Screening Acute Non-Cancer Risk at PMI, MEIR and MEIW Receptors

Type of Receptor	Receptor Number	Screening Acute Non-Cancer HI	Health Endpoints	UTME (m)	UTMN (m)
PMI	12543	1.25	IMMUN	236430.03	3813185.91
MEIR	10320	0.30	RESP	236480.03	3812835.91
MEIW	12232	0.63	IMMUN	236405.03	3813135.91
Sensitive: Montessori Preschool	10790	0.31	RESP	236230.03	3812910.91
Sensitive: IVCC	25570	0.26	RESP	236521.93	3812892.94

There were six receptors with a screening acute hazard index greater than one. HARP 2 is unable to run a refined acute risk with the number of sources and receptors in the original analysis. For that reason, it was necessary to rerun the air dispersion for the refined acute risk to significantly reduce the number of receptors and sources. The acute risk driving tables (Tables 10.4-1, 10.4-2, and 10.4-4) show that the dominant driving pollutant for the immune system is nickel, making up 99.97 percent of the total risk. Furthermore, the immune system was the only health endpoint with an acute hazard index greater than 1.0. For these reasons, the refined risk analysis included only nickel. This allowed the air dispersion to be run with only ten sources instead of 76, significantly reducing the processing time and file size.

The refined acute analysis was run for all six receptors with a screening acute HI greater than one. The refined acute analysis showed a slightly different location for the point of maximum impact than the screening PMI by a few meters. The PMI for the screening acute risk occurs at Receptor No. 12543, located at UTME 236430.03 m, UTMN 3813185.91 m. The PMI for the refined acute risk occurs at Receptor No. 25631, located at UTME 236433 m, UTMN 3813180 m.

Table 9.5: Refined Acute Non-Cancer Risk (Immune System Endpoint)

Type of Receptor	Original Run Receptor No.	Refined Run Receptor No.	Refined Acute HI	Screening Acute HI	UTME (m)	UTMN (m)
PMI for Simple Acute (Grid)	12543	32	1.1435	1.2533	236430.03	3813185.91
Boundary Receptor	25631	35	1.1447	1.2163	236433	3813180
PMI for Refined Acute (Boundary Receptor)	25632	29	**1.1683**	1.2073	236438	3813189
Boundary Receptor	25633	28	1.0894	1.1636	236439	3813195
Grid	11921	56	1.1061	1.1095	236505.03	3813085.91
Boundary Receptor	25630	36	1.0114	1.015	236422	3813174

The PMI for the screening acute non-cancer risk is located west of the facility on Bollay Drive, approximately 7 meters from the property boundary, as shown in Attachments D and E.

The MEIR for the cancer, chronic non-cancer, and 8-hour chronic non-cancer risk is located at a residence to the southwest of the source, approximately 230 meters from the property boundary. The PMI for the cancer, chronic non-cancer, and 8-hour chronic non-cancer risks is located on the western property boundary. The MEIW for the cancer, chronic non-cancer, and 8-hour chronic non-cancer risks is located to the southwest of the facility, approximately 15 meters from the property boundary.

Attachment A shows the residential cancer risk isopleth of 1 in a million with the MEIR and PMI locations identified. There is no 10 in a million isopleth shown because none of the receptors have a calculated residential cancer risk of 10 in a million or greater. As none of the receptors have a calculated worker cancer risk of 1 in a million or greater, no worker cancer isopleths were created. For this reason, the MEIW location was also identified in Attachment A. Attachment B shows the residential chronic non-cancer hazard index isopleth of 0.1 with the MEIR and PMI locations identified. There is no chronic non-cancer hazard index isopleth of 1.0 shown because none of the receptors have a calculated residential chronic HI of 1.0 or greater.

As mentioned above, no worker cancer isopleths were plotted. Although there were no receptors with a chronic non-cancer hazard index above 0.1 at an actual worker location, the isopleth for receptors with a worker chronic HI above 0.1 was created. Attachment C shows that there are no actual offsite businesses or workers within the isopleth.

No isopleths were plotted for the 8-hour chronic non-cancer risk as there were no calculated 8-hour chronic non-cancer hazard indices above 0.1.

All resultant HRA risk data by receptor may be found in the *LMC2018HRA.zip* file referenced in the Attachments section of this report.

10.0 RISK DRIVER POLLUTANTS

10.1 Cancer Risk

The primary cancer risk driver pollutant for the PMI, MEIR, and the sensitive receptor at Montessori Preschool (Receptor No. 10791) is arsenic, which is primarily emitted by the combustion equipment (Source IDs BOILER1, BOILER2, BOILER3, BOILER4, BOILER5, and RTO), but is also emitted from the Amada and Unitek laser welders (Source IDs EF9_1 and EF9_2). PAHs, emitted solely from the combustion equipment, are a secondary risk driver. The primary cancer risk driver for the MEIW is cadmium, which is primarily emitted by the combustion equipment, but is also emitted from the Amada and Unitek laser welders. Tables 10.1-1, 10.1-2, and 10.1-3 show the contribution from the risk driver pollutants for the cancer risk at the PMI, MEIR, and MEIW, respectively. Table 10.1-4 shows the cancer risk driver pollutants for the sensitive receptor at Montessori Preschool.

Table 10.1-1: Risk Drivers[1] for Cancer Risk at the PMI – Receptor No. 25633

Pollutant	Cancer Risk by Pollutant (in a million)	Percent of Total Risk
Total	8.77	100%
Arsenic	5.12	58.3%
PAHs	1.71	19.5%
Cadmium	0.69	7.9%
Hexavalent Chromium	0.43	4.9%
Nickel	0.30	3.4%
Cobalt	0.19	2.1%
Diesel Particulate Matter (Diesel PM)	0.18	2.1%
Perchloroethylene	0.09	1.0%

Table 10.1-2: Risk Drivers[1] for Cancer Risk at the MEIR – Receptor No. 10634

Pollutant	Cancer Risk by Pollutant (in a million)	Percent of Total Risk
Total	0.74	100%
Arsenic	0.41	55.4%
PAHs	0.16	21.3%
Cadmium	0.06	8.7%
Diesel PM	0.04	5.2%
Hexavalent Chromium	0.02	3.3%
Nickel	0.02	2.6%
Cobalt	0.01	1.9%

Table 10.1-3: Risk Drivers[1] for Cancer Risk at the MEIW – Receptor No. 12232

Pollutant	Cancer Risk by Pollutant (in a million)	Percent of Total Risk
Total	0.270	100%
Cadmium	0.091	33.8%
Arsenic	0.051	18.7%
Diesel PM	0.039	14.5%
Nickel	0.028	10.6%
Cobalt	0.020	7.4%
Perchloroethylene	0.013	4.8%
PAHs	0.009	3.4%
Hexavalent Chromium	0.009	3.3%
Benzene	0.005	1.8%

[1] Pollutants contributing less than one percent to the total risk are not included.

Table 10.1-4: Risk Drivers[2] for Cancer Risk at Sensitive Receptor (Montessori Preschool) – Receptor No. 10791

Pollutant	Cancer Risk by Pollutant (in a million)	Percent of Total Risk
Total	0.77	100%
Arsenic	0.43	55.6%
PAHs	0.17	22.3%
Cadmium	0.07	9.1%
Diesel PM	0.03	4.3%
Hexavalent Chromium	0.02	2.8%
Nickel	0.02	2.4%
Cobalt	0.01	1.8%

10.2 Chronic Non-Cancer Risk

The primary chronic non-cancer risk driver pollutant for the PMI, MEIR, and MEIW is arsenic, which is primarily emitted by the combustion equipment, but is also emitted from the Amada and Unitek laser welders. The dominant health endpoint is the respiratory system. Tables 10.2-1, 10.2-2, and 10.2-3 show the contribution from the risk driver pollutants for the chronic non-cancer risk at the PMI, MEIR, and MEIW, respectively.

Table 10.2-1: Risk Drivers[2] for Chronic Non-Cancer Risk at the PMI – Receptor No. 25633 (Respiratory Endpoint)

Pollutant	Chronic HI by Pollutant	Percent of Total Risk
Total	0.473	100%
Arsenic	0.416	88.0%
Nickel	0.035	7.3%
Hydrochloric Acid	0.008	1.7%
Chlorine	0.005	1.1%

Table 10.2-2: Risk Drivers[2] for Chronic Non-Cancer Risk at the MEIR – Receptor No. 10634 (Respiratory Endpoint)

Pollutant	Chronic HI by Pollutant	Percent of Total Risk
Total	0.0416	100%
Arsenic	0.0333	79.9%
Hydrochloric Acid	0.0031	7.3%
Nickel	0.0022	5.4%
Hydrogen Fluoride	0.0016	3.7%
Chlorine	0.0009	2.1%

[2] Pollutants contributing less than one percent to the total risk are not included.

Table 10.2-3: Risk Drivers[3] for Chronic Non-Cancer Risk at the MEIW – Receptor No. 12232

Pollutant	Chronic HI by Pollutant	Percent of Total Risk
Total	0.052	100%
Arsenic	0.028	53.6%
Nickel	0.009	18.1%
Chlorine	0.006	10.6%
Hydrochloric Acid	0.005	8.8%
Hydrogen Fluoride	0.002	4.2%
Cadmium	0.001	2.5%

10.3 8-Hour Chronic Non-Cancer Risk

The primary 8-hour chronic non-cancer risk driver pollutant for the PMI, MEIR and MEIW is nickel. Nickel is emitted by the combustion equipment and laser welders. The dominant health endpoint is the respiratory system, followed by the immune system. Tables 10.3-1, 10.3-2, and 10.3-3 show the contribution from the risk driver pollutants for the chronic non-cancer risk at the PMI, MEIR, and MEIW, respectively.

Table 10.3-1: Risk Drivers[3] for 8-Hour Chronic Non-Cancer Risk at the PMI – Receptor No. 25633 (Respiratory Endpoint)

Pollutant	8-Hour Chronic HI by Pollutant	Percent of Total Risk
Total	0.0407	100%
Nickel	0.0339	83.3%
Arsenic	0.0051	12.6%
Acrolein	0.0010	2.5%
Formaldehyde	0.0005	1.2%

Table 10.3-2: Risk Drivers[3] for 8-Hour Chronic Non-Cancer Risk at the MEIR – Receptor No. 10634 (Respiratory Endpoint)

Pollutant	8-Hour Chronic HI by Pollutant	Percent of Total Risk
Total	0.00066	100%
Nickel	0.00052	78.9%
Arsenic	0.00010	14.8%
Acrolein	0.00002	3.3%
Formaldehyde	0.00001	1.7%
Ethylene Glycol Monobutyl Ether	0.00001	1.3%

[3] Pollutants contributing less than one percent to the total risk are not included.

Table 10.3-3: Risk Drivers[4] for 8-Hour Chronic Non-Cancer Risk at the MEIW – Receptor No. 12232 (Respiratory Endpoint)

Pollutant	8-Hour Chronic HI by Pollutant	Percent of Total Risk
Total	0.01168	100%
Nickel	0.00927	79.4%
Arsenic	0.00170	14.5%
Acrolein	0.00038	3.2%
Formaldehyde	0.00019	1.6%
Ethylene Glycol Monobutyl Ether	0.00015	1.3%

10.4 Acute Non-Cancer Risk

The screening acute non-cancer risk driver pollutant for the PMI and MEIW is nickel. Nickel is emitted by the combustion equipment and laser welders. The dominant health endpoint is the immune system. The screening acute non-cancer risk driver pollutant for the MEIR is ammonia, which is emitted by the Ammonia Image Reversal Chamber/Oven (Source ID 346_10), Fume Hood #13 (Source ID EF5_10), Fume Hood #25 (Source ID EF5_3), and Fume Hood #34 (Source ID EF5_1). The dominant health endpoint is the respiratory system. Tables 10.4-1, 10.4-2, and 10.4-3 show the contribution from the risk driver pollutants for the acute risk at the screening PMI, MEIR, and MEIW, respectively.

Table 10.4-1: Risk Drivers[4] for Screening Acute Risk at the (Screening) PMI Receptor No. 12543 (Immune System)

Pollutant	Acute HI by Pollutant	Percent of Total Risk
Total	1.2533	100%
Nickel	1.2529	99.97%
Benzene	0.0004	0.03%

Table 10.4-2: Risk Drivers[4] for Acute Risk at the MEIR Receptor No. 10320 (Respiratory System)

Pollutant	Acute HI by Pollutant	Percent of Total Risk
Total	0.3040	100%
Ammonia	0.1784	58.7%
Nitric Acid	0.0606	20.0%
Isopropyl Alcohol	0.0517	17.0%
Hydrogen Fluoride	0.0090	3.0%

[4] Pollutants contributing less than one percent to the total risk are not included.

Table 10.4-3: Risk Drivers[5] for Acute Risk at the MEIW Receptor No. 12232 (Immune System)

Pollutant	Acute HI by Pollutant	Percent of Total Risk
Total	0.6312	100%
Nickel	0.6310	99.97%
Benzene	0.0002	0.03%

11.0 RISK REDUCTION

Because LMC's risk results exceed the District's significant risk threshold for acute non-cancer risk, Health & Safety Code Section 44391 requires that LMC conduct an airborne toxic risk reduction audit and develop a plan to implement airborne toxic risk reduction measures that will result in the reduction of emissions that decrease risk below the significant risk level. LMC's Revised HRA Report notes that as part of a Risk Reduction Audit and Plan (RRAP), LMC will permanently remove the Unitek laser welder (EF9_2) from service. The Unitek laser welder has been out-of-service since September 2022. In addition, LMC plans to install a fume extractor on the Amada laser welder (EF9_1) with a control efficiency of 99 percent. The District will evaluate the risk reduction measures proposed in the formal RRAP to ensure that the risk will be reduced below the District's significance thresholds.

12.0 PUBLIC NOTIFICATION

Based on the HRA for inventory year 2018, LMC created a significant acute non-cancer risk on part of the public roadways surrounding their facility. Pursuant to Health & Safety Code Section 44362(b), LMC is required to notify the public of the significant risk.

13.0 CONCLUSION

Per District guidelines, if a facility's toxic emissions result in a cancer risk equal to or greater than 10 in a million, it is considered a *significant risk* facility. For non-cancer risk, if a facility's toxic emissions result in a Hazard Index greater than 1.0, it is considered a *significant risk* facility. The HRA results show that the Lockheed Martin - SB Focalplane stationary source, located in the Santa Barbara Business park, presented a significant acute non-cancer risk on public roadways immediately adjacent to LMC during 2018. For that reason, LMC will submit an RRAP to reduce the risk and conduct a public notification.

14.0 REFERENCES

- Risk notification levels were adopted by the Santa Barbara County Air Pollution Control Board of Directors on June 1993. The risk notification levels were set at 10 per million for cancer risk and a Hazard Index of greater than 1.0 for non-cancer risk.

[5] Pollutants contributing less than one percent to the total risk are not included.

- California Air Pollution Control Officers Association. August 2016. *Air Toxic "Hot Spots" Program Facility Prioritization Guidelines*. https://ww2.arb.ca.gov/sites/default/files/classic/ab2588/CAPCOA%20Prioritization%20Guidelines%20-%20August%202016%20FINAL.pdf
- California Air Resources Board. March 2022. *Emission Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program*. https://ww2.arb.ca.gov/our-work/programs/ab-2588-air-toxics-hot-spots/hot-spots-inventory-guidelines
- Office of Environmental Health Hazard Assessment. February 2015. *Air Toxics Hot Spots Program: Risk Assessment Guidelines*. California Environmental Protection Agency. http://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf.
- Santa Barbara County Air Pollution Control District. 2023. *Meteorological Data*. https://www.ourair.org/metdata/.
- Santa Barbara County Air Pollution Control District. December 2023. *Modeling Guidelines for Health Risk Assessments*. http://www.ourair.org/wp-content/uploads/apcd-15i.pdf.

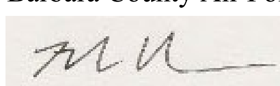
15.0 ATTACHMENTS

Source parameter data and HRA input and output files for this project may be found in the following location: \\sbcapcd.org\shares\Toxics\ActiveSourceFiles\SSID09313Lockheed_Martin\AB 2588 IY 2018\APCD HRA for AB 2588*LMC2018HRA.zip*

A – Residential Cancer Risk Isopleth
B – Residential Chronic Non-Cancer Risk Isopleth
C – Worker Chronic Non-Cancer Risk Isopleth
D – Screening Acute Non-Cancer Risk Isopleth of 1.0 Hazard Index
E – Screening Acute Non-Cancer Risk Isopleth of 0.1 Hazard Index
F – Facility Emissions Summary

16.0 PREPARER AND REVIEWER

This report was prepared by the Santa Barbara County Air Pollution Control District in December 2024.

Robin Cobbs		12/18/2024
Preparer	Signature	Date
Charlotte Mountain		12/19/2024
Reviewer	Signature	Date

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ATTACHMENT A

RESIDENTIAL CANCER RISK ISOPLETH

1 IN A MILLION RESIDENTIAL CANCER RISK ISOPLETH IN BLUE
PROPERTY BOUNDARY IN BLACK
PMI IN YELLOW; MEIR IN ORANGE; MEIW IN RED
SENSITIVE RECEPTORS IN GREEN

ATTACHMENT B

RESIDENTIAL CHRONIC NON-CANCER RISK ISOPLETH

0.1 HAZARD INDEX ISOPLETH IN BLUE
PROPERTY BOUNDARY IN BLACK
PMI IN YELLOW; MEIR IN ORANGE; MEIW IN RED
SENSITIVE RECEPTORS IN GREEN

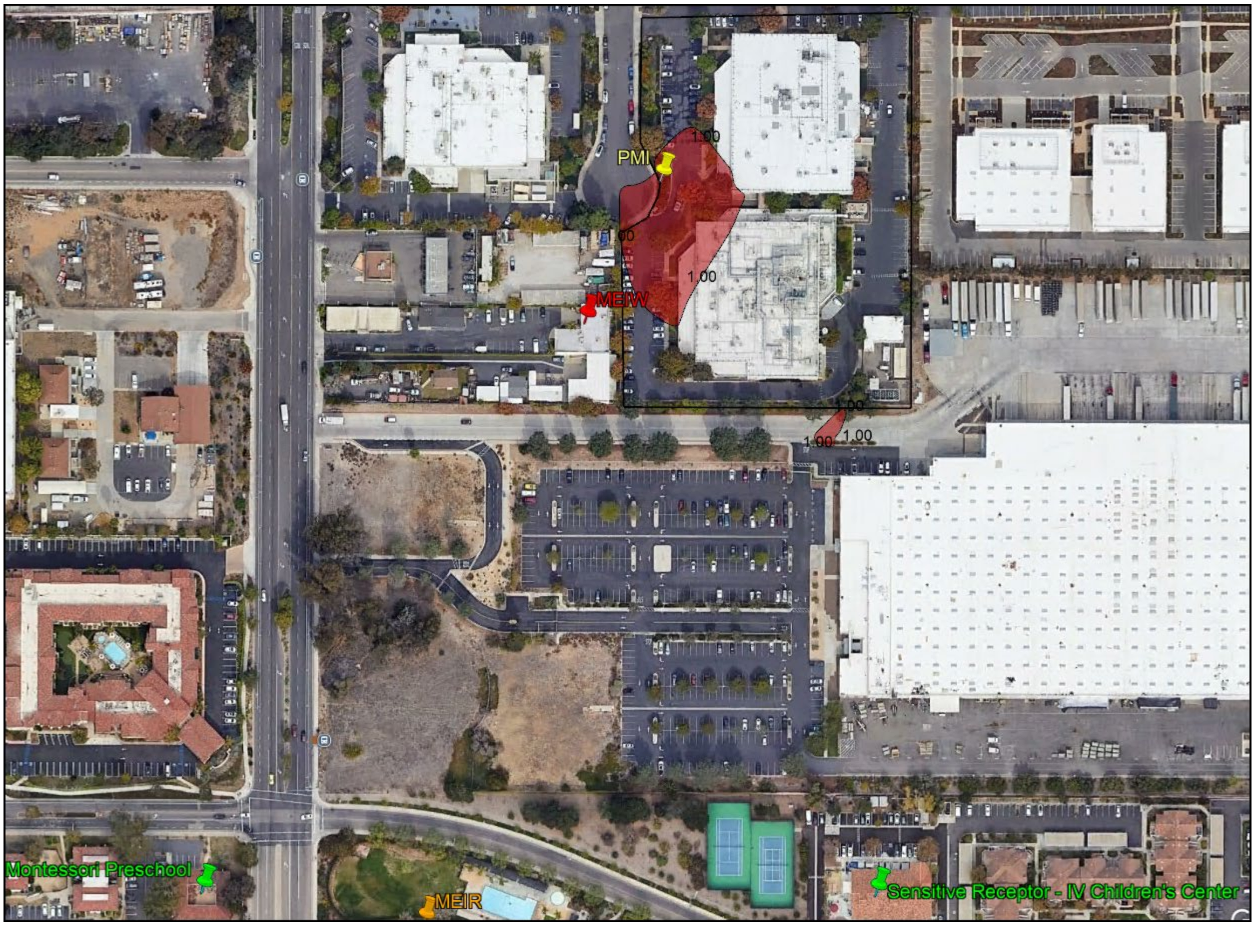
ATTACHMENT C

WORKER CHRONIC NON-CANCER RISK ISOPLETH

0.1 HAZARD INDEX ISOPLETH IN BLUE
PROPERTY BOUNDARY IN BLACK
PMI IN YELLOW; MEIW IN RED

ATTACHMENT D

SCREENING ACUTE NON-CANCER RISK ISOPLETH



SCREENING 1.0 HAZARD INDEX ISOPLETH IN RED
PROPERTY BOUNDARY IN BLACK
PMI IN YELLOW; MEIR IN ORANGE; MEIW IN RED
SENSITIVE RECEPTORS IN GREEN

ATTACHMENT E

SCREENING ACUTE NON-CANCER RISK ISOPLETH

SCREENING 0.1 HAZARD INDEX ISOPLETH IN BLUE
PROPERTY BOUNDARY IN BLACK
PMI IN YELLOW; MEIR IN ORANGE; MEIW IN RED
SENSITIVE RECEPTORS IN GREEN

ATTACHMENT F – FACILITY EMISSIONS SUMMARY[1]

Pollutant ID	Pollutant Name	lb/yr
75070	Acetaldehyde	2.46E-01
107028	Acrolein	1.54E-01
7429905	Aluminum	3.47E+00
1344281	Aluminum oxide	5.50E-01
7664417	Ammonia	1.34E+02
7440382	Arsenic	1.30E-02
7440393	Barium	2.51E-01
71432	Benzene	4.79E-01
7440417	Beryllium	7.47E-04
85687	Butyl benzyl phthalate	1.50E-02
7440439	Cadmium	6.29E-02
7782505	Chlorine	3.90E-01
108907	Chlorobenzene	2.21E-02
7440473	Chromium (total)	9.67E-02
18540299	Chromium, Hexavalent	7.65E-05
7440484	Cobalt	6.11E-03
7440508	Copper	5.22E-02
98828	Cumene	9.92E-03
80159	Cumene hydroperoxide	7.56E-02
110827	Cyclohexane	1.12E+00
9901	Diesel PM	2.29E-01
1091	Epoxy Resin	5.11E+01
100414	Ethyl benzene	7.05E-01
107211	Ethylene glycol	1.09E+00
111762	Ethylene glycol monobutyl ether	4.77E+00
68610413	Flexibilizer epoxy resin	1.65E-02
50000	Formaldehyde	1.01E+00
7647010	Hydrochloric acid	2.01E+02
7664393	Hydrogen fluoride	1.44E+02
123319	Hydroquinone	5.02E-03
67630	Isopropyl alcohol	1.84E+03
7439965	Manganese	3.18E-02
7439976	Mercury	1.49E-02
67561	Methanol	8.53E+01
78933	Methyl ethyl ketone	1.42E+01
108101	Methyl isobutyl ketone	1.35E+00
91203	Naphthalene	3.93E-02
71363	n-Butyl alcohol	7.63E+00
110543	n-Hexane	3.60E-01

[1] Pursuant to Section VIII.E.(3) of CARB's *Emission Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program* (EICG), all pollutants emitted on a facility-wide basis exceeding one-half the degree of accuracy listed in Appendix A-1 of CARB's EICG are quantified in the ATEIR, and risk is evaluated in the HRA. Pollutants emitted from the facility at less than one-half the degree of accuracy (e.g., lead), may not be quantified in the ATEIR, HRA, and Facility Emissions Summary. However, any omitted substance of negligible emissions (i.e., less than one-half the degree of accuracy) are required to be reported in a Supplemental Use and Production Information form in the ATEIR.

Pollutant ID	Pollutant Name	lb/yr
7440020	Nickel	2.12E-01
7697372	Nitric acid	1.51E+02
1151	PAHs	5.72E-03
127184	Perchloroethylene	1.49E+00
108952	Phenol	2.11E-02
7723140	Phosphorus	1.43E-02
85449	Phthalic anhydride	3.14E+00
115071	Propylene	4.18E+01
107982	Propylene glycol monomethyl ether	3.13E-03
108656	Propylene glycol monomethyl ether acetate	9.63E+01
14808607	Quartz	4.42E-02
7782492	Selenium	1.37E-03
7440224	Silver	2.21E-04
1310732	Sodium hydroxide	5.51E-03
108883	Toluene	1.56E+02
25551137	Trimethyl benzene	2.21E-02
95636	1,2,4-Trimethylbenzene	6.27E-03
7440622	Vanadium	1.34E-01
1330207	Xylenes	2.14E+00
7440666	Zinc	1.66E+00
1314132	Zinc oxide	1.27E-03