Lockheed Martin Missiles and Fire Control
Santa Barbara Focalplane

Facility ID 09424
Stationary Source ID 09313

SB1731 Risk Reduction Audit and Plan

for

AB 2588
California Air Toxics “Hot Spots”
Information and Assessment Act of 1987

March 14, 2025

Submitted to:
Santa Barbara County Air Pollution Control District
260 N San Antonio Rd, Ste A
Santa Barbara, CA 93110

Prepared by:
Lockheed Martin Missiles and Fire Control - Santa Barbara Focalplane
336/346 Bollay Drive
Goleta, California 93117

Table of Contents

1. Introduction

Lockheed Martin Missiles and Fire Control/Santa Barbara Focalplane (LMC) designs and manufactures infrared components, imaging systems, cameras and technologies. Product groups include Focalplane arrays and integrated FPA/Dewar assemblies. Production includes circuit card assembly, wet chemistry, dry etching, photolithography, vacuum deposition of thin films, dicing and thinning processes, surface coating of sub-assemblies, and various assembly processes. Reactive organic compound emitting processes include wipe cleaning, various solvent cleaning operations, the application of adhesives, sealants and coatings and the application and stripping of photoresist materials that are used during various steps of the manufacturing process. A regenerative thermal oxidizer is used to control ROC emissions from the facility.

A AB2588 Health Risk Assessment (HRA) was conducted and a detailed report along with the risk modeling files was submitted by AECOM and LMC to the Santa Barbara County Air Pollution Control District (SBCAPCD) on July 1, 2024. On December 19. 2024, SBCAPCD submitted a revised HRA to the Office of Environmental Health Hazard Assessment (OEHHA) for review after emissions were revised based on the manufacturing schedule. In a letter dated January 9, 2025, SBCAPCD designated LMC as a Potentially High-Risk Facility under Health & Safety Code 44931(f). LMC is required to submit a Risk Reduction and Audit Plan (RRAP) to SBCAPCD by May 19, 2025.

1.1 Facility Location

In 2018 (the emission inventory year for the HRA), the LMC facility was comprised of two buildings located at 336 and 346 Bollay Drive in the City of Goleta, California. LMC leased the building at 340 Storke Road in 2021. The facility is located in the Santa Barbara Business Park and is immediately surrounded by similar commercial and light industrial facilities. It is located about 16 kilometers (km) west of downtown Santa Barbara and about 1 km west of the Santa Barbara Airport.

Figure 1 in Attachment A details the location and property line of the facility.

1.2 Facility Operating Schedule

The LMC facility typically operates Monday through Friday from 5:00 AM to 2:00 AM, with work split between two separate shifts. The facility typically operates year-round for a total of 51 weeks per year. The HRA accounts for the operating schedule of each device, based on device operating schedules and interviews with equipment operators, and used the HRDOW and HRDOW7 variable emission keyword options in AERMOD. In order to account for multiple devices with differing operating schedules being vented through the same stack or release point, each operating schedule from the same release point was assigned a unique model identification (Model ID) with identical release parameters, but different variable emission scenarios selected.

2. HRA Modeling Assumptions

Emissions from the calendar year 2018 inventory for LMC were used to perform the HRA.

The dispersion modeling and the HRA were conducted using the American Meteorological Society/U.S. Environmental Protection Agency's (EPA's) regulatory short-range dispersion model, AERMOD, and California Air Resources Board's (CARB) HotSpots Analysis and Reporting Program (HARP2). AERMOD (version 23132) was used to estimate pollutant concentrations at specific distances from project emission sources, in conjunction with representative meteorological data. The meteorological dataset that was determined to be the most representative of the project area was the Santa Barbara Airport. AERMOD was run default mode without the consideration of any urban source options for all sources modeled.

In order to account for building downwash effects, the facility and surrounding structures were evaluated to determine if they are located sufficiently close to emissions sources to cause wake effects. Receptors with 25-meter spacing were placed along the fence-line of the facility. Additionally, a grid of receptors with 25-meter spacing were placed out to a distance of 2 km from the fence-line of the facility. This receptor grid adequately captures the surrounding areas containing the potential maximum exposed individual resident (MEIR), maximum exposed individual worker (MEIW), and any sensitive receptors such as schools, daycare facilities, hospitals, and senior care facilities.

AERMOD was run using unit emissions. Each source was modeled assuming emissions of 1 gram per second (g/s) for point sources and volume sources. The unitized AERMOD results for each source are output in micrograms per cubic meter ($\mu g/m^3$) per g/s [$(\mu g/m^3)(g/s)^{-1}$]. The maximum hourly and period-average concentration plot files generated by AERMOD were used as input to HARP2 (version 22118) with corresponding TAC emission rates. HARP2 incorporates the most recent approved health data, which are contained in the Consolidated Table of OEHHA/CARB Approved HRA Health Values. The health.mdb file used by HARP2 was version 23279, dated October 6, 2023. Modeling assumptions were based on the guidelines in SBCAPCD Form-15i (December 2023). Based on the emissions inventory and discussions with LMC personnel, sources were grouped into point (e.g., stack) and volume (e.g., fugitive from a work bay). These sources and their modeling parameters are presented in **Table 1**. All geographic coordinates used in the HRA are expressed in Universal Transverse Mercator coordinates in NAD83, zone 11. Figures 2 and 3 in Attachment A detail the locations of release points for buildings located at 336 and 346 Bollay Drive, respectively.

2.2 Receptor Exposure and Health Risk Characterization

The modeled sources assessed health risk for the following exposure scenarios:

PMI – Point of maximum impact for any receptor located within the modeling grid based on a 30-year lifetime exposure period.

MEIR – Maximum-exposed individual resident based on a 30-year lifetime exposure period. The MEIR assumes an exposure of 24 hours per day and 350 days per year.

Sensitive – Assumed to equal the 30-year lifetime exposure period used to calculate the MEIR. This is very conservative as the exposure period at an elementary or high school would be less than 10-years. For senior-living sensitive receptors, the starting age for exposure would be much higher, resulting in a lower age sensitivity factor.

MEIW – Maximum-exposed individual worker based on a 25-year lifetime exposure period. The MEIW assumes an exposure of 8 hours per day, and 250 days per year and a starting age of 16 years.

Table 1. Dispersion Sources

Source ID	Source	Height (m)	Temp (K)	Velocity (m/s)	Diameter (m)	σY (m)	σZ (m)	UTM Easting (m)	UTM Northing (m)
336[1]	Camera Lab 3D Printers, Benchtop, Test Station and Paint Booth. Other benchtops and fume hoods.	4.1	--	--	--	15.51	3.97	236490.74	3813222.19
346[1,2]	Abrasive Blasting, Annealing Furnace, Epoxy Ovens and Curing. Benchtops and fume hoods. IPG laser welder. Misc. tools and printers.	4.12	--	--	--	14.14	3.83	236475.26	3813145.36
EF3[2]	Fume Hood #23	6.4	Ambient	10.64	0.51	--	--	236505.74	3813152.04
EF4[2]	Fume Hood #32, Turning Machines	9.75	Ambient	9.28	0.51	--	--	236497.40	3813137.62
EF5[2]	Automated Polisher, Die Cleaning System. Fume hoods. Cleaners.	10.67	Ambient	20.70	1.06	--	--	236494.27	3813154.90
EF6[2,3]	Fume Hood #24, Cold Shield Cleaning System.	8.48	Ambient	1.32	0.48	--	--	236488.80	3813152.04
EF9[2]	Amada Laser Welder, (Unitek) Laser Welder 1.	8.48	Ambient	4.08	0.25	--	--	236475.69	3813155.88
PB[2]	Dewar Paint Booth	7.93	Ambient	5.75	0.46	--	--	236467.09	3813181.56
RTO	Fume Hoods and Coaters routed to Regenerative Thermal Oxidizer	6.71	349.82	15.52	0.76	--	--	236522.14	3813176.97
BOIL1	Natural Gas Boiler	9.30	438.25	5.03	0.41	--	--	236493.32	3813146.38
BOIL2	Natural Gas Boiler	9.30	438.25	5.03	0.41	--	--	236495.31	3813146.42
BOIL3	Natural Gas Boiler	9.57	438.25	5.03	0.41	--	--	236497.25	3813146.44
BOIL4	Natural Gas Boiler	9.30	438.25	5.03	0.41	--	--	236502.60	3813246.68
BOIL5	Natural Gas Boiler	9.30	438.25	5.03	0.41	--	--	236501.04	3813226.31
DICE	Diesel Emergency Engine	2.53	772.59	65.03	0.13	--	--	236508.04	3813135.77

[1] Volume source.
[2] Source information revised from February 2021 LMC Modeling Protocol Tables for ATEIP.xlsx based on site inspection.
[3] Point source release that is oriented horizontally. All other point sources release vertically.

3. HRA Results

The HRA results were compared to the SBCAPCD significant thresholds listed in **Table 2**.

Table 2. SBCAPCD HRA Significance Thresholds

Risk Type	Significance Threshold
Maximum Incremental Cancer Risk	10 in 1 million
Chronic 8-hour & Acute Hazard Index	1.0

Table 3 summarizes the acute health risks associated with the operation of the LMC facility. The non-cancer acute PMI is over the significance threshold and is the focus of this RRAP. All other cancer and non-cancer health risks were found to be below their respective significance thresholds. Isopleths overlaid on an aerial photo map was generated for non-cancer acute risk and is provided in Attachment B. HARP2's Simple Acute Risk methodology assumes the maximum 1-hour concentration for each source occurs at the receptor at the same time. As noted in Section 1.2, each operating schedule from the same release point was assigned a unique model identification (Model ID), therefore a number of sources are counted more than once; therefore, the results in **Table 3** are conservative.

Table 3. Summary of Acute Non-Cancer Health Risk Results

Receptor Type	Receptor No.	UTME (m)	UTMN (m)	Acute HI	Health Endpoint(s)	Significance Threshold (HI)
Offsite PMI	12543	236,430.03	3,813,185.91	**1.25**	IMMUN	>1
MEIR	10320	236,480.03	3,812,835.91	0.30	RESP	>1
MEIW	12232	236,405.03	3,813,135.91	0.63	IMMUN	>1
Sensitive (Montessori Preschool)	10790	236,230.03	3,812,910.91	0.31	RESP	>1

Notes: PMI = Point of Maximum Impact; MEIR = Maximum Exposed Individual Resident; MEIW = Maximum Exposure Individual Worker; Sensitive Receptor(s) = Maximum of sensitive receptors modeled; UTME = Universal Transverse Mercator Easting; UTME = Universal Transverse Mercator Northing; Bold denotes exceeds threshold.

There were six receptors with a screening acute risk greater than one. As discussed above, the acute risk results are conservative. Refined Acute Risk modeling was conducted for Nickel as that pollutant contributes more than 99 percent of the risk for the Immunity organ group, which is the only group that exceeds the acute risk threshold. **Table 4** summarizes the results from the Refined Acute Risk modeling. The acute risk remains above the significance threshold.

Table 4. Summary of Refined Acute Non-Cancer Health Risk Results

Receptor Type	Receptor No.	UTME (m)	UTMN (m)	Acute HI	Health Endpoint(s)	Significance Threshold (HI)
Offsite PMI	25632	236,438	3,813,189	**1.17**	IMMUN	>1

Notes: PMI = Point of Maximum Impact; UTME = Universal Transverse Mercator Easting; UTME = Universal Transverse Mercator Northing; Bold denotes exceeds threshold.

The risk drivers by pollutant for acute risk are presented for the PMI in **Table 5**.

Table 5. Simple Acute Non-Cancer Risk by Pollutant at the PMI

Pollutant	Acute Non-Cancer Risk Contribution at the PMI (HI)	Percentage Contribution to Total Cancer Risk
Total	1.2533	100%
Nickel	1.2529	99.97%
Benzene	0.0004	0.03%

The significant culpable sources are listed in **Table 6** for the Simple Acute Risk.

Table 6. Simple Acute Non-Cancer Risk by Source at the PMI

Pollutant	Acute Non-Cancer Risk Contribution at the PMI (HI)	Percentage Contribution to Total Cancer Risk
Total	1.2533	100.0%
Amada Laser Welder (EF9_1)	0.6718	53.6%
Unitek Laser Welder (EF9_2)	0.5702	45.5%
BOIL4	0.0031	0.2%
BOIL1	0.0018	0.1%
BOIL3	0.0017	0.1%
RTO	0.0017	0.1%
BOIL2	0.0013	0.1%
BOIL5	0.0012	0.1%
Other	< 0.01	<0.1%

Notes: Other represents all remaining sources with individual contribution percentage less than five percent.

The results above exceed the AB2588 threshold for acute risk. The highest contributing sources are the Amada laser welder and the Unitek laser welder. As presented in **Table 6**, the acute risk at the PMI is driven by the Amada laser welder (EF9_1) and the Unitek laser welder (EF9_2) as they both emit from the same stack. A similar welder, the IPG laser welder, has a BOFA AD Oracle iQ fume collector which removes 99.97% of nickel emissions.

4. Risk Reduction Action Plan

As part of a Risk Reduction Action Plan, LMC will permanently remove the Unitek laser welder (Model ID: EF9_2) from their operating permit as it has been out of service due to needed repairs since September 2022. The unit will be removed from the permit within one year. In addition, LMC installed a fume extractor on the Amada laser welder (Model ID: EF9_1) on September 16, 2024. This reduces particulate metal emissions by 99.97 percent. The installation and operating manual is provided in Attachment C. Any future laser welders will also be installed with a fume extractor to minimize emissions and risk.

5. Residual Facility Risk Characterization

The risk reduction measures/modifications that are identified/proposed in this RRAP are expected to significantly reduce the calculated health risk impacts. The emissions inventory was updated to reflect the removal of the Unitek laser welder from the permit and the installation of the fume extractor on the Amada laser welder. All other parameters remained the same. The revised acute risk values are summarized in **Table 7**.

Table 7. Summary of Acute Non-Cancer Health Risk Results

Receptor Type	Receptor No.	UTME (m)	UTMN (m)	Acute HI	Health Endpoint(s)	Significance Threshold (HI)
Offsite PMI	25631	236433.00	3813180.00	0.96	RESP	>1
MEIR	9360	236480.03	3812685.91	0.32	RESP	>1
MEIW	12077	236405.03	3813110.91	0.62	RESP	>1
Sensitive (Montessori Preschool)	10790	236,230.03	3,812,910.91	0.31	RESP	>1

Notes: PMI = Point of Maximum Impact; MEIR = Maximum Exposed Individual Resident; MEIW = Maximum Exposure Individual Worker; Sensitive Receptor(s) = Maximum of sensitive receptors modeled; UTME = Universal Transverse Mercator Easting; UTME = Universal Transverse Mercator Northing.

With the implementation of the RRAP, the health risk impacts will be reduced below the applicable threshold. **Table 8** summarizes the acute non-cancer risk by source after implementation of the RRAP. The primary contributor is Fume Hood #34 (Model ID EF5_1).

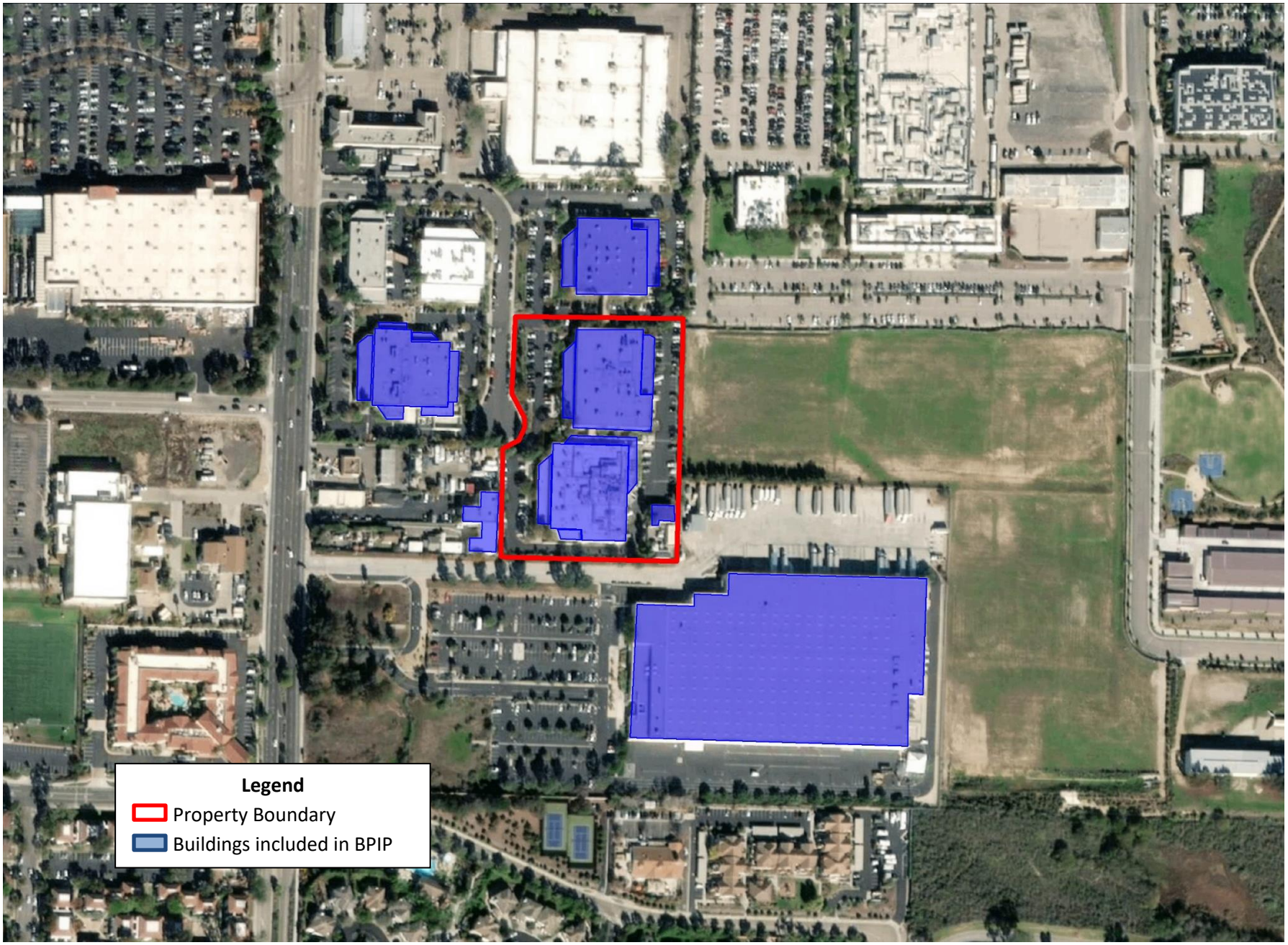
Table 8. Simple Acute Non-Cancer Risk by Source at the RRAP PMI

Pollutant	Acute Non-Cancer Risk Contribution at the PMI (HI)	Percentage Contribution to Total Cancer Risk
Total	0.960	100.0%
EF5_1	0.526	54.3%
EF3	0.096	9.9%
EF5_6	0.071	7.3%
EF4_1	0.060	6.2%
PB	0.031	3.2%
EF5_10	0.029	3.0%
EF5_3	0.020	2.1%
346_20	0.019	2.0%
EF5_9	0.019	1.9%
EF6_1	0.017	1.7%
Other	0.072	8.6%

Notes: Other represents all remaining sources.

Attachment A

Figures



AECOM

Figure 1
Facility Property Line and Buildings Included in BPIP

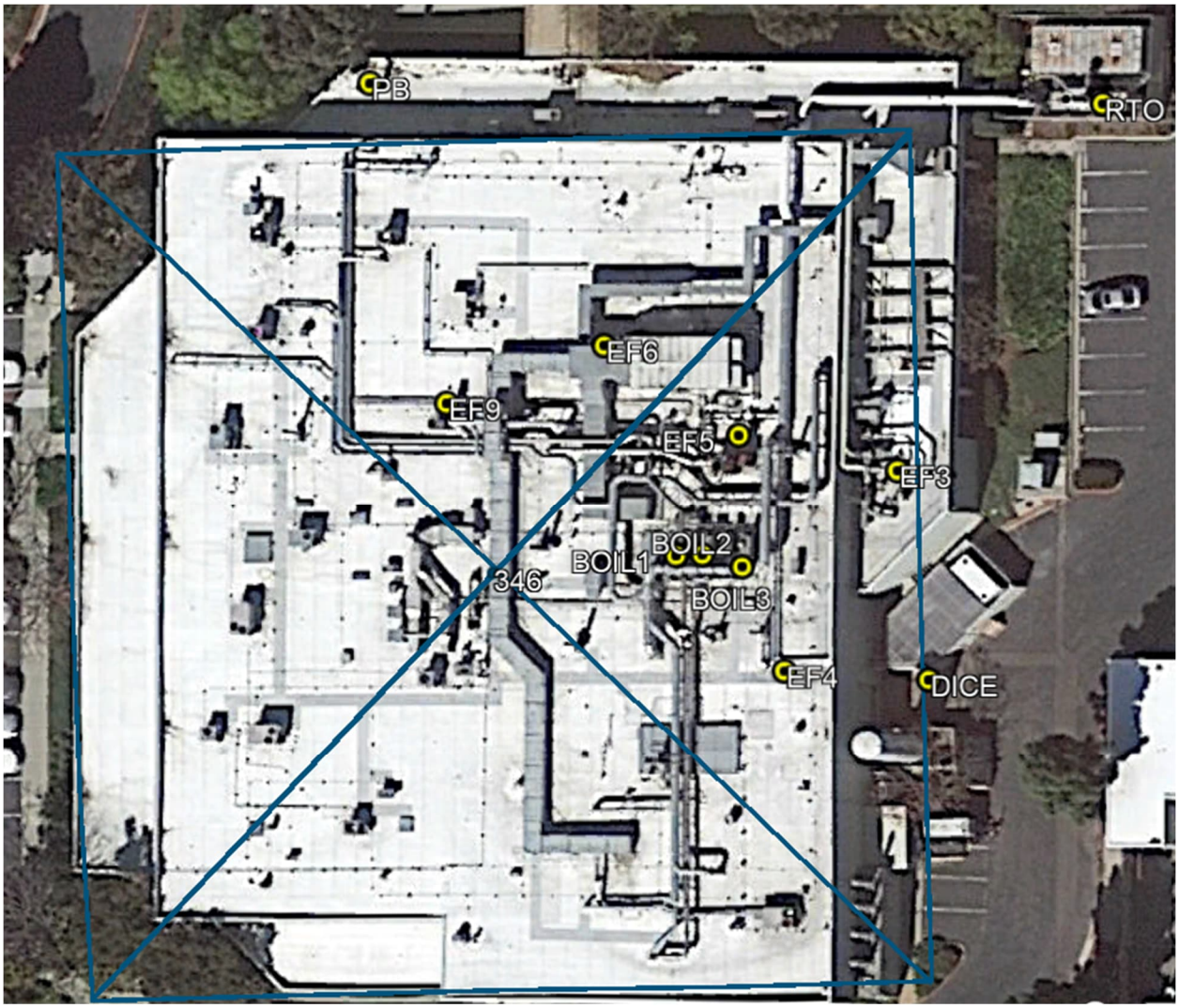
Legend

Point Source

Volume Source

AECOM

Figure 2
336 Bollay Drive Emission Source Release Points



Legend

Point Source

Volume Source

AECOM

Figure 3
346 Bollay Drive Emission Source Release Points

AECOM

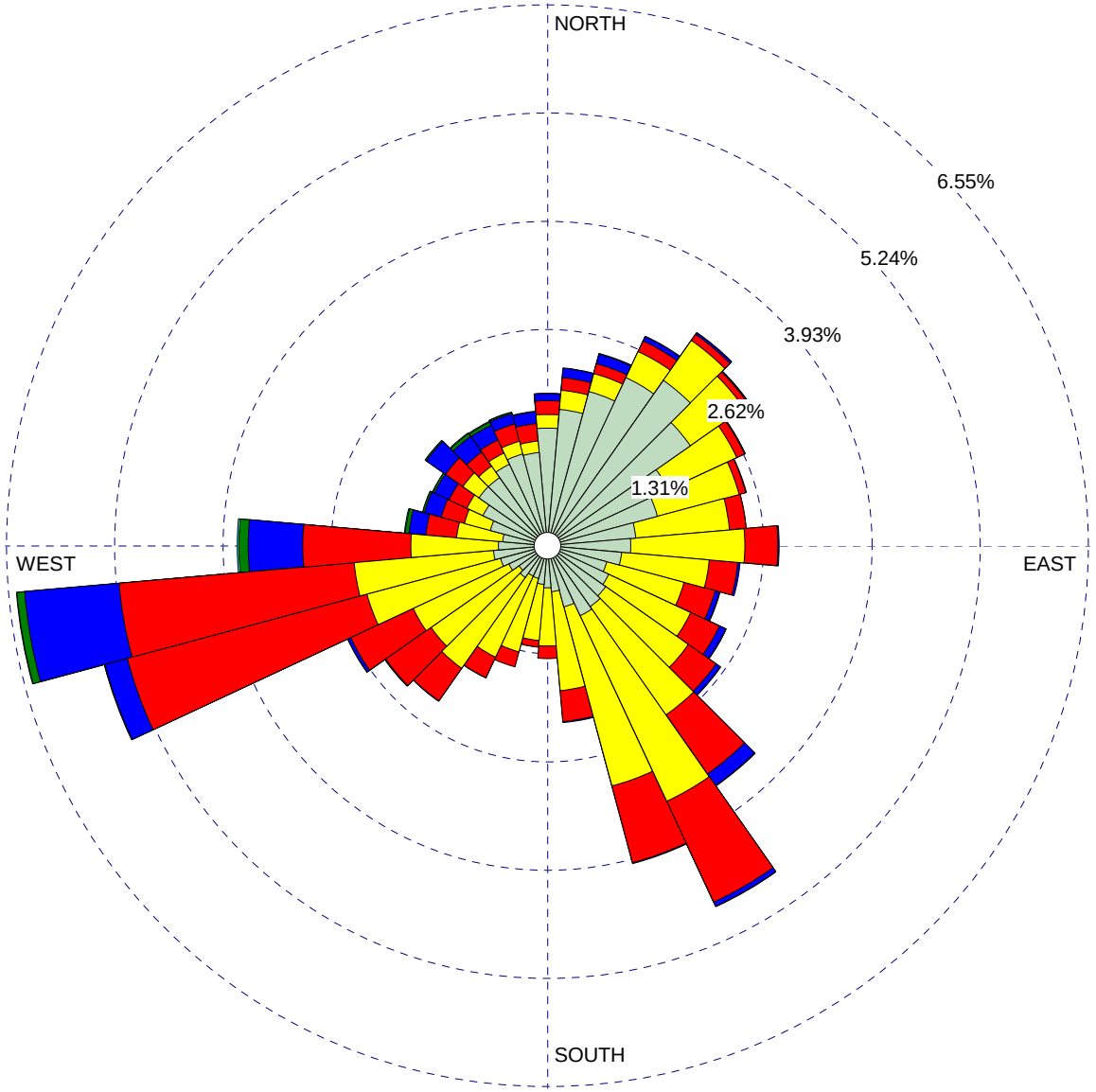
Figure 4
Sensitive Receptor Locations

WIND ROSE PLOT:

Santa Barbara Airport 2012-2016
U* Adjustment

DISPLAY:

Wind Speed
Direction (blowing from)



DATA PERIOD:

Start Date: 1/1/2012 - 00:00
End Date: 12/31/2016 - 23:59

TOTAL COUNT:	CALM WINDS:
43496 hrs.	**7.37%**

AVG. WIND SPEED:

2.61 m/s

DATE:

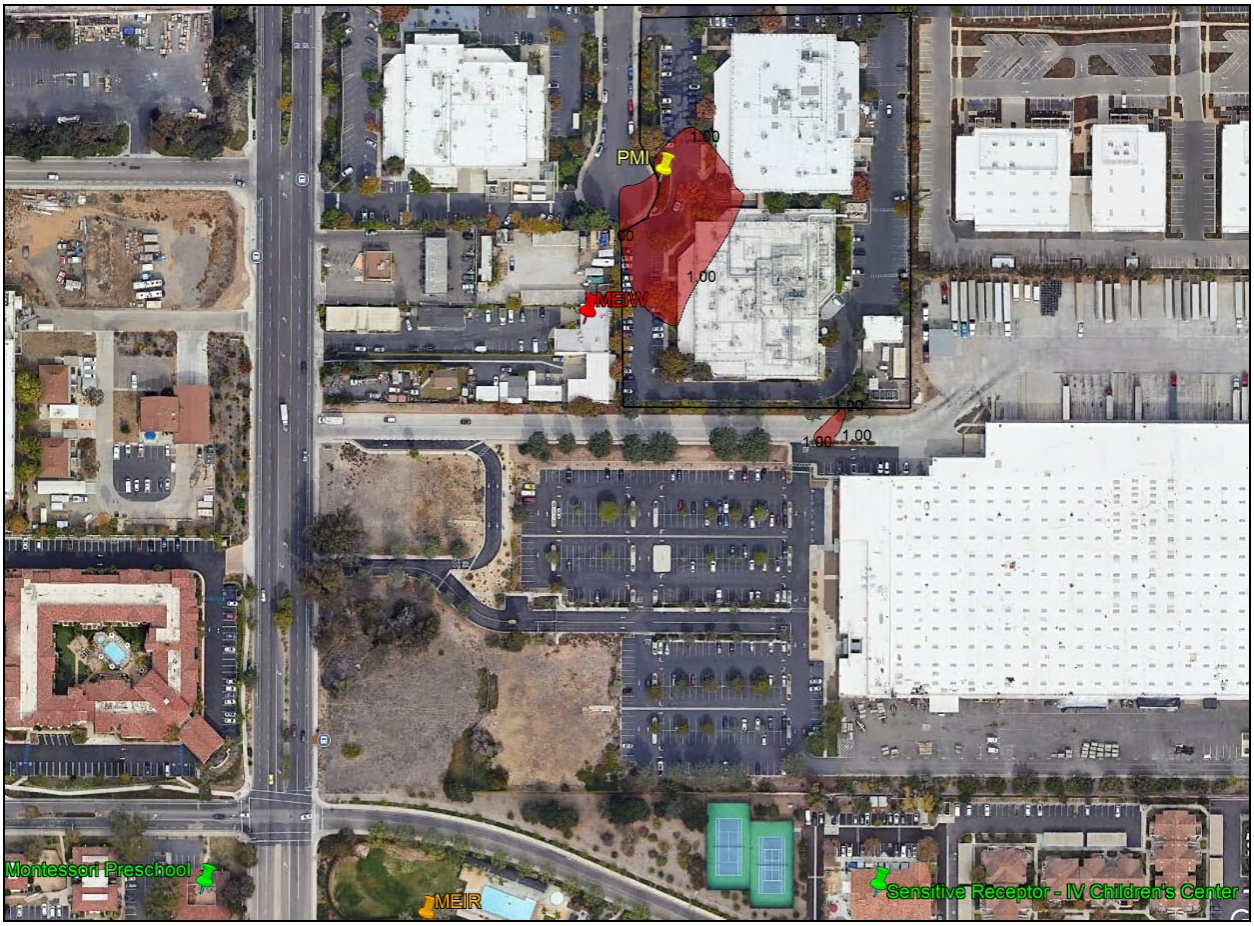
1/23/2019

Attachment B

Isopleth Maps Displaying HRA Results

ATTACHMENT B

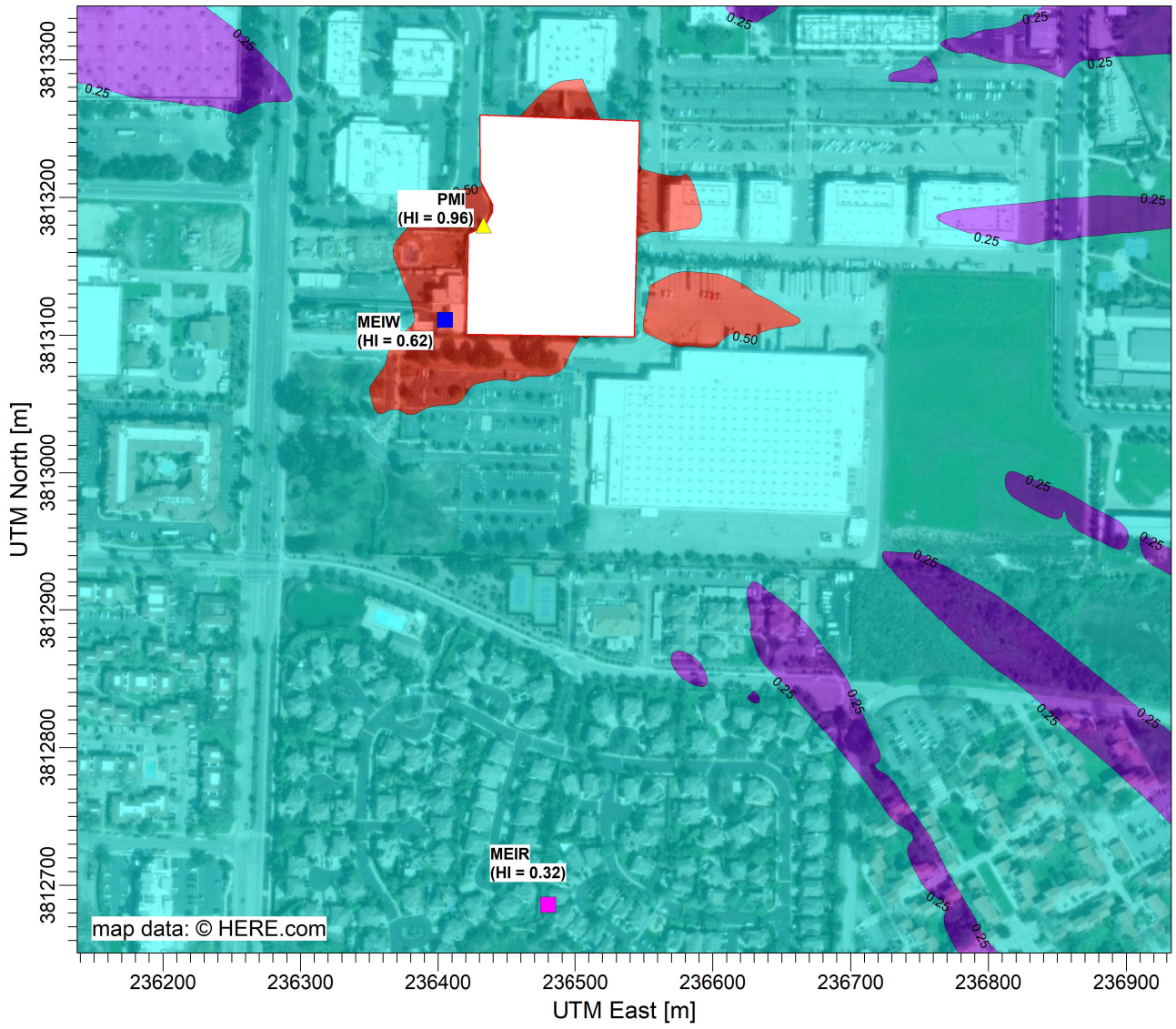
SCREENING ACUTE NON-CANCER RISK ISOPLETH



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

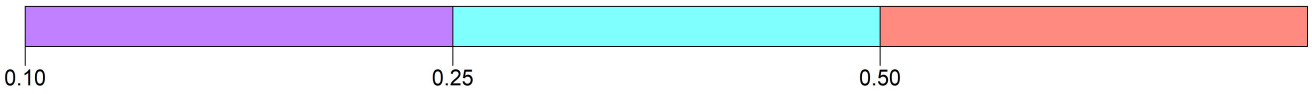
PROJECT TITLE:

LMC HRA
RRAP Acute Risk



PLOT FILE OF HIGH 1ST HIGH 1-HR VALUES FOR SOURCE GROUP: ALL ug/m^3

Max: 0.96 [ug/m^3] at (236433.00, 3813180.00)

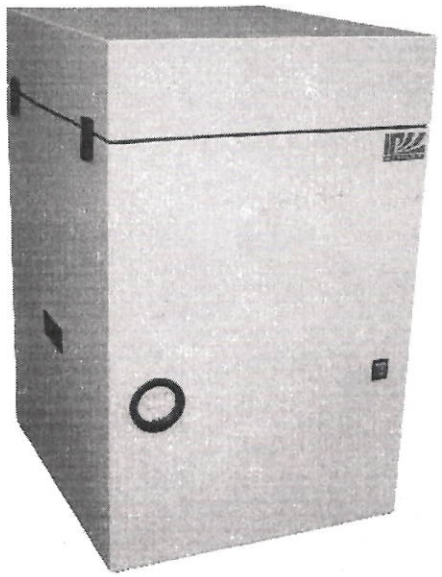


COMMENTS:	SOURCES: **76**	COMPANY NAME: **AECOM**	
	RECEPTORS: **25636**	MODELER: **M. Kaplan**	
	OUTPUT TYPE: **Concentration**	SCALE: 1:5,000 (0 — 0.1 km)	
	MAX: **0.96 ug/m^3**	DATE: **3/11/2025**	PROJECT NO.:

Attachment C

Fume Extractor Installation and Operation Manual

SYSTEMS



Installation and Operating Manual

Model F1800C
Model F1800PG
Model F1802C
Model F1802PG
Model F1806C
Model F1806PG
Model F1860C
Model F1860PG
Model F1866C
Model F1866PG

www.ipsystemsusa.com

Contents

Safety Warnings ⚠

CAUTION: When using electrical devices, the following basic safety measures must be followed in order to prevent shock, injury, or fire.

CAUTION: Electrical connection must be done by a certified electrician in accordance with all applicable codes.

For safe and successful operation of this equipment, please read this user guide completely. If the instructions stated herein are not observed or followed, the manufacturer cannot assume responsibility for any harm or damage to the operator or equipment. Please retain this manual for future reference.

Always disconnect the power supply before servicing the equipment.

Do not operate this equipment without filter inserts as contaminants in the extracted air will damage the blower. Use only filters recommended or supplied by IP Systems.

The F1800 is designed for the removal of fumes and gases only. Consult your company's Safety Department when using this equipment for filtering flammable gases. This equipment is not explosion safe and can **only** be used for the extraction of vapors that have concentration level well below the lower explosive limit.

Consult your Safety Department if the concentration level of fumes exceed the permissible "safety limit" as set by your local authority in order to ensure that the equipment is adequate for your application.

The blower motor of this equipment is protected with an automatic thermal overload device and will restart automatically after the motor has cooled down.

This equipment is to be repaired only by IP Systems or its authorized Service Representative while it is under warranty.

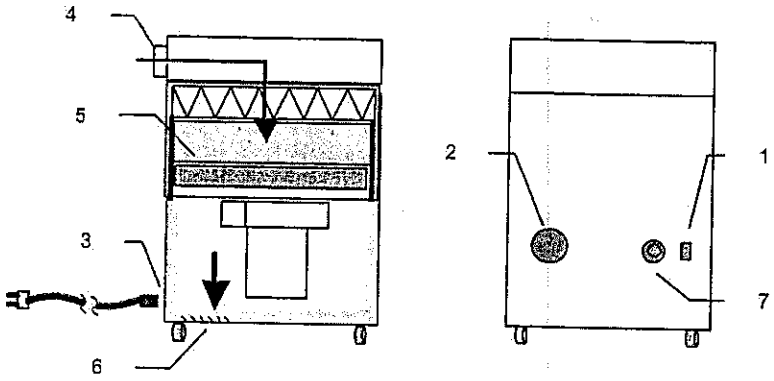
Items supplied

1 - Filter unit with filters installed
1 - Power cord (110VAC or 230VAC)
1 - User Guide

Description

Parts and Functions

(1) On / Off switch
(2) Filter Monitor (Differ. Pressure Gauge)
(3) Power inlet and circuit breaker
(4) Air inlet - port sizes vary by model number.
(5) Filters
(6) Air outlet
(7) Volume Control (only models F1860 / F1866)



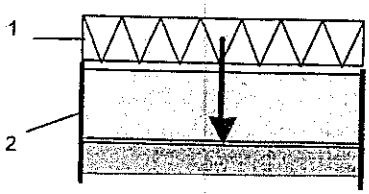
Model Variations

Model Number	Power Supply	Filtration
F1800C	115 VAC, 60 Hz	Pre / HEPA / Gas
F1800PG	115 VAC, 60 Hz	Pre / HEPA / Deep-Bed Gas
F1802C	230 VAC, 60 Hz	Pre / HEPA / Gas
F1802PG	230 VAC, 60 Hz	Pre / HEPA / Deep-Bed Gas
F1806C	230 VAC, 50 Hz	Pre / HEPA / Gas
F1806PG	230 VAC, 50 Hz	Pre / HEPA / Deep-Bed Gas
F1860C	115 VAC, 50/60 Hz	Pre / HEPA / Gas
F1860PG	115 VAC, 50/60 Hz	Pre / HEPA / Deep-Bed Gas
F1866C	230 VAC, 50/60 Hz	Pre / HEPA / Gas
F1866PG	230 VAC, 50/60 Hz	Pre / HEPA / Deep-Bed Gas

HEPA = Highly Efficient Particulate Arrestor

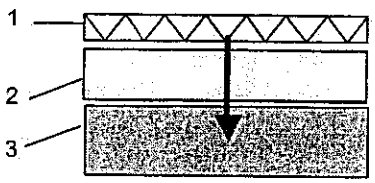
Models with Pre / HEPA / Gas filtration (all "C" models):

Supplied with a Pre-filter (1) and a Combination-filter (HEPA / Gas) (2. These models are designed for the removal of solder, laser-, and other fumes which have a high particulate content.



Models with Pre / HEPA / Deep-Bed Gas filtration (all "PG" models):

Supplied with a Pre-filter (1), a HEPA filter (2) and a high capacity Gas-filter (3). These models are designed for a highly efficient filtration of gases, odors as well as particulates.



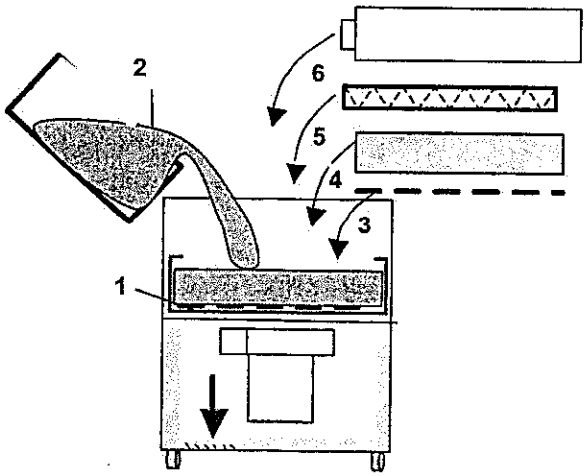
⚠ For use on "flammable" gases refer to "Safety Warnings" above.

Installation

Set-Up

⚠ Do not operate Models F1800PG, F1802PG, F1806PG, F1860PG and F1866PG before removing shipping bag of carbon from inside of unit.

- Filling of carbon tray on Models F1800PG, F1802PG, F1806PG, F1860PG and F1866PG
  - Open up unit and remove pleated filter (**5**) and HEPA filter (**4**).
  - Remove box filled with bulk carbon located inside metal tray.
  - Open box and place one blue filter mat onto bottom of metal tray (**1**).
  - Pour carbon (**2**) from bag into tray and distribute carbon evenly in tray.
  - Place second blue mat (**3**) on top of carbon.
  - Place HEPA filter (**4**) on top of carbon tray and then pleated Prefilter (**5**).
  - Place lid (**6**) back on unit and close latches.



Note: the above steps are not necessary on Models F1800C, F1802C, F1806C, F1860C and F1866C. These units have a Combi-Filter HEPA/Carbon.

- Position equipment in the work area and make sure there is ample access to the unit for filter maintenance.
- Connect extraction hoses to the air inlets.
- Connect the power cord to the equipment and to a grounded wall socket.
- Follow operating and maintenance procedures stated in this user guide.

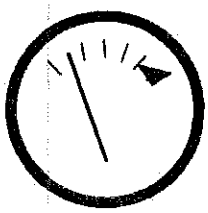
Operation

⚠ **Do not operate the equipment without installing filters. Unfiltered air contaminants may damage motor bearings and other components. Use only factory recommended filters.**

- Switch (1) turn the equipment ON / OFF
- Monitor gauge (2) for filter condition
- Use Volume Control (7) to adjust airflow rate – only models F1860 / F1866

Maintenance

Filter Replacement Timing



- Models with Pre / HEPA-Carbon filters (all "C" models)
  - When the gauge needle falls into the red marked field, it is time to change filters.
    Change pre-filter first. If the needle of the analog gauge remains near to the "red" mark, also replace the HEPA/Carbon filter.
- Models with Pre / HEPA / Deep-Bed Gas filter (all "PG" models)
  - When the gauge needle falls into the red marked field, it is time to change the particulate filters. Change pre-filter first. If the needle of the analog gauge remains near to the "red" mark, also replace the HEPA filter.
  - When odor is noticeable in the exhaust air, change the carbon of the gas-filter.

Filter Replacement Procedure

- Turn equipment off and disconnect the power source
- Unlatch the lid of the filter unit
- Remove the lid
- Replace filters
- Place lid back on and close the latches
- Reconnect to power source and turn unit on

Always use new replacement filters from the original manufacturer! Do not try to clean the filters!

Filter Disposal

Keep "used" filters in disposable bags or closed containers to avoid contamination of other areas. While the filter material is none-hazardous, the contaminants captured inside the filter may be hazardous. Please consult the MSDS sheets for the material used at your facility and follow the prescribed handling instructions. Follow your local regulations for disposal of used filters.

Troubleshooting

Problem	Possible Cause	Check and Correction
Equipment does not turn on	No power	Check ON / OFF switch Check power cord connections and integrity Check circuit breaker (at rear of unit) Automatic thermal overload stopped the motor. Wait until motor has cooled down.
Minimum air flow	Air leak	Check lid for properly closure and latching
	Air blockage	Check extraction hose for any blockage Check filter monitor for filter saturation

Technical Data

Model No.	F1800C (F1802C)	F1800PG (F1802PG)	F1806C	F1806PG
Fan capacity	700 cfm	700 cfm	900 m3/h	900 m3/h
System capacity	400 cfm	300 cfm	600 m3/h	500 m3/h
Sealed Vacuum	4.8" WG	4.8" WG	1075 Pa	1075 Pa
HEPA efficiency	99.97% at 0.3mic	99.97% at 0.3mic	H12 (DIN EN 1822)	H12 (DIN EN 1822)
Carbon capacity	5.5 lbs	22 lbs	2.5 kg	10 kg
Power supply (F1802C+G)	115VAC, 60 Hz (230VAC, 60 Hz)	115VAC, 60 Hz (230VAC, 60 Hz)	230VAC, 50Hz	230VAC, 50Hz
Motor power (input)	400 Watt	400 Watt	400 Watt	400 Watt
Noise level *	58 - 64 dBA	58 - 64 dBA	58 - 64 dBA	58 - 64 dBA
Dimensions (w/d/h)	17.5"/19.5"/28.5"	17.5"/19.5"/28.5"	445/495/725mm	445/495/725mm
Weight, approx.	110 lbs	120 lbs	50 kg	54 kg

* Notice: The noise level varies with number of exhaust ports in use or amount of airflow.

Model No.	F1860C	F1860PG	F1866C	F1866PG
Fan capacity	210 cfm	210 cfm	350 m3/h (210 cfm)	350 m3/h (210 cfm)
System capacity	180 cfm	180 cfm	300 m3/h (180 cfm)	300 m3/h (180 cfm)
Sealed Vacuum	22" WG	22" WG	6000 Pa (24" WG)	6000 Pa (24" WG)
HEPA efficiency	99.97% at 0.3mic	99.97% at 0.3mic	H12 (DIN EN 1822)	H12 (DIN EN 1822)
Carbon capacity	5.5 lbs	22 lbs	2.5 kg (5.5 lbs)	10 kg (22 lbs)
Power supply	115VAC, 50-60 Hz	115VAC, 50-60 Hz	230VAC, 50-60Hz	230VAC, 50-60Hz
Motor power (input)	450 Watt	450 Watt	450 Watt	450 Watt
Noise level *	58 - 64 dBA	58 - 64 dBA	58 - 64 dBA	58 - 64 dBA
Dimensions (w/d/h)	17.5"/19.5"/28.5"	17.5"/19.5"/28.5"	445/495/725mm	445/495/725mm
Weight, approx.	100 lbs	110 lbs	45 kg	50 kg

* Notice: The noise level varies with number of exhaust ports in use or amount of airflow.

Part Numbers

Filter Units

F1800C	Filter Unit Pre / HEPA / Gas, 400 cfm, 115VAC/ 60Hz
F1800PG	Filter Unit Pre / HEPA / Deep-Bed Gas, 300 cfm, 115VAC/ 60Hz
F1802C	Filter Unit Pre / HEPA / Gas, 400 cfm, 230VAC/ 60Hz
F1802PG	Filter Unit Pre / HEPA / Deep-Bed Gas, 300 cfm, 230VAC/ 60Hz
F1806C	Filter Unit Pre / HEPA / Gas, 400 cfm. 230VAC/ 50Hz
F1806PG	Filter Unit Pre / HEPA / Deep-Bed Gas, 300 cfm, 230VAC/ 50Hz
F1860C	Filter Unit Pre / HEPA / Gas, 400 cfm, 115VAC/ 50-60Hz
F1860PG	Filter Unit Pre / HEPA / Deep-Bed Gas, 300 cfm, 115VAC/ 50-60Hz
F1866C	Filter Unit Pre / HEPA / Gas, 400 cfm, 230VAC/ 50-60Hz
F1866PG	Filter Unit Pre / HEPA / Deep-Bed Gas, 300 cfm, 230VAC/ 50-60Hz

Replacement Filters

For Models F1800C / F1802C / F1806C / F1860C / F1866C:

Fil18P040 Pre-filter Pleated 60% efficiency (2/pack)

Fil18H070 Combination Filter, HEPA / Carbon

For Models F1800PG / F1802PG / F1806PG / F1860PG / F1866PG:

Fil18P020 Pre-filter Pleated 60% efficiency (2/pack)

Fil18H010 HEPA filter 99.97% efficiency at 0.3 micron

Fil18G020 Carbon Refill Kit 22lbs (10 kg)

Warranty

IP Systems warrants the F1800 Series against any defects in materials or workmanship for one (1) year from the date of purchase by the original owner. This warranty excludes filters, normal maintenance, and shall not apply to any opened, misused, abused, altered or damaged items. If the product should become defective within the warranty period, IP Systems will repair or replace it free of charge at its sole discretion. The repaired or replacement item(s) will be shipped, freight prepaid, to the original purchaser. The warranty period will start from the date of purchase. If the date of purchase cannot be substantiated the date of manufacture will be used as the start of the warranty period.

For repair or return of the equipment anytime, a Return Material Authorization Number (RMA #) must be obtained from IP Systems. Customer ships to factory "freight prepaid" – "collect" shipments are not accepted. IP Systems pays for return freight.

Contact Information

For Sales and Customer Care

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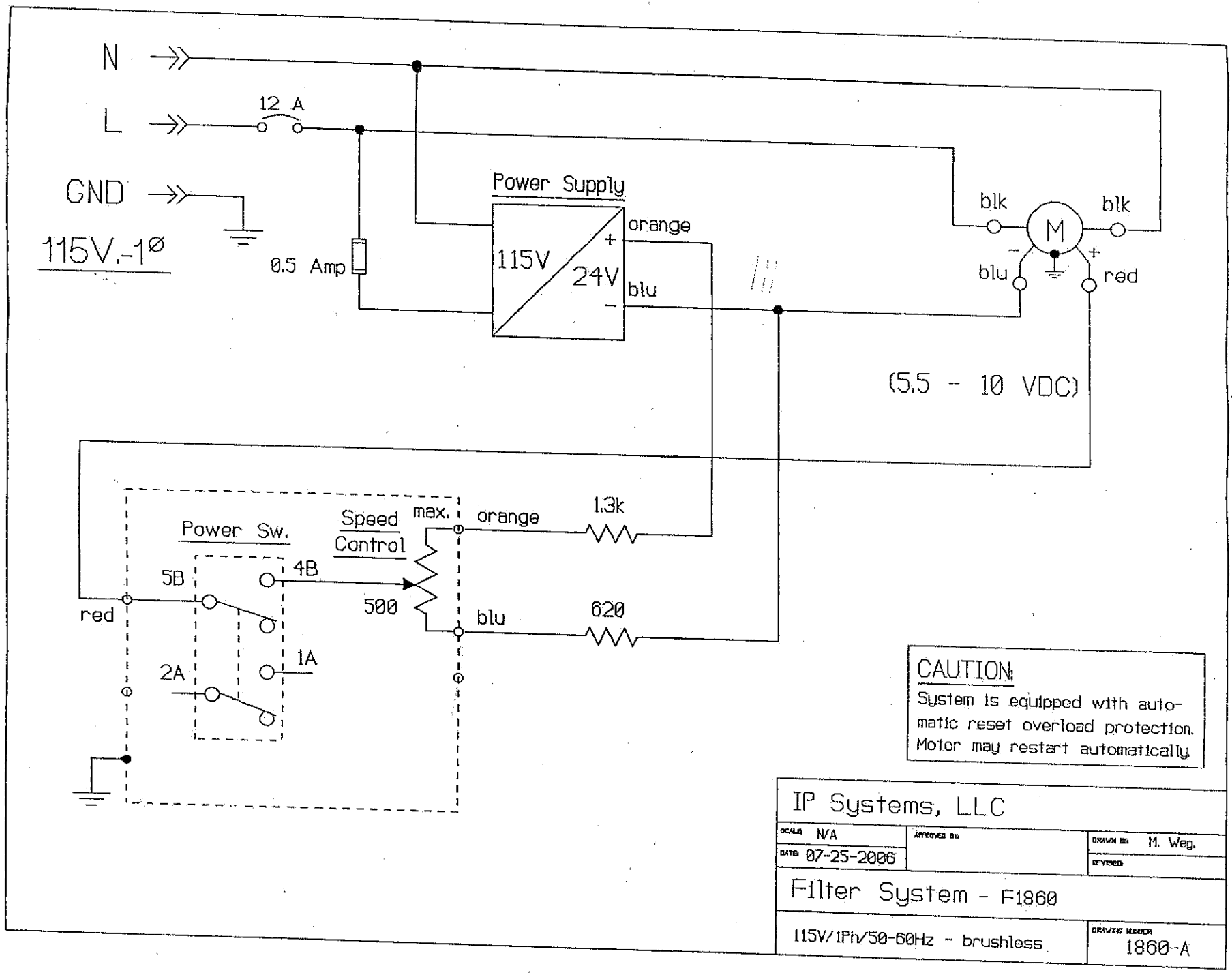
USA
Phone: 770-614-7701
Fax: 770-614-7707
sales@ipsystemsusa.com
www.ipsystemsusa.com


N
L
GND
115V.-1ø
12 A
0.5 Amp
Power Supply
115V
24V
+
−
orange
blu
blk
blk
M
blu
red
(5.5 - 10 VDC)
Power Sw.
Speed Control
max.
orange
1.3k
5B
4B
500
red
blu
620
2A
1A
CAUTION:
System is equipped with automatic reset overload protection. Motor may restart automatically.
IP Systems, LLC
SCALE N/A
DATE 07-25-2006
APPROVED BY
DRAWN BY M. Weg.
REVISED
Filter System - F1860
115V/1Ph/50-60Hz - brushless
DRAWING NUMBER
1860-A