

**CITY OF ALBUQUERQUE  
ENVIRONMENTAL HEALTH DEPARTMENT  
AIR QUALITY PROGRAM**

**MODIFICATION APPLICATION  
PERMIT #1029-M2**

**SolAero Technologies Corporation**

**Prepared By:**

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March 2026

Project 243201.0159

*KT*  
Application received March 3, 2026

**Trinity**  
Consultants 

February 27, 2026

City of Albuquerque – Environmental Health Department  
One Civic Plaza NW,  
3<sup>rd</sup> Floor, Suite 3023  
Albuquerque, NM 87102

*RE: Air Quality Construction Permit Application #1029-M3  
1<sup>st</sup> Administrative Incompleteness Determination*

Dear Neusa McWilliams:

On behalf of SolAero Technologies Corporation (SolAero), we are submitting an update to this application for an air quality construction permit modification. This facility is located at 10420 Research Road SE in Albuquerque, NM.

Within this application, the following requests from the agency have been completed and provided:

1. **Request:** There appears to be an issue with the emission rates for Units 16 & 17. It looks like the units are derated for elevation in the Excel sheet, the emissions were calculated using those derated heating rates and those same emission rates are listed in the most recent application package. The AQP does not allow derating and the nameplate heat rate should be used. This same deration was requested in the 2017 application for permit #1029-M2 but was not approved by the Program. This change will result in increased emissions for all pollutants for these units compared to the most recently submitted application but will match the permitted emissions for most pollutants other than PM10/PM2.5, as noted below. The Excel calculation file and application package will need to be updated.

**Response:** The emission rates of Units 16 and 17 have been updated to remove derating. The Excel calculation file and application package have been updated.

2. **Request:** The PM emission calculations for the boilers, Units 4, 5 & 13, as well as Units 16-20, appear to be incorrect. The calculations use 1.9 lb/MMscf as the PM emission factor from AP-42 Table 1.4-2, which is just for filterable PM. PM emission calculations for external natural gas combustion should use the 7.6 lb/MMscf emission factor for total PM to calculate PM10 and PM2.5 emissions, as indicated in footnote c to Table 1.4-2. This emission factor is routinely used by consultants submitting applications to the Program. The Excel file, application form and application package should all be updated with these corrected emission rates.

**Response:** The PM emission calculations for Units 4, 5, & 13 and Units 16-19 have had the PM emission factor updated to 7.6 lb/MMscf. Unit 20 does not exist and has been removed from the application and modeling. The Excel file, application form, and application package have been updated with these corrected emission rates.

3. **Request:** There is currently in the Excel calculations, a TSP safety factor of 200% for the Unit 13 boiler. This appears to be an error and although it does not affect the application form because the TSP standard was repealed in 2018 it should be corrected. Please ensure that all emission calculations include PM10 and PM2.5.

a. It also appears that ROUNDUP and ROUNDDOWN were used in the calculation formulas for some Unit 13 pollutants. It is unclear why this was done for this one unit and this is not a standard emission calculation practice. ROUNDDOWN is definitely a concern that needs to be resolved.

**Response:** The TSP safety factor of 200% was an error and was corrected to 20%. All emission calculations include both PM<sub>10</sub> and PM<sub>2.5</sub>. For Units 1 through 5, 13, 15 through 19, and UPTIMUM-1 through UPTIMUM-6 PM emissions are equal to PM<sub>10</sub> and PM<sub>2.5</sub> emissions. All PM<sub>10</sub> and PM<sub>2.5</sub> emissions are accounted for on Tables 1.1a and 1.1b. ROUNDUP and ROUNDDOWN formulas were removed throughout the calculation formulas.

4. **Request:** SolAero and Trinity should check all of the emission calculations to ensure that there are no other outdated/incorrect emission factors or derating present. Then the updated application should be checked to ensure that the emission rates are the same in all parts of the application package.

**Response:** All emission calculations were checked by Trinity to ensure that there are no other outdated/incorrect emission factors or derating. The updated application was checked by Trinity to ensure that the emission rates are the same in all parts of the application.

5. **Request:** Please include the required but missing Zoning Requirement cover letter form. The application contained a zoning certification letter from the City of Albuquerque but not the required cover letter form. The form can be downloaded from the Program's website.

**Response:** The Zoning Requirement cover letter form has been added to the application package.

6. **Request:** An updated wet ink signature will be required on the application form because several units were removed and several units will have updated emission rates, therefore emission totals will have changed, and unit information was updated. This updated application form should be part of a complete re-submittal of the entire application package.

**Response:** Updated wet ink signatures are included in the updated application package.

7. **Request:** After discovering the derated emission rates for Units 16 & 17, the Program looked at the modeling submitted with the 2017 application for permit #1029-M2 and it appears that the modeling used the derated emission rates. This means that Units 16 & 17 have never been modeled at their correct permitted emission rates. Therefore, due to these effective emission increases, these units will need to be included in the SIL models for all pollutants, as well as in any cumulative impact analysis (CIA) models.

a. Units 18-20 should also be included in the PM<sub>10</sub> and PM<sub>2.5</sub> SIL models due to the effective increase in those emission rates based on correcting the PM emission factor, as noted in item 2 above.

**Response:** Units 16 and 17 were included in the updated SIL models for all pollutants. Units 18-19 were included in the PM<sub>10</sub> and PM<sub>2.5</sub> SIL models. Unit 20 does not exist and has been removed from the application and modeling. These model updates are addressed in the latest modeling report included in the updated application.

8. **Request:** Responses were received on January 27, 2026 to questions about the correct stack parameters for Units 16-20. However, there is still confusing information about Units 16-20 in the Stack Parameters Table versus the CIA model.
- The Stack Parameters Table still lists ~500 acfm for the Unit 16 & 17 flow rates and then a 142.3 fps velocity. That velocity is impossible with the given flow rate and 0.67 ft stack diameter, and the submitted CIA model shows that. The flow rate for each of these units in the CIA model is 3010.2 acfm, not 500 acfm, in order to get the 142.3 fps velocity.
  - Comparing the Unit 16 & 17 stack parameters to the Unit 20 stack parameters highlights the fact that there are incorrect or inconsistent parameter values. Unit 20 in the Stack Parameters Table also has a listed flow rate of ~500 acfm and diameter of 0.67 ft, however it has a velocity of 44.4 fps (the model shows a flow rate of 939.2 acfm to get this velocity). You cannot have two stacks with the same flow rate and diameter, but exit velocities that are almost 100 fps different.
  - The submitted Excel file also shows the calculations that were done to determine the stack parameters for Units 16 (screenshot below), 17, 18, 19 & 20. It looks like the flow rates listed in the Stack Parameters Table are the scfm rates, not the acfm rates like they should be, but even with that difference the velocities for Units 16 & 17 are not what is listed in the table or in the models. According to the calculations in the Excel file, the flow rates and velocities for Units 16 & 17 are much lower than the modeled values, which will lead to higher impacts. Please list the correct acfm stack flow rates in the Stack Parameters Table.
  - Are the emails with data from SolAero and calculations related to stack parameters in the Excel file correct? If so, the models and application form should be updated. If the information in the Excel file is not correct then it needs to be updated with correct information, including sources for the new data. Data for units should be consistent between all submitted documents/files.

**Response:** The Stack Parameters Table has been updated to show the correct parameters for Units 16 through 19 and the table is now consistent with the emission calculations and the air dispersion modeling analysis. Unit 20 does not exist and has been removed from the application and modeling. The stack parameters for all other units in the application were reviewed and should now be consistent with the calculations and the air dispersion modeling analysis.

9. **Request:** The receptor grid spacing is not quite correct as described on page 12 of the modeling report and as present in the models. The modeling report states that access to the SolAero facility is not restricted and that the building edges act as the modeled fence. It then states that 50 m spaced receptors go outward from that fence to 250 m. The AQP Modeling Guidelines state that "Receptor spacing on property with unrestricted access should be less than 25 meters to the edge of the property. Beyond the...edge of the property, receptor spacing may be increased to 50 meters out to at least 250 meters from the fence/property edge and then 100 meters out to at least 1 kilometer from the fence/property edge." Please adjust the receptor spacing appropriately before the models are re-run.

**Response:** The receptor grid spacing has been updated to 25m spacing on the property. This model update is addressed in the latest modeling report included in the updated application.

10. **Request:** The height of building W0L4Z003 appears to be incorrect in all the submitted SIL models. Table 10 in the modeling report says that building is 27 ft tall, which matches the 8.23 m height in

the 24-hour PM10 CIA model. All the SIL models have a height of 2.13 m or 6.98 ft. Please correct the building height where necessary.

**Response:** Building W0L4Z003 has been corrected to 27 ft tall in the SIL models. This model update is addressed in the latest modeling report included in the updated application.

Please feel free to contact me at (505) 266-6611 or by email at [Michael.Brown@trinityconsultants.com](mailto:Michael.Brown@trinityconsultants.com) if you have any questions regarding this application. Alternatively, you may contact Rebecca Chambers with SolAero Technologies Corporation at (505) 659-5183 or by email at [Rebecca.Chambers@rocketlabusa.com](mailto:Rebecca.Chambers@rocketlabusa.com).

Sincerely,

TRINITY CONSULTANTS

Michael Brown  
Senior Consultant

cc: Rebecca Chambers (SolAero Technologies Corporation)

Trinity Project File 243201.0159

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# 1. GENERAL INFORMATION

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## 1.0 Executive Summary

This modification application is being submitted for the SolAero Technologies Corporation (SolAero) facility, currently permitted under ATC Permit No. 1029-M2 and located at a commercial, non-residential facility within Sandia Research Park. The address of this facility is 10420 Research Rd SE, Albuquerque NM, 87123. Proposed changes include the removal of a base scrubber (EF-5B), the addition of six (6) new Veeco EPI growth reactors (EBARA1-12), a new burn wet abatement system to control emissions from the reactors including six (6) UPTIMIUM PLUS control devices (UPTIMUM1-6) and three (3) electrostatic dust collector (EDC) PLUS control devices (EDC1-3). A new solvent vent, a new base scrubber, and a new acid scrubber are also being added with this project (Units 25, 26, 27). The new burn wet abatement system disposes of emissions via combustion and subsequent scrubbing of particles, as well as absorption of soluble gas components with the aid of a scrubbing liquid. There are no emission increases associated with Unit 6a (CHEM) as the new EPI growth reactors are more efficient than the existing reactors. Additionally, three (3) existing cooling towers (CT1-3) are being incorporated into this permit.

The emission rates for the backup generator engines (Units 1 & 2), boilers (Units 3, 4, 5, 13), autoclaves (Units 16 & 17), release booth (Unit 18), and Wisconsin oven (Unit 19) are being updated in accordance with the incompleteness letter dated January 30, 2026.

Wisconsin oven 2 (Unit 20), the paint booth heater (Unit 21), and paint sprayers 1-3 (Units 22-24) are also removed with this application.

This facility is a source of NO<sub>x</sub>, CO, VOC, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and HAPs. In accordance with the department's guidance, updated air dispersion modeling has been completed, and is included in this submittal. The included modeling report (Section 4) details AERMOD inputs and modeled concentrations associated with the proposed modifications. The report also demonstrates compliance with all applicable National and New Mexico Ambient Air Quality Standards (NAAQS and NMAAQs). The uncontrolled and controlled emissions associated with the proposed modifications are included in the department's application forms.

## 2. FACILITY AND EMISSIONS INFORMATION

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The following section summarizes the sources of emissions, process description, methodology, and emission factors used to estimate air pollutant emissions from the facility. The facility is a minor source of criteria pollutants and an area source of HAPs.

### 2.1 Description of the Facility

The SolAero facility is a semiconductor manufacturing facility that manufactures high energy photovoltaics and other advanced semiconductors. The facility consists of the following process equipment: emergency generators (Units 1, 2, and 15), boilers (Units 3, 4, 5, and 13), autoclaves (Units 16 and 17), a release booth (Unit 18), oven (Units 19), the EPI reactors (Units EBARA-1 through 12), UPTIMUM PLUS units (Units UPTIMUM-1 through 6), EDC PLUS units (Units EDC-1 through 3), cooling towers (Units CT-1 through 3), and Unit 6a which consists of various chemical emissions throughout the facility. A plot plan and facility site map are included in Appendix C.

### 2.2 Air Pollutant Emissions and Calculation Methodology

#### 2.2.1 Description of Calculations and Emission Factors

##### 2.2.1.1 Emergency Generators (1, 2, and 15)

The emergency generator units are diesel powered. NO<sub>x</sub>, CO, SO<sub>2</sub>, and VOC emissions for the generators are determined from the manufacturing specifications provided from the Kohler manufacturing sheets for Units 1 and 2, and the Cummins manufacturing sheets for unit 15. The PM emissions are determined from AP-42 table 3.3-1. The emission factors for unit 15 were set to be below the NSPS emission limits.

##### 2.2.1.2 Boilers (3, 4, 5, and 13)

The boilers are natural gas powered. NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and PM emissions from natural gas combustion were calculated using emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-1 and 1.4-2. The HAP emission factors are taken from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-3.

##### 2.2.1.3 Autoclaves (16 and 17)

The Autoclaves are fueled by natural gas. NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and PM emissions were calculated using the heating rate for the autoclaves, and the emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-1. The HAP emissions were calculated using the heating rate and the HAP emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-3. A 10% safety factor was applied to the NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and PM emissions.

##### 2.2.1.4 Release Booth (18)

The release booth is fueled by natural gas. NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and PM emissions were calculated using the heating rate for the autoclaves, and the emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-1. The HAP emissions were calculated using the heating rate and the HAP emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-3. A 20% safety factor was applied to the NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and PM emissions.

### **2.2.1.5 Oven (19)**

The oven is fueled by natural gas. NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and PM emissions are calculated using the heating rate for the oven, and the emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-1. The HAP emissions were calculated using the heating rate and the HAP emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-3. A 20% safety factor was applied to the NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and PM emissions.

### **2.2.1.6 EPI reactors (EBARA 1-12)**

VOC and HAP emissions were calculated using the expected waste gas flow rate from the Veeco EPI reactor chambers and the ideal gas law equation. It was assumed that operations occur for 8,760 hr/yr. Emissions from the EPI reactors are controlled by the UPTIMUM PLUS units (Units UPTIMUM-1 through 6) and EDC PLUS units (Units EDC-1 through 3). An overall waste gas destruction efficiency of 99% was claimed.

### **2.2.1.7 CHEM emissions (6a)**

The uncontrolled VOC and HAP emissions were calculated from previous purchasing records, solvent evaporation rate, amount used in the process, and composition of the material. For controlled emissions, HCl, HF, Phosphine, Arsine, Catechol, and Naphthalene emissions are controlled via absorbers/scrubbers with 99% control efficiency.

### **2.2.1.8 UPTIMUM PLUS (UPTIMUM 1-6)**

The UPTIMUM PLUS units are fueled by natural gas. NO<sub>x</sub>, CO, VOC, SO<sub>2</sub>, and PM emissions were calculated using the heating rate for the UPTIMUM PLUS units, and the emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-1. The HAP emissions were calculated using the heating rate and the HAP emission factors from AP-42 Chapter 1.4, Natural Gas Combustion (1998), Table 1.4-3.

### **2.2.1.9 Cooling Towers (CT1-3)**

PM, PM<sub>10</sub>, and PM<sub>2.5</sub> emissions were calculated using the drift rate from AP-42 Chapter 13.4, Wet Cooling Towers (1995), Table 13.4-1, manufacturer specifications on water circulation, and the maximum total dissolved solids (TDS) from the 2024 Consumer Confidence Report – Zone 3, Albuquerque Bernalillo County Water Utility Authority (ABCWUA). The ABCWUA maximum TDS value was rounded up to 500 ppmw to incorporate a conservative safety factor. Particle size distribution was calculated based on emission calculations outlined in Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers", Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, CA 95825.

## **2.3 Supporting Information**

The following supporting information is included in Appendix D to support the emission calculations provided.

- Emergency Generator manufacturing specifications for Kohler and Cummins
- AP-42 Table 3.3-1
- AP-42 Table 1.4-1, 1.4-2, 1.4-3
- AP-42 Table 13.4-1
- Lumina blueprint
- Purchasing records for chemicals
- UPTIMUM Chemical efficiency records

- Vanaire Scrubber Efficiency Records
- 2024 Consumer Confidence Report – Zone 3, ABCWUA
- Table 1. Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers"
- Cooling tower design specifications

### 3. OPERATIONAL PLAN – AIR EMISSIONS DURING SSM AND MALFUNCTIONS

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The facility is owned and operated by SolAero. This Startup, Shutdown, Maintenance, and Malfunction (SSM/M) plan provides an operational and maintenance strategy for the permitted sources of emissions at the SolAero Facility.

This plan addresses the operational strategy if a malfunction occurs that may cause an exceedance of the permitted emission unit of a regulated air contaminant, as well as the anticipated nature of emissions during routine startup or shutdown of each source and the steps SolAero will take to minimize emissions during routine startup or shutdown.

The following definitions from 20.11.41.7 NMAC apply to this SSM/M plan:

- “Malfunction” means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment or process equipment, or the failure of a process to operate in a normal or expected manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.
- “Shutdown” means the cessation of operation of any air pollution control equipment, process equipment or process for any purpose, except routine phasing out of batch process units.
- “Startup” means to put a stationary source that has been constructed or modified as authorized by a permit issued pursuant to 20.11.41 NMAC into operation complete with functional air pollution controls, so the process equipment or the process performs for the purpose intended. The operation may be cyclic in response to on-off controls. Repetition of cycles is not startup for purposes of 20.11.41 NMAC.

Note that all the procedures contained herein may be superseded (and thereby fulfilled by) by other NSR and NSPS requirements.

#### 3.1 Malfunction Procedure

The following procedures will be taken in the event of a malfunction event that may cause an exceedance of the permitted emission limit of a regulated air contaminant:

- The unit will be taken offline for repairs upon the observation of an abnormal emissions event.
- The maintenance technician will perform the repairs or adjustments and bring the unit back online. If the work is beyond SolAero’s capability, then the work will be contracted to an outside contractor.
- All work completed will be documented and recorded in SolAero’s records.
- SolAero will calculate the emissions of regulated air contaminants from the malfunction event to determine if there has been an exceedance of a permitted emission limit.
- SolAero will report excess emissions to the City of Albuquerque Environmental Health Department as necessary.

## **3.2 Emergency Generator Startup, Shutdown, and Maintenance**

### **3.2.1 Emergency Generator Startup Procedure**

A startup event for a Reciprocating Internal Combustion Engine (RICE) occurs when the unit is initially operated after being off.

SolAero carefully monitors the entire startup process to ensure safety and minimize airborne emissions. The following actions included in the startup SOP are critical for minimizing emissions during startup:

- Minimizing cold engine startups. SolAero ensures warm engine startup by ensuring engine block heaters are online.
- Ensuring the engine is achieving good combustion.
- Monitoring the opacity and color of the exhaust gases and taking the unit offline for repairs upon the observation of abnormal soot coming out of the stacks.

### **3.2.2 Emergency Generator Shutdown Procedure**

A shutdown event for a RICE occurs when the unit is shut down after a period of operation.

SolAero carefully monitors the entire shutdown process to ensure safety and minimize airborne emissions. The following actions included in the shutdown SOP are critical for minimizing emissions during engine shutdown:

- Removing the full electrical load from the system and initiating a cool down cycle before the engine is stopped.
- Monitoring the opacity and color of the exhaust gases and taking the unit offline for repairs upon the observation of abnormal soot coming out of the stacks.

### **3.2.3 Emergency Generator Maintenance**

SolAero ensures the emergency generator RICE engines are appropriately maintained according to the manufacturer's recommendations. SolAero carefully monitors the engines to ensure safety and minimize airborne emissions during regularly scheduled maintenance events. The following actions included in the maintenance SOP are critical for minimizing emissions during the event:

- Ensure the engine is achieving good combustion during the maintenance activity.
- Monitoring the opacity and color of the exhaust gases and taking the unit offline for repairs upon the observance of abnormal soot coming out of the stacks.

## **3.3 Boiler Startup, Shutdown, and Maintenance**

### **3.3.1 Boiler Startup Procedure**

SolAero does not have a formalized startup procedure, as it is not anticipated that the boiler units will have increased emissions during routine startup.

### **3.3.2 Boiler Shutdown Procedure**

SolAero does not have a formalized shutdown procedure, as it is not anticipated that the boiler units will have increased emissions during routine shutdown.

### **3.3.3 Boiler Maintenance Procedure**

SolAero operates and maintains the boiler units per the manufacturer's recommended guidance. SolAero ensures that preventative maintenance is completed on each boiler in accordance with the manufacturer's recommended guidance. If there is soot build up in the boiler tubes an adjustment for air/fuel mixture adjustment will be performed as necessary.

## **4. AIR DISPERSION MODELING ANALYSIS**

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The modeling report included in this section details the air dispersion modeling completed and submitted with this application to demonstrate compliance with the National and New Mexico Ambient Air Quality Standards. All requirements have been satisfied. There are no exceedances which would prohibit approval of the proposed permit modification.

# **AIR DISPERSION MODELING REPORT**

## **Air Quality Construction Permit Revision**



### **SolAero Technologies Corporation**

**Prepared For:**

**SolAero Technologies Corporation**  
10420 Research Road SE  
Albuquerque, New Mexico 87123

**Prepared By:**

Michael Brown – Senior Consultant

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February 2026

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## I. APPLICANT AND CONSULTANT INFORMATION

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This modeling report is being submitted as part of a permit modification application submitted pursuant to 20.11.41.2.A(3) NMAC for SolAero Technologies Corporation (the Facility) owned and operated by SolAero Technologies Corporation (SolAero). This report and accompanying modeling files are being submitted to the City of Albuquerque (CABQ) Environmental Health Department (EHD), Air Quality Program (AQP) to satisfy the requirements of 20.11.41.13.E NMAC. This report includes all required components outlines in the "Completeness Requirements" section of the CABQ EHD AQP Air Dispersion Modeling Guidelines (revised May 2024)<sup>1</sup>. This modeling has been conducted in accordance with the modeling protocol approved with comments by CABQ AQP on August 27, 2025. Responses to comments from CABQ AQP were provided via email on September 17, 2025, and are presented in Appendix A.

### a. Name of Facility and Company

**Facility Name:** SolAero Technologies Corporation

**Company:** SolAero Technologies Corporation

### b. Permit Numbers Currently Registered for the Facility

This facility currently operates under **ATC #1029-M2-2TR**.

### c. Contact Information for Modeling Questions

**Contact Name:** Michael Brown

**Phone Number:** (505) 266-6611

**E-mail Address:** [Michael.Brown@trinityconsultants.com](mailto:Michael.Brown@trinityconsultants.com)

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<sup>1</sup> City of Albuquerque, Environmental Health Department, Air Quality Program. (May 2024). *Air Dispersion Modeling Guidelines For Air Quality Permitting*, revised May 2024, 16-17, <https://www.cabq.gov/airquality/air-quality-permits/dispersion-modeling-guidelines>

## II. FACILITY AND OPERATIONS DESCRIPTION

### a. Narrative Summary of Proposed Modification

This application is being submitted for the modification of the SolAero Technologies Corporation (the Facility) owned and operated by SolAero Technologies Corporation (SolAero). SolAero Technologies Corporation is a compound semiconductor device manufacturing facility located at a commercial, non-residential facility within Sandia Research Park.

The following is a list of the proposed modifications SolAero plans to make at the Facility:

- ▶ The removal of a base scrubber (EF-5B).
- ▶ The addition of six (6) Veeco EPI growth reactors (Units EBARA-1 through EBARA-12).
- ▶ The addition of a Burn Wet Abatement System to control emissions from the reactors resulting in the following emission units:
  - Six (6) UPTIMUM PLUS units (UPTIMUM-1 through UPTIMUM-6); and
  - Three (3) Electrostatic Dust Collectors (EDC-1 through EDC-3).
- ▶ The incorporation of three (3) existing cooling towers (CT1 through CT3).

The Facility will have eight (8) new sources which emits criteria pollutants required for modeling: two (2) new stacks, EF-36A Growth Exhaust (Unit 28a) and EF-36B Growth Exhaust (Unit 28b), where UPTIMUM-1 through UPTIMUM-6 and EDC-1 through EDC-3 will be routed to; and six (6) cooling tower fans for CT1 through CT3 (Units CT1a, CT1b, CT2a, CT2b, CT3a, CT3b). The new solvent exhaust fan, new base scrubber, and new acid scrubber (Units 25, 26, 27) do not emit pollutants for which a National Ambient Air Quality Standard (NAAQS) or New Mexico Ambient Air Quality Standard (NMAAQs) has been established and will therefore not require air dispersion modeling. SolAero has accurately represented the location of the modeled emission sources using an accurate plot plan and aerial imagery.

### i. Re-modeling addressing 1<sup>st</sup> Administrative Incompleteness Determination

On January 29, 2026 CABQ EHD AQP deemed the application administratively incomplete. The following deficiencies were identified in the modeling and were addressed:

- ▶ Included Units 16 & 17 in the SIL models for all pollutants so the units were modeled at their correct permitted emission rates.
- ▶ Included Units 18-19 in the PM<sub>10</sub> and PM<sub>2.5</sub> SIL models due to an increase in an emission rate based on correcting the PM emission factor in the calculations. Removed unit 20 as it does not exist.
- ▶ Updated the stack velocity of Units 16 & 17.
- ▶ The receptor grid spacing of the property was updated from 50m to 25m spacing based on AQP Modeling Guidelines. The property boundary was determined using the CABQ's Advanced Map Viewer and is presented in Figure 8.
- ▶ Corrected the height of building W0L4Z003 in all SIL models.

### b. Brief Physical Description of the Location

The Facility is located at 10420 Research Road SE, Albuquerque, Bernalillo County, New Mexico 87123 (13S UTM 360,360 m E and 3,880,130 m N).

**c. Duration of Time that the Facility will be Located at This Location**

The facility will be at this location for more than one (1) year.

**d. Facility Maps – Google Earth Imagery Dated August 24, 2023**

**Figure 1. Location of the Facility, Fenceline, and Property Boundary**

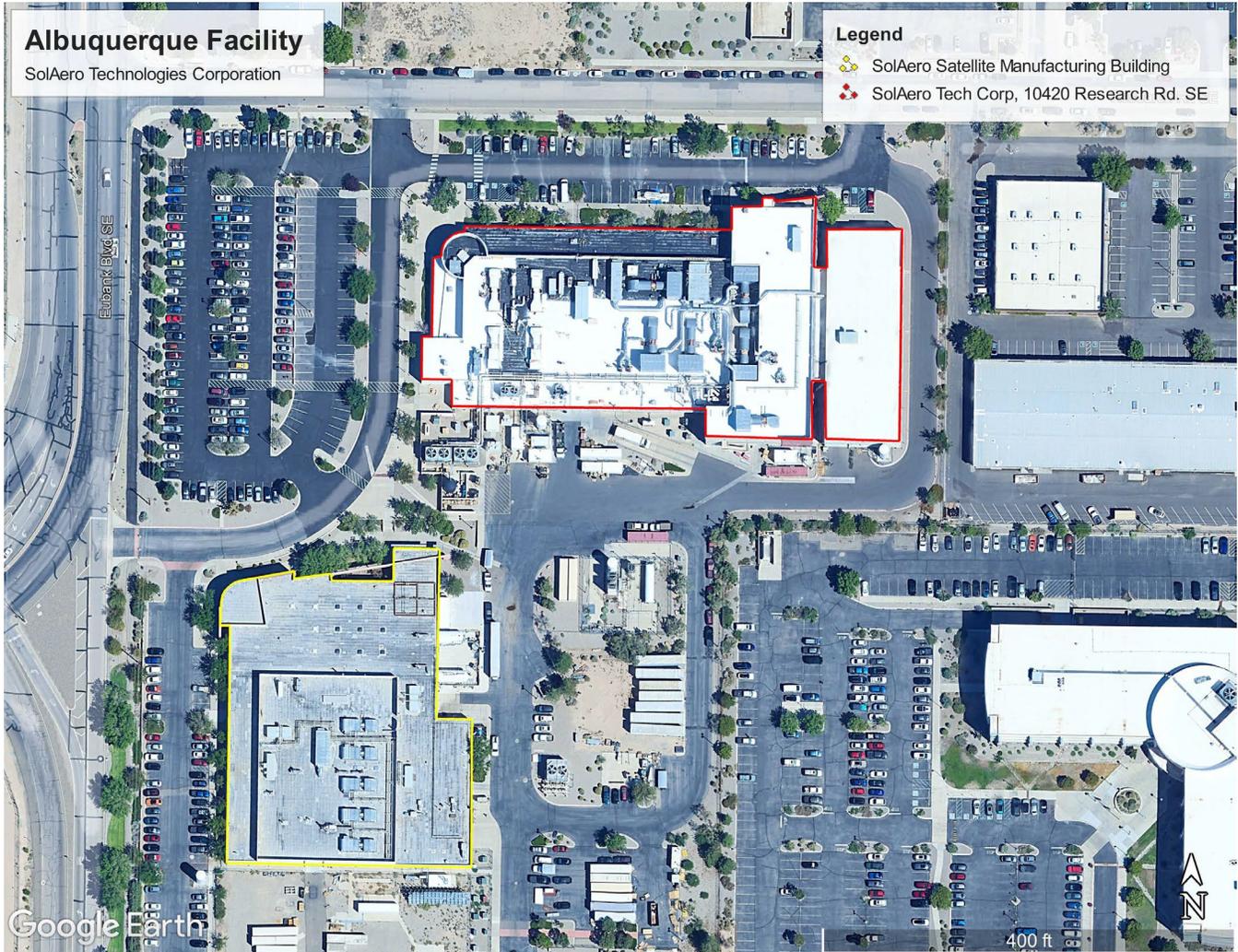
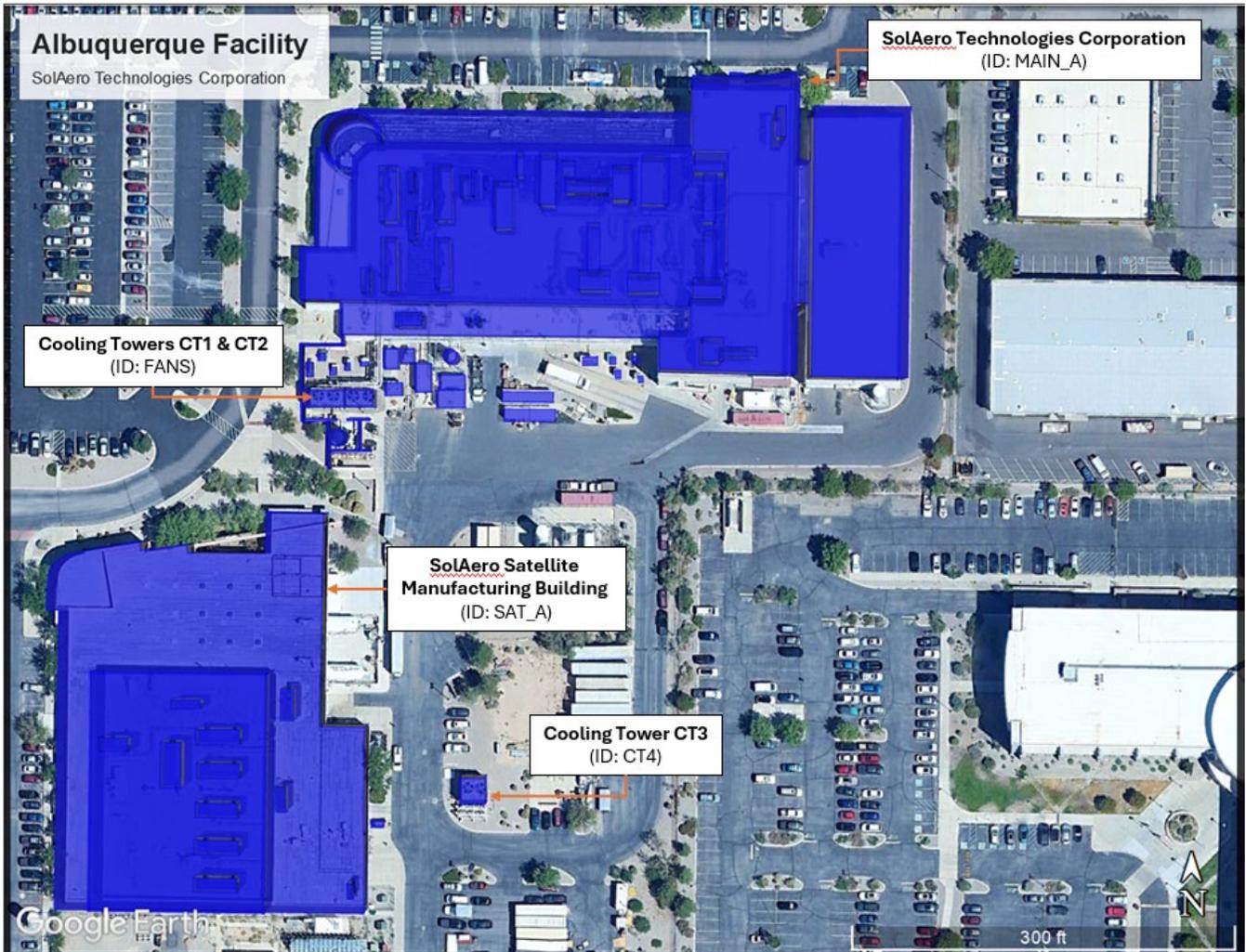
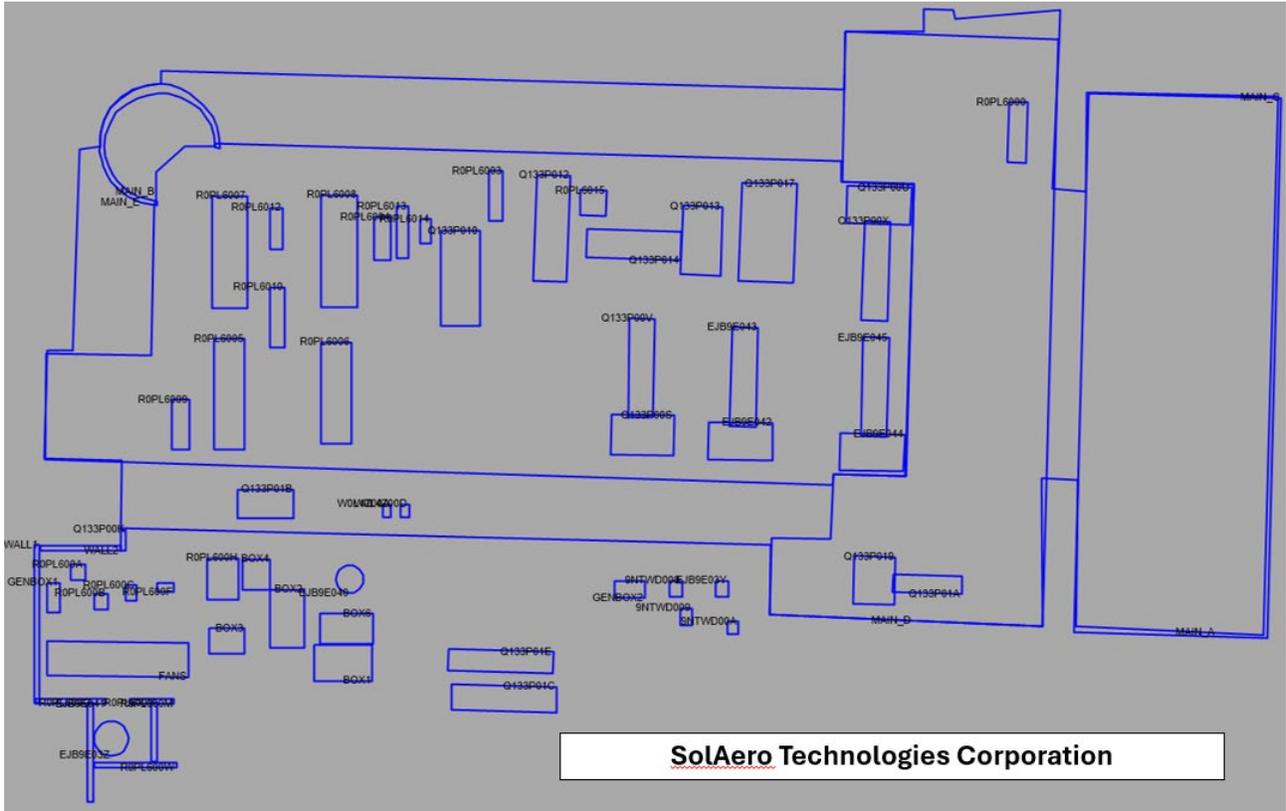


Figure 2. Location of On-Site Buildings, August 24, 2023

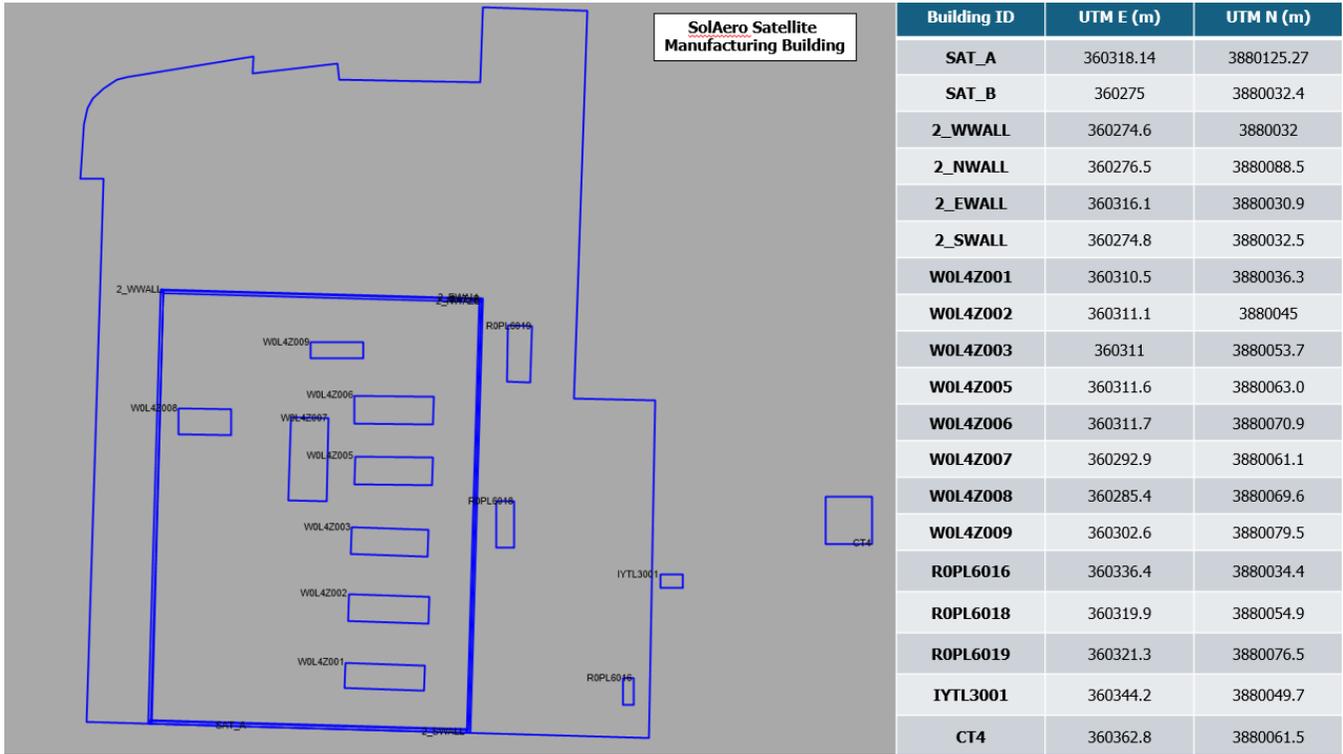


**Figure 3. Location of On-Site Buildings (SolAero Technology Corporation)**



Building ID	UTM E (m)	UTM N (m)	Building ID	UTM E (m)	UTM N (m)	Building ID	UTM E (m)	UTM N (m)
MAIN_A	360340.93	3880220.08	Q133P017	360407.9	3880195.6	ROPL600W	360333.1	3880139.7
MAIN_B	360418.94	3880173.2	Q133P019	360421.2	3880158.2	ROPL600Y	360339.8	3880139.8
MAIN_C	360446.9	3880154.8	Q133P01A	360425.9	3880161.6	ROPL6010	360353.5	3880187.9
MAIN_D	360420.27	3880224.64	Q133P01B	360349.8	3880168.1	ROPL6012	360353.5	3880199.3
MAIN_E	360347.21	3880211.1	Q133P01C	360374.6	3880145.8	ROPL6013	360368.2	3880198.3
BOX3	360346.5	3880152.3	Q133P01E	360374.2	3880150.4	ROPL6014	360371	3880200
BOX4	360350.3	3880159.8	ROPL6000	360439.1	3880209.4	ROPL6015	360389.5	3880203.3
WALL1	360326.2	3880146.7	ROPL6003	360378.9	3880202.6	9NTWD008	360399.9	3880159.0
WALL2	360326.9	3880164.9	ROPL6004	360365.6	3880198	9NTWD009	360401.2	3880155.6
Q133P00K	360336.2	3880164.3	ROPL6005	360347.0	3880176.1	9NTWD00A	360406.7	3880154.6
BOX6	360359.3	3880153.5	ROPL6006	360359.5	3880176.7	W0L4Z00A	360366.6	3880168.2
GENBOX1	360327.7	3880157.1	ROPL6007	360346.8	3880192.5	W0L4Z00D	360368.7	3880168.2
GENBOX2	360393.5	3880160.8	ROPL6008	360359.5	3880192.6	EJB9E03Y	360405.3	3880159.0
Q133P00S	360393.1	3880175.5	ROPL6009	360342.2	3880176.0	EJB9E041	360326.3	3880147.1
Q133P00U	360420.4	3880202.4	ROPL600A	360330.4	3880160.9	EJB9E042	360404.4	3880174.9
Q133P00V	360395.1	3880179.8	ROPL600B	360333.1	3880157.5	EJB9E043	360406.9	3880178.8
Q133P00X	360422.2	3880191.1	ROPL600C	360336.8	3880158.5	EJB9E044	360419.6	3880173.7
Q133P010	360373.4	3880190.4	ROPL600F	360340.4	3880160.5	EJB9E045	360422.1	3880177.6
Q133P012	360384.1	3880195.7	ROPL600H	360346.3	3880158.6	ROPL600Z	360335.1	3880142.5
Q133P013	360401.2	3880196.4	ROPL600M	360337.2	3880147.1	EJB9E040	360362.8	3880161.0
Q133P014	360390.4	3880201.7	ROPL600O	360332.4	3880135.1			

**Figure 4. Location of On-Site Buildings (SolAero Satellite Manufacturing Building)**



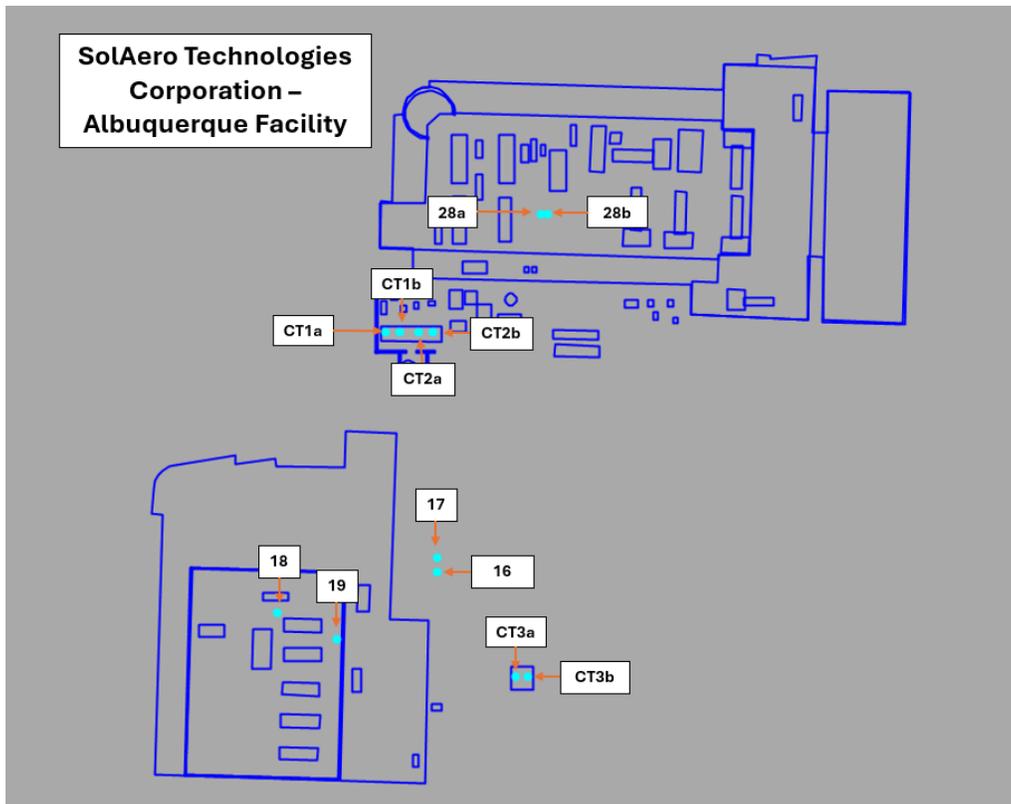
**Figure 5. Location of New Emission Points, August 24, 2023**



**Figure 6. Location of Existing Emission Points, August 24, 2023**



**Figure 7. Location of All Emission Points at the Facility**



**Figure 8. 2018 Aerial Imagery of the Facility and its Surroundings Obtained from the City of Albuquerque's Advanced Map Viewer**



### III. MODELING REQUIREMENTS DESCRIPTION

#### a. List of Pollutants Requiring NAAQs and/or NMAAQs Modeling

This air dispersion modeling evaluation is for a permit modification that will authorize the addition of two (2) point sources with combustion emissions and six (6) sources with particulate matter emissions. As such, averaging periods will be evaluated for CO, NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub>, and SO<sub>2</sub>. There are no sources of lead or H<sub>2</sub>S at this facility and therefore these pollutants will not be modeled.

**Table 1. Modeled Pollutants and Averaging Periods to Show Compliance with the NAAQS and NMAAQs**

Pollutant	Averaging Period	Not Emitted	Surrogate Modeled	Modeled
CO	8-hr			<input checked="" type="checkbox"/>
	1-hr			<input checked="" type="checkbox"/>
H <sub>2</sub> S	1-hr	<input checked="" type="checkbox"/>		
Pb	Quarterly	<input checked="" type="checkbox"/>		
NO <sub>2</sub>	Annual			<input checked="" type="checkbox"/>
	24-hr		<input checked="" type="checkbox"/>	
	1-hr			<input checked="" type="checkbox"/>
PM <sub>2.5</sub>	Annual			<input checked="" type="checkbox"/>
	24-hr			<input checked="" type="checkbox"/>
PM <sub>10</sub>	24-hr			<input checked="" type="checkbox"/>
SO <sub>2</sub>	Annual		<input checked="" type="checkbox"/>	
	24-hr		<input checked="" type="checkbox"/>	
	3-hr		<input checked="" type="checkbox"/>	
	1-hr			<input checked="" type="checkbox"/>

#### b. Additional Modeling Required

No additional New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), or Prevention of Significant Deterioration (PSD) modeling is required as part of this modification application. The Facility is located in an area that is classified by the EPA as in attainment with the National Ambient Air Quality Standard (NAAQS) for all regulated pollutants.

## IV. MODELING INPUTS

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### a. General Modeling Approach

#### i. Models Used and Justification

The most recent executable of AERMOD (v24142) was used to perform all air dispersion modeling. All models were run in regulatory default mode and Building Profile Input Program (BPIP) Prime was used to address building downwash associated with the structures located at this facility as well as the surrounding area. Based on satellite imagery and the CABQ Advanced Map Viewer, the land use in a 3 km radius around the facility is less than 50% industrial, commercial, or compact residential, as defined in the CABQ EHD modeling guidance; therefore, rural dispersion coefficients were used.

#### ii. Operational Flexibility

No operational flexibility is required for the modeling of the Facility. The Facility is expected to operate 8760 hours per year with no downtime to provide the most conservative estimate of emissions for facility demonstration of compliance with the NAAQS and NMAAQs.

#### iii. Source Groups

Only the new/modified units of this project (units 28a, 28b, CT1a, CT1b, CT2a, CT2b, CT3a, CT3b, 16, and 17) were included in the SIL source group for all pollutants. For Units 18 and 19, NO<sub>x</sub>, CO, and SO<sub>2</sub> emission rates were not modified, therefore these sources were included in the SIL source group for PM<sub>10</sub> and PM<sub>2.5</sub> only per the request of item 7(a) of the incompleteness letter. All sources of modeled criteria pollutants at the Facility were grouped together under the FACILITY source group. All surrounding sources provided by the City of Albuquerque Modeling Department, as well as the Facility were grouped together under the NAAQS source group. The NAAQS source group was used for cumulative impacts analysis modeling along with the background concentration.

#### iv. Hourly Emission Factors

No hourly emission factors were used as part of the air dispersion modeling evaluation. All lb/hr values were calculated as the maximum and conservative concentration for each of the sources.

As this facility will continue to be authorized to operate continuously, emissions are not averaged over non-operational hours and emission factors were not modified using the protocols defined in 40 CFR 51 Appendix W Table 8-1.

#### v. Gravitational Settling/Plume Depletion

Wet and dry depletion were not used to model ambient impacts of PM<sub>10</sub> and PM<sub>2.5</sub>.

#### vi. Reduction of NO<sub>x</sub> to NO<sub>2</sub>

The Tier 2, Ambient Ratio Method 2 (ARM2) was used to model ambient impacts of NO<sub>2</sub>. The default minimum ambient ratio of 0.5 and maximum ambient ratio of 0.9 was used.

**vii. Background Concentrations**

Background concentrations were provided by the Air Quality Program (AQP) via email on January 3, 2025 and have been preserved as provided. Updated PM<sub>10</sub> and PM<sub>2.5</sub> background concentrations were provided on September 17, 2025, and are presented below. Background concentrations shown in Table 2 have been added to the calculated facility and neighboring source impacts for each pollutant and averaging period.

**Table 2. Background Concentrations from the Del Norte Monitor**

<b>Pollutant</b>	<b>Averaging Periods</b>	<b>Value (µg/m<sup>3</sup>)</b>
CO	8-hr	1336
	1-hr	1870
NO <sub>2</sub>	Annual	18
	1-hr	83.1
PM <sub>2.5</sub>	Annual	5.4
	24-hr	14.3
PM <sub>10</sub>	24-hr	22.3
SO <sub>2</sub>	Annual	0
	24-hr	0
	1-hr	13.1

**viii. Method for Demonstrating Compliance in Nearby Facilities**

Discrete receptors were included in all surrounding sources and facilities.

**b. Meteorological and Ozone Data**

**i. Discussion of Meteorological and Ozone Data**

The most recent meteorological data set from the Albuquerque Airport from 2014 to 2018 provided by the CABQ was used for the air dispersion modeling. The airport is located nearby, and this meteorological data is assumed to be adequately representative of conditions at the Facility.

No ozone data was used or required for the modeling completed as part of this modification application.

**ii. Actual Data**

No further justification is required as the data was provided by the CABQ.

**c. Receptor and Terrain Discussion**

**i. Spacing of Receptor Grids**

AERMOD was run using a rectangular grid receptor array. Spacing is as follows:

- ▶ Facility buildings and property spacing: 25 meters

- ▶ Very fine grid spacing: 50 meters from the facility fenceline out to 250 meters
- ▶ Fine grid spacing: 100 meters from 250 meters to 1000 meters out from the facility fenceline
- ▶ Medium grid spacing: 250 meters from 1000 meters to 3000 meters out from the facility fenceline.
- ▶ Course grid spacing: 500 meters from 3000 meters to 5000 meters out from the facility fenceline.

Access to the SolAero facility is not restricted by a fence line. For modeling purposes, discrete receptors representing the fence line spacing of 25 m will be placed around the perimeter of the main and satellite facility buildings. The roof of the main and satellite buildings are inaccessible to the public and therefore discrete receptors were not placed on facility roofs. Areas of the property with unrestricted access had discrete receptors with 25 m spacing incorporated.

**ii. Terrain Discussion**

USGS National Elevation Dataset (NED) 1 arc-second data files were provided on the CABQ EHD dispersion modeling guidelines website<sup>2</sup>. These files were imported into AERMAP (version 24142) to determine elevations for sources, receptors, and buildings. There is no complex terrain requiring modifications to air dispersion modeling inputs.

**iii. Reduction in Receptor Grid Size**

The full receptor grid was utilized for all SIL models. Receptors not exceeding significance thresholds per Table 18 of the NMED Air Dispersion Modeling Guidelines<sup>3</sup> were removed for all CIA modeling.

**d. Emission Sources**

**i. Description of Sources at Facility**

*1. Source Types*

**Table 3. Modeled New Point Source Types**

<b>Unit No.</b>	<b>Description</b>	<b>Vertical</b>	<b>Horizontal</b>	<b>Rain Capped</b>
28a	EF-36A Growth Exhaust	<input checked="" type="checkbox"/>		
28b	EF-36B Growth Exhaust	<input checked="" type="checkbox"/>		
CT1a	Cooling Tower Fan #1	<input checked="" type="checkbox"/>		
CT1b	Cooling Tower Fan #2	<input checked="" type="checkbox"/>		
CT2a	Cooling Tower Fan #3	<input checked="" type="checkbox"/>		
CT2b	Cooling Tower Fan #4	<input checked="" type="checkbox"/>		
CT3a	Cooling Tower Fan #5	<input checked="" type="checkbox"/>		
CT3b	Cooling Tower Fan #6	<input checked="" type="checkbox"/>		

<sup>2</sup> City of Albuquerque, Environmental Health Department, Air Quality Bureau. (n.d.). *Dispersion Modeling Guidelines & Data*. <https://www.cabq.gov/airquality/air-quality-permits/dispersion-modeling-guidelines>

<sup>3</sup> New Mexico Air Quality Bureau. (July 2024). *Air Dispersion Modeling Guidelines*. New Mexico Environment Department. <https://www.env.nm.gov/air-quality/modeling-publications/>

All other permitted sources were kept as previously modeled. There are no area or volume sources located at this facility.

**Table 4. Modeled Existing Point Source Types**

Unit No.	Description	Vertical	Horizontal	Rain Capped
16	Autoclave 1	<input checked="" type="checkbox"/>		
17	Autoclave 2	<input checked="" type="checkbox"/>		
18	Release Booth	<input checked="" type="checkbox"/>		
19	Wisconsin Oven 1	<input checked="" type="checkbox"/>		

2. *Emission Rates and Stack Parameters*

**Table 5. New and Modified Source Emission Rates and Stack Parameters**

ID	NO <sub>x</sub> (lb/hr)	CO (lb/hr)	SO <sub>2</sub> (lb/hr)	PM <sub>10</sub> (lb/hr)	PM <sub>2.5</sub> (lb/hr)	Height (ft)	Temp. (°F)	Velocity (ft/s)	Diameter (ft)
28a	0.0318	0.0267	0.00019	0.0024	0.0024	30.0	70	62.88	2.25
28b	0.0318	0.0267	0.00019	0.0024	0.0024	30.0	70	62.88	2.25
CT1a	-	-	-	0.0683	0.0014	20.00	-459.67*	16.40	9.50
CT1b	-	-	-	0.0683	0.0014	20.00	-459.67*	16.40	9.50
CT2a	-	-	-	0.0683	0.0014	20.00	-459.67*	16.40	9.50
CT2b	-	-	-	0.0683	0.0014	20.00	-459.67*	16.40	9.50
CT3a	-	-	-	0.0547	0.0011	15.00	-459.67*	16.40	8.80
CT3b	-	-	-	0.0547	0.0011	15.00	-459.67*	16.40	8.80
16	0.4278	0.3593	0.0026	0.0325	0.0325	17.0	450	140.90	0.67
17	0.4278	0.3593	0.0026	0.0325	0.0325	17.0	450	140.90	0.67
18	-	-	-	0.0203	0.0203	40.0	250	48.50	1.20
19	-	-	-	0.0076	0.0076	40.0	350	79.70	0.50

\* -459.67 F is the ambient temperature used in AERMOD.

**Table 6. Existing Emission Rates and Stack Parameters**

ID	NO <sub>x</sub> (lb/hr)	CO (lb/hr)	SO <sub>2</sub> (lb/hr)	PM <sub>10</sub> (lb/hr)	PM <sub>2.5</sub> (lb/hr)	Height (ft)	Temp. (°F)	Velocity (ft/s)	Diameter (ft)
16	0.4278	0.3593	0.0026	0.0325	0.0325	17.0	450	140.90	0.67
17	0.4278	0.3593	0.0026	0.0325	0.0325	17.0	450	140.90	0.67
18	0.2700	0.2200	0.0016	-	-	40.0	250	48.50	1.20
19	0.1000	0.0840	0.00060	-	-	40.0	350	79.70	0.50

### 3. Summary of Actual and Modeled Dimensions of Volume Sources

There are no volume sources at the Facility.

### 4. Table of Proposed Changes

This application is for new sources. Emission rates and stack parameters of existing sources will not change with this application. Stack parameters and emission rates for new sources are presented in Table 7.

**Table 7. Proposed Changes in Emission Rates**

	<b>NO<sub>2</sub> (lb/hr)</b>	<b>CO (lb/hr)</b>	<b>SO<sub>2</sub> (lb/hr)</b>	<b>PM<sub>10</sub> (lb/hr)</b>	<b>PM<sub>2.5</sub> (lb/hr)</b>
<b>Permitted Totals</b>	31.0	11.5	3.0	2.1	2.1
<b>Removal of Base Scrubber EF-5B</b>	-	-	-	-	-
<b>Removal of Paint Booth Heater and Sprayers 21-24</b>	-0.067	-0.056	-0.00040	-0.0013	-0.0013
<b>Removal of Wisconsin Oven 2 (unit 20)</b>	-0.16	-0.13	-0.00096	-0.003	-0.003
<b>Addition of EPI Reactors EBARA-1 through EBARA-12</b>	-	-	-	-	-
<b>Addition of UPTIMUM-1 through UPTIMUM-6</b>	+0.064	+0.053	+0.00038	+0.0048	+0.0048
<b>Addition of EDC-1 through EDC-3</b>	-	-	-	-	-
<b>Addition of CT1</b>	-	-	-	+0.14	+0.0027
<b>Addition of CT2</b>	-	-	-	+0.14	+0.0027
<b>Addition of CT3</b>	-	-	-	+0.11	+0.0022
<b>Modification of unit 16</b>	-0.0422	-0.0307	0	+0.0255	+0.0255
<b>Modification of unit 17</b>	-0.0422	-0.0307	0	+0.0251	+0.0251
<b>Modification of unit 18</b>	0	0	0	+0.0103	+0.0103
<b>Modification of unit 19</b>	0	0	0	+0.0056	+0.0056
<b>Project Emissions</b>	-0.247	-0.194	-0.001	0.46	0.075
<b>New Facility Total</b>	<b>30.76</b>	<b>11.30</b>	<b>3.02</b>	<b>2.76</b>	<b>2.38</b>

"-" indicates unit is not a source of the specified pollutant.

### 5. Treatment of Operating Hours

All hours of operation were modeled as part of this permit modification. Maximum hourly emission rates were used to model all standards. No reductions were claimed to represent non-continuous annual operation.

### 6. Particle Size Characteristics

No particle size distribution characteristics were included in the particulate matter modeling.

### 7. Discrepancies Between Modeled Parameters and Those in the Application

Modeled stack parameters and those represented in the application are identical.

## 8. Flare Calculations

N/A – There are no flares at the Facility.

## 9. Cross-Reference of Model Input Numbers and Names

The new UPTIMUM PLUS units (UPTIMUM-1 through UPTIMUM-6) and Electrostatic Dust Collectors (EDC-1 through EDC-3) are routed to stack 28 which splits into 28a and 28b. EDC-1 through EDC-3 do not emit pollutants for which a NAAQS or NMAAQs have been established and will therefore be excluded from Table 8 below. The Facility cooling towers each have two exit stacks.

**Table 8. Application and Model Comparison Table**

Application ID	Model ID	NO <sub>x</sub> (lb/hr)	CO (lb/hr)	SO <sub>2</sub> (lb/hr)	PM <sub>10</sub> (lb/hr)	PM <sub>2.5</sub> (lb/hr)
UPTIMUM-1 through UPTIMUM-6	28a	0.0318	0.0267	0.00019	0.0024	0.0024
	28b	0.0318	0.0267	0.00019	0.0024	0.0024
CT1	CT1a	-	-	-	0.0683	0.0014
	CT1b	-	-	-	0.0683	0.0014
CT2	CT2a	-	-	-	0.0683	0.0014
	CT2b	-	-	-	0.0683	0.0014
CT3	CT3a	-	-	-	0.0547	0.0011
	CT3b	-	-	-	0.0547	0.0011

## e. Building Downwash

### i. Dimension of Buildings

**Table 9. Rectangular Building Dimensions and Locations**

Model ID	X Coordinate (m)	Y Coordinate (m)	Height (ft)	X Length (ft)	Y Length (ft)	Angle
FANS	360327.7	3880154	20	13.12336	53.80577	90.6
BOX1	360358.7	3880153	10	13.77953	21.98163	90
BOX2	360353.6	3880153	10	12.79528	22.30971	0
BOX3	360346.5	3880152	10	13.45144	9.84252	0
BOX4	360350.3	3880160	10	10.82677	11.48294	0
WALL1	360326.2	3880147	7	2	60	0
WALL2	360326.9	3880165	7	2	30.51181	90
Q133P00K	360336.2	3880164	7	2	8	0
BOX6	360359.3	3880154	8	20.34121	11.48294	0
GENBOX1	360327.7	3880157	8	4.92126	11.48294	0
GENBOX2	360393.5	3880161	8	6.56168	11.81102	90
Q133P00S	360393.1	3880176	35	23.95013	15.10761	1
Q133P00U	360420.4	3880202	35	24.6063	14.10761	2
Q133P00V	360395.1	3880180	30	9.514436	37.72966	1
Q133P00X	360422.2	3880191	30	9.84252	37.72966	2
Q133P010	360373.4	3880190	28	14.76378	36.08924	0

Model ID	X Coordinate (m)	Y Coordinate (m)	Height (ft)	X Length (ft)	Y Length (ft)	Angle
Q133P012	360384.1	3880196	28	12.79528	40.35433	2
Q133P013	360401.2	3880196	35	15.09186	26.24672	2
Q133P014	360390.4	3880202	30	10.82677	35.76115	92
Q133P017	360407.9	3880196	28	20.99738	37.72966	2
Q133P019	360421.2	3880158	51.8	15.74803	18.04462	1.6
Q133P01A	360425.9	3880162	45	6.889763	26.24672	91.6
Q133P01B	360349.8	3880168	23.75	21.32546	10.82677	0
Q133P01C	360374.6	3880146	8	40.02887	9.84252	1.5
Q133P01E	360374.2	3880150	8	40.02887	8.2021	1.6
ROPL6000	360439.1	3880209	45	7.217848	22.96588	1.6
ROPL6003	360378.9	3880203	25	5.577428	19.02887	0
ROPL6004	360365.6	3880198	25	6.56168	16.4042	0
ROPL6005	360347	3880176	26	11.81102	41.99475	0
ROPL6006	360359.5	3880177	26	11.48294	38.71391	0
ROPL6007	360346.8	3880193	26	13.45144	42.65092	0
ROPL6008	360359.5	3880193	26	13.77953	42.65092	0
ROPL6009	360342.2	3880176	26	6.56168	19.02887	0
ROPL600A	360330.4	3880161	4	5.577428	5.905512	0
ROPL600B	360333.1	3880158	4	5.249344	5.905512	0
ROPL600C	360336.8	3880159	6	3.937008	5.905512	0
ROPL600F	360340.4	3880161	4	3.28084	6.56168	90
ROPL600H	360346.3	3880159	11	11.81102	15.74803	0
ROPL600M	360337.2	3880147	7	2	17.13386	90
ROPL600O	360332.4	3880135	7	2	37.72966	0
ROPL600W	360333.1	3880140	7	2	31.49607	90
ROPL600Y	360339.8	3880140	7	2	22.30971	0
ROPL6010	360353.5	3880188	26	5.577428	22.96588	0
ROPL6012	360353.5	3880199	26	4.92126	15.74803	0
ROPL6013	360368.2	3880198	23	4.593176	19.68504	0
ROPL6014	360371	3880200	24	3.937008	9.186352	0
ROPL6015	360389.5	3880203	24	9.84252	9.545932	2
ROPL6016	360336.4	3880034	25	4.593176	11.48294	0
ROPL6018	360319.9	3880055	25	7.874016	19.68504	0
ROPL6019	360321.3	3880077	25.5	10.1706	23.95013	1.6
2_WWALL	360274.6	3880032	22	1.5	185.3674	1.6
2_NWALL	360276.5	3880089	22	1.5	136	91.6
2_EWALL	360316.1	3880031	22	1.64042	185.35	1.6
2_SWALL	360274.8	3880033	22	1.5	135.5	91.6
SAT_B	360275	3880032	20	135.8268	183.727	1.6
9NTWD008	360399.9	3880159	4	4.92126	5.905512	0
9NTWD009	360401.2	3880156	4	4.593176	6.56168	0
9NTWD00A	360406.7	3880155	4	3.937008	4.92126	0
WOL4Z001	360310.5	3880036	27	10.82677	33.79265	-88
WOL4Z002	360311.1	3880045	27	11.48294	34.44882	-88
WOL4Z003	360311	3880054	27	11.48294	32.8084	-88
WOL4Z005	360311.6	3880063	27	11.81102	33.13649	-89
WOL4Z006	360311.7	3880071	27	11.81102	33.79265	-89
WOL4Z007	360292.9	3880061	28	16.07612	35.43307	1.6
WOL4Z008	360285.4	3880070	27	10.82677	22.6378	-89

Model ID	X Coordinate (m)	Y Coordinate (m)	Height (ft)	X Length (ft)	Y Length (ft)	Angle
W0L4Z009	360302.6	3880080	27	6.889763	22.30971	-90
W0L4Z00A	360366.6	3880168	30	3.28084	4.92126	0
W0L4Z00D	360368.7	3880168	30	3.28084	4.92126	0
MAIN_C	360446.9	3880155	30	73.45932	205.6142	1.5
IYTL3001	360344.2	3880050	8	5.577428	9.514436	-90.0
EJB9E03Y	360405.3	3880159	4	4.92126	5.905512	0
EJB9E041	360326.3	3880147	7	2	27.13386	90
EJB9E042	360404.4	3880175	35	24.6063	14.10761	0.5
EJB9E043	360406.9	3880179	30	9.84252	37.72966	1.6
EJB9E044	360419.6	3880174	35	24.6063	14.10761	1.6
EJB9E045	360422.1	3880178	30	9.84252	37.72966	1.6
CT4	360362.8	3880062	14.98	20.04	20.04	90

**Table 10. Circular Building Dimensions**

Bldg. ID	Height (ft)	X Coordinate (m)	Y Coordinate (m)	Radius (ft)	Corners
EJB9E03Z	18	360335.1	3880142.5	6.56168	24
EJB9E040	30	360362.8	3880161.0	5.249344	24

**Table 11. Polygon Building Dimensions**

Bldg. ID	Description	Height (ft)	Corner	X Coordinate (m)	Y Coordinate (m)	Corner	X Coordinate (m)	Y Coordinate (m)
MAIN_A	Main Building A	12.5	1	360340.93	3880220.08	19	360411.50	3880156.95
			2	360420.19	3880217.81	20	360411.61	3880164.95
			3	360420.30	3880224.62	21	360336.23	3880166.90
			4	360429.38	3880224.62	22	360336.35	3880174.77
			5	360429.48	3880227.23	23	360327.36	3880175.07
			6	360432.89	3880227.05	24	360327.70	3880187.57
			7	360433.07	3880226.03	25	360330.61	3880187.53
			8	360445.31	3880227.08	26	360331.43	3880210.90
			9	360445.16	3880223.92	27	360333.85	3880211.27
			10	360444.36	3880206.31	28	360333.88	3880212.64
			11	360448.29	3880206.07	29	360334.33	3880214.36
			12	360448.34	3880217.47	30	360335.02	3880215.66
			13	360470.63	3880217.11	31	360336.08	3880216.71
			14	360468.82	3880154.53	32	360337.55	3880217.77
			15	360447.11	3880155.56	33	360339.11	3880218.28
			16	360447.29	3880172.56	34	360340.95	3880218.51
			17	360443.15	3880172.77	35	360340.93	3880220.08
			18	360443.18	3880155.48			

Bldg. ID	Description	Height (ft)	Corner	X Coordinate (m)	Y Coordinate (m)	Corner	X Coordinate (m)	Y Coordinate (m)
MAIN_B	Main Building B	20	1	360418.94	3880173.2	9	360340.37	3880208.26
			2	360427.29	3880172.99	10	360340.32	3880205.1
			3	360428.27	3880206.84	11	360340.11	3880204.37
			4	360419.9	3880207.17	12	360339.77	3880186.96
			5	360419.87	3880209.51	13	360327.52	3880187.23
			6	360347.13	3880211.56	14	360327.41	3880174.92
			7	360347.13	3880211.23	15	360418.89	3880171.95
			8	360343.64	3880211.28	16	360418.94	3880173.2
MAIN_D	Main Building D	35	1	360420.27	3880224.64	7	360411.73	3880165.84
			2	360419.99	3880207.2	8	360411.52	3880156.92
			3	360428.32	3880206.95	9	360443.21	3880155.52
			4	360427.36	3880172.98	10	360445.09	3880223.65
			5	360418.9	3880173.2	11	360420.27	3880224.64
			6	360418.61	3880165.69			
MAIN_E	Main Building E	30	1	360347.21	3880211.1	29	360337.03	3880205.46
			2	360347.72	3880211.06	30	360338.45	3880204.76
			3	360347.66	3880212.28	31	360339.67	3880204.54
			4	360347.44	3880213.52	32	360340.42	3880204.44
			5	360346.91	3880214.63	33	360340.49	3880204.92
			6	360345.75	3880216.08	34	360339.02	3880205.18
			7	360344.23	3880217.42	35	360338.11	3880205.5
			8	360343.18	3880217.97	36	360337.15	3880206.05
			9	360341.97	3880218.39	37	360335.9	3880207.13
			10	360340.94	3880218.54	38	360335.28	3880207.95
			11	360339.92	3880218.45	39	360334.8	3880208.89
			12	360338.89	3880218.26	40	360334.38	3880210.12
			13	360337.6	3880217.83	41	360334.3	3880211.27
			14	360336.87	3880217.39	42	360334.36	3880212.5
			15	360336.35	3880217.03	43	360335.02	3880213.85
			16	360335.65	3880216.41	44	360335.67	3880215.2
			17	360334.97	3880215.75	45	360336.93	3880216.2
			18	360334.6	3880215.07	46	360338.12	3880216.79
			19	360334.23	3880214.29	47	360339.34	3880217.22
			20	360333.94	3880213.23	48	360340.59	3880217.41
			21	360333.78	3880211.94	49	360341.66	3880217.36
			22	360333.81	3880211.4	50	360343.23	3880216.98
			23	360333.77	3880210.65	51	360344.47	3880216.29
			24	360334.01	3880209.59	52	360345.42	3880215.56
			25	360334.19	3880208.92	53	360346.14	3880214.61
			26	360334.67	3880207.96	54	360346.7	3880213.79

Bldg. ID	Description	Height (ft)	Corner	X Coordinate (m)	Y Coordinate (m)	Corner	X Coordinate (m)	Y Coordinate (m)
			27	360335.09	3880207.14	55	360347.08	3880212.52
			28	360335.83	3880206.38	56	360347.21	3880211.1
SAT_A	Satellite Building	19	1	360318.14	3880125.27	11	360267.40	3880113.34
			2	360331.80	3880124.76	12	360268.75	3880114.70
			3	360330.03	3880074.37	13	360270.58	3880115.81
			4	360340.62	3880074.05	14	360271.98	3880116.20
			5	360339.79	3880030.17	15	360288.31	3880118.86
			6	360266.58	3880032.29	16	360288.25	3880116.60
			7	360268.74	3880102.88	17	360299.23	3880117.91
			8	360265.78	3880102.92	18	360299.48	3880115.83
			9	360266.26	3880110.02	19	360317.88	3880115.42
			10	360266.72	3880112.05			

## ii. Discussion of Included and Excluded Buildings

CT4 was included in this model to represent Cooling Tower CT3. With the exception of CT4, the same buildings were used as the January 2017 model.

Surrounding buildings excluded from the model were outside of the 5L distance of facility stacks as outlined in the City of Albuquerque Environmental Health Department Air Quality Program's Air Dispersion Modeling Guidelines (Revised May 2024).

## V. MODELING FILES DESCRIPTION

### a. List of File Names

**Table 12. Modeling Files and Description**

Name	Description
SolAero_COSIL_KABQ14-18_v2.0_2026 0223	CO 1hr and 8hr SIL model
SolAero_NO2SIL_KABQ14-18_v2.0_2026 0223	NO <sub>2</sub> 1hr, 24hr, and Annual SIL model
SolAero_PM2.5SIL_KABQ14-18_v2.0_2026 0223	PM <sub>2.5</sub> 24hr, and Annual SIL model
SolAero_PM10SIL_KABQ14-18_v2.0_2026 0223	PM <sub>10</sub> 24hr SIL model
SolAero_SO2SIL_KABQ14-18_v2.0_2026 0223	SO <sub>2</sub> 1hr, 3hr, 24hr, and Annual SIL model
SolAero_NO2-1r_KABQ14-18_v1.0_2026 0223	NO <sub>2</sub> 1hr NAAQS CIA model
SolAero_NO2-Ann_KABQ14-18_v1.0_2026 0223	NO <sub>2</sub> Annual NAAQS CIA model
SolAero_PM25-24hr_KABQ14-18_v1.0_2026 0223	PM <sub>2.5</sub> 24hr NAAQS CIA model
SolAero_PM25-Ann_KABQ14-18_v1.0_2026 0223	PM <sub>2.5</sub> Annual NAAQS CIA model
SolAero_PM10-24hr_KABQ14-18_v3.0_2026 0223	PM <sub>10</sub> 24hr NAAQS CIA model

### b. Description of Scenarios

All files labeled "SIL" correspond to the Significance Impact Level (SIL) analysis. Only the new/modified units at the Facility were included in the SIL modeling. The results indicate that the modeled concentrations are below the SIL thresholds for all CO and SO<sub>2</sub> averaging periods. The NO<sub>2</sub> 1hr, NO<sub>2</sub> Annual, PM<sub>2.5</sub> 24-hr, PM<sub>2.5</sub> Annual, and PM<sub>10</sub> 24-hr averaging periods exceeded the SIL threshold and therefore required a Cumulative Impacts Analysis (CIA).

All files labeled "CIA" correspond to the Cumulative Impacts Analysis. These files included all other sources of the specific pollutant at the facility.

According to the NMED Modeling Guidelines, the following exceptions apply:

- ▶ The NO<sub>2</sub> 24-hour NMAAQs does not need to be modeled, as compliance with the NO<sub>2</sub> 1-hr NAAQS demonstrates compliance with this standard
- ▶ The SO<sub>2</sub> annual and 24-hr NMAAQs, as well as the 3-hour NAAQS, do not require modeling as compliance with the SO<sub>2</sub> 1-hr NAAQS will demonstrate compliance with these standards
- ▶ There are no established NAAQS or NMAAQs standards for the PM<sub>10</sub> annual averaging period, and the City of Albuquerque does not have a PSD Increment program in place. Therefore, modeling is not required.

## VI. MODELING RESULTS

### a. Summary of Modeling Results

**Table 13. Model Results, Maximum Concentration and Location, and Significance Thresholds Comparison**

Pollutant	Averaging Period	Significance Level ( $\mu\text{g}/\text{m}^3$ )	Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	Percent of Significance	Location of Maximum Concentration		Elevation (m)
					X	Y	
CO	8-hr	500	38.89	7.78%	360247	3880105.0	1667.39
	1-hr	2000	96.06	4.80%	360247	3880105.0	1667.39
NO <sub>2</sub>	Annual	1.0	6.65	Significant	360330.5	3880088.5	1668.68
	24-hr	5.0	27.92	Significant	360247	3880105.0	1667.39
	1-hr	7.52	102.94	Significant	360247	3880105.0	1667.39
PM <sub>2.5</sub>	Annual	0.13	0.594	Significant	360330.5	3880088.5	1668.68
	24-hr	1.2	2.39	Significant	360247	3880105.0	1667.39
PM <sub>10</sub>	24-hr	5	53.67	Significant	360362.8	3880061.5	1669.29
SO <sub>2</sub>	Annual	1.0	0.0449	4.49%	360330.5	3880088.5	1668.7
	24-hr	5.0	0.189	3.77%	360247	3880105.0	1667.39
	3-hr	25.0	0.511	2.04%	360247	3880105.0	1667.39
	1-hr	7.8	0.695	8.91%	360247	3880105	1667.39

**Table 14. Cumulative Impact Analysis Comparison to NAAQS Threshold**

Pollutant	Averaging Period and Standard	NAAQS/ NMAAQS ( $\mu\text{g}/\text{m}^3$ )	Facility Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	Facility and Neighbors Modeled Concentration <sup>1</sup> ( $\mu\text{g}/\text{m}^3$ )	Background Concentration <sup>2</sup> ( $\mu\text{g}/\text{m}^3$ )	Cumulative Total	Percent of Standard
NO <sub>2</sub>	Annual NMAAQS	94.02	6.67	7.010	18.00	25.01	26.6%
	1-hr NAAQS	188.03	87.74	87.76	83.10	170.86	90.9%
PM <sub>2.5</sub>	Annual NAAQS	9.00	0.59	0.64	5.4	6.04	67.1%
	24-hr NAAQS	35.00	1.66	1.68	14.3	15.98	45.6%
PM <sub>10</sub>	24-hr NAAQS	150.00	28.29	28.30	22.3	50.60	33.7%

<sup>1</sup> Surrounding sources provided per Jeff Stonesifer's email 2025-0827.

<sup>2</sup> Background concentrations were provided by CABQ AQP on August 27, 2025. Background concentrations are from the Del Norte Monitor.

## VII. SUMMARY/CONCLUSIONS

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### a. Modeling Statement

The submitted air dispersion modeling and report demonstrate compliance with the National and New Mexico Ambient Air Quality Standards. All requirements have been satisfied. There are no exceedances which would prohibit approval of the permit modification.

### b. Expected Permit Conditions

The six (6) new UPTIMUM PLUS units (UPTIMUM-1 through UPTIMUM-6) and three (3) existing cooling towers (CT1 through CT3) will be allowed to operate continuously with no permit conditions restricting hours of operation. All other units at this facility will remain as permitted.

## **APPENDIX A. APPROVED MODELING PROTOCOL AND AGENCY CORRESPONDENCE**

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# **AIR DISPERSION MODELING PROTOCOL**

## **Construction Permit Modification**



### **SolAero Technologies Corporation**

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July 2025

Project 243201.0159



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## 1. GENERAL INFORMATION

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The format of this modeling protocol has been configured to match Attachment B of the City of Albuquerque (CABQ) Environmental Health Department (EHD), Air Quality Program's (AQP) Air Dispersion Modeling Guidelines (published May 2024).

SolAero Technologies Corporation (SolAero) owns and operates the SolAero Technologies Corporation (the Facility) located at 10420 Research Road SE, Albuquerque, Bernalillo County, New Mexico 87123 (13S UTM 360,360 m E and 3,880,130 m N). The Facility is a compound semiconductor device manufacturing facility classified under Standard Industrial Classification (SIC) code 3674 and North American Industry Classification System (NAICS) 334413.

The procedures described hereafter will serve as the foundation for the dispersion modeling analysis to be conducted in support of the application.

## 2. FACILITY INFORMATION

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The Facility operates under Air Quality Construction Permit No. 1029-M2-2TR. SolAero is now submitting a permit modification pursuant to 20.11.41.2.A.(3) NMAC for the following modifications to the facility:

- ▶ The removal of base scrubber (EF-5B).
- ▶ The addition of six (6) Veeco EPI growth reactors (Units EBARA-1 through EBARA-12).
- ▶ The addition of a Burn Wet Abatement System to control emissions from the reactors resulting in the following emission units:
  - Six (6) UPTIMUM PLUS units (UPTIMUM-1 through UPTIMUM-6); and
  - Three (3) Electrostatic Dust Collectors (EDC-1 through EDC-3).

UPTIMUM-1 through UPTIMUM-6 and EDC-1 through EDC-3 will be routed to the New Growth Exhaust stack (Unit #23).

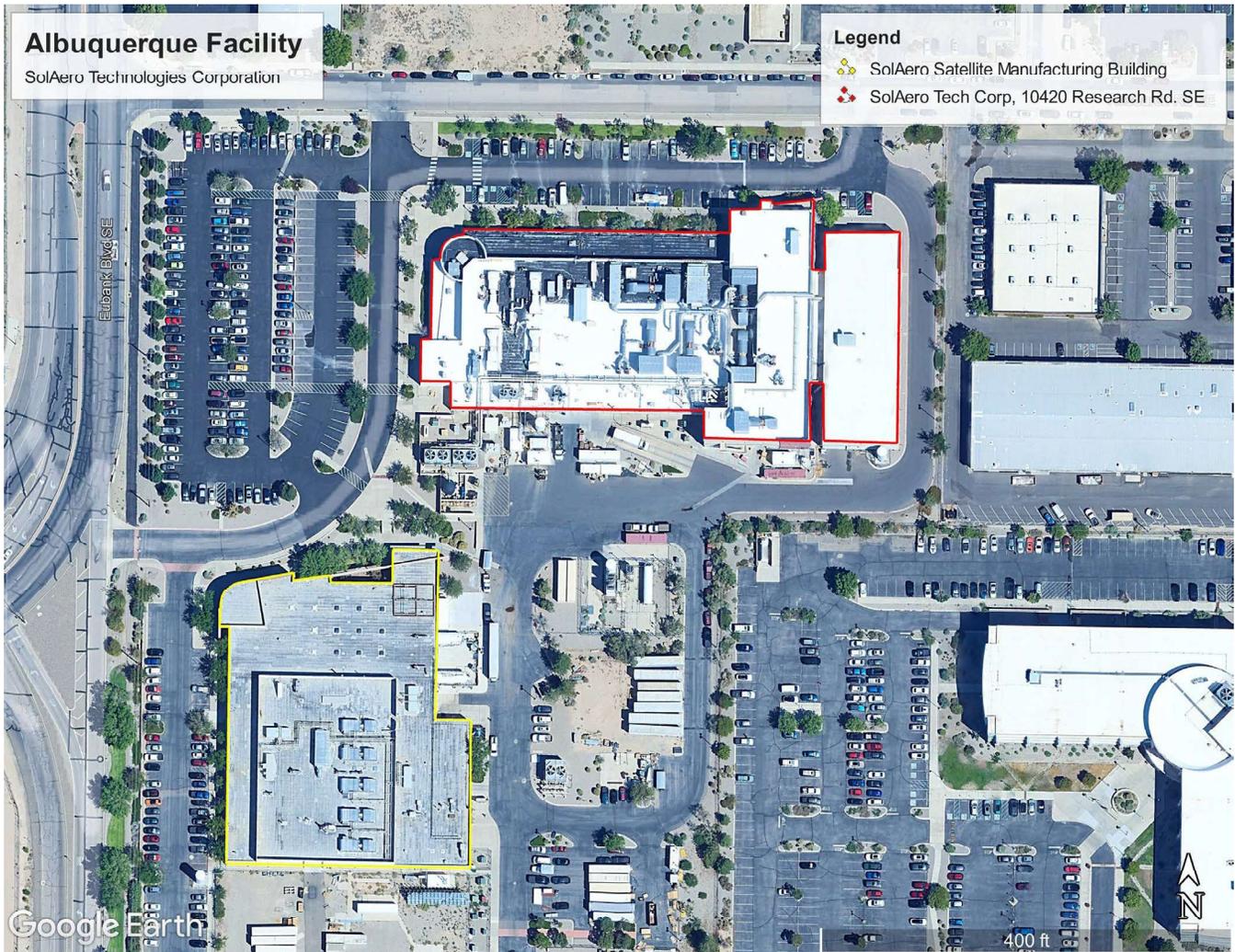
### 2.1 Facility Maps

Figures 1, 2, and 3 show aerial images of the Facility from Google Earth, Google Maps, and the City of Albuquerque's Advanced Map Viewer. These images display the buildings at the facility.

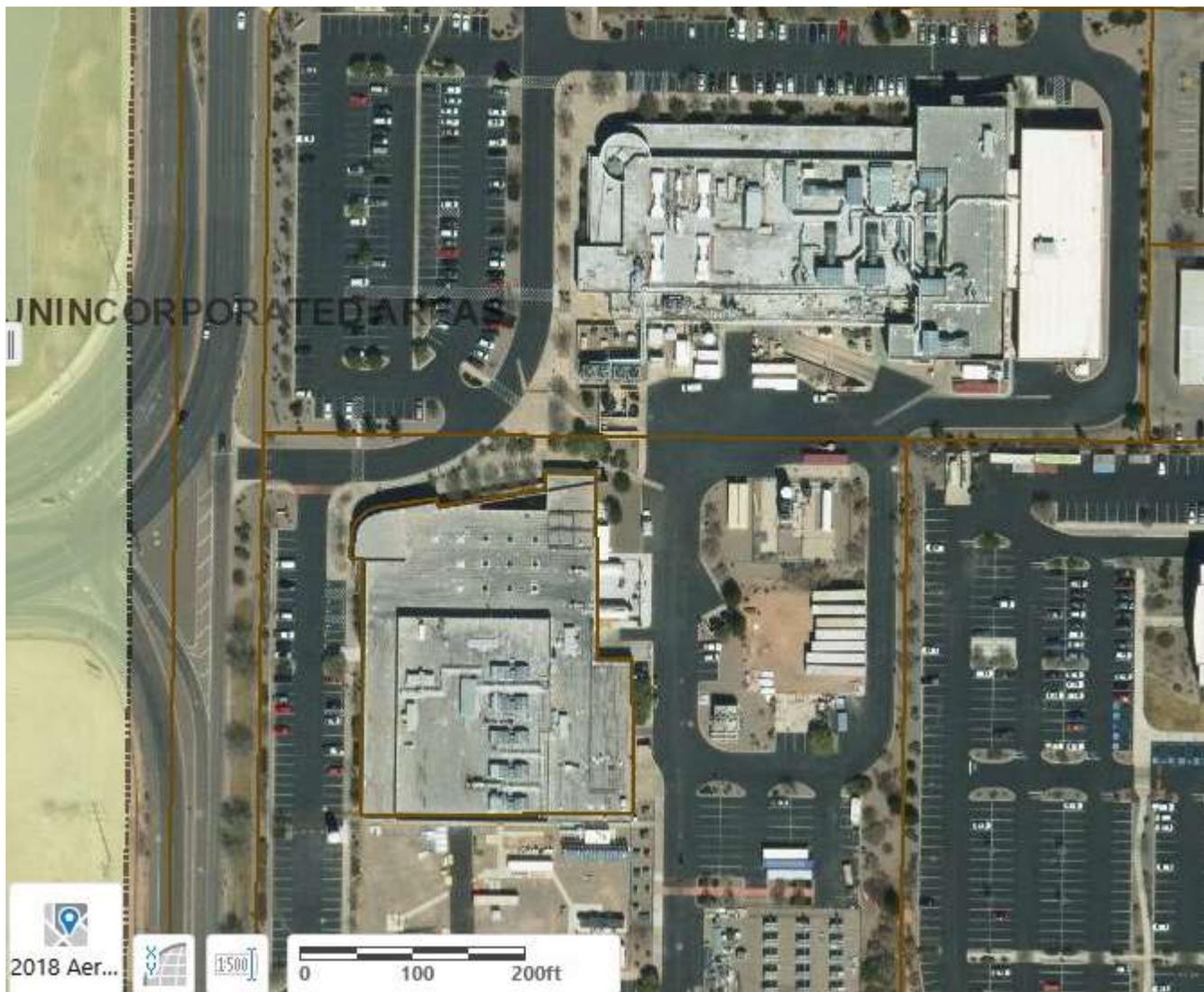
### 2.2 Facility Maps

The maps requested by Attachment B of CABQ's Modeling Guidelines are reported in Figures 1 through 3 of this section. These aerial images of the Facility from Google Earth, Google Maps, and the City of Albuquerque's Advanced Map Viewer display the buildings at the facility.

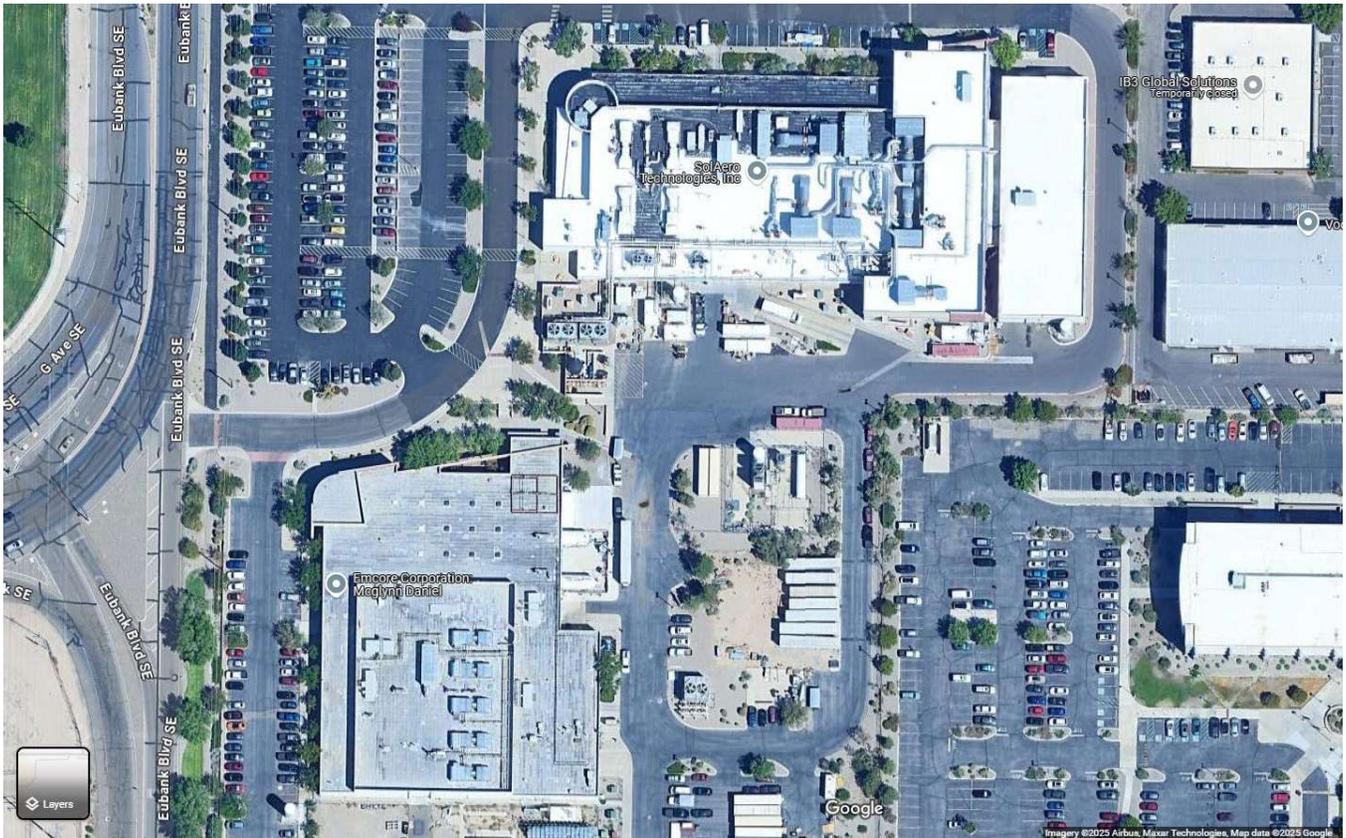
Figure 1 – Google Earth Imagery of the Facility Dated 8/24/2023



**Figure 2 – 2018 Aerial Imagery of the Facility and its Surroundings Obtained from the City of Albuquerque’s Advanced Map Viewer**



**Figure 3 – Google Maps Imagery of the Facility and its Surroundings dated 8/24/2023**



### 2.3 Operating Hours

The Facility is requesting to be authorized to operate 24 hours a day, 7 days a week, and 52 weeks a year. All hours will be modeled.

## 3. EMISSIONS AND STANDARDS MODELED

### 3.1 Facility Emissions

Requested emission rates for all criteria pollutants can be found in Table 1. Please note that the requested emissions may change slightly during development of the permit application.

**Table 1 – Requested Total Facility Emissions**

	NO <sub>x</sub>		CO		SO <sub>2</sub>		PM <sub>10</sub>		PM <sub>2.5</sub>	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
<b>Permitted Totals</b>	31.0	26.2	11.5	18.3	3.0	0.9	2.1	0.9	2.1	0.9
<b>Removal of Base Scrubber EF-5B</b>	-	-	-	-	-	-	-	-	-	-
<b>Addition of EPI Reactors EBARA-1 through EBARA-12</b>	-	-	-	-	-	-	-	-	-	-
<b>Addition of UPTIMUM-1 through UPTIMUM-6</b>	0.06	0.28	0.05	0.23	0.00038	0.0017	0.0048	0.02	0.0048	0.02
<b>Addition of EDC-1 through EDC-3</b>	-	-	-	-	-	-	-	-	-	-
<b>Project Emissions</b>	0.06	0.28	0.05	0.23	0.00038	0.0017	0.0048	0.02	0.0048	0.02
<b>New Facility Total</b>	<b>30.96</b>	<b>25.98</b>	<b>11.50</b>	<b>18.05</b>	<b>3.02</b>	<b>0.86</b>	<b>2.14</b>	<b>0.87</b>	<b>2.14</b>	<b>0.87</b>

The current permit emission limits for the existing autoclaves (Units 16 and 17) are ~16% higher than the emission rates for Units 16 and 17 originally modeled for the air quality application package submitted January 20, 2017. The report submitted with the 2017 application is included for reference in Appendix C.

### 3.2 Standards Modeled

The pollutants and standards to be modeled are shown in Table 2. Note that some standards are surrogates that demonstrate compliance for other averaging periods. (e.g., SO<sub>2</sub> 1-hr NAAQS is a surrogate that demonstrates compliance for SO<sub>2</sub> 3-hr NAAQS and SO<sub>2</sub> 24-hr and annual NMAAQs) per the NMED Air Dispersion Modeling Guidance.<sup>1</sup>

<sup>1</sup> New Mexico Environment Department Air Quality Bureau, New Mexico Air Quality Bureau Air Dispersion Modeling Guidelines. Revised June 2024, Table 18.

**Table 2 – Proposed Pollutants and Averaging Periods to be Modeled**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Not Emitted</b>	<b>Surrogate Modeled</b>	<b>Modeled</b>
CO	8-hr			<input checked="" type="checkbox"/>
	1-hr			<input checked="" type="checkbox"/>
H <sub>2</sub> S	1-hr	<input checked="" type="checkbox"/>		
Pb	Quarterly	<input checked="" type="checkbox"/>		
NO <sub>2</sub>	Annual			<input checked="" type="checkbox"/>
	24-hr		<input checked="" type="checkbox"/>	
	1-hr			<input checked="" type="checkbox"/>
PM <sub>2.5</sub>	Annual			<input checked="" type="checkbox"/>
	24-hr			<input checked="" type="checkbox"/>
PM <sub>10</sub>	Annual			<input checked="" type="checkbox"/>
	24-hr			<input checked="" type="checkbox"/>
SO <sub>2</sub>	Annual		<input checked="" type="checkbox"/>	
	24-hr		<input checked="" type="checkbox"/>	
	3-hr		<input checked="" type="checkbox"/>	
	1-hr			<input checked="" type="checkbox"/>

### 3.3 Impacts and Results

#### 3.3.1 Significance Impact Level (SIL) Analysis

SolAero will conduct a screen analysis to determine if the High 1st High modeled impacts of each standard exceed the significance thresholds listed in Table 18 of the NMED Air Dispersion Modeling guidelines.<sup>2</sup> The significance levels for the modeled pollutants are reported in Table 3. The maximum potential hourly emission rate from the emission sources will be used to demonstrate compliance. All pollutants and standards shown in Table 3 will be modeled to assess significance.

**Table 3 – Significant Impact Levels of Pollutants that Will be Modeled**

<b>Pollutant</b>	<b>Averaging Period</b>	<b>Significance Level (µg/m<sup>3</sup>)</b>
CO	8-hr	500
	1-hr	2,000
NO <sub>2</sub>	Annual	1.0
	24-hr	5.0
	1-hr	7.52
PM <sub>2.5</sub>	Annual	0.13

<sup>2</sup> Ibid, Table 18.

Pollutant	Averaging Period	Significance Level ( $\mu\text{g}/\text{m}^3$ )
PM <sub>10</sub>	24-hr	1.2
	Annual	1.0
	24-hr	5.0
SO <sub>2</sub>	Annual	1.0
	24-hr	5.0
	3-hr	25.0
	1-hr	7.8

### 3.3.2 Cumulative Impact Analysis (CIA)

If the significance analysis predicts that modeled concentrations will exceed a SIL, a cumulative impact analysis (CIA) will be conducted. SolAero proposes to use the prescribed design value of each modeled standard as described in Table 18 and Table 20 of the NMED Air Dispersion Modeling guidelines<sup>3</sup>. Modeling will only be performed for receptors where the SIL is in exceedance based on the significant impacts modeling results.

**Table 4 – Cumulative Impact Analysis Design Values of Each Modeled Standard**

Pollutant	Averaging Period	Modeled Concentration	Add Background Sources	Surrounding Sources Modeled	NAAQS Standard ( $\mu\text{g}/\text{m}^3$ )	NMAAQS Standard ( $\mu\text{g}/\text{m}^3$ )
CO	8-hr	High 1st High	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		9,960.1
	1-hr	High 1st High	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		14,997.5
NO <sub>2</sub>	Annual	Annual Average*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		94.02
	1-hr	High 8th High	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	188.03	
PM <sub>2.5</sub>	Annual	Annual Average*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	9	
	24-hr	High 8th High	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	35	
PM <sub>10</sub>	Annual	Annual Average*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
	24-hr	High 2nd High	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	150	
SO <sub>2</sub>	1-hr	High 4th High	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	196.4	

\* The average of the three highest annual impacts from the five year met data set will be compared against the standard.

The proposed total NO<sub>2</sub> emission rate is 25.98 tpy and the proposed total SO<sub>2</sub> emission rate is 0.86 tpy. As the modeled emission rates for these pollutants do not exceed 40 tpy, secondary particulate formation will not be evaluated as part of modeling.<sup>4</sup>

<sup>3</sup> Ibid, Table 18 & Table 20.

<sup>4</sup> Ibid, Section 2.6.6.2

## 4. MODELING SET-UP

### 4.1 Proposed Sources Summary

As described in Section 1, this permit modification application will authorize the modification of the SolAero compound semiconductor device manufacturing facility to manufacture high energy photovoltaics and other advanced semiconductors. The facility consists of the following process equipment: emergency generators (Units 1, 2, and 15), boilers (Units 3, 4, 5, and 13), autoclaves (Units 16 and 17), a release booth (Unit 18), ovens (Units 19 and 20), paint booth heater (Unit 21), paint sprayers (Units 22-24), the EPI reactors (Units EBARA-1 through 12), UPTIMUM PLUS units (Units UPTIMUM-1 through 6), EDC PLUS units (Units EDC-1 through 3), and Unit 6a which consists of various chemical emissions throughout the facility. UPTIMUM-1 through UPTIMUM-6 and ECD-1 through ECD-3 will be routed to the New Growth Exhaust stack (Unit 28). The center of the facility is located at 13S UTM 360,337 m E and 3,880,095 m N.

### 4.2 Sources and Emission Rates Modeled

The Facility will have one new source which emits criteria pollutants required for modeling: New Growth Exhaust, Unit 28. The new Solvent Exhaust Fan, New Base Scrubber, and New Acid Scrubber (Units 25, 26, 27) do not emit pollutants for which a national Ambient Air Quality Standard (NAAQS) or New Mexico Ambient Air Quality Standard (NMAAQs) have been established and will therefore not require air dispersion modeling. SolAero has accurately represented the location of the modeled emission sources using an accurate plot plan and aerial imagery.

Table 5 reports the hourly emission rates that will be modeled for each new unit. Please note that the requested emissions may change slightly during development of the permit application.

**Table 5 – Modeled SIL Emission Rates**

Unit No.	Description	NO <sub>x</sub> (lb/hr)	CO (lb/hr)	SO <sub>2</sub> (lb/hr)	PM <sub>10</sub> (lb/hr)	PM <sub>2.5</sub> (lb/hr)
28	New Growth Exhaust	0.06	0.05	0.00038	0.0048	0.0048

Table 6 reports the hourly emission rates for existing and unchanged units. These units will be incorporated into the CIA model for each criteria pollutant that exceeds the significance level in its corresponding SIL model.

The emergency generator units 1, 2, and 15 will not be included in this model as emergency generators that operate 500 hours or less per year are not required to be modeled and do not need to request a waiver.<sup>5</sup>

The comfort boiler units 3, 4, 5, and 13 were previously approved for a modeling waiver in 2016. Units 3, 4, 5, and 13 have not been modified since 2017 and therefore would not need to be modeled. The previous waiver can be found in Appendix B.

<sup>5</sup> City of Albuquerque Environmental Health Department Air Quality Program Permitting Division, Air Dispersion Modeling Guidelines for Air Quality Permitting, Revised May 2024, Page 7.

**Table 6 – Existing and Unchanged Emission Rates**

<b>Unit No.</b>	<b>Description</b>	<b>NO<sub>x</sub> (lb/hr)</b>	<b>CO (lb/hr)</b>	<b>SO<sub>2</sub> (lb/hr)</b>	<b>PM<sub>10</sub> (lb/hr)</b>	<b>PM<sub>2.5</sub> (lb/hr)</b>
16	Autoclave 1*	0.39	0.33	0.0024	0.0074	0.0074
17	Autoclave 2*	0.39	0.33	0.0024	0.0074	0.0074
18	Release Booth	0.27	0.22	0.0016	0.0051	0.0051
19	Wisconsin Oven 1	0.10	0.084	6.0E-04	0.0019	0.0019
20	Wisconsin Oven 2	0.16	0.13	0.0010	0.0030	0.0030
21-24	Pain Booth Heater and Sprayers	0.067	0.056	4.00E-04	0.0016	0.0016

\*Unit 16 and 17 emission rates are based on prior modeling and do not match the current permit emission limits on Table 2b of ATC Permit No. 1029-M2-2TR

### 4.3 Source Types and Stack Parameters

All units will be modeled as point sources. The facility will run continuously. Table 7 contains the stack parameters for each new point source at the facility. Table 8 contains the stack parameters for each existing and unchanged point source at the facility.

**Table 7 – Point Source Stack Parameters for SIL model**

<b>Unit No.</b>	<b>UTM Coordinates</b>	<b>Exit Direction</b>	<b>Height Above Ground (ft)</b>	<b>Exhaust Temperature (°F)</b>	<b>Exhaust Velocity (ft/s)</b>	<b>Inside Diameter (ft)</b>	<b>Rain Cap?</b>
28	TBD*	Vertical	28	70	90	TBD*	No

\*The location and stack diameter of unit 28 are in the process of being developed. The final location of the stack and inside diameter will be confirmed before modeling and will be included in the modeling report.

**Table 8 – Point Source Stack Parameters for Existing and Unchanged Units**

<b>Unit No.</b>	<b>UTM Coordinates</b>	<b>Exit Direction</b>	<b>Height Above Ground (ft)</b>	<b>Exhaust Temperature (°F)</b>	<b>Exhaust Velocity (ft/s)</b>	<b>Inside Diameter (ft)</b>	<b>Rain Cap?</b>
16	360,343 m E 3,880,087 m N	Vertical	17	450	142.3	0.67	No
17	360,343 m E 3,880,091 m N	Vertical	17	450	142.3	0.67	No
18	360,300 m E 3,880,076 m N	Vertical	40	250	48.5	1.20	No
19	360,316 m E 3,880,069 m N	Vertical	40	350	79.7	0.50	No
20	360,315 m E 3,880,040 m N	Vertical	40	350	44.4	0.67	No
21-24	360,282 m E 3,880,073 m N	Vertical	40	65	10.1	3.19	No

#### 4.4 Buildings and Downwash

There are two main buildings located at the Facility. Building Profile Input Program for PRIME (BPIPPRM) will be run in all models to address building downwash associated with the structures at this facility. SolAero will determine the dimensions of all off site buildings and will run BPIPPRM if they are within the Good Engineering Practice (GEP) 5L area of influence<sup>6,7</sup> of any proposed or existing point source.

The GEP 5L area of influence for each structure is determined by measuring a distance of five times 'L' from each edge of the structure, where 'L' is the lesser of the building height or projected building width or length. Only those stacks within the area of influence are affected by building wake effects.

Table 9, Table 10, and Table 11 contains the building dimensions.

**Table 9 – Rectangular Building Dimensions**

<b>Bldg. ID</b>	<b>Height (ft)</b>	<b>X Coordinate (m)</b>	<b>Y Coordinate (m)</b>	<b>X Length (ft)</b>	<b>Y Length (ft)</b>	<b>Angle</b>
MAIN_C	30	360446.9	3880154.8	73.45932	205.6142	1.5
SAT_B	20	360275.0	3880032.4	135.8268	183.727	1.6
FANS	20	360327.7	3880153.8	13.12336	53.80577	90.6
BOX1	10	360358.7	3880153.4	13.77953	21.98163	90
BOX2	10	360353.6	3880153.0	12.79528	22.30971	0

<sup>6</sup> EPA-454/R-93-038. User's Guide to the Building Profile Input Program. Revised February 8, 1995.

<sup>7</sup> Electric Power Research Institute. Addendum to ISC3 User's Guide: The prime Plume Rise and Building Downwash Model. November 1997.

<b>Bldg. ID</b>	<b>Height (ft)</b>	<b>X Coordinate (m)</b>	<b>Y Coordinate (m)</b>	<b>X Length (ft)</b>	<b>Y Length (ft)</b>	<b>Angle</b>
BOX3	10	360346.5	3880152.3	13.45144	9.84252	0
BOX4	10	360350.3	3880159.8	10.82677	11.48294	0
WALL1	7	360326.2	3880146.7	2	60	0
WALL2	7	360326.9	3880164.9	2	30.51181	90
Q133P00K	7	360336.2	3880164.3	2	8	0
BOX6	8	360359.3	3880153.5	20.34121	11.48294	0
GENBOX1	8	360327.7	3880157.1	4.92126	11.48294	0
GENBOX2	8	360393.5	3880160.8	6.56168	11.81102	90
Q133P00S	35	360393.1	3880175.5	23.95013	15.10761	1
Q133P00U	35	360420.4	3880202.4	24.6063	14.10761	2
Q133P00V	30	360395.1	3880179.8	9.514436	37.72966	1
Q133P00X	30	360422.2	3880191.1	9.84252	37.72966	2
Q133P010	28	360373.4	3880190.4	14.76378	36.08924	0
Q133P012	28	360384.1	3880195.7	12.79528	40.35433	2
Q133P013	35	360401.2	3880196.4	15.09186	26.24672	2
Q133P014	30	360390.4	3880201.7	10.82677	35.76115	92
Q133P017	28	360407.9	3880195.6	20.99738	37.72966	2
Q133P019	51.8	360421.2	3880158.2	15.74803	18.04462	1.6
Q133P01A	45	360425.9	3880161.6	6.889763	26.24672	91.6
Q133P01B	23.75	360349.8	3880168.1	21.32546	10.82677	0
Q133P01C	8	360374.6	3880145.8	40.02887	9.84252	1.5
Q133P01E	8	360374.2	3880150.4	40.02887	8.2021	1.6
ROPL6000	45	360439.1	3880209.4	7.217848	22.96588	1.6
ROPL6003	25	360378.9	3880202.6	5.577428	19.02887	0
ROPL6004	25	360365.6	3880198	6.56168	16.4042	0
ROPL6005	26	360347.0	3880176.1	11.81102	41.99475	0
ROPL6006	26	360359.5	3880176.7	11.48294	38.71391	0
ROPL6007	26	360346.8	3880192.5	13.45144	42.65092	0
ROPL6008	26	360359.5	3880192.6	13.77953	42.65092	0
ROPL6009	26	360342.2	3880176.0	6.56168	19.02887	0
ROPL600A	4	360330.4	3880160.9	5.577428	5.905512	0
ROPL600B	4	360333.1	3880157.5	5.249344	5.905512	0
ROPL600C	6	360336.8	3880158.5	3.937008	5.905512	0
ROPL600F	4	360340.4	3880160.5	3.28084	6.56168	90
ROPL600H	11	360346.3	3880158.6	11.81102	15.74803	0

<b>Bldg. ID</b>	<b>Height (ft)</b>	<b>X Coordinate (m)</b>	<b>Y Coordinate (m)</b>	<b>X Length (ft)</b>	<b>Y Length (ft)</b>	<b>Angle</b>
ROPL600M	7	360337.2	3880147.1	2	17.13386	90
ROPL600O	7	360332.4	3880135.1	2	37.72966	0
ROPL600W	7	360333.1	3880139.7	2	31.49607	90
ROPL600Y	7	360339.8	3880139.8	2	22.30971	0
ROPL6010	26	360353.5	3880187.9	5.577428	22.96588	0
ROPL6012	26	360353.5	3880199.3	4.92126	15.74803	0
ROPL6013	23	360368.2	3880198.3	4.593176	19.68504	0
ROPL6014	24	360371	3880200	3.937008	9.186352	0
ROPL6015	24	360389.5	3880203.3	9.84252	9.545932	2
ROPL6016	25	360336.4	3880034.4	4.593176	11.48294	0
ROPL6018	25	360319.9	3880054.9	7.874016	19.68504	0
ROPL6019	25.5	360321.3	3880076.5	10.1706	23.95013	1.6
2_WWALL	22	360274.6	3880032.0	1.5	185.3674	1.6
2_NWALL	22	360276.5	3880088.5	1.5	136	91.6
2_EWALL	22	360316.1	3880030.9	1.64042	185.35	1.6
2_SWALL	22	360274.8	3880032.5	1.5	135.5	91.6
9NTWD008	4	360399.9	3880159.0	4.92126	5.905512	0
9NTWD009	4	360401.2	3880155.6	4.593176	6.56168	0
9NTWD00A	4	360406.7	3880154.6	3.937008	4.92126	0
WOL4Z001	27	360310.5	3880036.3	10.82677	33.79265	-88
WOL4Z002	27	360311.1	3880045	11.48294	34.44882	-88
WOL4Z003	7	360311	3880053.7	11.48294	32.8084	-88
WOL4Z005	27	360311.6	3880063.0	11.81102	33.13649	-89
WOL4Z006	27	360311.7	3880070.9	11.81102	33.79265	-89
WOL4Z007	28	360292.9	3880061.1	16.07612	35.43307	1.6
WOL4Z008	27	360285.4	3880069.6	10.82677	22.6378	-89
WOL4Z009	27	360302.6	3880079.5	6.889763	22.30971	-90
WOL4Z00A	30	360366.6	3880168.2	3.28084	4.92126	0
WOL4Z00D	30	360368.7	3880168.2	3.28084	4.92126	0
IYTL3001	8	360344.2	3880049.7	5.577428	9.514436	-90.0
EJB9E03Y	4	360405.3	3880159.0	4.92126	5.905512	0
EJB9E041	7	360326.3	3880147.1	2	27.13386	90
EJB9E042	35	360404.4	3880174.9	24.6063	14.10761	0.5
EJB9E043	30	360406.9	3880178.8	9.84252	37.72966	1.6
EJB9E044	35	360419.6	3880173.7	24.6063	14.10761	1.6

Bldg. ID	Height (ft)	X Coordinate (m)	Y Coordinate (m)	X Length (ft)	Y Length (ft)	Angle
EJB9E045	30	360422.1	3880177.6	9.84252	37.72966	1.6

**Table 10 – Circular Building Dimensions**

Bldg. ID	Height (ft)	X Coordinate (m)	Y Coordinate (m)	Radius (ft)	Corners
EJB9E03Z	18	360335.1	3880142.5	6.56168	24
EJB9E040	30	360362.8	3880161.0	5.249344	24

**Table 11 – Polygon Building Dimensions**

Bldg. ID	Height (ft)	Corner	X Coordinate (m)	Y Coordinate (m)	Corner	X Coordinate (m)	Y Coordinate (m)
MAIN_A	12.5	1	360340.93	3880220.08	19	360411.50	3880156.95
		2	360420.19	3880217.81	20	360411.61	3880164.95
		3	360420.30	3880224.62	21	360336.23	3880166.90
		4	360429.38	3880224.62	22	360336.35	3880174.77
		5	360429.48	3880227.23	23	360327.36	3880175.07
		6	360432.89	3880227.05	24	360327.70	3880187.57
		7	360433.07	3880226.03	25	360330.61	3880187.53
		8	360445.31	3880227.08	26	360331.43	3880210.90
		9	360445.16	3880223.92	27	360333.85	3880211.27
		10	360444.36	3880206.31	28	360333.88	3880212.64
		11	360448.29	3880206.07	29	360334.33	3880214.36
		12	360448.34	3880217.47	30	360335.02	3880215.66
		13	360470.63	3880217.11	31	360336.08	3880216.71
		14	360468.82	3880154.53	32	360337.55	3880217.77
		15	360447.11	3880155.56	33	360339.11	3880218.28
		16	360447.29	3880172.56	34	360340.95	3880218.51
		17	360443.15	3880172.77	35	360340.93	3880220.08
		18	360443.18	3880155.48			
MAIN_B	20	1	360418.94	3880173.2	9	360340.37	3880208.26
		2	360427.29	3880172.99	10	360340.32	3880205.1
		3	360428.27	3880206.84	11	360340.11	3880204.37
		4	360419.9	3880207.17	12	360339.77	3880186.96
		5	360419.87	3880209.51	13	360327.52	3880187.23
		6	360347.13	3880211.56	14	360327.41	3880174.92

		7	360347.13	3880211.23	15	360418.89	3880171.95
		8	360343.64	3880211.28	16	360418.94	3880173.2
MAIN_D	35	1	360420.27	3880224.64	7	360411.73	3880165.84
		2	360419.99	3880207.2	8	360411.52	3880156.92
		3	360428.32	3880206.95	9	360443.21	3880155.52
		4	360427.36	3880172.98	10	360445.09	3880223.65
		5	360418.9	3880173.2	11	360420.27	3880224.64
		6	360418.61	3880165.69			
MAIN_E	30	1	360347.21	3880211.1	29	360337.03	3880205.46
		2	360347.72	3880211.06	30	360338.45	3880204.76
		3	360347.66	3880212.28	31	360339.67	3880204.54
		4	360347.44	3880213.52	32	360340.42	3880204.44
		5	360346.91	3880214.63	33	360340.49	3880204.92
		6	360345.75	3880216.08	34	360339.02	3880205.18
		7	360344.23	3880217.42	35	360338.11	3880205.5
		8	360343.18	3880217.97	36	360337.15	3880206.05
		9	360341.97	3880218.39	37	360335.9	3880207.13
		10	360340.94	3880218.54	38	360335.28	3880207.95
		11	360339.92	3880218.45	39	360334.8	3880208.89
		12	360338.89	3880218.26	40	360334.38	3880210.12
		13	360337.6	3880217.83	41	360334.3	3880211.27
		14	360336.87	3880217.39	42	360334.36	3880212.5
		15	360336.35	3880217.03	43	360335.02	3880213.85
		16	360335.65	3880216.41	44	360335.67	3880215.2
		17	360334.97	3880215.75	45	360336.93	3880216.2
		18	360334.6	3880215.07	46	360338.12	3880216.79
		19	360334.23	3880214.29	47	360339.34	3880217.22
		20	360333.94	3880213.23	48	360340.59	3880217.41
		21	360333.78	3880211.94	49	360341.66	3880217.36
		22	360333.81	3880211.4	50	360343.23	3880216.98
		23	360333.77	3880210.65	51	360344.47	3880216.29
		24	360334.01	3880209.59	52	360345.42	3880215.56
		25	360334.19	3880208.92	53	360346.14	3880214.61
		26	360334.67	3880207.96	54	360346.7	3880213.79
		27	360335.09	3880207.14	55	360347.08	3880212.52
		28	360335.83	3880206.38	56	360347.21	3880211.1
SAT_A		1	360318.14	3880125.27	11	360267.40	3880113.34
		2	360331.80	3880124.76	12	360268.75	3880114.70
		3	360330.03	3880074.37	13	360270.58	3880115.81

4	360340.62	3880074.05	14	360271.98	3880116.20
5	360339.79	3880030.17	15	360288.31	3880118.86
6	360266.58	3880032.29	16	360288.25	3880116.60
7	360268.74	3880102.88	17	360299.23	3880117.91
8	360265.78	3880102.92	18	360299.48	3880115.83
9	360266.26	3880110.02	19	360317.88	3880115.42
10	360266.72	3880112.05			

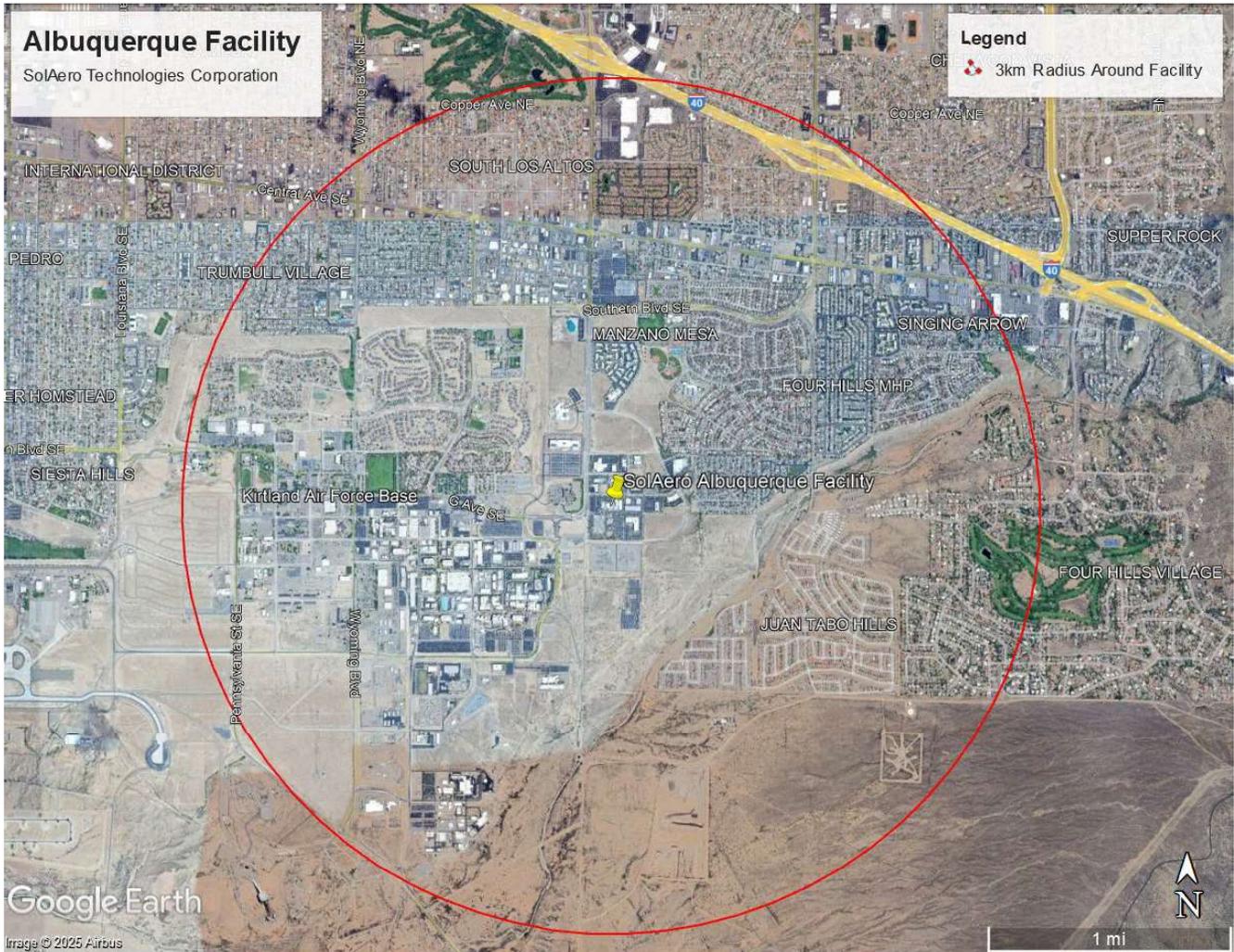
## 4.5 Model and Options Used

The most recent executable of AERMOD (v23132) will be used to perform air dispersion modeling. All regulatory default options will be used for air dispersion modeling at this facility. As seen in Figure 4, based on satellite imagery and the CABQ Advanced Map Viewer<sup>8</sup>, the land use in a 3 km radius around the facility is more than 50% industrial, commercial, or compact residential, as defined in the CABQ EHD modeling guidance; therefore, urban dispersion coefficients will be used.

---

<sup>8</sup> City of Albuquerque Environmental Health Department Air Quality Program Permitting Division, Air Dispersion Modeling Guidelines for Air Quality Permitting, Revised May 2024, Attachment A.

**Figure 4 - An Aerial Image of the Facility Circumscribed by a 3 km Radius**



The Tier 2, Ambient Ratio Method 2 (ARM2) will be used to model ambient impact of NO<sub>2</sub>. The national default minimum ambient ratio of 0.5 and maximum ambient ratio of 0.9 will be used.<sup>9</sup> Tier III methods (OLM or PVMRM) may be used if required. If Tier III methods are used, SolAero will apply the in-stack ratios provided in the CABQ EHD modeling guidelines.

<sup>9</sup> New Mexico Environment Department, New Mexico Air Quality Bureau, Air Dispersion Modeling Guidelines. Revised June 2024, Section 2.6.4.3.

**Table 12 – Department-Approved In-Stack Ratios**

<b>Sources</b>	<b>In-Stack Ratio Value Accepted by the AQP</b>
Diesel-fired RICE engines	0.15
Natural gas-fired boilers	0.2
Other sources at facility seeking permit	0.5
Other sources 1-3 km from fence of facility seeking permit	0.2
Other sources <1 km from fence of facility seeking permit	0.3

### **4.6 Meteorological Data**

Meteorological data from the Albuquerque Airport from 2014 to 2018 provided by the CABQ EHD will be used for this air dispersion modeling. This meteorological data is assumed to be adequately representative of conditions at the Facility, based on the CABQ EHD modeling guidelines.<sup>10</sup>

### **4.7 Background Concentrations**

In the memo titled “Background Values of Air Dispersion Modeling” found in Appendix C of the CABQ EHD modeling guidelines<sup>11</sup>, it was stated that using data from the PM<sub>2.5</sub> in the South Valley (2ZV) results in a double counting of fine particulate emissions from industry. Using the PM<sub>2.5</sub> background values calculated from the Del Norte monitor data nearly eliminates double counting. This is also true for other pollutants, such as PM<sub>10</sub> and NO<sub>2</sub>, measured by the South Valley monitor. Like the South Valley monitor, the Jefferson, North Valley, and Foothills monitors are also not ideally located for calculating background values from monitored data. Additionally, the memo emphasized that background values for all pollutants should normally come from the Del Norte monitor and be used across the Albuquerque metro area within the jurisdiction of the Air Quality Program.

Background concentrations were provided by the CABQ EHD on January 3, 2025 and will be used as applicable. Table 13 shows the background concentrations proposed to be used from the Del Norte monitor.

---

<sup>10</sup> City of Albuquerque Environmental Health Department Air Quality Program Permitting Division, Air Dispersion Modeling Guidelines for Air Quality Permitting, Revised May 2024, Page 12.

<sup>11</sup> City of Albuquerque Environmental Health Department Air Quality Program Permitting Division, Air Dispersion Modeling Guidelines for Air Quality Permitting, Revised May 2024, Page 12.

**Table 13 – Background Concentrations of Pollutants Proposed for Modeling**

<b>Pollutant</b>	<b>Standard</b>	<b>Background Concentration (<math>\mu\text{g}/\text{m}^3</math>)</b>
CO	8-hr	1,336
	1-hr	1,870
NO <sub>2</sub>	Annual	18
	1-hr	83.1
PM <sub>2.5</sub>	Annual	6.4
	24-hr	16.0
PM <sub>10</sub>	24-hr	22.9
SO <sub>2</sub>	1-hr	13.1

## 4.8 Receptor Grid and Elevation Data

AERMOD will be run using a rectangular grid receptor array. Spacing will follow CABQ EHD modeling guidelines:

- ▶ Fence line spacing: 25 meters
- ▶ Very fine grid spacing: 50 meters from the facility fenceline out to 250 meters
- ▶ Fine grid spacing: 100 meters from 250 meters to 1000 meters out from the facility fenceline
- ▶ Medium grid spacing: 250 meters from 1000 meters to 3000 meters out from the facility fenceline.
- ▶ Course grid spacing: 500 meters from 3000 meters to 5000 meters out from the facility fenceline.

This facility will use the USGS 1 arc-second national elevation data (NED) provided on the CABQ EHD website.<sup>12</sup> AERMAP, a terrain data preprocessor that incorporates complex terrain using USGS NED data, will be used to integrate all elevations and process the complex terrain in the model. All receptors will be used for Significant Impact Limits (SIL) modeling. Cumulative Impacts Analysis (CIA) modeling will only be performed for receptors where the SIL is exceeded based on the SIL modeling results.

Access to the SolAero facility is not restricted by a fence line. For modeling purposes, discrete receptors representing the fence line spacing of 25 m will be placed around the perimeter of the main and satellite facility buildings.

## 4.9 Nearby Permits and Surrounding Sources

Surrounding source data is requested from CABQ EHD for the Facility at this time. The data provided will be included in the models as provided, unless specific approval to adjust the surrounding sources is granted.

---

<sup>12</sup> City of Albuquerque. Dispersion Modeling Guidelines. (n.d.) <https://www.cabq.gov/airquality/air-quality-permits/dispersion-modeling-guidelines>

## **APPENDIX A. FACILITY PLOT PLANS**

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# Albuquerque Facility - Existing Stack Locations

SolAero Technologies Corporation



## Legend

-  SolAero Satellite Manufacturing Building
-  SolAero Tech Corp, 10420 Research Rd. SE







# Satellite Building - Unchanged



ADVERTISING / DESIGN / ARCHITECTURE  
**DEKKER PERICH SABATINI**  
 7601 JEFFERSON AVE. SUITE 100  
 ALBUQUERQUE, NM 87129  
 505.241.7191 / INFO@DPSA.NM.ORG  
 WWW.DPSA.NM.ORG

ISSUED FOR PERMIT

**Solera Technologies**  
 Albuquerque, New Mexico 87123

DATE: 08/12/2018  
 DRAWING NO.: 18-0008.000  
 DRAWING NAME: FLOOR PLAN (Overall)

SHEET NO. **AE101** OF 107

- A. Autoclave #1
- B. Autoclave #2
- C. Release Booth
- D. Wisconsin Oven #1
- E. Wisconsin Oven #2
- F. Paint booth

(A1) FLOOR PLAN (Overall)  
 3000 x 107

## **APPENDIX B. 2016 COMFORT BOILERS MODELING WAIVER**

---

## Beth Morley

---

**From:** Stonesifer, Jeff W. <JStonesifer@cabq.gov>  
**Sent:** Monday, December 12, 2016 2:25 PM  
**To:** Vern Hershberger  
**Cc:** Wesley Lyon; Andrew Glen; Dickerson, Lauren H.  
**Subject:** RE: Question Regarding Modeling of minor Nat Gas Boilers for Comfort Heat

Vern,

Correct...no modeling is required for natural gas-fired comfort heat boilers in the 5-8 MMBtu range.

Regards,

Jeff Stonesifer  
City of Albuquerque Air Quality Program  
Staff Meteorologist  
(505)767-5624

---

**From:** Vern Hershberger [mailto:vhershberger@trinityconsultants.com]  
**Sent:** Monday, December 12, 2016 12:47 PM  
**To:** Stonesifer, Jeff W.  
**Cc:** Wesley Lyon; Andrew Glen; Dickerson, Lauren H.  
**Subject:** RE: Question Regarding Modeling of minor Nat Gas Boilers for Comfort Heat

Hi Jeff,

Are you still good with no modeling required for natural gas-fired comfort heating equipment in the 5 MMBtu/hr to 8 MMBtu/hr range? This is the same question I left a voicemail about this morning.

Thx,  
Vern

.....  
**Vern Hershberger, CHMM, LEED AP**  
Sr. Consultant

### Trinity Consultants

9400 Holly Avenue | Bldg 3 Suite 300 | Albuquerque, NM 87122

Office: **505-266-6611 x116** | Mobile: 505-269-8343

Email: [vhershberger@trinityconsultants.com](mailto:vhershberger@trinityconsultants.com) | Website: [www.TrinityConsultants.com](http://www.TrinityConsultants.com)

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**From:** Vern Hershberger  
**Sent:** Friday, December 09, 2016 1:46 PM  
**To:** 'Dickerson, Lauren H.' <[ldickerson@cabq.gov](mailto:ldickerson@cabq.gov)>; Stonesifer, Jeff W. <[JStonesifer@cabq.gov](mailto:JStonesifer@cabq.gov)>; Tavaréz, Isreal L. <[ITavarez@cabq.gov](mailto:ITavarez@cabq.gov)>  
**Cc:** Wesley Lyon <[wlyon@trinityconsultants.com](mailto:wlyon@trinityconsultants.com)>; Andrew Glen <[aglen@trinityconsultants.com](mailto:aglen@trinityconsultants.com)>  
**Subject:** RE: Question Regarding Modeling of Boilers for Comfort Heat

Hi Lauren,

Thank you kindly for the prompt response. The 5 MMBtu/hr threshold does help us a little today.

We still may need to request waiver for a three other natural gas fired comfort heating boilers greater than 5 MMBtu/hr to less than 8 MMBtu/hr when Jeff gets back on Monday or perhaps Isreal can advise on this?

Thank you,  
Vern

---

**Vern Hershberger, CHMM, LEED AP**  
Sr. Consultant

**Trinity Consultants**  
9400 Holly Avenue | Bldg 3 Suite 300 | Albuquerque, NM 87122  
Office: **505-266-6611 x116** | Mobile: 505-269-8343  
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**From:** Dickerson, Lauren H. [<mailto:ldickerson@cabq.gov>]  
**Sent:** Friday, December 09, 2016 1:27 PM  
**To:** Vern Hershberger <[vhershberger@trinityconsultants.com](mailto:vhershberger@trinityconsultants.com)>; Stonesifer, Jeff W. <[JStonesifer@cabq.gov](mailto:JStonesifer@cabq.gov)>  
**Cc:** Wesley Lyon <[wlyon@trinityconsultants.com](mailto:wlyon@trinityconsultants.com)>; Andrew Glen <[aglen@trinityconsultants.com](mailto:aglen@trinityconsultants.com)>; Tavaréz, Isreal L. <[ITavarez@cabq.gov](mailto:ITavarez@cabq.gov)>  
**Subject:** RE: Question Regarding Modeling of Boilers for Comfort Heat

Hello Vern,

Good call contacting both of us; Jeff is out for the afternoon. I've never run into this exact issue before, but I'll share my understanding of Part 41. If the comfort heating units qualify for the exemption in 20.11.41.2.F.(3)(a) NMAC, (gaseous fuel <5 MMBtu/hr), then their emissions do not need to be modeled. Heaters that qualify for this exemption still need to be reported on the application but since they are exempt from permitting I'm 99% sure they would be exempt from modeling – and you wouldn't need to request a waiver.

I'll let Jeff correct me if I'm wrong. Have a nice weekend.

Regards,

Lauren Dickerson  
Environmental Health Scientist  
Stationary Source Permitting  
Air Quality Program  
Environmental Health Department  
City of Albuquerque  
(505) 767-5627  
[ldickerson@cabq.gov](mailto:ldickerson@cabq.gov)

---

**From:** Vern Hershberger [<mailto:vhershberger@trinityconsultants.com>]  
**Sent:** Friday, December 09, 2016 1:14 PM  
**To:** Dickerson, Lauren H.; Stonesifer, Jeff W.  
**Cc:** Wesley Lyon; Andrew Glen  
**Subject:** FW: Question Regarding Modeling of Boilers for Comfort Heat

Hi Jeff and Lauren,

Since I've recently heard that Lauren may be helping Jeff on city modeling now, I wanted to forward Wes's modeling question to you both in case Jeff is out or busy today.

We would like to get a waiver from modeling natural gas-fired comfort heating emissions for an important client who is expanding to create many good new high-tech jobs in ABQ. We will certainly model their process-related air emissions.

Please let us know how we go about getting a waiver to avoid having to model comfort heating emissions if more than this email is needed.

Thx,  
Vern  
505-269-8343

.....  
**Vern Hershberger, CHMM, LEED AP**  
Sr. Consultant

**Trinity Consultants**  
9400 Holly Avenue | Bldg 3 Suite 300 | Albuquerque, NM 87122  
Office: **505-266-6611 x116** | Mobile: 505-269-8343  
Email: [vhershberger@trinityconsultants.com](mailto:vhershberger@trinityconsultants.com) | Website: [www.TrinityConsultants.com](http://www.TrinityConsultants.com)

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---

**From:** Wesley Lyon  
**Sent:** Friday, December 09, 2016 12:57 PM  
**To:** Vern Hershberger <[vhershberger@trinityconsultants.com](mailto:vhershberger@trinityconsultants.com)>  
**Subject:** FW: Question Regarding Modeling of Boilers for Comfort Heat

---

**From:** Wesley Lyon  
**Sent:** Friday, December 09, 2016 12:40 PM  
**To:** Stonesifer, Jeff W. <[JStonesifer@cabq.gov](mailto:JStonesifer@cabq.gov)>  
**Subject:** Question Regarding Modeling of Boilers for Comfort Heat

Hey Jeff,

When using AERMOD to model the pollutant impacts of a facility, is it required to include boilers that are only used for comfort heat?

I see that they may be waived on a case-by-case basis in the guidance. What considerations go into such a waiver?

Thanks,  
Wes

**Wesley Lyon**  
Consultant

**Trinity Consultants**  
9400 Holly Avenue NE, Building 3, Suite 300 | Albuquerque, New Mexico 87122  
Office: **505-266-6611 x105** | Mobile: 207-749-6676  
Email: [wlyon@trinityconsultants.com](mailto:wlyon@trinityconsultants.com) |

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## **APPENDIX C. 2017 MODELING REPORT**

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## **Air Dispersion Modeling Report**

### **SolAero Technologies Corporation Albuquerque Facility**

## **Introduction**

### **Purpose of Modeling**

SolAero Technologies Corporation (SolAero) is submitting a permit application to update permit 1029-M1 for its Albuquerque Facility. The purpose of the application is to add two autoclave units, two ovens, a release booth, and a paint booth with associated sprayers. Emission rates for Nitrogen Oxides (NO<sub>x</sub>), Carbon Monoxide (CO), Sulfur Dioxide (SO<sub>2</sub>), Total Suspended Particulates (TSP), Particulate Matter less than 10 μm (PM<sub>10</sub>), and Particulate Matter less than 2.5 μm (PM<sub>2.5</sub>) are increasing with the proposed changes. SolAero is preparing air dispersion modeling to demonstrate that the changes included in Permit Application 1029-M2 will not cause or contribute to an exceedance of any applicable air quality standards.

SolAero seeks to demonstrate compliance with the New Mexico Ambient Air Quality Standards (NMAAQs) and the National Ambient Air Quality Standards (NAAQS) as applicable for NO<sub>x</sub>, CO, SO<sub>2</sub>, TSP, PM<sub>10</sub>, and PM<sub>2.5</sub>. PSD increment analysis is not applicable since the facility is an existing minor source proposing a minor modification. Per the AQD modeling guidelines, minor modifications do not trigger PSD modeling analyses.

### **Facility Location**

The SolAero Albuquerque facility is located at 10420 Research Rd SE in Albuquerque, New Mexico. The facility is located in Zone 13 and Air Quality Control Region (AQCR) 152. The approximate UTM coordinates of the facility are 360,360 meters east and 3,880,130 meters north with WGS 84 datum at an elevation of approximately 5,500 feet above mean sea level.

## **Proposed Modeling**

### **Model Input Options**

The latest version of the AERMOD dispersion model, version 15181, was used for this analysis. The model determined the impacts for NO<sub>x</sub>, CO, SO<sub>2</sub>, TSP, PM<sub>10</sub>, and PM<sub>2.5</sub> for each of the applicable averaging periods. The modeled results for each pollutant and averaging period were compared to the applicable significance level.

The emergency generator units (EU #1, #2, and #15) at the facility were not included in the modeling analysis. Emergency generators that operate 500 hours or less per year are not required per the City of Albuquerque Environmental Health Air Quality Program's *Air Dispersion Modeling Guidelines for Air Quality Permitting*, June 18, 2015. In addition the EPA memorandum *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard (03/01/2011)* provides justification for the exclusion of intermittent emissions such as emergency generators from the 1-hour NO<sub>2</sub> standard.

A building downwash analysis using the latest version of BPIP was conducted and incorporated into the modeling analysis to account for potential pollutant downwash due to the buildings.

### Receptor Grid Description and Elevation Data

The center point of the facility was designated at approximately 360,360 meters east and 3,880,130 meters north and serves as the center point for all receptor grids.

Access to the SolAero facility is not restricted by a fenceline, for modeling purposes discrete receptors were arranged around the facility at 50 meter spacing out to 1,000 meters from the facility center point in each direction for a very fine grid resolution. A 100 meter grid spacing extends from 1,000 meters to 2,000 meters in each direction for a fine grid resolution. A 250 meter grid spacing extends from 2,000 meters to 5,000 meters in each direction for a medium grid resolution. A 500 meter grid spacing extends from 5,000 meters to 10,000 meters in each direction for a coarse grid resolution. A 1,000 meter grid extends from 10,000 meters to 20,000 meters and finally a 2,500 meter grid extends from 20,000 meters to 40,000 meters to capture any far field impacts. In addition, each of the three main buildings on site have a 1 meter spaced receptor grid around the perimeter to capture any high concentrations induced from building downwash. There are also a number of small buildings on the south side of the northern building, to ensure that these buildings are properly represented in the modeling, a receptor grid was deployed with 1 meter spacing around the area to capture the modeled impacts as seen in Figure 1.

**Figure 1. Receptor Overview.**



### Meteorological Data

The “ABQ-AERMET-2001-2005” five year meteorological data set from the AQD website was used in this model. This meteorological data set was processed with AERMINUTE in addition to AERMET.

### Emission Rates and Stack Parameters

The emission rates and stack parameters to be modeled are included in Table 1 below.

**Table 1. Emission Rates and Stack Parameters for Modeling**

Unit No.	Source	NO <sub>x</sub>	CO	SO <sub>2</sub>	TSP	PM <sub>10</sub>	PM <sub>2.5</sub>	Stack Height	Stack Temp.	Stack Velocity	Stack Diameter
		lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	ft	F	ft/s
16	Autoclave 1	0.392	0.329	0.0024	0.030	0.0074	0.0074	17	450	142.3	0.67
17	Autoclave 2	0.392	0.329	0.0024	0.030	0.0074	0.0074	17	450	142.3	0.67
18	Release Booth	0.267	0.224	0.0016	0.020	0.0051	0.0051	40	250	48.5	1.20
19	Wisconsin Oven 1	0.100	0.084	0.0006	0.008	0.0019	0.0019	40	350	79.7	0.50
20	Wisconsin Oven 2	0.160	0.134	0.0010	0.012	0.0030	0.0030	40	350	44.4	0.67
21-24	Paint Booth Heater and Sprayers	0.067	0.056	0.0004	0.005	0.0016	0.0016	40	65	10.1	3.19

### NO<sub>x</sub> to NO<sub>2</sub> Conversion

To address the conversion of NO<sub>x</sub> to NO<sub>2</sub> in the air dispersion modeling, Tier II Ambient Ratio Method 2 (ARM2) was used. To ensure that this method of conversion was applicable to the SolAero facility the EPA memorandum *Clarification on the Use of AERMOD Dispersion Modeling for Demonstrating Compliance with the NO<sub>2</sub> National Ambient Air Quality Standard (9/30/2014)* was followed along with verbal discussion with Jeff Stonesifer (1/17/2017). The following two criteria were identified and addressed below for evaluating the use of ARM2 for SolAero:

1. **The primary source/facility can demonstrate that the total modeled NO<sub>x</sub> from the source/facility is less than 150-200 ppb.**

Based on the EPA guidance, NO<sub>x</sub> air dispersion modeling was conducted using Tier I, total conversion to identify if the primary source is likely to have ambient impacts that are appropriately conservative when using ARM2 regardless of the In-Stack Ratio of the source. The EPA sensitivity study discussed in the guidance shows that ARM2 can be considered conservative if the NO<sub>x</sub> Tier I modeling produces a resulting concentration which is less than 150-200 ppb threshold.

Therefore air dispersion modeling was conducted for NO<sub>x</sub> with 100% conversion of NO<sub>x</sub> to NO<sub>2</sub> (Tier I) assumed. The model was executed with the stack conditions and emission rates shown in Table 1 and included all buildings and receptors described above. The resulting ambient concentration for the 1-hour NO<sub>x</sub> High 1<sup>st</sup> high was found to be 118.05 µg/m<sup>3</sup>.

The *New Mexico Air Quality Bureau Air Dispersion Modeling Guidance* (September 2016) provides an equation for converting the modeled concentration in µg/m<sup>3</sup> to ppm as shown in the equation below.

$$ppm = 4.553 \times 10^{-5} \times \frac{C \times T}{M_w} \times 10^{2 \times 1.598 \times 10^{-5}}$$

Where: C = modeled NO<sub>x</sub> concentration (µg/m<sup>3</sup>).

T = Average summer morning temperature (default = 530 Rankin).

M<sub>w</sub> = Molecular weight of component (assumed NO<sub>2</sub> = 46.0055).

Z = site elevation (assumed z = 5475 ft).

$$ppm = 4.553 \times 10^{-5} \times \frac{118.05 \frac{\mu g}{m^3} \times 530R}{46.0055} \times 10^{5475ft \times 1.598 \times 10^{-5}}$$

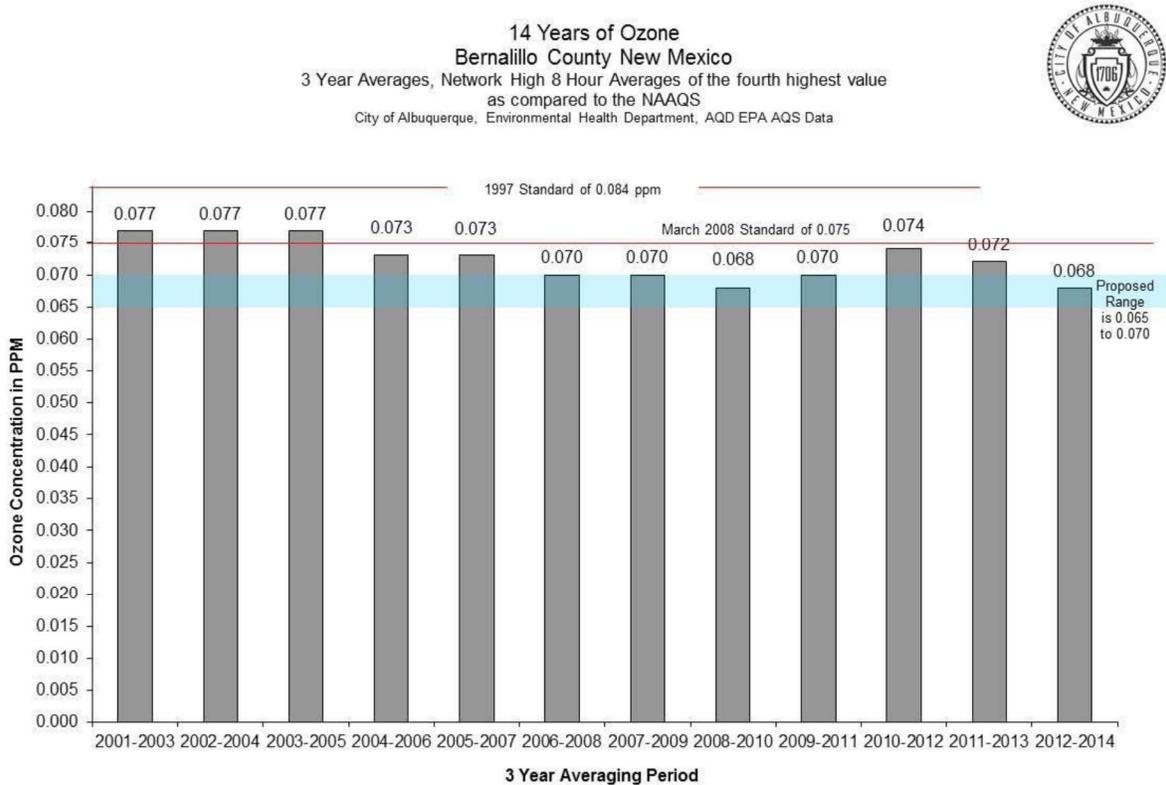
$$ppm = 0.075 ppm$$

$$ppb = 75.4 ppb$$

The resulting NO<sub>x</sub> concentration is much lower than the 150-200 ppb range described by the EPA, therefore based on this criteria ARM2 can be used as a conversion methodology for NO<sub>x</sub> to NO<sub>2</sub>.

**2. The background ozone is not persistently above approximately 80-90 ppb.**

The background concentration of ozone in Bernalillo County has been consistently below 80 ppb since 2001, see the figure below (<https://www.cabq.gov/airquality/images/ozone-14-year-graph.jpg>).



Based on the analysis of the two criteria listed above which were set forth in the EPA (9/30/2014) memorandum it can be seen that ARM2 is applicable for conversion of NO<sub>x</sub> to NO<sub>2</sub> for the modeling conducted for the SolAero Facility.

### **Significant Impact Analysis (SIL) and Cumulative Impact Analysis (CIA)**

In the Significant Impact Analysis (SIL), the emissions of NO<sub>x</sub>, CO, SO<sub>2</sub>, TSP, PM<sub>10</sub>, and PM<sub>2.5</sub> were evaluated to determine whether they have the potential for a significant impact upon the area surrounding the facility. The SIL determines whether a cumulative impact analysis (CIA) needs to be conducted for any of the modeled pollutants. The results of the SIL for each pollutant and applicable averaging period can be found in Table 2. Based on the SIL analysis the facility is only significant for NO<sub>2</sub>.

The CIA analysis included impacts from the background concentrations provided by Jeff Stonesifer, Staff Meteorologist, by email on November 30, 2016. Surrounding sources are not required with this analysis. The results of the CIA for NO<sub>2</sub> for the 1-hr and annual averaging period can be found in Table 3.

### **PSD Increment Analysis**

PSD increment analysis is not applicable since the facility is an existing minor source proposing a minor modification. Per the AQD modeling guidelines, minor modifications do not trigger PSD modeling analyses.

### **Results**

The results of the air dispersion modeling analysis can be found in Tables 2 and 3. SolAero has demonstrated that the CO, NO<sub>x</sub>, SO<sub>2</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, and TSP emissions neither cause nor contribute to an exceedance of New Mexico Ambient Air Quality Standards (NMAAQS) or the National Ambient Air Quality Standards (NAAQS).

**Table 2. Significance Analysis**

Pollutant	Averaging Period	Significance Level ( $\mu\text{g}/\text{m}^3$ )	Modeled ( $\mu\text{g}/\text{m}^3$ )	Percent of Significance	Location of Maximum Concentration				
					X	Y	Elevation (m)	Distance (m)	ROI (m)
CO	8-hr	500	70.0	14.0%					
CO	1-hr	2000	100.5	5.0%					
NO <sub>2</sub>	Annual	1	6.9	Significant	360331.3	3880087	1659.72	51.7	304.1
NO <sub>2</sub>	1-hr	7.54	103.2	Significant	360260	3880130	1659.29	100.0	2692.6
PM <sub>2.5</sub>	Annual	0.3	0.1	48.6%					
PM <sub>2.5</sub>	24-hr	1.2	0.7	56.9%					
PM <sub>10</sub>	Annual	1	0.1	14.6%					
PM <sub>10</sub>	24-hr	5	0.7	13.7%					
TSP	Annual	1	0.6	57.9%					
TSP	24-hr	5	2.7	54.7%					
SO <sub>2</sub>	Annual	1	0.0	4.6%					
SO <sub>2</sub>	24-hr	5	0.2	4.3%					
SO <sub>2</sub>	3-hr	25	0.5	2.2%					
SO <sub>2</sub>	1-hr	7.8	0.7	9.2%					

Notes:

1. NO<sub>x</sub> to NO<sub>2</sub> conversion methodology: ARM2



**Table 3. Cumulative Impact Analysis**

Pollutant	Averaging Period	Standard, $\mu\text{g}/\text{m}^3$		Modeled		Background Calculated ( $\mu\text{g}/\text{m}^3$ )	Calculated as a Percent of the	Background Monitor (If Applicable)	Location of Maximum Concentration			
		NAAQS	NMAAQS	Facility ( $\mu\text{g}/\text{m}^3$ )	Facility & Neighbors ( $\mu\text{g}/\text{m}^3$ )				NAAQS	NMAAQS	X	Y
NO <sub>2</sub>	Annual	99.66	94.0	6.9	6.9	30.0	37%	350010023	360331.3	3880087.0	1659.7	51.7
	1-hr	<b>188.03</b>	-	95.8	95.8	82.0	95%	350010023	360260.0	3880130.0	1659.3	100.0

**Notes:**

1. Bolded standards are as provided in Table 6-A of the NMED Modeling Guidelines.
2. NOX to NO2 conversion methodology: ARM2.
3. Background Concentration for NO2 was provided by Jeff Stonesifer (1/12/17).

**From:** [Michael Brown](#)  
**To:** [Stonesifer, Jeff W.](#)  
**Cc:** [Adam Erenstein](#); [Tumpane, Kyle](#); [McWilliams, Neusa H.](#); [McKinstry, Michael W.](#); [b.radke@rocketlabusa.com](mailto:b.radke@rocketlabusa.com); [rebecca.chambers@rocketlabusa.com](mailto:rebecca.chambers@rocketlabusa.com); [Beth Morley](#)  
**Subject:** RE: review of protocol for SolAero permit modification  
**Date:** Wednesday, September 17, 2025 1:34:35 PM  
**Attachments:** [image001.png](#)  
[image002.png](#)

---

Hello Mr. Stonesifer,

Thank you for your review and comments regarding the modeling protocol. Please see responses below in [blue](#). Let me know if you have any other questions, or if you have any other comments on the modeling.

Best Regards,  
**Michael Brown, PE**  
Senior Consultant

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**From:** Stonesifer, Jeff W. <JStonesifer@cabq.gov>  
**Sent:** Wednesday, August 27, 2025 12:55 PM  
**To:** Michael Brown <michael.brown@trinityconsultants.com>  
**Cc:** Adam Erenstein <aerenstein@trinityconsultants.com>; Tumpane, Kyle <ktumpane@cabq.gov>; McWilliams, Neusa H. <nmcwilliams@cabq.gov>; McKinstry, Michael W. <mmckinstry@cabq.gov>; [b.radke@rocketlabusa.com](mailto:b.radke@rocketlabusa.com); [rebecca.chambers@rocketlabusa.com](mailto:rebecca.chambers@rocketlabusa.com); [beth.morley@trinityconsultants.com](mailto:beth.morley@trinityconsultants.com)  
**Subject:** review of protocol for SolAero permit modification

Mr. Brown,

The City's Air Quality Program has reviewed the modeling protocol submitted on 28Jul2025 for SolAero's planned permit modification. The protocol is approved with comments.

- **The Air Quality Program doesn't approve the use of urban dispersion coefficients for modeling SolAero. There is a great deal of undeveloped land within the 3 km radius. If you still want to use urban dispersion coefficients, the Air Quality Program will require an analysis of all the properties within the 3km radius area surrounding SolAero. Thank you for the clarification. Rural dispersion coefficients will be used as you suggest.**
- **The PM backgrounds have been updated since this protocol was written. The PM<sub>10</sub>**

background should be  $22.3 \mu\text{g}/\text{m}^3$ ; annual  $\text{PM}_{2.5}$  should be  $5.4 \mu\text{g}/\text{m}^3$ ; 24-hour  $\text{PM}_{2.5}$  should be  $14.3 \mu\text{g}/\text{m}^3$ . Thank you for the update. We will use these background concentrations in the modeling.

- Is the exhaust temperature for the new stack (unit 28) ambient? If so, then let's use an exhaust temp of 0K. The exhaust temperature is approximately 70 °F
- Are there any emissions from the relatively new silos at 360,383 m E / 3,880,113 m N? This unit converts liquid nitrogen into gaseous nitrogen. There are no regulated emissions from the unit.
- Are the fans at 360, 335 m E / 3,880,150 m N cooling towers? If so, are there any emissions? Yes, it is a cooling tower. There are emissions. The cooling tower will be included in the permit application and air dispersion modeling analysis.
- Are the fans at 360,353 m E / 3,880,169 m N cooling towers? If so, are there particulate emissions? Yes, it is a cooling tower. However, it is out of operation and there are no emissions. Active cooling towers with emissions will be included in the permit application and air dispersion modeling analysis.

Surrounding source data is attached in case cumulative modeling is required.

Regards,



**JEFF STONESIFER**

senior environmental health scientist

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**[cabq.gov/environmentalhealth](http://cabq.gov/environmentalhealth)**

## 5. APPLICABLE REGULATIONS

Table 1 is a summary of all City of Albuquerque and Federal regulations applicable to SolAero. Justifications are provided below detailing why or why not a regulation is subject.

**Table 1 – Applicable Requirements for the Facility**

Applicable Requirements	Federally Enforceable	Entire Facility	Emission Unit
<b>20.11.2 NMAC</b> Fees	X	X	
<b>20.11.5 NMAC</b> Visible Air Contaminants	X	X	
<b>20.11.8 NMAC</b> Ambient Air Quality Standards		X	
<b>20.11.41 NMAC</b> Construction Permits	X	X	
<b>20.11.43 NMAC</b> Stack Heights	X	X	
<b>20.11.47 NMAC</b> Emission Inventory Requirements		X	
<b>20.11.49 NMAC</b> Excess Emissions		X	
<b>20.11.63 NMAC</b> New Source Performance Standards for Stationary Sources	X	X	
<b>20.11.64 NMAC</b> Emission Standards for Hazardous Air Pollutants for Stationary Sources	X	X	
<b>20.11.65 NMAC</b> Volatile Organic Compounds	X	X	
<b>20.11.66 NMAC</b> Process Equipment	X	X	
<b>20.11.67 NMAC</b> Equipment, Emissions, Limitations	X	X	
<b>20.11.72 NMAC</b> Health, Environment and Equity Impacts		X	
<b>20.11.90 NMAC</b> Source Surveillance; Administration and Enforcement	X	X	
<b>40 CFR 50</b> - National Primary and Secondary Ambient Air Quality Standards	X	X	
<b>40 CFR 60 Subpart IIII</b> - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	X		15
<b>40 CFR 63 Subpart ZZZZ</b> National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	X		1, 2, 15

### 5.1 Applicable City of Albuquerque Regulations

#### 20.11.2 NMAC – Fees

This Part applies to every person required to submit a permit application pursuant to 20.11.41 NMAC, Construction Permits

#### 20.11.5 NMAC – Visible Air Contaminants

This Part applies to stationary sources and visible emissions and operational limitations shall be applicable to the sources listed in this Part.

#### 20.11.8 NMAC – Ambient Air Quality Standards

This Part adopts state and federal ambient air quality standards and are applicable to any sources located within Bernalillo County.

#### **20.11.41 NMAC – Construction Permits**

This proposed facility will be a new stationary source that will emit one or more regulated air contaminants for which a federal, state or board ambient air quality standard exists and if the source will emit, when calculated at the contaminant's potential emission rate, +10 lb/hr or +25 tpy of any single regulated air contaminant. Therefore, a construction permit is required by 20.11.41 NMAC before the person commences construction or operation of the source.

#### **20.11.43 NMAC – Stack Heights**

This Part adopts local requirements that are identical to those required by federal new source review regulations assuring uniform procedures and formulae in determining, on a case-by-case basis, what stack heights or other dispersion techniques are creditable under the term "good engineering practice."

#### **20.11.47 NMAC – Emission Inventory Requirements**

This Part applies to each person who owns or operates a source or who intends to construct or modify a source within Bernalillo County.

#### **20.11.49 NMAC – Excess Emissions**

This Part implements requirements for the reporting of excess emissions for facility owners and operators within Bernalillo County.

#### **20.11.63 NMAC – New Source Performance Standards for Stationary Sources**

This Part establishes requirements for all stationary sources of air pollutants located within Bernalillo County, which are subject to the requirements of 40 CFR Part 60.

#### **20.11.64 NMAC – Emission Standards for Hazardous Air Pollutants for Stationary Sources**

This Part establishes requirements for all stationary sources of air pollutants located within Bernalillo County, which are subject to the requirements of 40 CFR Part 61 or Part 63.

#### **20.11.65 NMAC – Volatile Organic Compounds**

This Part establishes standards for any source located within Bernalillo County to prevent or reduce emission of hydrocarbon vapors from facilities and sources not otherwise regulated or exempted by 40 CFR Part 60; including volatile organic compounds and petroleum liquids, in order to prevent the formation of photochemical oxidants in the atmosphere.

#### **20.11.66 NMAC – Process Equipment**

This Part is applicable to owners or operators of any equipment capable of emitting pollution emissions into the atmosphere within Bernalillo County.

#### **20.11.67 NMAC – Equipment, Emissions, Limitations**

This Part is applicable to any stationary source located in Bernalillo County containing, constructing or modifying the following: Orchard Heaters; Kraft Mills; Coal, Oil, or Gas Burning Equipment.

### **20.11.72 NMAC – Health, Environment and Equity Impacts**

This Part establishes additional permitting requirements for new or modified stationary sources of air pollution that are located, or proposed to be located, in or within a one-mile radius of an overburdened area. This Part is applicable to any person who intends to construct a new stationary source or modify an existing stationary source that is subject to permitting under 20.11.41 NMAC. The BACT analysis for this subpart can be found in Section 5 of this application.

### **20.11.90 NMAC – Source Surveillance; Administration and Enforcement**

This Part minimizes emissions from sources through inspection, enforcement, and good operating procedures and is applicable to any source within Bernalillo County.

## **5.2 Applicable Federal Regulations**

### **40 CFR 50 National Primary and Secondary Ambient Air Quality Standards**

This regulation establishes national primary and secondary ambient air quality standards under section 109 of the Clean Air Act and are applicable to this facility.

### **40 CFR 60 Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units**

This regulation establishes standards of performance for steam generating units for which construction, modification, or reconstruction was commenced after June 9, 1989, with a maximum design heat input capacity between 10 and 100 MMBtu/hr. Boiler unit 3 has a heat input capacity of 4.8 MMBtu/hr, units 4 and 5 have a heat input capacity of 7.5 MMBtu/hr, and unit 13 has a heat input capacity of 5.6 MMBtu/hr; therefore this regulation does not apply.

### **40 CFR 60 Subpart Kc - Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After October 4, 2023**

This regulation establishes performance standards for storage vessels with a capacity  $\geq$  20,000 gallons that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after October 4, 2023. All of the tanks at SolAero have a capacity  $<$  20,000 gallons; therefore, this regulation does not apply.

### **40 CFR 60 Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines**

This regulation establishes standards of performance for stationary compression ignition (CI) internal combustion engines (ICE) that commenced construction after July 11, 2005. Generator engine units 1 and 2 are emergency CI ICE units constructed prior to July 11, 2005; therefore, this regulation does not apply to units 1 and 2. Generator engine unit 15 is an emergency CI ICE unit constructed after July 11, 2005; therefore, this regulation applies to unit 15.

#### **40 CFR 63 Subpart Q – National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers**

This regulation establishes national emission standards for hazardous air pollutants for all new and existing industrial process cooling towers that are operated with chromium-based water treatment chemicals are either major sources or integral parts of facilities that are major sources. This facility does not use chromium-based water treatment chemicals and is not a major source; therefore, this regulation does not apply.

#### **40 CFR 63 Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines**

This regulation establishes standards of performance for stationary compression ignition (CI) internal combustion engines (ICE) that commenced construction after July 11, 2005. Generator engine units 1 and 2 are emergency CI ICE units constructed prior to July 11, 2005, and unit 15 is an emergency CI ICE unit constructed after July 11, 2005; therefore, this regulation applies.

#### **40 CFR 63 Subpart JJJJJJ—National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources**

This regulation establishes national emission standards for hazardous air pollutants for industrial, commercial, or institutional boilers that are located at an area source of HAPs. This facility does not meet the definitions of an affected facility as listed in § 63.11200 in this Part; therefore, this regulation does not apply.

#### **40 CFR 63 Subpart BBBB—National Emission Standards for Hazardous Air Pollutants for Semiconductor Manufacturing**

This regulation establishes national emission standards for hazardous air pollutants for semiconductor manufacturing facilities that are a major source of HAPs. SolAero is not a major source of HAPs; therefore, this regulation does not apply.

## 6. BACT ANALYSIS:

20.11.72 NMAC establishes additional permitting requirements for new or modified stationary sources of air pollution located within the Albuquerque-Bernalillo County air quality control board jurisdictional area. 20.11.72.8(D) NMAC requires Best Available Control Technology (BACT) for new or modified stationary sources throughout Bernalillo County that emit any one, or combination of, the following fifteen hazardous air pollutants (HAPs): acetaldehyde, acrolein, benzene, 1,3-butadiene, carbon tetrachloride, ethyl benzene, ethylene oxide, formaldehyde, hydrochloric acid, methyl bromide, methylene chloride, naphthalene, toluene, vinyl chloride, and xylenes. Additionally, 20.11.72.8(C) NMAC requires BACT for all new or modified stationary sources that are located, or proposed to be located, in or within a one-mile radius of an overburdened area. A BACT evaluation was conducted for the applicable emission units at the SolAero Facility as presented below.

### 6.1 Definition of BACT

Pursuant to 20.11.72.7.A NMAC, "Best Available Control Technology" (BACT) means the same in 20.11.72 NMAC as it is defined in Subsection M of 20.11.61.7.M NMAC:

**"Best available control technology (BACT)"** means an emissions limitation ... based on the maximum degree of reduction for each regulated [New Source Review] NSR pollutant which would be emitted from any proposed major stationary source or major modification, which the director on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant.

This definition is consistent with federal regulations as codified in 40 CFR 52.21(b)(12) which goes on to define an NSR pollutant to be any pollutant for which a National Ambient Air Quality Standard (NAAQS) has been established, including Volatile Organic Compounds (VOC) as a precursor to ozone emissions. In order to appropriately apply federal guidance and national resources, this facility has used VOC emissions as a surrogate for the HAPs listed within the regulation. VOC is an appropriate surrogate because the listed HAPs also meet the definition of a VOC:

**Volatile organic compounds (VOC)** means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions.

The BACT definition goes on to add the following baseline:

In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61.

Control technologies for VOC specific to natural gas fired units and diesel generators, similar to those at the facility, are listed within the Federal Regulations (40 CFR Parts 60, 61, and 63), Reasonably Available Control Technology (RACT)/BACT/Lowest Available Emission Rate (LAER) Clearinghouse (RBLC) and EPA published guidance. These resources establish national BACT standards and were reviewed in preparation of this report.

## 6.2 Emergency Diesel Generators (1,2,15) BACT

Total HAP emissions from the generators were calculated using AP-42 Table 3.3-2 emission factors, which lists acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde, naphthalene, toluene, and xylenes among the HAPs. According to the RBLC database, the best control technologies to reduce VOCs from diesel generators are:

- Good Combustion Practices and Design
- Compliance with 40 CFR 60 Subpart IIII

### **Good Combustion Practices and Design**

Good combustion practices and design are essential for reducing emissions of pollutants including VOCs and HAPs which can contribute to smog and impact air quality. VOCs and HAPs can be released when fuel doesn't burn completely, so the goal of good combustion is to ensure efficient, complete burning of fuel. For these diesel generators, the equipment has been designed to achieve high combustion efficiency, which minimizes the release of VOCs and HAPs. The combustion systems ensure proper mixing of air and fuel to support complete combustion. The units operate at optimal temperatures and airflow conditions to avoid incomplete burning, which can lead to excess VOC and HAP emissions. In addition, the generators are equipped with controls that automatically adjust combustion settings to maintain ideal conditions during operation. Regular maintenance, inspections, and operator training ensure the systems stay clean and operate reliably over time. These design and operational elements work together to ensure the generators emit very low levels of VOCs and HAPs and meet environmental standards.

### **Compliance with 40 CFR 60 Subpart IIII**

This regulation establishes performance standards for stationary compression ignition (CI) internal combustion engines (ICE) that commenced construction after July 11, 2005. Subpart IIII establishes stringent performance standards for these engines, focusing on reducing emissions of VOCs. The regulations require the use of advanced emission control technologies, such as closed crankcase ventilation, selective catalytic reduction (SCR), and diesel oxidation catalysts (DOCs), which significantly reduce the formation of VOCs during combustion. Additionally, engines that meet these standards are designed to operate with greater combustion efficiency, ensuring that fuel is burned more completely and producing fewer unburned hydrocarbons that contribute to VOC emissions.

### **Compliance with 40 CFR 63 Subpart ZZZZ**

Compliance with 40 CFR 63 Subpart ZZZZ, the MACT (Maximum Achievable Control Technology) standard for stationary engines, is a highly effective way to reduce HAP emissions, especially from diesel and gasoline engines. This regulation sets strict limits on emissions of HAPs and requires the use of control technologies to minimize these emissions.

Under MACT ZZZZ, engines must follow best practices for maintenance, use cleaner fuels, and install emission control devices like oxidation catalysts and crankcase ventilation systems. These measures help ensure that the engines burn fuel more completely, releasing fewer unburned hydrocarbons and HAPs. Regular monitoring and testing also ensure compliance with the standards.

## 6.3 Boilers (3-5,13), Autoclaves (16,17), Release Booth (18), Wisconsin Oven (19), UPTIMUM PLUS (UPTIMUM 1-6) BACT

These units at the facility are natural gas fired combustion units. Total HAP emissions from the boilers were calculated using AP-42 Table 1.4-3 emission factors, which lists benzene and formaldehyde among the HAPs. According to the RBLC database, the best control technologies to reduce HAPs from natural gas combustion are:

- Good Combustion Practices and Design
- Operations and Maintenance Plan
- Use of Natural Gas

### **Good Combustion Practices and Design**

Good combustion practices and design are essential for reducing emissions of pollutants including VOCs and HAPs which can contribute to smog and impact air quality. VOCs and HAPs can be released when fuel doesn't burn completely, so the goal of good combustion is to ensure efficient, complete burning of natural gas. For these natural gas units, the equipment has been designed to achieve high combustion efficiency, which minimizes the release of VOCs and HAPs. The burner system ensures proper mixing of air and fuel to support complete combustion. The units operate at optimal temperatures and airflow conditions to avoid incomplete burning, which can lead to excess VOC and HAP emissions. In addition, the units are equipped with controls that automatically adjust combustion settings to maintain ideal conditions during operation. Regular maintenance, inspections, and operator training ensure the system stays clean and operates reliably over time. These design and operational elements work together to ensure the units emit very low levels of VOCs and HAPs and meet environmental standards.

### **Operations and Maintenance Plan**

An operation and maintenance plan is required per 20.11.41.13.E(5) NMAC to obtain an air quality construction permit with the CABQ EHD AQP. This plan is a structured document that outlines how a facility, system, or piece of equipment will be operated and maintained to ensure safe, efficient, and compliant performance over its lifetime and includes the steps the applicant will take if a malfunction occurs that may cause emission of a regulated air contaminant to exceed a limit that is included in the permit; the nature of emissions during routine startup or shutdown of the source and the source's air pollution control equipment; and the steps the applicant will take to minimize emissions during routine startup or shutdown. Finally, the units will be under the supervision of a facilities manager who is responsible for proper maintenance and operating efficiency.

### **Use of Natural Gas**

Natural gas combustion is a widely used process in various industries due to its efficiency and relatively lower emissions compared to other fossil fuels. Natural gas with a higher methane content and lower carbon levels minimizes incomplete combustion which is a common source of VOC and HAP emissions. Additionally, natural gas allows for precise control over combustion conditions, allowing for optimized air-to-fuel ratios and temperature management. At this facility, the units are designed to operate exclusively on pipeline quality natural gas supplied by the local utility.

## **6.4 CHEM Emissions (6a)**

Chemical emissions at the SolAero facility include listed HAPs in 20.11.72.8(D) NMAC. To limit the chemical emissions for CHEM 6a, all best available control measures and practices will be followed as detailed within this section:

- Wet benches and chemical hoods are kept clean, free of spills, and uncluttered.
- Only the minimum quantity of chemicals necessary for production will be used.
- Drip trays and secondary containment are kept clean and promptly emptied when liquid is present.
- Contaminated wipes or spilled chemicals are disposed of within closed containers.
- Chemical containers are kept closed whenever they are not actively in use to minimize evaporative losses.
- Damaged caps, gaskets, or seals on chemical containers are replaced as soon as possible.

- Chemical lines, valves, pumps, canisters, totes, and fittings are routinely inspected for leaks or corrosion

## **APPENDIX A. APPLICATION FORMS**

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Compliance History Form

Application for Air Pollutant Sources in Bernalillo County Source Registration (20.11.40 NMAC) and  
Construction Permits (20.11.41 NMAC)

Permit Application Checklist

Permit Application Review Fee Checklist



# City of Albuquerque Environmental Health Department Air Quality Program



## Air Quality Compliance History Disclosure Form

The Albuquerque-Bernalillo County Joint Air Quality Program (“Program”) administers and enforces local air quality laws for the City of Albuquerque (“City”) and Bernalillo County (“County”) on behalf of the City Environmental Health Department, including the New Mexico Air Quality Control Act (“AQCA”), NMSA 1978, Sections 74-2-1 to -17. In accordance with Sections 74-2-7(P) and (S) of the AQCA, the Program may deny any permit application or revoke any permit issued pursuant to the AQCA if, within ten years immediately preceding the date of submission of the permit application, the applicant or permittee meets any one of the criteria outlined in the AQCA. The Program requires applicants to file this Compliance History Disclosure Form in order for the Program to deem an air permit application administratively complete, or issue an air permit for those permits without an initial administrative completeness determination process. Additionally, an existing permit holder (permits issued prior to the Effective Date of this Form) shall provide this Compliance History Disclosure Form to the Program upon the Program’s request. Note: Program Staff can answer basic questions about this Compliance History Disclosure Form but cannot provide specific guidance or legal advice.

### Instructions

1. Applications filed pursuant to the following regulations shall include this Compliance History Disclosure Form, in accordance with Section 74-2-7(S) of the AQCA: *Construction Permits* (20.11.41 NMAC); *Operating Permits* (20.11.42 NMAC); *Nonattainment Areas* (20.11.60 NMAC); *Prevention of Significant Deterioration* (20.11.61 NMAC); *Acid Rain* (20.11.62 NMAC); and *Fugitive Dust* (20.11.20 NMAC) except this Form shall not be required for asbestos notifications under 20.11.20.22 NMAC.
2. This Compliance History Disclosure Form is not site specific: responses shall be based on the applicant/permittee as an entity and not be limited to the application, site, facility or source.
3. The permittee identified on this Compliance History Disclosure Form shall match the permittee in the existing permit or new application. If the information in an existing permit needs to be changed, please contact the Program about revisions and ownership transfers.
4. Answer every question completely and truthfully, and do not leave any blank spaces. If there is nothing to disclose in answer to a particular question, check the box labeled “No” except for Question 5b. Failure to provide any of the information requested in this Compliance History Disclosure Form may constitute grounds for an incompleteness determination, application denial, or permit revocation.
5. Be especially careful not to leave out information in a way that might create an impression that you are trying to hide it. Omitting information, even unintentionally, may result in application denial or permit revocation.
6. For any required explanations, be sure to identify the question to which the explanation is responsive. If you submit any document in connection with your answer to any question, refer to it as, “Exhibit No. \_\_\_”, and attach it after the explanation(s) at the end of the Compliance History Disclosure Form, consecutively numbering each additional page at the top right corner.
7. The Program may require additional information to make a thorough review of an application. At all times before the Program has made a final decision regarding the application, an applicant has a duty to promptly supplement and correct information the applicant has submitted in an application to the Program. The applicant’s duty to supplement and correct the application includes, but is not limited to, relevant information acquired after the applicant has submitted the application and additional information the applicant otherwise determines is relevant to the application and the Program’s review and decision. While the Program is processing an application, regardless of whether the Program has determined the application is administratively complete, if the Program determines that additional information is necessary to evaluate or make a final decision regarding the application, the Program may request additional information and the applicant shall provide the requested additional information.
8. Supplementary information required by the Program may include responses to public comment received by the Program during the application review process.
9. Any fees submitted for processing an application that has been denied will not be refunded. If the Program denies an application, a person may submit a new application and the fee required for a new application. The applicant has the burden of demonstrating that a permit should be issued.

COMPLIANCE HISTORY		
A. Applicant/Permittee Name: <b>SolAero Technological Corporation</b>		Check Applicable Box: <input checked="" type="checkbox"/> Applicant <input type="checkbox"/> Permittee
B. Time Period of Compliance Reporting (10 Years): <u>August 11, 2015</u> to <u>August 11, 2025</u> Instructions: For applicants, answer the following questions with information from within the 10 years preceding the current application. For existing permit holders requested to submit this form by the Program outside of an application, answer the following questions with information from within the 10 years preceding the Program's issuance of each permit.		
C. Questions		
1	Knowingly misrepresented a material fact in an application for a permit?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2	Refused to disclose information required by the provisions of the New Mexico Air Quality Control Act?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
3	Been convicted in any court of any state or the United States of a felony related to environmental crime?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
4	Been convicted in any court of any state or the United States of a crime defined by state or federal statute as involving or being in restraint of trade, price fixing, bribery, or fraud?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
5a	Constructed or operated any facility for which a permit was sought, including the current application, without the required air quality permit(s) under 20.11.41 NMAC, 20.11.42 NMAC, 20.11.60 NMAC, 20.11.61 NMAC, or 20.11.62 NMAC?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
5b	If "No" to question 5a, mark N/A and go to question 6.  If "Yes" to question 5a, state whether each facility that was constructed or operated without the required air quality permit met at least one of the following exceptions:  i. The unpermitted facility was discovered after acquisition during a timely environmental audit that was authorized by the Program or the New Mexico Environment Department; or  ii. The operator of the facility, using good engineering practices and established approved calculation methodologies, estimated that the facility's emissions would not require an air permit, <b>and</b> the operator applied for an air permit within 30 calendar days of discovering that an air permit was required for the facility.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
6	Had any permit revoked or permanently suspended for cause under the environmental laws of any state or the United States?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
7	For each "yes" answer, or "no" to 5b, please attach an explanation and supporting documentation.	

I, the undersigned, hereby certify under penalty of law that this Compliance History Disclosure Form (Form) and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. I have knowledge of the information in this Form and it is, to the best of my knowledge and belief, true, accurate, and complete. I understand that there are significant penalties for submitting false information, including denial of the application or revocation of a permit, as well as fines and imprisonment for knowing violations. If I filed an application, I covenant and agree to promptly supplement and correct information in this Form until the Program makes a final decision regarding the application. Further, I certify that I am qualified and authorized to file this Form, to certify to the truth and accuracy of the information herein, and bind the permittee and source.

Signed on 27 Feb 2026

Rebecca Chambers  
Print Name

ETS manager  
Print Title

Rebecca Chambers  
Signature

SolAero Technologies  
Company Name



**City of Albuquerque – Environmental Health Department  
Air Quality Program**

Please mail this application to **P.O. Box 1293, Albuquerque, NM 87103**  
or hand deliver between 8:00 am – 5:00 pm Monday – Friday to:  
**3rd Floor, Suite 3023 – One Civic Plaza NW, Albuquerque, NM 87102**  
**(505) 768-1972 [aqd@cabq.gov](mailto:aqd@cabq.gov)**



**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Submittal Date: February 27, 2026**

**Owner/Corporate Information**  Check here and leave this section blank if information is exactly the same as Facility Information below.

Company Name:			
Mailing Address:	City:	State:	Zip:
Company Phone:	Company Contact:		
Company Contact Title:	Phone:	E-mail:	

**Stationary Source (Facility) Information:** Provide a plot plan (legal description/drawing of the facility property) with overlay sketch of facility processes, location of emission points, pollutant type, and distances to property boundaries.

Facility Name: <b>SolAero Technologies Corporation</b>			
Facility Physical Address: <b>10420 Research Rd SE</b>	City: <b>Albuquerque</b>	State: <b>NM</b>	Zip: <b>87123</b>
Facility Mailing Address (if different):	City:	State:	Zip:
Facility Contact: <b>Rebecca Chambers</b>	Title: <b>EHS Manager</b>		
Phone: <b>(505) 659-5183</b>	E-mail: <b>rebecca.chambers@rocketlabusa.com</b>		
Authorized Representative Name <sup>1</sup> : <b>Rebecca Chambers</b>	Authorized Representative Title: <b>EHS Manager</b>		

**Billing Information**  Check here if same contact and mailing address as corporate  Check here if same as facility

Billing Company Name:			
Mailing Address:	City:	State:	Zip:
Billing Contact:	Title:		
Phone:	E-mail:		

**Preparer/Consultant(s) Information**  Check here and leave section blank if no Consultant used or Preparer is same as Facility Contact.

Name: <b>Adam Erenstein</b>	Title: <b>Principal Consultant, Operations Manager</b>		
Mailing Address: <b>9400 Holly Ave NE, Bldg 3, Suite B</b>	City: <b>Albuquerque</b>	State: <b>NM</b>	Zip: <b>87122</b>
Phone: <b>(505)-266-6611</b>	Email: <b>AErenstein@trinityconsultants.com</b>		

1. See 20.11.41.13(E)(13) NMAC.

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**General Operation Information (if any question does not pertain to your facility, type N/A on the line or in the box)**

Permitting action being requested (please refer to the definitions in 20.11.40 NMAC or 20.11.41 NMAC):				
<input type="checkbox"/> New Permit	<input checked="" type="checkbox"/> Permit Modification Current Permit #: <b>#1029-M2-2TR</b>	<input type="checkbox"/> Technical Permit Revision Current Permit #:	<input type="checkbox"/> Administrative Permit Revision Current Permit #:	
<input type="checkbox"/> New Registration Certificate	<input type="checkbox"/> Modification Current Reg. #:	<input type="checkbox"/> Technical Revision Current Reg. #:	<input type="checkbox"/> Administrative Revision Current Reg. #:	
UTM coordinates of facility (Zone 13, NAD 83): <b>Easting: 360,360 m, Northing: 3,880,130 m</b>				
Facility type ( <i>i.e.</i> , a description of your facility operations): <b>It is a facility focused on manufacturing high-efficiency photovoltaics and other advanced semiconductors.</b>				
Standard Industrial Classification (SIC Code #): <b>3674</b>		North American Industry Classification System ( <a href="#">NAICS Code #</a> ): <b>334413</b>		
Is this facility currently operating in Bernalillo County? <b>Yes</b>		If <b>YES</b> , list date of original construction: <b>1997 (started business as EMCORE)</b> If <b>NO</b> , list date of planned startup:		
Is the facility permanent? <b>Yes</b>		If <b>NO</b> , list dates for requested temporary operation: From                      Through		
Is the facility a portable stationary source? <b>No</b>		If <b>YES</b> , is the facility address listed above the main permitted location for this source?		
Is the application for a physical or operational change, expansion, or reconstruction ( <i>e.g.</i> , altering process, or adding, or replacing process or control equipment, etc.) to an existing facility? <b>Yes</b>				
Provide a description of the requested changes: <b>Proposed changes include the removal of a base scrubber (EF-5B), the addition of six (6) new Veeco EPI growth reactors (EBARA1-12), a new burn wet abatement system to control emissions from the reactors including six (6) UPTIMIUM PLUS control devices (UPTIMUM1-6) and three (3) electrostatic dust collector (EDC) PLUS control devices (EDC1-3). A new solvent vent, a new base scrubber, and a new acid scrubber are also being added with this project. The new burn wet abatement system disposes of emissions via combustion and subsequent scrubbing of particles, as well as absorption of soluble gas components with the aid of a scrubbing liquid. There are no emission increases associated with Unit 6a (CHEM) as the new EPI growth reactors are more efficient than the existing reactors.</b>				
What is the facility's operation? <input checked="" type="checkbox"/> Continuous <input type="checkbox"/> Intermittent <input type="checkbox"/> Batch				
Estimated percent of production/operation:	Jan-Mar: <b>25%</b>	Apr-Jun: <b>25%</b>	Jul-Sep: <b>25%</b>	Oct-Dec: <b>25%</b>
Requested operating times of facility:	<b>24 hours/day</b>	<b>7 days/week</b>	<b>4.35 weeks/month</b>	<b>12 months/year</b>
Will there be special or seasonal operating times other than shown above? This includes monthly- or seasonally-varying hours. <b>No</b>				
If <b>YES</b> , please explain:				
List raw materials processed: <b>Semi-conductors and associated chemicals</b>				
List saleable item(s) produced: <b>Photovoltaics, Semiconductors, other products</b>				

USE INSTRUCTIONS: For the forms on the following pages, please do not alter or delete the existing footnotes or page breaks. If additional footnotes are needed then add them to the end of the existing footnote list for a given table. Only update the rows and cells within tables as necessary for your project. Unused rows can be deleted from tables. If multiple scenarios will be represented then the Uncontrolled and Controlled Emission Tables, and other tables as needed, can be duplicated and adjusted to indicate the different scenarios.

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Regulated Emission Sources Table**

(E.g., Generator-Crusher-Screen-Conveyor-Boiler-Mixer-Spray Guns-Saws-Sander-Oven-Dryer-Furnace-Incinerator-Haul Road-Storage Pile, etc.) Match the Units listed on this Table to the same numbered line if also listed on Emissions Tables & Stack Table.

Unit Number and Description <sup>1</sup>	Manufacturer	Model #	Serial #	Manufacture Date	Installation Date	Modification Date <sup>2</sup>	Process Rate or Capacity (Hp, kW, Btu, ft <sup>3</sup> , lbs, tons, yd <sup>3</sup> , etc.) <sup>3</sup>	Fuel Type	
Ex. 1.	Generator	Unigen	B-2500	A567321C	7/1996	7/1997	11/2020	250 Hp/HR	Diesel
Ex. 2.	Spray Gun	HVLP Systems	Spra-N-Stay 1100	K26-56-95	01/2017	11/2017	N/A	0.25 gal./HR	Electric Compressor
1	Emergency Diesel Generator	Kohler	150R0ZJ	602110	08/97	1998	N/A	250 hp/186 kW	Diesel
2	Emergency Diesel Generator	Kohler	300REOZD	683650	07/00	~2000-2001	N/A	490 hp/365 kW	Diesel
4	Boiler	Kewanee	H3S-200G	13142	09/00	12/00	N/A	7,532,000 Btu/hr	Natural Gas
5	Boiler	Kewanee	H3S-200G	12243	09/00	12/00	N/A	7,532,000 Btu/hr	Natural Gas
6a	CHEM (Various Facility emissions)	Various	Various	Various	Various	02/01	2015	N/A	N/A
13	Boiler	Kewanee	H3S-150G	14148	2001	05/01	N/A	5,650,200 Btu/hr	Natural Gas
15	Emergency Diesel Generator	Cummins	QSB7-G5NR3	73428388	7/12/12	~2012	N/A	324 hp engine 125 kW generator	Ultra Low Sulfur Diesel
16	Autoclave 1	Thermal Equipment Corporation	8391	294	1986	2017	N/A	3.5 MMBtu/hr	Natural Gas
17	Autoclave 2	ACS Process Systems	No model number	12301	7/30/12	2017	N/A	3.5 MMBtu/hr	Natural Gas
18	Release booth	Global Finishing Solutions	No model number	U25426-A	2017	2020	N/A	2.0 MMBtu/hr	Natural Gas
19	Oven 1	Wisconsin Oven Corporation	SWN-816-8G	095080407	2015	2017	N/A	0.75 MMBtu/hr	Natural Gas
EBARA1	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA2	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA3	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA4	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA5	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

Unit Number and Description <sup>1</sup>		Manufacturer	Model #	Serial #	Manufacture Date	Installation Date	Modification Date <sup>2</sup>	Process Rate or Capacity (Hp, kW, Btu, ft <sup>3</sup> , lbs, tons, yd <sup>3</sup> , etc.) <sup>3</sup>	Fuel Type
EBARA6	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA7	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA8	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA9	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA10	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA11	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
EBARA12	Veeco Reactor Chamber	Veeco	Lumina R480/R480 S	TBD	TBD	TBD	N/A	30,000 6" Z4J Wafers/year	N/A
UPTIMUM 1	Process Waste Gas Control	DAS Environmental Experts	UPTIMUM PLUS	TBD	TBD	TBD	N/A	0.93 MMScf/yr	Natural Gas
UPTIMUM 2	Process Waste Gas Control	DAS Environmental Experts	UPTIMUM PLUS	TBD	TBD	TBD	N/A	0.93 MMScf/yr	Natural Gas
UPTIMUM 3	Process Waste Gas Control	DAS Environmental Experts	UPTIMUM PLUS	TBD	TBD	TBD	N/A	0.93 MMScf/yr	Natural Gas
UPTIMUM 4	Process Waste Gas Control	DAS Environmental Experts	UPTIMUM PLUS	TBD	TBD	TBD	N/A	0.93 MMScf/yr	Natural Gas
UPTIMUM 5	Process Waste Gas Control	DAS Environmental Experts	UPTIMUM PLUS	TBD	TBD	TBD	N/A	0.93 MMScf/yr	Natural Gas
UPTIMUM 6	Process Waste Gas Control	DAS Environmental Experts	UPTIMUM PLUS	TBD	TBD	TBD	N/A	0.93 MMScf/yr	Natural Gas
CT1	Building 1 Cooling Tower	EVAPCO, INC.	AT 212-824	Unknown	Unknown	Unknown	N/A	3,000 gpm	N/A
CT2	Building 1 Cooling Tower	EVAPCO, INC.	AT 212-824	Unknown	Unknown	Unknown	N/A	3,000 gpm	N/A
CT3	Building 2 Cooling Tower	Baltimore Aircoil	33412A-MM-2	Unknown	Unknown	Unknown	N/A	2,400 gpm	N/A

NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

- Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.
- To determine whether a unit has been modified, evaluate if changes have been made to the unit that impact emissions or that trigger modification as defined in 20.11.41.7(U) NMAC. If not, put N/A.
- Basis for Equipment Process Rate or Capacity (e.g., Manufacturer's Data, Field Observation/Test, etc.) **Manufacturer's Data**  
Submit information for each unit as an attachment.

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Emissions Control Equipment Table**

Control Equipment Units listed on this Table should either match up to the same Unit number as listed on the Regulated Emission Sources, Controlled Emissions and Stack Parameters Tables (if the control equipment is integrated with the emission unit) or should have a distinct Control Equipment Unit Number and that number should then also be listed on the Stack Parameters Table.

Control Equipment Unit Number and Description		Controlling Emissions for Unit Number(s)	Manufacturer	Model #   Serial #	Date Installed	Controlled Pollutant(s)	% Control Efficiency <sup>1</sup>	Method Used to Estimate Efficiency	Rated Process Rate or Capacity or Flow
Ex. 8b	Baghouse	3,4,5	Best Baghouses	C-12010   A16925	11/12/2019	PM <sub>10</sub> , PM <sub>2.5</sub>	99%	Manufacturer's Data	1,500 ACFM
EF-1	Toxic Gas Absorbers	6a	Emcore	N/A   N/A	01/01	Phosphine, Arsine, Disilene	99%	Manufacturer Spec.	20,000 ACFM
EF-2	Toxic Gas Absorbers	6a	Emcore	N/A   N/A	01/01	Phosphine, Arsine, Disilene	99%	Manufacturer Spec.	20,000 ACFM
EF-4	Solvent Gas Scrubber	6a	Twin City	150 arrangement   1 Class 1   99-148519-1-1	01/01	IPA, Acetone	0%	Manufacturer Spec.	3,500 ACFM
EF-5A	Acid Scrubber	6a	Beverly Pacific	MPSH-408-6.5   663-6.5	01/01	H <sub>3</sub> PO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HCl, HF, and HNO <sub>3</sub>	99%	Manufacturer Spec.	4,500 ACFM
EF-22	Acid Scrubber	6a	Harrington	ECH 5 6-5 LB   S-08 3000-02	01/01	H <sub>3</sub> PO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> , HCl, HF, and HNO <sub>3</sub>	99%	Manufacturer Spec.	15,000 ACFM
EF-23	Base Scrubber	6a	Harrington	ECH-4 4-5LB   S-083000-1	01/01	NH <sub>4</sub> OH	95%	Manufacturer Spec.	6,200 ACFM
EF-24	Solvent Scrubber	6a	BLC Industries	32HC04X06   111552 and 111553	01/01	IPA, Acetone	0%	Manufacturer Spec.	6,600 ACFM
26	Base Scrubber	6a	Vanaire	TBD   TBD	TBD	Ammonium Hydroxide	95%	Manufacturer Spec.	TBD
27	Acid Scrubber	6a	Vanaire	TBD   TBD	TBD	Acetic Acid, Citric Acid, HCl, HF, H <sub>2</sub> O <sub>2</sub> , Nitric Acid, Phosphoric Acid	95%	Manufacturer Spec.	TBD
UPTIMUM 1	Combustor	Ebara1-12	DAS Environmental Expert GmbH	UPTIMUM Plus   TBD	TBD	VOCs, HAPs	99%*	Manufacturer Spec.	TBD
UPTIMUM 2	Combustor	Ebara1-12	DAS Environmental Expert GmbH	UPTIMUM Plus   TBD	TBD	VOCs, HAPs	99%*	Manufacturer Spec.	TBD
UPTIMUM 3	Combustor	Ebara1-12	DAS Environmental Expert GmbH	UPTIMUM Plus   TBD	TBD	VOCs, HAPs	99%*	Manufacturer Spec.	TBD
UPTIMUM 4	Combustor	Ebara1-12	DAS Environmental Expert GmbH	UPTIMUM Plus   TBD	TBD	VOCs, HAPs	99%*	Manufacturer Spec.	TBD
UPTIMUM 5	Combustor	Ebara1-12	DAS Environmental Expert GmbH	UPTIMUM Plus   TBD	TBD	VOCs, HAPs	99%*	Manufacturer Spec.	TBD
UPTIMUM 6	Combustor	Ebara1-12	DAS Environmental Expert GmbH	UPTIMUM Plus   TBD	TBD	VOCs, HAPs	99%*	Manufacturer Spec.	TBD

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

Control Equipment Unit Number and Description		Controlling Emissions for Unit Number(s)	Manufacturer	Model #   Serial #	Date Installed	Controlled Pollutant(s)	% Control Efficiency <sup>1</sup>	Method Used to Estimate Efficiency	Rated Process Rate or Capacity or Flow
EDC1	Electrostatic Dust Collector	Ebara1-12	DAS Environmental Expert GmbH	EDC Plus   TBD	TBD	VOCs, HAPs	99%*	Manufacturer Spec.	TBD
EDC2	Electrostatic Dust Collector	Ebara1-12	DAS Environmental Expert GmbH	EDC Plus   TBD	TBD	VOCs, HAPs	99%*	Manufacturer Spec.	TBD
EDC3	Electrostatic Dust Collector	Ebara1-12	DAS Environmental Expert GmbH	EDC Plus   TBD	TBD	VOCs, HAPS	99%*	Manufacturer Spec.	TBD

NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

\*The control efficiency of the combined UPTIMUM PLUS and EDC PLUS is 99%.

1. Basis for Control Equipment % Efficiency (e.g., Manufacturer's Data, Field Observation/Test, AP-42, etc.). \_\_\_\_\_  
Submit information for each unit as an attachment.



**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Uncontrolled Emissions Table**

(Process potential under physical/operational limitations during a 24 hr/day and 365 day/year = 8760 hrs)

Regulated Emission Units listed on this Table should match up to the same numbered line and Unit as listed on the Regulated Emissions and Controlled Tables. List total HAP values per Emission Unit if overall HAP total for the facility is  $\geq 1$  ton/yr.

Unit Number*	Nitrogen Oxides (NO <sub>x</sub> )		Carbon Monoxide (CO)		Nonmethane Hydrocarbons/Volatile Organic Compounds (NMHC/VOCs)		Sulfur Dioxide (SO <sub>2</sub> )		Particulate Matter $\leq 10$ Microns (PM <sub>10</sub> )		Particulate Matter $\leq 2.5$ Microns (PM <sub>2.5</sub> )		Hazardous Air Pollutants (HAPs)		Method(s) used for Determination of Emissions (AP-42, Material Balance, Field Tests, etc.)
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	
Example 1.	27.7	121.3	9.1	39.9	1.3	5.7	0.5	2.2	2.0	8.8	0.2	0.4	0.2	0.4	AP-42 Section 3.3
1	6.28	27.5	1.98	8.7	0.26	1.2	1.12	4.9	0.66	2.9	0.66	2.9	-	-	AP-42 3.3-1 and Kohler Manufacturer Data with 20% Safety Factors
2	18.23	79.84	3.93	17.20	1.45	6.36	1.21	5.28	1.29	5.67	1.29	5.67	-	-	AP-42 3.3-1 and Kohler Manufacturer Data with 20% Safety Factors
4	1.09	4.8	0.91	4.0	0.06	0.26	0.01	0.029	0.083	0.36	0.083	0.36	0.016	0.069	AP-42 Table 1.4-1&2 with 20% Safety factors
5	1.09	4.8	0.91	4.0	0.06	0.26	0.01	0.029	0.083	0.36	0.083	0.36	0.016	0.069	AP-42 Table 1.4-1&2 with 20% Safety factors
6a	-	-	-	-	3.35	14.69	-	-	-	-	-	-	3.46	15.15	Based on highest chemical emissions from last several years of AEIs plus added a 20% safety factor.
13	0.75	3.30	0.63	2.77	0.041	0.18	0.0045	0.020	0.057	0.25	0.057	0.25	0.012	0.052	AP-42 3.3- 1 with 20% safety factor.
15	2.03	8.9	1.85	8.1	0.11	0.47	0.66	2.9	0.10	0.44	0.10	0.44	-	-	Cummins NSPS IIII emissions data and AP-42 Section 3.3 for SOx from AQP's NSPS App. form table.
16	0.43	1.87	0.36	1.57	0.02	0.10	0.003	0.010	0.033	0.14	0.033	0.14	0.0073	0.032	AP-42 Table 1.4-1&2 and SolAero information
17	0.43	1.87	0.36	1.57	0.02	0.10	0.003	0.010	0.033	0.14	0.033	0.14	0.0073	0.032	AP-42 Table 1.4-1&2 and SolAero information
18	0.27	1.2	0.22	1.0	0.01	0.064	0.002	0.0070	0.020	0.089	0.020	0.089	0.0042	0.018	AP-42 Table 1.4-1&2 and SolAero information
19	0.10	0.44	0.08	0.37	0.01	0.024	0.001	0.0026	0.0076	0.033	0.0076	0.033	0.0016	0.0069	AP-42 Table 1.4-1&2 and SolAero information
EBARA1	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

Unit Number*	Nitrogen Oxides (NO <sub>x</sub> )		Carbon Monoxide (CO)		Nonmethane Hydrocarbons/Volatile Organic Compounds (NMHC/VOCs)		Sulfur Dioxide (SO <sub>2</sub> )		Particulate Matter ≤ 10 Microns (PM <sub>10</sub> )		Particulate Matter ≤ 2.5 Microns (PM <sub>2.5</sub> )		Hazardous Air Pollutants (HAPs)		Method(s) used for Determination of Emissions (AP-42, Material Balance, Field Tests, etc.)
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	
EBARA2	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA3	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA4	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA5	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA6	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA7	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA8	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA9	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA10	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA11	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
EBARA12	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08	Engineering Estimate from Ideal Gas Law
UPTIMUM 1	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	AP-42 Table 1.4-1&2&3
UPTIMUM 2	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	AP-42 Table 1.4-1&2&3
UPTIMUM 3	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	AP-42 Table 1.4-1&2&3
UPTIMUM 4	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	AP-42 Table 1.4-1&2&3
UPTIMUM 5	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	AP-42 Table 1.4-1&2&3
UPTIMUM 6	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	AP-42 Table 1.4-1&2&3

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

Unit Number*	Nitrogen Oxides (NO <sub>x</sub> )		Carbon Monoxide (CO)		Nonmethane Hydrocarbons/Volatile Organic Compounds (NMHC/VOCs)		Sulfur Dioxide (SO <sub>2</sub> )		Particulate Matter ≤ 10 Microns (PM <sub>10</sub> )		Particulate Matter ≤ 2.5 Microns (PM <sub>2.5</sub> )		Hazardous Air Pollutants (HAPs)		Method(s) used for Determination of Emissions (AP-42, Material Balance, Field Tests, etc.)
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	
CT1	-	-	-	-	-	-	-	-	0.14	0.60	0.0027	0.012	-	-	Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers"
CT2	-	-	-	-	-	-	-	-	0.14	0.60	0.0027	0.012	-	-	Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers"
CT3	-	-	-	-	-	-	-	-	0.11	0.48	0.0022	0.010	-	-	Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers"
<b>Totals of Uncontrolled Emissions</b>	<b>31.39</b>	<b>137.50</b>	<b>11.84</b>	<b>51.85</b>	<b>6.50</b>	<b>25.77</b>	<b>3.02</b>	<b>13.24</b>	<b>2.81</b>	<b>12.29</b>	<b>2.43</b>	<b>10.64</b>	<b>23.31</b>	<b>52.39</b>	

NOTE: To add extra rows in Word, click anywhere in the second-to-last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

\*A permit is required and this application along with the additional checklist information requested on the Permit Application checklist must be provided if:

- (1) any one of these process units or combination of units, has an uncontrolled emission rate greater than or equal to (≥) 10 lbs/hr or 25 tons/yr for any of the above pollutants, excluding HAPs, based on 8,760 hours of operation; or
- (2) any one of these process units or combination of units, has an uncontrolled emission rate ≥ 2 tons/yr for any single HAP or ≥ 5 tons/yr for any combination of HAPs based on 8,760 hours of operation; or
- (3) any one of these process units or combination of units, has an uncontrolled emission rate ≥ 5 tons/yr for lead (Pb) or any combination of lead and its compounds based on 8,760 hours of operation; or
- (4) any one of the process units or combination of units is subject to an Air Board or federal emission limit or standard.

\* If all of these process units, individually and in combination, have an uncontrolled emission rate less than (<) 10 lbs/hr or 25 tons/yr for all of the above pollutants (based on 8,760 hours of operation), but > 1 ton/yr for any of the above pollutants, then a source registration is required. A Registration is required, at minimum, for any amount of HAP emissions. Please complete the remainder of this form.

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Controlled Emissions Table**

(Based on current operations with emission controls OR requested operations with emission controls)

Regulated Emission Units listed on this Table should match up to the same numbered line and Unit as listed on the Regulated Emissions and Uncontrolled Tables. List total HAP values per Emission Unit if overall HAP total for the facility is  $\geq 1$  ton/yr.

Unit Number	Nitrogen Oxides (NO <sub>x</sub> )		Carbon Monoxide (CO)		Nonmethane Hydrocarbons/Volatile Organic Compounds (NMHC/VOCs)		Sulfur Dioxide (SO <sub>2</sub> )		Particulate Matter $\leq 10$ Microns (PM <sub>10</sub> )		Particulate Matter $\leq 2.5$ Microns (PM <sub>2.5</sub> )		Hazardous Air Pollutants (HAPs)		Control Method	% Efficiency <sup>1</sup>
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr		
Example 1.	27.7	55.4	9.1	18.2	1.3	2.6	0.5	1.0	2.0	4.0	0.2	0.088	0.2	0.088	Operating Hours	N/A
1	6.28	1.57	1.98	0.50	0.26	0.07	1.12	0.28	0.66	0.17	0.66	0.17	---	---	Operating Hours	N/A
2	18.23	79.84	3.93	17.20	1.45	6.36	1.21	5.28	1.29	5.67	1.29	5.67	---	---	Operating Hours	N/A
4	1.09	4.77	0.91	4.0	0.06	0.26	0.01	0.03	0.083	0.36	0.083	0.36	0.016	0.069	None	N/A
5	1.09	4.77	0.91	4.0	0.06	0.26	0.01	0.03	0.083	0.36	0.083	0.36	0.016	0.069	None	N/A
6a	---	---	---	---	3.35	14.69	---	---	---	---	---	---	0.47	2.06	None	N/A
13	0.75	3.30	0.63	2.77	0.041	0.18	0.0045	0.020	0.057	0.25	0.057	0.25	0.012	0.052	None	N/A
15	2.03	0.51	1.85	0.46	0.11	0.027	0.66	0.17	0.10	0.025	0.10	0.025	-	-	Operating Hours	N/A
16	0.43	1.87	0.36	1.57	0.02	0.10	0.003	0.010	0.033	0.14	0.033	0.14	0.0073	0.032	None	N/A
17	0.43	1.87	0.36	1.57	0.02	0.10	0.003	0.010	0.033	0.14	0.033	0.14	0.0073	0.032	None	N/A
18	0.27	1.2	0.22	1.0	0.01	0.064	0.002	0.0070	0.020	0.089	0.020	0.089	0.0042	0.018	None	N/A
19	0.10	0.44	0.08	0.37	0.01	0.02	0.001	0.003	0.0076	0.033	0.0076	0.033	0.0016	0.0069	None	N/A
EBARA1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

Unit Number	Nitrogen Oxides (NO <sub>x</sub> )		Carbon Monoxide (CO)		Nonmethane Hydrocarbons/Volatile Organic Compounds (NMHC/VOCs)		Sulfur Dioxide (SO <sub>2</sub> )		Particulate Matter ≤ 10 Microns (PM <sub>10</sub> )		Particulate Matter ≤ 2.5 Microns (PM <sub>2.5</sub> )		Hazardous Air Pollutants (HAPs)		Control Method	% Efficiency <sup>1</sup>
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr		
EBARA4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
EBARA12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	UPTIMUM PLUS and EDC PLUS	99
UPTIMUM 1	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	None	0
UPTIMUM 2	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	None	0
UPTIMUM 3	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	None	0
UPTIMUM 4	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	None	0
UPTIMUM 5	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	None	0
UPTIMUM 6	0.011	0.046	0.0089	0.039	0.0006	0.0026	0.0001	0.0003	0.0008	0.0035	0.0008	0.0035	0.0002	0.0009	None	0
EDC-1	-	-	-	-	0.004	0.006	-	-	-	-	-	-	0.066	0.12	None	0
EDC-2	-	-	-	-	0.004	0.006	-	-	-	-	-	-	0.066	0.12	None	0

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

Unit Number	Nitrogen Oxides (NO <sub>x</sub> )		Carbon Monoxide (CO)		Nonmethane Hydrocarbons/Volatile Organic Compounds (NMHC/VOCs)		Sulfur Dioxide (SO <sub>2</sub> )		Particulate Matter ≤ 10 Microns (PM <sub>10</sub> )		Particulate Matter ≤ 2.5 Microns (PM <sub>2.5</sub> )		Hazardous Air Pollutants (HAPs)		Control Method	% Efficiency <sup>1</sup>
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr		
EDC-3	-	-	-	-	0.004	0.006	-	-	-	-	-	-	0.066	0.12	None	0
CT1	-	-	-	-	-	-	-	-	0.14	0.60	0.0027	0.012	-	-	None	0
CT2	-	-	-	-	-	-	-	-	0.14	0.60	0.0027	0.012	-	-	None	0
CT3	-	-	-	-	-	-	-	-	0.11	0.48	0.0022	0.010	-	-	None	0
Totals of Controlled Emissions	30.76	25.10	11.30	17.45	5.42	16.18	3.02	0.86	2.76	3.59	2.38	1.95	0.71	2.63		

NOTE: To add extra rows in Word, click anywhere in the second-to-last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

1. Basis for Control Method % Efficiency (e.g., Manufacturer's Data, Field Observation/Test, AP-42, etc.). **Manufacturer's Data, Operating Hours**  
Submit information for each unit as an attachment.

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Hazardous Air Pollutants (HAPs) Emissions Table**

Report the Potential Emission Rate for each HAP from each source on the Regulated Emission Sources Table that emits a given HAP. Report individual HAPs with  $\geq 1$  ton/yr total emissions for the facility on this table. Otherwise, report total HAP emissions for each source that emits HAPs and report individual HAPs in the accompanying application package in association with emission calculations. If this application is for a Registration solely due to HAP emissions, report the largest HAP emissions on this table and the rest, if any, in the accompanying application package.

Unit Number	Total HAPs															
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Example 1.	6.3	18.2	3.2	8.5	2.3	7.7	0.5	1.0	0.3	1.0	N/A	N/A	N/A	N/A	N/A	N/A
1. Emergency Diesel Generator	---	---														
2. Emergency Diesel Generator	---	---														
4. Boiler	0.016	0.069														
5. Boiler	0.016	0.069														
6a. CHEM (various facility-wide chemical related emissions)	0.45	1.97														
13. Boiler	0.012	0.052														
15. Emergency Diesel Generator	---	---														
16. Autoclave 1	0.0073	0.032														
17. Autoclave 2	0.0073	0.032														
18. Release Booth	0.0042	0.018														
19. Wisconsin Oven 1	0.0016	0.0069														
UPTIMUM 1	0.0002	0.0009														

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

Unit Number	Total HAPs															
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
UPTIMUM 2	0.0002	0.0009														
UPTIMUM 3	0.0002	0.0009														
UPTIMUM 4	0.0002	0.0009														
UPTIMUM 5	0.0002	0.0009														
UPTIMUM 6	0.0002	0.0009														
EDC 1	0.07	0.12														
EDC 2	0.07	0.12														
EDC 3	0.07	0.12														
CT1	---	---														
CT2	---	---														
CT3	---	---														
Totals of HAPs for all units:	<b>0.72</b>	<b>2.67</b>														

NOTE: To add extra rows in Word, click anywhere in the second-to-last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

Use Instructions: Copy and paste the HAPs table here if need to list more individual HAPs.

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Purchased Hazardous Air Pollutant Table\***

Product Categories (Coatings, Solvents, Thinners, etc.)	Hazardous Air Pollutant (HAP), or Volatile Hazardous Air Pollutant (VHAP) Primary To The Representative As Purchased Product	Chemical Abstract Service (CAS) Number of HAP or VHAP from Representative As Purchased Product	HAP or VHAP Concentration of Representative As Purchased Product (pounds/gallon, or %)	Concentration Determination (CPDS, SDS, etc.) <sup>1</sup>	Total Product Purchases For Category	(-)	Quantity of Product Recovered & Disposed For Category	(=)	Total Product Usage For Category
Example 1. Surface Coatings	Xylene	1330207	4.0 lbs/gal	SDS	lb/yr	(-)	lb/yr	(=)	lb/yr
					100 gal/yr		0 gal/yr		100 gal/yr
Example 2. Cleaning Solvents	Toluene	108883	70%	Product Label	lb/yr	(-)	lb/yr	(=)	lb/yr
					200 gal/yr		50 gal/yr		150 gal/yr
<b>1. 6a. CHEM HAPs (covers all products &amp; chemicals including paints and solvents containing HAPs)</b>	<b>CHEM HAPs (see calculations for details)</b>	<b>Various</b>	<b>Varies</b>	<b>SDS</b>	<b>124,478</b>	(-)	<b>0.0 lb/yr</b>	(=)	<b>124,478</b>
					gal/yr		gal/yr		gal/yr
2.					lb/yr	(-)	lb/yr	(=)	lb/yr
					gal/yr		gal/yr		gal/yr
3.					lb/yr	(-)	lb/yr	(=)	lb/yr
					gal/yr		gal/yr		gal/yr
4.					lb/yr	(-)	lb/yr	(=)	lb/yr
					gal/yr		gal/yr		gal/yr
5.					lb/yr	(-)	lb/yr	(=)	lb/yr
					gal/yr		gal/yr		gal/yr
6.					lb/yr	(-)	lb/yr	(=)	lb/yr
					gal/yr		gal/yr		gal/yr
7.					lb/yr	(-)	lb/yr	(=)	lb/yr
					gal/yr		gal/yr		gal/yr
8.					lb/yr	(-)	lb/yr	(=)	lb/yr
					gal/yr		gal/yr		gal/yr
.					lb/yr	(-)	lb/yr	(=)	lb/yr
					gal/yr		gal/yr		gal/yr
<b>TOTALS</b>					<b>124,478</b>	(-)	<b>0 lb/yr</b>	(=)	<b>124,478</b>
					lb/yr		gal/yr		lb/yr

NOTE: To add extra rows in Word, click anywhere in the second-to-last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

NOTE: Product purchases, recovery/disposal and usage should be converted to the units listed in this table. If units cannot be converted please contact the Air Quality Program prior to making changes to this table.

1. Submit, as an attachment, information on one (1) product from each Category listed above which best represents the average of all the products purchased in that Category. CPDS = Certified Product Data Sheet; SDS = Safety Data Sheet

**\* A Registration is required, at minimum, for any amount of HAP or VHAP emission.**

**Emissions from purchased HAP usage should be accounted for on previous tables as appropriate.**

**A permit may be required for these emissions if the source meets the requirements of 20.11.41 NMAC.**

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Material and Fuel Storage Table**

*(E.g., Tanks, barrels, silos, stockpiles, etc.)*

Storage Equipment		Product Stored	Capacity (bbls, tons, gals, acres, etc.)	Above or Below Ground	Construction (Welded, riveted) & Color	Installation Date	Loading Rate <sup>1</sup>	Offloading Rate <sup>1</sup>	True Vapor Pressure	Control Method	Seal Type	% Eff. <sup>2</sup>
Ex. 1.	Tank	Diesel Fuel	5,000 gal.	Below	Welded/Brown	3/1993	3,000 gal/hr	500 gal/hr	N/A	N/A	N/A	N/A
Ex. 2.	Barrels	Solvent	55 gal. drum	Above	Welded/Green	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1. Generator	Tank	Diesel Fuel	<1,000 gal	Above	Welded/Brown	~1998	<1,000 gal/hr	N/A	N/A	N/A	N/A	N/A
2. Generator	Tank	Diesel Fuel	<1,000 gal	Above	Welded/Brown	~2000-2001	<1,000 gal/hr	N/A	N/A	N/A	N/A	N/A
6A. CHEM	Totes or Barrels	Acetone	275 gal. totes or 55 gal. drums	Above	Molded plastic, various	N/A	N/A	N/A	N/A	Gaskets & seals	Various	N/A
6A. CHEM	Tank	Waste Acetone/Solvent	1,600 gal	Above	Welded Double-walled/white	~2013	N/A	N/A	N/A	Gaskets & seals	Various	N/A
6A. CHEM	Totes or Barrels	Isopropanol (IPA)	275 gal. totes or 55 gal. drums	Above	Molded plastic, various	N/A	N/A	N/A	N/A	Gaskets & seals	Various	N/A
6A. CHEM	Barrels or Bottles	Hydrochloric acid (HCl)	55 gal drums or 1-gal bottles	Above	Molded plastic, various	N/A	N/A	N/A	N/A	Gaskets & seals	Various	N/A
6A. CHEM	Barrels or Bottles	AZ EBR 70/30	55 gal drums or 1-gal bottles	Above	Molded plastic, various	N/A	N/A	N/A	N/A	Gaskets & seals	Various	N/A
6A. CHEM	Totes or Barrels	EKC 922	275 gal. totes or 55 gal. drums	Above	Molded plastic, various	N/A	N/A	N/A	N/A	Gaskets & seals	Various	N/A
15. Generator	Tank	Diesel Fuel	<1,000 gal	Above	Welded/Brown	05/01	<1,000 gal/hr	N/A	N/A	N/A	N/A	N/A

NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

1. Basis for Loading/Offloading Rate (e.g., Manufacturer's Data, Field Observation/Test, etc.). **Limited Fuel Tank Sizes & field observation**  
Submit information for each unit as an attachment.
2. Basis for Control Method % Efficiency (e.g., Manufacturer's Data, Field Observation/Test, AP-42, etc.). **Field observations**  
Submit information for each unit as an attachment.

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Stack Parameters Table**

If any equipment from the Regulated Emission Sources Table is also listed in this Stack Table, use the same numbered line for the emission unit on both tables to show the association between the Process Equipment and its stack.

Unit Number and Description		Pollutant (CO, NOx, PM <sub>10</sub> , etc.)	UTM Easting (m)	UTM Northing (m)	Stack Height (ft)	Stack Exit Temp. (°F)	Stack Velocity (fps)	Stack Flow Rate (acfm)	Stack Inside Diameter (ft)	Stack Type
Ex. 1.	Generator	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub>	349430.28	3884014.64	18	900 °F	150 fps	4524 acfm	0.8	Rain Cap
Ex. 2.	Spray Gun	PM <sub>10</sub> , xylene, toluene	348540.1	3882928.5	9.2	Ambient	50 fps	589 acfm	0.5	Vertical
1	Emergency Generator	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360337.87	3880155.14	12 ft	925 °F	202 fps	~2,374 acfm	0.5 ft	Vertical
2	Emergency Generator	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360396.74	3880166.38	14 ft	780 °F	483 fps	~2,530 acfm	0.3 ft	Vertical
4	Boiler	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360387	3880171	22 ft	250 °F	35 fps	~2191 acfm	1.16 ft	Vertical
5	Boiler	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360391	3880171	22 ft	250 °F	35 fps	~2191 acfm	1.16 ft	Vertical
6A	CHEM into existing APCD EF-5A	Acids, including acidic HAPs & VOCs	360354	3880189	32 ft	70 °F	14.13 fps	~4,500 acfm	2.6 ft	Vertical
6A	CHEM into existing APCD EF-22	Acids, including acidic HAPs & VOCs	360407.18	3880171.09	52 ft	70 °F	35.37 fps	~15,000 acfm	3 ft	Vertical
6A	CHEM into existing APCD EF-5B	Bases, including basic HAPs & VOCs	360353.0	3880205.0	32 ft	70 °F	10.05 fps	~3,200 acfm	2.6 ft	Vertical
6A	CHEM into existing APCD EF-23	Bases, including basic HAPs & VOCs	360407.27	3880171.15	52 ft	70 °F	32.89 fps	~6,200 acfm	2 ft	Vertical
6A	CHEM into existing APCD EF-4	Solvents, including solvent HAPs & VOCs	360355.0	3880205.0	32 ft	70 °F	33.01 fps	~3,500 acfm	1.5 ft	Vertical
6A	CHEM into existing APCD EF-24	Solvents, including solvent HAPs & VOCs	360418	3880166	52 ft	70 °F	62.25 fps	~6,600 acfm	1.5 ft	Vertical
6A	CHEM into existing APCD EF-1	HAPs & VOCs	360369	3880168	28 ft	70 °F	90.97 fps	~20,000 acfm	2.16 ft	Vertical
6A	CHEM into existing APCD EF-2	HAPs & VOCs	360367	3880168	28 ft	70 °F	90.97 fps	~20,000 acfm	2.16 ft	Vertical
13	Boiler	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360332	3880048	22 ft	312 °F	28 fps	~1,787 acfm	1.16 ft	Vertical

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

Unit Number and Description	Pollutant (CO, NOx, PM <sub>10</sub> , etc.)	UTM Easting (m)	UTM Northing (m)	Stack Height (ft)	Stack Exit Temp. (°F)	Stack Velocity (fps)	Stack Flow Rate (acfm)	Stack Inside Diameter (ft)	Stack Type
15 Emergency Generator	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360345	3880049	11.5 ft	835 °F	139.67 fps	~1,161 acfm	0.42 ft	Vertical
16 Autoclave 1	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360343	3880087	17 ft	450 °F	141 fps	~2,981 acfm	0.67 ft	Vertical
17 Autoclave 2	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360343	3880091	17 ft	450 °F	141 fps	~2,981 acfm	0.67 ft	Vertical
18 Release Booth	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360300	3880076	40 ft	250 °F	48.5 fps	~3,290 acfm	1.2 ft	Vertical
19 Wisconsin Oven 1	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360316	3880069	40 ft	350 °F	79.7 fps	~938 acfm	0.5 ft	Vertical
25 General Chemical Room Exhaust Fan - CHEM	Ammonium Hydroxide	360376.63	3880189.3	23 ft	Ambient	4.72 fps	500 acfm	1.5 ft	Vertical
26 Base Scrubber - CHEM	Bases, including basic HAPs & VOCs	360386.96	3880191.5	28 ft	69.8 °F	40 fps	~7,500 acfm	1.5 ft	Vertical
27 Acid Scrubber - CHEM	Acetic Acid, Citric Acid, HCl, HF, H <sub>2</sub> O <sub>2</sub> , Nitric Acid, Phosphoric Acid	360379.9	3880189.3	28 ft	69.8 °F	40 fps	~4,500 acfm	2 ft	Vertical
28a UPTIMUM PLUS+EDC PLUS	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360373	3880184	30 ft	69.8 °F	62.88	~15,000 acfm	2.25	Vertical
28b UPTIMUM PLUS+EDC PLUS	CO, NOx, PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , NMHC	360371	3880184	30 ft	69.8 °F	62.88	~15,000 acfm	2.25	Vertical
CT1 Building 1 Cooling Tower	PM <sub>10</sub> , PM <sub>2.5</sub>	360329.2, 360333	3880152, 3880152	20 ft	Ambient	16.4	~70,000 acfm	9.50	Vertical
CT2 Building 1 Cooling Tower	PM <sub>10</sub> , PM <sub>2.5</sub>	360338, 360342	3880152, 3880152	20 ft	Ambient	16.4	~70,000 acfm	9.50	Vertical
CT3 Building 2 Cooling Tower	PM <sub>10</sub> , PM <sub>2.5</sub>	360364.2, 360367.4	3880058.7, 3880058.7	15 ft	Ambient	16.4	~60,000 acfm	8.80	Vertical

NOTE: To add extra rows in Word, click anywhere in the last row. A plus (+) sign should appear on the bottom right corner of the row. Click the plus (+) sign to add a row. Repeat as needed.

**Application for Air Pollutant Sources in Bernalillo County  
Source Registration (20.11.40 NMAC) and Construction Permits (20.11.41 NMAC)**

**Certification**

**NOTICE REGARDING SCOPE OF A PERMIT:** The Environmental Health Department's issuance of an air quality permit only authorizes the use of the specified equipment pursuant to the air quality control laws, regulations and conditions. Permits relate to air quality control only and are issued for the sole purpose of regulating the emission of air contaminants from said equipment. Air quality permits are not a general authorization for the location, construction and/or operation of a facility, nor does a permit authorize any particular land use or other form of land entitlement. It is the applicant's/permittee's responsibility to obtain all other necessary permits from the appropriate agencies, such as the City of Albuquerque Planning Department or Bernalillo County Department of Planning and Development Services, including but not limited to site plan approvals, building permits, fire department approvals and the like, as may be required by law for the location, construction and/or operation of a facility. For more information, please visit the City of Albuquerque Planning Department website at <https://www.cabq.gov/planning> and the Bernalillo County Department of Planning and Development Services website at <https://www.bernco.gov/planning>.

**NOTICE REGARDING ACCURACY OF INFORMATION AND DATA SUBMITTED:** Any misrepresentation of a material fact in this application and its attachments is cause for denial of a permit or revocation of part or all of the resulting registration or permit, and revocation of a permit for cause may limit the permittee's ability to obtain any subsequent air quality permit for ten (10) years. Any person who knowingly makes any false statement, representation, or certification in any application, record, report, plan or other document filed or required to be maintained under the Air Quality Control Act, NMSA 1978 §§ 74-2-1 to 74-2-17, is guilty of a misdemeanor and shall, upon conviction, be punished by a fine of not more than ten thousand dollars (\$10,000) per day per violation or by imprisonment for not more than twelve months, or by both.

I, the undersigned, hereby certify that I have knowledge of the information and data represented and submitted in this application and that the same is true and accurate, including the information and data in any and all attachments, including without limitation associated forms, materials, drawings, specifications, and other data. I also certify that the information represented gives a true and complete portrayal of the existing, modified existing, or planned new stationary source with respect to air pollution sources and control equipment. I understand that there may be significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. I also understand that the person who has applied for or has been issued an air quality permit by the Department is an obligatory party to a permit appeal filed pursuant to 20.11.81 NMAC. Further, I certify that I am qualified and authorized to file this application, to certify the truth and accuracy of the information herein, and bind the source. Moreover, I covenant and agree to comply with any requests by the Department for additional information necessary for the Department to evaluate or make a final decision regarding the application.

Signed this 27 day of February, 202026

Rebecca Chambers  
Print Name

EHS manager  
Print Title

Rebecca Chambers  
Signature

Role:  Owner  Operator  
 Other Authorized Representative



# City of Albuquerque Environmental Health Department Air Quality Program



## Construction Permit (20.11.41 NMAC) Application Checklist

**This checklist must be returned with the application**

Any person seeking a new air quality permit, a permit modification, or an emergency permit under 20.11.41 NMAC (Construction Permits) shall do so by filing a written application with the Albuquerque-Bernalillo County Joint Air Quality Program, which administers and enforces local air quality laws for the City of Albuquerque (“City”) and Bernalillo County (“County”), on behalf of the City Environmental Health Department (“Department”).

The Department will rule an application administratively incomplete if it is missing or has incorrect information. The Department may require additional information that is necessary to make a thorough review of an application, including but not limited to technical clarifications, emission calculations, emission factor usage, additional application review fees if any are required by 20.11.2 NMAC, and new or additional air dispersion modeling.

If the Department has ruled an application administratively incomplete three (3) times, the Department will deny the permit application. Any fees submitted for processing an application that has been denied will not be refunded. If the Department denies an application, a person may submit a new application and the fee required for a new application. The applicant has the burden of demonstrating that a permit should be issued.

The following are the minimum elements that shall be included in the permit application before the Department can determine whether an application is administratively complete and ready for technical review. It is not necessary to include an element if the Department has issued a written waiver regarding the element and the waiver accompanies the application. However, the Department shall not waive any federal requirements.

At all times before the Department has made a final decision regarding the application, an applicant has a duty to promptly supplement and correct information the applicant has submitted in an application to the Department. The applicant’s duty to supplement and correct the application includes but is not limited to relevant information acquired after the applicant has submitted the application and additional information the applicant otherwise determines is relevant to the application and the Department’s review and decision. While the Department is processing an application, regardless of whether the Department has determined the application is administratively complete, if the Department determines that additional information is necessary to evaluate or make a final decision regarding the application, the Department may request additional information and the applicant shall provide the requested additional information.

**NOTICE REGARDING PERMIT APPEALS:** A person who has applied for or has been issued an air quality permit by the Department shall be an obligatory party to a permit appeal filed pursuant to 20.11.81 NMAC.

**NOTICE REGARDING SCOPE OF A PERMIT:** The Department’s issuance of an air quality permit only authorizes the use of the specified equipment pursuant to the air quality control laws, regulations and conditions. Permits relate to air quality control only and are issued for the sole purpose of regulating the emission of air contaminants from said equipment. Air quality permits are not a general authorization for the location, construction and/or operation of a facility, nor does a permit authorize any particular land use or other form of land entitlement. It is the applicant’s/permittee’s responsibility to obtain all other necessary permits from the appropriate agencies, such as the City Planning Department or County Department of Planning and Development Services, including but not limited to site plan approvals, building permits, fire department approvals and the like, as may be required by law for the location, construction and/or operation of a facility. For more information, please visit the City Planning Department website at <https://www.cabq.gov/planning> and the County Department of Planning and Development Services website at <https://www.bernco.gov/planning>.

**The Applicant shall:**

**20.11.41.13(A) NMAC – Pre-Application Requirements:**

Item	Completed	N/A <sup>1</sup>	Waived <sup>2</sup>
(1) Request a pre-application meeting with the Department using the pre-application meeting request form. Include a copy of the request form submitted to the Department.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) Attend the pre-application meeting. Date of pre-application meeting: <b>4/30/2025</b>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pre-application meeting agenda and public notice sign checklists included with application?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1. Not Applicable
2. It is not necessary to include an element if the Department has issued a written waiver regarding the element and the waiver accompanies the application. However, the Department shall not waive any federal requirements.

**20.11.41.13(B) NMAC – Applicant’s Public Notice Requirements:**

Item	Included in Application	N/A <sup>1</sup>	Waived <sup>2</sup>
(1) Provide public notice in accordance with the regulation, including by certified mail or electronic copy to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are within one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>• Contact list of representative(s) of recognized neighborhood associations and recognized coalitions cannot be more than three months old from the application submittal date.</li> <li>• Include contact list provided by Department in application submittal.</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>• Provide notice using the Notice of Intent to Construct form and Applicant Notice Cover Letter.</li> </ul>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) In accordance with the regulation, post and maintain in a visible location a weather proof sign provided by the Department. Include pictures in application.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Documentary proof of all public notice requirements listed above and required by 20.11.41.13(E)(15) included with application?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1. Not Applicable; For emergency permits, the public notice requirements in 20.11.41.24 NMAC shall apply instead.
2. It is not necessary to include an element if the Department has issued a written waiver regarding the element and the waiver accompanies the application. However, the Department shall not waive any federal requirements.

**20.11.41.13(D) NMAC**

Item	Included in Application
A person who is seeking a construction permit pursuant to 20.11.41 NMAC shall complete a permit application and file one complete original and one duplicate copy with the Department.	<input checked="" type="checkbox"/>
<ul style="list-style-type: none"> <li>• A high-quality electronic duplicate copy is required by the Department to speed up review and allow for the Department public notice to be posted online. The electronic copy must be an exact duplicate of the hardcopy original, including pages with signatures such as the application certification page. Note: Do not include financial information, such as a copy of a check, in the electronic PDF.</li> </ul>	<input checked="" type="checkbox"/>
The electronic submittal on thumb drive, unless alternate method is allowed by the Department, must also include modeling files, if applicable, and emission calculations file(s) in Microsoft Excel-compatible format.	<input checked="" type="checkbox"/>

**The Permit Application shall include:**

**20.11.41.13(E) NMAC – Application Contents**

Item	Included in Application	N/A <sup>1</sup>	Waived <sup>2</sup>
(1) A complete permit application on the most recent form provided by the Department.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(2) The application form includes:			
a. The applicant’s name, street and post office address, and contact information;	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The facility owner/ operator’s name, street address and mailing address, if different from the applicant;	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. The consultant’s name and contact information, if applicable;	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. All information requested on the application form is included ( <i>i.e.</i> , the form is complete).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(3) The date the application was submitted to the Department.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(4) Sufficient attachments for the following:			
a. Ambient impact analysis using an atmospheric dispersion model approved by the U.S. Environmental Protection Agency, and the Department to demonstrate compliance with the applicable National Ambient Air Quality Standards (NAAQS). <i>See</i> 20.11.1 NMAC. If you are modifying an existing source, the modeling must include the emissions of the entire source to demonstrate the impact the new or modified source(s) will have on existing plant emissions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. The air dispersion model has been executed pursuant to a protocol that was approved in advance by the Department.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Air dispersion modeling approved (or 2 <sup>nd</sup> denied) protocol date:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Basis or source for each emission rate (including manufacturer’s specification sheets, AP-42 section sheets, test data, or corresponding supporting documentation for any other source used).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. All calculations used to estimate potential emission rates and controlled/proposed emissions.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Basis for the estimated control efficiencies and sufficient engineering data for verification of the control equipment operation, including if necessary, design, drawing, test report and factors which affect the normal operation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Fuel data for each existing and/or proposed piece of fuel burning equipment.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Anticipated maximum production capacity of the entire facility and the requested production capacity after construction and/or modification.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Stack and exhaust gas parameters for all existing and proposed emission stacks.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(5) An operational and maintenance strategy detailing:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. the steps the applicant will take if a malfunction occurs that may cause emission of a regulated air contaminant to exceed a limit that is included in the permit;	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. the nature of emissions during routine startup or shutdown of the source and the source’s air pollution control equipment; and	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. the steps the applicant will take to minimize emissions during routine startup or shutdown.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(6) A map, such as a 7.5’-topographic quadrangle map published by the U.S. Geological Survey or a map of equivalent or greater scale, detail, and precision, including a City or County zone atlas map that shows the proposed location of each process equipment unit involved in the proposed construction, modification, or operation of the source, as applicable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Item	Included in Application	N/A <sup>1</sup>	Waived <sup>2</sup>
(7) An aerial photograph showing the proposed location of each process equipment unit involved in the proposed construction, modification, relocation or technical revision of the source except for federal agencies or departments involved in national defense or national security as confirmed and agreed to by the Department in writing.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(8) A complete description of all sources of regulated air contaminants and a process flow diagram depicting the process equipment unit or units at the facility, both existing and proposed, that are proposed to be involved in routine operations and from which regulated air contaminant emissions are expected to be emitted.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(9) A full description of air pollution control equipment, including all calculations and the basis for all control efficiencies presented, manufacturer's specifications sheets, and site layout and assembly drawings; UTM (universal transverse mercator) coordinates shall be used to identify the location of each emission unit.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(10) A description of the equipment or methods proposed by the applicant to be used for emission measurement.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(11) The maximum and normal operating time schedules of the source after completion of construction or modification, as applicable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(12) Any other relevant information as the Department may reasonably require, including without limitation:	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. Provide an applicability determination for all potentially applicable federal regulations.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Applicants shall provide documentary proof that the proposed air quality permitted use of the facility's subject property is allowed by the zoning designation of the City or County zoning laws, as applicable. Sufficient documentation includes: (i) a zoning certification from the City Planning Department or County Department of Planning and Development Services, as applicable, if the property is subject to City or County zoning jurisdiction; or (ii) a zoning verification from both planning departments if the property is not subject to City or County zoning jurisdiction. <sup>3</sup> A zone atlas map shall not be sufficient.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Compliance History Disclosure Form <sup>4</sup>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. BACT Analysis, if applicable, for new permit or permit modification applications.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(13) The signature of the applicant, operator, owner or an authorized representative, certifying to the accuracy of all information as represented in the application and attachments, if any.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(14) A check or money order for the appropriate application fee or fees required by 20.11.2 NMAC, Fees. (Online fee payments are now accepted as well. Application must be submitted first, then Department will provide invoice for online payment.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

1. Not Applicable

2. It is not necessary to include an element if the Department has issued a written waiver regarding the element and the waiver accompanies the application. However, the Department shall not waive any federal requirements.

3. Applicants are not required to submit documentation for the subject property's zoning designation when applying for a relocation of a portable stationary source, or a technical or administrative revision to an existing permit.

4. Required for applications filed pursuant to the following regulations: Construction Permits (20.11.41 NMAC); Operating Permits (20.11.42 NMAC); Nonattainment Areas (20.11.60 NMAC); Prevention of Significant Deterioration (20.11.61 NMAC); and Acid Rain (20.11.62 NMAC); except this Form shall not be required for asbestos notifications under 20.11.20.22 NMAC, and this Form shall only be required for administrative permit revision (20.11.41.28(A) NMAC) and administrative permit amendments (20.11.42.12(E)(1) NMAC) when the action requested is a transfer of ownership. Air Quality Program staff can answer basic questions about the Compliance History Disclosure Form but will not provide specific advice about which boxes to check or whether information must be disclosed. The decision about how to answer a question and whether there is information to disclose is the responsibility of applicants/permittees.



**City of Albuquerque  
Environmental Health Department  
Air Quality Program**



**Permit Application Review Fee Checklist Instructions**

All source registration and construction permit applications for stationary or portable sources shall be charged an application review fee according to the fee schedule in 20.11.2 NMAC. These filing fees are required for both new construction, reconstruction, and permit modification/revision applications. Most air quality notification (AQN) applications shall be charged an application review fee according to 20.11.39 NMAC. Qualified small businesses as defined in 20.11.2 NMAC may be eligible to pay one-half of the application review fees and 100% of all applicable federal program review fees.

Please fill out the permit application review fee checklist completely and submit with a check or money order payable to the “City of Albuquerque Fund 242” and:

1. Deliver it in person to the Albuquerque Environmental Health Department, 3<sup>rd</sup> floor, Room 3023, Albuquerque-Bernalillo County Government Center, south building, One Civic Plaza NW, Albuquerque, NM 87102; or
2. Mail it to Albuquerque Environmental Health Department, Air Quality Program, Permitting Division, P.O. Box 1293, Albuquerque, NM 87103; or
3. Online fee payments are now accepted as well. Application must be submitted first, then Department will provide invoice for online payment. Fill out form completely and mark check box below fee amount due on last page to request an invoice to pay the fee online.

The Department will provide a receipt of payment to the applicant. The person delivering or filing a submittal shall attach a copy of the receipt of payment to the submittal as proof of payment. Application review fees shall not be refunded without the written approval of the manager. If a refund is requested, a reasonable professional service fee to cover the costs of staff time involved in processing such requests shall be assessed. Please refer to 20.11.2 NMAC (effective January 10, 2011) for more detail concerning the “Fees” regulation as this checklist does not relieve the applicant from any applicable requirement of the regulation.



**City of Albuquerque  
Environmental Health Department  
Air Quality Program**



**Permit Application Review Fee Checklist Effective January 1, 2025 – December 31, 2025**

Please completely fill out the information in each section. Incompleteness of this checklist may result in the Albuquerque Environmental Health Department not accepting the application review fees. If you have any questions concerning this checklist, please call (505) 768-1972.

**I. COMPANY INFORMATION:**

<b>Company Name</b>	SolAero Technological Corporation		
<b>Company Address</b>	10420 Research Rd SE, Albuquerque, NM 87123		
<b>Facility Name</b>	SolAero Technological Corporation		
<b>Facility Address</b>	10420 Research Rd SE, Albuquerque, NM 87123		
<b>Contact Person</b>	Rebecca Chambers		
<b>Contact Person Phone Number</b>	(505) 659-5183	<b>Email</b>	rebecca.chambers@rocketlabusa.com
<b>Are these application review fees for an existing permitted source located within the City of Albuquerque or Bernalillo County?</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
<b>If yes, what is the current permit/registration/AQN number for this facility?</b>	Permit # 1029-M2-TR		
<b>Is this application review fee for a Qualified Small Business as defined in 20.11.2 NMAC? (See Definition of Qualified Small Business on Page 4)</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	

**II. STATIONARY SOURCE APPLICATION REVIEW FEES:**

If the application is for a new stationary source facility, please check all that apply. If this application is for a modification to an existing permit please see Section III. For revisions or relocations please see Sections IV or V.

Check All That Apply	Stationary Sources	Review Fee	Program Element
<b>Air Quality Notifications</b>			
<input type="checkbox"/>	AQN New Application	\$701.00	2801
<input type="checkbox"/>	AQN Technical Amendment	\$383.00	2802
<input type="checkbox"/>	AQN Transfer of a Prior Authorization	\$383.00	2803
<input checked="" type="checkbox"/>	<i>Not Applicable</i>	<i>See Sections Below</i>	
<b>Stationary Source Review Fees (Not Based on Proposed Allowable Emission Rate)</b>			
<input type="checkbox"/>	Source Registration required by 20.11.40 NMAC	\$715.00	2401
<input type="checkbox"/>	A Stationary Source that requires a permit pursuant to 20.11.41 NMAC or other board regulations and are not subject to the below proposed allowable emission rates	\$1,429.00	2301
<input checked="" type="checkbox"/>	<i>Not Applicable</i>	<i>See Sections Below</i>	
<b>Stationary Source Review Fees (Based on the Proposed Allowable Emission Rate for the single highest fee pollutant)</b>			
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 1 tpy and less than 5 tpy	\$1,072.00	2302
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 5 tpy and less than 25 tpy	\$2,144.00	2303
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 25 tpy and less than 50 tpy	\$4,288.00	2304
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 50 tpy and less than 75 tpy	\$6,432.00	2305
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 75 tpy and less than 100 tpy	\$8,577.00	2306
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 100 tpy	\$10,721.00	2307

<b>Federal Program Review Fees for each subpart (In addition to the Stationary Source Application Review Fees above)</b>			
<input type="checkbox"/>	40 CFR 60 – “New Source Performance Standards” (NSPS)	\$1,429.00	2308
<input type="checkbox"/>	40 CFR 61 – “National Emission Standards for Hazardous Air Pollutants” (NESHAPs)	\$1,429.00	2309
<input type="checkbox"/>	40 CFR 63 – (NESHAPs) Promulgated Standards	\$1,429.00	2310
<input type="checkbox"/>	20.11.64 – (NESHAPs) Case-by-Case MACT Review (Major HAP sources)	\$14,294.00	2311
<input type="checkbox"/>	20.11.61 NMAC – Prevention of Significant Deterioration (PSD) Permit	\$7,147.00	2312
<input type="checkbox"/>	20.11.60 NMAC – Non-Attainment Area Permit	\$7,147.00	2313
<input checked="" type="checkbox"/>	<i>Not Applicable</i>	<i>Not Applicable</i>	

### III. MODIFICATION TO EXISTING PERMIT APPLICATION REVIEW FEES:

If the application is for a modification to an existing permit, please check all that apply. If this application is for a new stationary source facility, please see Section II. For revisions or relocations please see Sections IV or V.

Check All That Apply	Modifications	Review Fee	Program Element
<b>Modification Application Review Fees (Not Based on Proposed Allowable Emission Rate)</b>			
<input type="checkbox"/>	Proposed modification to an existing Source Registration required by 20.11.40 NMAC	\$715	2401
<input type="checkbox"/>	Proposed modification to an existing stationary source that requires a permit pursuant to 20.11.41 NMAC or other board regulations and are not subject to the below proposed allowable emission rates	\$1,429	2321
<input checked="" type="checkbox"/>	<i>Not Applicable</i>	<i>See Sections Below</i>	
<b>Modification Application Review Fees (Based on the Proposed Allowable Emission Rate for the single highest fee pollutant)</b>			
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 1 tpy and less than 5 tpy	\$1,072.00	2322
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 5 tpy and less than 25 tpy	\$2,144.00	2323
<input checked="" type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 25 tpy and less than 50 tpy	\$4,288.00	2324
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 50 tpy and less than 75 tpy	\$6,432.00	2325
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 75 tpy and less than 100 tpy	\$8,577.00	2326
<input type="checkbox"/>	Proposed Allowable Emission Rate equal to or greater than 100 tpy	\$10,721.00	2327
<input type="checkbox"/>	<i>Not Applicable</i>	<i>See Sections Below</i>	
<b>Major Modifications Review Fees (In addition to the Modification Application Review Fees above)</b>			
<input type="checkbox"/>	20.11.60 NMAC – Permitting in Non-Attainment Areas	\$7,147.00	2333
<input type="checkbox"/>	20.11.61 NMAC – Prevention of Significant Deterioration	\$7,147.00	2334
<input checked="" type="checkbox"/>	<i>Not Applicable</i>	<i>Not Applicable</i>	
<b>Federal Program Review Fees for each subpart (This section applies only if a Federal Program Review is triggered by the proposed modification) (These fees are in addition to the Modification and Major Modification Application Review Fees above)</b>			
<input type="checkbox"/>	40 CFR 60 – “New Source Performance Standards” (NSPS)	\$1,429.00	2328
<input type="checkbox"/>	40 CFR 61 – “National Emission Standards for Hazardous Air Pollutants” (NESHAPs)	\$1,429.00	2329
<input type="checkbox"/>	40 CFR 63 – (NESHAPs) Promulgated Standards	\$1,429.00	2330
<input type="checkbox"/>	20.11.64 – (NESHAPs) Case-by-Case MACT Review (Major HAP sources)	\$14,294.00	2331
<input type="checkbox"/>	20.11.61 NMAC – Prevention of Significant Deterioration (PSD) Permit	\$7,147.00	2332
<input type="checkbox"/>	20.11.60 NMAC – Non-Attainment Area Permit	\$7,147.00	2333
<input checked="" type="checkbox"/>	<i>Not Applicable</i>	<i>Not Applicable</i>	

**IV. ADMINISTRATIVE AND TECHNICAL REVISION APPLICATION REVIEW FEES:**

If the application is for an administrative or technical revision of an existing permit issued pursuant to 20.11.40 or 20.11.41 NMAC, please check one that applies.

Check One	Revision Type	Review Fee	Program Element
<input type="checkbox"/>	Administrative Revisions	\$250.00	2340
<input type="checkbox"/>	Technical Revisions	\$500.00	2341
<input checked="" type="checkbox"/>	Not Applicable	See Sections II, III or V	

**V. PORTABLE STATIONARY SOURCE RELOCATION FEES:**

If the application is for a portable stationary source relocation of an existing permit, please check one that applies.

Check One	Portable Stationary Source Relocation Type	Review Fee	Program Element
<input type="checkbox"/>	No New Air Dispersion Modeling Required	\$500.00	2501
<input type="checkbox"/>	New Air Dispersion Modeling Required	\$750.00	2502
<input checked="" type="checkbox"/>	Not Applicable	See Sections II, III or IV	

**VI. Please submit payment in the amount shown for the total application review fee.**

Section Totals	Review Fee Amount
Section II Total	\$0.00
Section III Total	\$4,288.0
Section IV Total	\$0.00
Section V Total	\$0.00
<b>Total Application Review Fee</b>	<b>\$4,288.00</b>

Check here if an invoice is requested so Application Review Fee can be paid online.

I, the undersigned, a responsible officer of the applicant company, certify that to the best of my knowledge, the information stated on this checklist gives a true and complete representation of the permit application review fees which are being submitted. I also understand that an incorrect submittal of permit application reviews may cause an incompleteness determination of the submitted permit application and that the balance of the appropriate permit application review fees shall be paid in full prior to further processing of the application.

Signed this 18 day of December, 2025

Rebecca Chambers  
Print Name

EHS Manager  
Print Title

Rebecca Chambers  
Signature

**Definition of Qualified Small Business as defined in 20.11.2 NMAC:**

“Qualified small business” means a business that meets all of the following requirements:

- (1) a business that has 100 or fewer employees;
- (2) a small business concern as defined by the federal Small Business Act;
- (3) a source that emits less than 50 tons per year of any individual regulated air pollutant, or less than 75 tons per year of all regulated air pollutants combined; and
- (4) a source that is not a major source or major stationary source.

**Note:** Beginning January 1, 2011, and every January 1 thereafter, an increase based on the consumer price index shall be added to the application review fees. The application review fees established in Subsection A through D of 20.11.2.18 NMAC shall be adjusted by an amount equal to the increase in the consumer price index for the immediately-preceding year. Application review fee adjustments equal to or greater than fifty cents (\$0.50) shall be rounded up to the next highest whole dollar. Application review fee adjustments totaling less than fifty cents (\$0.50) shall be rounded down to the next lowest whole dollar. The department shall post the application review fees on the city of Albuquerque environmental health department air quality program website.

## **APPENDIX B. PRE-PERMIT APPLICATION MEETING DOCUMENTATION AND PUBLIC NOTICE**

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Pre-Permit Application Meeting Request Form

Pre-Permit Application Meeting Checklist

Public Notice Sign Guidelines Checklist

Pictures of Posted Notice

Notice of Intent Cover Letter

Notice of Intent to Construct (NOI) Form

Email Documentation of NOI sent to Neighborhood Associations and Coalitions



**City of Albuquerque  
Environmental Health Department  
Air Quality Program**



**Pre-Permit Application Meeting Request Form**

Please complete appropriate boxes and email to [aqd@cabq.gov](mailto:aqd@cabq.gov) or mail to:

Environmental Health Department  
Air Quality Program  
Permitting Division  
P.O. Box 1293  
Albuquerque, NM 87103

**A copy of this form must be included as part of the application package.**

Company/Organization:	<b>SolAero Technologies Corporation 10420 Research Rd. SE Albuquerque, NM 87123</b>
Current Permit #:	<b>1029-M2-2TR</b>
Point of Contact: (phone number and email): Preferred form of contact (check one): <input type="checkbox"/> Phone <input checked="" type="checkbox"/> E-mail	<p>Name: <b>Brian Radke</b> Phone: <b>(505) 785-5776</b> Email: <a href="mailto:B.Radke@rocketlabusa.com">B.Radke@rocketlabusa.com</a></p> <p>Name: <b>Rebecca Chambers</b> Phone: <b>(505) 659-5183</b> Email: <a href="mailto:B.Radke@rocketlabusa.com">B.Radke@rocketlabusa.com</a></p> <p>Name: <b>Michael Brown</b> Phone: <b>(505) 266-6611</b> Email: <a href="mailto:michael.brown@trinityconsultants.com">michael.brown@trinityconsultants.com</a></p> <p>Name: <b>Adam Erenstein</b> Phone: <b>(505) 266-6611</b> Email: <a href="mailto:AErenstein@trinityconsultants.com">AErenstein@trinityconsultants.com</a></p> <p>Name: <b>Beth Morley</b> Phone: <b>(505) 266-6611</b> Email: <a href="mailto:Beth.Morley@trinityconsultants.com">Beth.Morley@trinityconsultants.com</a></p>
Preferred meeting dates/times: (provide several dates/times when applicant/consultant are available in the 1-2 weeks after submitting this form)	April 15 through April 30 8AM – 5PM, except April 16, 18, 25, or 28.
Preferred meeting type (Zoom/In Person):	<b>In Person</b>



**City of Albuquerque  
Environmental Health Department  
Air Quality Program**



<p>Description of Project:</p>	<p>SolAero Technologies Corporation requests a pre-application meeting to discuss a Permit Modification to Air Permit 1029-M2 as described below.</p> <p>SolAero will be removing a base scrubber (EF-5B) and adding: new EPI growth reactors, a new burn wet abatement system to control emissions from the reactors, a new solvent vent, a new base scrubber, and a new acid scrubber. The new burn wet abatement system disposes of emissions via combustion and subsequent scrubbing of particles, as well as absorption of soluble gas components with the aid of a scrubbing liquid. The chemical usage will not be increased by the proposed changes as the new EPI growth reactors are more efficient than the existing reactors.</p> <p>The facility will be a source of NO<sub>x</sub>, CO, VOC, PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, and HAPs. Compliance with the applicable NAAQS and NMAAQs will be demonstrated via air dispersion modeling analysis. A modeling protocol will be submitted to the EHD for approval. Emission estimates will be provided for all applicable equipment at the facility.</p>
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# City of Albuquerque Environmental Health Department Air Quality Program



## Construction Permit (20.11.41 NMAC) Pre-Permit Application Meeting Agenda Checklist & Public Notice Sign Guidelines Checklist

**This entire document, including both completed checklists, must be included as part of the application package.**

Any person seeking a new permit, a permit modification, or an emergency permit under 20.11.41 NMAC (Construction Permits) shall do so by filing a written application with the Albuquerque-Bernalillo County Joint Air Quality Program, which administers and enforces local air quality laws for the City of Albuquerque (“City”) and Bernalillo County (“County”), on behalf of the City Environmental Health Department (“Department”).

Prior to submitting an application, per 20.11.41.13(A) NMAC, the applicant (or their consultant) shall contact the Department in writing and submit a Pre-Permit Application Meeting Request Form to request a pre-application meeting. The Pre-Permit Application Meeting Request Form is available at <https://www.cabq.gov/airquality/air-quality-permits/air-quality-application-forms>. The purpose of the pre-application meeting is for the Department to provide the applicant with information regarding the contents of the application and the application process.

This pre-application meeting agenda checklist is provided to aid the Department and applicant in ensuring that in the pre-permit application meeting all information regarding the contents of the application and the application process are communicated to the applicant. This is because applications that are ruled incomplete because of missing information will delay any determination or the issuance of the permit. The Department reserves the right to request additional relevant information prior to ruling the application complete in accordance with 20.11.41 NMAC.

Also included in this document is the Public Notice Sign Guidelines Checklist, which contains requirements for how the applicant must display the required weather-proof sign.

The applicant should fill out and have this agenda checklist available at the pre-application meeting to be sure all items are covered. Check the boxes to acknowledge that each item from the agenda was discussed and that requirements for the weather-proof sign were followed.

## Pre-Permit Application Meeting Agenda Checklist

Applicant Company Name: **SolAero Technologies Corporation**

Facility Name: **SolAero Technologies Corporation**

Fill out and submit a Pre-Permit Application Meeting Request form  
Available online at <https://www.cabq.gov/airquality/air-quality-permits/air-quality-application-forms/air-quality-application-forms>

- I.  Discuss Project:
  - a. Facility Location
  - b. Facility Description
  - c. Main Processes
  - d. Equipment
  - e. Proposed Schedule
  
- II.  Discuss the requirement for a zoning certification or verifications for new permits and permit modifications. The Zoning Requirement Cover Page form is a required component of this part of the submittal:
  - a. For projects on property subject to City or County zoning laws (*i.e.*, **not** located on federal land, **not** located on State of New Mexico land, **not** located on Tribal land), a zoning certification from the appropriate planning department is required.
    - i. City Planning Form: <https://www.cabq.gov/planning/code-enforcement-zoning>
    - ii. County Planning Form: <https://www.bernco.gov/planning/planning-and-land-use/applications-forms/>
  - b. If the project's property is not subject to City or County zoning jurisdiction, a zoning verification from both planning departments is required.
    - i. City Planning Form: <https://www.cabq.gov/planning/code-enforcement-zoning>
    - ii. County Planning Form: <https://www.bernco.gov/planning/planning-and-land-use/applications-forms/>
  - c. The zoning certification or verifications **must** be obtained from the appropriate Planning Department, either City of Albuquerque or Bernalillo County. For more information, please visit the City's Planning Department website at <https://www.cabq.gov/planning> or Bernalillo County's Planning Department website at the <https://www.bernco.gov/planning/>.
  
- III.  Discuss the requirement for a Compliance History Disclosure Form as of Nov. 6, 2023 for permit application submittals except for Administrative Revisions that are not transfers of ownership.
  
- IV.  Discuss the potential requirement for a BACT Analysis for new permits and permit modifications per 20.11.72 NMAC.
  - a. Required if new or modifying stationary source is within a one-mile radius of an overburdened area, as described in 20.11.72.8(C) NMAC; or
  - b. Required if new or modifying stationary source emits any one, or combination of, the fifteen hazardous air pollutants (HAPs) listed in 20.11.72.8(D) NMAC.
  
- V.  If permit modification or revision, review current permit:
  - a. Review Process Equipment Table and Emissions Table and discuss changes
  - b. Request information about the replacement or new equipment (for example, if it is an engine, we need to know if it is new, what year, fuel type, etc...) to give them an idea of the changes that will be needed
  - c. Discuss possible changes in permit conditions

- VI.  Air Dispersion modeling process, procedures and options:
- a. When modeling is required and possibility of waivers
  - b. Protocol process, purpose, and time frame
  - c. Preliminary review, purpose, and time frame
  - d. Full review and time frame
  - e. Peer reviews
  - f. Assumptions in the modeling become permit conditions
  - g. NED data should be used instead of DEM data for assigning elevations to receptors, sources, buildings, etc.
- VII.  Applicant's public notice requirements
- a. During the same month application package will be submitted, ask Department for memo of neighborhood associations/coalitions within ½ mile of facility
  - b. Fill out and send Notice of Intent to Construct form as attachment, with Applicant Notice Cover Letter as email body, to neighborhood associations/coalitions listed in memo:  
<https://www.cabq.gov/airquality/air-quality-permits/air-quality-application-forms>
  - c. Post and maintain a weather-proof sign. Signs are available in the downtown Program office. The Public Notice Sign Guidelines Checklist can be found on the next page of this document.
- VIII.  Regulatory timelines
- a. 30 days to rule application complete
  - b. 90 days after ruled complete for permitting decision
  - c. 30-day public comment period after application deemed complete
  - d. If public interest in application:
    - i. 30-day review of technical analysis
    - ii. 90-day extension for permitting decision
  - e. Request for Public Information Hearing - 90-day extension for permitting decision
  - f. Complex technical issues in application - 90-day extension for permitting decision
  - g. If application ruled incomplete it stops timeline and restarts at beginning with updated submittal
- IX.  Department Policies
- a. One original hard copy must be submitted along with a duplicate copy. The duplicate copy should be a high-quality electronic duplicate submitted on thumb drive as one complete PDF with all application contents found in the hardcopy, including pages with signatures. However, do not include financial information, such as a copy of a check, in the electronic PDF. The electronic submittal should also include emission calculations Excel-compatible file(s) and modeling files, if applicable.
  - b. Applications will be ruled incomplete if any parts from Permit Application Checklist are missing
  - c. Review fees paid in full are part of the application package (Except as noted above)
  - d. Discuss payment format (by check, credit card or online)
  - e. Use the most recent Permit Application Checklist, found under Part 41 Implementation on this page:  
<https://www.cabq.gov/airquality/air-quality-permits/air-quality-application-forms>
  - f. After three tries, permit application denied and application must start over including repayment of fees
- X.  Additional Questions?



# City of Albuquerque Environmental Health Department Air Quality Program



## Public Notice Sign Guidelines

Any person seeking a permit under 20.11.41 NMAC, Construction Permits, shall do so by filing a written application with the Department. *Prior to submitting an application, the applicant shall post and maintain a weather-proof sign provided by the department. The applicant shall keep the sign posted until the department takes final action on the permit application; if an applicant can establish to the department's satisfaction that the applicant is prohibited by law from posting, at either location required, the department may waive the posting requirement and may impose different notification requirements. A copy of this form must be submitted with your application.*

Applications that are ruled incomplete because of missing information will delay any determination or the issuance of the permit. The Department reserves the right to request additional relevant information prior to ruling the application complete in accordance with 20.11.41 NMAC.

Applicant Company Name: **SolAero Technologies Corporation**

Facility Name: **SolAero Technologies Corporation**

- The sign must be posted at the more visible of either the proposed or existing facility entrance (or, if approved in advance and in writing by the department, at another location on the property that is accessible to the public)
  - The sign shall be installed and maintained in a condition such that members of the public can easily view, access, and read the sign at all times.
  - The lower edge of the sign board should be mounted a minimum of 2 feet above the existing ground surface to facilitate ease of viewing
- Include at least two pictures of the completed, properly posted sign in the application package immediately following this document. One picture should show the location of the posted sign and the other should be close enough to the sign for the posted information to be legible in the picture.
- Check here if the department has waived the sign posting requirement.**  
Alternative public notice details:

# SolAero

CHNOLOGIES

**Safety is Everyone's Responsibility:**

- SolAero employees must badge in, one at a time.
- Vendors/Contractors with badge must badge in, one at a time.
- If you do not have an employee badge, please contact HR at Ext. 1721, or contact your supervisor.
- If you are a visitor, please sign in at the Kiosk, located at Building #1, front door vestibule.
- Please make sure the door closes behind you.

PLEASE DELIVER TO  
REAR OF BUILDING  
IN SHIPPING AREA  
THANK YOU!



**SolAero Deliveries**  
Go to the back of Building 1



**Proposed Air Quality Construction Permit**  
Permiso de Construcción de Calidad del Aire Propuesta

Applicant's Name: **SolAero Technologies Corporation**  
Owner or Operator's Name: **SolAero Technologies Corporation**

Actual or Estimated Date the Application will be Submitted to this Department: **DECEMBER 10, 2015**

Exact Location of the Source or Proposed Source: **10720 REMARKS RD SE, ALBUQUERQUE, NM 87113**

Description of the Source: **ADVANCED SEMICONDUCTOR MANUFACTURING EQUIPMENT**  
Nature of Business: **ADVANCED SEMICONDUCTOR MANUFACTURING**

Process or changes for which a permit is requested: **Process of the SolAero Technologies Corporation, which involves the use of advanced semiconductor manufacturing equipment.**

Preliminary estimate of the maximum quantities of each regulated air contaminant to be emitted:  
Estimación preliminar de las cantidades máximas de cada contaminante regulado que serán emitidos:

Air Contaminant (Contaminante del Aire)	Proposed Construction Permit (Permiso de Construcción Propuesta)		Permitting Department (Departamento de Permisos)	
	lb/day (libras por día)	lb/year (libras por año)	lb/day (libras por día)	lb/year (libras por año)
NO <sub>x</sub>	30.76	24,378	0.0063	0.214
CO	11.50	11,025	0.0011	0.366
VOC	8.81	11,225	0.013	0.504
SO <sub>2</sub>	3.01	0.85	0.010	0.333
PM <sub>10</sub>	4.51	1.45	0.013	0.504
PM <sub>2.5</sub>	2.15	0.86	0.013	0.504
MAP	0.11	2.63	0.0001	0.333

Maximum Operating Schedule: **8,760 hours per year**  
Normal Operation Schedule: **8,760 hours per year**

Current Contact Information for Comments and Inquiries:  
Name: **Rebecca Chambers**  
Address: **10720 REMARKS RD SE, ALBUQUERQUE, NM 87113**  
Phone: **(505) 659-5113**  
Email: **REBECCA.CHAMBERS@TOWER160.COM**

Call 311 for additional information or to request a permit. For more information, visit [www.ci.albuquerque.nm.us](http://www.ci.albuquerque.nm.us).  
Llamada al 311 para obtener información adicional sobre este programa de permisos de construcción. Para obtener más información, visite [www.ci.albuquerque.nm.us](http://www.ci.albuquerque.nm.us).  
Llamada al 311 para obtener información adicional sobre este programa de permisos de construcción. Para obtener más información, visite [www.ci.albuquerque.nm.us](http://www.ci.albuquerque.nm.us).

City of Albuquerque, Department of Environmental Health Services, Air Quality Program, Permitting and Compliance Division  
Ciudad de Albuquerque, Departamento de Salud Ambiental, Programa de Calidad del Aire, División de Permisos y Cumplimiento

THIS SIGN SHALL REMAIN POSTED UNTIL THE DEPARTMENT HAS TAKEN ACTION ON THE PERMIT APPLICATION.  
ESTE SIGNO DEBE DE MANTENERSE PUESTO HASTA QUE EL DEPARTAMENTO TOMA UNA DECISIÓN SOBRE LA SOLICITUD DE PERMISO.



## Proposed Air Quality Construction Permit

### Permiso de Construcción de Calidad del Aire Propuesto



1. **Applicant's Name:** SolAero Technologies Corporation  
Nombre del solicitante:
- Owner or Operator's Name:** SolAero Technologies Corporation  
Nombre del Propietario u Operador:
2. **Actual or Estimated Date the Application will be Submitted to the Department:** DECEMBER 10, 2025  
Fecha Actual o Estimada en que se Entrará la Solicitud al Departamento:
3. **Exact Location of the Source or Proposed Source:** 10420 RESEARCH RD SE, ALBUQUERQUE, NM 87123  
Ubicación Exacta de la Fuente o Fuente Propuesta:
4. **Description of the Source:** ADVANCED SEMICONDUCTOR MANUFACTURING EQUIPMENT  
Descripción de la Fuente:  
**Nature of Business:** ADVANCED SEMICONDUCTOR MANUFACTURING  
Tipo de Negocio:  
**Process or change for which a permit is requested:** Proposed addition of EPI growth reactor units for Chemical Vapor Deposition and a burn wet abatement system used for air emission controls of the reactor units. Proposed addition of an acid scrubber base scrubber and solvent vent. Incorporation of facility cooling towers. Removal of a base scrubber.  
Proceso o cambio para el cual se solicita el permiso:

**Preliminary estimate of the maximum quantities of each regulated air contaminant the source will emit:**  
Estimación preliminar de las cantidades máximas de cada contaminante de aire regulado que la fuente va a emitir:

Air Contaminant Contaminante de Aire	Proposed Construction Permit Permiso de Construcción Propuesto		Net Change Emissions (for permit modification or technical revision) Cambio Neto de Emisiones (para modificación de permiso o revisión técnica)	
	Pounds per hour libras por hora	Tons per year toneladas por año	Pounds per hour libras por hora	Tons per year toneladas por año
NO <sub>x</sub>	30.96	25.98	-0.043	-0.22
CO	11.50	18.05	0.00011	-0.25
VOC	8.81	17.95	0.013	0.045
SO <sub>2</sub>	3.02	0.86	0.020	-0.037
PM <sub>10</sub>	2.52	2.55	0.42	1.65
PM <sub>2.5</sub>	2.13	0.86	0.013	0.055
HAP	0.71	2.63	-0.37	-2.37

5. **Maximum Operating Schedule:** 8760 hours per year  
Horario Máximo de Operaciones:  
**Normal Operation Schedule:** 8760 hours per year  
Horario Normal de Operaciones:
6. **Current Contact Information for Comments and Inquiries**  
Datos actuales para Comentarios y Preguntas  
**Name (Nombre):** Rebecca Chambers  
**Address (Domicilio):** 10420 RESEARCH RD. SE, ALBUQUERQUE, NM 87123  
**Phone Number (Número Telefónico):** (505) 659-5183  
**Email Address (Correo Electrónico):** Rebecca.Chambers@rocketlabusa.com

**Call 311 for additional information concerning this project, the Air Quality Program, or to file a complaint.**  
Llame al 311 para obtener información adicional sobre este proyecto, del Programa de Calidad del Aire, o para presentar una queja.  
**Gọi 311 để biết thêm thông tin hoặc để khiếu nại về dự án này, Chương Trình Chất Lượng Không Khí**  
City of Albuquerque, Environmental Health Department, Air Quality Program - Stationary Source Permitting  
Ciudad de Albuquerque, Departamento de Salud Ambiental, Programa de Calidad del Aire - Permisos para Fuentes Inmóviles  
(505) 768-1972, aqd@cabq.gov

**THIS SIGN SHALL REMAIN POSTED UNTIL THE DEPARTMENT TAKES FINAL ACTION ON THE PERMIT APPLICATION**  
**ESTE AVISO DEBERÁ DE MANTENERSE PUESTO HASTA QUE EL DEPARTAMENTO TOMA UNA DECISIÓN SOBRE LA SOLICITUD DE PERMISO**

Fill out the required highlighted information below. Then use the Subject as the Subject line of the required public notice email(s) sent to nearby neighborhood associations/neighborhood coalitions. Copy and paste the rest of the completed information on this page into the body of the email(s) and attach the completed NOI form. If providing notice by certified mail, use this page as the cover letter and attach the NOI form.

**SUBJECT: Public Notice of Proposed Air Quality Construction Permit Application SolAero Technologies Corporation**

Dear Neighborhood Association/Coalition Representative(s),

***Why did I receive this public notice?***

You are receiving this notice in accordance with New Mexico Administrative Code (NMAC) 20.11.41.13.B(1) which requires any applicant seeking an Air Quality Construction Permit pursuant to 20.11.41 NMAC to provide public notice by certified mail or electronic mail to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are within one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located.

***What is the Air Quality Permit application review process?***

The City of Albuquerque, Environmental Health Department, Air Quality Program (Program) is responsible for the review and issuance of Air Quality Permits for any stationary source of air contaminants within Bernalillo County. Once the application is received, the Program reviews each application and rules it either complete or incomplete. Complete applications will then go through a 30-day public comment period. Within 90 days after the Program has ruled the application complete, the Program shall issue the permit, issue the permit subject to conditions, or deny the requested permit or permit modification. The Program shall hold a Public Information Hearing pursuant to 20.11.41.15 NMAC if the Director determines there is significant public interest and a significant air quality issue is involved.

***What do I need to know about this proposed application?***

Applicant Name	SolAero Technology Corporation
Site or Facility Name	SolAero Technology Corporation
Site or Facility Address	10420 Research Rd SE, Albuquerque NM, 87123
New or Existing Source	EXISTING
Anticipated Date of Application Submittal	December 10, 2025
Summary of Proposed Source to Be Permitted	The application is to modify the existing Construction Permit #1029-M2-2TR. The modification addition of EPI growth reactor units for Chemical Vapor Deposition and burn wet abatement system used for air emission controls of the reactor units. Proposed addition of an acid scrubber, base scrubber, and solvent vent. Incorporation of facility cooling towers. Removal of a base scrubber.

***What emission limits and operating schedule are being requested?***

See attached Notice of Intent to Construct form for this information.

***How do I get additional information regarding this proposed application?***

For inquiries regarding the proposed source, contact:

- Rebecca Chambers
- [Rebecca.Chambers@rocketlabusa.com](mailto:Rebecca.Chambers@rocketlabusa.com)
- (505) 659-5183

For inquiries regarding the air quality permitting process, contact:

- City of Albuquerque Environmental Health Department Air Quality Program
- [aqd@cabq.gov](mailto:aqd@cabq.gov)
- (505) 768-1972

# NOTICE FROM THE APPLICANT

## Notice of Intent to Apply for Air Quality Construction Permit

You are receiving this notice because the New Mexico Air Quality Control Act (20.11.41.13B NMAC) requires any owner/operator proposing to construct or modify a facility subject to air quality regulations to provide public notice by certified mail or electronic mail to designated representatives of recognized neighborhood associations and coalitions within 0.5-mile of the property on which the source is or is proposed to be located.

This notice indicates that the owner/operator intends to apply for an Air Quality Construction Permit from the Albuquerque – Bernalillo County Joint Air Quality Program. Currently, no application for this proposed project has been submitted to the Air Quality Program. Applicants are required to include a copy of this form and documentation of mailed notices with their Air Quality Construction Permit Application.

### Proposed Project Information

**Applicant's name and address:**

*Nombre y domicilio del solicitante:*

SolAero Technologies Corporation, 10420 Research Rd SE, Albuquerque NM, 87123

**Owner / operator's name and address:**

*Nombre y domicilio del propietario u operador:*

SolAero Technologies Corporation, 10420 Research Rd SE, Albuquerque NM, 87123

**Contact for comments and inquires:**

*Datos actuales para comentarios y preguntas:*

Name (Nombre): Rebecca Chambers

Address (Domicilio): 10420 Research Rd SE, Albuquerque NM, 87123

Phone Number (Número Telefónico): (505) 659-5183

E-mail Address (Correo Electrónico): Rebecca.Chambers@rocketlabusa.com

**Actual or estimated date the application will be submitted to the department:**

*Fecha actual o estimada en que se entregará la solicitud al departamento:* December 10, 2025

**Description of the source:**

*Descripción de la fuente:* Advanced semiconductor manufacturing equipment

**Exact location of the source or proposed source:**

*Ubicación exacta de la fuente o fuente propuesta:*

10420 Research Rd SE, Albuquerque NM, 87123

**Nature of business:**

*Tipo de negocio:* Advanced semiconductor manufacturing

**Process or change for which the permit is requested:**

*Proceso o cambio para el cuál de solicita el permiso:*

Proposed addition of EPI growth reactor units for Chemical Vapor Deposition and burn wet abatement system used for air emission controls of the reactor units. Proposed addition of an acid scrubber, base scrubber, and solvent vent. Incorporation of facility cooling towers. Removal of a base scrubber.

**Maximum operating schedule:**

*Horario máximo de operaciones:* 8760 hours per year

**Normal operating schedule:**

*Horario normal de operaciones:* 8760 hours per year

**Preliminary estimate of the maximum quantities of each regulated air contaminant the source will emit:**  
*Estimación preliminar de las cantidades máximas de cada contaminante de aire regulado que la fuente va a emitir:*

Air Contaminant <i>Contaminante de aire</i>	Proposed Construction Permit <i>Permiso de Construcción Propuesto</i>		Net Changes <i>(for permit modification or technical revision)</i> <i>Cambio Neto de Emisiones</i> <i>(para modificación de permiso o revisión técnica)</i>	
	pounds per hour <i>libras por hora</i>	tons per year <i>toneladas por año</i>	pounds per hour <i>libras por hora</i>	tons per year <i>toneladas por año</i>
<b>NO<sub>x</sub></b>	30.96	25.98	-0.043	-0.22
<b>CO</b>	11.50	18.05	0.00011	-0.25
<b>VOC</b>	8.81	17.95	0.013	0.045
<b>SO<sub>2</sub></b>	3.02	0.86	0.020	-0.037
<b>PM<sub>10</sub></b>	2.52	2.55	0.42	1.65
<b>PM<sub>2.5</sub></b>	2.13	0.86	0.013	0.055
<b>HAP</b>	0.71	2.63	-0.37	-2.37

NOTE: To add extra rows for H<sub>2</sub>S or Pb in Word, click in a box in the last row. Click the plus (+) sign that appears on the right of the row to add a row.

**Questions or comments regarding this Notice of Intent should be directed to the Applicant.** Contact information is provided with the Proposed Project Information on the first page of this notice. To check the status of an Air Quality Construction Permit application, call 311 and provide the Applicant’s information, or visit [www.cabq.gov/airquality/air-quality-permits](http://www.cabq.gov/airquality/air-quality-permits).

The Air Quality Program will issue a Public Notice announcing a 30-day public comment period on the permit application for the proposed project when the application is deemed complete. The Air Quality Program does not process or issue notices on applications that are deemed incomplete. More information about the air quality permitting process is attached to this notice.

## Air Quality Construction Permitting Overview

This is the typical process to obtain an Air Quality Construction Permit for Synthetic Minor and Minor sources of air pollution from the Albuquerque – Bernalillo County Joint Air Quality Program.

**Step 1: Pre-application Meeting:** The Applicant and their consultant must request a meeting with the Air Quality Program to discuss the proposed action. If air dispersion modeling is required, Air Quality Program staff discuss the modeling protocol with the Applicant to ensure that all proposed emissions are considered.

**Notice of Intent from the Applicant:** Before submitting their application, the Applicant is required to notify all nearby neighborhood associations and interested parties that they intend to apply for an air quality permit or modify an existing permit. The Applicant is also required to post a notice sign at the facility location.

**Step 2: Administrative Completeness Review and Preliminary Technical Review:** The Air Quality Program has 30 days from the day the permit is received to review the permit application to be sure that it is administratively complete. This means that all application forms must be signed and filled out properly, and that all relevant technical information needed to evaluate any proposed impacts is included. If the application is not complete, the permit reviewer will return the application and request more information from the Applicant. Applicants have three opportunities to submit an administratively complete application with all relevant technical information.

**Public Notice from the Department:** When the application is deemed complete, the Department will issue a Public Notice announcing a 30-day public comment period on the permit application. This notice is distributed to the same nearby neighborhood associations and interested parties that the Applicant sent notices to, and published on the Air Quality Program's website.

During this 30-day comment period, individuals have the opportunity to submit written comments expressing their concerns or support for the proposed project, and/or to request a Public Information Hearing. If approved by the Environmental Health Department Director, Public Information Hearings are held after the technical analysis is complete and the permit has been drafted.

**Step 3: Technical Analysis and Draft Permit:** Air Quality Program staff review all elements of the proposed operation related to air quality, and review outputs from advanced air dispersion modeling software that considers existing emission levels in the area surrounding the proposed project, emission levels from the proposed project, and meteorological data. The total calculated level of emissions is compared to state and federal air quality standards and informs the decision on whether to approve or deny the Applicant's permit.

**Draft Permit:** The permit will establish emission limits, standards, monitoring, recordkeeping, and reporting requirements. The draft permit undergoes an internal peer review process to determine if the emissions were properly evaluated, permit limits are appropriate and enforceable, and the permit is clear, concise, and consistent.

**Public Notice from the Department:** When the technical analysis is complete and the permit has been drafted, the Department will issue a second Public Notice announcing a 30-day public comment period on the technical analysis and draft permit. This second Public Notice, along with the technical analysis documentation and draft permit, will be published on the Air Quality Program's website, and the public notice for availability of the technical analysis and draft permit will only be directly sent to those who requested further information during the first comment period.

## Air Quality Construction Permitting Overview

During this second 30-day comment period, residents have another opportunity to submit written comments expressing their concerns or support for the proposed project, and/or to request a Public Information Hearing.

**Possible Public Information Hearing:** The Environmental Health Department Director may decide to hold a Public Information Hearing for a permit application if there is significant public interest and a significant air quality issue. If a Public Information Hearing is held, it will occur after the technical analysis is complete and the permit has been drafted.

**Step 4: Public Comment Evaluation and Response:** The Air Quality Program evaluates all public comments received during the two 30-day public comment periods and Public Information Hearing, if held, and updates the technical analysis and draft permit as appropriate. The Air Quality Program prepares a response document to address the public comments received, and when a final decision is made on the permit application, the comment response document is published on the Air Quality Program's website and distributed to the individuals who participated in the permit process. If no comments are received, a response document is not prepared.

**Step 5: Final Decision on the Application:** After public comments are addressed and the final technical review is completed, the Environmental Health Department makes a final decision on the application. If the permit application meets all applicable requirements set forth by the New Mexico Air Quality Control Act and the federal Clean Air Act, the permit is approved. If the permit application does not meet all applicable requirements, it is denied.

Notifications of the final decision on the permit application and the availability of the comment response document is published on the Air Quality Program's website and distributed to the individuals who participated in the permit process.

**The Department must approve** a permit application if the proposed action will meet all applicable requirements and if it demonstrates that it will not result in an exceedance of ambient air quality standards. Permit writers are very careful to ensure that estimated emissions have been appropriately identified or quantified and that the emission data used are acceptable.

**The Department must deny** a permit application if it is deemed incomplete three times, if the proposed action will not meet applicable requirements, if estimated emissions have not been appropriately identified or quantified, or if the emission data are not acceptable for technical reasons.

For more information about air quality permitting, visit [www.cabq.gov/airquality/air-quality-permits](http://www.cabq.gov/airquality/air-quality-permits)

## Beth Morley

---

**From:** Beth Morley  
**Sent:** Tuesday, December 9, 2025 3:29 PM  
**To:** eastgatewaycoalition@gmail.com; dreikeja@comcast.net  
**Cc:** Michael Brown  
**Subject:** Public Notice of Proposed Air Quality Construction Permit Application SolAero Technologies Corporation  
**Attachments:** SolAero\_Notice of Intent\_v1.0\_2025 1202.pdf

Dear Neighborhood Association/Coalition Representative(s),

### ***Why did I receive this public notice?***

You are receiving this notice in accordance with New Mexico Administrative Code (NMAC) 20.11.41.13.B(1) which requires any applicant seeking an Air Quality Construction Permit pursuant to 20.11.41 NMAC to provide public notice by certified mail or electronic mail to the designated representative(s) of the recognized neighborhood associations and recognized coalitions that are within one-half mile of the exterior boundaries of the property on which the source is or is proposed to be located.

### ***What is the Air Quality Permit application review process?***

The City of Albuquerque, Environmental Health Department, Air Quality Program (Program) is responsible for the review and issuance of Air Quality Permits for any stationary source of air contaminants within Bernalillo County. Once the application is received, the Program reviews each application and rules it either complete or incomplete. Complete applications will then go through a 30-day public comment period. Within 90 days after the Program has ruled the application complete, the Program shall issue the permit, issue the permit subject to conditions, or deny the requested permit or permit modification. The Program shall hold a Public Information Hearing pursuant to 20.11.41.15 NMAC if the Director determines there is significant public interest and a significant air quality issue is involved.

### ***What do I need to know about this proposed application?***

Applicant Name	SolAero Technology Corporation
Site or Facility Name	SolAero Technology Corporation
Site or Facility Address	10420 Research Rd SE, Albuquerque NM, 87123
New or Existing Source	EXISTING
Anticipated Date of Application Submittal	December 10, 2025
Summary of Proposed Source to Be Permitted	The application is to modify the existing Construction Permit #1029-M2-2TR. The modification addition of EPI growth reactor units for Chemical Vapor Deposition and burn wet abatement system used for air emission controls of the reactor units. Proposed addition of an acid scrubber, base scrubber, and solvent vent. Incorporation of facility cooling towers. Removal of a base scrubber.

### ***What emission limits and operating schedule are being requested?***

See attached Notice of Intent to Construct form for this information.

### ***How do I get additional information regarding this proposed application?***

For inquiries regarding the proposed source, contact:

- Rebecca Chambers
- [Rebecca.Chambers@rocketlabusa.com](mailto:Rebecca.Chambers@rocketlabusa.com)
- (505) 659-5183

For inquiries regarding the air quality permitting process, contact:

- City of Albuquerque Environmental Health Department Air Quality Program
- [agd@cabq.gov](mailto:agd@cabq.gov)

- (505) 768-1972

Regards,

**Beth Morley**  
Consultant

P 505.266.6611

Email: [Beth.Morley@Trinityconsultants.com](mailto:Beth.Morley@Trinityconsultants.com)

9400 Holly Avenue NE, Building 3, Suite B, Albuquerque, NM 87122



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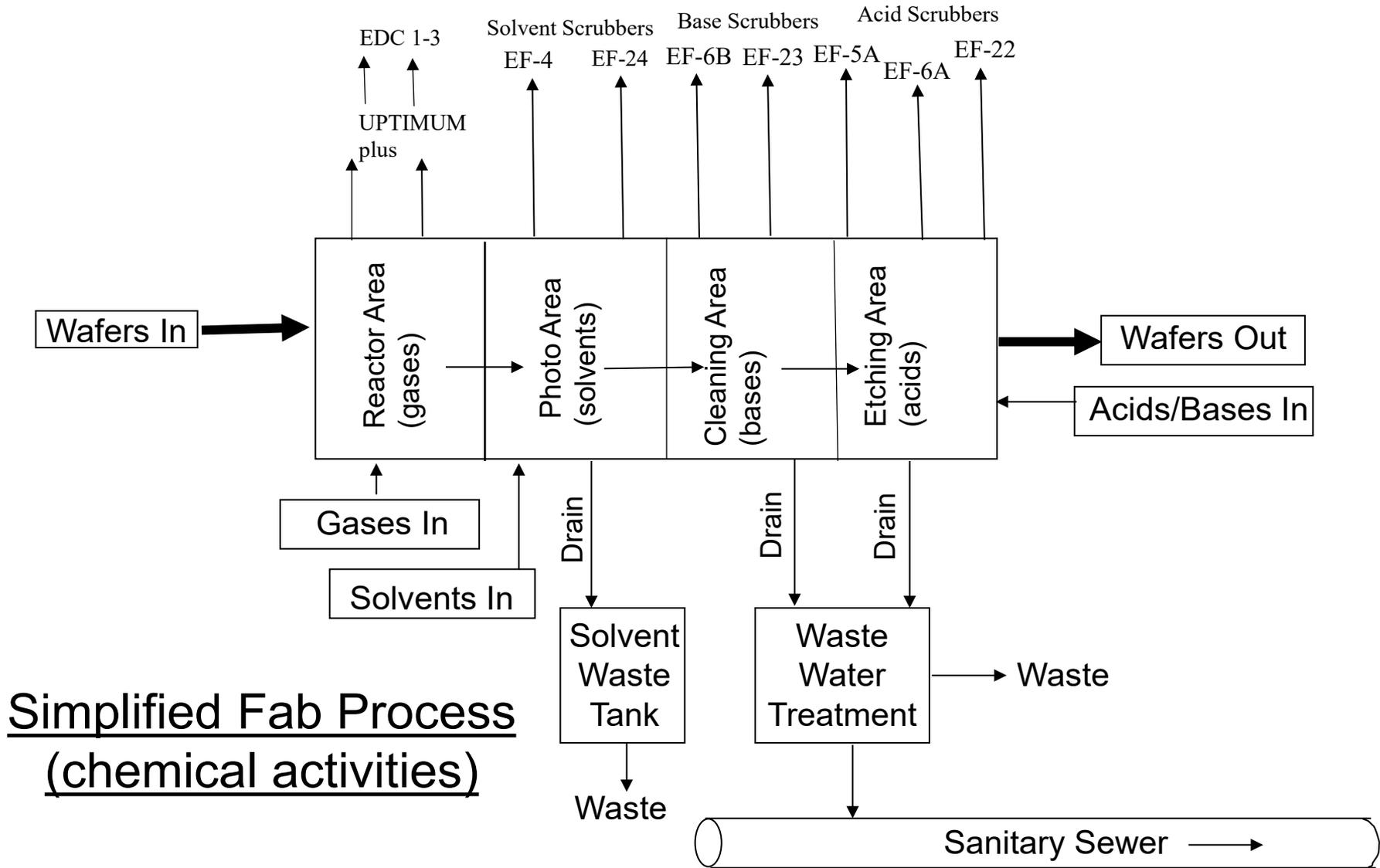
## **APPENDIX C. FACILITY PFD, LOCATION, AND AERIAL PHOTOGRAPH**

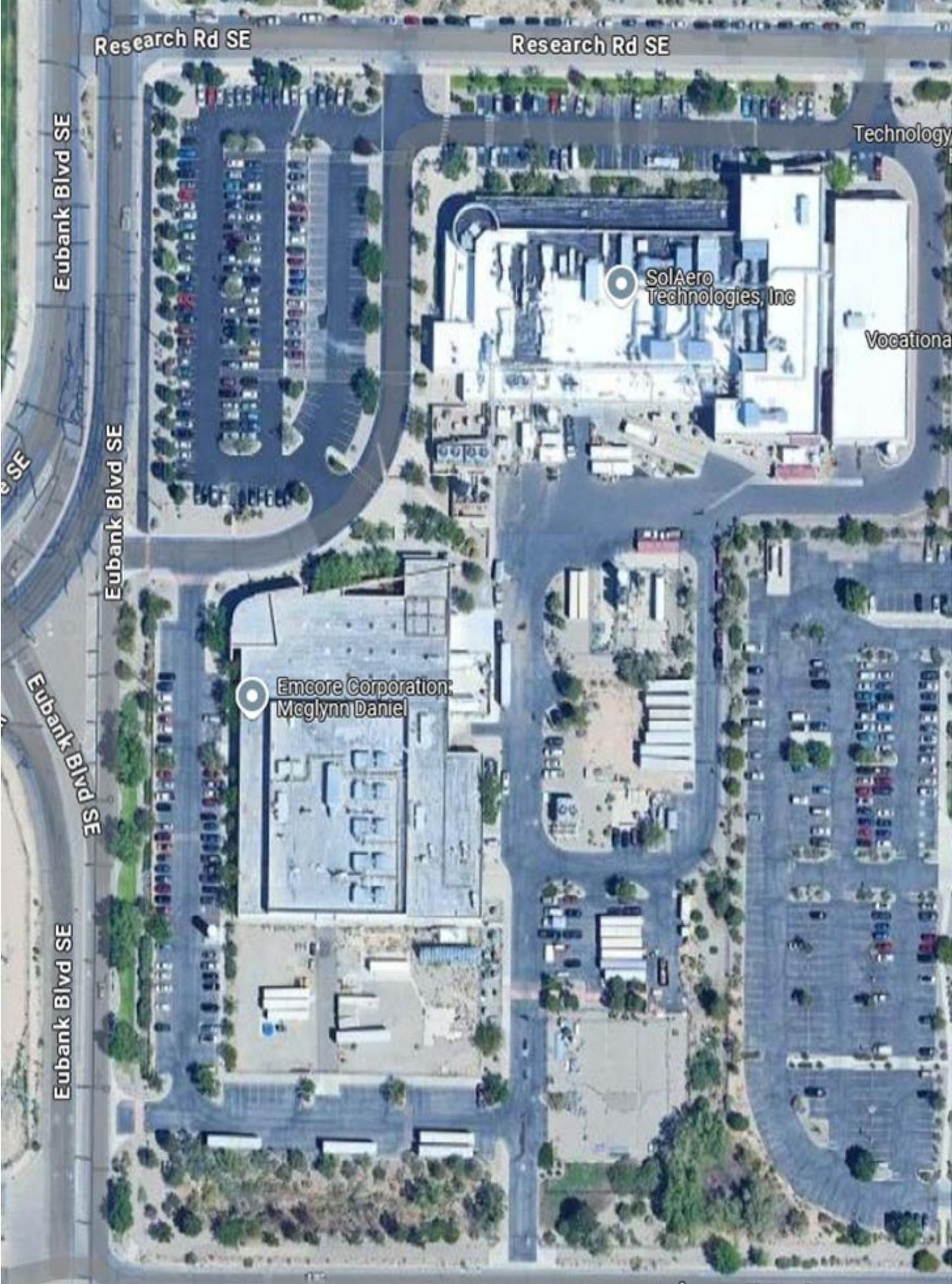
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Simplified Fab PFD

Aerial Photograph of Facility Process Location

Facility Plot Plan





Research Rd SE

Research Rd SE

Technology

Eubank Blvd SE

SolAero Technologies, Inc

Vocational

Eubank Blvd SE

Encore Corporation, McGlynn Daniel

Eubank Blvd SE

Eubank Blvd SE







## **APPENDIX D. AIR EMISSION CALCULATIONS**

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Summary page

Emergency Generators

Boilers

Autoclaves

Release booth

Oven

Chemical Reactors

Chem Unit

Cooling Towers

**Table 1.1a - Summary of Controlled Emissions**

Estimated Maximum Emissions following the permit modification

Unit No.	Source	NOx		CO		VOC		SO <sub>2</sub>		PM <sub>10</sub>		PM <sub>2.5</sub>		Total HAPs	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	Backup Generator	6.28	1.57	1.98	0.50	0.26	0.066	1.12	0.28	0.66	0.17	0.66	0.17	-	-
2	Backup Generator	18.23	4.56	3.93	0.98	1.45	0.36	1.21	0.30	1.29	0.32	1.29	0.32	-	-
3	Boiler	0.64	2.79	0.54	2.35	0.035	0.15	3.83E-03	0.017	0.048	0.21	0.048	0.21	1.00E-02	0.044
4	Boiler	1.09	4.77	0.91	4.00	0.060	0.26	6.53E-03	0.029	0.083	0.36	0.083	0.36	0.016	0.069
5	Boiler	1.09	4.77	0.91	4.00	0.060	0.26	6.53E-03	0.029	0.083	0.36	0.083	0.36	0.016	0.069
6A.	"CHEM" chemical emissions associated with Units 6-12, Unit 14, Units 25-27 and former SEDU units 3 & 4 and satellite mfg.	-	-	-	-	3.35	14.69	-	-	-	-	-	-	0.45	1.97
13	Boiler	0.75	3.30	0.63	2.77	0.041	0.18	4.52E-03	0.020	0.057	0.25	0.057	0.25	0.012	0.052
15	Emergency Generator	2.03	0.51	1.85	0.46	0.11	0.027	0.66	0.17	0.100	0.025	0.100	0.025	-	-
16	Autoclave 1	0.43	1.87	0.36	1.57	0.024	0.10	2.57E-03	0.011	0.033	0.14	0.033	0.14	7.32E-03	0.032
17	Autoclave 2	0.43	1.87	0.36	1.57	0.024	0.10	2.57E-03	0.011	0.033	0.14	0.033	0.14	7.32E-03	0.032
18	Release Booth	0.27	1.17	0.22	0.98	0.015	0.064	1.60E-03	7.01E-03	0.020	0.089	0.020	0.089	4.18E-03	0.018
19	Wisconsin Oven 1	0.100	0.44	0.084	0.37	5.50E-03	0.024	6.00E-04	2.63E-03	7.60E-03	0.033	7.60E-03	0.033	1.57E-03	6.87E-03
EBARA-1	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-2	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-3	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-4	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-5	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-6	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-7	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-8	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-9	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-10	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-11	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-12	Veeco EPI reactor chamber	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UPTIMUM-1	UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
UPTIMUM-2	UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
UPTIMUM-3	UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
UPTIMUM-4	UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
UPTIMUM-5	UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
UPTIMUM-6	UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
EDC-1	EDC PLUS	-	-	-	-	3.52E-03	6.39E-03	-	-	-	-	-	-	0.066	0.12
EDC-2	EDC PLUS	-	-	-	-	3.52E-03	6.39E-03	-	-	-	-	-	-	0.066	0.12
EDC-3	EDC PLUS	-	-	-	-	3.52E-03	6.39E-03	-	-	-	-	-	-	0.066	0.12
CT1	Building 1 Cooling Tower	-	-	-	-	-	-	-	-	0.14	0.60	2.73E-03	0.012	-	-
CT2	Building 1 Cooling Tower	-	-	-	-	-	-	-	-	0.14	0.60	2.73E-03	0.012	-	-
CT3	Building 2 Cooling Tower	-	-	-	-	-	-	-	-	0.11	0.48	2.18E-03	9.55E-03	-	-
<b>Total</b>		<b>30.76</b>	<b>25.10</b>	<b>11.30</b>	<b>17.45</b>	<b>5.42</b>	<b>16.18</b>	<b>3.02</b>	<b>0.86</b>	<b>2.76</b>	<b>3.59</b>	<b>2.38</b>	<b>1.95</b>	<b>0.71</b>	<b>2.63</b>

**Table 1.1b - Summary of Uncontrolled Emissions**

Estimated Maximum Emissions following the permit modification

Unit No.	Source	NOx		CO		VOC		SO <sub>2</sub>		PM <sub>10</sub>		PM <sub>2.5</sub>		Total HAPs	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
	1 Backup Generator	6.28	27.52	1.98	8.69	0.26	1.16	1.12	4.92	0.66	2.89	0.66	2.89	-	-
	2 Backup Generator	18.23	79.84	3.93	17.20	1.45	6.36	1.21	5.28	1.29	5.67	1.29	5.67	-	-
	3 Boiler	0.64	2.79	0.54	2.35	0.035	0.15	3.83E-03	0.017	0.048	0.21	0.048	0.21	1.00E-02	0.044
	4 Boiler	1.09	4.77	0.91	4.00	0.060	0.26	6.53E-03	0.029	0.083	0.36	0.083	0.36	0.016	0.069
	5 Boiler	1.09	4.77	0.91	4.00	0.060	0.26	6.53E-03	0.029	0.083	0.36	0.083	0.36	0.016	0.069
	6A. "CHEM" chemical emissions associated with Units 6-12, Unit 14, Units 25-27, and former SEDU units 3 & 4 and satellite mfg.	-	-	-	-	3.35	14.69	-	-	-	-	-	-	3.46	15.15
	13 Boiler	0.75	3.30	0.63	2.77	0.041	0.18	4.52E-03	0.020	0.057	0.25	0.057	0.25	0.012	0.052
	15 Emergency Generator	2.03	8.89	1.85	8.10	0.11	0.47	0.66	2.91	0.10	0.44	0.10	0.44	-	-
	16 Autoclave 1	0.43	1.87	0.36	1.57	0.024	0.10	2.57E-03	0.011	0.033	0.14	0.033	0.14	7.32E-03	0.032
	17 Autoclave 2	0.43	1.87	0.36	1.57	0.024	0.10	2.57E-03	0.011	0.033	0.14	0.033	0.14	7.32E-03	0.032
	18 Release Booth	0.27	1.17	0.22	0.98	0.015	0.064	1.60E-03	7.01E-03	0.020	0.089	0.020	0.089	4.18E-03	0.018
	19 Wisconsin Oven 1	0.10	0.44	0.084	0.37	5.50E-03	0.024	6.00E-04	2.63E-03	7.60E-03	0.033	7.60E-03	0.033	1.57E-03	6.87E-03
	EBARA-1 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-2 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-3 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-4 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-5 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-6 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-7 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-8 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-9 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-10 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-11 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	EBARA-12 Veeco EPI reactor chamber	-	-	-	-	0.088	0.16	-	-	-	-	-	-	1.65	3.08
	UPTIMUM-1 UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
	UPTIMUM-2 UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
	UPTIMUM-3 UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
	UPTIMUM-4 UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
	UPTIMUM-5 UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
	UPTIMUM-6 UPTIMUM PLUS	0.011	0.046	8.90E-03	0.039	5.83E-04	2.55E-03	6.36E-05	2.78E-04	8.05E-04	3.53E-03	8.05E-04	3.53E-03	1.99E-04	8.73E-04
	EDC-1 EDC PLUS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EDC-2 EDC PLUS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	EDC-3 EDC PLUS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CT1 Building 1 Cooling Tower	-	-	-	-	-	-	-	-	0.14	0.60	2.73E-03	0.012	-	-
	CT2 Building 1 Cooling Tower	-	-	-	-	-	-	-	-	0.14	0.60	2.73E-03	0.012	-	-
	CT3 Building 2 Cooling Tower	-	-	-	-	-	-	-	-	0.11	0.48	2.18E-03	9.55E-03	-	-
	<b>Total</b>	<b>31.39</b>	<b>137.50</b>	<b>11.84</b>	<b>51.85</b>	<b>6.50</b>	<b>25.77</b>	<b>3.02</b>	<b>13.24</b>	<b>2.81</b>	<b>12.29</b>	<b>2.43</b>	<b>10.64</b>	<b>23.31</b>	<b>52.39</b>

Notes: 1. Pollutants not emitted by a source are indicated by "-".



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Controlled HAPS Emissions																		
Unit <sup>1</sup>	Total HAPs		Arsine		Phosphine		Diisopropylselenide		Carbon Tetrachloride		Hydrochloric Acid		Hydrogen Fluoride		Catechol		Naphthalene	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
3	1.00E-02	0.044	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.24E-06	1.42E-05
4	0.016	0.069	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.11E-06	2.24E-05
5	0.016	0.069	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.11E-06	2.24E-05
13	0.012	0.052	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.83E-06	1.68E-05
16	0.0073	0.032	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.37E-06	1.04E-05
17	0.0073	0.032	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.37E-06	1.04E-05
18	4.18E-03	0.018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.36E-06	5.94E-06
19	1.57E-03	6.87E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.08E-07	2.23E-06
EBARA-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UPTIMUM-1	1.99E-04	8.73E-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.46E-08	2.83E-07
UPTIMUM-2	1.99E-04	8.73E-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.46E-08	2.83E-07
UPTIMUM-3	1.99E-04	8.73E-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.46E-08	2.83E-07
UPTIMUM-4	1.99E-04	8.73E-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.46E-08	2.83E-07
UPTIMUM-5	1.99E-04	8.73E-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.46E-08	2.83E-07
UPTIMUM-6	1.99E-04	8.73E-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.46E-08	2.83E-07
EDC-1	0.07	0.12	0.035	0.053	0.030	0.067	3.69E-04	1.62E-03	3.44E-04	1.51E-03	-	-	-	-	-	-	-	-
EDC-2	0.07	0.12	0.035	0.053	0.030	0.067	3.69E-04	1.62E-03	3.44E-04	1.51E-03	-	-	-	-	-	-	-	-
EDC-3	0.07	0.12	0.035	0.053	0.030	0.067	3.69E-04	1.62E-03	3.44E-04	1.51E-03	-	-	-	-	-	-	-	-
CHEM	0.45	1.97	5.55E-03	0.024	4.34E-03	0.019	-	-	-	-	-	-	-	-	-	-	7.73E-04	3.39E-03
CT1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CT2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CT3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>0.72</b>	<b>2.67</b>	<b>0.11</b>	<b>0.18</b>	<b>0.095</b>	<b>0.22</b>	<b>1.11E-03</b>	<b>4.85E-03</b>	<b>1.03E-03</b>	<b>4.52E-03</b>	-	-	-	-	-	-	<b>7.97E-04</b>	<b>3.49E-03</b>

Controlled HAPS Emissions																		
Unit <sup>1</sup>	Methanol		Chromion Trioxide		MEK		Formaldehyde		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylenes	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
3	-	-	-	-	-	-	4.00E-04	1.75E-03	9.56E-03	0.042	1.12E-05	4.89E-05	1.81E-05	7.91E-05	-	-	-	-
4	-	-	-	-	-	-	6.29E-04	2.76E-03	0.015	0.066	1.76E-05	7.70E-05	2.85E-05	1.25E-04	-	-	-	-
5	-	-	-	-	-	-	6.29E-04	2.76E-03	0.015	0.066	1.76E-05	7.70E-05	2.85E-05	1.25E-04	-	-	-	-
13	-	-	-	-	-	-	4.72E-04	2.07E-03	0.011	0.049	1.32E-05	5.77E-05	2.13E-05	9.35E-05	-	-	-	-
16	-	-	-	-	-	-	2.92E-04	1.28E-03	7.00E-03	0.031	8.17E-06	3.58E-05	1.32E-05	5.79E-05	-	-	-	-
17	-	-	-	-	-	-	2.92E-04	1.28E-03	7.00E-03	0.031	8.17E-06	3.58E-05	1.32E-05	5.79E-05	-	-	-	-
18	-	-	-	-	-	-	1.67E-04	7.32E-04	4.00E-03	0.018	4.67E-06	2.04E-05	7.56E-06	3.31E-05	-	-	-	-
19	-	-	-	-	-	-	6.27E-05	2.74E-04	1.50E-03	6.57E-03	1.75E-06	7.67E-06	2.83E-06	1.24E-05	-	-	-	-
EBARA-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EBARA-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UPTIMUM-1	-	-	-	-	-	-	7.94E-06	3.48E-05	1.91E-04	8.35E-04	2.22E-07	9.74E-07	3.60E-07	1.58E-06	-	-	-	-
UPTIMUM-2	-	-	-	-	-	-	7.94E-06	3.48E-05	1.91E-04	8.35E-04	2.22E-07	9.74E-07	3.60E-07	1.58E-06	-	-	-	-
UPTIMUM-3	-	-	-	-	-	-	7.94E-06	3.48E-05	1.91E-04	8.35E-04	2.22E-07	9.74E-07	3.60E-07	1.58E-06	-	-	-	-
UPTIMUM-4	-	-	-	-	-	-	7.94E-06	3.48E-05	1.91E-04	8.35E-04	2.22E-07	9.74E-07	3.60E-07	1.58E-06	-	-	-	-
UPTIMUM-5	-	-	-	-	-	-	7.94E-06	3.48E-05	1.91E-04	8.35E-04	2.22E-07	9.74E-07	3.60E-07	1.58E-06	-	-	-	-
UPTIMUM-6	-	-	-	-	-	-	7.94E-06	3.48E-05	1.91E-04	8.35E-04	2.22E-07	9.74E-07	3.60E-07	1.58E-06	-	-	-	-
EDC-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDC-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EDC-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CHEM	0.020	0.089	6.41E-03	0.028	3.63E-03	0.016	3.02E-04	1.32E-03	-	-	-	-	0.16	0.72	0.060	0.26	0.19	0.81
CT1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CT2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CT3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total</b>	<b>0.020</b>	<b>0.089</b>	<b>6.41E-03</b>	<b>0.028</b>	<b>3.63E-03</b>	<b>0.016</b>	<b>3.29E-03</b>	<b>0.014</b>	<b>0.072</b>	<b>0.31</b>	<b>8.36E-05</b>	<b>3.66E-04</b>	<b>0.16</b>	<b>0.72</b>	<b>0.060</b>	<b>0.26</b>	<b>0.19</b>	<b>0.81</b>

Notes

\* Indicates an hourly emission limit is not appropriate for this unit.

"-" Indicates emissions of this pollutant are not expected.

<sup>1</sup> Emissions for EBARA-1 through EBARA-12 are controlled by UPTIMUM-1 through UPTIMUM-6 and EDC-1 through EDC-3. Controlled emissions are represented at units EDC-1 through EDC-3.

# Backup Generator Engine Emissions

Unit No. 1

**Engine Type:**

Manufacturer: Kohler  
 Model: 150ROZJ  
 Turbo/Normal: Normal  
 Lean/Rich:  
 2/4 cycle: 4

**Horsepower Calculations**

Sea level horsepower: 250  
 RPM: 1800  
 Altitude: 5568  
 Derate percent per 1000 ft.: No derate taken (conservative assumption)  
 Derate starting elevation: na  
 Site rated hp: 250  
 Uncontrolled hours operated: 8760  
 Controlled hours operated: 500 Permit limit

**Emission Calculations**

Uncontrolled emissions

NO <sub>x</sub>	CO	NMHC	SO <sub>2</sub>	PM-10	TSP	Units	
2375	750	100	425			g/hr	Unit emissions from ~2002 app. quoted mfg. data
				0.0022		lb/hp-hr	Unit emissions from AP-42 3.3-1
20%	20%	20%	20%	20%			Safety Factor
6.3	2.0	0.3	1.1	0.7	0.7	lb/hr	Unit emissions / 453.6 g/lb
27.5	8.7	1.2	4.9	2.9	2.9	tons/yr	Uncontrolled lb/hr * (hours operated)/2000
1.57	0.50	0.066	0.28	0.17	0.17	tons/yr	Controlled lb/hr * (hours operated)/2000

**Fuel Consumption**

7000 btu/hp-hr Average BSFC AP-42  
 1750 MBTU/hr Average Heat Rate Average BSFC \* Site hp

**Exhaust Parameters**

925 deg F Exhaust temp Mfg. Data  
 2374 cfm Stack flow Mfg. Data  
 0.5 ft Stack diameter typical  
 202 ft/s Stack velocity Stack flow / Stack area  
 12.0 ft Stack height typical

# Backup Generator Engine Emissions

Unit No. 2

**Engine Type:**

Manufacturer: Kohler  
 Model: 300REOZD  
 Turbo/Normal: Turbocharged  
 Lean/Rich:  
 2/4 cycle: 4

**Horsepower Calculations**

Sea level horsepower: 490  
 RPM: 1800  
 Altitude: 5568  
 Derate percent per 1000 ft.: No derate taken (conservative assumption)  
 Derate starting elevation: na  
 Site rated hp: 490  
 Uncontrolled hours operated: 8760  
 Controlled hours operated: 500 Permit limit

**Emission Calculations**

Uncontrolled emissions

NO <sub>x</sub>	CO	NMHC	SO <sub>2</sub>	PM-10	TSP	Units	
0.031	0.00668	0.00247	0.00205	0.0022		lb/hp-hr	Unit emissions from AP-42 3.3-1
20%	20%	20%	20%	20%			Safety Factor
18.2	3.9	1.5	1.2	1.3	1.3	lb/hr	Unit emissions * hp
79.8	17.2	6.4	5.3	5.7	5.7	tons/yr	Uncontrolled lb/hr * (hours operated)/2000
4.56	0.98	0.36	0.30	0.32	0.32	tons/yr	Controlled lb/hr * (hours operated)/2000

**Fuel Consumption**

86.8 gal/hr Max fuel flow rate Mfg. Data  
 19,300 btu/lb Diesel heat value AP-42  
 7.17704 lb/gal Diesel density MSDS  
 12023.3 Mbtu/hr Maximum Heat rate Density \* Heat Value \* Flow rate  
 7000 btu/hp-hr Average BSFC AP-42  
 3430 MBTU/hr Average Heat Rate Average BSFC \* Site hp

**Exhaust Parameters**

780 deg F Exhaust temp Mfg. Data  
 2530 cfm Stack flow Mfg. Data  
 0.3 ft Stack diameter typical  
 483 ft/s Stack velocity Stack flow / Stack area  
 14.0 ft Stack height typical

# Boiler

Unit No. 3

**Boiler type**

Manufacturer: [Kewanee](#)  
 Model [M425KG](#)  
 Fuel: [Natural gas](#)  
 Serial No.: [21709](#)

**Fuel Consumption**

5313 scf/hr	Hourly firing at maximum rated output	Mfg data
46.5 MMscf/yr	Annual fuel usage	Firing rate * 8760 / 1e6
900 btu/scf	Fuel Heat Value	Nominal, natural gas
4781.7 Mbtu/hr	Heat Rate	Hourly Firing rate * Fuel Heat Value
8760.0 hrs	Permit limit	

**Emission Rates**

*Uncontrolled Emissions*

NOx	CO	VOC	SO <sub>2</sub>	PM-10	TSP	Units
100	84	5.5	0.6	7.6	7.6	lb/MMscf Unit emission from AP-42 Table 1.4-1&2
20%	20%	20%	20%	20%	20%	Safety Factor
0.64	0.54	0.035	0.0038	0.048	0.048	lb/hr Unit emissions * Input heat rate * Safety Factor
2.79	2.35	0.15	0.017	0.21	0.21	tpy lb/hr * operated hrs/yr / 2000lb/ton

*Controlled emissions same as Uncontrolled*

**Total HAP Emission Rates**

	lb/MMscf	lb/hr	tpy
Benzene	0.0021	1.1E-05	4.9E-05
Hexane	1.8	9.6E-03	4.2E-02
Naphthalene	6.1E-04	3.2E-06	1.4E-05
Formaldehyde	0.075	4.0E-04	1.7E-03
Toluene	0.0034	1.8E-05	7.9E-05
<b>Total HAPs</b>		0.010	0.044

<sup>1</sup> lb/MMscf factors from AP-42, Table 1.4-3

**Exhaust Parameters**

360 °F	Exhaust temp	Mfg. Test Data
22 ft	Stack height	Measured
1.16 ft	Stack diameter	Measured
10610 wscf/10e6 Btu		F factor-40 CFR 60 Appx A Method 19
846 scfm	Exhaust flow	Heat input * F factor/60
1607 acfm	Exhaust flow	$V_a = V_s * (P_s/P_a) * (T_a/T_s)$
25 ft/sec	Exhaust velocity	Exhaust flow / stack area

**Site Data**

5470 ft MSL	Site Elevation
29.92 in Hg	Standard Pressure (Ps)
24.46 in Hg	Pressure at Elevation   Hess, Introduction to Theoretical Meteorology, eqn. 6.8
528 R	Standard Temperature (Ts)

# Boiler

Unit Nos. 4, 5

## Boiler type

Manufacturer: [Kewanee](#)  
 Model: [H3S-200-G](#)  
 Fuel: [Natural gas](#)  
 Serial No.: [13142](#) unit 4  
                   [12243](#) unit 5

## Fuel Consumption

	<a href="#">8369</a> scf/hr	Hourly firing at maximum rated output	Mfg data
	73.3 MMscf/yr	Annual fuel usage	Firing rate * 8760 / 1e6
	900 btu/scf	Fuel Heat Value	Nominal, natural gas
	7532.1 Mbtu/hr	Heat Rate	Hourly Firing rate * Fuel Heat Value
Unit 4	<a href="#">8760.0</a> hrs	Hours Operated	
Unit 5	<a href="#">8760.0</a> hrs	Hours Operated	

## Emission Rates

### Estimated Emissions

Unit	NOx	CO	VOC	SO <sub>2</sub>	PM	TSP	Units	
Unit 4	<a href="#">100</a>	<a href="#">84</a>	<a href="#">5.5</a>	<a href="#">0.6</a>	<a href="#">7.6</a>	<a href="#">7.6</a>	lb/MMscf	Unit emission from AP-42 Table 1.4-1 & 2
	<a href="#">30%</a>		Safety Factor					
	1.1	0.91	0.060	0.0065	0.083	0.083	lb/hr	Unit emissions * Input heat rate* safety factor
	4.8	4.0	0.26	0.029	0.362	0.36	tpy	lb/hr * operated hrs/yr / 2000lb/ton
Unit 5	<a href="#">100</a>	<a href="#">84</a>	<a href="#">5.5</a>	<a href="#">0.6</a>	<a href="#">7.6</a>	<a href="#">7.6</a>	lb/MMscf	Unit emission from AP-42 Table 1.4-1 & 2
	<a href="#">30%</a>		Safety Factor					
	1.1	0.91	0.060	0.0065	0.083	0.083	lb/hr	Unit emissions * Input heat rate* safety factor
	4.8	4.0	0.26	0.029	0.362	0.36	tpy	lb/hr * operated hrs/yr / 2000lb/ton

Controlled emissions same as Uncontrolled

## Total HAP Emission Rates

	lb/MMscf	lb/hr	tpy
Benzene	0.0021	1.8E-05	7.7E-05
Hexane	1.8	1.5E-02	6.6E-02
Naphthalene	6.1E-04	5.1E-06	2.2E-05
Formaldehyde	0.075	6.3E-04	2.8E-03
Toluene	0.0034	2.8E-05	1.2E-04
<b>Total HAPs for Unit 4 and Unit 5 each</b>		0.016	0.069

<sup>1</sup> lb/MMscf factors from AP-42, Table 1.4-3

## Exhaust Parameters

<a href="#">250</a> °F	Exhaust temp	Mfg. Test Data
<a href="#">22</a> ft	Stack height	Measured
<a href="#">1.16</a> ft	Stack diameter	Measured
10610 wscf/10e6 Btu		F factor-40 CFR 60 Appx A Method 19
1332 scfm	Exhaust flow	Heat input * F factor/60
2191 acfm	Exhaust flow	Va = Vs*(Ps/Pa)*(Ta/Ts)
35 ft/sec	Exhaust velocity	Exhaust flow / stack area

## Site Data

<a href="#">5470</a> ft MSL	Site Elevation
29.92 in Hg	Standard Pressure (Ps)
24.46 in Hg	Pressure at Elevation (P: Hess, Introduction to Theoretical Meteorology, eqn. 6.8
528 R	Standard Temperature (Ts)

# Boiler

Unit No. 13

**Boiler type**

Manufacturer: [Kewanee](#)  
 Model: [H3S-150G](#)  
 Serial No.: [14148](#)  
 Fuel: [Natural gas](#)  
 Installation Date: [May 2001](#)  
 Manufacture Date: [Unknown](#)

**Fuel Consumption**

<a href="#">6278</a> scf/hr	Hourly firing at maximum rated output	Mfg data
<a href="#">55.0</a> MMscf/yr	Annual fuel usage	Firing rate * 8760 / 1e6
<a href="#">900</a> Btu/scf	Fuel Heat Value	Nominal, natural gas
<a href="#">5650.2</a> Mbtu/hr	Heat Rate	Hourly Firing rate * Fuel Heat Value
<a href="#">8760</a> hr/yr	Hours operated	

**Emission Rates**

*Uncontrolled emissions*

	NOx	CO	VOC	SO <sub>2</sub>	PM	TSP	Units	
	<a href="#">100</a>	<a href="#">84</a>	<a href="#">5.5</a>	<a href="#">0.6</a>	<a href="#">7.6</a>	<a href="#">7.6</a>	lb/MMscf	Unit emission from AP-42 Table 1.4-1 & 2
	<a href="#">20%</a>	<a href="#">20%</a>	<a href="#">20%</a>	<a href="#">20%</a>	<a href="#">20%</a>	<a href="#">20%</a>		Safety Factor
	<a href="#">0.75</a>	<a href="#">0.63</a>	<a href="#">0.041</a>	<a href="#">0.0045</a>	<a href="#">0.057</a>	<a href="#">0.057</a>	lb/hr	Unit emissions * Input heat rate* safety factor
	<a href="#">3.30</a>	<a href="#">2.77</a>	<a href="#">0.18</a>	<a href="#">0.020</a>	<a href="#">0.25</a>	<a href="#">0.25</a>	tpy	lb/hr * 8760 hrs/yr / 2000lb/ton

*Controlled emissions same as uncontrolled*

**Total HAP Emission Rates**

	lb/MMscf	lb/hr	tpy
Benzene	<a href="#">0.0021</a>	<a href="#">1.3E-05</a>	<a href="#">5.8E-05</a>
Hexane	<a href="#">1.8</a>	<a href="#">1.1E-02</a>	<a href="#">4.9E-02</a>
Naphthalene	<a href="#">6.1E-04</a>	<a href="#">3.8E-06</a>	<a href="#">1.7E-05</a>
Formaldehyde	<a href="#">0.075</a>	<a href="#">4.7E-04</a>	<a href="#">2.1E-03</a>
Toluene	<a href="#">0.0034</a>	<a href="#">2.1E-05</a>	<a href="#">9.3E-05</a>
<b>Total HAPs</b>		<a href="#">0.012</a>	<a href="#">0.052</a>

<sup>1</sup> lb/MMscf factors from AP-42, Table 1.4-3

**Exhaust Parameters**

<a href="#">312</a> °F	Exhaust temp	Mfg. Test Data
<a href="#">22</a> ft	Stack height	Measured
<a href="#">1.16</a> ft	Stack diameter	Measured
<a href="#">10610</a> wscf/10e6 Btu		F factor-40 CFR 60 Appx A Method 19
<a href="#">999</a> scfm	Exhaust flow	Heat input * F factor/60
<a href="#">1787</a> acfm	Exhaust flow	Va = Vs*(Ps/Pa)*(Ta/Ts)
<a href="#">28</a> ft/sec	Exhaust velocity	Exhaust flow / stack area

**Site Data**

<a href="#">5470</a> ft MSL	Site Elevation	
<a href="#">29.92</a> in Hg	Standard Pressure	
<a href="#">24.46</a> in Hg	Pressure at Elevation	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
<a href="#">528</a> R	Standard Temperature	

# Autoclave 1

Unit No. 16

**Boiler type**

Manufacturer: Thermal Equipment Corporation  
 Model 8391  
 Fuel: Natural gas  
 Serial No.: 294

**Fuel Consumption**

3889 scf/hr	Hourly firing at maximum rated output	Heat Rate / Fuel Heat Value
34.1 MMscf/yr	Annual fuel usage	Firing rate * 8760 / 1e6
900 btu/scf	Fuel Heat Value	Nominal, natural gas
3500 Mbtu/hr	Heat Rate	
8760.0 hrs	Permit limit	

**Emission Rates**

*Uncontrolled Emissions*

NOx	CO	VOC	SO <sub>2</sub>	PM-10	TSP	Units	
100	84	5.5	0.6	7.6	7.6	lb/MMscf	Unit emission from AP-42 Table 1.4-1&2
10%	10%	10%	10%	10%	10%		Safety Factor
0.4278	0.36	0.024	0.0026	0.033	0.033	lb/hr	Unit emissions * Input heat rate * Safety Factor
1.87	1.57	0.10	0.011	0.14	0.14	tpy	lb/hr * operated hrs/yr / 2000lb/ton

**Total HAP Emission Rates**

	lb/MMscf <sup>1</sup>	lb/hr	tpy
Benzene	0.0021	8.2E-06	3.6E-05
Hexane	1.8	7.0E-03	3.1E-02
Naphthalene	6.1E-04	2.4E-06	1.0E-05
Formaldehyde	0.075	2.9E-04	1.3E-03
Toluene	0.0034	1.3E-05	5.8E-05
<b>Total HAPs</b>		0.007	0.032

<sup>1</sup> lb/MMscf factors from AP-42, Table 1.4-3

*Controlled emissions same as Uncontrolled*

**Client Data Exhaust Parameters for Modeling**

450 °F	Avg. exhaust temp.	Between namplate max temp and 11-14-16 SolAero exhaust info email
17 ft	Stack height	min. stack height per modeling and as agreed by SolAero in 1/11/17 emails
0.67 ft	Stack diameter	SolAero email confirmation 1-11-17
2981 acfm	Exhaust flow	$V_a = V_s * (P_s / P_a) * (T_a / T_s)$
140.9 ft/sec	Exhaust velocity	Exhaust flow / stack area

**Site Data**

5470 ft MSL	Site Elevation	
29.92 in Hg	Standard Pressure (Ps)	
24.46 in Hg	Pressure at Elevation (Pa)	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
528 R	Standard Temperature (Ts)	

# Autoclave 2

Unit No. 17

**Boiler type**

Manufacturer: TBD  
 Model: TBD  
 Fuel: Natural gas  
 Serial No.: TBD

**Fuel Consumption**

3889 scf/hr	Hourly firing at maximum rated output	Heat Rate / Fuel Heat Value
34.1 MMscf/yr	Annual fuel usage	Firing rate * 8760 / 1e6
900 btu/scf	Fuel Heat Value	Nominal, natural gas
3500 Mbtu/hr	Heat Rate	
8760.0 hrs	Permit limit	

**Emission Rates**

*Uncontrolled Emissions*

NOx	CO	VOC	SO <sub>2</sub>	PM-10	TSP	Units	
100	84	5.5	0.6	7.6	7.6	lb/MMscf	Unit emission from AP-42 Table 1.4-1&2
10%	10%	10%	10%	10%	10%		Safety Factor
0.43	0.36	0.024	0.0026	0.033	0.033	lb/hr	Unit emissions * Input heat rate * Safety Factor
1.87	1.57	0.10	0.011	0.14	0.14	tpy	lb/hr * operated hrs/yr / 2000lb/ton

**Total HAP Emission Rates**

	lb/MMscf <sup>1</sup>	lb/hr	tpy
Benzene	0.0021	8.2E-06	3.6E-05
Hexane	1.8	7.0E-03	3.1E-02
Naphthalene	6.1E-04	2.4E-06	1.0E-05
Formaldehyde	0.075	2.9E-04	1.3E-03
Toluene	0.0034	1.3E-05	5.8E-05
<b>Total HAPs</b>		0.007	0.032

<sup>1</sup> lb/MMscf factors from AP-42, Table 1.4-3

*Controlled emissions same as Uncontrolled*

**Client Data Exhaust Parameters for Modeling**

450 °F	Avg. exhaust temp.	Per W. Temp. on autoclave namplate
17 ft	Stack height	min. stack height per modeling and as agreed by SolAero in 1/11/17 emails
0.67 ft	Stack diameter	SolAero email confirmation 1-11-17
2981 acfm	Exhaust flow	$V_a = V_s * (P_s/P_a) * (T_a/T_s)$
141 ft/sec	Exhaust velocity	Exhaust flow / stack area

**Site Data**

5470 ft MSL	Site Elevation	
29.92 in Hg	Standard Pressure (Ps)	
24.46 in Hg	Pressure at Elevation (Pa)	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
528 R	Standard Temperature (Ts)	

# Release Booth

Unit No. 18

**Boiler type**

Manufacturer: TBD  
 Model: TBD  
 Fuel: Natural gas  
 Serial No.: TBD

**Fuel Consumption**

2222 scf/hr	Hourly firing at maximum rated output	Heat Rate / Fuel Heat Value
19.5 MMscf/yr	Annual fuel usage	Firing rate * 8760 / 1e6
900 btu/scf	Fuel Heat Value	Nominal, natural gas
2000 Mbtu/hr	Heat Rate	Per SolAero
8760.0 hrs	Permit limit	

**Emission Rates**

*Uncontrolled Emissions*

NOx	CO	VOC	SO <sub>2</sub>	PM-10*	TSP	Units	
100	84	5.5	0.6	7.6	7.6	lb/MMscf	Unit emission from AP-42 Table 1.4-1&2
20%	20%	20%	20%	20%	20%		Safety Factor
0.27	0.22	0.015	0.0016	0.020	0.020	lb/hr	Unit emissions * Input heat rate * Safety Factor
1.17	0.98	0.064	0.0070	0.089	0.089	tpy	lb/hr * operated hrs/yr / 2000lb/ton

**Total HAP Emission Rates**

	lb/MMscf	lb/hr	tpy
Benzene	0.0021	4.7E-06	2.0E-05
Hexane	1.8	4.0E-03	1.8E-02
Naphthalene	6.1E-04	1.4E-06	5.9E-06
Formaldehyde	0.075	1.7E-04	7.3E-04
Toluene	0.0034	7.6E-06	3.3E-05
<b>Total HAPs</b>		0.0042	0.018

<sup>1</sup> lb/MMscf factors from AP-42, Table 1.4-3

*Controlled emissions same as Uncontrolled*

**Alternate B - Exhaust Parameters Based on Client Data**

250 °F	Avg. exhaust temp.	Per 11-14-16 SolAero exhaust info email
40 ft	Stack height	SolAero email confirmation 11-11-16
1.2 ft	Stack diameter	SolAero email confirmation 11-11-16
2000 scfm	Exhaust flow	Per 11-14-16 SolAero exhaust info email
3290 acfm	Exhaust flow	$V_a = V_s * (P_s/P_a) * (T_a/T_s)$
48.5 ft/sec	Exhaust velocity	Exhaust flow / stack area

**Site Data**

5470 ft MSL	Site Elevation	
29.92 in Hg	Standard Pressure (Ps)	
24.46 in Hg	Pressure at Elevation (Pa)	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
528 R	Standard Temperature (Ts)	

# Wisconsin Oven 1

Unit No. 19

**Boiler type**

Manufacturer: Wisconsin Oven Corp.  
 Model SWN-816-8G  
 Fuel: Natural gas  
 Serial No.: 095080407

**Fuel Consumption**

833 scf/hr	Hourly firing at maximum rated output	Heat Rate / Fuel Heat Value
7.3 MMscf/yr	Annual fuel usage	Firing rate * 8760 / 1e6
900 btu/scf	Fuel Heat Value	Nominal, natural gas
750 Mbtu/hr	Heat Rate	Per SolAero
8760.0 hrs	Permit limit	

**Emission Rates**

*Uncontrolled Emissions*

NOx	CO	VOC	SO <sub>2</sub>	PM-10*	TSP	Units	
100	84	5.5	0.6	7.6	7.6	lb/MMscf	Unit emission from AP-42 Table 1.4-1&2
20%	20%	20%	20%	20%	20%		Safety Factor
0.10	0.084	5.50E-03	6.00E-04	0.0076	0.0076	lb/hr	Unit emissions * Input heat rate * Safety Factor
0.44	0.37	0.024	0.0026	0.033	0.033	tpy	lb/hr * operated hrs/yr / 2000lb/ton

**Total HAP Emission Rates**

	lb/MMscf	lb/hr	tpy
Benzene	0.0021	1.75E-06	7.67E-06
Hexane	1.8	1.50E-03	6.57E-03
Naphthalene	6.1E-04	5.08E-07	2.23E-06
Formaldehyde	0.075	6.27E-05	2.74E-04
Toluene	0.0034	2.83E-06	1.24E-05
<b>Total HAPs</b>		0.0016	0.0069

<sup>1</sup> lb/MMscf factors from AP-42, Table 1.4-3

Controlled emissions same as Uncontrolled

**Alternate B - Exhaust Parameters Based on Client Data**

350 °F	Avg. exhaust temp.	Per 11-14-16 SolAero exhaust info email
40 ft	Stack height	SolAero email confirmation 11-11-16
0.5 ft	Stack diameter	SolAero email confirmation 11-11-16
500 scfm	Exhaust flow	Per 11-14-16 SolAero exhaust info email
938 acfm	Exhaust flow	$V_a = V_s * (P_s/P_a) * (T_a/T_s)$
79.7 ft/sec	Exhaust velocity	Exhaust flow / stack area

**Site Data**

5470 ft MSL	Site Elevation	
29.92 in Hg	Standard Pressure (Ps)	
24.46 in Hg	Pressure at Elevation (Pa)	Hess, Introduction to Theoretical Meteorology, eqn. 6.8
528 R	Standard Temperature (Ts)	

### Unit CHEM emission calculation

		Total lbs	Basis	
HAPs	HCl	78507		
	HF	4121.7		
	Phosphine	3,800		
	Arsine	4,860		
	Catechol	1539.12		
	Napthalene	677.21		
	Methanol	178.34		
	Chromium Trioxide	56.1	Facility HAPs	
	Formaldehyde	2.6		
	Toluene	1436.8		
	Xylene	1622.3		
	Methyl Isobutyl Ketone	31.8		
	Ethyl Benzene	523.9		
VOCs	IPA	125,710		Purchasing Records
	Acetic Acid	13,365		Purchasing Records
	AZ EBR 70/30	18357		Purchasing Records
	AZ 2035	3107		Purchasing Records
	AZ 2070	447		Purchasing Records
	Videojet 16-8425	972.00		Purchasing Records
	Videojet 16-8420	86		Purchasing Records
	Videojet 16-5905	373	Purchasing Records	
	Catechol	1539.12	5% of EK922	
	Napthalene	677.21	2.2% of EK922	
	Phenolphthalein indicator solution 1%	13.3	Purchasing Records	
	Reagent grade ethanol	26.3	Purchasing Records	
	AEROGLAZE 9958	59.4	Purchasing Records	
	AEROGLAZE A276	96.5	Purchasing Records	
	AEROGLAZE Z306	78.5	Purchasing Records	
	AEROGLAZE Z307	78.4	Purchasing Records	
	AEROGLAZE 9929B	76.7	Purchasing Records	
	AEROGLAZE 9929A	49.1	Purchasing Records	
	AEROGLAZE 9953	27.6	Purchasing Records	
	AEROGLAZE 9958	29.7	Purchasing Records	
	APTEK 2706 B	75.0	Purchasing Records	
	APTEK 2706 A	140.1	Purchasing Records	

### Isopropanol Cleaning Emission Calculation

Isopropanol (IPA) is used throughout the facility as a cleaning agent. The majority of IPA probably goes down drains and into the facility's solvent tank, but a fraction of the IPA is assumed to evaporate and be picked up by the facility's general exhaust. Since it is extremely difficult to calculate the fraction of IPA that evaporates (versus going down the drain), it is assumed that 30% of the IPA used at the facility (not in baths) will evaporate and go to the General Exhaust. The quantity of IPA is estimated using purchasing records and calculating an average use of IPA per week.

#### IPA Consumption

19,340 gal	Estimated maximum quantity purchased
125,710 lb	Total Proposed Quantity Purchased- Amount withdrawn as liquid minus disposed as hazwaste
17,406 gal	Amount used in Baths (10% of total)
1,934 gal	Estimated non-bath quantity used
12,571 lb/yr	Estimated non-bath quantity used
30%	Solvent evaporation effir Estimated
0.43 lb/hr	Estimated Emission Rat Usage rate (lb/yr) / (8760) * Evaporation efficiency
1.89 ton/yr	Estimated Emission Rat Emission rate (lb/hr) * 8760 (hrs/yr) / 2000 (lb/ton)

**Uncontrolled Emission Factor (pounds emitted per pound purchased)**

		<b>Total lbs</b>	<b>Basis</b>
HAPs	HCl	12561.1	Bath evaporation ratio of 4.2 tons emissions per 53617 pounds purchased in 2005 (16%), emission inventory calc
	HF	3008.9	Bath Evaporation ratio of 0.2432 tons emissions per 666 pounds purchased in 2005 (73%), emission inventory calc
	Phosphine	3800.0	100% of usage
	Arsine	4860.0	
	Catechol	1539.1	assume 100% evaporation, catechol = 5% of EKC 922
	Naphthalene	677.2	assume 100% evaporation, Naphthalene = 2.2% of EKC 922
	Methanol	178.3	assume 100% evaporation
	Chromium Trioxide	56.1	assume 100% evaporation
	Formaldehyde	2.6	assume 100% evaporation
	Toluene	1436.8	assume 100% evaporation
	Xylene	1622.3	assume 100% evaporation
	Methyl Isobutyl Ketone	31.8	assume 100% evaporation
	Ethyl Benzene	523.9	assume 100% evaporation
VOCs	IPA	6285.5	100% VOC content, 10% of total use in bath, 50% solvent evaporation
	Acetic Acid	668.3	100% VOC content, 10% of total use in bath, 50% solvent evaporation
	AZ EBR 70/30	9151	930 g/l VOC, 0.9326 g/cc (d) = 99.7% VOC content, 50% solvent evaporation
	AZ 2035	932	670 g/l VOC, 1.1 g/cc (d) = 60% VOC content, 50% solvent evaporation
	AZ 2070	134	60% VOC content, 50% evaporation
	Videojet 16-8425	486	100% VOC content, 50% evaporation
	Videojet 16-8420	36	83% VOC content, 50% evaporation
	Videojet 16-5905	185	99% VOC content, 50% evaporation
	Catechol	1539.12	assume 100% evaporation, catechol = 5% of EKC 922
	Naphthalene	677.21	assume 100% evaporation, Naphthalene = 2.2% of EKC 922
	Phenolphthalein indicator solution 1%	12.67	95% VOC, 100% evaporation
	Reagent grade ethanol	25.0	95% VOC, 100% evaporation
	AEROGLAZE 9958	59.4	100% VOC, 100% evaporation
	AEROGLAZE A276	58.8	61% VOC, 100% evaporation
	AEROGLAZE Z306	71.4	91% VOC, 100% evaporation
	AEROGLAZE Z307	75.3	96% VOC, 100% evaporation
	AEROGLAZE 9929B	76.7	100% VOC, 100% evaporation
	AEROGLAZE 9929A	17.2	35% VOC, 100% evaporation
	AEROGLAZE 9953	27.6	100% VOC, 100% evaporation
	AEROGLAZE 9958	29.7	100% VOC, 100% evaporation
	APTEK 2706 B	63.8	85% VOC, 100% evaporation
APTEK 2706 A	105.1	75% VOC, 100% evaporation	

Uncontrolled Emission Rate (tons)		Total tons	Basis	
HAPs	HCl	6.3	pound/pound / 2000 lb/ton	
	HF	1.50	pound/pound / 2000 lb/ton	
	Phosphine	1.9	pound/pound / 2000 lb/ton	
	Arsine	2.4	pound/pound / 2000 lb/ton	
	Catechol	0.77	pound/pound / 2000 lb/ton	
	Naphthalene	0.34	pound/pound / 2000 lb/ton	
	Methanol	0.09	pound/pound / 2000 lb/ton	
	Chromium Trioxide	0.028	pound/pound / 2000 lb/ton	
	Formaldehyde	0.0013	pound/pound / 2000 lb/ton	
	Toluene	0.7184	pound/pound / 2000 lb/ton	
	Xylene	0.8111	pound/pound / 2000 lb/ton	
	Methyl Isobutyl Ketone	1.6E-02	pound/pound / 2000 lb/ton	
	Ethyl Benzene	2.6E-01	pound/pound / 2000 lb/ton	
	<b>TOTAL</b>	<b>15.1</b>		
	<b>Total uncontrolled HAPs for CHEM in permit app.</b>		<b>15.1</b> tpy	Assume 0% safety factor
		<b>3.5</b> lb/hr		
VOCs	IPA	3.1	pound/pound / 2000 lb/ton	
	Acetic Acid	0.3	pound/pound / 2000 lb/ton	
	AZ EBR 70/30	4.6	pound/pound / 2000 lb/ton	
	AZ 2035	0.466	pound/pound / 2000 lb/ton	
	AZ 2070	0.067	pound/pound / 2000 lb/ton	
	Videojet 16-8425	0.24	pound/pound / 2000 lb/ton	
	Videojet 16-8420	0.02	pound/pound / 2000 lb/ton	
	Videojet 16-5905	0.09	pound/pound / 2000 lb/ton	
	Catechol	0.77	pound/pound / 2000 lb/ton	
	Naphthalene	0.34	pound/pound / 2000 lb/ton	
	Phenolphthalein indicator solution 1%	6.3E-03	pound/pound / 2000 lb/ton	
	Reagent grade ethanol	1.2E-02	pound/pound / 2000 lb/ton	
	AEROGLAZE 9958	3.0E-02	pound/pound / 2000 lb/ton	
	AEROGLAZE A276	2.9E-02	pound/pound / 2000 lb/ton	
	AEROGLAZE Z306	3.6E-02	pound/pound / 2000 lb/ton	
	AEROGLAZE Z307	3.8E-02	pound/pound / 2000 lb/ton	
	AEROGLAZE 9929B	3.8E-02	pound/pound / 2000 lb/ton	
	AEROGLAZE 9929A	8.6E-03	pound/pound / 2000 lb/ton	
	AEROGLAZE 9953	1.4E-02	pound/pound / 2000 lb/ton	
	AEROGLAZE 9958	1.5E-02	pound/pound / 2000 lb/ton	
	APTEK 2706 B	3.2E-02	pound/pound / 2000 lb/ton	
	APTEK 2706 A	5.3E-02	pound/pound / 2000 lb/ton	
	<b>TOTAL</b>	<b>12.2</b>		
	<b>Total uncontrolled VOCs for CHEM in permit app.</b>		<b>14.7</b> tpy	Assume 20% safety factor
			<b>3.4</b> lb/hr	

Controlled Emission Rate (tons)		Total tons	
HAPs	HCl	0.063	scrubber system 99% control
	HF	0.0150	scrubber system 99% control
	Phosphine	0.019	reactor system 99% control
	Arsine	0.024	reactor system 99% control
	Catechol	0.0077	scrubber system 99% control
	Naphthalene	0.0034	scrubber system 99% control
	Methanol	0.09	Assume 0% control
	Chromium Trioxide	0.028	Assume 0% control
	Formaldehyde	0.001	Assume 0% control
	Toluene	0.718	Assume 0% control
	Xylene	0.811	Assume 0% control
	Methyl Isobutyl Ketone	0.016	Assume 0% control
	Ethyl Benzene	0.262	Assume 0% control
	<b>TOTAL</b>	<b>2.06</b>	
VOCs	IPA	3.1	Assume 0% control
	Acetic Acid	0.3	Assume 0% control
	AZ EBR 70/30	4.6	Assume 0% control
	AZ 2035	0.466	Assume 0% control
	AZ 2070	0.067	Assume 0% control
	Videojet 16-8425	0.24	Assume 0% control
	Videojet 16-8420	0.02	Assume 0% control
	Videojet 16-5905	0.09	Assume 0% control
	Catechol	0.77	Assume 0% control
	Naphthalene	0.34	Assume 0% control
	Phenolphthalein indicator solution 1%	6.3E-03	Assume 0% control
	Reagent grade ethanol	0.0125	Assume 0% control
	AEROGLAZE 9958	0.0297	Assume 0% control
	AEROGLAZE A276	0.0294	Assume 0% control
	AEROGLAZE Z306	0.0357	Assume 0% control
	AEROGLAZE Z307	0.0376	Assume 0% control
	AEROGLAZE 9929B	0.0384	Assume 0% control
	AEROGLAZE 9929A	0.0086	Assume 0% control
	AEROGLAZE 9953	0.0138	Assume 0% control
	AEROGLAZE 9958	0.0149	Assume 0% control
	APTEK 2706 B	0.0319	Assume 0% control
	APTEK 2706 A	0.0525	Assume 0% control
	<b>TOTAL</b>	<b>12.2</b>	
	<b>Total controlled VOCs for CHEM in permit app.</b>		<b>14.7</b>
		<b>3.4</b>	lb/hr
			Assume 20% safety factor

## Emissions Calculations Sheet

**SolAero Technologies Corp., 10420 Research Rd. SE, Albuquerque, NM 87123**

**EU# 15 Cummins 125DSGAB 125 KW Emergency Generator w/ QSB7-G5 NR3 Tier 3 NSPS Diesel Engine**

### UNCONTROLLED EMISSIONS (PER)

Pollutant	Emis. Factor (g/Hp-Hr)	Engine Power (Hp)	Emissions Rate (g/Hr)	Grams/pound (g/lb)	Emissions Rate (lb/Hr)	Annual Operation (Hrs/Yr)	Annual Emissions (Tons/Yr)
CO*	2.59	324	839.16	453.6	1.85	8760	8.1
NOx	2.84	324	920.32	453.6	2.03	8760	8.9
VOC/HC	0.15	324	48.44	453.6	0.11	8760	0.47
NOx+ HC*	2.99	324	968.76	453.6	2.14	8760	9.4
SOx**	0.93	324	301.32	453.6	0.66	8760	2.9
PM*	0.14	324	45.36	453.6	0.10	8760	0.44

### CONTROLLED EMISSIONS

Pollutant	Emis. Factor (g/Hp-Hr)	Engine Power (Hp)	Emissions Rate (g/Hr)	Grams/pound (g/lb)	Emissions Rate (lb/Hr)	Annual Operation (Hrs/Yr)	Annual Emissions (lb/Yr)	Annual Emissions (Tons/Yr)
CO*	2.59	324	839.16	453.6	1.85	500	925.00	0.46
NOx	2.84	324	920.32	453.6	2.03	500	1014.46	0.51
VOC/HC	0.15	324	48.44	453.6	0.11	500	53.39	0.03
NOx+ HC*	2.99	324	968.76	453.6	2.14	500	1067.86	0.53
SOx**	0.93	324	301.32	453.6	0.66	500	332.14	0.17
PM*	0.14	324	45.36	453.6	0.10	500	50.00	0.03

Notes: \* = Emission factors are set just slightly under NSPS IIII limits to accommodate Excel rounding calculated values  
 \*\* = SOx emission factors are based on Air Quality Program recommendations on table that is the last page of the NSPS engine application



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**Calculation Description<sup>1</sup>:**

Waste gas from the reactors (EBARA-1 through EBARA-12) is first combusted within the UPTIMUM PLUS units. Waste gas is then sent from the UPTIMUM PLUS units to the EDC units as an additional control step. Post-control in the EDC unit, the waste gas is emitted via the EDC stack. There are six (6) UPTIMUM PLUS units and three (3) EDC units in total. This calculation utilizes the ideal gas law equation to determine the mass flow rate of gas and then the control factor is applied.

Emission Unit Numbers: UPTIMUM-1 through UPTIMUM-6  
 Source Description: UPTIMUM Control Device  
 Associated Controlled Equipment: Ebara Chambers (EBARA-1 through EBARA-12)  
 Number of Chambers Controlled: 12  
 Hours of Operation per Year: 8,760 hr

**Burner Gas: Natural Gas**

Fuel Consumption 3.00 sm<sup>3</sup>/hr Max fuel flow rate  
 Fuel heat value 1,020 Btu/scf AP-42 Chapter 1.4  
 Hourly fuel usage 0.11 Mscf/hr Fuel usage  
 Annual fuel usage 0.93 MMscf/yr Annual fuel usage  
 Operating hours 8,760 hr/yr

**Emission Calculations Based on AP-42 Emission Factors:**

NO <sub>x</sub>	CO	VOC	SO <sub>2</sub>	PM	Units	Notes
100.00	84.00	5.50	0.60	7.60	lb/MMSCF	Unit emission rates from AP-42 Table 1.4-1 & 2
<b>0.011</b>	<b>8.90E-03</b>	<b>5.83E-04</b>	<b>6.36E-05</b>	<b>8.05E-04</b>	<b>lb/hr</b>	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
<b>0.046</b>	<b>0.039</b>	<b>2.55E-03</b>	<b>2.78E-04</b>	<b>3.53E-03</b>	<b>tpy</b>	lb/hr * (8760hr/yr / 2000lb/ton)

HCOH	Benzene	Toluene	Naphthalene	Hexane	Total HAPs	Units	Notes
0.075	2.10E-03	3.40E-03	6.10E-04	1.80		lb/MMSCF	Emission factors from AP-42 Table 1.4-3
<b>7.94E-06</b>	<b>2.22E-07</b>	<b>3.60E-07</b>	<b>6.46E-08</b>	<b>1.91E-04</b>	<b>1.99E-04</b>	<b>lb/hr</b>	lb/MMscf * (Mscf/hr / 1000 Mscf/1 MMscf)
<b>3.48E-05</b>	<b>9.74E-07</b>	<b>1.58E-06</b>	<b>2.83E-07</b>	<b>8.35E-04</b>	<b>8.73E-04</b>	<b>tpy</b>	lb/hr * (8760hr/yr / 2000lb/ton)

**GHG Calculations:**

CO <sub>2</sub> <sup>2</sup>	N <sub>2</sub> O <sup>2</sup>	CH <sub>4</sub> <sup>2</sup>	CO <sub>2</sub> e <sup>2</sup>	Units	Notes
53.06	1.00E-04	1.00E-03		kg/MMBtu	40 CFR 98 Subpart C Tables C-1 and C-2
1.00	265.00	28.00		GWP	40 CFR 98 Table A-1
55.36	1.04E-04	1.04E-03		tpy	
<b>55.36</b>	<b>0.028</b>	<b>0.029</b>	<b>55.42</b>	tpy CO <sub>2</sub> e	

**Notes:**

<sup>1</sup> Waste gas emissions are represented under Units EDC-1 through EDC-3.

<sup>2</sup> N<sub>2</sub>O, CH<sub>4</sub>, and CO<sub>2</sub> tpy Emission Rate= EF \* Fuel Usage \* Fuel Heat Value \* 2.20462 lb/1 kg \* 1 ton/2000 lb

CO<sub>2</sub>e tpy Emission Rate = CO<sub>2</sub> Emission Rate + N<sub>2</sub>O Emission Rate\*GWP Factor +CH<sub>4</sub> Emission Rate\*GWP Factor



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**Calculation Description:**

Waste gas from the reactors (EBARA-1 through EBARA-12) is first combusted within the UPTIMUM PLUS units. Waste gas is then sent from the UPTIMUM PLUS units to the EDC units as an additional control step. Post-control in the EDC unit, the waste gas is emitted via the EDC stack. There are six (6) UPTIMUM PLUS units and three (3) EDC units in total. This calculation utilizes the ideal gas law equation to determine the mass flow rate of gas and then the control factor is applied.

Emission Unit Numbers: EDC-1 through EDC-3  
 Description: Electrostatic Dust Collector  
 Associated Controlled Equipment: Ebara Chambers (EBARA-1 through EBARA-12)  
 Number of Chambers Controlled: 12  
 Hours of Operation per Year: 8,760 hr  
 Overall Waste Gas Removal Efficiency: 0.99

Unit ID	Waste Gas Component	Max Flow Rate per Chamber (sL/min)	Average Flow Rate per Chamber (sL/min)	MW	Max Uncontrolled Flow Rate per Chamber (lb/hr)	Average Uncontrolled Flow Rate per Chamber (lb/hr)	Controlled Emissions per Chamber (lb/hr)	Controlled Emissions per Chamber (tpy)	Total Controlled Emissions (lb/hr)	Total Controlled Emissions (tpy)
EDC-1 through EDC-3	H2	150.00	150.00	2.02	1.69	1.69	0.017	0.074	0.20	0.89
	AsH3	2.00	0.70	77.95	0.87	0.30	8.71E-03	0.013	0.10	0.16
	PH3	4.00	2.00	34.00	0.76	0.38	7.60E-03	0.017	0.091	0.20
	Si2H6	0.010	0.010	62.22	3.48E-03	3.48E-03	3.48E-05	1.52E-04	4.17E-04	1.83E-03
	DIPSe (Diisopropylselenide)	0.010	0.010	165.14	9.22E-03	9.22E-03	9.22E-05	4.04E-04	1.11E-03	4.85E-03
	TMA (Trimethylamine)	0.030	0.010	59.11	9.90E-03	3.30E-03	9.90E-05	1.45E-04	1.19E-03	1.74E-03
	TMIn (Trimethylindium)	0.010	0.010	159.92	8.93E-03	8.93E-03	8.93E-05	3.91E-04	1.07E-03	4.69E-03
	TMGa (Trimethylgallium)	0.080	0.010	114.83	0.051	6.41E-03	5.13E-04	2.81E-04	6.16E-03	3.37E-03
	CCl4	0.010	0.010	153.82	8.59E-03	8.59E-03	8.59E-05	3.76E-04	1.03E-03	4.52E-03
	Total VOC									0.011
Total HAPs									0.20	0.37



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**Building 1 Evapco Cooling Tower Design Specifications**

Parameter	Units	Cooling Tower 1 & 2
Water Circulation Rate	gpm	3,000
Operating Hours per Year	hrs/yr	8,760
Drift Rate <sup>1</sup>	%	0.02
Water Authority Max TDS <sup>2</sup>	ppmw	312
Maximum TDS <sup>3</sup>	ppmw	500

<sup>1</sup> AP-42 Table 13.4-1.

<sup>2</sup> Max TDS value taken from 2024 Consumer Confidence Report – Zone 3, Albuquerque Bernalillo County Water Utility Authority (Water Authority).

<sup>3</sup> The Water Authority Max TDS value was rounded up to 500 ppmw to incorporate a conservative safety factor.

**Potential Emissions**

Source Name	EPN	Hourly Emissions (lb/hr) <sup>1</sup>			Annual Emissions (tpy) <sup>2</sup>		
		PM	PM <sub>10</sub>	PM <sub>2.5</sub>	PM	PM <sub>10</sub>	PM <sub>2.5</sub>
Cooling Tower Fan #1	CT1	0.075	0.068	1.36E-03	0.33	0.30	5.97E-03
Cooling Tower Fan #2	CT1	0.075	0.068	1.36E-03	0.33	0.30	5.97E-03
Cooling Tower Fan #3	CT2	0.075	0.068	1.36E-03	0.33	0.30	5.97E-03
Cooling Tower Fan #4	CT2	0.075	0.068	1.36E-03	0.33	0.30	5.97E-03
<b>Total Cooling Tower Emissions</b>		<b>0.30</b>	<b>0.27</b>	<b>5.45E-03</b>	<b>1.32</b>	<b>1.20</b>	<b>0.024</b>

<sup>1</sup> Maximum hourly emissions calculated for TDS values ranging from 0 to 12,000 ppm. Detailed calculations provided in the tables below.

<sup>2</sup> Annual Emissions (tpy) = Hourly Emissions \* Annual Operating Hours (hrs/yr) \* 1/2,000 (ton/lb)

$$\text{Annual Emissions of PM (tpy)} = \frac{0.07506 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{1 \text{ ton}}{2,000 \text{ lb}} = 0.33 \text{ tpy}$$

**Particle Size Distribution of PM Emissions from Cooling Towers**

**Particle Size Distribution Based on TDS<sup>1</sup>**

TDS (ppm)	0	500	1000	1500	3000	4500	6000	7500	9000	10500	12000	EPRI % Mass Smaller <sup>2</sup>
EPRI Droplet Diameter (µm) <sup>2</sup>	Solid Particle Diameter (µm) <sup>3</sup>											
10	0.00	0.61	0.77	0.88	1.11	1.27	1.40	1.51	1.60	1.68	1.76	0.000
20	0.00	1.22	1.54	1.76	2.22	2.54	2.79	3.01	3.20	3.37	3.52	0.196
30	0.00	1.83	2.31	2.64	3.33	3.81	4.19	4.52	4.80	5.05	5.28	0.226
40	0.00	2.44	3.08	3.52	4.44	5.08	5.59	6.02	6.40	6.73	7.04	0.514
50	0.00	3.05	3.84	4.40	5.54	6.35	6.99	7.53	8.00	8.42	8.80	1.816
60	0.00	3.66	4.61	5.28	6.65	7.62	8.38	9.03	9.60	10.10	10.56	5.702
70	0.00	4.27	5.38	6.16	7.76	8.89	9.78	10.54	11.20	11.79	12.32	21.348
90	0.00	5.49	6.92	7.92	9.98	11.42	12.57	13.55	14.39	15.15	15.84	49.812
110	0.00	6.71	8.46	9.68	12.20	13.96	15.37	16.56	17.59	18.52	19.36	70.509
130	0.00	7.93	10.00	11.44	14.42	16.50	18.16	19.57	20.79	21.89	22.88	82.023
150	0.00	9.15	11.53	13.20	16.63	19.04	20.96	22.58	23.99	25.25	26.40	88.012
180	0.00	10.98	13.84	15.84	19.96	22.85	25.15	27.09	28.79	30.31	31.69	91.032
210	0.00	12.82	16.15	18.48	23.29	26.66	29.34	31.61	33.59	35.36	36.97	92.468
240	0.00	14.65	18.45	21.12	26.61	30.47	33.53	36.12	38.38	40.41	42.25	94.091
270	0.00	16.48	20.76	23.76	29.94	34.27	37.72	40.64	43.18	45.46	47.53	94.689
300	0.00	18.31	23.07	26.40	33.27	38.08	41.91	45.15	47.98	50.51	52.81	96.288
350	0.00	21.36	26.91	30.81	38.81	44.43	48.90	52.68	55.98	58.93	61.61	97.011
400	0.00	24.41	30.76	35.21	44.36	50.78	55.89	60.20	63.97	67.35	70.41	98.340
450	0.00	27.46	34.60	39.61	49.90	57.12	62.87	67.73	71.97	75.76	79.21	99.071
500	0.00	30.51	38.44	44.01	55.45	63.47	69.86	75.25	79.97	84.18	88.01	99.071
600	0.00	36.62	46.13	52.81	66.54	76.16	83.83	90.30	95.96	101.02	105.62	100.000

<sup>1</sup> Particle size distribution calculated based on emission calculations outlined in Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers", Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, CA 95825.

<sup>2</sup> The EPRI Droplet Diameter and the EPRI % Mass Smaller obtained from Table 1. Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers", Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, CA 95825.

<sup>3</sup> Solid particle diameter is calculated from EPRI droplet diameter assuming that each water droplet evaporates shortly after being emitted into a single, solid, spherical particle using the equation below.

$$D_p = D_d [(TDS)(\rho_w / \rho_{TDS})]^{1/3}$$

Where,

TDS is in units of ppmw

$D_p$  = diameter of solid particle, micrometers ( $\mu m$ )

$D_d$  = diameter of drift droplet,  $\mu m$

Other assumptions include:

$\rho_{droplet}$	1	$g/cm^3$
$\rho_{solid}$	2.2	$g/cm^3$

**Particle Size Distribution and Emission Rates for PM<sub>10</sub> and PM<sub>2.5</sub>**

TDS (ppm)	Solid Particle Diameter used for PM <sub>10</sub> ( $\mu m$ )	% of Particles where diameter < 10 $\mu m$	Solid Particle Diameter used for PM <sub>2.5</sub> ( $\mu m$ )	% of Particles where diameter < 2.5 $\mu m$	Hourly Emission Rate <sup>1, 2, 3</sup>		
					Cooling Tower 1		
					PM	PM <sub>10</sub>	PM <sub>2.5</sub>
0					--	--	--
500	10.98	91.032	3.05	1.816	0.15	0.14	0.003
1000	10.00	82.023	3.08	0.514	0.30	0.25	0.0015
1500	11.44	82.023	2.64	0.226	0.45	0.37	0.0010
3000	12.20	70.509	3.33	0.226	0.90	0.64	0.0020
4500	11.42	49.812	2.54	0.196	1.35	0.67	0.003
6000	12.57	49.812	2.79	0.196	1.80	0.90	0.004
7500	10.54	21.348	3.01	0.196	2.25	0.48	0.004
9000	11.20	21.348	3.20	0.196	2.70	0.58	0.005
10500	10.10	5.702	3.37	0.196	3.15	0.18	0.006
12000	10.56	5.702	3.52	0.196	3.60	0.21	0.007
<b>Maximum Emission Rate (lb/hr):</b>					<b>3.60</b>	<b>0.90</b>	<b>0.007</b>

<sup>1</sup> Hourly Emissions of PM (lb/hr) = Water Circulation Rate (gpm) \* Drift Rate (%) / 100 x TDS (ppmw) \* 8.34 (lb water/gal) \* 60 (min/hr)

$$\text{Hourly Emissions of PM (lb/hr) @ 12,000 ppm} = \frac{1600 \text{ gal}}{\text{min}} \times \frac{0.02}{100} \times \frac{12,000 \text{ parts solids}}{1,000,000 \text{ part water}} \times \frac{8.34 \text{ lb water}}{\text{gal}} \times \frac{60 \text{ min}}{\text{hr}} = 1.92 \text{ lb/hr}$$

<sup>2</sup> Hourly Emissions of PM<sub>10</sub> (lb/hr) = Hourly Emissions of PM (lb/hr) \* PM<sub>10</sub> Portion of PM (%) / 100

$$\text{Hourly Emissions of PM}_{10} \text{ (lb/hr) @ 12,000 ppm} = \frac{1.92 \text{ lb}}{\text{hr}} \times \frac{5.702}{100} = 0.11 \text{ lb/hr}$$

<sup>3</sup> Hourly Emissions of PM<sub>2.5</sub> (lb/hr) = Hourly Emissions of PM (lb/hr) \* PM<sub>2.5</sub> Portion of PM (%) / 100

$$\text{Hourly Emissions of PM}_{2.5} \text{ (lb/hr) @ 12,000 ppm} = \frac{1.92 \text{ lb}}{\text{hr}} \times \frac{0.196}{100} = 0.0038 \text{ lb/hr}$$



**SolAero Technologies Corporation**  
SolAero Technologies Corporation

**Building 2 Baltimore Aircoil Cooling Tower Design Specifications**

Parameter	Units	Cooling Tower 3
Water Circulation Rate	gpm	2,400
Operating Hours per Year	hrs/yr	8,760
Drift Rate <sup>1</sup>	%	0.02
Water Authority Max TDS <sup>2</sup>	ppmw	312
Maximum TDS <sup>3</sup>	ppmw	500

<sup>1</sup> AP-42 Table 13.4-1.

<sup>2</sup> Max TDS value taken from 2024 Consumer Confidence Report – Zone 3, Albuquerque Bernalillo County Water Utility Authority (Water Authority).

<sup>3</sup> The Water Authority Max TDS value was rounded up to 500 ppmw to incorporate a conservative safety factor.

**Potential Emissions**

Source Name	EPN	Hourly Emissions (lb/hr) <sup>1</sup>			Annual Emissions (tpy) <sup>2</sup>		
		PM	PM <sub>10</sub>	PM <sub>2.5</sub>	PM	PM <sub>10</sub>	PM <sub>2.5</sub>
Cooling Tower Fan #5	CT3	0.060	0.055	1.09E-03	0.26	0.24	4.78E-03
Cooling Tower Fan #6	CT3	0.060	0.055	1.09E-03	0.26	0.24	4.78E-03
<b>Total Cooling Tower Emissions</b>		<b>0.12</b>	<b>0.11</b>	<b>2.18E-03</b>	<b>0.53</b>	<b>0.48</b>	<b>9.55E-03</b>

<sup>1</sup> Maximum hourly emissions calculated for TDS values ranging from 0 to 12,000 ppm. Detailed calculations provided in the tables below.

<sup>2</sup> Annual Emissions (tpy) = Hourly Emissions \* Annual Operating Hours (hrs/yr) \* 1/2,000 (ton/lb)

$$\text{Annual Emissions of PM (tpy)} = \frac{0.060048 \text{ lb}}{\text{hr}} \times \frac{8760 \text{ hr}}{\text{yr}} \times \frac{1 \text{ ton}}{2,000 \text{ lb}} = 0.26 \text{ tpy}$$

**Particle Size Distribution of PM Emissions from Cooling Towers**

**Particle Size Distribution Based on TDS<sup>1</sup>**

TDS (ppm)	0	500	1000	1500	3000	4500	6000	7500	9000	10500	12000	EPRI % Mass Smaller <sup>2</sup>
EPRI Droplet Diameter (µm) <sup>2</sup>	Solid Particle Diameter (µm) <sup>3</sup>											
10	0.00	0.61	0.77	0.88	1.11	1.27	1.40	1.51	1.60	1.68	1.76	0.000
20	0.00	1.22	1.54	1.76	2.22	2.54	2.79	3.01	3.20	3.37	3.52	0.196
30	0.00	1.83	2.31	2.64	3.33	3.81	4.19	4.52	4.80	5.05	5.28	0.226
40	0.00	2.44	3.08	3.52	4.44	5.08	5.59	6.02	6.40	6.73	7.04	0.514
50	0.00	3.05	3.84	4.40	5.54	6.35	6.99	7.53	8.00	8.42	8.80	1.816
60	0.00	3.66	4.61	5.28	6.65	7.62	8.38	9.03	9.60	10.10	10.56	5.702
70	0.00	4.27	5.38	6.16	7.76	8.89	9.78	10.54	11.20	11.79	12.32	21.348
90	0.00	5.49	6.92	7.92	9.98	11.42	12.57	13.55	14.39	15.15	15.84	49.812
110	0.00	6.71	8.46	9.68	12.20	13.96	15.37	16.56	17.59	18.52	19.36	70.509
130	0.00	7.93	10.00	11.44	14.42	16.50	18.16	19.57	20.79	21.89	22.88	82.023
150	0.00	9.15	11.53	13.20	16.63	19.04	20.96	22.58	23.99	25.25	26.40	88.012
180	0.00	10.98	13.84	15.84	19.96	22.85	25.15	27.09	28.79	30.31	31.69	91.032
210	0.00	12.82	16.15	18.48	23.29	26.66	29.34	31.61	33.59	35.36	36.97	92.468
240	0.00	14.65	18.45	21.12	26.61	30.47	33.53	36.12	38.38	40.41	42.25	94.091
270	0.00	16.48	20.76	23.76	29.94	34.27	37.72	40.64	43.18	45.46	47.53	94.689
300	0.00	18.31	23.07	26.40	33.27	38.08	41.91	45.15	47.98	50.51	52.81	96.288
350	0.00	21.36	26.91	30.81	38.81	44.43	48.90	52.68	55.98	58.93	61.61	97.011
400	0.00	24.41	30.76	35.21	44.36	50.78	55.89	60.20	63.97	67.35	70.41	98.340
450	0.00	27.46	34.60	39.61	49.90	57.12	62.87	67.73	71.97	75.76	79.21	99.071
500	0.00	30.51	38.44	44.01	55.45	63.47	69.86	75.25	79.97	84.18	88.01	99.071
600	0.00	36.62	46.13	52.81	66.54	76.16	83.83	90.30	95.96	101.02	105.62	100.000

<sup>1</sup> Particle size distribution calculated based on emission calculations outlined in *Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers", Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, CA 95825.*

<sup>2</sup> The EPRI Droplet Diameter and the EPRI % Mass Smaller obtained from Table 1. *Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers", Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, CA 95825.*

<sup>3</sup> Solid particle diameter is calculated from EPRI droplet diameter assuming that each water droplet evaporates shortly after being emitted into a single, solid, spherical particle using the equation below.

$$D_p = D_d [(TDS)(\rho_w / \rho_{TDS})]^{1/3}$$

Where,

TDS is in units of ppmw

$D_p$  = diameter of solid particle, micrometers ( $\mu m$ )

$D_d$  = diameter of drift droplet,  $\mu m$

Other assumptions include:

$\rho_{droplet}$	1	$g/cm^3$
$\rho_{solid}$	2.2	$g/cm^3$

**Particle Size Distribution and Emission Rates for PM<sub>10</sub> and PM<sub>2.5</sub>**

TDS (ppm)	Solid Particle Diameter used for PM <sub>10</sub> ( $\mu m$ )	% of Particles where diameter < 10 $\mu m$	Solid Particle Diameter used for PM <sub>2.5</sub> ( $\mu m$ )	% of Particles where diameter < 2.5 $\mu m$	Hourly Emission Rate <sup>1, 2, 3</sup>		
					Cooling Tower 1		
					PM	PM <sub>10</sub>	PM <sub>2.5</sub>
0					--	--	--
500	10.98	91.032	3.05	1.816	0.12	0.11	0.002
1000	10.00	82.023	3.08	0.514	0.24	0.20	0.0012
1500	11.44	82.023	2.64	0.226	0.36	0.30	0.0008
3000	12.20	70.509	3.33	0.226	0.72	0.51	0.0016
4500	11.42	49.812	2.54	0.196	1.08	0.54	0.002
6000	12.57	49.812	2.79	0.196	1.44	0.72	0.003
7500	10.54	21.348	3.01	0.196	1.80	0.38	0.004
9000	11.20	21.348	3.20	0.196	2.16	0.46	0.004
10500	10.10	5.702	3.37	0.196	2.52	0.14	0.005
12000	10.56	5.702	3.52	0.196	2.88	0.16	0.006
<b>Maximum Emission Rate (lb/hr):</b>					<b>2.88</b>	<b>0.72</b>	<b>0.01</b>

<sup>1</sup> Hourly Emissions of PM (lb/hr) = Water Circulation Rate (gpm) \* Drift Rate (%) / 100 x TDS (ppmw) \* 8.34 (lb water/gal) \* 60 (min/hr)

$$\text{Hourly Emissions of PM (lb/hr) @ 12,000 ppm} = \frac{1600 \text{ gal}}{\text{min}} \times \frac{0.02}{100} \times \frac{12,000 \text{ parts solids}}{1,000,000 \text{ part water}} \times \frac{8.34 \text{ lb water}}{\text{gal}} \times \frac{60 \text{ min}}{\text{hr}} = 1.92 \text{ lb/hr}$$

<sup>2</sup> Hourly Emissions of PM<sub>10</sub> (lb/hr) = Hourly Emissions of PM (lb/hr) \* PM<sub>10</sub> Portion of PM (%) / 100

$$\text{Hourly Emissions of PM}_{10} \text{ (lb/hr) @ 12,000 ppm} = \frac{1.92 \text{ lb}}{\text{hr}} \times \frac{5.702}{100} = 0.11 \text{ lb/hr}$$

<sup>3</sup> Hourly Emissions of PM<sub>2.5</sub> (lb/hr) = Hourly Emissions of PM (lb/hr) \* PM<sub>2.5</sub> Portion of PM (%) / 100

$$\text{Hourly Emissions of PM}_{2.5} \text{ (lb/hr) @ 12,000 ppm} = \frac{1.92 \text{ lb}}{\text{hr}} \times \frac{0.196}{100} = 0.0038 \text{ lb/hr}$$

## APPENDIX E. SUPPORTING INFORMATION

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Emergency Generator manufacturing specifications for Kohler and Cummins

AP-42 Table 3.3-1

AP-42 Table 1.4-1, 1.4-2, 1.4.-3

AP-42 Table 13.4-1

Lumina data sheet and schematics

DAS UPTIMUM PLUS and EDC PLUS manufacturer information

Purchasing records for chemicals

Vanaire scrubber efficiency documentation

2024 Consumer Confidence Report – Zone 3, ABCWUA

Table 1. Reisman, J. and G. Frisbie "Calculating Realistic PM10 Emissions from Cooling Towers"

Cooling tower design specifications



# EPA Tier 3 Exhaust Emission Compliance Statement 125DSGAB 60 Hz Diesel Generator Set

## Compliance Information:

The engine used in this generator set complies with the Tier 3 emissions limits of U.S EPA New Source Performance Standards for Stationary Emergency engines under the provisions of 40 CFR 60 Subpart IIII when tested per ISO 8178 D2.

Engine Manufacturer:	Cummins Inc.
EPA Certificate Number:	CEX-STATCI-11-20
Effective Date:	10/14/2010
Date Issued:	10/14/2010
EPA Diesel Engine Family:	BCEXL0409AAD
CARB Executive Order:	

## Engine Information:

Model:	Cummins Inc. QSB7-G5 NR3	Bore:	4.21 in. (107 mm)
Engine Nameplate HP:	324	Stroke:	4.88 in. (124 mm)
Type:	4 Cycle, In-line, 6 Cylinder Diesel	Displacement:	408 cu. in. (6.7 liters)
Aspiration:	Turbocharged and CAC		
Compression Ratio:	17.2:1		
Emission Control Device:	Turbocharged and CAC		

## U.S. Environmental Protection Agency NSPS Stationary Emergency Tier 3 Limits

(All values are Grams per HP-Hour)

<u>COMPONENT</u>	
NOx + HC (Oxides of Nitrogen as NO2 + Non Methane Hydrocarbons)	3.0
CO (Carbon Monoxide)	2.6
PM (Particulate Matter)	0.15

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

# Model: 300REOZD

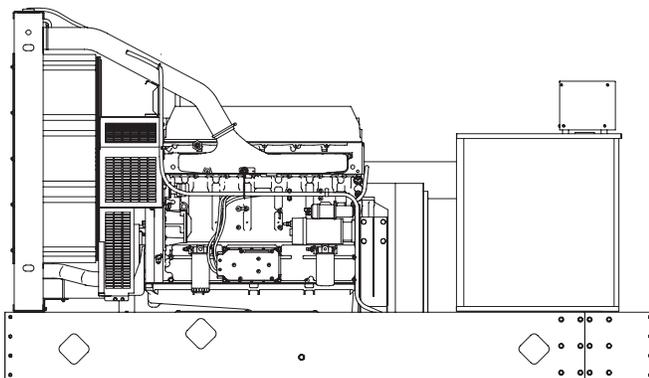
# KOHLER POWER SYSTEMS

## 190-600 V 4-Cycle Diesel



## Ratings Range

		60 Hz	50 Hz
Standby:	kW	280-300	252
	kVA	350-375	315
Prime:	kW	255-270	228
	kVA	319-338	285



## Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL-2200 listing.
- The generator set complies with ISO 8528-5, Class G2 requirements for transient performance in all generator set configurations. Select the Decision-Maker™ 550 controller for improved voltage regulation and ISO 8528-5, Class G3 compliance.
- The generator set accepts rated load in one step.
- The 60 Hz generator set engine is certified by the Environmental Protection Agency (EPA) to conform to Tier 2 nonroad emissions regulations.
- A one-year limited warranty covers all systems and components. Two-, five-, and ten-year extended warranties are also available.
- Generator features:
  - Kohler's unique Fast-Response™ excitation system delivers the fastest voltage response in the industry.
  - The brushless, rotating-field generator has broadrange reconnectability.
  - Kohler's permanent magnet-excited generator (PMG) provides superior short-circuit capability.
- Other features:
  - Controllers are available for all applications. See controller features inside.
  - The low coolant level shutdown prevents overheating. (Standard on radiator models only.)
  - Integral vibration isolation eliminates the need for under-unit vibration spring isolators.
  - An electronic, isochronous governor delivers precise frequency regulation.
  - Electronic engine controls and a generator microprocessor controller combine to deliver one of the most advanced control systems in today's generator market.

## Generator Ratings

Generator	Voltage	Ph	Hz	130°C Rise Standby Rating		105°C Rise Prime Rating	
				kW/kVA	Amps	kW/kVA	Amps
4UA13	120/208	3	60	300/375	1041	270/338	937
	120/240	3	60	300/375	902	270/338	812
	127/220	3	60	300/375	984	270/338	886
	139/240	3	60	300/375	902	270/338	812
	220/380	3	60	280/350	532	255/319	484
	240/416	3	60	300/375	520	270/338	468
	277/480	3	60	300/375	451	270/338	406
	347/600	3	60	300/375	361	270/338	325
	110/190	3	50	252/315	957	228/285	866
	110/220	3	50	252/315	827	228/285	748
	115/200	3	50	252/315	909	228/285	823
	120/208	3	50	252/315	874	228/285	791
	220/380	3	50	252/315	479	228/285	433
	230/400	3	50	252/315	455	228/285	411
240/416	3	50	252/315	437	228/285	396	

**RATINGS:** All three-phase units are rated at 0.8 power factor. **Standby Ratings:** Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. **Prime Power Ratings:** Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. Obtain the technical information bulletin (TIB-101) on ratings guidelines for the complete ratings definitions. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. **NOTE:** Order separate generator set specs for 50 or 60 Hz as this model cannot change frequency. **GENERAL GUIDELINES FOR DERATION:** **Altitude:** Derate 0.5% per 305 m (1000 ft.) elevation above 1525 m (5000 ft.) up to a maximum elevation of 3660 m (12000 ft.). **Temperature:** Derate 1.0% per 5.5°C (10°F) temperature above 40°C (104°F). For radiator cooling system capacity, derate 1.4°C (2.5°F) per 305 m (1000 ft.) elevation above 183 m (600 ft.).

# Alternator Specifications

Specifications	Generator
Manufacturer	Kohler
Type	4-Pole, Rotating Field
Exciter type	Brushless, Permanent-Magnet, Fast-Response™
Leads: quantity, type	12, Reconnectable
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	
Standard	±2%
Decision-Maker™ 550 controller (with 0.5% drift due to temp. variation)	3-Phase Sensing, ±0.25%
One-step load acceptance	100% of Rating
Unbalanced load capability	100% of Rated Standby Current
Peak motor starting kVA:	(35% dip for voltages below)
480 V, 380 V 4UA13	980 (60Hz), 600 (50Hz)

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the generator field.
- Self-ventilated and drip-proof construction.
- Vacuum-impregnated windings with fungus-resistant epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Solid-state, volts-per-hertz voltage regulator with ±2% no-load to full-load regulation.
- Fast-Response™ brushless alternator with brushless exciter for excellent load response.

## Application Data

### Engine

Engine Specifications	60 Hz	50 Hz
Manufacturer	Detroit Diesel	
Engine: model, type	S60, 4-Cycle Turbocharged, Aftercooled	
Cylinder arrangement	6, Inline	
Displacement, L (cu. in.)	12.7 (778)	
Bore and stroke, mm (in.)	130 x 160 (5.12 x 6.30)	
Compression ratio	15.0:1	
Piston speed, m/min. (ft./min.)	576 (1890)	480 (1575)
Main bearings: quantity, type	7, Precision Half-Shell	
Rated rpm	1800	1500
Max. power at rated rpm, kWm (BHP)	366 (490)	321 (430)
Cylinder head material	Cast Iron	
Piston: type, material	Crosshead, Malleable Iron	
Crankshaft material	Forged Steel	
Valve material:		
Intake	Iron Based Seat	
Exhaust	Nickel Based Seat	
Governor: type, make/model	DDEC Electronic Control	
Frequency regulation, no-load to full-load	Isochronous	
Frequency regulation, steady state	±0.25%	
Frequency	Fixed	
Air cleaner type, all models	Dry	

### Exhaust

Exhaust System	60 Hz	50 Hz
Exhaust flow at rated kW, m <sup>3</sup> /min. (cfm)	71.6 (2530)	60.9 (2150)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	416 (780)	443 (830)
Maximum allowable back pressure, kPa (in. Hg)	10.2 (3.0)	
Engine exhaust outlet size, mm (in.)	See ADV Drawing	

### Engine Electrical

Engine Electrical System	60 Hz	50 Hz
Battery charging alternator:		
Ground (negative/positive)		Negative
Volts (DC)		24
Ampere rating		40
Starter motor rated voltage (DC)		24
Battery, recommended cold cranking amps (CCA):		
Qty., CCA rating		2, 950
Battery voltage (DC)		12

### Fuel

Fuel System	60 Hz	50 Hz
Fuel supply line, min. ID, mm (in.)	13 (0.50)	
Fuel return line, min. ID, mm (in.)	8 (0.31)	
Max. lift, engine-driven fuel pump, m (ft.)	2.1 (6.8)	
Max. fuel flow, Lph (gph)	329 (86.8)	
Fuel prime pump	N/A	
Fuel filter: quantity, type	2, Primary/Secondary	
Recommended fuel	#2 Diesel	

### Lubrication

Lubricating System	60 Hz	50 Hz
Type	Full Pressure	
Oil pan capacity, L (qt.)	30 (32)	
Oil pan capacity with filter, L (qt.)	36 (38)	
Oil filter: quantity, type	2, Cartridge	
Oil cooler	Water-Cooled	

# Application Data

## Cooling (Standard Radiator)

Cooling System	60 Hz	50 Hz
Ambient temperature, °C (°F) *	50 (122)	
Engine jacket water capacity, L (gal.)	22.7 (6.0)	
Radiator system capacity, including engine, L (gal.)	45.4 (12)	
Engine jacket water flow, Lpm (gpm)	363 (96)	300 (80)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	136 (7746)	121 (6871)
Heat rejected to air charge cooler at rated kW, dry exhaust, kW (Btu/min.)	87.8 (4997)	64.5 (3667)
Water pump type	Centrifugal	
Fan diameter, including blades, mm (in.)	991 (39)	
Fan, kWm (HP)	22 (30)	13 (18)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H <sub>2</sub> O)	0.125 (0.5)	

\* Weather housing reduces ambient temperature capability by 6°C (10°F).

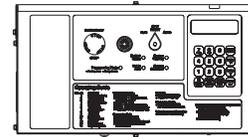
## Operation Requirements

Air Requirements	60 Hz	50 Hz
Radiator-cooled cooling air, m <sup>3</sup> /min. (scfm) †	561 (19800)	467 (16500)
Combustion air, m <sup>3</sup> /min. (cfm)	30 (1070)	25 (875)
Heat rejected to ambient air:		
Engine, kW (Btu/min.) . . . . .	51.8 (2949)	44.1 (2511)
Generator, kW (Btu/min.) . . . . .	24.3 (1382)	21.9 (1245)

† Air density = 1.20 kg/m<sup>3</sup> (0.075 lbm/ft<sup>3</sup>)

Fuel Consumption	60 Hz	50 Hz
<b>Diesel, Lph (gph) at % load</b>	<b>Standby Rating</b>	
100%	82.5 (21.8)	70.8 (18.7)
75%	61.7 (16.3)	53.8 (14.2)
50%	42.0 (11.1)	36.7 (9.7)
25%	22.7 (6.0)	20.4 (5.4)
<b>Diesel, Lph (gph) at % load</b>	<b>Prime Rating</b>	
100%	74.9 (19.8)	64.6 (17.1)
75%	56.3 (14.9)	49.1 (13.0)
50%	38.5 (10.2)	33.7 (8.9)
25%	20.9 (5.5)	18.9 (5.0)

# Controllers



## Available Controllers

### Decision-Maker™ 550 Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Programmable microprocessor logic and digital display features. Generator safeguard circuit protection. 12- or 24-volt engine electrical system capability. Remote start, remote annunciation, and remote communication options. Refer to G6-46 for additional controller features and accessories.

### Decision-Maker™ 3+, 16-Light Controller

Audiovisual annunciation with NFPA 110 Level 1 capability. Microprocessor logic, AC meters, and engine gauge features. 12- or 24-volt engine electrical system capability. Remote start, prime power, and remote annunciation options. Refer to G6-30 for additional controller features and accessories.

## Standard Features and Accessories

### Standard Features

- Alternator Protection (standard with Decision-Maker™ 550)
- Battery Rack and Cables
- Electronic, Isochronous Governor
- Oil Drain Extension
- Operation and Installation Literature

### Accessories

#### Enclosed Unit

- Exhaust Silencer, Critical (kit: PA-354258)
- Exhaust Silencer, Residential (kit: PA-354257)
- Silencer Mounting Kit for Weather Housing
- Tail Pipe and Rain Cap Kit
- Weather Housing (with skid end caps)

#### Open Unit

- Exhaust Silencer, Hospital (kits: PA-354903, PA-354905)
- Exhaust Silencer, Critical (kits: PA-354880, PA-354881)
- Exhaust Silencer, Residential (kits: PA-354882, PA-354883)
- Exhaust Silencer, Industrial (kits: PA-354904, PA-354906)
- Flexible Exhaust Connector, Stainless Steel

#### Cooling System

- Block Heater
- Radiator Duct Flange

#### Fuel System

- Flexible Fuel Lines
- Fuel Pressure Gauge
- Fuel/Water Separator with Prime Feature
- Hand Primer Pump
- Subbase Fuel Tanks
- Subbase Fuel Tank with Day Tank

#### Electrical System

- Battery
- Battery Charger, Equalize/Float Type
- Battery Heater

#### Engine and Generator

- Air Cleaner, Heavy Duty
- Air Cleaner Restriction Indicator
- Bus Bar Kits
- Crankcase Emission Canister
- CSA Certification
- Generator Strip Heater
- Line Circuit Breaker (NEMA1 enclosure)
- Line Circuit Breaker with Shunt Trip (NEMA1 enclosure)
- Optional Generators
- Rated Power Factor Testing
- Rodent Guards
- Safeguard Breaker (not available with Decision-Maker™ 550)
- Skid End Caps
- Voltage Regulation, 1%
- Voltage Regulator Sensing, Three-Phase

#### Paralleling System

- Load-Sharing Module
- Reactive Droop Compensator
- Voltage Regulator Relocation Kit

#### Maintenance and Literature

- General Maintenance Literature Kit
- Maintenance Kit (includes air, oil, and fuel filters)
- NFPA 110 Literature
- Overhaul Literature Kit
- Production Literature Kit

#### Controller

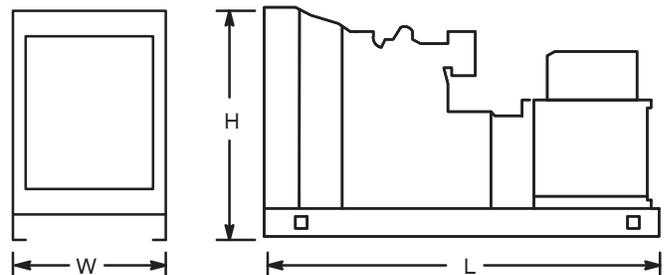
- Common Failure Relay Kit
- Communications Products and PC Software (Decision-Maker™ 550 controller only)
- Customer Connection Kit
- Dry Contact Kit (isolated alarm)
- Engine Prealarm Sender Kit
- Remote Annunciator Panel
- Remote Audiovisual Alarm Panel
- Remote Emergency Stop Kit
- Remote Mounting Cable
- Run Relay Kit

#### Miscellaneous Accessories

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

### Dimensions and Weights

Overall Size, L x W x H, mm (in.): 3416 x 1270 x 1953  
 (134.5 x 50.0 x 76.9)  
 Weight (radiator model), wet, kg (lb.): 3032 (6684)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

**DISTRIBUTED BY:**

Table 3.3-1. EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES<sup>a</sup>

Pollutant	Gasoline Fuel (SCC 20200301, 20300301)	Gasoline Fuel (SCC 20200301, 20300301)	Diesel Fuel (SCC 20200102, 20300101)	Diesel Fuel (SCC 20200102, 20300101)	Emission Factor Rating
	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	Emission Factor (lb/hp- hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	
NO <sub>x</sub>	0.011	1.63	0.031	4.41	D
CO	6.96 E-03 <sup>d</sup>	0.99 <sup>d</sup>	6.68 E-03	0.95	D
SO <sub>x</sub>	5.91 E-04	0.084	2.05 E-03	0.29	D
PM-10 <sup>b</sup>	7.21 E-04	0.10	2.20 E-03	0.31	D
CO <sub>2</sub> <sup>c</sup>	1.08	154	1.15	164	B
Aldehydes	4.85 E-04	0.07	4.63 E-04	0.07	D
TOC - Exhaust	0.015	2.10	2.47 E-03	0.35	D
TOC - Evaporative	6.61 E-04	0.09	0.00	0.00	E
TOC - Crankcase	4.85 E-03	0.69	4.41 E-05	0.01	E
TOC - Refueling	1.08 E-03	0.15	0.00	0.00	E

<sup>a</sup> References 2,5-6,9-14. When necessary, an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr. To convert from lb/hp-hr to kg/kw-hr, multiply by 0.608. To convert from lb/MMBtu to ng/J, multiply by 430. SCC = Source Classification Code. TOC = total organic compounds.

<sup>b</sup> PM-10 = particulate matter less than or equal to 10 µm aerodynamic diameter. All particulate is assumed to be # 1 µm in size.

<sup>c</sup> Assumes 99% conversion of carbon in fuel to CO<sub>2</sub> with 87 weight % carbon in diesel, 86 weight % carbon in gasoline, average BSFC of 7,000 Btu/hp-hr, diesel heating value of 19,300 Btu/lb, and gasoline heating value of 20,300 Btu/lb.

<sup>d</sup> Instead of 0.439 lb/hp-hr (power output) and 62.7 lb/mmBtu (fuel input), the correct emissions factors values are 6.96 E-03 lb/hp-hr (power output) and 0.99 lb/mmBtu (fuel input), respectively. This is an editorial correction. March 24, 2009.

Table 1.4-1. EMISSION FACTORS FOR NITROGEN OXIDES (NO<sub>x</sub>) AND CARBON MONOXIDE (CO)  
FROM NATURAL GAS COMBUSTION<sup>a</sup>

Combustor Type (MMBtu/hr Heat Input) [SCC]	NO <sub>x</sub> <sup>b</sup>		CO	
	Emission Factor (lb/10 <sup>6</sup> scf)	Emission Factor Rating	Emission Factor (lb/10 <sup>6</sup> scf)	Emission Factor Rating
Large Wall-Fired Boilers (>100) [1-01-006-01, 1-02-006-01, 1-03-006-01]				
Uncontrolled (Pre-NSPS) <sup>c</sup>	280	A	84	B
Uncontrolled (Post-NSPS) <sup>c</sup>	190	A	84	B
Controlled - Low NO <sub>x</sub> burners	140	A	84	B
Controlled - Flue gas recirculation	100	D	84	B
Small Boilers (<100) [1-01-006-02, 1-02-006-02, 1-03-006-02, 1-03-006-03]				
Uncontrolled	100	B	84	B
Controlled - Low NO <sub>x</sub> burners	50	D	84	B
Controlled - Low NO <sub>x</sub> burners/Flue gas recirculation	32	C	84	B
Tangential-Fired Boilers (All Sizes) [1-01-006-04]				
Uncontrolled	170	A	24	C
Controlled - Flue gas recirculation	76	D	98	D
Residential Furnaces (<0.3) [No SCC]				
Uncontrolled	94	B	40	B

<sup>a</sup> Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. To convert from lb/10<sup>6</sup> scf to kg/10<sup>6</sup> m<sup>3</sup>, multiply by 16. Emission factors are based on an average natural gas higher heating value of 1,020 Btu/scf. To convert from lb/10<sup>6</sup> scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. SCC = Source Classification Code. ND = no data. NA = not applicable.

<sup>b</sup> Expressed as NO<sub>2</sub>. For large and small wall fired boilers with SNCR control, apply a 24 percent reduction to the appropriate NO<sub>x</sub> emission factor. For tangential-fired boilers with SNCR control, apply a 13 percent reduction to the appropriate NO<sub>x</sub> emission factor.

<sup>c</sup> NSPS=New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction modification, or reconstruction after June 19, 1984.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION<sup>a</sup>

Pollutant	Emission Factor (lb/10 <sup>6</sup> scf)	Emission Factor Rating
CO <sub>2</sub> <sup>b</sup>	120,000	A
Lead	0.0005	D
N <sub>2</sub> O (Uncontrolled)	2.2	E
N <sub>2</sub> O (Controlled-low-NO <sub>x</sub> burner)	0.64	E
PM (Total) <sup>c</sup>	7.6	D
PM (Condensable) <sup>c</sup>	5.7	D
PM (Filterable) <sup>c</sup>	1.9	B
SO <sub>2</sub> <sup>d</sup>	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

<sup>a</sup> Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from lb/10<sup>6</sup> scf to kg/10<sup>6</sup> m<sup>3</sup>, multiply by 16. To convert from lb/10<sup>6</sup> scf to lb/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds.

VOC = Volatile Organic Compounds.

<sup>b</sup> Based on approximately 100% conversion of fuel carbon to CO<sub>2</sub>.  $CO_2[\text{lb}/10^6 \text{ scf}] = (3.67) (\text{CON}) (\text{C})(\text{D})$ , where CON = fractional conversion of fuel carbon to CO<sub>2</sub>, C = carbon content of fuel by weight (0.76), and D = density of fuel,  $4.2 \times 10^{-4} \text{ lb}/10^6 \text{ scf}$ .

<sup>c</sup> All PM (total, condensable, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM<sub>10</sub>, PM<sub>2.5</sub> or PM<sub>1</sub> emissions. Total PM is the sum of the filterable PM and condensable PM. Condensable PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

<sup>d</sup> Based on 100% conversion of fuel sulfur to SO<sub>2</sub>.

Assumes sulfur content is natural gas of 2,000 grains/10<sup>6</sup> scf. The SO<sub>2</sub> emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO<sub>2</sub> emission factor by the ratio of the site-specific sulfur content (grains/10<sup>6</sup> scf) to 2,000 grains/10<sup>6</sup> scf.

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION<sup>a</sup>

CAS No.	Pollutant	Emission Factor (lb/10 <sup>6</sup> scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene <sup>b, c</sup>	2.4E-05	D
56-49-5	3-Methylcholanthrene <sup>b, c</sup>	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene <sup>b, c</sup>	<1.6E-05	E
83-32-9	Acenaphthene <sup>b, c</sup>	<1.8E-06	E
203-96-8	Acenaphthylene <sup>b, c</sup>	<1.8E-06	E
120-12-7	Anthracene <sup>b, c</sup>	<2.4E-06	E
56-55-3	Benz(a)anthracene <sup>b, c</sup>	<1.8E-06	E
71-43-2	Benzene <sup>b</sup>	2.1E-03	B
50-32-8	Benzo(a)pyrene <sup>b, c</sup>	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene <sup>b, c</sup>	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene <sup>b, c</sup>	<1.2E-06	E
207-08-9	Benzo(k)fluoranthene <sup>b, c</sup>	<1.8E-06	E
106-97-8	Butane	2.1E+00	E
218-01-9	Chrysene <sup>b, c</sup>	<1.8E-06	E
53-70-3	Dibenzo(a,h)anthracene <sup>b, c</sup>	<1.2E-06	E
25321-22-6	Dichlorobenzene <sup>b</sup>	1.2E-03	E
74-84-0	Ethane	3.1E+00	E
206-44-0	Fluoranthene <sup>b, c</sup>	3.0E-06	E
86-73-7	Fluorene <sup>b, c</sup>	2.8E-06	E
50-00-0	Formaldehyde <sup>b</sup>	7.5E-02	B
110-54-3	Hexane <sup>b</sup>	1.8E+00	E
193-39-5	Indeno(1,2,3-cd)pyrene <sup>b, c</sup>	<1.8E-06	E
91-20-3	Naphthalene <sup>b</sup>	6.1E-04	E
109-66-0	Pentane	2.6E+00	E
85-01-8	Phenanathrene <sup>b, c</sup>	1.7E-05	D
74-98-6	Propane	1.6E+00	E

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION (Continued)

CAS No.	Pollutant	Emission Factor (lb/10 <sup>6</sup> scf)	Emission Factor Rating
129-00-0	Pyrene <sup>b, c</sup>	5.0E-06	E
108-88-3	Toluene <sup>b</sup>	3.4E-03	C

- <sup>a</sup> Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from lb/10<sup>6</sup> scf to kg/10<sup>6</sup> m<sup>3</sup>, multiply by 16. To convert from lb/10<sup>6</sup> scf to lb/MMBtu, divide by 1,020. Emission Factors preceded with a less-than symbol are based on method detection limits.
- <sup>b</sup> Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.
- <sup>c</sup> HAP because it is Polycyclic Organic Matter (POM). POM is a HAP as defined by Section 112(b) of the Clean Air Act.
- <sup>d</sup> The sum of individual organic compounds may exceed the VOC and TOC emission factors due to differences in test methods and the availability of test data for each pollutant.

Table 13.4-1 (Metric And English Units). PARTICULATE EMISSIONS FACTORS FOR WET COOLING TOWERS<sup>a</sup>

Tower Type <sup>d</sup>	Total Liquid Drift <sup>b</sup>			PM-10 <sup>c</sup>			
	Circulating Water Flow <sup>b</sup>	g/daL	lb/10 <sup>3</sup> gal	EMISSION FACTOR RATING	g/daL <sup>c</sup>	lb/10 <sup>3</sup> gal	EMISSION FACTOR RATING
Induced Draft (SCC 3-85-001-01, 3-85-001-20, 3-85-002-01)	0.020	2.0	1.7	D	0.023	0.019	E
Natural Draft (SCC 3-85-001-02, 3-85-002-02)	0.00088	0.088	0.073	E	ND	ND	—

<sup>a</sup> References 1-17. Numbers are given to 2 significant digits. ND = no data. SCC = Source Classification Code.

<sup>b</sup> References 2,5-7,9-10,12-13,15-16. Total liquid drift is water droplets entrained in the cooling tower exit air stream. Factors are for % of circulating water flow ( $10^{-2}$  L drift/L [ $10^{-2}$  gal drift/gal] water flow) and g drift/daL (lb drift/10<sup>3</sup> gal) circulating water flow. 0.12 g/daL = 0.1 lb/10<sup>3</sup> gal; 1 daL = 10<sup>1</sup> L.

<sup>c</sup> See discussion in text on how to use the table to obtain PM-10 emission estimates. Values shown above are the arithmetic average of test results from References 2,4,8, and 11-14, and they imply an effective TDS content of approximately 12,000 parts per million (ppm) in the circulating water.

<sup>d</sup> See Figure 13.4-1 and Figure 13.4-2. Additional SCCs for wet cooling towers of unspecified draft type are 3-85-001-10 and 3-85-002-10.

<sup>e</sup> Expressed as g PM-10/daL (lb PM-10/10<sup>3</sup> gal) circulating water flow.

parameter for the cooling tower water (such as conductivity, calcium, chlorides, or phosphate) to that parameter for the make-up water. This estimated cooling tower TDS can be used to calculate the PM-10 emission factor as above. If neither of these methods can be used, the arithmetic average PM-10 factor given in Table 13.4-1 can be used. Table 13.4-1 presents the arithmetic average PM-10 factor calculated from the test data in References 2, 4, 8, and 11 - 14. Note that this average corresponds to an effective cooling tower recirculating water TDS content of approximately 11,500 ppm for induced draft towers. (This can be found by dividing the total liquid drift factor into the PM-10 factor.)

As an alternative approach, if TDS data are unavailable for an induced draft tower, a value may be selected from Table 13.4-2 and then be combined with the total liquid drift factor in Table 13.4-1 to determine an apparent PM-10 factor.

As shown in Table 13.4-2, available data do not suggest that there is any significant difference between TDS levels in counter and cross flow towers. Data for natural draft towers are not available.



# Lumina MOCVD Platform

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- > Based on industry-leading TurboDisc MOCVD technology
- > Simple, effective and reliable design
- > Stable and clean operation leads to long campaign between preventive maintenance

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Modular design for ease of operation and maintenance

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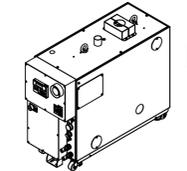
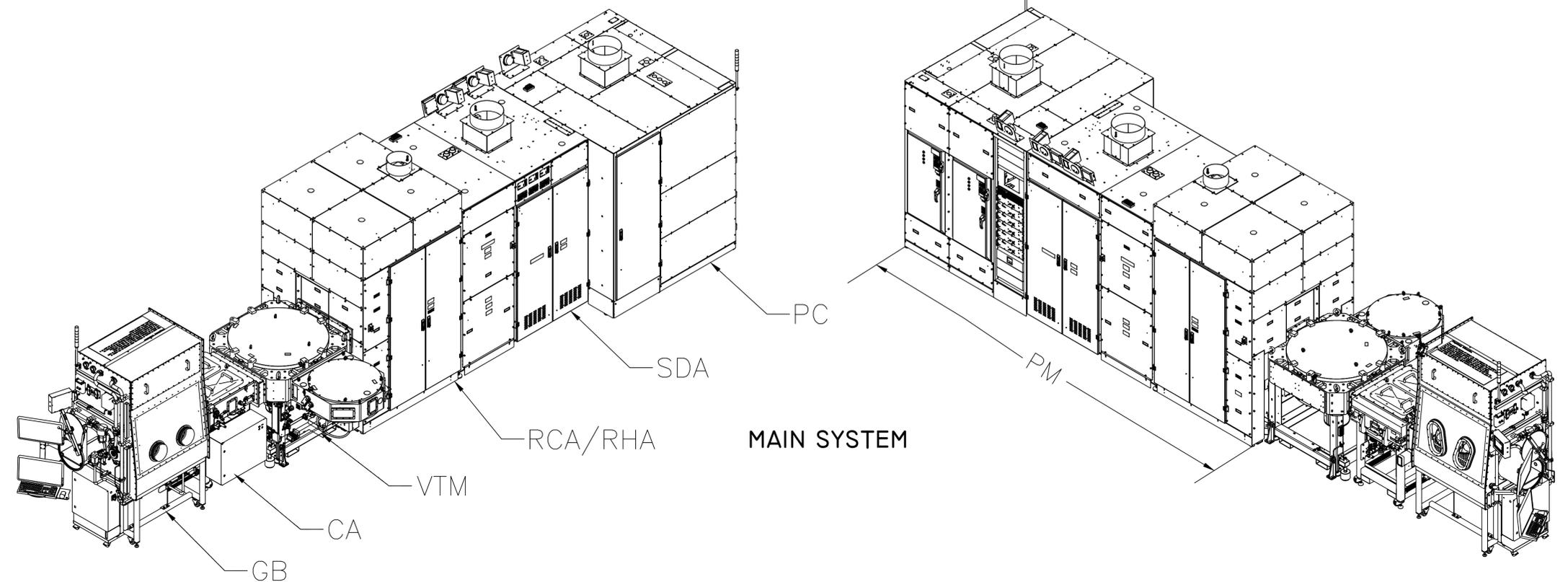
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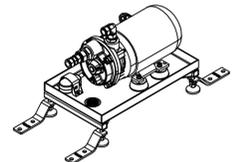
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**LEGEND:**

- GB : GLOVE BOX
- CA : CARRIER ANTECHAMBER
- VTM : VACUUM TRANSFER MODULE
- SDA : SOURCE DELIVERY ASSEMBLY
- RHA : REACTOR HOUSING ASSEMBLY
- RCA : REACTOR CART ASSEMBLY
- PC : PUMP CABINET
- PM : PROCESS MODULE
- EB : EQUIPMENT BOUNDARY
- LFP : LOAD FACE PLANE
- HDP : HORIZONTAL DATUM PLANE
- SB : SEISMIC BRACKET
- CTP : CARRIER TRANSFER PLANE
- FDP : FACIAL DATUM PLANE
- BDP : BILATERAL DATUM PLANE



**PROCESS PUMP  
QTY-02**



**RECIRCULATORY PUMP  
QTY-01**

**NOTES**

1. ALL GASES AND WATER SUPPLIED TO THE VEECO SYSTEM MUST BE INDEPENDENTLY REGULATED.
2. PRESSURE REQUIREMENTS TO BE MEASURED AT THE BULKHEAD LOCATION.
3. SYSTEM OPERATION TEMPERATURE IS TO BE 19-28°C WITH RELATIVE HUMIDITY FROM 25%-75% (NON-CONDENSING).
4. PIPING & CONNECTIONS:  
 THE CUSTOMER FACILITY PIPING MUST PROVIDE THE REQUIRED PRESSURES AND FLOW-RATES AT THE SYSTEM AS INDICATED IN TABLE 1.  
 THE PIPING CONNECTION TO THE SYSTEM SHOULD NOT PRESENT LIMITING PRESSURE DROPS DUE TO FRICTIONAL LOSSES.  
 THE CUSTOMER MUST MAKE THE NECESSARY PRESSURE-DROP CALCULATIONS FOR THE FACILITY PIPING TO BE USED.  
 VEECO REQUIRES SMOOTH ( <5 RA ) INTERNAL-WALL, HIGH-PURITY GRADE 316 STAINLESS STEEL TUBING.
5. EXHAUST VENTILATION PRESSURE SWITCH TO READ PRESSURE BENEATH THE EXHAUST DAMPERS. INSTALL DAMPERS ON SIDE OPPOSITE OF PRESSURE SWITCH BULKHEAD.
6. WATER QUALITY:  
  
 WARNING! DE-IONIZED OR DISTILLED WATER IS CORROSIVE TO METALS AND CANNOT BE USED.  
 WARNING! ETHYLENE GLYCOL OR OTHER ANTI-FREEZE MIXTURES CANNOT BE USED DUE TO THEIR HIGH VISCOSITY COMPARED TO WATER.  
  
 THE QUALITY OF THE SUPPLIED FACILITY COOLING WATER MUST MEET THE FOLLOWING SPECIFICATIONS:  
  
 PARTICULATE: SUPPLY FILTERED TO 10 MICRONS.  
 HARDNESS: 60 PPM MAXIMUM (CALCIUM & MAGNESIUM CARBONATES).  
 SILICA: 60 PPM MAXIMUM  
 TDS (TOTAL DISSOLVED SOLIDS): 800 PPM MAXIMUM  
 PH VALUE: MAINTAIN SLIGHTLY ALKALINE SOLUTION BETWEEN 7.5-8.5PH  
 CONDUCTIVITY: LESS THAN 2000MS/CM  
 CORROSION: USE CORROSION INHIBITORS TO MINIMIZE THE NEGATIVE EFFECTS OF CORROSION. (NITRIDE BORATE OR SODIUM NITRIDE IS COMMON.)  
 BIOCIDES: USE NON-CHLORIDE BASED BIOCIDAL ADDITIVES (BACTERICIDE, ALGAEICIDE) TO KILL MICRO-ORGANISMS AND PREVENT THEIR GROWTH.
7. POWER QUALITY: AC POWER QUALITY MUST COMPLY WITH THE STANDARDS OUTLINED IN SEMI F47 (VOLTAGE SAG IMMUNITY) AND EN 50160 (POWER QUALITY MEASUREMENT).
8. REFERENCE DRAWING FEA19000 AS NEEDED FOR DESIGNING SEISMIC BRACKETS TO ANCHOR THE SYSTEM
9. ALL DIMENSIONS ON THIS PAGE: INCH & [MM]

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FILLETS R.015 FINISH 125	THIRD ANGLE PROJECTION	FRACTIONAL ±1/64	ANGULAR ±1/2°	ENG: ELIO F	CHKR: HARSHA	DRWR: VINAYAK	APPVD: ELIO F
				SHEET 1		OF 18	

TABLE 1 - GAS SPECIFICATIONS AT SYSTEM INLET BULKHEAD

Port #	MODULE	GAS INPUTS	TYPICAL PROCESS FLOW (SLM)*	ESTIMATED MAX FLOW (SLM)**	MIN SUPPLY PRESSURE***	MAX SUPPLY PRESSURE***	BULKHEAD FITTING TYPE****	GAS PURITY
F1	SDA	PURIFIED N2	5-17	180	80 PSIG [5.52BAR]	100 PSIG [6.89BAR]	3/8IN TUBE STUB	<5 PBB H2O
F2		PH3****	4.6	10	60 PSIG [4.14BAR]	100 PSIG [6.89BAR]	1/4IN TUBE STUB	<5 PBB H2O
F3		ASH3****	2	3.3	60 PSIG [4.14BAR]	100 PSIG [6.89BAR]	1/4IN TUBE STUB	<5 PBB H2O
F4		DOPANT A	-	-	60 PSIG [4.14BAR]	100 PSIG [6.89BAR]	1/4IN TUBE STUB	-
F5		DOPANT B (SI2H6)	0.5	1	60 PSIG [4.14BAR]	100 PSIG [6.89BAR]	1/4IN TUBE STUB	<5 PBB H2O
F6		PURIFIED H2	400	729	80 PSIG [5.52BAR]	100 PSIG [6.89BAR]	3/8IN TUBE STUB	<5 PBB H2O
F7		HOUSE N2	76	76	35 PSIG [2.41BAR]	60 PSIG [4.14BAR]	1/4IN SWAGELOK	<10 PBB H2O
F8		HOUSE N2/CDA	15	30	85 PSIG [5.86BAR]	100 PSIG [6.89BAR]	1/4IN COMPRESSION FEMALE	<-70C DEW POINT
F9	VTM	PURIFIED N2	140	140	80 PSIG [5.52BAR]	100 PSIG [6.89BAR]	1/4IN VCR MALE	<5 PBB H2O
F10		HOUSE N2/CDA	15	30	80 PSIG [5.52BAR]	100 PSIG [6.89BAR]	1/4IN,ONE TOUCH,FTG	<-70C DEW POINT

\*CUSTOMER PROCESS MAY REQUIRE DIFFERENT FLOW  
 \*\*MAX FLOW IS DEFINED AS THE SUM OF THE FLOWS OF ALL PRIMARY MFC'S WHEN FULLY OPEN  
 \*\*\*PRESSURE VALUES AS MEASURED AT THE SYSTEM BULKHEAD  
 \*\*\*\*AsH3/PH3 MUST BE REGULATED AT 30PSIG [2.07 BAR]  
 \*\*\*\*\*AsP, PH3, H2 AND SI2H6 FACILITY SUPPLY LINES MUST BE FULLY WELDED CONNECTIONS TO THE FIRST VCR CONNECTION AT THE AUTOMATIC LOTO SHUT-OFF VALVE INSIDE VOLUME ENVELOPE OF THE MOCVD SYSTEM. ALL EXTERNALLY CAPPED VCR CONNECTIONS ARE PROVIDED FOR TESTING ONLY AND MUST BE REMOVED & REPLACED WITH FULLY WELDED CONNECTIONS PRIOR TO EXPOSURE TO PROCESS GASES.

TABLE 2 - WATER SPECIFICATION \*

#	MODULE	CONNECTION	FROM	TO	TYPICAL FLOW (LPM/GPM)	SUPPLY PRESSURE	MIN SUPPLY RETURN DELTA PRESSURE**	SUPPLY TEMPERATURE	FITTING
F11	SDA	MAIN SYSTEM SUPPLY	FACILITY	SDA	97.2/25.7	75.4±7.2PSIG [5.2 ±0.5BAR]	39.8PSIG [2.75BAR]	19+/-1°C	2IN CAM GROVE A-A-59326
F12		MAIN SYSTEM RETURN	SDA	FACILITY	-	-	-	-	2IN CAM GROVE A-A-59326

\* SEE NOTE 6 ON SHEET 1 REGARDING WATER QUALITY REQUIREMENTS.  
 \*\*MINIMUM PRESSURE AT RETURN WATER CONNECTION = 5 PSIG (0.345 BAR).

TABLE 3 - ELECTRICAL REQUIREMENTS

PORT	F17	F18
PARAMETER	REQUIREMENTS	
VOLTAGE	380 VAC +/-10%, 3 PHASE	208 VAC +/-10%, 1 PHASE
MAIN BREAKER	150A	100A
AMPS	140A	63A
FREQUENCY	50/60 Hz	50/60 Hz
WIRING REQUIREMENT	3 WIRES + GROUND	2 WIRES + GROUND
NOMINAL POWER	-	-
PEAK POWER	92KVA	14KVA
MAIN POWER ROUTING LOCATION	TOP OR BOTTOM OF SYSTEM	TOP OR BOTTOM OF SYSTEM

TABLE 4 - CABINET VENTILATION EXHAUST REQUIREMENTS

#	MODULE/STACK	EFFECTIVE VOLUME(FT*3)	REQUIRED VENTILATION (CFM)*	PURPOSE	PORT SIZE (DIAMETER)	MIN PRESSURE DIFFERENTIAL IN STACK INCHES (H2O)**
F19	PUMP CABINET	312	1600***	ABATEMENT UNINTENDED RELEASE, HEAT DISSIPATION	16IN	-0.07
F20	SOURCE DELIVERY ASSEMBLY	120	1600***	ABATEMENT UNINTENDED RELEASE, HEAT DISSIPATION	16IN	-0.07
F21	REACTOR HOUSING ASSEMBLY	212	1100***	ABATEMENT UNINTENDED HEAT RELEASE	12IN	-0.11

\*- CFM MEASUREMENTS WERE TAKEN AT THE CENTER OF THE DUC AT 0.25 EXHAUST DIAMETERS UPSTREAM OF THE DAMPER  
 \*\*- MEASURED AT THE DELTA PRESSURE CONNECTION PORT.  
 \*\*\*- THE MINIMUM RECOMMENDED VENTILATION SPECIFIED FOR ABATEMENT OF UNINTENDED RELEASES MUST BE MAINTAINED AT ALL TIMES TO COMPLY WITH SEMI REQUIREMENTS STANDARDS: SEMI S2 0712a, SEMI S6 0707E TRACER GAS AND SEMI S14-0704 SAFETY GUIDELINES FOR FIRE RISK ASSESSMENT AND MITIGATION FOR SEMICONDUCTOR MANUFACTURING

TABLE 5 - PROCESS AND PUMP EXHAUST BULKHEAD FITTINGS AND TUBING

#	MODULE	EXHAUST CONNECTION	PURPOSE	PORT TYPE AND SIZE	TUBING
F22	PC	REACTOR PROCESS PUMP EXHAUST	PROCESS ABATEMENT	KF40	1.5IN
F23	PC	VTM PUMP OUT TO FACILITY	VACUUM PUMP EXHAUST	KF25	1IN
F24	PC	CLM/WLM PUMP OUT TO FACILITY	VACUUM PUMP EXHAUST	KF25	1IN
F25	PC	RCA DIFF SEAL OUT TO FACILITY	VACUUM PUMP EXHAUST	KF25	1IN

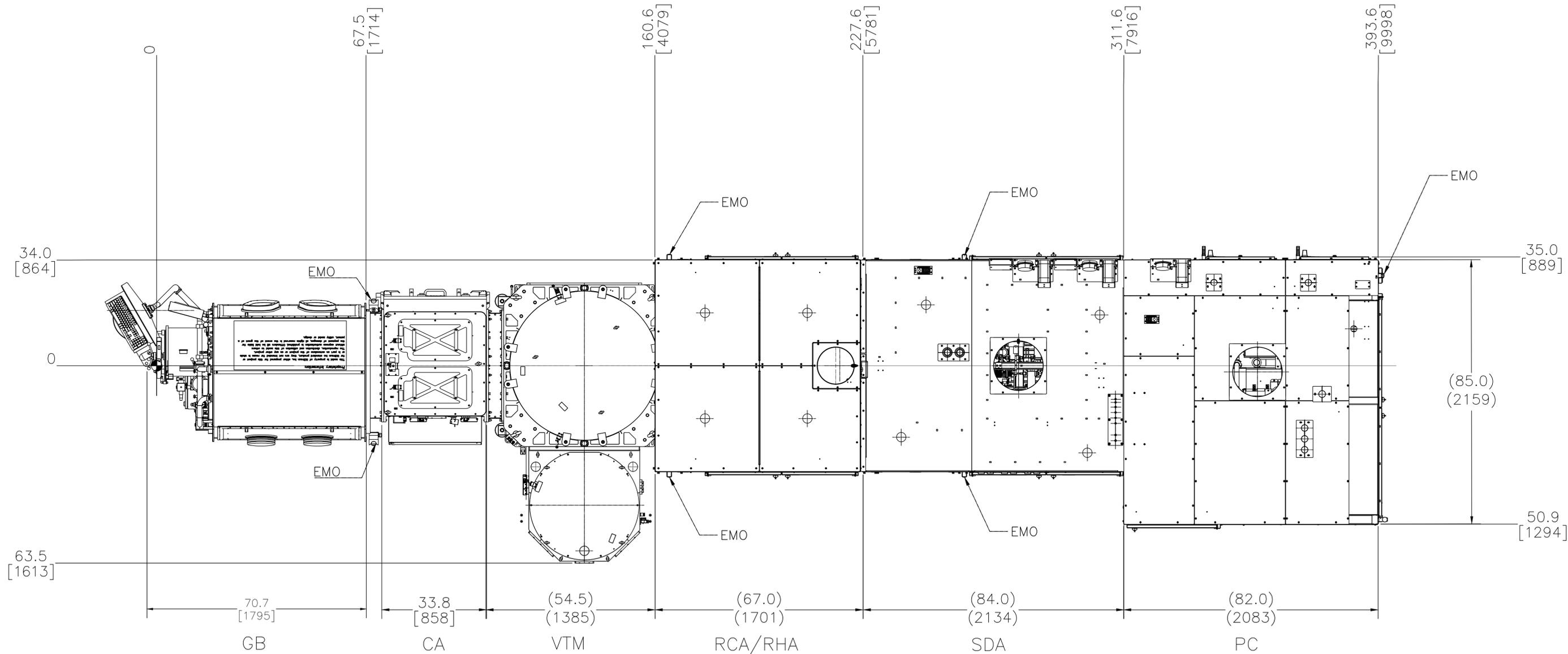
TABLE 6 - MODULE CRATED DIMENSIONS

SL NO#	MODULE	DIMENSION LXWXH (INCH)	DIMENSION LXWXH (CM)	APPROX WEIGHT (LBS)	APPROX WEIGHT (KG)
1	GB	TBD	TBD	TBD	TBD
2	CA	TBD	TBD	TBD	TBD
3	VTM	96X65X60	244X165X152	3690	1673.75
4	RCA	42.5X42.5X66	108X108X168	3800	1723.65
5	SDA	112X87.5X68	284X222X172	4000	1814.36
6	PC	85X82X96	216X208X244	4239	1922.77
7	FILTER CART	66x28x29	168x71x74	360	163

TABLE 7 - TEMPERATURE BATH WATER QUALITY SPECIFICATION

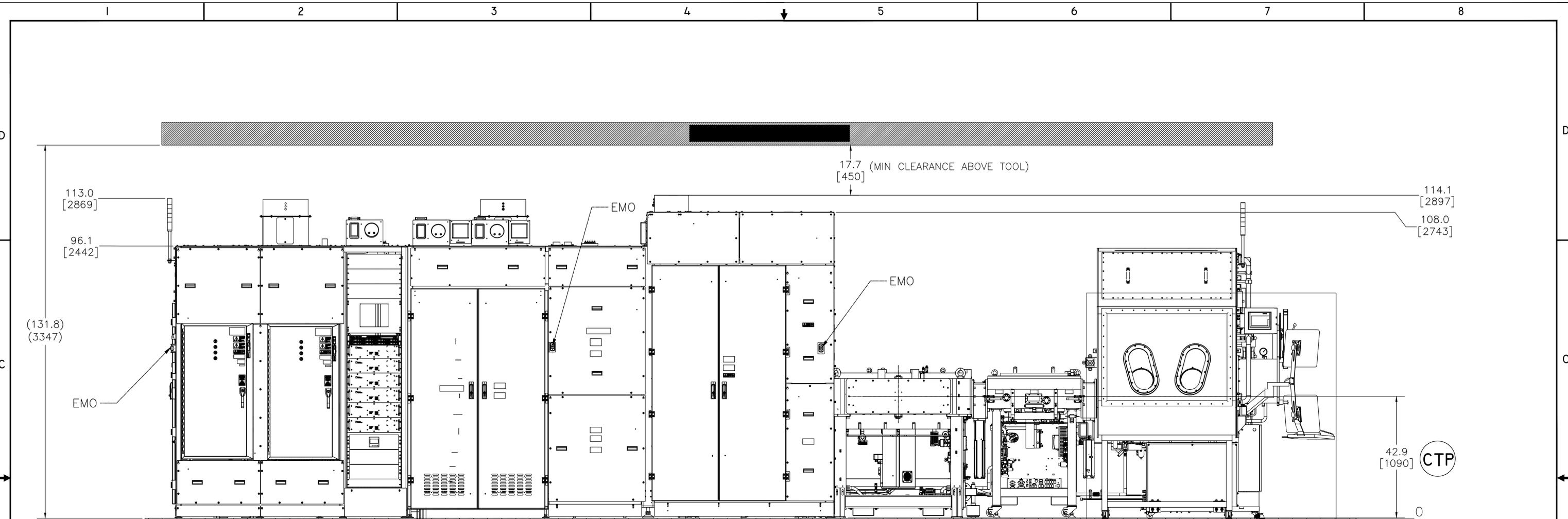
QUALITY ITEM	ITEM	STANDARD VALVE
	pH(25°C)	6.0 TO 8.0
	ELECTRIC CONDUCTIVITY (25°C) (µS/cm)	100 TO 300
	CHLORIDE ION (mgCl-/L)	50 OR LESS
	SULPHATE ION (mgSO4 <sup>2-</sup> /L)	50 OR LESS
	ACID CONSUMPTION (pH4.8) (mgCaCO3/L)	50 OR LESS
	TOTAL HARDNESS (mgCaCO3/L)	70 OR LESS
	CALCIUM HARDNESS (mgCaCO3/L)	50 OR LESS
	ION SILICA (mgSiO2/L)	30 OR LESS
	IRON (mgFe/L)	0.3 OR LESS
	COPPER (mgCu/L)	0.1 OR LESS
	SULPHIDE ION (mgS <sup>2-</sup> /L)	NONE DETECTED
	AMMONIUM ION (mgNH4 <sup>+</sup> /L)	0.1 OR LESS
	RESIDUAL CHLORINE (mgCl/L)	0.3 OR LESS
	FREE CARBON (mgCO2/L)	4.0 OR LESS
	FILTRATION (µm)	5 OR LESS

TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR					
		CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED			
SIZE	DWG. NO.	REV			
D	FP19100	A			
ENG ELIO F	DWN HARSHA	CHKR VINAYAK	APVD ELIO F	SCALE X/X	SHEET 2 OF 18



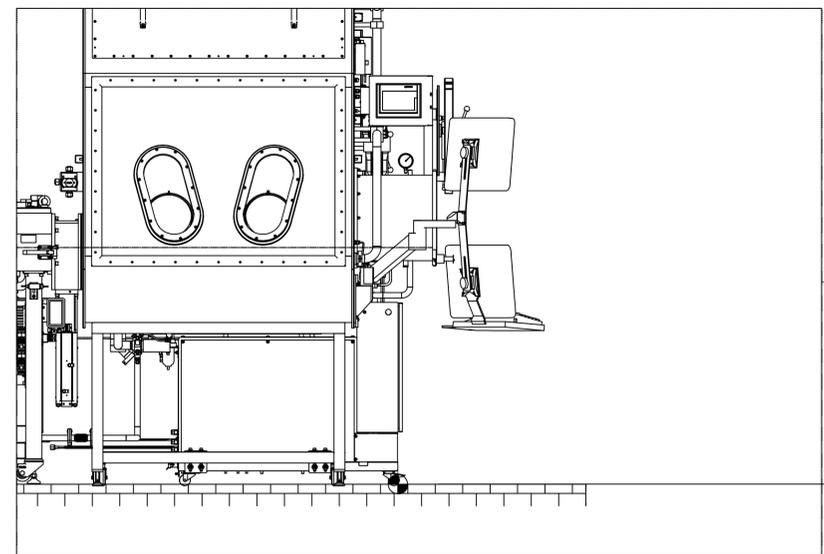
MAIN SYSTEM TOP VIEW

TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR									
CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED									
Veeco		SIZE D	DWG. NO. FP19100	REV A					
ENG ELIO F	DWN HARSHA	CHKR VINAYAK	APVD ELIO F	SCALE X/X	SHEET 3	OF 18			



FLOOR LEVEL

MAIN SYSTEM SIDE VIEW

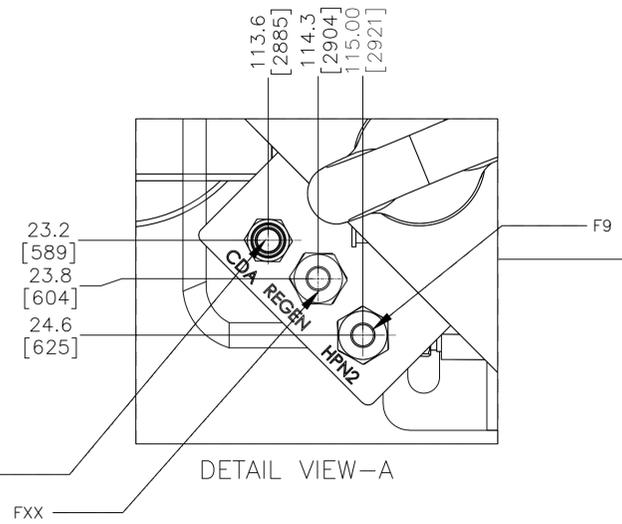
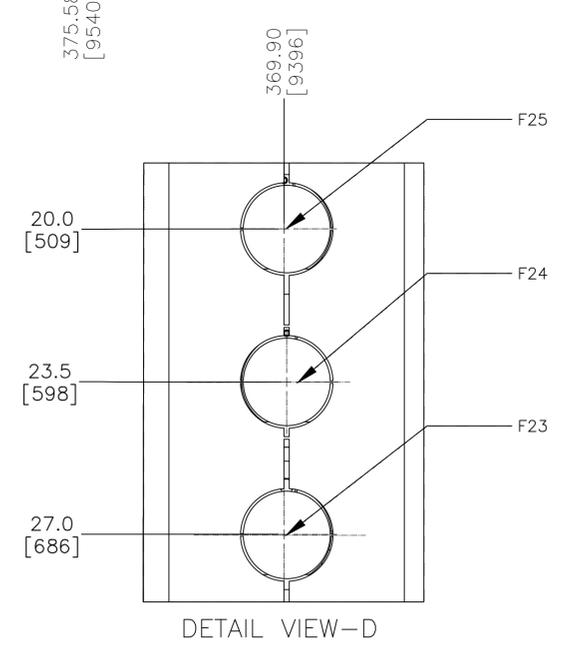
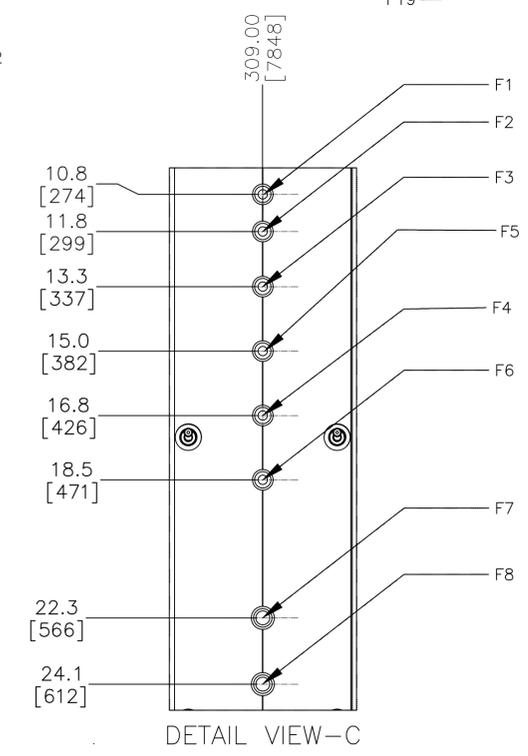
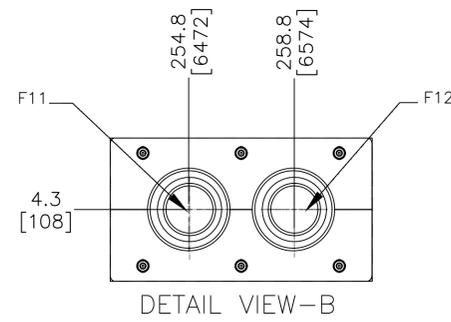
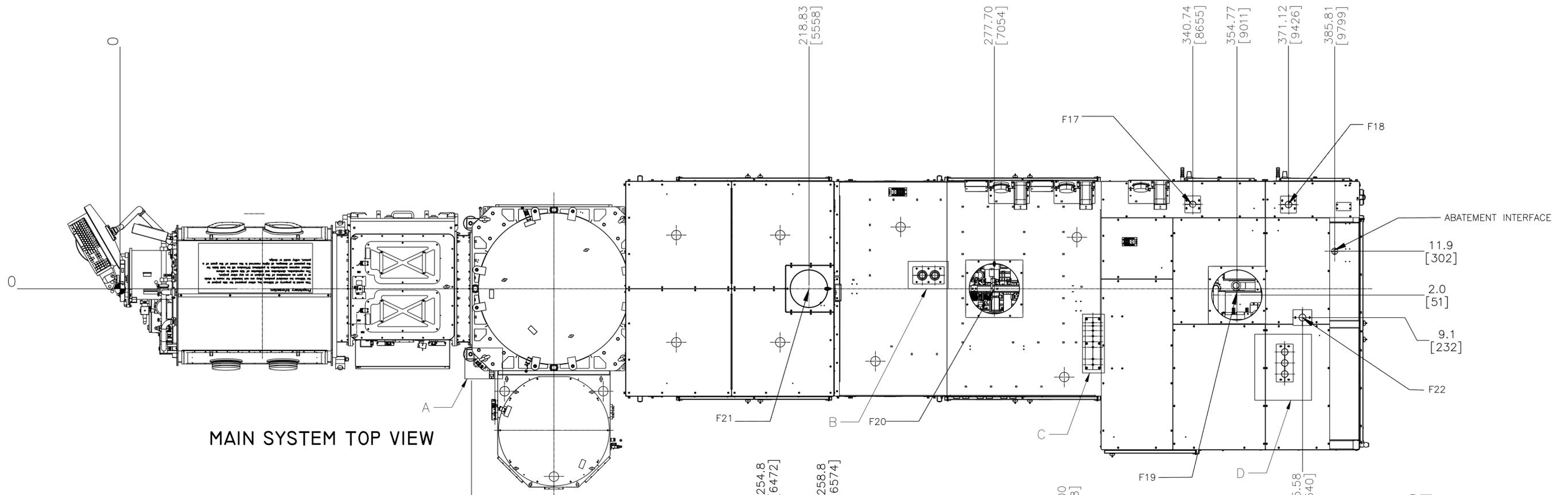


DETAIL VIEW-N

TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR									
CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED									
Veeco		SIZE D	DWG. NO. FP19100	REV A					
ENG ELIO F	DWN HARSHA	CHKR VINAYAK	APVD ELIO F	SCALE X/X	SHEET 4	OF 18			

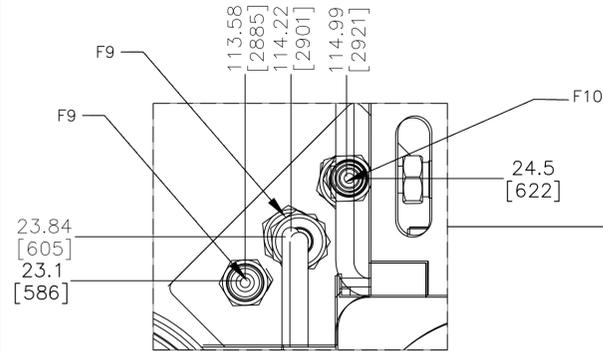
# C1 TOP FEED FACILITY CONNECTIONS

MAIN SYSTEM TOP VIEW

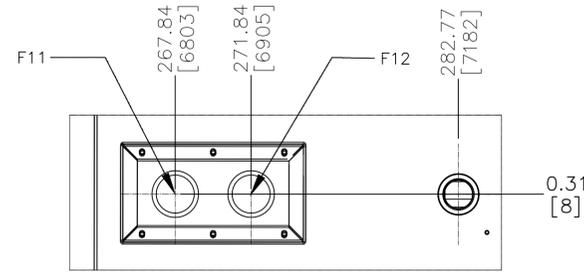
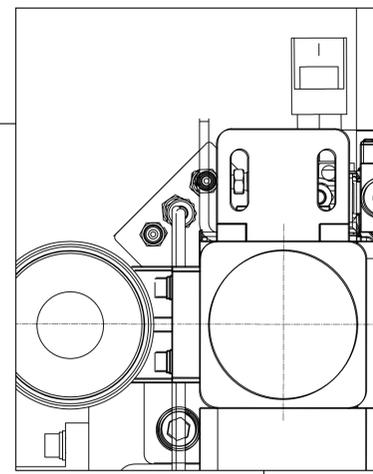


TITLE FOOTPRINT AND FACILITY REQUIREMENT, C1, LINEAR										
CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED										
SIZE	D	DWG. NO.	FP19100				REV	A		
ENG	ELIO F	DWN	HARSHA	CHKR	VINAYAK	APVD	ELIO F	SCALE	X/X	SHEET 5 OF 18

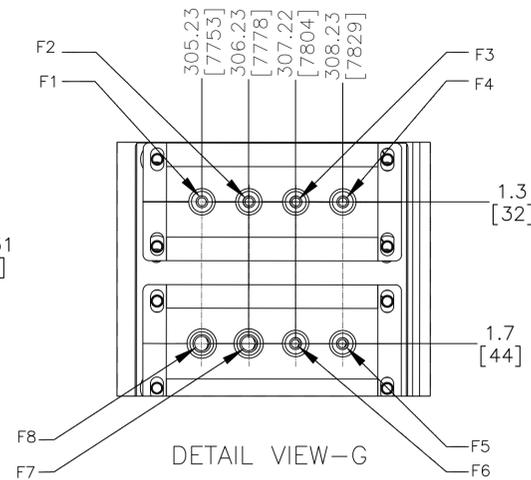
# C1 BOTTOM FEED FACILITY CONNECTIONS



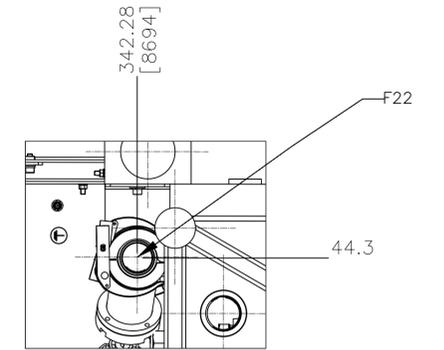
DETAIL VIEW-E



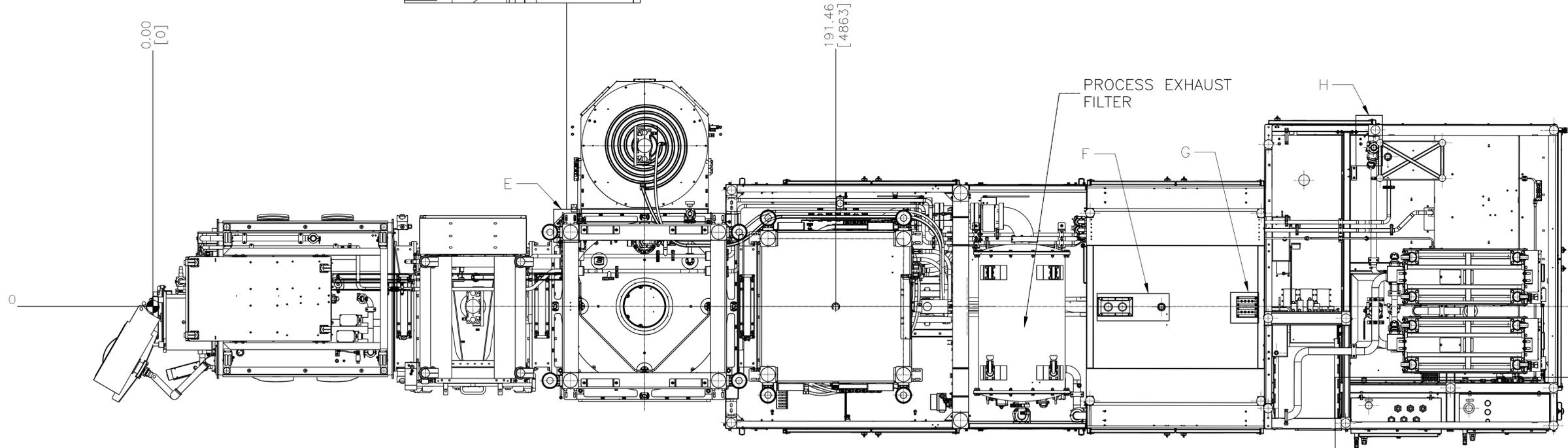
DETAIL VIEW-F



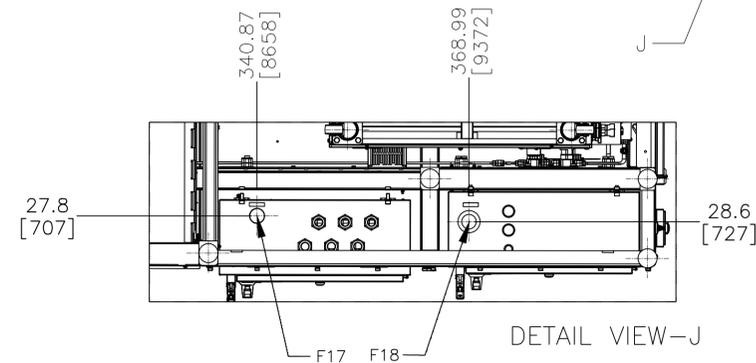
DETAIL VIEW-G



DETAIL VIEW-H



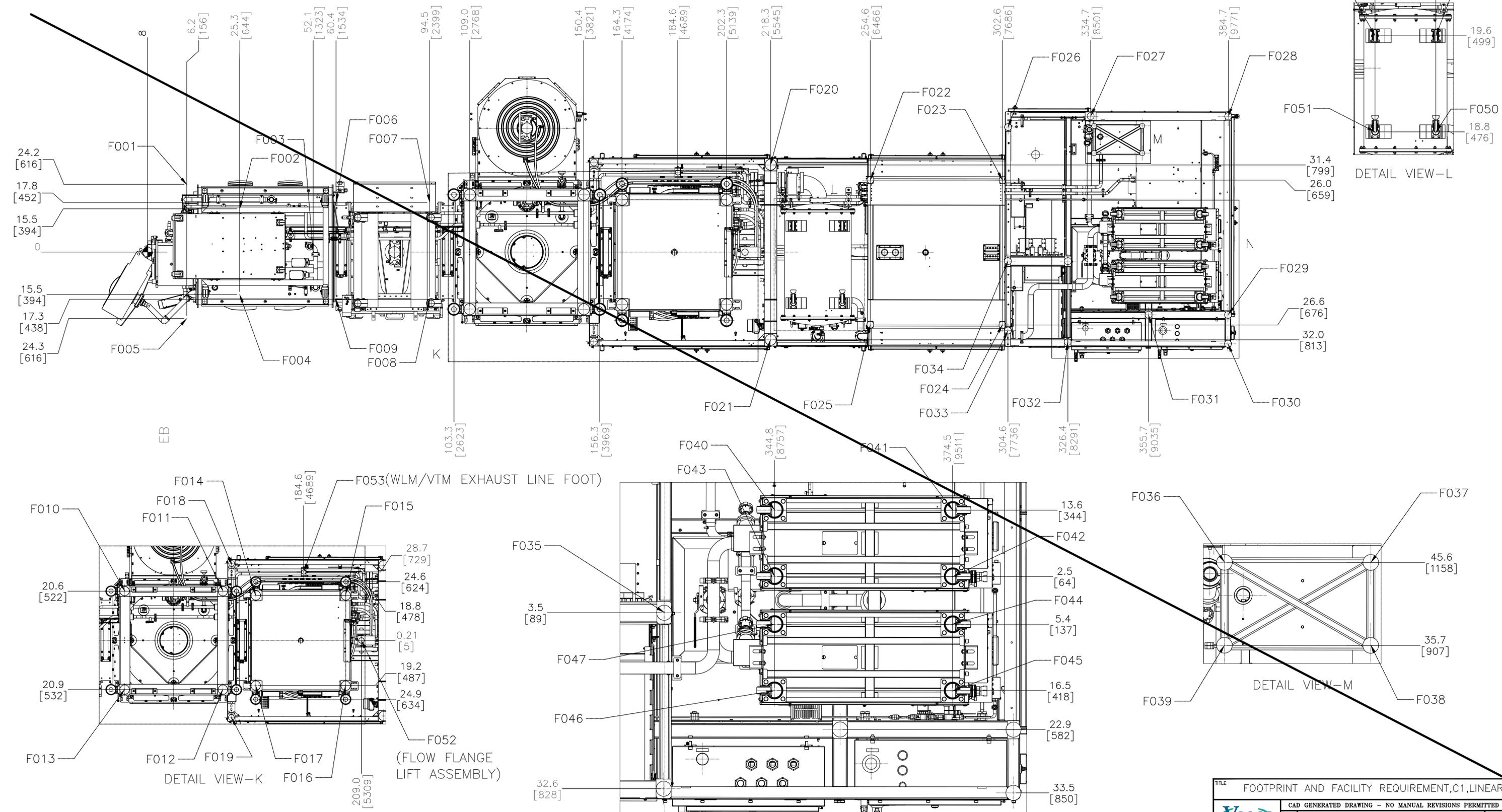
MAIN SYSTEM BOTTOM VIEW



DETAIL VIEW-J

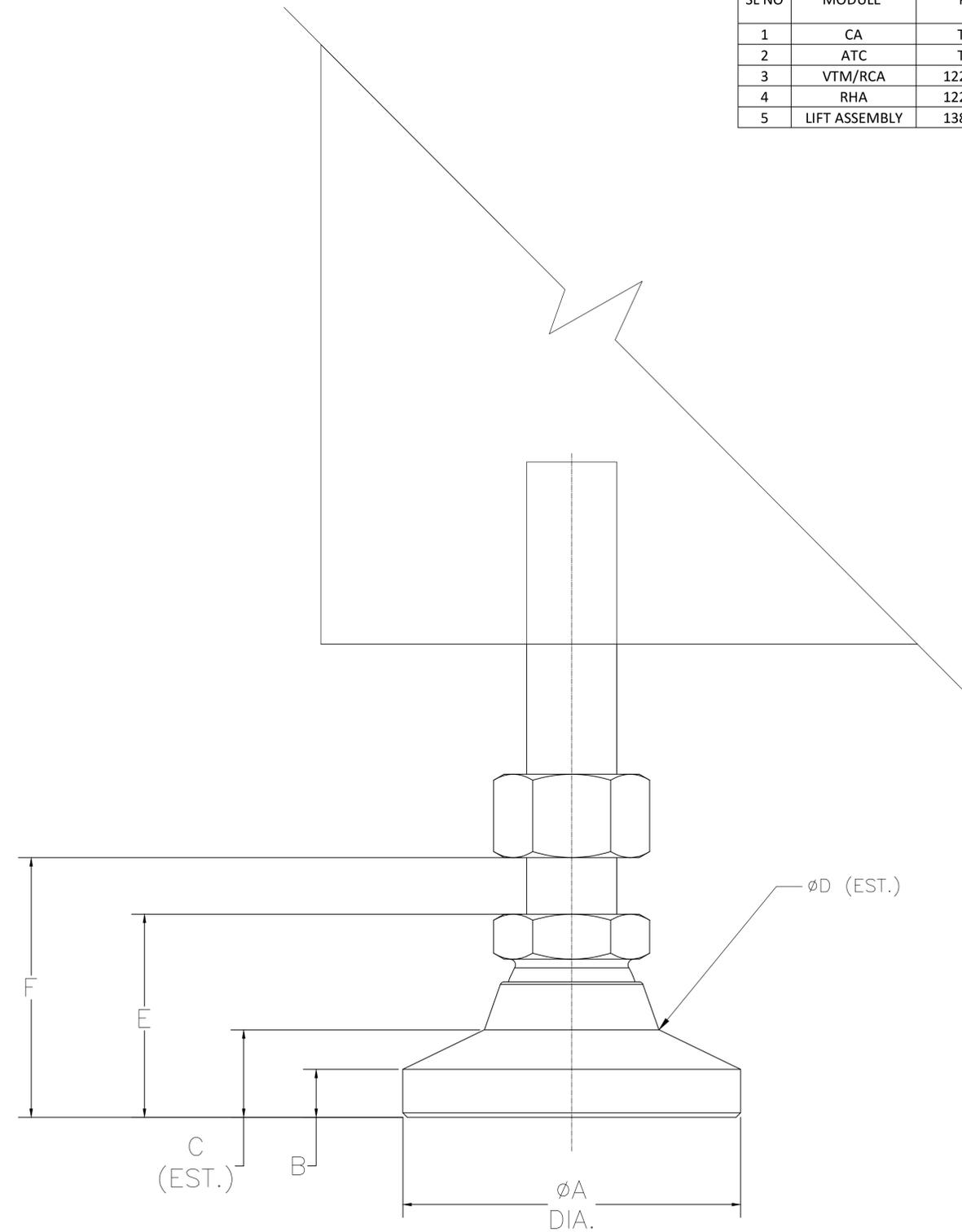
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						CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED		
SIZE	DWG. NO.	REV						
D	FP19100	A						
ENG	DWN	CHKR	APVD	SCALE	SHEET	OF		
ELIO F	HARSHA	VINAYAK	ELIO F	X/X	6	18		

# C1 STRUCTURAL PLAN



TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR			
CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED			
SIZE D	DWG. NO. FP19100	REV A	
ENG ELIO F	DWN HARSHA	CHKR VINAYAK	APVD ELIO F
SCALE X/X		SHEET 7	OF 18

FOOT PROFILE TYPE										
SL NO	MODULE	P/N	DESCRIPTION	FOOT PROFILE TYPE	DIMENSIONS (IN)					
					ØA	B	C	ØD	E	F
1	CA	TBD	TBD	A	TBD	TBD	TBD	TBD	TBD	TBD
2	ATC	TBD	TBD	B	TBD	TBD	TBD	TBD	TBD	TBD
3	VTM/RCA	1229633	LEVELING FOOT, M24, ZPS, 156 H X 102 DIA	D	4.015IN	0.393IN	1.083IN	1.627IN	1.889IN	2.283IN
4	RHA	1228301	LEVELING FOOT, M16, 130mm LG, SS	H	2.51IN	0.196IN	0.393IN	1.062IN	1.205IN	4.295IN
5	LIFT ASSEMBLY	1387540	LEVELING FOOT, M16, 116 H X 60 DIA	J	2.362IN	0.334IN	0.61IN	1.22IN	1.417IN	2.393IN

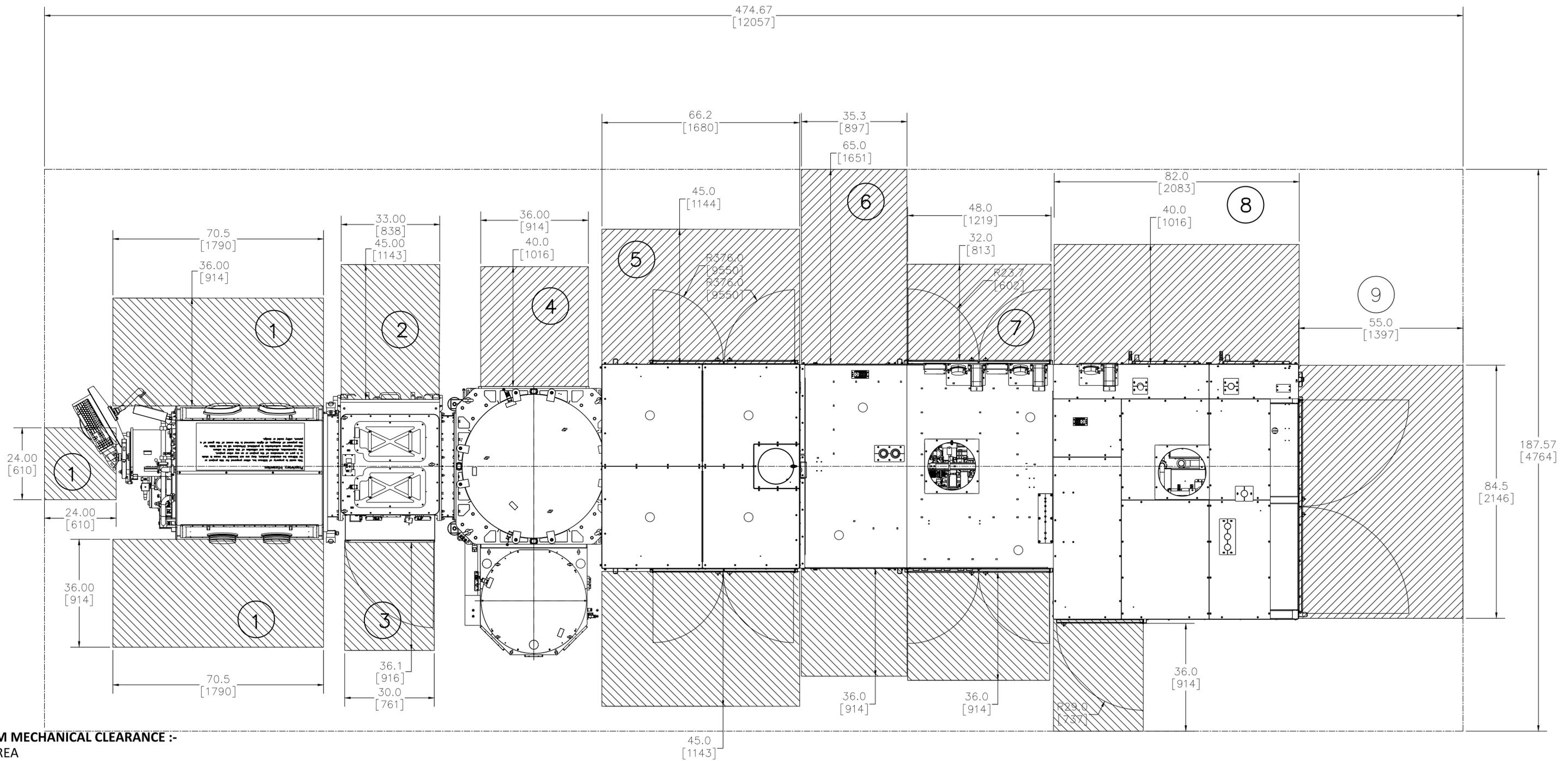


FOOT PROFILE TYPE A,B,D,H&J

### STRUCTURAL DATA

TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR									
CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED									
Veeva		SIZE D	DWG. NO. FP19100	REV A					
ENG ELIO F	DWN HARSHA	CHKR VINAYAK	APVD ELIO F	SCALE X/X	SHEET 8	OF 18			

# C1 – LINEAR SERVICING AREA



**MINIMUM MECHANICAL CLEARANCE :-**

- 1 : GB AREA
- 2 : CA AREA
- 3 : SYS CONTROL BOX AREA
- 4 : VTM AREA
- 5 : RHA AREA
- 6 : FILTER AREA
- 7 : BATH AREA
- 8 : ELECTRICAL UNIT AREA
- 9 : PUMP AREA

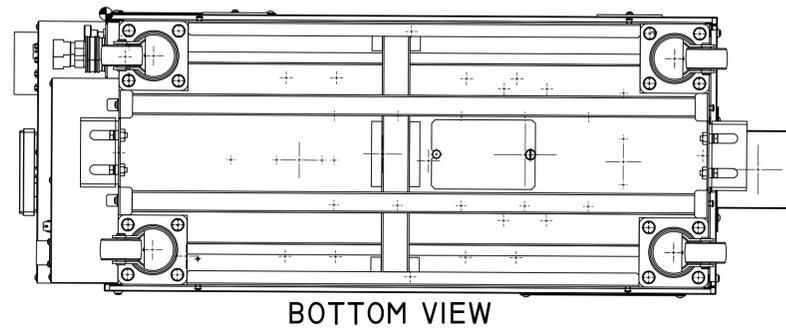
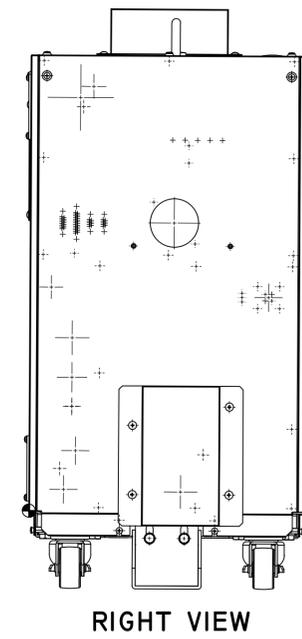
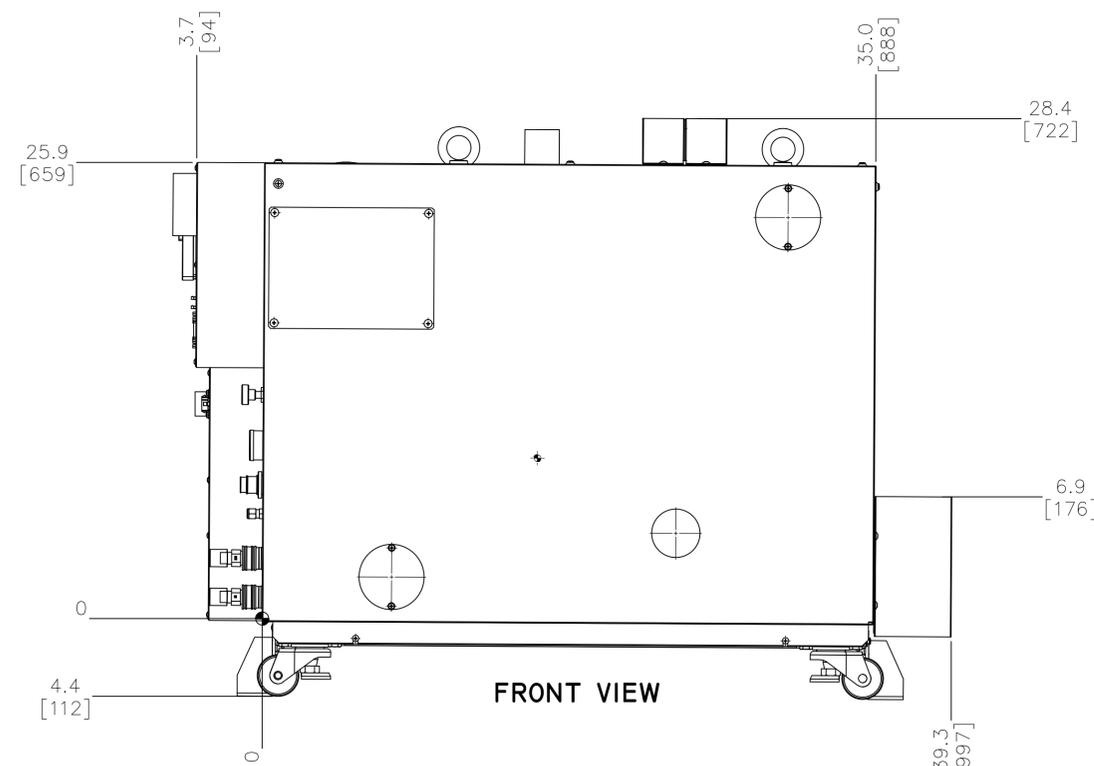
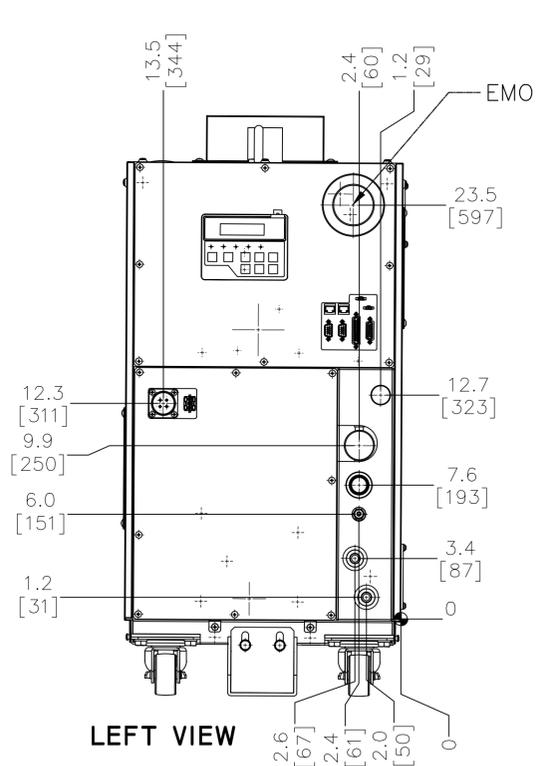
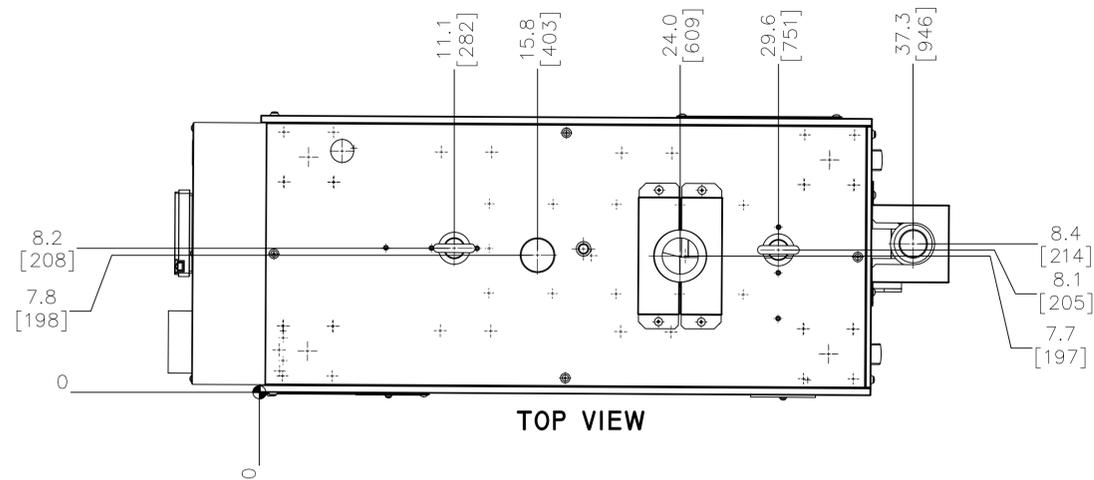
C1 AREA – 58M<sup>2</sup>

TITLE		FOOTPRINT AND FACILITY REQUIREMENT, C1, LINEAR			
Veeva		CAD GENERATED DRAWING – NO MANUAL REVISIONS PERMITTED			
SIZE	DWG. NO.	REV			
D	FP19100	A			
ENG	DWN	CHKR	APVD	SCALE	SHEET
ELIO F	HARSHA	VINAYAK	ELIO F	X/X	9 OF 18

PROCESS PUMP  
QTY-02

PLANE \ ELEVATIONS

TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR									
CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED									
SIZE D		DWG. NO. FP19100		REV A					
ENG ELIO F	DWN HARSHA	CHKR VINAYAK	APVD ELIO F	SCALE X/X	SHEET 10	OF 18			



15.7  
[400]

MINIMUM MECHANICAL  
CLEARANCE "K"

TOP VIEW

41.3  
[1048]

5.2  
[132]

FRONT VIEW

LEFT VIEW

RIGHT VIEW

BOTTOM VIEW

PROCESS PUMP  
QTY-02

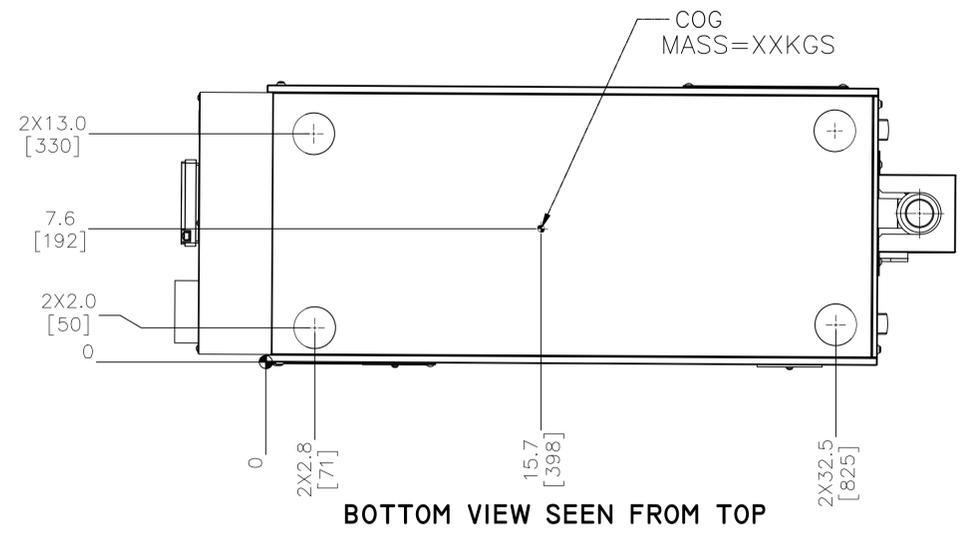
EQUIPMENT CLEARANCE\FALL PROTECTION

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SIZE	DWG. NO.	REV					
D	FP19100	A					
ENG	DWN	CHKR	APVD	SCALE	SHEET	OF	
ELIO F	HARSHA	VINAYAK	ELIO F	X/X	11	18	

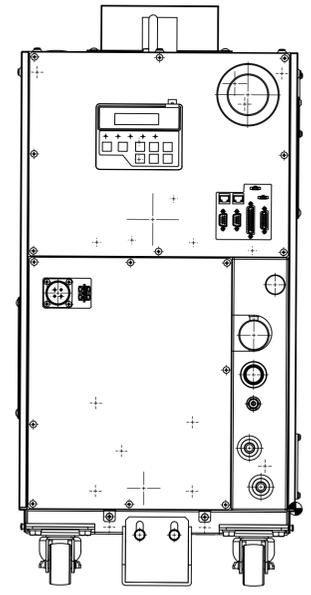
PROCESS PUMP  
QTY-02

STRUCTURAL PLAN

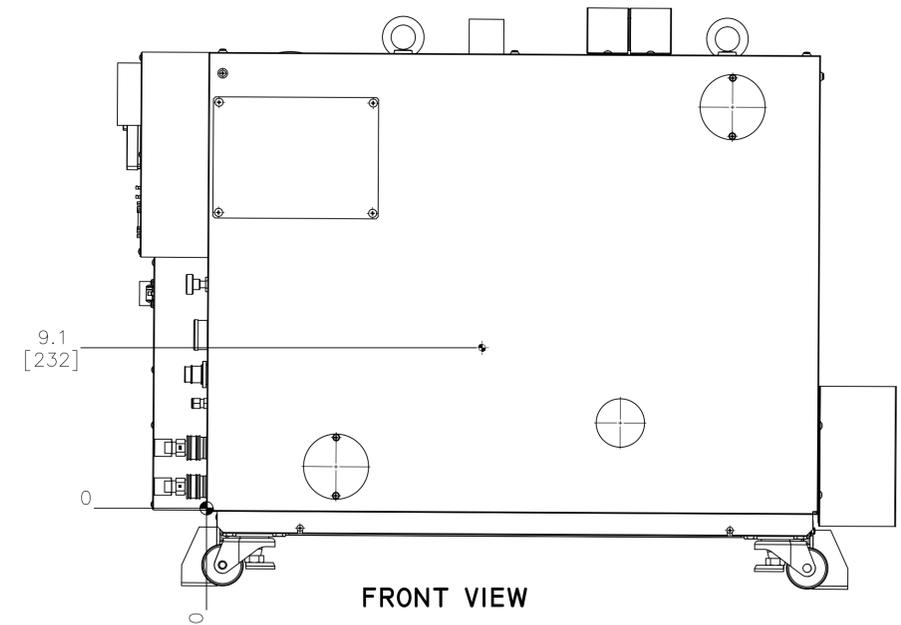
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CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED													
Veeva		SIZE	DWG. NO.	REV									
D		FP19100		A									
ENG	ELIO F	DWN	HARSHA	CHKR	VINAYAK	APVD	ELIO F	SCALE	X/X	SHEET	12	OF	18



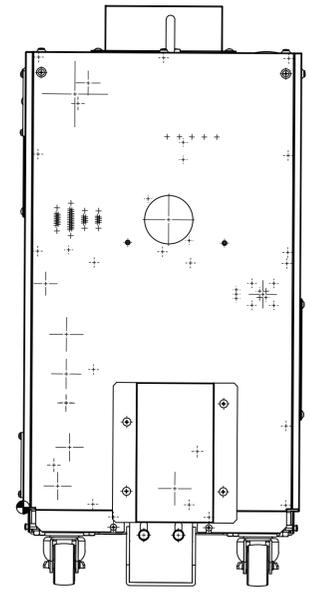
BOTTOM VIEW SEEN FROM TOP



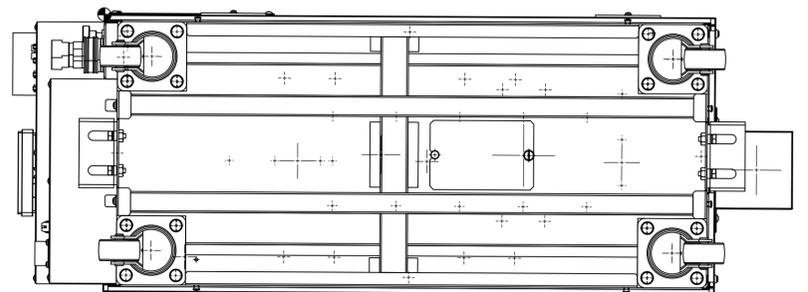
LEFT VIEW



FRONT VIEW

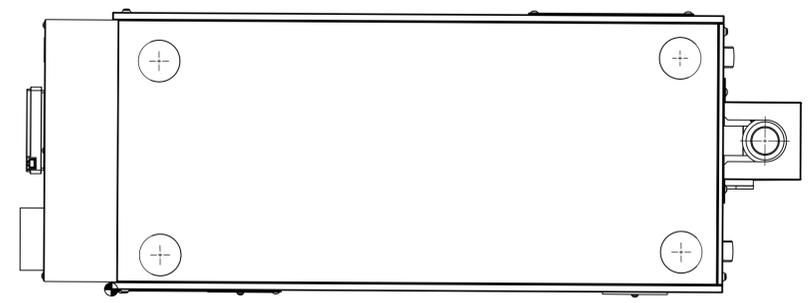


RIGHT VIEW

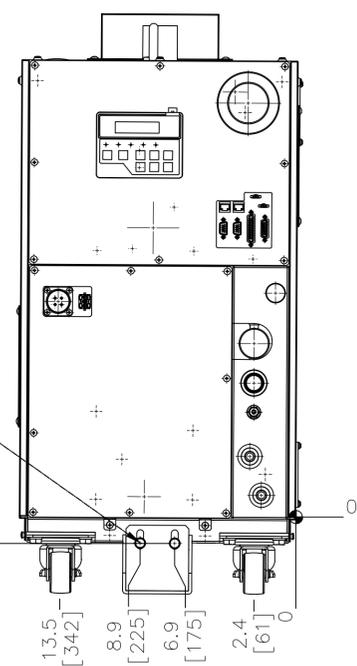


BOTTOM VIEW

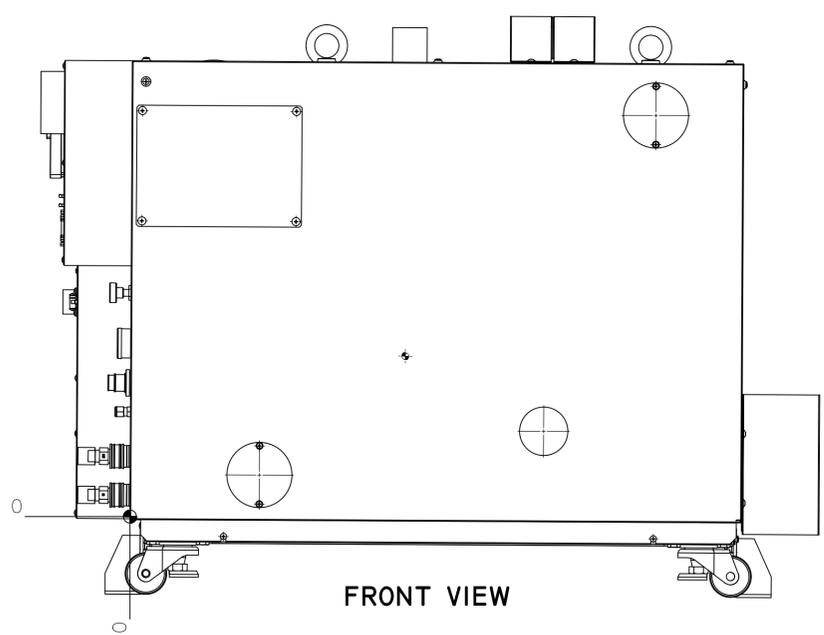
1 2 3 4 5 6 7 8



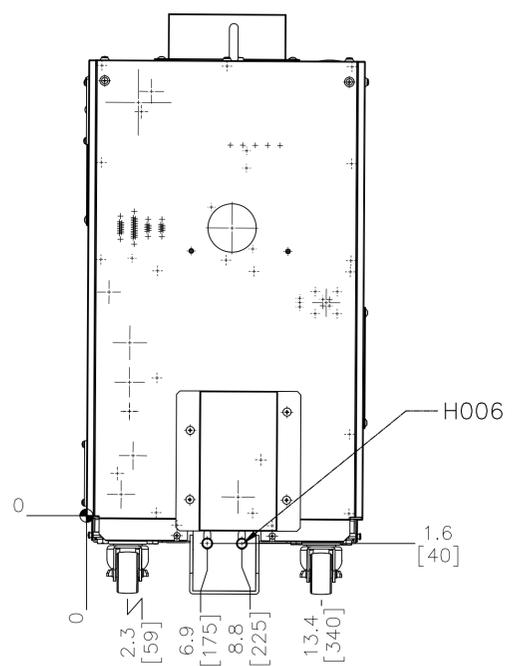
BOTTOM VIEW SEEN FROM TOP



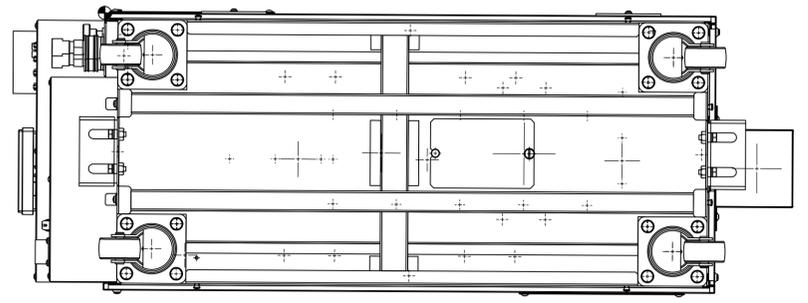
LEFT VIEW  
STRUCTURAL HOLD DOWN LOCATIONS (H006)



FRONT VIEW



RIGHT VIEW  
STRUCTURAL HOLD DOWN LOCATIONS (H006)



BOTTOM VIEW

PROCESS PUMP  
QTY-02

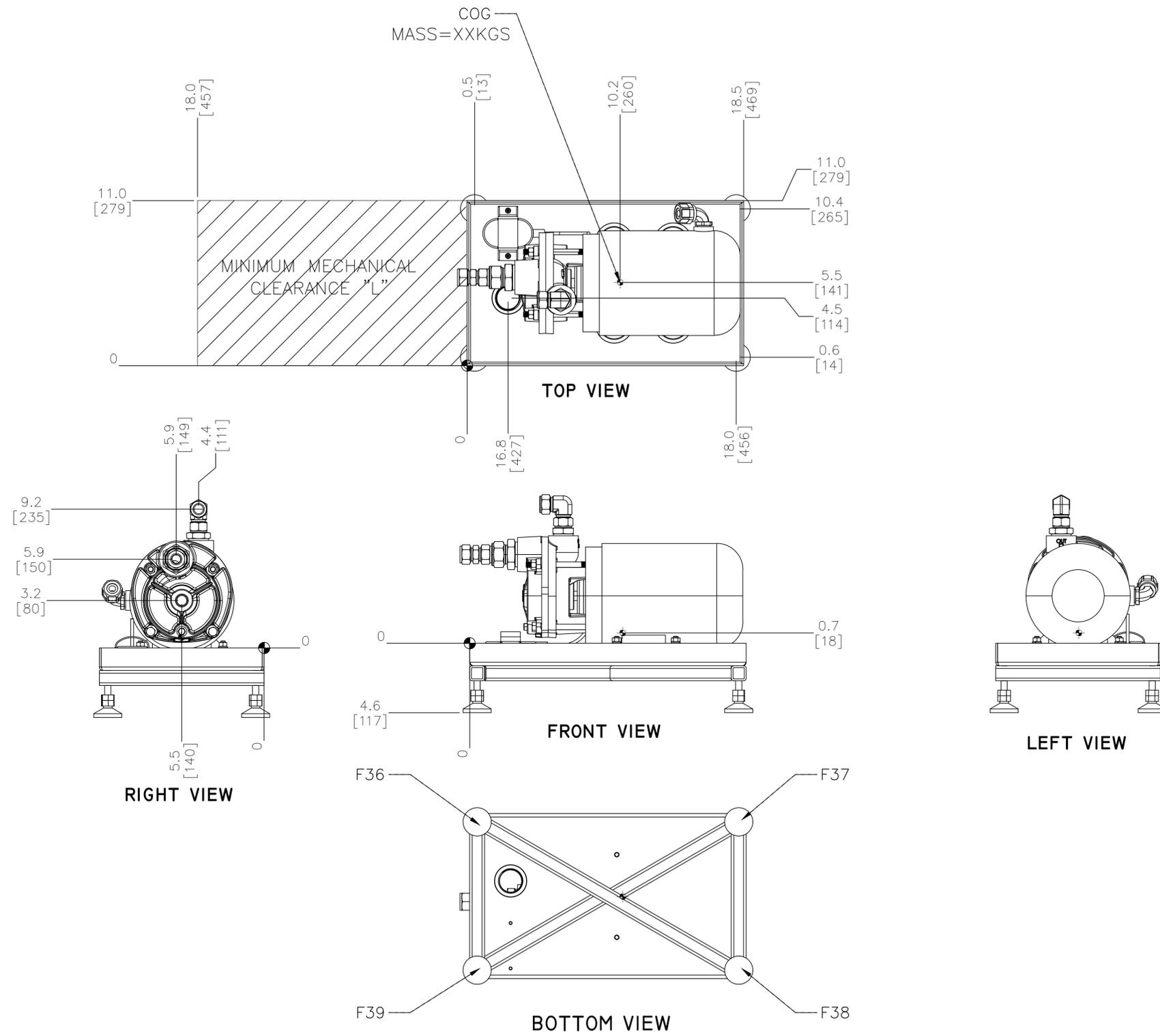
HOLD DOWN LOCATIONS

TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR													
CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED													
Veeva		SIZE	DWG. NO.		REV								
D		FP19100		A									
ENG	ELIO F	DWN	HARSHA	CHKR	VINAYAK	APVD	ELIO F	SCALE	X/X	SHEET	13	OF	18

1 2 3 4 5 6 7 8

RECIRCULATORY PUMP  
QTY-01

EQUIPMENT CLEARANCE\FALL PROTECTION, STRUCTURAL PLAN, EQUIPMENT PLAN/ELEVATIONS  
(THIS SHEET INCLUDES COMBINED INFORMATION)

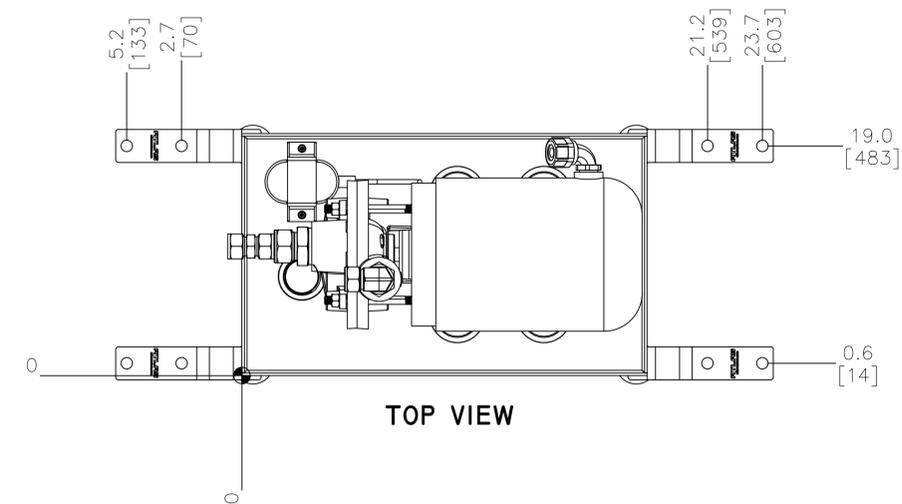


TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR									
CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED									
Veeva		SIZE	DWG. NO.	REV				REV	
D		FP19100		A				A	
ENG	ELIO F	DWN	HARSHA	CHKR	VINAYAK	APVD	ELIO F	SCALE	X/X
SHEET		14	OF		18				

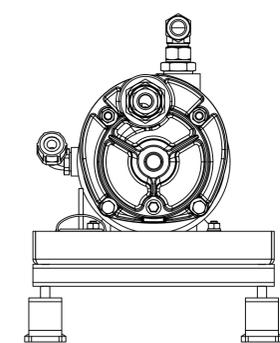
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D

D

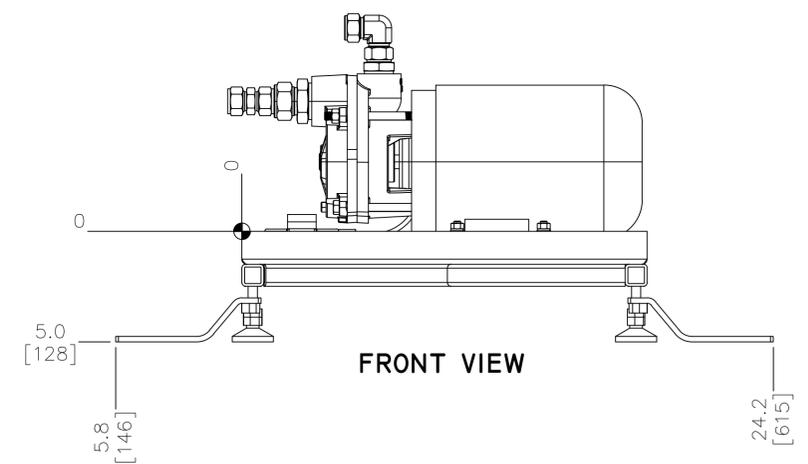


TOP VIEW

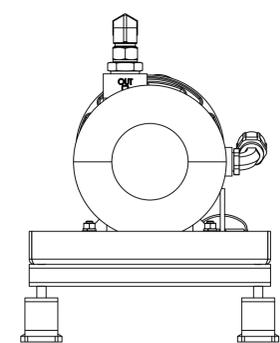


LEFT VIEW

STRUCTURAL HOLD DOWN LOCATIONS (H006)

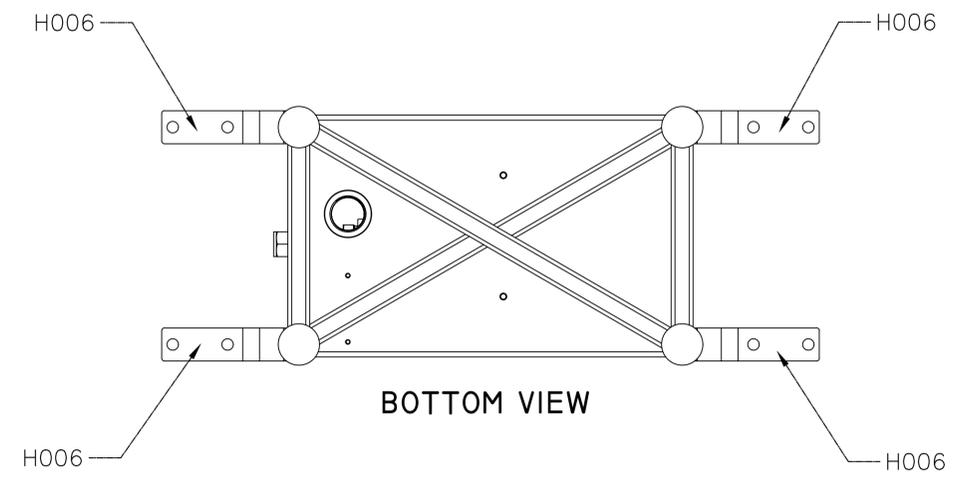


FRONT VIEW



RIGHT VIEW

STRUCTURAL HOLD DOWN LOCATIONS (H006)



BOTTOM VIEW

RECIRCULATORY PUMP  
QTY-01

HOLD DOWN LOCATIONS

C

C

B

B

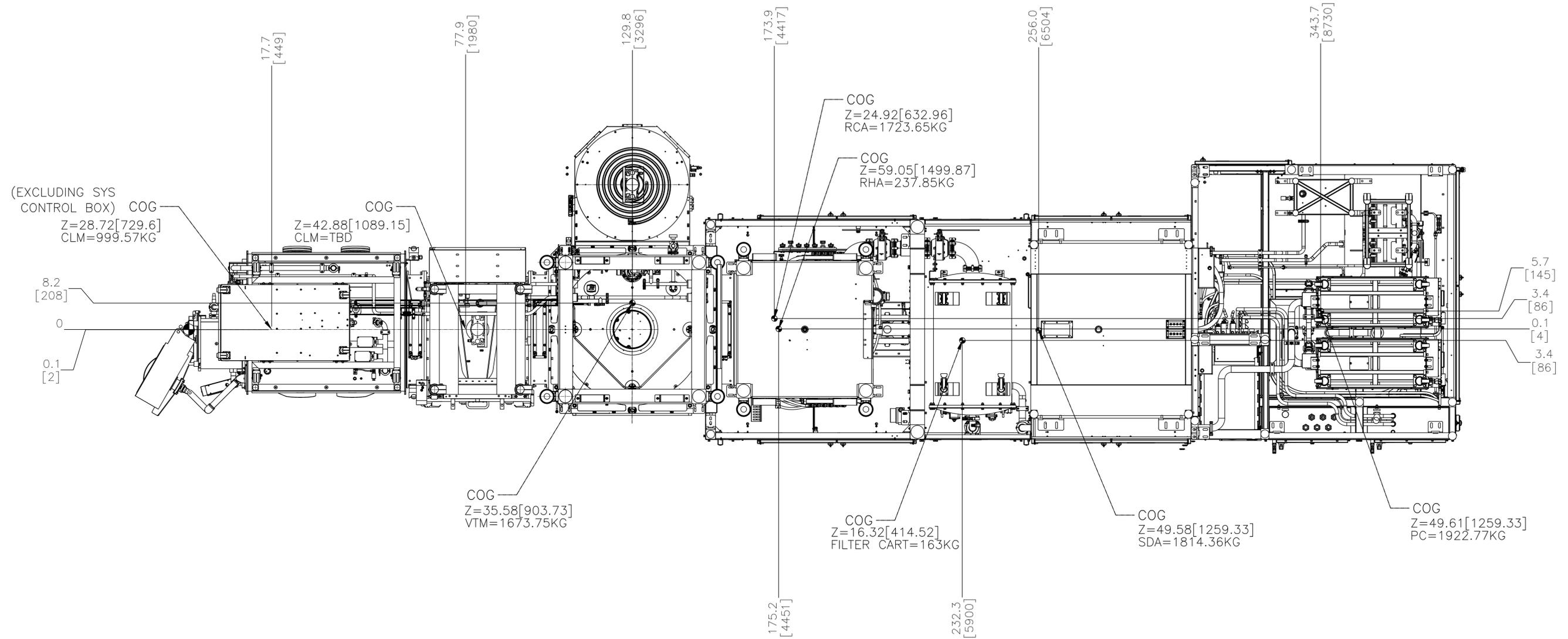
A

A

1 2 3 4 5 6 7 8

TITLE FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR									
Veeva					CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED				
SIZE	DWG. NO.	REV							
D	FP19100	A							
ENG ELIO F	DWN HARSHA	CHKR VINAYAK	APVD ELIO F	SCALE X/X	SHEET 15	OF 18			





MAIN SYSTEM BOTTOM VIEW

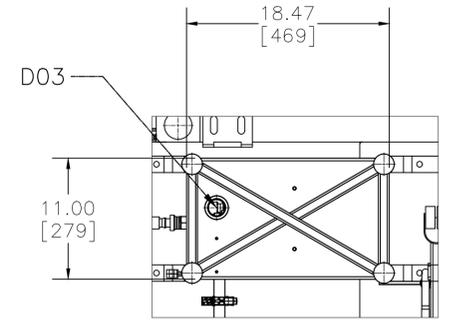
STRUCTURAL PLAN

TITLE		FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR					
		CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED					
SIZE	DWG. NO.	REV					
D	FP19100	A					
ENG	DWN	CHKR	APVD	SCALE	SHEET	OF	
ELIO F	HARSHA	VINAYAK	ELIO F	X/X	17	18	

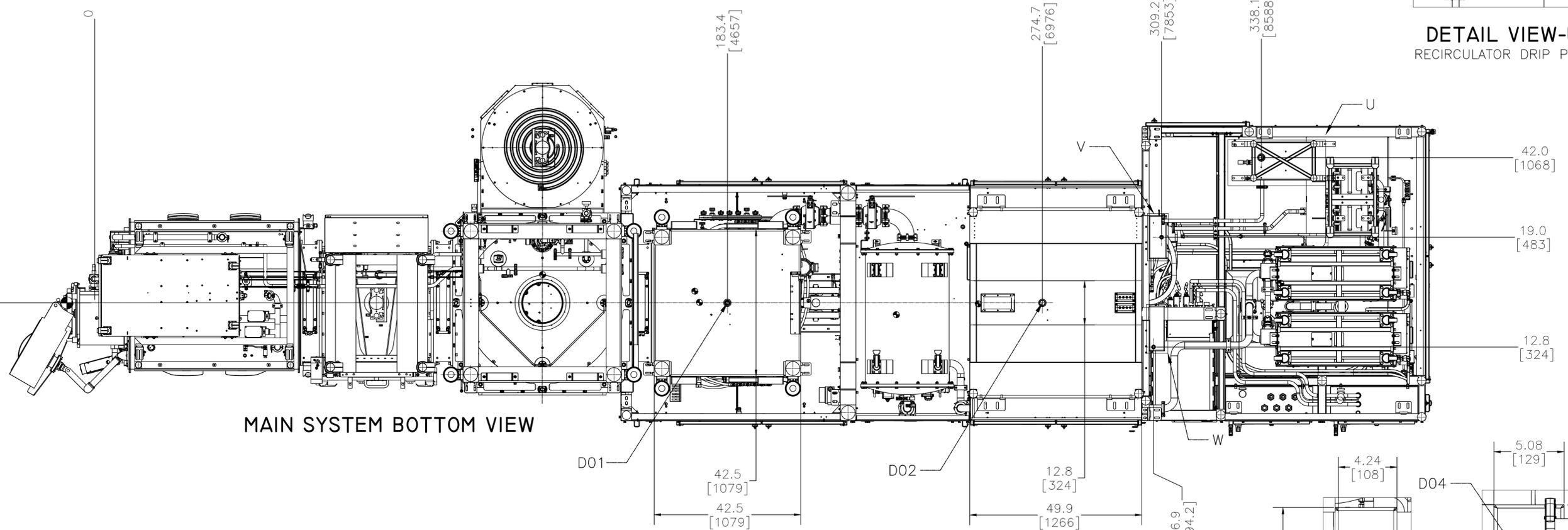
NOTES

1. DRIP PAN HOLE IS APPROXIMATELY AT CENTER OF DRIP PAN.
2. DRIP PAN HOLE CAPACITY IS SHOWN IN BELOW TABLE FOR EACH MODULE.

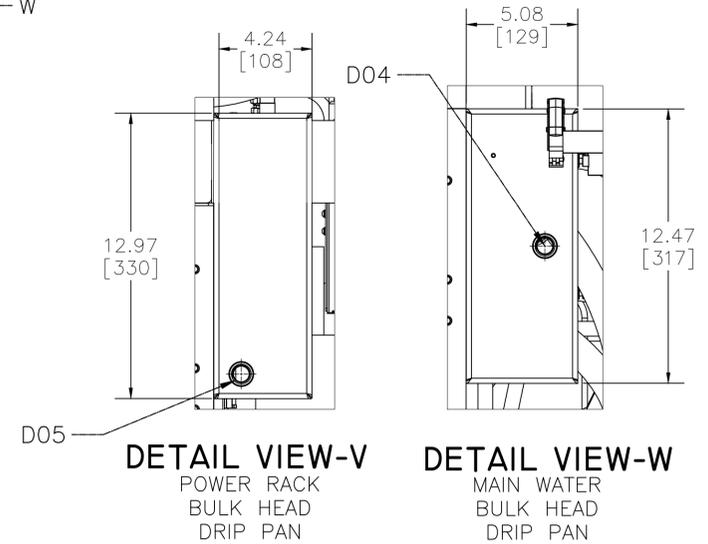
# LUMINA+: WATER CONTAINMENT LAYOUT



DETAIL VIEW-U  
RECIRCULATOR DRIP PAN



MAIN SYSTEM BOTTOM VIEW



DETAIL VIEW-V  
POWER RACK  
BULK HEAD  
DRIP PAN

DETAIL VIEW-W  
MAIN WATER  
BULK HEAD  
DRIP PAN

PORT #	MODULE TRAY	PAN DETAILS					DRAIN PORT DETAILS			SYSTEM NEEDS			REMARKS
		TRAY SIZE (In)		HEIGHTS (Hf) In	AREA "A" IN^2	VOLUME IN^3	WATER CAPACITY (GALLONS)	DRAIN PORT SIZE (d) In	AREA (a) IN^2	WATER FLOW (GPM)	TIME TO DRAIN "t" (SEC)	DRAIN PORT CAPACITY (GPM)	
D01	RCA	42.5	42.5	1.76	1604	2823.0	12.2	1.25	1.2	3	160	5	MODULE REQUIRED 3GPM WATER BUT TRAY COULD TAKE UP TO 12.2 GPM WATER AND DRAIN WITH 160 SECONDS WITH 1.25IN DRAIN HOLE. (1.25IN DRAIN HOLE CAN TAKE UP TO 5 GPM).
D02	SDA	12.76	49.53	2.88	540.5	1556.6	6.7	1.25	1.2	9	69	6	MODULE REQUIRED 9GPM WATER BUT TRAY COULD TAKE UP TO 6.7 GPM WATER AND DRAIN WITH 69 SECONDS WITH 1.25IN DRAIN HOLE. (1.25IN DRAIN HOLE CAN TAKE UP TO 6 GPM).
D03	PC-RECIRCULATORY PUMP	18.24	10.76	1.38	196.3	271.3	1.2	1.25	1.2	4.2	17	4	MODULE REQUIRED 4.2GPM WATER BUT TRAY COULD TAKE UP TO 1.2 GPM WATER AND DRAIN WITH 17 SECONDS WITH 1.25IN DRAIN HOLE. (1.25IN DRAIN HOLE CAN TAKE UP TO 4 GPM).
D04	PC-WATER BULK HEAD BULK HEAD	12.24	4.84	1.38	59.3	81.9	0.4	0.5	0.2	10.5	31	1	MODULE REQUIRED 10.5GPM WATER BUT TRAY COULD TAKE UP TO 0.4 GPM WATER AND DRAIN WITH 31 SECONDS WITH .5IN DRAIN HOLE. (.5IN DRAIN HOLE CAN TAKE UP TO 1GPM).
D05	PC-POWER RACK BULK HEAD	12.74	4.24	1.38	54.0	74.6	0.3	0.5	0.2	4.5	29	1	MODULE REQUIRED 4.5GPM WATER BUT TRAY COULD TAKE UP TO .3 GPM WATER AND DRAIN WITH 29 SECONDS WITH .5IN DRAIN HOLE. (.5IN DRAIN HOLE CAN TAKE UP TO 1GPM).

C	0.8
Hf	0
g	386.22 In/s^2

$$t = \frac{A}{a C} (\sqrt{H_1} - \sqrt{H_2}) \sqrt{\frac{2}{g}}$$

CONTAINMENT FOOTPRINT

TITLE		FOOTPRINT AND FACILITY REQUIREMENT,C1,LINEAR					
VEECO		CAD GENERATED DRAWING - NO MANUAL REVISIONS PERMITTED					
SIZE	DWG. NO.	REV					
D	FP19100	A					
ENG	DWN	CHKR	APVD	SCALE	SHEET	OF	
ELIO F	HARSHA	VINAYAK	ELIO F	X/X	18	18	

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**Quotation**

**D00400001748**

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dated

December 5<sup>th</sup>, 2024

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**for**

**SolAero Technologies  
10420 Research Rd SE  
Albuquerque**

---

to

Zachary Bittner

---

**Project**

**Process Waste Gas Abatement &  
Wastewater Treatment Systems**

---

**Your DAS Environmental Experts**

**Joshua McCrory**

Key Account Manager Waste Gas Abatements

Mobile +1 208 995 6406

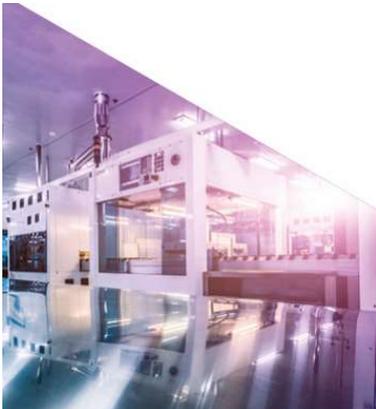
E-Mail [j.mccrory@das-ee.com](mailto:j.mccrory@das-ee.com)

**Dr. Stavroula Sfaelou**

Director Sales Water Treatment Global

Mobile +49 175 5396995

E-Mail [s.sfaelou@das-ee.com](mailto:s.sfaelou@das-ee.com)



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Germany

[www.das-ee.com](http://www.das-ee.com)

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for

**SolAero Technologies**  
**10420 Research Rd SE**  
**Albuquerque**

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to

Zachary Bittner

---

**Project**

**OPTIMUM PLUS + EDC PLUS**

---

**Process Waste Gas Abatements**

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Your DAS Environmental Expert:

**Joshua McCrory**  
Key Account Manager

Mobile +1 208 995 6406  
E-Mail [j.mccrory@das-ee.com](mailto:j.mccrory@das-ee.com)

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01219 Dresden  
Germany

[www.das-ee.com](http://www.das-ee.com)



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# 1 Scope of Work UPTIMUM PLUS

The scope of work is defined in accordance with your inquiry with the following application:

<p><b>Process equipment:</b></p>	<p>MOCVD tools type Veeco (2 VEECO per UPTIMUM PLUS)</p>																																																																																																																																																																																																												
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<p><b>Additional dust removal</b></p>	<p>1x EDC PLUS to be installed downstream of 2x UPTIMUM PLUS</p>																																																																																																																																																																																																												

The following offer applies specifically to **this** application.



## 2 DAS Abatement System and Pricing for UPTIMUM PLUS

Pos	Description	Qty	Price per Unit in USD	Total Price in USD
01	<b>UPTIMUM PLUS Burn/Wet System</b> <ul style="list-style-type: none"> <li>▪ 2 heated waste gas inlets DN40 with three-way valves</li> <li>▪ Fuel gas MFC: Natural gas with CDA</li> <li>▪ External signal for bypass dilution</li> <li>▪ N<sub>2</sub> heater for heated nitrogen purge into reactor head</li> <li>▪ Heat exchanger with 98 kW</li> <li>▪ Scrubbing circuit with water and lye (KOH or NaOH)</li> <li>▪ Lye supply via in-house ring line</li> <li>▪ PLC/operation via touch screen</li> <li>▪ Signal interface via dry contacts (excl. cable supply &amp; wiring to the process tool)</li> <li>▪ Ethernet-Interface to enable connection to separate Monitoring-system</li> <li>▪ Gas sensor within the cabinet</li> <li>▪ Signal tower</li> <li>▪ SEMI S2 compliant</li> <li>▪ Electrical supply: 3 x 208 V/60 Hz, N, PE</li> <li>▪ Imperial connections</li> </ul>	5 units	145,000.00	725,000.00
02	<b>Start-up of system, instruction and training of maintenance personnel</b> by DAS service technician(s) (incl. travels costs and expenses) <ul style="list-style-type: none"> <li>▪ Total on-site time: 1 man x 3d (8 h/d)</li> </ul>	2 trips	included	included
<b>Total</b>				<b>725,000.00</b>

All prices are additionally subject to statutory VAT.

### 3 Scope of Work EDC PLUS

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				TMA	0,03	0,00	slm																																																																																																																		
				TMIn	0,01	0,00	slm																																																																																																																		
				TMGa	0,08	0,00	slm																																																																																																																		
				DEZ	0,00	0,00	g/min																																																																																																																		
				CCl4	0,00	0,00	slm																																																																																																																		
<b>Upstream abatement:</b>	DAS UPTIMUM PLUS																																																																																																																								



## 4 DAS Abatement System and Pricing for EDC PLUS

Pos	Description	Qty	Price per Unit in USD	Total Price in USD
03	<p><b>EDC PLUS</b>  <b>Electrostatic Dust Collector with HV-electrodes and self-cleaning mechanism</b></p> <ul style="list-style-type: none"> <li>▪ 1 waste-gas inlet DN150</li> <li>▪ Bypass external</li> <li>▪ 12 electrostatic separator columns with HV-electrodes</li> <li>▪ Scrubbing circuit with water</li> <li>▪ PLC/operation via touch screen</li> <li>▪ Signal interface via dry contacts (excl. cable supply &amp; wiring to the process tool)</li> <li>▪ Ethernet-Interface to enable connection to separate Monitoring-system</li> <li>▪ SEMI S2 compliant</li> <li>▪ Signal tower</li> <li>▪ Drain pan</li> <li>▪ Electrical supply: 3 x 208 V/60 Hz, N, PE</li> <li>▪ Imperial connections</li> </ul>	3 units	118,000.00	354,000.00
04	<p><b>Start-up of system, instruction and training of maintenance personnel</b>  by DAS service technician(s)  (incl. travels costs and expenses)</p> <ul style="list-style-type: none"> <li>▪ Total on-site time: 1 man 3 d (8 h/d)</li> </ul>	2 trips	included	included
<b>Total</b>				<b>354,000.00</b>

### 4.1 Options for UPTIMUM PLUS and EDC PLUS

Pos	Description	Qty	Price per Unit in USD	Total Price in USD
05	<b>Anti-earthquake protection</b> per system	1 set	258.00	on demand

All prices are additionally subject to statutory VAT.

## 5 General Conditions

The basis is provided by the parameters defined in the appendix entitled "Facility Requirements".

Alternative conditions are to be agreed in writing.

The scope of delivery does not include installation and connection of the transported media.  
The customer is responsible for performing these tasks in compliance with all requisite safety standards.

By placing its order for commissioning, the customer indicates that all requisite media connections have been installed. Prior to commissioning, the customer is duty bound to inform the contractor of possible hazards.

If the said information proves to be incomplete, inaccurate or unavailable, the customer will bear full responsibility and is liable for all resulting damage to the system.



## 6 Scope and Limits of Supply

### 6.1 Training and Service Support

DAS Environmental Expert US, Inc. (hereinafter "DAS EE") will conduct technical training for maintenance personnel in accordance with the terms of the contract. The training participants will be instructed on how to independently perform preventative maintenance tasks and standard service tasks.

For the duration of the system lifetime, DAS EE offers the following services:

- Technical advice from DAS expert via phone/e-mail 24 h/7 d (free of charge)
- The normal working hours of our service department are Monday – Friday, 8:00 am – 5:00 pm except for Public Holidays
- 48 h response time after requisition note for on-site intervention
- Within the warranty period service support (i.e. corrective maintenance) is free of charge, unless the errors were caused by the user. After the warranty period, the service prices will be calculated based on the current valid service price list.

DAS EE recommends that a basic level of spare parts be kept in stock. These will keep system downtimes to a minimum if parts require cleaning, etc.

**Optional** – DAS EE can also offer a customised service contract drafted in accordance with specific on-site requirements.

### 6.2 Lifetime of Plastic Components

Due to chemical effects, the lifetime of PP, PPs, PVC and PVC-C plastic is approx. 8 years. The manufacturer and DAS EE recommend that all PP, PPs, PVC und PVC-C plastic parts are replaced before the end of their expected lifetime. Defective plastic parts could result in system(s) sustaining significant damage and constitute a risk to safety.

### 6.3 Gas Sensor

The air within the cabinet of DAS process waste gas abatement system has to be monitored by a gas sensor which is connected to the digital input. Should it detect an explosive air-fuel-gas mixture it will transmit an alarm signal which shuts down the fuel gas supply.

Upon request, we are pleased to offer a GfG gas sensor at an additional charge which will be integrated into the cabinet. This sensor transforms the detected gas concentration into an electric current that is amplified and standardized. This signal is interpreted and integrated into the alarm signal chain of the process waste gas abatement system.

The regular calibration and maintenance of the gas sensor is to be carried out exclusively by GfG's expert staff or GfG certified personnel. It lies within the responsibilities of the customer.

**Optional** DAS EE also offers the inclusion of calibration and maintenance of the gas sensors in a customized service contract.

## 6.4 Process Interface

DAS EE's process waste gas abatement systems are equipped for a process interface via potential-free contacts. The process tool manufacturers also usually supply equipment with interfaces via potential-free contacts. Process tool and scrubber are connected by cables supplied and installed by the customer.

If the process tool is not equipped with an interface, the connection can also be implemented via a pneumatic process interface. In this version, a PE converter is connected with the compressed air line within the gas box and generates a demand signal to the scrubber if the process tool valve is opened for a particular process exhaust gas. Gas box and scrubber are connected by cables. The customer is responsible for the complete wiring.

Upon request, we will be pleased to offer you a pneumatic system interface at an additional price.



## 6.5 Scope of Supply for the Project

Performance of the Work		Responsibility		Comments
		DAS	Customer	
<b>1 Delivery and on-site move-in</b>				
1.1	All systems are packed and ready for shipment	√	-	• As defined in item “Terms and Conditions of Delivery and Contract”
1.2	Transport of systems to customer's site	-	√	• As defined in item “Terms and Conditions of Delivery and Contract”
1.3	Marking final position within the plant prior to delivery	-	√	-
1.4	Provision of auxiliary equipment (e.g. forklifts, lifting platforms) required for transporting systems into site	-	√	• Upon request and in return for an additional fee, DAS EE can provide the necessary equipment required for this task.
1.5	Move-in of the systems and/or accessories from the customer's loading ramp to the final position	-	√	• The customer will ensure that all access ways to the installation site are accessible to the DAS systems in accordance with the agreed delivery and positioning plan.
1.6	Positioning and height adjustment of the systems and/or the accessories in accordance with the plant layout and the DAS pre-installation manual	-	√	-
<b>2 Hook-up, installation and start-up</b>				
2.1	Facility hook up	-	√	• In accordance with the connection points specified by DAS EE (see DAS connection and layout plan)
2.2	Final installation and final check of plant and/or accessories prior to start-up	√	-	• As defined in item “DAS Abatement System and Pricing”, within the scope of the start-up
2.3	Provision and installation of the connection lines between DAS systems	-	√	-
2.4	Interface between process system and DAS system	-	√	• The customer is responsible for the cable ducts and wiring between process tool and DAS system (the cable ducts of the process tool can be used).



Performance of the Work		Responsibility		Comments
		DAS	Customer	
2.5	Media connections and pipelines	-	✓	<ul style="list-style-type: none"> <li>The customer will ensure that all requisite media connections, pipelines etc. are connected to the DAS system</li> </ul>
2.6	Commissioning of all DAS system incl. functional test	✓	-	<ul style="list-style-type: none"> <li>As defined in item "DAS Abatement System and Pricing"</li> <li>The customer will inform DAS EE of the commissioning dates at least 2 weeks in advance and it will confirm that all connections are available.</li> <li>Commissioning must be ordered in writing (customer completes the "Start-up/Commissioning Order" form and sends it to DAS EE).</li> <li>DAS EE will additionally bill extra trips to the customer's site and for delays for which DAS EE is not responsible.</li> </ul>
2.7	Additional installations such as lye tank and/or external interface box	✓	✓	<ul style="list-style-type: none"> <li>The customer is responsible for the installation and/or mounting.</li> <li>DAS EE is responsible for the connection.</li> </ul>
<b>3 Training and documentation</b>				
3.1	On-site training of the maintenance and operating team (during commissioning)	✓	-	<ul style="list-style-type: none"> <li>1 training unit per DAS system type (theoretical and practical training)</li> <li>Max. 4 participants per training</li> </ul>
3.2	Provision of the Technical Documentation (manual)	✓	-	<ul style="list-style-type: none"> <li>As defined in item "Terms and Conditions of Delivery and Contract"</li> </ul>
<b>4 Piping</b>				
4.1	Provision, installation and verification of external connection lines between the DAS systems	-	✓	<ul style="list-style-type: none"> <li>SolAero is responsible for connection lines between UPTIMUM PLUS and EDC PLUS</li> </ul>
<b>5 Acceptance of systems</b>				
5.1	Hand-over to the customer (start of warranty)	✓	-	<ul style="list-style-type: none"> <li>Signing of the "Commissioning Protocol"</li> </ul>



## 7 Terms and Conditions of Delivery and Contract

<b>Delivery time:</b>	Approx. 28 weeks following written order confirmation by DAS
<b>Delivery conditions:</b>	FCA DAS HQ, Dresden, Germany (INCOTERMS 2020)
<b>Packaging:</b>	Included; packaging cannot be re-used; customer is responsible for its disposal
<b>Terms of payment:</b>	
40% down payment   60% after delivery, 60 days net	
<b>Delivery postponement:</b>	
<p>If DAS receives a request to adjust the contractually agreed delivery time ("postponement notice") for a current order for which DAS is not responsible and which arises from the Customer's sphere of responsibility, DAS will examine its reasonableness.</p> <p>If the adjustment of the delivery time is reasonable for DAS, the Customer will pay a postponement fee according to the applicable manufacturing progress to cover the costs that have arisen as a result of this.</p> <p>If the request to adjust the delivery time is unreasonable for DAS, DAS has the right to terminate the current order without notice.</p>	
<b>Default of acceptance:</b>	
<p>DAS remains the owner of all its deliveries until it has received the agreed payments in full. This applies in particular if the deliverables are in the possession of the Customer, acceptance does not take place in due time and a related payment step is not triggered. The Customer will maintain the delivered items at his expense for the duration of the retention of title and insure them in favor of DAS against theft, breakage, fire, water and other risks.</p>	
<b>Cancellation:</b>	
<p>If DAS receives a cancellation notice for a current order for an important reason for which DAS is not responsible, the Customer undertakes to pay a cancellation fee in accordance with the applicable delivery progress. The date of receipt of the cancellation notice by DAS is decisive. The cancellation fee amounts in the respective process step:</p> <ul style="list-style-type: none"> <li>• Production of the delivery not yet started to 5%;</li> <li>• Production of the delivery already started to 10% or</li> <li>• Production completed and delivery ready for dispatch 50%</li> </ul> <p>of the net price (delivery value).</p>	

<b>Warranty<sup>1</sup>:</b>	12 months following start of commissioning; however, warranty start not later than 2 months following delivery, provided that DAS EE is not responsible for the delay in commissioning. The warranty starts in any case with productive use. <ul style="list-style-type: none"> <li>• Incl. spare parts</li> <li>• Excl. wear-and-tear parts (consumables) and gas sensors</li> </ul>
<b>Documentation:</b>	Manual in English language (softcopy of technical documentation for download from DAS SharePoint – Login details provided upon request)
<b>Validity of offer:</b>	The quotation is valid 180 days / until June 4 <sup>th</sup> , 2025. The quotation has a fixed price. Any modification may cause a change in the price.

<sup>1</sup> Warranty (Gewährleistung) as defined under German law.



## 8 Rights and Obligations on Intellectual Property

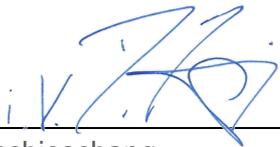
The quotation and all information herein (e.g. plans, prices, drawings and process descriptions) are confidential and the property of DAS EE. The customer is obliged to only use the information for the purpose of this quotation and must keep it confidential in relation to third parties. They shall not be copied, reproduced or transmitted without written consent of DAS EE.

We hope that we have prepared a quotation you will find attractive and we are looking forward to receiving your order. If you have any other questions, we can clarify these issues during a face-to-face meeting at your convenience.

The quotation is based on the General Terms and Conditions ("GTC") of DAS EE which shall apply accordingly. Once the GTC have been incorporated into the business transactions with our customer, they also be used correspondingly for any other business relationship between DAS EE and the customers, unless otherwise agreed in writing. You can find additional information and our GTC on our website [www.das-ee.com](http://www.das-ee.com).

Yours sincerely

DAS Environmental Expert GmbH



Daniel Zschieschang  
Director Pre-Sales and After Sales Global



Joshua McCrory  
Key Account Manager

Environmental Experts.



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**Quotation (budgetary)**

**D00400001748-II**

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dated

December 5<sup>th</sup>, 2024

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for

**SolAero Technologies**  
**10420 Research Rd SE**  
**Albuquerque**

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to

Zachary Bittner

---

**Project**

**Waste Gas Abatement &**  
**Wastewater Treatment Systems**

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**Wastewater Treatment**

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**Your DAS Environmental Expert:**

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## 1 Scope of Work –Wastewater Treatment

The scope of work is defined in accordance with the inquiry from SolAero and with the application mentioned in [Chapter 1](#). The planned wastewater treatment system is designed to remove arsenic from the abatement wastewater.

The project scope includes the following:

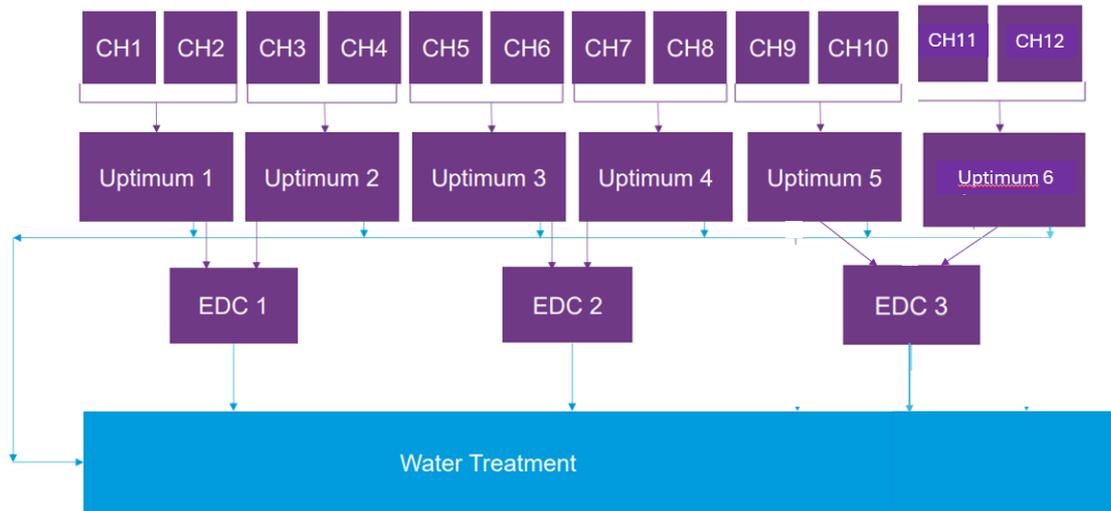
- Basic & detailed engineering for the wastewater treatment system (including process design, mechanical & electrical planning, software programming)
- Material costs for mechanical & electrical equipment (wherever applicable based on the interfaces with the customer)
- Project management
- Skid construction at DAS HQ in Dresden
- Commissioning on-site (cold & warm commissioning incl. training)
- Documentation

Please note that any customer-site construction and equipment installation services as well as construction management and supervision at the customer site are not included in the current quotation but could be offered separately.

More detailed list of services can be found [here](#).

## 2 Design Parameters and Technical Assumptions

The process design is based on the technical data (process data) provided by SolAero and the estimated wastewater characteristics that are expected for the abatement wastewater. Please note that in case any changes occur in the customer process data, the process design might need to be changed accordingly.



**Figure 2-1:** Process Flow Diagram of the overall system. The water treatment system currently planned will treat the wastewater from 6xUptimum and 3xEDC (equals to 12 process chambers).

The expected total water flow to be treated is 26 L/min. Please note that the grinding wastewater is no longer considered for the present treatment concept. The expected wastewater characteristics of the abatement wastewater can be found in the **Table 2-1**.

**Table 2-1:** Expected abatement wastewater characteristics that were taken into consideration for the design of the system.

Reaction Product	Expected concentration in wastewater (mg/L = ppm)
As <sub>2</sub> O <sub>3</sub>	1,100
H <sub>3</sub> PO <sub>4</sub>	790
P <sub>2</sub> O <sub>5</sub>	0.00
SiO <sub>2</sub>	1.20
SeO <sub>2</sub>	0.30
Al <sub>2</sub> O <sub>3</sub>	2.00
In <sub>2</sub> O <sub>3</sub>	6.90
Ga <sub>2</sub> O <sub>3</sub>	37.00
ZnO	0.75
CCl <sub>4</sub> (0.8 g/L)	2.70

Prior to the design, proof of concept tests were conducted on a lab-scale with synthetically produced wastewater. In these tests, different parameters were tested, among them also the solubility of the contaminants in the water. A summary is shown in the **Table 2-2**.

**Table 2-2:** Tested solubility of contaminants in synthetically produced wastewater. Please note that this is only used as reference and deviations might occur in the real processes.

Process gas	Oxidation product	Solubility tested in synthetic wastewater
AsH <sub>3</sub>	As <sub>2</sub> O <sub>5</sub>	soluble
PH <sub>3</sub>	P <sub>2</sub> O <sub>5</sub>	soluble
Si <sub>2</sub> H <sub>6</sub>	SiO <sub>2</sub>	not soluble
DIPSe	SeO <sub>2</sub>	soluble
TMAI	Al <sub>2</sub> O <sub>3</sub>	not soluble
TMIIn	In <sub>2</sub> O <sub>3</sub>	not soluble
TMGa	Ga <sub>2</sub> O <sub>3</sub>	not soluble
DeZn	ZnO	soluble

The system is designed as 1+1 treatment trains. Each treatment train is designed to be able to handle the wastewater from 6xUPTIMUM and 3xEDC, thus providing full process redundancy.

The following technical assumptions have been made at this stage for the process design:

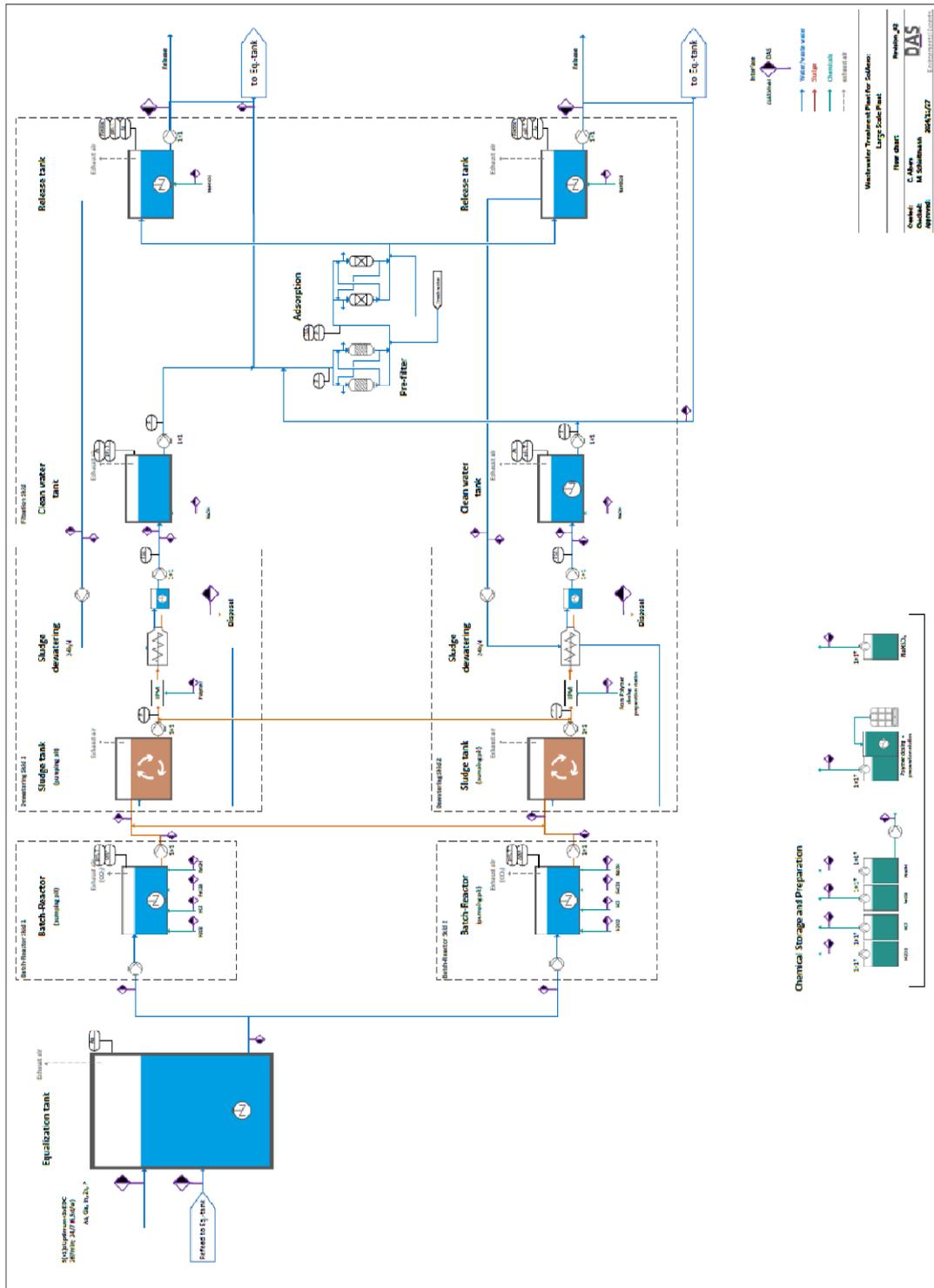
- Prior to the design, proof of concept tests were conducted on a lab-scale with synthetically produced wastewater. We assume that the real wastewater matrix will behave similarly to the synthetic one.
- The pH of the incoming wastewater is assumed to be around 2-3 (based on the pH measured on a synthetically produced matrix).
- Based on our experience, we assume that in the mentioned pH range, the arsenic is 100% dissolved and no particles are present.
- The incoming wastewater temperature is in the range of 25-35 °C.
- The system design and all materials are chosen for an indoor installation.
- The system is designed for a maximum total flow of 26 L/min per treatment train.
- All the arsenic is assumed to be present in trivalent form (As(III)) (no As(V)). Since the ratio of As(III)/As(V) cannot be predicted, the worst-case scenario was chosen for the design and we plan for 100% As(III) that needs to be oxidized to As(V). The chemical dosing can be easily adapted to the real data after the first on-site tests.
- The coagulation reaction is planned with an overdosing factor defined by the preliminary lab tests to ensure an outflow concentration of As <1mg/l. The remaining arsenic will be removed in the additional adsorption stage planned.

### 3 Quality of effluent discharge

The targeted effluent concentration of total dissolved arsenic for the present design is **50 ppb**. Please note that only the removal of arsenic has been taken into consideration and no other contaminants will be removed from the system on purpose.

## 4 Process Flow Diagram

The Process Flow Diagram of the system can be seen in **Figure 4-1**.



**Figure 4-1:** Process Flow Diagram of the designed system.

## 5 Description of the proposed treatment system

The objective of this process is to remove arsenic from the abatement wastewater by converting it into an insoluble iron-arsenic compound and then separating and removing the precipitate. The entire process can be briefly represented with the following treatment steps:



The first step includes a common **equalization tank (EQ-tank)** which collects the wastewater effluent from the waste gas abatements. According to the latest update (Oct. 2024), the grinding wastewater is no longer considered in the design. However, one more Uptimum is added to the concept (for chambers 11&12) which hydraulically matches the amount of the grinding wastewater. The wastewater inflow is irregular with regards to its amount and the degrees of arsenic contamination. The equalization tank is mixed to equalize the flow and concentrations of the contaminants as well as to keep any particles homogeneously dispersed. The arsenic concentration in the inflow is regularly analyzed in the equalization tank, to adjust the chemical demand and dosing in the downstream treatment stages. The measurement is planned with an automatic measuring device.

The wastewater is pumped to one of the **batch reactor** tanks where the oxidation and afterwards the coagulation/precipitation occur. The precipitation can reach arsenic effluent concentrations lower than 1 mg/l.

**Arsenic oxidation:** Arsenic exists in water primarily in two oxidation states: arsenite ( $\text{As}^{3+}$ ) and arsenate ( $\text{As}^{5+}$ ). Arsenate ( $\text{As}^{5+}$ ) is easier to remove as it binds more effectively to coagulants. Therefore,  $\text{H}_2\text{O}_2$  will be added as an oxidizing agent to oxidize arsenite to arsenate.

**Coagulation/precipitation:** Following the oxidation reaction, the coagulation involves the addition of chemicals to negate surface charge repulsion of single particles, promoting aggregation into larger agglomerates (flocs). The precipitant  $\text{FeCl}_3$  is dosed proportional to the amount of arsenic. Ferric salts are particularly effective, as  $\text{Fe}^{3+}$  reacts with arsenate to form insoluble ferric arsenate. Optimal conditions for the precipitation are set by the chemical supply of HCl and NaOH in the batch reactor.

**Polymer dosing:** A suitable polymer will be added to facilitate the aggregation of destabilized particles into even larger flocs. The generated flocs will be removed in the next treatment step.

In the batch reactor, parameters like pH, temperature and oxidation-reduction-potential will be monitored online.

A **dewatering system** is used for the solid-liquid separation. The water is separated from the precipitated sludge and the sludge is simultaneously dewatered for easier handling and disposal. The dewatering system chosen here is a screw press. The sludge still contains hazardous substances, such as arsenic, and must be properly disposed by the customer. The water from the dewatering unit flows to the next process stage for further treatment.

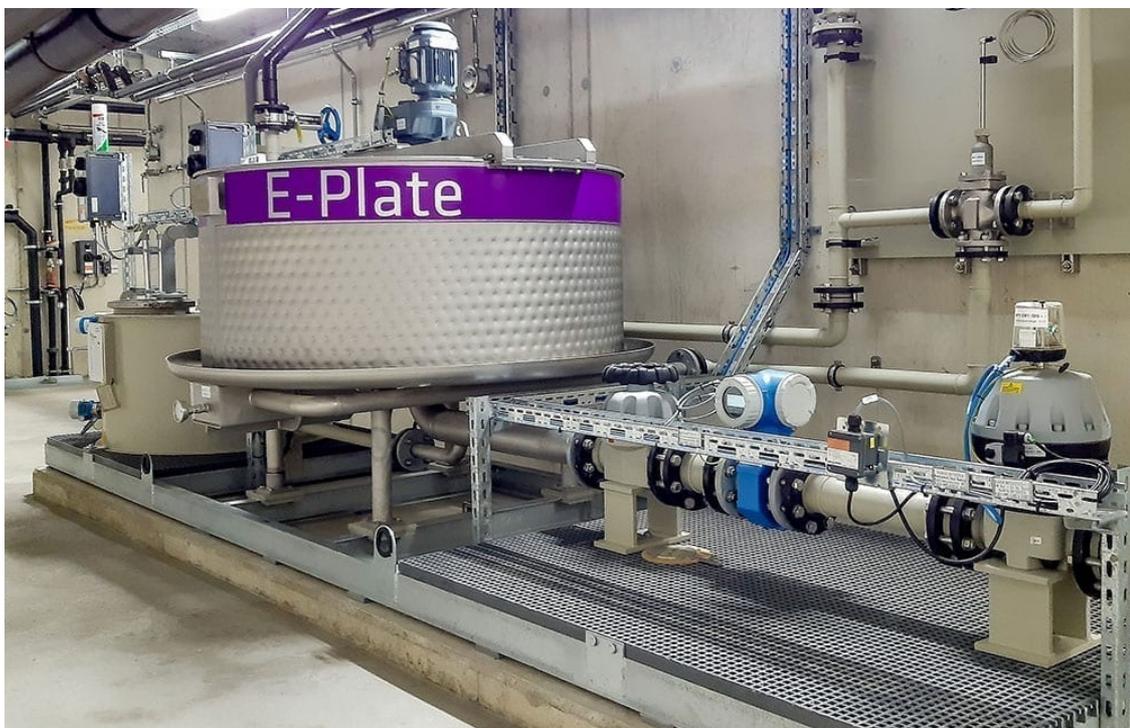
In the final **adsorption step**, arsenic is bound to the surface of a sorbent. The coagulation/flocculation reaction is planned to ensure an outflow concentration of As <1 mg/L and the adsorption stage is planned as an additional step to reduce further the arsenic concentration and reach the required effluent value of 0.05 mg/l (50 ppb). The concentration of arsenic is monitored in the release tank. The sorption process consists of several filter columns filled with the sorbent material. A sand and gravel filter is connected as a pre-filter to protect the adsorption filter from possible residual impurities from the previous stage. Once the sorbent material is fully loaded, it must be disposed and replaced with new sorbent material. At the end of the process, NaHSO<sub>3</sub> will be dosed if needed to eliminate any remaining H<sub>2</sub>O<sub>2</sub> from the water.

## 6 Design Concept of the Treatment Plant

We are currently planning the system with a modular design, consisting of pre-assembled, skid-mounted units. An example of a skid-mounted unit can be seen in **Figure 6-1**.

The planned skids (also shown in the [process flow diagram](#)) are the following:

- **Batch reactor skid** for the oxidation and coagulation/precipitation step
- **Dewatering skid** for the solid-liquid separation and sludge dewatering step
- **Filtration skid** for the adsorption step



**Figure 6-1:** Practical example of a skid-mounted unit.

The remaining equipment planned will be delivered to SolAero as individual components. This includes the following:

- **Equalization tank**
- **Chemical storage tank** for FeCl<sub>3</sub>, H<sub>2</sub>O<sub>2</sub> and HCl
- **Polymer preparation station** for liquid polymer
- **Dosing station** for FeCl<sub>3</sub>, H<sub>2</sub>O<sub>2</sub>, HCl, NaOH, NaHSO<sub>3</sub> and polymer

The on-site installation and connection of the skids and the individual components mentioned above are not part of the DAS scope and have not been considered for the present quotation.

## 6.1 Skid-mounted units

The general scope, as well as the interfaces for the skid-mounted units, are listed in **Table 6-1**.

**Table 6-1:** General scope and interfaces of skid-mounted units.

Services included at the DAS scope	<ul style="list-style-type: none"> <li>• Process technology components (such as tanks, pumps, etc.) mounted on a galvanized steel frame</li> <li>• Pipework up to the interface (see below)</li> <li>• Cabling up to the interface (see below)</li> </ul>
Interfaces ( <u>not</u> in the DAS scope)	<ul style="list-style-type: none"> <li>• Inlet and outlet of the process streams with a flange or screw joint as interconnection point</li> <li>• Inlet for utilities (such as water, compressed air, etc.) with a screw joint or quick connectors as interconnection point</li> <li>• Power and signal connection with a terminal box as interconnection point</li> </ul>
Required support&services from the customer	<ul style="list-style-type: none"> <li>• Preparation of a flat installation surface with appropriate load capacity</li> <li>• On-site installation and connection of the skids</li> <li>• Pipework and cabling between the individual skids and their interfaces</li> </ul>

The scope of delivery and the general design conditions for the skid-mounted units are described in more details below.

### 6.1.1 Batch reactor skid

The scope of one batch reactor unit is listed in **Table 6-26-2**. Please note that there are two batch reactor skids planned in total.

**Table 6-2:** Scope of one batch reactor skid.

	Description	Qty
<b>Batch reactor Tank</b>	<ul style="list-style-type: none"> <li>Vertical cylindric tank, closed top</li> <li>Material: PE</li> <li>Usable volume: ca. 2 m<sup>3</sup></li> <li>1 piece agitator</li> <li>1 piece manway opening</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	1 unit
<b>Feed pump batch reactor</b>	<ul style="list-style-type: none"> <li>1 piece pneumatic diaphragm pump</li> <li>Internal piping with valves and supports</li> </ul>	2 units
<b>Discharge pump</b>	<ul style="list-style-type: none"> <li>1 piece progressing cavity pump</li> <li>Internal piping with valves and supports</li> </ul>	2 units

### 6.1.2 Sludge dewatering skid

The sludge dewatering is carried out in a robust and maintenance-friendly screw press, which has low energy requirements compared to other solutions. The press also has a high level of operational reliability.

The dewaterability of the sludge will be improved by adding a polymer to the inflow stream of the screw press. This requires the installation of a corresponding polymer-preparation station. The flocculated sludge is conveyed in the screw press over several sections of a sieve. The volume between the sieve basket, shaft and spiral decreases along the conveying section, so that the pressure on the sludge is continually increased. By gradually increasing the pressure on the sludge, the filtrate water is prevented to be contaminated by excessive sludge discharge and at the same time the sludge dewatering progress is increased. The sieve basket is continuously cleaned from the inside with the help of scrapers and from the outside with flushing water. High filtration resistance is avoided by continuously scraping the filter cake on the sieve.

The filtrate from the screw press is collected in a filtrate tank and afterwards pumped to the next treatment step. The separation performance is monitored by a turbidity measurement. The dewatered sludge is collected in a container via a conveyor.

The screw press is designed for a continuous operation (operating time: 24 h/d). According to the sludge quantities and the described boundary conditions, the smallest screw press in our portfolio is selected and can treat the produced sludge from two treatment trains simultaneously. For this reason, we consider that a third sludge press is no longer necessary since redundancy (1+1) can still be ensured using the second screw press. The exact scope of the dewatering skid is listed in **Table 6-3**. Please note that there are two sludge dewatering skids planned in total.

**Table 6-3: Scope of the sludge dewatering skid.**

	Description	Qty
<b>Screw press</b>	<ul style="list-style-type: none"> <li>Tubular reactor</li> <li>Inline polymer mixer</li> <li>Exhaust air nozzle</li> <li>Sieve basket lock</li> <li>Transition piece to the following machine: conveyer</li> <li>No ATEX certification</li> </ul>	1 Unit
<b>Conveyer</b>	<ul style="list-style-type: none"> <li>Supports</li> <li>Feed hopper (sludge discharge from screw press)</li> <li>No ATEX certification</li> </ul>	1 Unit
<b>Sludge tank</b>	<ul style="list-style-type: none"> <li>Vertical cylindric tank, closed top</li> <li>1 piece agitator</li> <li>1 piece Manway opening</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	1 Unit
<b>Filtrate tank</b>	<ul style="list-style-type: none"> <li>Rectangular tank, closed top</li> <li>1 piece agitator</li> <li>1 piece hand hole</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	1 Unit
<b>Feed pump screw press</b>	<ul style="list-style-type: none"> <li>1 piece progressing cavity pump</li> <li>Internal piping with valves and supports</li> </ul>	2 units
<b>Discharge pump filtrate</b>	<ul style="list-style-type: none"> <li>1 piece pneumatic diaphragm pump</li> <li>Internal piping with valves and supports</li> </ul>	2 units

### 6.1.3 Filtration skid

The filtration skid consists of a pre-filter and an adsorption filter. Each filter is designed as a double system with cross piping, which allows single, parallel and series operation. The pre-filters are backwashed at regular intervals to keep the pressure loss due to the retained impurities as low as possible. The backwash water can be fed into the sludge tank. Usually, no significant particle load, which would increase the pressure loss, is to be expected in the adsorption filter. Nevertheless, a backwash function is also taken into consideration for these filters. Pressure difference, flow rate or manual operation are provided as trigger parameters for backwashing and can be carried out during operation due to the cross piping.

The arsenic concentration can be measured in the inlet of the pre-filter and in the outlet of each adsorption filter to monitor the cleaning performance of the precipitation, a breakthrough of the adsorption filter and the limit value in the release tank. It is recommended to operate the adsorption filters in series. The second filter acts as a safety filter and prevents a shutdown of the treatment plant if the first filter breaks through.

The scope of this skid is listed in **Table 6-4**.

**Table 6-4:** Scope of the filtration skid.

	Description	Qty
<b>Pre-filter</b>	<ul style="list-style-type: none"> <li>2 pieces of structural composite pressure vessel Including filter material</li> <li>Internal piping with valves and supports</li> <li>Pipeline designed as cross connection for single, parallel and series operation</li> </ul>	1 unit
<b>Adsorption-filter</b>	<ul style="list-style-type: none"> <li>2 pieces structural composite pressure vessel including filter material</li> <li>Internal piping with valves and supports</li> <li>Pipeline designed as cross connection for single, parallel and series operation</li> </ul>	1 unit
<b>Clean water tank</b>	<ul style="list-style-type: none"> <li>Vertical cylindric tank, closed top</li> <li>1 piece agitator</li> <li>1 piece Manway opening</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	2 units
<b>Release tank</b>	<ul style="list-style-type: none"> <li>Vertical cylindric tank, closed top</li> <li>1 piece agitator</li> <li>1 piece Manway opening</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	2 units
<b>Feed pump filter</b>	<ul style="list-style-type: none"> <li>1 piece pneumatic diaphragm pump Internal piping with valves and supports</li> </ul>	2 units
<b>Back flush pump</b>	<ul style="list-style-type: none"> <li>1 piece pneumatic diaphragm pump</li> <li>Internal piping with valves and supports</li> </ul>	2 units

## 6.2 Individual components

The details of the Equalization and the chemical storage tanks are listed in **Table 6-5**.

**Table 6-5:** Scope of equalization and chemical storage tank.

	Description	Qty
<b>Equalization tank</b>	<ul style="list-style-type: none"> <li>Vertical cylindric tank, closed top</li> <li>Usable volume: ca. 15 m<sup>3</sup></li> <li>1 piece agitator</li> <li>1 piece manway opening</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	1 unit
<b>FeCl<sub>3</sub> storage tank</b>	<ul style="list-style-type: none"> <li>Vertical cylindric tank, double wall, closed top</li> <li>Usable volume: ca. 30 m<sup>3</sup></li> <li>FRP ladder with operator safety deck with handrails and installation bracket</li> <li>1 piece manway opening</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	1 unit
<b>H<sub>2</sub>O<sub>2</sub> storage tank</b>	<ul style="list-style-type: none"> <li>Vertical cylindric tank, double wall, closed top</li> <li>Usable volume: ca. 15 m<sup>3</sup></li> <li>FRP ladder with operator safety deck with handrails and installation bracket</li> <li>1 piece manway opening</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	1 unit
<b>HCl storage tank</b>	<ul style="list-style-type: none"> <li>Vertical cylindric tank, double wall, closed top</li> <li>Usable volume: ca. 15 m<sup>3</sup></li> <li>FRP ladder with operator safety deck with handrails and installation bracket</li> <li>1 piece manway opening</li> <li>Adequate nozzle for in- and outflow, measurement instrumentation, drainage</li> </ul>	1 unit

### 6.2.1 Chemical and polymer dosing station

Similar to the skids, the dosing stations are delivered to the construction site prefabricated, leaving only the dosing pipeline to the interconnection point of the skid and the cabling to the control cabinet to be installed on site. Each dosing station is designed with a duty/standby (1+1) pump arrangement.

The required dosing for the batch reactors can be carried out with a dosing station for each chemical, as the cycles of the individual reactors are staggered accordingly. This affects the dosing stations for  $\text{FeCl}_3$ ,  $\text{H}_2\text{O}_2$ ,  $\text{HCl}$  and  $\text{NaOH}$ .

In addition, a  $\text{NaOH}$  dosing station is taken into account for each clean water tank and a  $\text{NaHSO}_3$  dosing station for each release tank.

The required polymer dosing for sludge dewatering is carried out with a polymer preparation station and corresponding dosing station for each screw press. The polymer preparation station includes the following components:

- 1 piece 3-chamber tank, closed top
- 2 pieces agitator
- 1 piece pump for the polymer concentrate
- 1 piece water connection with solenoid valve and pressure reducer
- Adequate nozzle for in- and outflow, measurement instrumentation, drainage

Please note that in case certain chemicals are already available at the fab, these chemicals could be provided directly to the system without the need of an extra chemical storage tank. In this case, we would recommend to plan a day tank (tank which stores the amount of chemicals needed for one day) instead.

## 7 System Specifications

### 7.1 Main mechanical components

In **Table 7-1** a summary of the main specifications of the main mechanical components can be found.

**Table 7-1:** Main specifications of the mechanical components

Component	Medium	Material	Comment
Tanks	wastewater; sludge	PE	
Pressure vessel	wastewater	GRP	
Sludge press	sludge	stainless steel	
Agitator	wastewater; sludge	stainless steel	parts in contact with the media
Diaphragm pump	wastewater	PE/EPDM	parts in contact with the media
Progressing cavity pump	sludge	coated cast iron/stainless steel/NBR	parts in contact with the media
Chemical pipeline	H <sub>2</sub> O <sub>2</sub> ; HCl; FeCl <sub>3</sub> ; NaOH; NaHSO <sub>3</sub>	PVC	inside the drip tray
		hose in protective tube	outside the drip tray
Waste water pipeline	wastewater	PE	≤ 2"
		PVC	> 2"
Sludge pipeline	sludge	PE	
Fresh water	water	stainless steel	with press fittings
Compressed air pipeline	air	PUN	flexible tubing
Frame & support	ambient condition	galvanized steel	

## 7.2 Electrical, Instrumentation and Controls (EI&C), Software

### 7.2.1 Description of scope

The electrical connection capacity of the water treatment plant is 90 kVA, with an operating current of 107 A. Treatment train 1 includes the power supply for the entire treatment system, as well as control cabinets containing the variable frequency drives (VFD) and direct-on-line starters (DOL) for this area. For the treatment train 2, only an additional control cabinet with the VFD and DOL for train 2 is provided.

#### Following services are included:

- Switchgear with Siemens control, including variable frequency drives (VFD) and direct online starter (DOL)
- Measurement technology and sensors from Endress + Hauser
- Maintenance switches for equipment
- Preparation of circuit diagrams (using EPlan design software).
- Creation of a cable list
- Planning of the cable tray system

#### Following services are not included:

- Delivery and installation of cable tray as well as cabling between the individual skids
- Testing and documentation of the electrical installation on-site
- Technical building equipment (HVAC): this offer does not include HVAC, such as lighting, sockets, heating, and ventilation. The main power supply line must be installed and connected by the customer.
- Surge Protection, Lightning Protection, and Grounding Concept: the preparation of a surge protection, lightning protection, and grounding concept is not part of this offer and must be carried out by the customer.
- IEC 60364-4-44:2007/A1:2015 requires surge protection (lightning protection device) depending on the use of a building or system. Installing a surge protection device is only meaningful within the context of a lightning protection concept.
- Regardless of the lightning protection concept, we will install a surge arrester Type 1+2 near the feed-in point in our switchgear.
- If no lightning protection zone concept or specific requirements for the use of a certain surge protection are provided, it is assumed that such protection is not required.
- Fire Protection measures: integration into an existing fire alarm system is the customer's responsibility.

### 7.2.2 Specifications switchboard

- **Rittal VX** (Height: 2,000 mm + 200 mm base), for control and power, RAL 7035.
- This offer applies to operating the system in a TNS or TNC system, 480 V, 60 Hz
- Emergency stop buttons will be placed at appropriate locations within the system.
- **Control Power:** 24 V DC, supported by UPS from Siemens
- **Bus system:** Profinet
- **Frequency converters:** Danfoss FC

- **Breaker and contactor:** Siemens
- **PLC:** Siemens 1500 controller, including two network ports for the internal system network and external communication.
- **Terminals:** Phoenix Contact.

#### Temperature ranges for the switchgear:

- Max ambient temperature (operating room): 30°C.
- Max internal temperature (inside the switchgear): 35°C.
- Internal temperature controlled by air conditioning unit mounted on the cabinet

#### 7.2.3 Process analysis and measurement equipment

The following measurement equipment is planned for the system:

- arsenic analyser for the in- and outlet of the water treatment plant
- pH and redox measurement
- level sensor for the tank as overflow and dry run protection
- flow sensor for the screw press
- pressure sensor for the progressing cavity pump as overpressure protection
- temperature already included in the pH and redox measurement
- leakage sensors for the dosing station and chemical storage tanks

## 8 Project Timeline

A preliminary project timeline can be found in **Table 8-1**. This timeline is defined based on the current information and the assumed delivery dates. Please note that a more accurate timeline can be provided upon coordination with SolAero.

### Main assumptions:

- Reviews (and adaptation) for any necessary official approvals considered with 15 days.
- Delays due to customer approvals are not considered and for delays for which DAS EE is not responsible, additional costs might occur and will be placed with change orders.
- Closing times and public holidays have not been considered in the current planning status.

Please note that the payment terms and payment steps will be defined for the binding quotation.

**Table 8-1: Services, scope of supply and interfaces planned at the project**

	Duration	Comments
<b>Total duration</b>	<b>01.01.2025 – 21.06.2026</b>	<b>The start date is only given as a reference</b>
Project start	1 day	PO confirmation by DAS and handover of advanced payment bond
Engineering, fabrication and pre-tests	10 months	
Shipping by SolAero	Estimation 4 weeks	Not in the current DAS EE scope
On-site installations by SolAero	Estimation 4 weeks	Not in the current DAS EE scope
Commissioning by DAS on-site	2 weeks	The customer shall inform DAS EE about planned commissioning date at least 1 month in advance
Acceptance test and training	1 week	
As-built documentation	4 weeks	

## 9 Pricing summary

The following prices **Table 9-1** are estimated based on the current design, equipment and material prices. Please note that this is budgetary quotation and therefore the given price is non-binding. Additionally, any changes in the concept design or the customer requirements might have an influence on the pricing of the project.

**Table 9-1:** Estimated price for the project scope as described.

Pos	Description	Amount USD*
01	Wastewater Treatment System	3,200,000.00
<b>Total price* in USD</b>		<b>3,200,000.00</b>

\* All prices are exclusive of VAT.

\* The current price is calculated based on the current exchange rate 1.00 EUR = 1.06 USD (06.12.2025). The mentioned prices will be adjusted according to the exchange rate at the point of the binding quotation.

## 10 Interfaces

The pricing mentioned in **Table 10-1** is based on the following project services and interfaces.

**Table 10-1:** Services, scope of supply and interfaces planned at the project.

Services		DAS	SolAero	Comments
<b>1. Engineering, project management &amp; supervision</b>				
1.01	Process Design	√	-	
1.02	Mechanical and electrical design	√	-	<ul style="list-style-type: none"> <li>All drawings are planned with AutoCAD Plant 3D</li> <li>Design Standards: we consider that DAS EE design standards can be used for: P&amp;ID (incl. colour codes, symbols, legend, annotations, page configurations, etc.), system labelling and piping classes</li> </ul>
1.03	Construction management/ supervision	-	√	
1.04	Project management	√	-	
1.05	Software programming	√	-	
1.06	Cold & warm commissioning incl. final functional test	√	-	<ul style="list-style-type: none"> <li>Customer shall finalize all tie-ins prior to commissioning.</li> <li>The customer shall inform DAS EE about planned commissioning date at least 1 month in advance.</li> </ul>
<b>2. Scope of supply (System Components)</b>				
2.01	Skid-mounted components	√	-	Please see <a href="#">Design Concept of the Treatment Plant</a>
2.02	Mechanical components	√	-	Please see <a href="#">Main mechanical components</a>
2.03	Electrical components and measurement equipment	√	-	Please see <a href="#">Electrical, Instrumentation and Controls (EI&amp;C), Software</a>
2.04	PLC & HMI	√	-	Siemens S7 1500 CPU & Siemens IPC
2.05	SCADA	√	-	Siemens WinCC 8.0 or later
2.06	UPS power supply	-	√	

2.07	Surge protection devices (SPD)	-	✓	
2.08	Spare parts	-	✓	
2.09	Chemicals for commissioning	-	✓	
<b>3. On-site scope of work</b>				
3.01	Civil engineering; excavation and foundation; surface coatings	-	✓	
3.02	On-site installations of equipment (mechanical & electrical)	-	✓	
3.03	Steel construction	-	✓	
3.04	Technical building equipment / Building Services	-	✓	
3.05	Surge protection, lightning protection concept, lightning protection	-	✓	
3.06	Fire protection	-	✓	
3.07	Grounding concept, earthing points/tracks	-	✓	
3.08	Isolation and pipe heating	-	✓	
3.09	Electricity and electrical connection	-	✓	
3.10	Water and water connection	-	✓	
3.11	Media connections	-	✓	
3.12	Static calculations	-	✓	
3.13	Permits	-	✓	
3.14	System certifications	-	✓	
3.15	Facility hook-up	-	✓	
3.16	Exhaust air treatment	-	✓	
3.17	Workspace provision for the commissioning	-	✓	
<b>4. Others</b>				
4.01	Labelling	✓	-	Using DAS standard

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4.02	Documentation	✓	-	<ul style="list-style-type: none"><li>• Project language: English</li><li>• Documentation according to EC machinery directive 2006/42/EG</li></ul>
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## 11 Terms and Conditions of Delivery and Contract for Wastewater Treatment System

<b>Delivery time:</b>	See project timeline
<b>Delivery conditions:</b>	FCA DAS HQ, Dresden, Germany (INCOTERMS 2020) (this can be changed upon request for the binding quotation)
<b>Packaging:</b>	Included; packaging cannot be re-used; customer is responsible for its disposal
<b>Terms of payment:</b>	To be defined for the binding quotation
<b>Warranty<sup>1</sup>:</b>	12 months Warranty start with handing over the shipping documents
<b>Documentation:</b>	Manual in English language
<b>Validity of offer:</b>	30 days
<b>Contract Details</b>	Contracting party will be: DAS Environmental Expert USA Inc. Office Boise 1108 West Boise Avenue Suite 102 Boise, ID 83706, USA

<sup>1</sup>Warranty (Gewährleistung) as defined under German law.

## 12 Rights and Obligations on Intellectual Property

All given information (e.g. plans, drawings and process descriptions) is property of DAS EE and may not be copied, reproduced or transmitted to 3<sup>rd</sup> parties without written consent of DAS EE. This also refers to this quotation as well as all communicated and sent data and information.

This quotation is subject to the condition precedent of the conclusion of a legally valid work and performance contract between the potential customer and DAS EE.

The data used for the calculation and design are based on theoretical values and assumptions, the results of which depend on the actual circumstances. In case the information and the technical data and assumptions considered in the current quotation are found to be incorrect or change until the realization of the project, DAS EE can no longer guarantee the performance of the system described in the quotation. To achieve the required performance, the process design and system details might have to change accordingly and in that case DAS EE has no obligation to cover the costs for the necessary changes.

We hope that we have prepared a quotation that you will find attractive. If you have any further questions, we will be glad to provide the necessary clarifications during a meeting at your convenience.

You can find additional information and our Terms and Conditions (T&Cs) on our website [www.das-ee.com](http://www.das-ee.com).

Yours sincerely

### DAS Environmental Expert GmbH

i.V. 

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Mirko Heinze  
COO Water Treatment

i.V. 

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Dr. Stavroula Sfaelou  
Director Sales Water Treatment Global

**Table 1.3 - CHEM Purchase List for High-Use VOC/HAP/TAP Chemicals**

Material/Chemical	Quantity Purchased <sup>1</sup>	Quantity of Liquid Disposed	Remaining Quantity <sup>2</sup>	Container <sup>3</sup>	Total pounds used	Components/Notes	Density (lb/gal) or (lb/bottle)
Acetone	53,744	0	53,744	gallons	354,710	Exempted from VOC regulation in 1995	6.6
Isopropanol	19,340	0	19,340	gallons	125,710		6.5
Acetic acid	1485	0	1,485	bottles	13,365	Used in Bath Mass Balance tab	9
Hydrochloric acid	9,223	0	9,223	bottles	77,012		8.35
Hydrochloric acid 37%	404	0	404	gallons	4,040		10
Hydrofluoric acid	415	0	415	bottles	3,984		9.6
AZ 2035	327	0	327	gallons	3,107		9.5
AZ EBR 70/30	2,384	0	2,384	gallons	18,357	70% 1 PMGE, 30% PMGEA	7.7
AZ 2070	50.0	0	50	gallons	447		8.94
EKC 922	3,872	0	3,872	gallons	30,782	5% Catechol, 2.2% Naphthalene	7.95
Video Jet Make Up Fluid (16-8425)	144	0	144	gallons	972		6.75
Video Jet Make Up Fluid (16-5905)	56.0	0	56	gallons	373		6.66
Video Jet 16-8420	12.0	0	12	gallons	86		7.16
Nitric Acid 70%	36.0	0	36	gallons	424		11.79
Sulfuric Acid 95-98%	48.0	0	48	gallons	738		15.37
1N Sodium Hydroxide	2.0	0	2	gallons	17.4		8.68
Phenolphthalein indicator solution 1%	2.0	0	2	gallons	13.3		6.67
0.1N Sulfuric Acid	4.0	0	4	gallons	33.4		8.34
0.4N Sodium Hydroxide	4.0	0	4	gallons	33.7		8.42
Reagent Grade Ethanol	4.0	0	4	gallons	26.3		6.58
Hydrofluoric Acid, 49%	14.0	0	14	gallons	137.7		9.84
Iridite 14-2	10.0	0	10	gallons	93.6		9.36
BR 127 NC Primer	18.0	0	18	gallons	132.1		7.34
AEROGLAZE 9958	8	0	8	gallons	59.4		7.43
AEROGLAZE A276	10	0	10	gallons	96.5		9.65
AEROGLAZE Z306	10	0	10	gallons	78.5		7.85
AEROGLAZE Z307	10	0	10	gallons	78.4		7.84
AEROGLAZE 9929B	10	0	10	gallons	76.7		7.67
AEROGLAZE 9929A	4	0	4	gallons	49.1		12.3
AEROGLAZE 9953	4	0	4	gallons	27.6		6.9
AEROGLAZE 9958	4	0	4	gallons	29.7		7.4
APTEK 2706 B	12	0	12	gallons	75.0		6.3
APTEK 2706 A	12	0	12	gallons	140.1		11.7
MLP-300AZ	156	0	156	gallons	1951.1		12.5
S13GP:6N/LO-1 Thermal Control Coating	156	0	156	gallons	1560.0		10
S13GP:6N/LO-1 Catalyst	156	0	156	gallons	1365.8		8.8
X-99 Thinner	156	0	156	gallons	1560.0		10
<b>Gases</b>	<b>Cylinders</b>				<b>Pounds</b>		
Arsine (60 lb cylinders)	81		81		4,860	Added as a HAP in 2013	
Phosphine (40 lb cylinders)	95		95		3,800		

VOCs

HAPs

**162,416 Total Annual VOCs purchases**

**124,478 Total Annual HAPs purchases**

<sup>1</sup> Quantity purchased values taken assumed from the maximum of the past emission inventory data

<sup>2</sup> Total purchased Gallons - Solvent waste gallons = Remaining Quantity

<sup>3</sup> Assumed all cases are 4 gallons, all drums are 55 gallons, and one bottle is equivalent to a gallon



A DIVISION OF VANEAS ENTERPRISES, INC.

10141 BUNSEN WAY  
LOUISVILLE, KENTUCKY 40299  
502-491-3553 FAX: 502-491-5182

CONTAMINANT	3 Ft. Pack Bed	With pH Control	5 Ft. Pack Bed	With pH Control
Acetic Acid	NR	80-85	NR	90-95
Alcohols <sup>3</sup>	*	*	*	*
Alkaline Cleaners <sup>4</sup>	99.5-99.9	99.5-99.9	99.9	99.9
Amines	NR	90-95	NR	98-99
Ammonia	NR	90-95	NR	98-99
Aqua Regia <sup>1,5</sup>	85-90	86-92	95-98	96-98
Arsine <sup>2</sup>	NR	80-85	NR	85-90
Boric Acid <sup>4</sup>	95-98	95-98	98	98
Caustic Cleaners <sup>4</sup>	99.5-99.9	99.5-99.9	99.9	99.9
Caustic Soda <sup>4</sup>	99.5-99.9	99.5-99.9	99.9	99.9
Chlorine <sup>6</sup>	NR	85-90	NR	95-98
Chromic Acid <sup>4</sup>	98-99	98-99	99	99
Copper Chloride <sup>4</sup>	90-92	90-92	92	92
Cyanide Solutions <sup>4</sup>	99.5-99.9	99.5-99.9	99.9	99.9
Diborane <sup>2</sup>	NR	90-95	NR	95-98
Ethylene Oxide <sup>3</sup>	*	*	*	*
Ferric Chloride <sup>4</sup>	93-95	93-95	95	95
Ferric Nitrate <sup>4</sup>	98-99	98-99	99	99
Ferrous Chloride <sup>4</sup>	98-99	98-99	99	99
Ferrous Sulfate <sup>4</sup>	98-99	98-99	99	99
Fluoborate Mists <sup>4</sup>	98-99	98-99	99	99
Fluosilicic Acid <sup>4</sup>	98-99	98-99	99	99
Formaldehyde	NR	85-90	NR	98-99
Halide Mists <sup>4</sup>	96-98	96-98	98	98
Hydrochloric Acid <sup>1,5</sup>	90-95	92-95	95-99	98-99
Hydrofluoric Acid <sup>1</sup>	95-98	96-98	96-99	98-99
Hydrofluosilicic Acid <sup>4</sup>	98-99	98-99	99	99
Hydrogen Cyanide <sup>1,2</sup>	NR	85-90	NR	95-98
Hydrogen Peroxide	90-95	90-95	95-99	95-99
Hydrogen Sulfide <sup>2</sup>	NR	70-75	NR	85-90
Mercaptans <sup>3</sup>	*	*	*	*
Nickel Chloride <sup>4</sup>	93-95	93-95	95	95
Nickel Sulfate <sup>4</sup>	98-99	98-99	99	99
Nitric Acid <sup>1,5</sup>	85-90	86-92	95-98	96-98
Nitric Oxide (NO) <sup>3</sup>	*	*	*	*
Nitrogen Dioxide (NO <sub>2</sub> ) <sup>3</sup>	*	*	*	*
Perchloric Acid <sup>5</sup>	80-85	80-85	85-90	95-98
Phenol <sup>2</sup>	NR	70-75	NR	85-90
Phosphine <sup>2</sup>	NR	85-90	NR	90-95
Phosphoric Acid <sup>4</sup>	95-99	95-99	98-99	98-99
Potassium Dichromate <sup>4</sup>	98-99	98-99	99	99
Selenium Sulfide <sup>1</sup>	98-99	98-99	99	99
Silane	NR	96-98	NR	99
Sodium Chloride <sup>4</sup>	98-99	98-99	99	99
Sodium Fluoride <sup>4</sup>	98-99	98-99	99	99
Sodium Glutamate <sup>4</sup>	98-99	98-99	99	99
Sodium Hydroxide <sup>4</sup>	99.5-99.9	99.5-99.9	99.9	99.9
Sulfamate Mists <sup>4</sup>	98-99	98-99	99	99
Sulfur Dioxide	NR	80-85	NR	90-95
Sulfuric Acid <sup>4</sup>	99.5-99.9	99.5-99.9	99.9	99.9
Tin Chloride <sup>4</sup>	90-95	90-95	95	95
Zinc Chloride <sup>4</sup>	90-95	90-95	95	95
Zinc Nitrate <sup>4</sup>	98-99	98-99	99	99
Zinc Sulfate <sup>4</sup>	98-99	98-99	99	99

**Citric Acid**

**99**

These efficiencies are intended only as a guide. Specific combinations and concentrations may result in significant variations from these values.

1. The use of pH control with these applications will reduce water usage.
2. Performance is improved with chemical addition.
3. These applications require extended packing depth & chemical addition or once thru water.
4. Wet scrubbing is not necessary, only a mist-elimination device.
5. Under certain conditions such as high inlet concentrations or high temperatures a fine fog can form which will not be removed at the stated efficiency. A special high efficiency mist eliminator is required.
6. For applications involving high levels of chlorine consult Vanaire for specifics.

# Water Quality Report 2024

## Distribution - Entry Points

[Definitions & Terms](#) [Notes & Sources of Substances](#)

### Zone 3

<u>Metals</u>	Sample Collection Years	Units	Zone Average	City Average	City Range	MCL	MCLG
Arsenic	2023 - 2024	PPB	0	2	0 - 9	10	0
Barium	2023 - 2024	PPM	0.122	0.070	0.035 - 0.18	2	2
Chromium	2023 - 2024	PPB	0.0	0.3	0 - 2	100	100
<u>Minerals</u>	Sample Collection Years	Units	Zone Average	City Average	City Range	MCL	MCLG
Fluoride	2023 - 2024	PPM	0.54	0.61	0.36 - 1.17	4	4
<u>Nutrients</u>	Sample Collection Years	Units	Zone Average	City Average	City Range	MCL	MCLG
Nitrate + Nitrite as Nitrogen	2024	PPM	0.15	0.38	0 - 3.07	10	10
<u>Radionuclides</u>	Sample Collection Years	Units	Zone Average	City Average	City Range	MCL	MCLG
Combined Radium 226 and 228	2023 - 2024	pCi/L	0.11	0.13	0.02 - 0.5	5	0
Gross Alpha Particle Activity	2023 - 2024	pCi/L	0.4	0.7	0 - 1.6	15	0
Uranium, Mass Concentration	2023 - 2024	PPB	3	2	0 - 6	30	0

# Voluntary Comprehensive Monitoring in Distribution

(Samples taken every three months, 2024 results)

Zone 3

<u>General Chemistry</u>	Sample Collection Years	Units	Minimum	Average	Maximum	City Average	City Range	MCL
Alkalinity	2024	PPM as CaCO <sub>3</sub>	73	104	116	107	68 - 140	~
Bicarbonate	2024	PPM as CaCO <sub>3</sub>	73	104	116	107	68 - 140	~
Calcium	2024	PPM	38.00	48.14	61.00	50.50	14 - 82	~
Chloride	2024	PPM	31.29	36.66	39.96	30.28	8.99 - 58.04	250 a
Field Conductivity	2024	uS/cm	407	450	510	477	349 - 712	
Field Free Chlorine	2024	mg/L	0.8	1.0	1.2	0.9	0.4 - 1.4	
Field pH	2024	Std. unit	7.2	7.6	8	7.65	6.94 - 8.23	
Field Temperature	2024	Fahrenheit	48	62	68	65	47 - 87	
Hardness	2024	grains/gallon	6.61	8.39	10.50	8.81	2.65 - 14.17	~
Magnesium	2024	PPM	4.40	5.66	6.60	5.96	2.5 - 9.10	~
Potassium	2024	PPM	3	3	4	4	2 - 10	~
Silica	2024	PPM as SiO <sub>2</sub>	17.1	27.5	36.3	30.5	13 - 64.1	~
Sodium	2024	PPM	20	27	30	32	16 - 76	~
Sulfate	2024	PPM	29	49	83	65	23 - 106	250 a
Total Dissolved Solids	2024	PPM	242	265	312	289	222 - 386	500 a
<u>Metals</u>	Sample Collection Years	Units	Minimum	Average	Maximum	City Average	City Range	MCL
Arsenic	2024	PPB	1	3	5	4	0 - 8	10
Barium	2024	PPM	0.086	0.112	0.140	0.073	0.04 - 0.140	2
Chromium	2024	PPB	0.0	0.0	0.0	1.0	0 - 5.0	100
Iron	2024	PPM	0.0	0.0	0.0	0.0	0 - 0.1	0.3 a
<u>Minerals</u>	Sample Collection Years	Units	Minimum	Average	Maximum	City Average	City Range	MCL
Fluoride	2024	PPM	0.42	0.49	0.63	0.54	0.26 - 1.17	4
<u>Nutrients</u>	Sample Collection Years	Units	Minimum	Average	Maximum	City Average	City Range	MCL
Nitrate	2024	PPM	0.12	0.25	0.39	0.52	0 - 3.36	10

a- Represents the USEPA Secondary Maximum Contaminant Level (SMCL). Secondary Drinking Water Standards are unenforceable federal guidelines regarding taste, odor, color and certain other non-aesthetic effects of drinking water. USEPA recommends them as reasonable goals, but federal law does not require water systems to comply with them.

# Calculating Realistic PM<sub>10</sub> Emissions from Cooling Towers

Abstract No. 216      Session No. AM-1b

**Joel Reisman and Gordon Frisbie**

Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, California 95825

## ABSTRACT

Particulate matter less than 10 micrometers in diameter (PM<sub>10</sub>) emissions from wet cooling towers may be calculated using the methodology presented in EPA's AP-42<sup>1</sup>, which assumes that all total dissolved solids (TDS) emitted in "drift" particles (liquid water entrained in the air stream and carried out of the tower through the induced draft fan stack.) are PM<sub>10</sub>. However, for wet cooling towers with medium to high TDS levels, this method is overly conservative, and predicts significantly higher PM<sub>10</sub> emissions than would actually occur, even for towers equipped with very high efficiency drift eliminators (e.g., 0.0006% drift rate). Such over-prediction may result in unrealistically high PM<sub>10</sub> modeled concentrations and/or the need to purchase expensive Emission Reduction Credits (ERCs) in PM<sub>10</sub> non-attainment areas. Since these towers have fairly low emission points (10 to 15 m above ground), over-predicting PM<sub>10</sub> emission rates can easily result in exceeding federal Prevention of Significant Deterioration (PSD) significance levels at a project's fence line. This paper presents a method for computing realistic PM<sub>10</sub> emissions from cooling towers with medium to high TDS levels.

## INTRODUCTION

Cooling towers are heat exchangers that are used to dissipate large heat loads to the atmosphere. Wet, or evaporative, cooling towers rely on the latent heat of water evaporation to exchange heat between the process and the air passing through the cooling tower. The cooling water may be an integral part of the process or may provide cooling via heat exchangers, for example, steam condensers. Wet cooling towers provide direct contact between the cooling water and air passing through the tower, and as part of normal operation, a very small amount of the circulating water may be entrained in the air stream and be carried out of the tower as "drift" droplets. Because the drift droplets contain the same chemical impurities as the water circulating through the tower, the particulate matter constituent of the drift droplets may be classified as an emission. The magnitude of the drift loss is influenced by the number and size of droplets produced within the tower, which are determined by the tower fill design, tower design, the air and water patterns, and design of the drift eliminators.

## AP-42 METHOD OF CALCULATING DRIFT PARTICULATE

EPA's AP-42<sup>1</sup> provides available particulate emission factors for wet cooling towers, however, these values only have an emission factor rating of "E" (the lowest level of confidence acceptable). They are also rather high, compared to typical present-day manufacturers' guaranteed drift rates, which are on the order of 0.0006%. (Drift emissions are typically

expressed as a percentage of the cooling tower water circulation rate). AP-42 states that “a *conservatively high* PM<sub>10</sub> emission factor can be obtained by (a) multiplying the total liquid drift factor by the TDS fraction in the circulating water, and (b) assuming that once the water evaporates, all remaining solid particles are within the PM<sub>10</sub> range.” (Italics per EPA).

If TDS data for the cooling tower are not available, a source-specific TDS content can be estimated by obtaining the TDS for the make-up water and multiplying it by the cooling tower cycles of concentration. [The cycles of concentration is the ratio of a measured parameter for the cooling tower water (such as conductivity, calcium, chlorides, or phosphate) to that parameter for the make-up water.]

Using AP-42 guidance, the total particulate emissions (PM) (after the pure water has evaporated) can be expressed as:

$$\text{PM} = \text{Water Circulation Rate} \times \text{Drift Rate} \times \text{TDS} \quad [1]$$

For example, for a typical power plant wet cooling tower with a water circulation rate of 146,000 gallons per minute (gpm), drift rate of 0.0006%, and TDS of 7,700 parts per million by weight (ppmw):

$$\text{PM} = 146,000 \text{ gpm} \times 8.34 \text{ lb water/gal} \times 0.0006/100 \times 7,700 \text{ lb solids}/10^6 \text{ lb water} \times 60 \text{ min/hr} = \underline{3.38 \text{ lb/hr}}$$

On an annual basis, this is equivalent to almost 15 tons per year (tpy). Even for a state-of-the-art drift eliminator system, this is not a small number, especially if assumed to all be equal to PM<sub>10</sub>, a regulated criteria pollutant. However, as the following analysis demonstrates, only a very small fraction is actually PM<sub>10</sub>.

## COMPUTING THE PM<sub>10</sub> FRACTION

Based on a representative drift droplet size distribution and TDS in the water, the amount of solid mass in each drop size can be calculated. That is, for a given initial droplet size, assuming that the mass of dissolved solids condenses to a spherical particle after all the water evaporates, and assuming the density of the TDS is equivalent to a representative salt (e.g., sodium chloride), the diameter of the final solid particle can be calculated. Thus, using the drift droplet size distribution, the percentage of drift mass containing particles small enough to produce PM<sub>10</sub> can be calculated. This method is conservative as the final particle is assumed to be perfectly spherical; hence as small a particle as can exist.

The droplet size distribution of the drift emitted from the tower is critical to performing the analysis. Brentwood Industries, a drift eliminator manufacturer, was contacted and agreed to provide drift eliminator test data from a test conducted by Environmental Systems Corporation (ESC) at the Electric Power Research Institute (EPRI) test facility in Houston, Texas in 1988 (Aull<sup>2</sup>, 1999). The data consist of water droplet size distributions for a drift eliminator that achieved a tested drift rate of 0.0003 percent. As we are using a 0.0006 percent drift rate, it is reasonable to expect that the 0.0003 percent drift rate would produce smaller droplets, therefore,

this size distribution data can be assumed to be conservative for predicting the fraction of PM<sub>10</sub> in the total cooling tower PM emissions.

In calculating PM<sub>10</sub> emissions the following assumptions were made:

- Each water droplet was assumed to evaporate shortly after being emitted into ambient air, into a single, solid, spherical particle.
- Drift water droplets have a density ( $\rho_w$ ) of water; 1.0 g/cm<sup>3</sup> or 1.0 \* 10<sup>-6</sup>  $\mu\text{g} / \mu\text{m}^3$ .
- The solid particles were assumed to have the same density ( $\rho_{\text{TDS}}$ ) as sodium chloride, (i.e., 2.2 g/cm<sup>3</sup>).

Using the formula for the volume of a sphere,  $V = 4\pi r^3 / 3$ , and the density of pure water,  $\rho_w = 1.0 \text{ g/cm}^3$ , the following equations can be used to derive the solid particulate diameter,  $D_p$ , as a function of the TDS, the density of the solids, and the initial drift droplet diameter,  $D_d$  :

$$\text{Volume of drift droplet} = (4/3)\pi(D_d/2)^3 \quad [2]$$

$$\text{Mass of solids in drift droplet} = (\text{TDS})(\rho_w)(\text{Volume of drift droplet}) \quad [3]$$

substituting,

$$\text{Mass of solids in drift} = (\text{TDS})(\rho_w)(4/3)\pi(D_d/2)^3 \quad [4]$$

Assuming the solids remain and coalesce after the water evaporates, the mass of solids can also be expressed as:

$$\text{Mass of solids} = (\rho_{\text{TDS}})(\text{solid particle volume}) = (\rho_{\text{TDS}})(4/3)\pi(D_p/2)^3 \quad [5]$$

Equations [4] and [5] are equivalent:

$$(\rho_{\text{TDS}})(4/3)\pi(D_p/2)^3 = (\text{TDS})(\rho_w)(4/3)\pi(D_d/2)^3 \quad [6]$$

Solving for  $D_p$ :

$$D_p = D_d [(\text{TDS})(\rho_w / \rho_{\text{TDS}})]^{1/3} \quad [7]$$

Where,

TDS is in units of ppmw

$D_p$  = diameter of solid particle, micrometers ( $\mu\text{m}$ )

$D_d$  = diameter of drift droplet,  $\mu\text{m}$

Using formulas [2] – [7] and the particle size distribution test data, Table 1 can be constructed for drift from a wet cooling tower having the same characteristics as our example; 7,700 ppmw TDS and a 0.0006% drift rate. The first and last columns of this table are the particle size distribution derived from test results provided by Brentwood Industries. Using straight-line interpolation for a solid particle size 10  $\mu\text{m}$  in diameter, we conclude that approximately 14.9 percent of the mass emissions are equal to or smaller than PM<sub>10</sub>. The balance of the solid

particulate are particulate greater than 10  $\mu\text{m}$ . Hence,  $\text{PM}_{10}$  emissions from this tower would be equal to PM emissions x 0.149, or 3.38 lb/hr x 0.149 = 0.50 lb/hr. The process is repeated in Table 2, with all parameters equal except that the TDS is 11,000 ppmw. The result is that approximately 5.11 percent are smaller at 11,000 ppm. Thus, while total PM emissions are larger by virtue of a higher TDS, overall  $\text{PM}_{10}$  emissions are actually lower, because more of the solid particles are larger than 10  $\mu\text{m}$ .

**Table 1. Resultant Solid Particulate Size Distribution (TDS = 7700 ppmw)**

EPRI Droplet Diameter ( $\mu\text{m}$ )	Droplet Volume ( $\mu\text{m}^3$ ) [2] <sup>1</sup>	Droplet Mass ( $\mu\text{g}$ ) [3]	Particle Mass (Solids) ( $\mu\text{g}$ ) [4]	Solid Particle Volume ( $\mu\text{m}^3$ )	Solid Particle Diameter ( $\mu\text{m}$ ) [7]	EPRI % Mass Smaller
10	524	5.24E-04	4.03E-06	1.83	1.518	0.000
20	4189	4.19E-03	3.23E-05	14.66	3.037	0.196
30	14137	1.41E-02	1.09E-04	49.48	4.555	0.226
40	33510	3.35E-02	2.58E-04	117.29	6.073	0.514
50	65450	6.54E-02	5.04E-04	229.07	7.591	1.816
60	113097	1.13E-01	8.71E-04	395.84	9.110	5.702
70	179594	1.80E-01	1.38E-03	628.58	10.628	21.348
90	381704	3.82E-01	2.94E-03	1335.96	13.665	49.812
110	696910	6.97E-01	5.37E-03	2439.18	16.701	70.509
130	1150347	1.15E+00	8.86E-03	4026.21	19.738	82.023
150	1767146	1.77E+00	1.36E-02	6185.01	22.774	88.012
180	3053628	3.05E+00	2.35E-02	10687.70	27.329	91.032
210	4849048	4.85E+00	3.73E-02	16971.67	31.884	92.468
240	7238229	7.24E+00	5.57E-02	25333.80	36.439	94.091
270	10305995	1.03E+01	7.94E-02	36070.98	40.994	94.689
300	14137167	1.41E+01	1.09E-01	49480.08	45.549	96.288
350	22449298	2.24E+01	1.73E-01	78572.54	53.140	97.011
400	33510322	3.35E+01	2.58E-01	117286.13	60.732	98.340
450	47712938	4.77E+01	3.67E-01	166995.28	68.323	99.071
500	65449847	6.54E+01	5.04E-01	229074.46	75.915	99.071
600	113097336	1.13E+02	8.71E-01	395840.67	91.098	100.000

<sup>1</sup> Bracketed numbers refer to equation number in text.

The percentage of  $\text{PM}_{10}$ /PM was calculated for cooling tower TDS values from 1000 to 12000 ppmw and the results are plotted in Figure 1. Using these data, Figure 2 presents predicted  $\text{PM}_{10}$  emission rates for the 146,000 gpm example tower. As shown in this figure, the PM emission rate increases in a straight line as TDS increases, however, the  $\text{PM}_{10}$  emission rate increases to a maximum at around a TDS of 4000 ppmw, and then begins to decline. The reason is that at higher TDS, the drift droplets contain more solids and therefore, upon evaporation, result in larger solid particles for any given initial droplet size.

## CONCLUSION

The emission factors and methodology given in EPA's AP-42<sup>1</sup> Chapter 13.4 *Wet Cooling Towers*, do not account for the droplet size distribution of the drift exiting the tower. This is a critical factor, as more than 85% of the mass of particulate in the drift from most cooling towers will result in solid particles larger than  $\text{PM}_{10}$  once the water has evaporated. Particles larger than  $\text{PM}_{10}$  are no longer a regulated air pollutant, because their impact on human health has been shown to be insignificant. Using reasonable, conservative assumptions and a realistic drift

droplet size distribution, a method is now available for calculating realistic PM<sub>10</sub> emission rates from wet mechanical draft cooling towers equipped with modern, high-efficiency drift eliminators and operating at medium to high levels of TDS in the circulating water.

**Table 2. Resultant Solid Particulate Size Distribution (TDS = 11000 ppmw)**

EPRI Droplet Diameter (μm)	Droplet Volume (μm <sup>3</sup> ) [2] <sup>1</sup>	Droplet Mass (μg) [3]	Particle Mass (Solids) (μg) [4]	Solid Particle Volume (μm <sup>3</sup> )	Solid Particle Diameter (μm) [7]	EPRI % Mass Smaller
10	524	5.24E-04	5.76E-06	2.62	1.710	0.000
20	4189	4.19E-03	4.61E-05	20.94	3.420	0.196
30	14137	1.41E-02	1.56E-04	70.69	5.130	0.226
40	33510	3.35E-02	3.69E-04	167.55	6.840	0.514
50	65450	6.54E-02	7.20E-04	327.25	8.550	1.816
60	113097	1.13E-01	1.24E-03	565.49	10.260	5.702
70	179594	1.80E-01	1.98E-03	897.97	11.970	21.348
90	381704	3.82E-01	4.20E-03	1908.52	15.390	49.812
110	696910	6.97E-01	7.67E-03	3484.55	18.810	70.509
130	1150347	1.15E+00	1.27E-02	5751.73	22.230	82.023
150	1767146	1.77E+00	1.94E-02	8835.73	25.650	88.012
180	3053628	3.05E+00	3.36E-02	15268.14	30.780	91.032
210	4849048	4.85E+00	5.33E-02	24245.24	35.909	92.468
240	7238229	7.24E+00	7.96E-02	36191.15	41.039	94.091
270	10305995	1.03E+01	1.13E-01	51529.97	46.169	94.689
300	14137167	1.41E+01	1.56E-01	70685.83	51.299	96.288
350	22449298	2.24E+01	2.47E-01	112246.49	59.849	97.011
400	33510322	3.35E+01	3.69E-01	167551.61	68.399	98.340
450	47712938	4.77E+01	5.25E-01	238564.69	76.949	99.071
500	65449847	6.54E+01	7.20E-01	327249.23	85.499	99.071
600	113097336	1.13E+02	1.24E+00	565486.68	102.599	100.000

**Figure 1: Percentage of Drift PM that Evaporates to PM<sub>10</sub>**

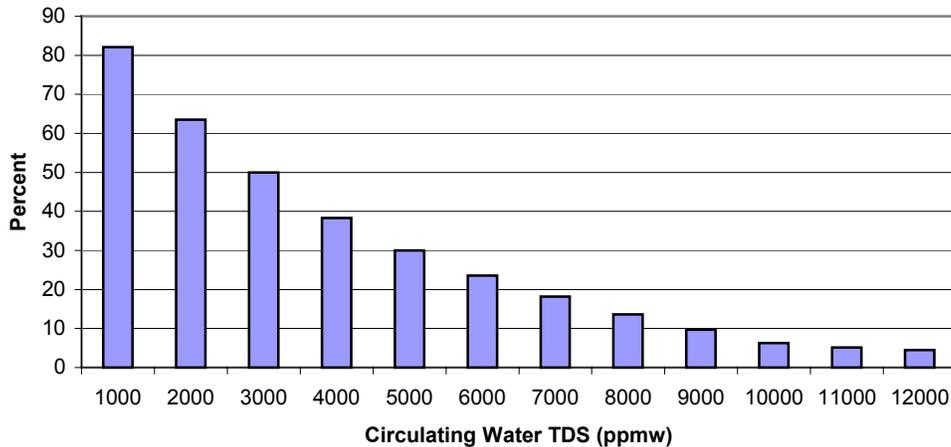
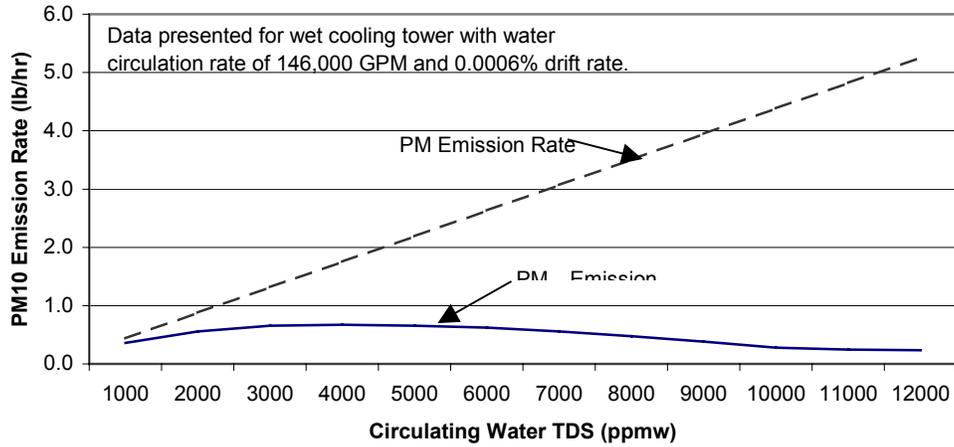


Figure 2: PM<sub>10</sub> Emission Rate vs. TDS



## REFERENCES

1. EPA, 1995. Compilation of Air pollutant Emission Factors, AP-42 Fifth edition, Volume I: *Stationary Point and Area Sources*, Chapter 13.4 Wet Cooling Towers, <http://www.epa.gov/ttn/chief/ap42/>, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, January.
2. Aull, 1999. Memorandum from R. Aull, Brentwood Industries to J. Reisman, Greystone, December 7, 1999.

## KEY WORDS

Drift  
Drift eliminators  
Cooling tower  
PM<sub>10</sub> emissions  
TDS



September 12, 2019

## EVAPCO® SUBMITTAL PACKAGE

PROJECT SOLAERO UNIT CTION - EVAPCO FILL CASING/FAN SECTION SECTION-H  
CUSTOMER SYS-KOOL, LLC P.O. PC19-0128-C  
EVAPCO SERIAL NO. 19-879953-879956 ENGINEER \_\_\_\_\_

### SUBMITTAL DATA ENCLOSED

DESCRIPTION

UNIT CERTIFIED DRAWING

DOCUMENT NUMBER

T2122448-DRC-01

**EVAPCO...TAKING QUALITY AND SERVICE TO A HIGHER LEVEL!**

# EVAPCO, INC.

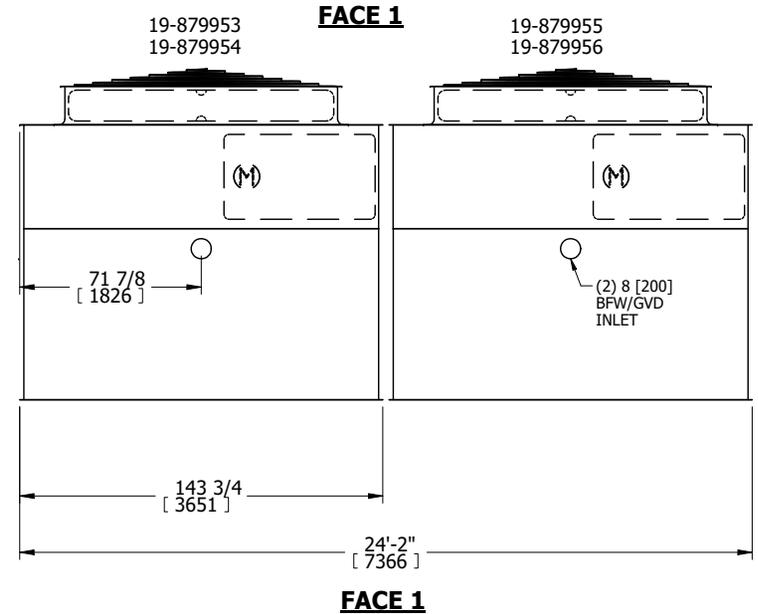
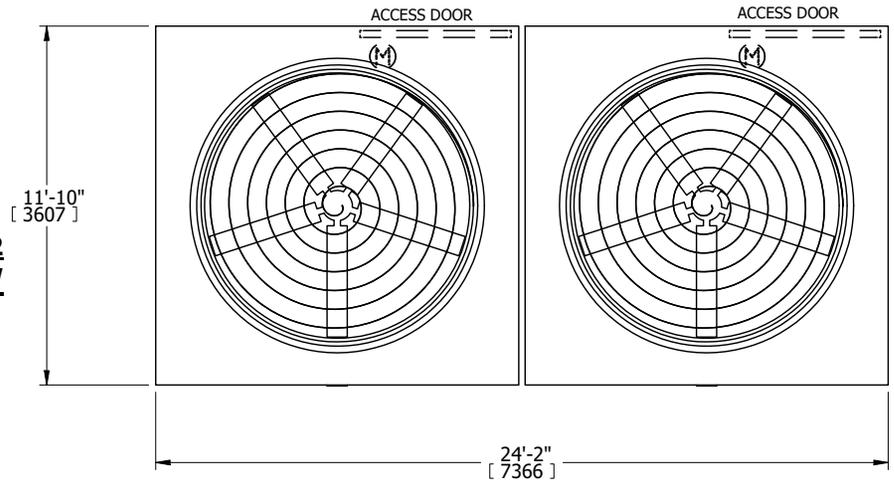
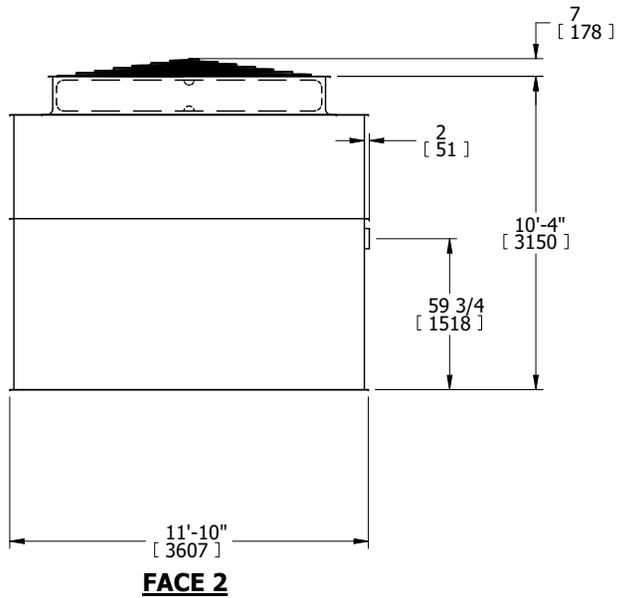


UNIT <b>REPLACEMENT CSG/FAN SECT</b>	MODEL # AT 212-824	SCALE NTS	DWG. # T2122448-DRC-01	REV. -	DATE 09/11/2019	SERIAL # 19-879953-879956
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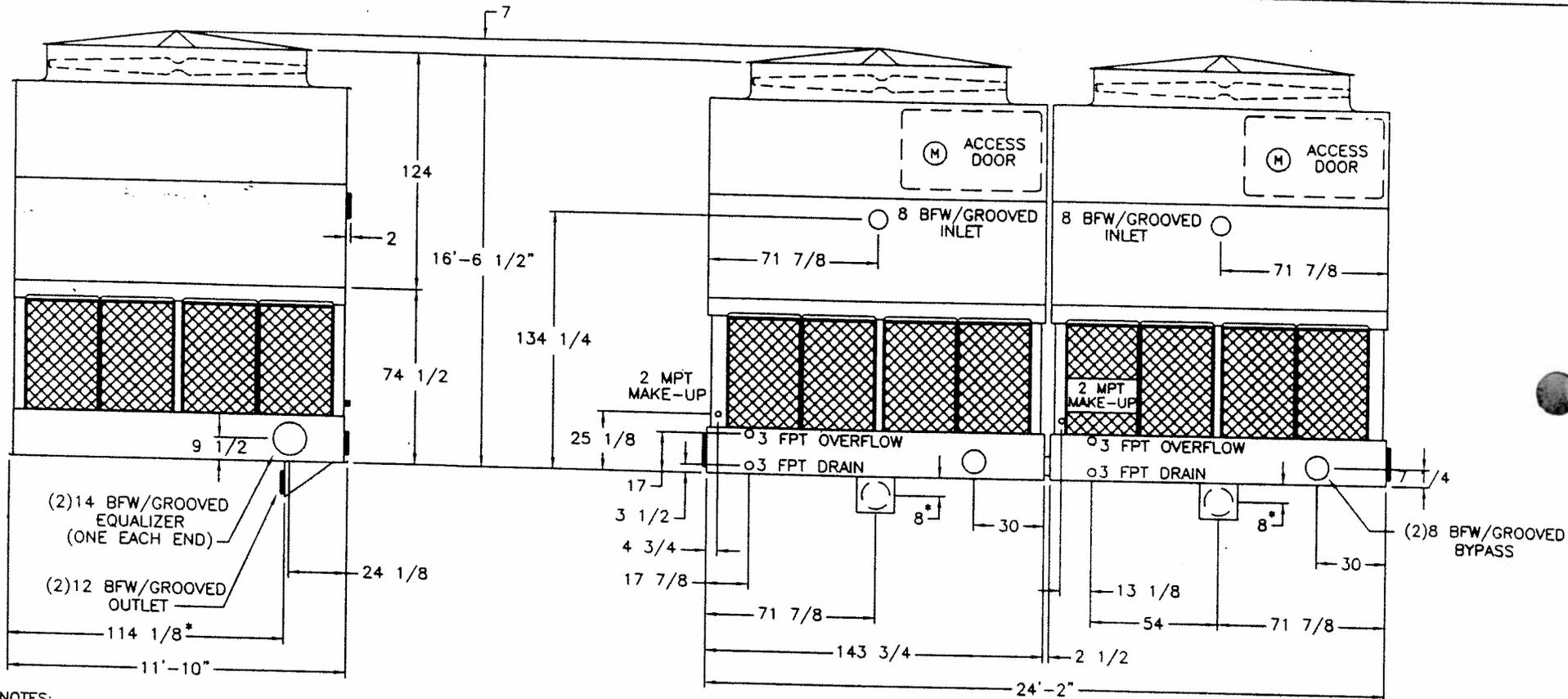
- NOTES:
- (M)- FAN MOTOR LOCATION
  - MPT DENOTES MALE PIPE THREAD  
FPT DENOTES FEMALE PIPE THREAD  
BFW DENOTES BEVELED FOR WELDING
  - +UNIT WEIGHT DOES NOT INCLUDE ACCESSORIES (SEE ACCESSORY DRAWINGS)

**Include platform brackets.  
Each section: (1) 30HP Fan Motor (460/3/60).**

**FACE 2  
PLAN VIEW**



SHIPPING WEIGHT 12960 lbs+ [5879] kg+	OPERATING WEIGHT lbs+ [0] kg+	HEAVIEST SECTION WEIGHT 6480 lbs+ [2939] kg+	NO. OF SHIPPING SECTIONS 2
--	----------------------------------	---	-------------------------------



**NOTES:**

1. (M) - FAN MOTOR LOCATION
2. MAKE-UP WATER PRESSURE 20psi MIN. 50psi MAX.
3. 3/4" DIA. MOUNTING HOLES. REFER TO RECOMMENDED STEEL SUPPORT DRAWING.
4. HEAVIEST SECTION IS UPPER SECTION.
5. BFW DENOTES BEVELED FOR WELDING. FPT DENOTES FEMALE PIPE THREADS. MPT DENOTES MALE PIPE THREADS.
6. \* APPROXIMATE DIMENSION DO NOT USE FOR PRE-FABRICATION OF PIPING.

WEIGHTS (LB)			NO. SHIPPING SECTIONS
SHIPPING	OPER.	HEAVIEST SECTION	
17800	30220	6480	4

**MODEL NUMBER:** (2) AT 212-824 COOLING TOWERS

**CERTIFIED FOR** Yearout Mechanical

**CUSTOMER ORDER NO.** \_\_\_\_\_

**Project:** Emcor

**EVAPCO NO.** #W007146/47

**CAPACITY** 3,000 GPM Each Unit

**FAN MOTOR HP** (2) 30 HP Inverter Duty

**90 ° IN 80 ° OUT 70 ° W.B.**

**INLET PRESSURE** 3.1 P.S.I.G.

**ELEC. SPEC.** 460/3/60 TEAO

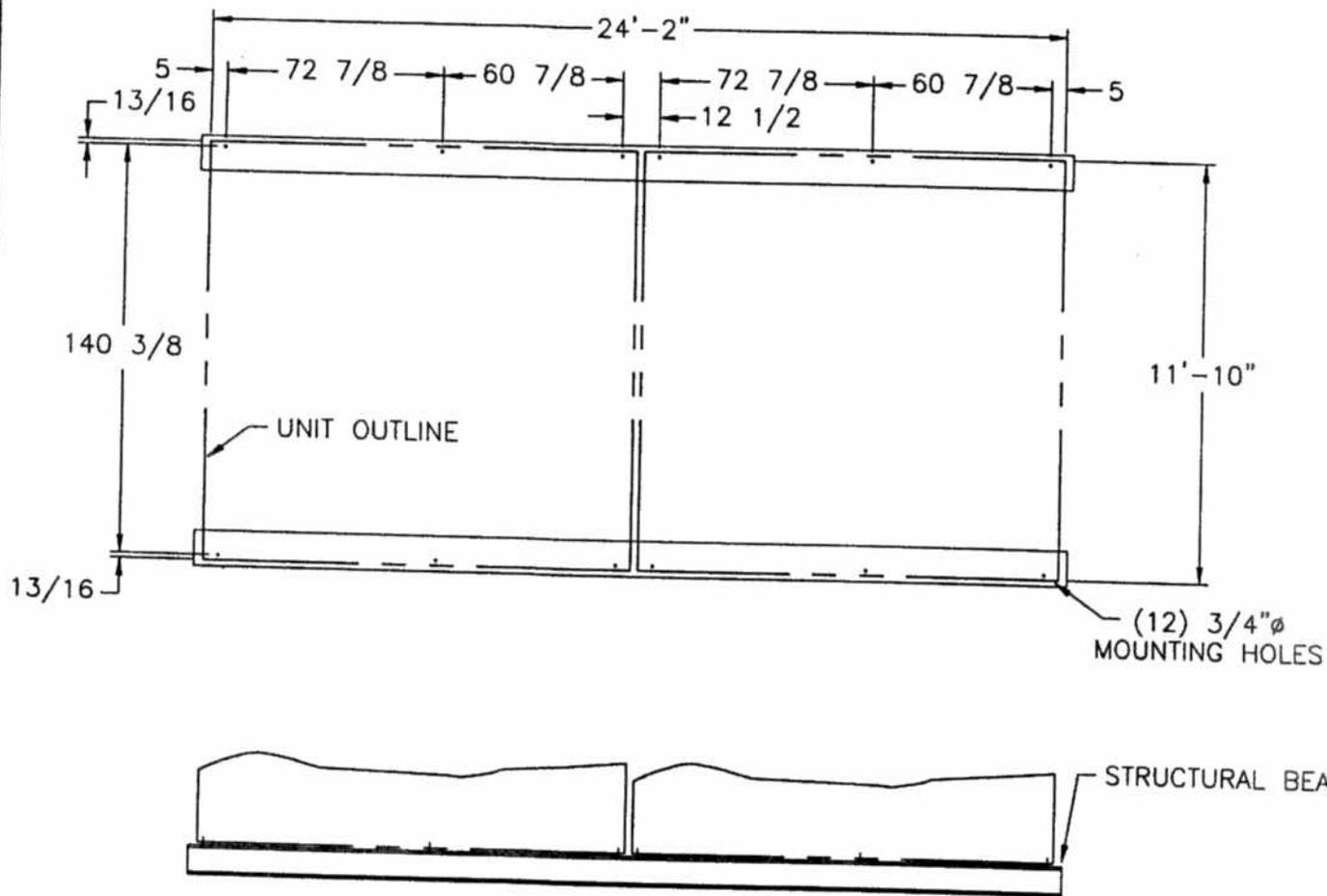
**REMARKS:** ACCESSORIES: Electric Basin Heater Package With (4) 6 KW Heater With Contactor And Combination Thermostat/Low Water Cut-Off (460/3/60), External Service Platforms With Ladders.

10/04/00 tet

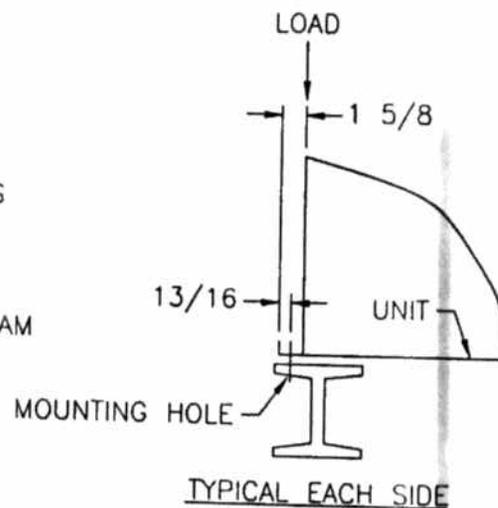


**COOLING TOWER**

**T2122448ERA-29**



ALL 12x24 INDUCED DRAFT UNITS



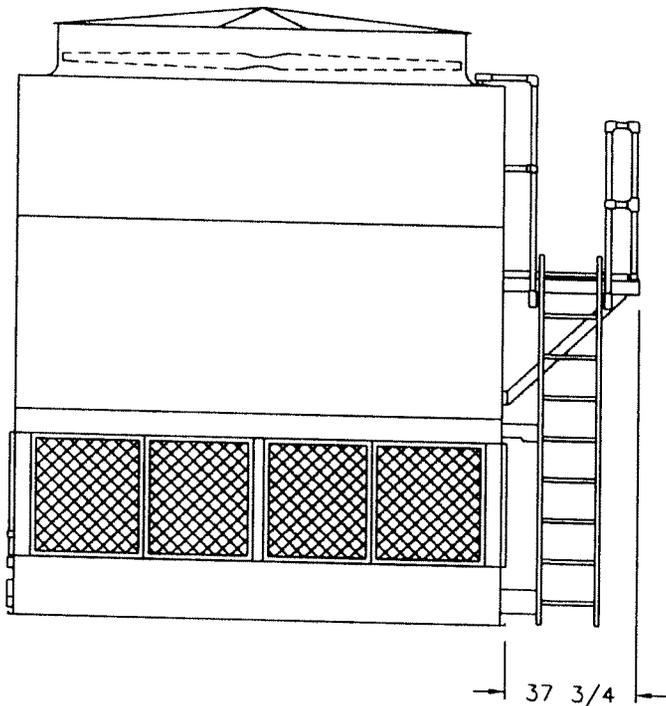
NOTES:

1. BEAMS SHOULD BE SIZED IN ACCORDANCE WITH ACCEPTED STRUCTURAL PRACTICES. MAXIMUM DEFLECTION OF BEAM UNDER UNIT TO BE 1/360 OF UNIT LENGTH NOT TO EXCEED 1/2".
2. DEFLECTION MAY BE CALCULATED BY USING 55% OF THE OPERATING WEIGHT AS A UNIFORM LOAD ON EACH BEAM. SEE CERTIFIED PRINT FOR OPERATING WEIGHT.
3. SUPPORT BEAMS AND ANCHOR BOLTS ARE TO BE FURNISHED BY OTHERS.
4. BEAMS MUST BE LOCATED UNDER THE FULL LENGTH OF THE PAN SECTION.
5. BEAMS SHOULD BE LEVEL TO WITHIN 1/8" IN 6' BEFORE SETTING THE UNIT IN PLACE. DO NOT LEVEL THE UNIT BY SHIMMING BETWEEN IT AND THE BEAMS.
6. ALL 12x24 MODELS ARE MULTIPLE CELL UNITS. OPERATING WEIGHT OF EACH CELL IS FOUND BY DIVIDING TOTAL OPERATING WEIGHT BY THE NUMBER OF CELLS.

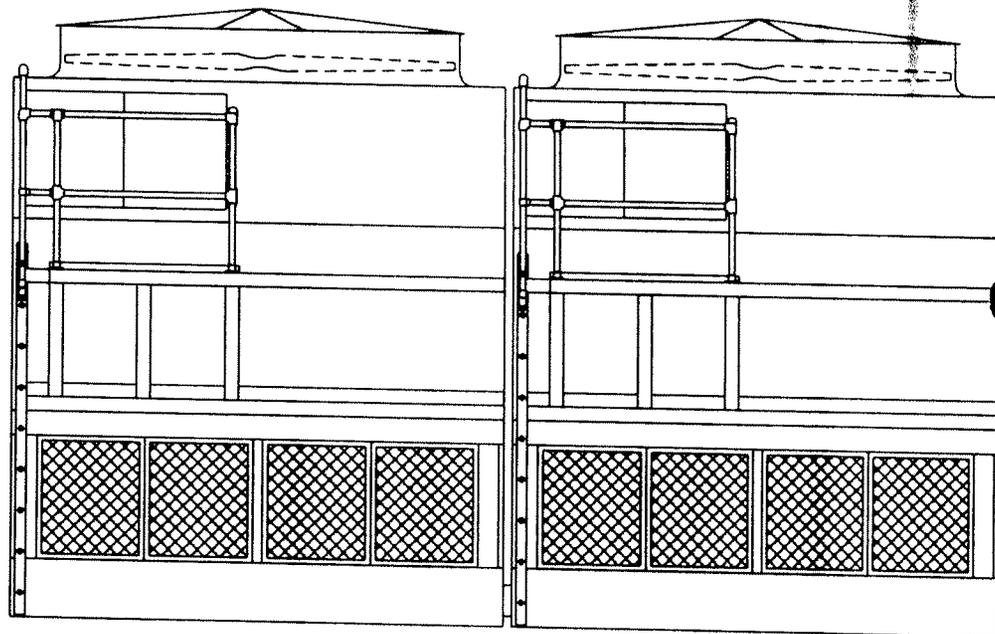


RECOMMENDED  
STEEL SUPPORT

T21224ERA-SL



END VIEW



SIDE VIEW

NOTES:

1. LADDER AND PLATFORM SHIP LOOSE. FIELD INSTALLATION BY OTHERS IS REQUIRED.
2. THE BOTTOM OF THE LADDER IS AT THE BASE OF THE UNIT. IF THE UNIT IS ELEVATED THEN AN OPTIONAL EXTENDED LADDER PACKAGE SHOULD BE CONSIDERED. (CONSULT FACTORY)
3. \* REFER TO RIGGING PACK FOR LADDER AND PLATFORM MOUNTING INSTRUCTIONS.



EXTERNAL  
SERVICE  
PLATFORM

T21224ERA-PL

DATE July 20, 2000

MECHANICAL SPECIFICATIONS

EVAPCO® AT COOLING TOWERS

PROJECT	Emcor	UNIT (2) AT 212-824 Cooling Towers
CUSTOMER	Yearout Mechanical	P.O.
EVAPCO SERIAL NUMBER	#W007146/47	ENGINEER Bridgers & Paxton
UNIT TYPE	Factory assembled, induced draft, counterflow cooling tower.	
CONSTRUCTION	Heavy gauge mill hot-dip galvanized steel casing and pan. Hot-dip galvanized steel channel and angle supports. All galvanized steel is coated with a minimum of 2.35 ounces of zinc per square foot of area (G-235 designation). During fabrication all galvanized steel panel edges are coated with 95% pure zinc-rich compound.	
MAKE-UP FLOAT VALVE ASSEMBLY*	Brass float valve with adjustable plastic float.	
PAN STRAINER*	All type 304 stainless steel construction with large area removable perforated screens.	
ACCESS	Hinge mounted door in the upper casing for fan drive and water distribution system access. Removable louver panels on all four sides of the unit for pan and sump access.	
FANS	Fans are axial propeller type constructed of aluminum alloy and statically balanced. The fan is installed in a closely fitted cowl with venturi air inlet. Fan screens are galvanized steel and have steel frames bolted to the fan cowl.	
FAN SHAFT	Solid shaft of ground and polished steel. Exposed surface coated with rust preventative.	
FAN SHAFT BEARINGS	Heavy-duty, self-aligning ball type bearings with extended lubrication lines to grease fittings located on access door frame. Bearings are designed for a minimum L-10 life of 75,000 hours.	
FAN MOTOR	Inverter duty, totally enclosed, ball bearing type electric motor(s) suitable for moist air service. Motor(s) are 1.15 service factor design.	
FAN DRIVE	The fan drive is a multi-groove, solid back, reinforced neoprene V-belt type with taper lock sheaves designed for 150% of the motor nameplate horsepower. Fan and motor sheaves are constructed of aluminum alloy.	
FILL	Polyvinyl Chloride (PVC) of cross-fluted design. PVC sheets are bonded together for strength and durability. Fill is self-extinguishing for fire resistance, has a flame spread of 5 under A.S.T.M. designation E-84-81a, and is resistant to rot, decay and biological attack.	
WATER DISTRIBUTION SYSTEMS	Precision molded ABS spray nozzles with large 3/8" x 1" orifice to eliminate clogging. Spray header and branches are Polyvinyl Chloride (PVC) for corrosion resistance with steel connection to attach external piping.	
ELIMINATORS	The eliminators are constructed entirely of Polyvinyl Chloride (PVC) in easily handled sections. Design incorporates three changes in air direction and limits the water carryover to a maximum of 0.001% of the circulating water rate.	
LOUVERS	The louvers are constructed from Polyvinyl Chloride (PVC) and are mounted in easily removable frames for access to the pan for maintenance. There are two changes in air direction to prevent splash-out and block direct sunlight.	

\* OMITTED ON UNITS FOR REMOTE SUMP OPERATION INVERTER DUTY

12 FT & 24 WIDE BELT DRIVE 2800



**BALTIMORE AIRCOIL**  
 ONE OF THE  
**Amsted**  
 INDUSTRIES

# SUBMITTAL DATA FORM

C U S T O M E R	YEAROUT MECHANICAL 3228 LOS ARBOLES NE ALBUQUERQUE, NM 87107	DATE P.O. NO. B.A.C. NO. MODEL NO:	REVISED 4/4/2001 TV 2/20/2001 BY110202 U013159101-MAD 33412A-MM-2
--------------------------------------	--	---	---

PROJECT:	EMCORE A T R FACILITY - ALBUQUERQUE, NM
ENGINEER:	BRIDGERS & PAXTON - ALBUQUERQUE, NM
B.A.C. REP:	MECHANICAL REPRESENTATIVES INC. - ALBUQUERQUE, NM

**SERIES 3000 COOLING TOWER**  
**"ALL INFORMATION IS PER UNIT"**

CERTIFIED CAPACITY: 2400 USGPM OF WATER FROM 90 F TO 80 F AT 70.5 F ENTERING WET BULB.

FAN MOTOR(S): (1) 20 HP, 1800 RPM, 3 PHASE, 60 HERTZ, 460 VOLTS, INVERTER DUTY, TEAO ENCLOSURE. FAN DRIVES BASED ON 0" ESP.

**NOTE: Two speed fan motors and/or Energy Miser Fan Systems require a starter that incorporates a 15 second time delay when switching from high to low speed. Inverter Duty Fan Motors, furnished in accordance with NEMA Standard MG.1Part 31 are required for applications using Variable Frequency Drives for fan motor control.**

10 COPIES OF SUBMITTAL DATA FOR RECORD

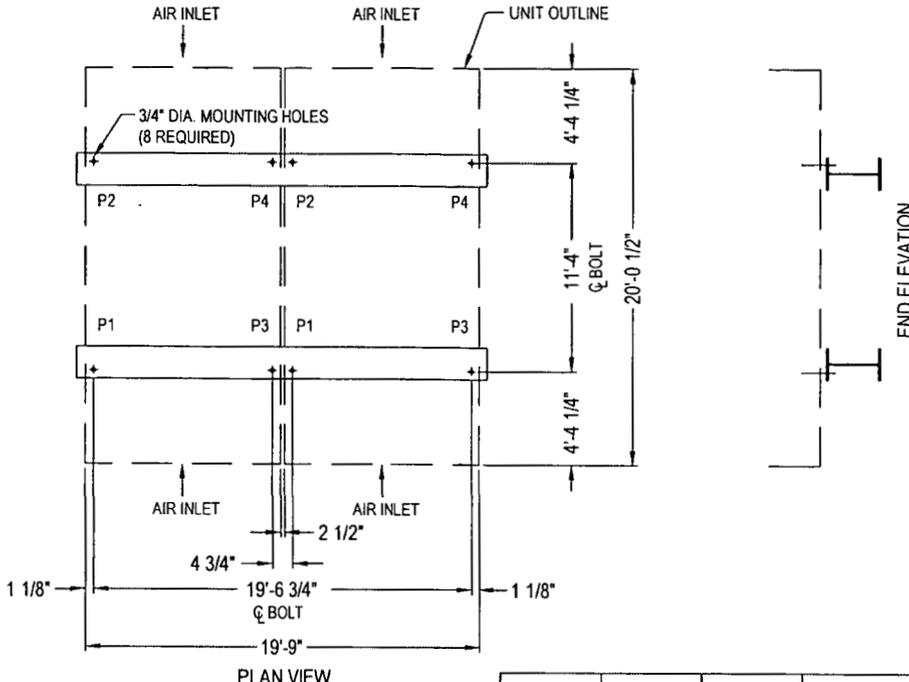
FEATURE		FEATURE	
UNIT DIMENSIONS & SUPPORT DATA	BAC-1A0CB0B200 BAC-1B0AB00200	INDEPENDENT CELL OPERATION	
MECHANICAL SPECIFICATIONS		ELEC. PAN HTR PKG., (4) 8 KW	BAC-1GEA000200 BAC-6988B
GALVANIZED STEEL STAINLESS STEEL PAN SECTION		EXTENDED LUBE LINES	
END INLET	BAC-1A0JB0B200	LADDER & SAFETY RAILING	BAC-1GCK000200
BOTTOM OUTLET		INTERNAL WALKWAY(S)	BAC-1GDK000200
POSITIVE CLOSURE PLATE		RECOMMENDED CONDUIT INSTALLATION	BAC-1FOA000200

THANK YOU FOR YOUR ORDER ACCEPTED AT THE B.A.C. MADERA PLANT ON: 2/15/2001.

AN APPROVED SUBMITTAL IS NOT REQUIRED. YOUR ORDER IS SCHEDULED TO SHIP FROM OUR FACTORY APPROXIMATELY 4/20/2001. PLEASE BE PREPARED FOR THE ARRIVAL OF THIS EQUIPMENT, AS OUR FACILITIES CANNOT ACCOMMODATE THE STORAGE OF COMPLETED UNITS.

P.O. BOX 7322, BALTIMORE, MARYLAND 21227 / TELE: (410) 799-6200 / FAX: 410-799-6416  
 P.O. BOX 960, MADERA, CALIFORNIA 93639 / TELE: (559) 673-9231 / FAX: 559-673-5095  
 P.O. BOX 317, PAXTON, ILLINOIS 60957 / TELE: (217) 379-2311 / FAX: 217-379-3522  
 P O BOX 402, MILFORD, DELAWARE 19963 / TELE: (302) 422-3061 / FAX: 302-422-9269

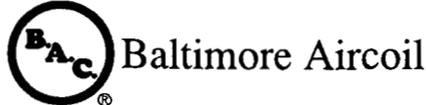
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- NOTES:**
1. Operating weight and weight loading are for towers with water level in basin at overflow.
  2. Supporting steelwork and anchor bolts to be designed and furnished by others.
  3. All supporting steel must be level at top.
  4. Beams should be selected in accordance with accepted structural practice. Maximum deflection of beam under unit to be 1/360 of span, not to exceed 1/2 inch.
  5. Weights shown are for standard unit. Some accessories may require weight adds. See respective accessory submittal drawing for weight adds.
  6. If vibration rails are used between tower and supporting steel, be certain to allow for the length of the vibration rails when determining length of supporting steel. Vibration rail length and mounting hole location may differ from those of the cooling tower. Refer to vibration isolation drawings for this data.

Model Number	Shipping Weight	Operating Weight	Load Points				Wind Reactions (30 PSF)		Seismic Reactions (UBC97-Zone 2B)	
							Max. Vert. Reaction at Anchor Bolt (LBS)	Max. Horiz. Reaction at Anchor Bolt (LBS)	Max. Vert. Reaction at Anchor Bolt (LBS)	Max. Horiz. Reaction at Anchor Bolt (LBS)
			P1	P2	P3	P4				
33412A-2	13900	34200	4275	4275	4275	4275	1820	1620	2610	2590
<del>33436A-2</del>	<del>14180</del>	<del>34480</del>	<del>4310</del>	<del>4310</del>	<del>4310</del>	<del>4310</del>	<del>1820</del>	<del>1620</del>	<del>2610</del>	<del>2590</del>
33455A-2	14500	35960	4495	4495	4495	4495	2290	1820	3200	2740
33482A-2	14780	36240	4530	4530	4530	4530	2290	1820	3200	2740
33527A-2	15060	36520	4565	4565	4565	4565	2290	1820	3200	2740

ORDER NO: **W013159101MAO**  
 DATE:



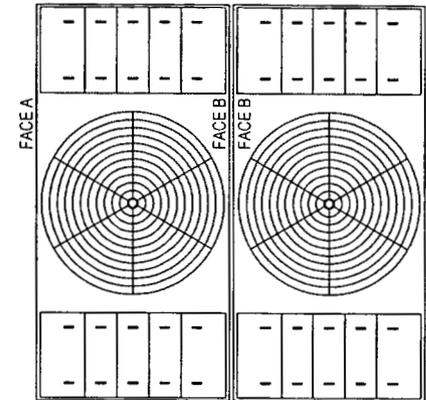
SERIES 3000  
 STEEL SUPPORT - PLAN C ZONE 2B  
 DRAWING NUMBER:  
**BAC-1B0AB00200**

Model Number	Shipping Weight	Heaviest Section	Operating Weight	"H" Dimension	"A" Dimension	"D" Dimension
33412A-2	13900	6950	34200	10'-9 1/8"	9'-11-3/4"	6'-1 1/4"
<del>33425A-2</del>	<del>14180</del>	<del>7000</del>	<del>34480</del>	<del>10'-9 1/8"</del>	<del>9'-11-3/4"</del>	<del>6'-1 1/4"</del>
33455A-2	14500	7250	35960	12'-1 1/8"	11'-3 3/4"	6'-6 3/4"
33482A-2	14780	7390	36240	12'-1 1/8"	11'-3 3/4"	6'-6 3/4"
33527A-2	15060	7530	36520	12'-1 1/8"	11'-3 3/4"	6'-6 3/4"

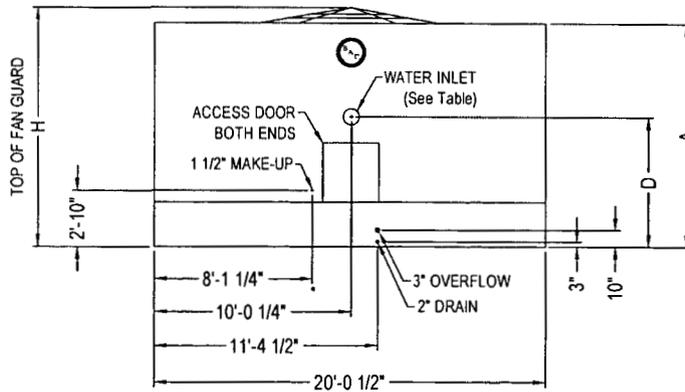
Water Inlet Sizing	
Flow Range (Per Cell)	End Inlet Size
286 - 1300	8"
<del>1301 - 2600</del>	<del>10"</del>

NOTES:

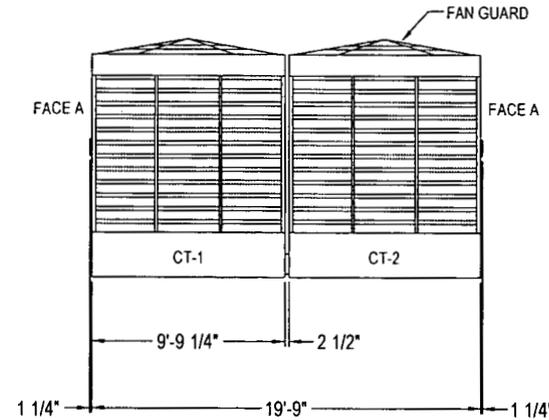
1. Unless otherwise indicated, connections 3" and smaller are MPT. Connections 4" and larger are grooved to suit a mechanical coupling and beveled for welding.
2. All dimensions are in feet and inches. Weights are in pounds.
3. For weight loadings and support requirements, refer to the suggested steel support drawing.
4. The area above the fan discharge must be unobstructed.
5. Piping must not be supported by the tower inlet or outlet connections.



PLAN VIEW



END ELEVATION (FACE A)  
(CONNECTIONS SAME BOTH ENDS)



SIDE ELEVATION

ORDER NO: U013159101-MAD

DATE:



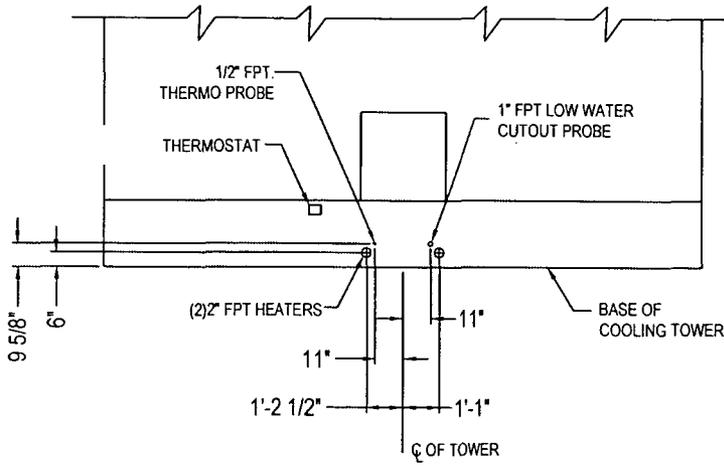
Baltimore Aircoil

Series 3000 Unit Print  
End Inlet Easy Connection / Bottom Outlet / Pump Suction

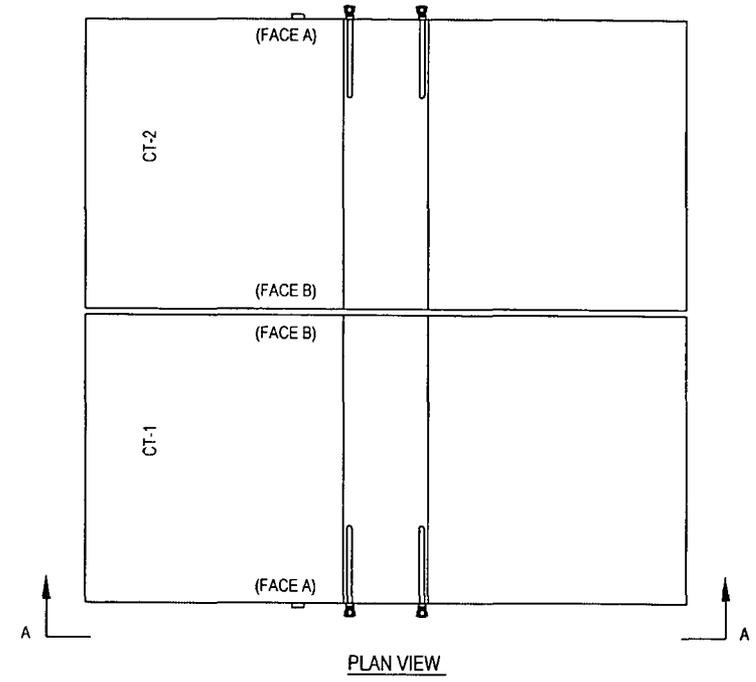
DRAWING NUMBER:  
BAC-1A0JB0B200

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Model Number	Ambient Temp. 0°F	Ambient Temp. 20°F
33245A-2 Thru 33387A-2	(4) 6	(4) 9
33412A-2 Thru 33527A-2	(4) 8	(4) 12
33473A-2 Thru 33723A-2	(4) 10	(4) 14
33743A-2 Thru 331056A-2	(4) 12	(4) 15
33583A-2 Thru 33768A-2	(4) 14	(4) 18
331132A-2 Thru 331328A-2	(4) 14	(4) 20

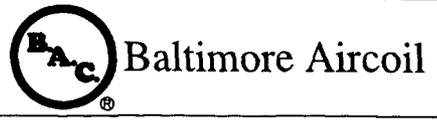


VIEW A - A  
Heater and Controls  
Both Ends of Unit

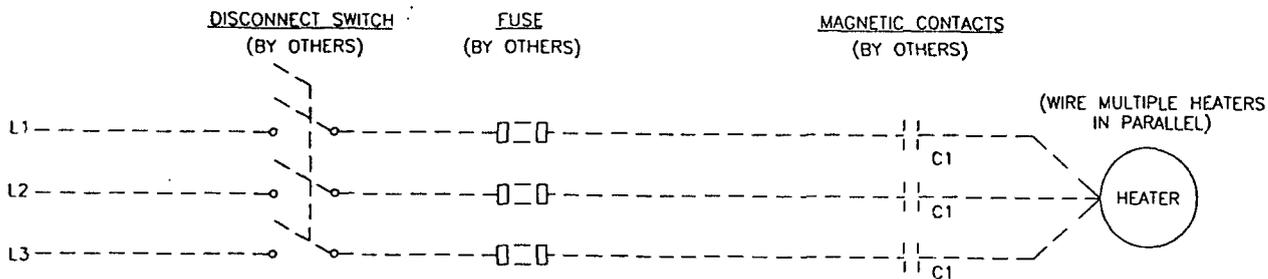


PLAN VIEW

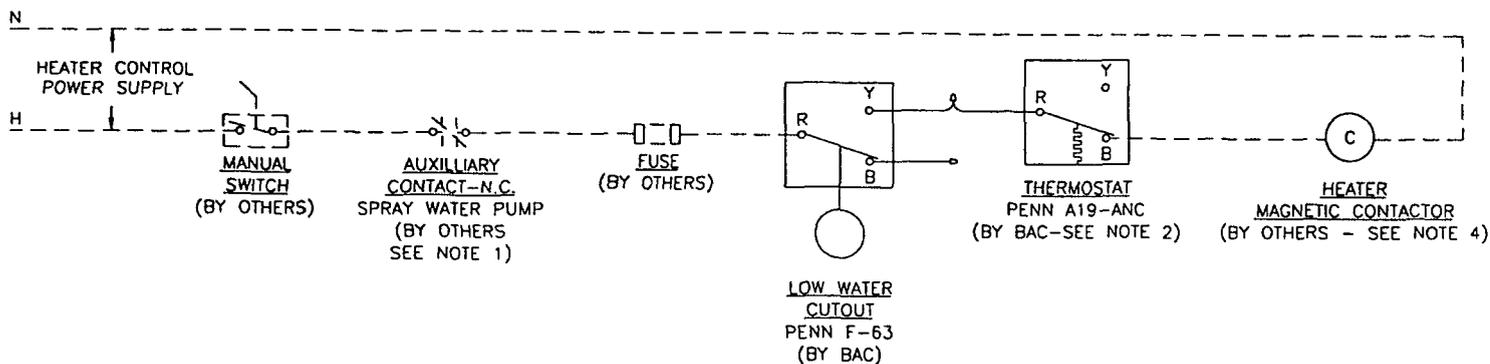
ORDER NO: **U013159101HAD**  
DATE:



Series 3000 Heater Package  
Heater / Low Water Cutout / Thermostat  
DRAWING NUMBER:  
**BAC-1GEA000200**



- NOTES:
1. INTERLOCK IMMERSION HEATERS WITH CIRCULATING PUMP TO DE-ENERGIZE HEATERS WHEN PUMP IS RUNNING.
  2. CONTROL THERMOSTAT IS TO BE SET FOR 40° F. DO NOT SET THERMOSTAT LOWER THAN 40° F.
  3. BROKEN LINES INDICATE COMPONENTS AND WIRING TO BE SUPPLIED BY OTHERS.
  4. CONTACTOR, FUSE PROTECTION AND POWER SUPPLY WIRING ARE TO BE SIZED TO MATCH HEATER REQUIREMENTS. WIRING MUST COMPLY TO APPLICABLE CODES AND ORDINANCES.



B.A.C. ORDER NO. **W013159101-MA**

DATE: / /



BALTIMORE AIRCOIL COMPANY

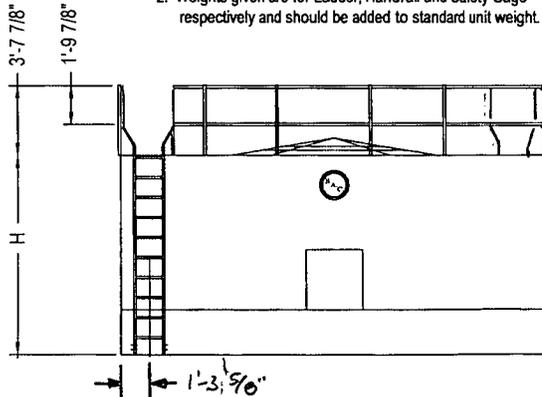
ELECTRIC IMMERSION HEATER PACKAGE THREE PHASE	
ELECTRIC HEATER WIRING DIAGRAM	
DRAWING NUMBER: BAC-6988 B	C

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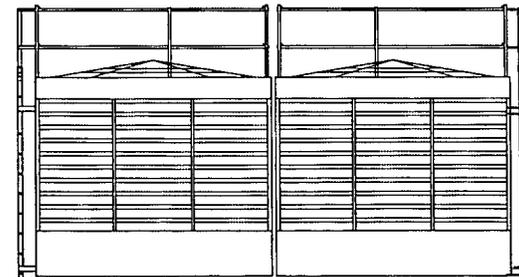
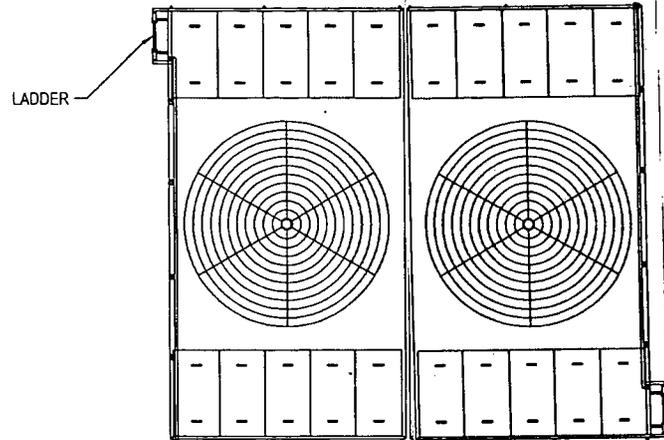
Model Number	H	Ladder Weight (LBS) See Note 2	Handrail Weight (LBS) See Note 2
<del>33245A-2 thru 33306A-2</del>	<del>0'-0 16/16"</del>	<del>30</del>	<del>300</del>
<del>33340A-2 thru 33387A-2</del>	<del>10'-4 15/16"</del>	<del>30</del>	<del>300</del>
33412A-2 thru 33436A-2	10'-4 15/16"	30	340
<del>33455A-2 thru 33527A-2</del>	<del>11'-8 15/16"</del>	<del>30</del>	<del>340</del>
33473A-2 thru 33501A-2	10'-4 15/16"	30	380
33552A-2 thru 33648A-2	11'-8 15/16"	30	380
33682A-2 thru 33723A-2	12'-2 11/16"	30	380
33743A-2 thru 33845A-2	15'-10 11/16"	40	380
33872A-2 thru 33990A-2	18'-6 11/16"	50	380
33985A-2 thru 331056A-2	21'-2 11/16"	50	380
33583A-2 thru 33768A-2	11'-8 15/16"	30	420
331132A-2	18'-6 11/16"	50	420
331213A-2 thru 331328A-2	21'-2 11/16"	60	420

NOTES:

1. Ladder, Handrail and Safety Cage requires field assembly.
2. Weights given are for Ladder, Handrail and Safety Cage respectively and should be added to standard unit weight.



END ELEVATION



SIDE ELEVATION

ORDER NO: **U013159101 MAD**

DATE:

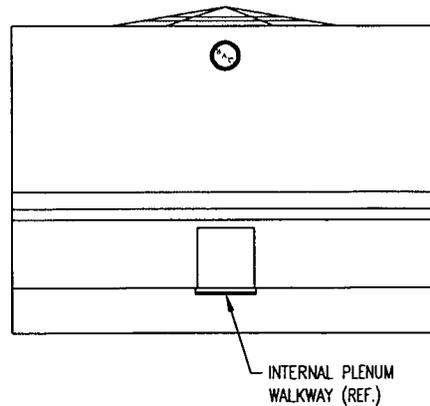
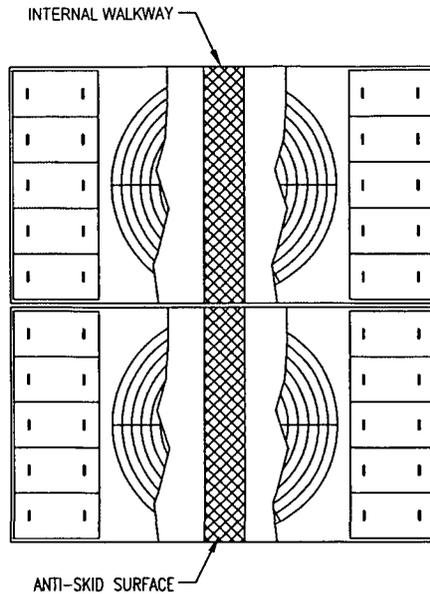


Baltimore Aircoil

SERIES 3000  
EXTENDED LADDER, HANDRAIL

DRAWING NUMBER:  
BAC-1GCK000200

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Model Number	Internal Walkway Weight (LBS) See Note 1
<del>33246A-2 thru 33306A-2</del>	<del>200</del>
<del>33340A-2 thru 33387A-2</del>	<del>200</del>
33412A-2 thru 33436A-2	200
<del>33455A-2 thru 33527A-2</del>	<del>200</del>
33473A-2 thru 33501A-2	220
33552A-2 thru 33648A-2	220
33682A-2 thru 33723A-2	220
33743A-2 thru 33845A-2	220
33872A-2 thru 33990A-2	220
33985A-2 thru 331056A-2	220
33583A-2 thru 33768A-2	240
331132A-2	240
331213A-2 thru 331328A-2	240

NOTES:

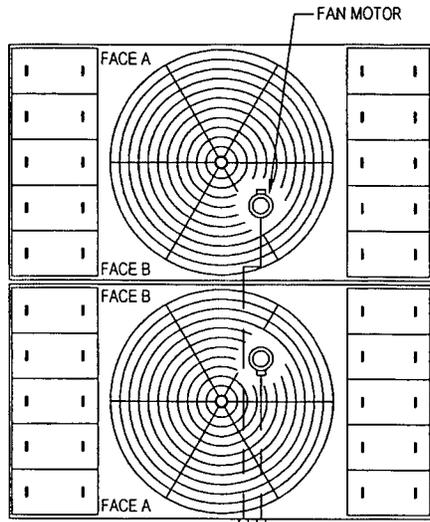
1. Weights given are for internal walkway and should be added to standard unit weight.

ORDER NO: W013159101-MAD  
 DATE:



Series 3000  
 Internal Walkway at Access Door

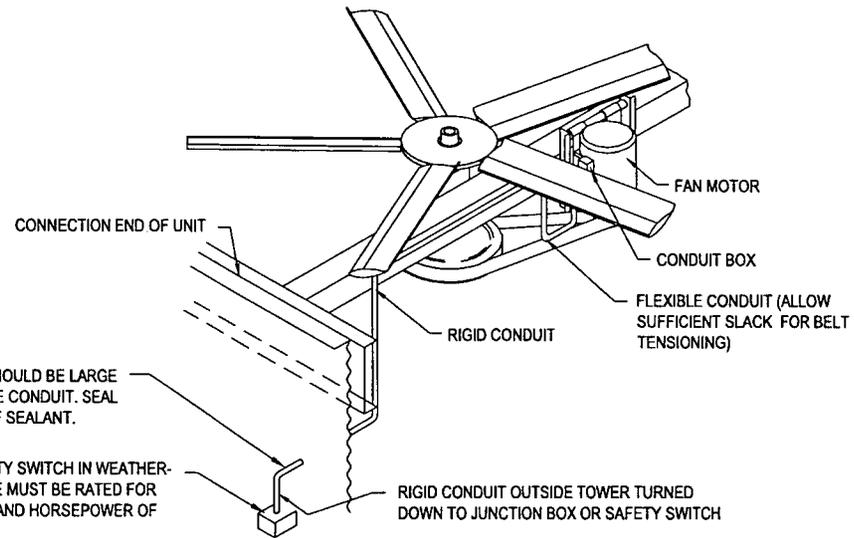
DRAWING NUMBER:  
 BAC-1GDK000200



PLAN VIEW

**NOTES:**

1. Conduit must be water tight and pitched downward to allow condensation to drain away from fan motor conduit box. Therefore, do not run the conduit through fan deck.
2. All wiring must conform to local and national electrical codes.
3. Rigid conduit outside casing panel must turn down to junction box.
4. External motor, mounting base and drive shaft must be field installed. Drive shaft must also be properly aligned after installation by qualified personnel to ensure satisfactory operation.



BELT DRIVE MOTOR DETAIL

HOLE IN CASING PANEL SHOULD BE LARGE ENOUGH TO ACCOMODATE CONDUIT. SEAL HOLE WITH WATER-PROOF SEALANT.

DISCONNECT/SAFETY SWITCH IN WEATHER-PROOF ENCLOSURE MUST BE RATED FOR PROPER VOLTAGE AND HORSEPOWER OF FAN MOTOR.

ORDER NO: **U013159101-MAD**

DATE:

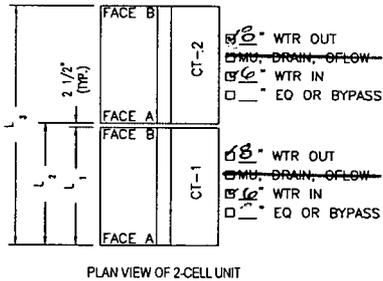
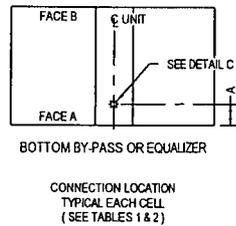
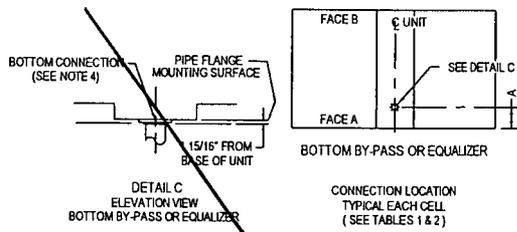
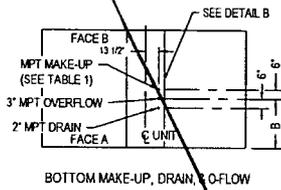
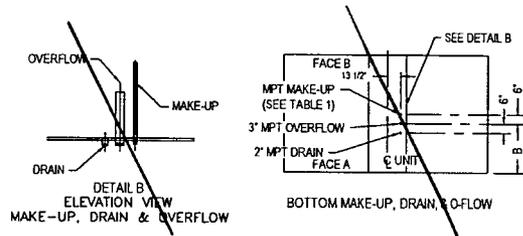
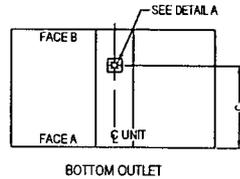
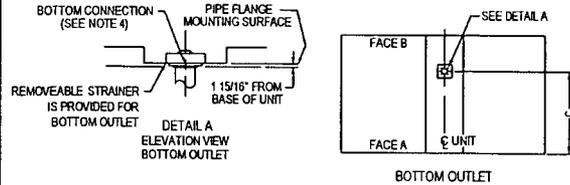


Baltimore Aircoil

SERIES 3000  
MOTOR LOCATION/CONDUIT INSTALLATION

DRAWING NUMBER:  
BAC-1F0A000200

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Model Number	A	B	C	Make-Up Size	Water Inlet Size	L1	L2	L3
<del>33246A-2 Thru 33305A-2</del>	<del>16"</del>	<del>36"</del>	<del>78"</del>	<del>1"</del>	<del>8"</del>	<del>8'-9 3/4"</del>	<del>8'-8 1/4"</del>	<del>16'-11 1/2"</del>
<del>33349A-2 Thru 33387A-2</del>	<del>16"</del>	<del>36"</del>	<del>78"</del>	<del>1"</del>	<del>8"</del>	<del>8'-5 3/4"</del>	<del>8'-8 1/4"</del>	<del>16'-11 1/2"</del>
33412A-2 Thru 33436A-2	15"	48"	81"	1 1/2"	8"	9'-9 1/4"	9'-11 3/4"	19'-9"
<del>33455A-2 Thru 33527A-2</del>	<del>16"</del>	<del>48"</del>	<del>84"</del>	<del>1 1/2"</del>	<del>10"</del>	<del>9'-9 4/4"</del>	<del>9'-11 3/4"</del>	<del>19'-9"</del>
33473A-2 Thru 33501A-2	21"	72"	104"	1 1/2"	10"	11'-9 3/4"	12'-0 1/4"	23'-10"
33552A-2 Thru 33648A-2	21"	72"	104"	1 1/2"	10"	11'-9 3/4"	12'-0 1/4"	23'-10"
33682A-2 Thru 33723A-2	21"	72"	104"	1 1/2"	10"	11'-9 3/4"	12'-0 1/4"	23'-10"
33743A-2 Thru 33845A-2	21"	72"	104"	1 1/2"	12"	11'-9 3/4"	12'-0 1/4"	23'-10"
33872A-2 Thru 33990A-2	21"	72"	104"	1 1/2"	12"	11'-9 3/4"	12'-0 1/4"	23'-10"
33985A-2 Thru 331056A-2	21"	72"	104"	1 1/2"	12"	11'-9 3/4"	12'-0 1/4"	23'-10"
33583A-2 Thru 33768A-2	21"	72"	105 1/8"	2"	10"	13'-11 1/8"	14'-1 5/8"	28'-0 3/4"
331132A-2	21"	72"	105 1/8"	2"	14"	13'-11 1/8"	14'-1 5/8"	28'-0 3/4"
331213A-2 Thru 331328A-2	21"	72"	105 1/8"	2"	14"	13'-11 1/8"	14'-1 5/8"	28'-0 3/4"

TABLE-1 CONNECTION LOCATIONS

CONN. SIZE	WATER OUTLET	EQUALIZER	BYPASS
6"	750	750	750
8"	1300	1300	1300
10"	2300	2300	2300
12"	3200	3200	3200
14"	4000	3730	4000
16"	4650	N/A	N/A

TABLE-2 MAXIMUM FLOW RATE FOR PAN BOTTOM CONNECTIONS (GPM)

\* MAX FLOW RATE TO COOLING TOWERS BEING EQUALIZED

NOTE:

1. Do not support piping from cooling tower. All necessary piping supplied by others.
2. Field piping should be fabricated at time of installation. Pre-fabrication of pipe work is not recommended.
3. Flow rates are given for pump suction applications. They are based on the maximum head available to move water from the basin into the outlet piping.
4. The bolt hole pattern is drilled to matched the bolt hole pattern of a 150 pound flat face american standard flange. The flat face flange and full face gasket is to be furnished by others for mating with the unit.

ORDER NO: **W013159101-MAO**

DATE:



Baltimore Aircoil

Series 3000 Unit Print  
Bottom Outlet With Equalizer Or Bypass

DRAWING NUMBER:  
**BAC-1D0A000200**

## Terms and Conditions of Sale

**Pricing:** Prices will remain firm, provided the order is released for fabrication within six (6) months after receipt of the order by the Seller and shipped within Seller's standard published factory lead times. For each additional month or portion thereof, one percent (1%) of the price per month will be added for a period to exceed six (6) months, after which the price in effect at time of shipment will apply. If an order is released but shipment is not accepted when produced, price will be subject to the same adjustments.

**Payments:** If the Buyer shall fail to make any payments in accordance with the terms and conditions of sale, the Seller, in addition to its other rights and remedies, but not in limitation thereof, may at its option defer shipments or deliveries hereunder, or under any other contract with the Buyer, except under receipt of satisfactory security or cash from the Buyer before shipment.

**Taxes:** Prices do not include any sales or use tax, either federal, state, or local payable on the transaction under any applicable statute or regulation. All such taxes must be paid by the Buyer.

**Warranties:** Seller warrants that the equipment sold under this contract shall be free from defects in material and workmanship for a period of twelve (12) months from the date of equipment startup or eighteen (18) months from the date of shipment, whichever occurs first. The following mechanical equipment components only are warranted against defects in materials and workmanship for a period of five (5) years from date of shipment: fans, fan shaft, bearings, sheaves, gearboxes, drive shafts, couplings, mechanical equipment support and fan motors.

Written notice of any defect shall be given to Seller immediately upon discovery by Purchaser, and shall fully describe the claimed defect. Defective parts shall be repaired or replaced F.O.B. point of shipment, provided that inspection by Seller verifies the claimed defect(s). This warranty does not cover the costs of removing, shipping or reinstalling the equipment. Repairs made without the prior written approval of Seller shall void all warranties covering material and workmanship. Any descriptions of the product(s) in the contract are for the sole purpose of identification and do not constitute a warranty. In the interest of product improvement, Seller reserves the right to change specifications and product design without incurring any liability therefor. The foregoing express warranties are the only warranties of Seller applicable to the product(s) sold under this contract. All other warranties, whether verbal or written, and all warranties implied by law, including any warranties of merchantability or fitness for a particular purpose, are hereby excluded. Failure on the part of Purchaser or of other parties to properly maintain the product(s) sold under this contract, or the operation of such product(s), by Purchaser and/or other parties under conditions more severe than those for which such product(s) were designed, shall void all warranties covering materials and workmanship. Seller's warranties do not apply to defects in product(s) for which payment in full has not been received by Seller, and said warranties do not cover normal wear and tear or the erosion, corrosion and/or deterioration of the product(s) from unusual causes. Seller shall in no event be liable for consequential, incidental or special damages arising out of a breach of any of its warranties or obligations hereunder. No warranties by Seller shall apply to accessories manufactured by others, inasmuch as they are warranted separately by their respective manufacturers, except as stated above. Purchaser assumes liability for and shall bear the costs of compliance with all laws, regulations, codes standards or ordinances applicable to the local operation and maintenance of the product(s) sold under this contract, including those requirements pertaining to the distances between such product(s) and air conditioning system duct intakes. No representative or agent of Seller is authorized to enlarge upon the express warranties of Seller.

**Shipping Dates:** Shipping dates are estimated only. No agreement will be made to deliver in a specified time unless in writing by an official of the Seller. Seller shall under no circumstances be responsible for failure to fill any order or orders when due to: fires, floods, war, riots, strikes, freight embargoes or transportation delays, shortage of labor, inability to secure fuel, material, supplies or power at current prices, or on account of shortages thereof; acts of God or of the public enemy; any existing or future laws or acts of the Federal or of any State Government (including specifically, but not exclusively, any orders, rules or regulations issued by any official or agency of any such government) affecting the conduct of Seller's business with which Seller in its judgment and discretion deems it advisable to comply as a legal or patriotic duty, or to any case beyond the Seller's reasonable control.

**Allocation of Risk:** The responsibility of the Seller ceases upon delivery of products to the carrier. The Buyer assumes all risks of loss, damage or shortage in transit, and any claims based thereon must be filed by the Buyer with the carrier.

**Returns:** Products may not be returned except by permission of authorized factory officials of the Seller and when so returned will be subject to a handling charge and transportation costs payable by Buyer.

**Government Contracts:** If Buyer's purchase order is for products to be used in the performance of a U.S. Government contract, those clauses of applicable procurement regulations mandatorily required by federal law to be included in U.S. Government subcontracts shall be incorporated herein by reference.

**Agreement of Sale:** All orders are subject to review and acceptance by the Seller, including all terms and conditions related thereto. Any of the terms and conditions of Buyer's order, or amendments or additions thereto, which are inconsistent with the terms and conditions herein shall not be binding on the Seller and shall not be considered applicable to the sale and shipment of the products. No waiver, alteration, or modification of the provisions hereof shall be binding on the Seller unless made in writing and agreed to by a duly authorized official of the Seller. Waiver by either party of any default by the other hereunder shall not be deemed a waiver by such party of any default by the other which may thereafter occur. Orders accepted by the Seller are subject to cancellation only upon the consent of the Seller and after payment by buyer of reasonable costs and expenses for the effort expended thereon. The agreement of sale shall be governed and construed in accordance with the laws of the State of Maryland.

(Revised 2/78)



February 20, 2001

## Baltimore Aircoil Company

### Series 3000 Cooling Tower Mechanical Specifications

Stainless Steel Cold Water Basin, Remaining Structural Elements Constructed of G-235 (Z700 metric)  
Hot-Dip Galvanized Steel, with FRP Casing Panels

<b>Project Name:</b>	EMCORE A T R FACILITY - ALBUQUERQUE, NM
<b>Customer Name:</b>	YEAROUT MECHANICAL - ALBUQUERQUE, NM
<b>Purchase Order No.:</b>	BY110202
<b>Engineer Name:</b>	BRIDGERS & PAXTON - ALBUQUERQUE, NM
<b>Model Number:</b>	33412A-MM-2
<b>B.A.C. Serial No.:</b>	U013159101-MAD
<b>Unit Type:</b>	Factory assembled, induced draft, crossflow cooling tower with vertical air discharge. Principal structural construction is of heavy gauge G-235 (Z700 metric) hot-dip galvanized steel angles and channels. The edges of the hot-dip galvanized steel components are given a protective coat of zinc-rich compound.
<b>Thermal Performance:</b>	Thermal performance is certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201.
<b>Quality Assurance:</b>	Each unit is manufactured under closely-controlled conditions using standardized parts to ensure each unit is built precisely to the same high-quality design and construction standards. The design, manufacture, and business processes are ISO 9001 certified.
<b>Cold Water Basin:</b>	Constructed of heavy gauge, weldable, Type 304 stainless steel. All factory seams between panels inside the cold water basin are welded water-tight. Basin includes a depressed center section with drain/clean-out connection. Basin areas under the fill sections are sloped toward the depressed center section for easy cleaning. The basin is provided with a five (5) year leak proof guarantee.
<b>Strainer or Trash Screen:</b>	Large area, lift-out, Type 304 stainless steel, strainer screen has perforated openings sized smaller than the water distribution nozzle orifices. Strainer includes anti-vortexing baffle to prevent air entrainment.
<b>Connections:</b>	All cold water basin connections four inches (4") (100 mm) and larger are both beveled for welding and grooved for mechanical coupling. Connections less than four inches (4") (100 mm) are provided with male pipe thread (MPT).
<b>Water Level Control:</b>	Bronze make-up valve with unsinkable polystyrene filled plastic float arranged for easy adjustment. The make-up valve is suitable for water supply pressures between 15 psig (103 kPa) and 50 psig (345 kPa).

**Casing:** Casing is constructed of fiberglass-reinforced polyester (FRP) panels.

**Access Doors:** Hinged access doors are provided on both side walls of the tower for access to eliminators and fan plenum section for all cells. The doors are made of G-235 (Z700 metric) hot-dip galvanized steel with an exterior overlay of fiberglass-reinforced polyester (FRP),

**Air Inlet Louvers:** Air inlet louvers are wave-formed, fiberglass-reinforced polyester (FRP), spaced to minimize air resistance and prevent water splash-out.

**Inlet:** Inlet water enters the high density polyethylene (HDPE) BALANCE CLEAN® Chamber through the EASY CONNECT® Piping Arrangement located on the side of each cell. The BALANCE CLEAN® Chamber includes a G-235 (Z700 metric) hot-dip galvanized steel strainer with perforated openings sized smaller the water distribution orifices and a plugged blow-down connection to permit purging of dirt and debris. Polyvinyl chloride (PVC) piping automatically balances water flow to the hot water distribution system.

**Water Distribution System:** CONDUIT(TM) hot water distribution system is constructed of durable, corrosion resistant material. Plastic metering devices are provided to assure uniform distribution of water over the wet deck surface. Heavy gauge, G-235 (Z700 metric) hot-dip galvanized steel covers are provided.

**Wet Deck & Eliminators:** The BACross® Wet Deck Surface and integral drift eliminators are formed from self-extinguishing polyvinyl chloride (PVC), having a flame spread rating of 5 per ASTM Standard E84-77a, and are impervious to rot, decay, and fungus or biological attack. The wetdeck surface is elevated above the cold water basin floor to facilitate cleaning. The eliminators are designed to effectively strip entrained moisture from the leaving airstream with a minimum of air resistance. This wet deck is suitable for a maximum entering water temperature of 120°F (48.8°C).

**BALTIDRIVE® PowerTrain:** Fan(s) are driven by a one-piece multi-groove, neoprene/polyester V-type powerband with taper lock sheaves designed for 150% of the motor nameplate horsepower. designed specifically for evaporative cooling equipment service. Fan and motor sheaves are non-corrosive cast aluminum. The BALTIDRIVE® PowerTrain, including fan motors, is warranted against defects in materials and workmanship for five (5) years from date of shipment.

**Mechanical Support:** The mechanical equipment support consists of a steel assembly designed to maintain alignment of rotating parts during start-up and operating conditions.

**Fan Shaft and Bearings:** Fan(s) and steel fan shaft(s) are supported by heavy-duty, self-aligning, grease-packed, relubricatable ball bearings with moisture proof seals and integral slinger collars. All bearings are designed for minimum L10 life of 40,000 hours (280,000 hours average life).

- Fan Motor(s):** Inverter Duty fan motor(s) is totally enclosed, air-over (TEAO), one speed, one winding, reversible squirrel cage, ball bearing type, designed specifically for evaporative heat rejection service. Motor is furnished with special moisture protection on windings, shafts and bearings. Motor is designed per NEMA MG1-Part 31 for Inverter Duty service.
- Fan and Fan Cylinder:** Fan(s) are heavy duty, aluminum alloy, axial flow. The heavy gauge, G-235 (Z700) hot-dip galvanized fan cylinder(s) are designed for streamlined air entry and minimum tip clearances for maximum fan efficiency.
- Fan Guard:** A heavy gauge, hot-dip galvanized steel wire fan guard is provided over each fan cylinder.
- Basin Freeze Protection:** An electric immersion heater package, sized to maintain +40°F (+4°C) basin water at 0°F (-18°C) ambient with a 10 mph (16 km/h) wind speed, is provided. The package includes a minimum number of high-watt-density electric immersion heater element(s), thermostat(s), and low water cutout switch(es) or probe(s). Disconnect switch, contactor, and wiring are not included.
- Positive Closure Plate:** Type 304 stainless steel positive closure plate(s) is shipped loose and can be installed on the flume box(es) connecting the cold water basins of a multi-cell unit.
- Internal Access:** A galvanized steel walkway in the plenum of each cell provides access to the fan drive components and basin strainer screens.
- Extended Lubrication Lines:** Bearing lubrication lines are extended to grease fitting located inside the unit and are accessible from the access door.
- External Access:** An aluminum ladder and perimeter safety railing constructed of 1-1/4" (32 mm) galvanized steel pipe are provided to access the top of the unit. These items meet pertinent OSHA standards and ship loose for field assembly and installation by others.

City of ABQ zoning certification.



# City of Albuquerque Environmental Health Department Air Quality Program



## Construction Permit (20.11.41 NMAC) Zoning Requirement Cover Letter

### **This Cover Letter Must Be Returned With The Application Along With All Required Attachments**

The Albuquerque-Bernalillo County Joint Air Quality Program, which administers and enforces local air quality laws for the City of Albuquerque (“City”) and Bernalillo County (“County”), on behalf of the City Environmental Health Department (“Department”).

Any person seeking a new air quality permit or a permit modification under 20.11.41 NMAC (Construction Permits) shall provide documentary proof that the proposed air quality permitted use of the facility’s subject property is allowed by the zoning designation of the City or County zoning laws, as applicable. Sufficient documentation may include (i) a zoning certification from the City Planning Department or County Department of Planning and Development Services, as applicable, if the applicant is subject to City or County zoning jurisdiction; or (ii) a zoning verification from both planning departments if the applicant is not subject to City or County zoning jurisdiction. A zone atlas map shall not be sufficient. At this time, applicants are not required to submit documentation for the subject property’s zoning designation when applying for a relocation of a portable stationary source, or a technical or administrative revision to an existing permit.

The Department will rule an application administratively incomplete if it is missing or has incorrect information. If the Department has ruled an application administratively incomplete three (3) times, the Department will deny the permit application. Any fees submitted for processing an application that has been denied will not be refunded. If the Department denies an application, a person may submit a new application and the fee required for a new application. The applicant has the burden of demonstrating that a permit should be issued.

The Department may require additional information that is necessary to make a thorough review of an application. At all times before the Department has made a final decision regarding the application, an applicant has a duty to promptly supplement and correct information the applicant has submitted in an application to the Department. The applicant’s duty to supplement and correct the application includes, but is not limited to, relevant information acquired after the applicant has submitted the application and additional information the applicant otherwise determines is relevant to the application and the Department’s review and decision. While the Department is processing an application, regardless of whether the Department has determined the application is administratively complete, if the Department determines that additional information is necessary to evaluate or make a final decision regarding the application, the Department may request additional information and the applicant shall provide the requested additional information.

**NOTICE REGARDING SCOPE OF A PERMIT:** The Department’s issuance of an air quality permit only authorizes the use of the specified equipment pursuant to the air quality control laws, regulations and conditions. Permits relate to air quality control only and are issued for the sole purpose of regulating the emission of air contaminants from said equipment. Air quality permits are not a general authorization for the location, construction and/or operation of a facility, nor does a permit authorize any particular land use or other form of land entitlement. It is the applicant’s/permittee’s responsibility to obtain all other necessary permits from the appropriate agencies, such as the City Planning Department or County Department of Planning and Development Services, including but not limited to site plan approvals, building permits, fire department approvals and the like, as may be required by law for the location, construction and/or operation of a facility. For more information, please visit the City Planning Department website at <https://www.cabq.gov/planning> and the County Department of Planning and Development Services website at <https://www.berncogov/planning>.

**Corporate and Facility Information:** This information shall match the information in the permit application.

Air Quality Permit Applicant Company Name: <b>SolAero Technologies Corporation</b>			
Facility Name: <b>SolAero Technologies Corporation</b>			
Facility Physical Address: <b>10420 Research Rd SE</b>	City: <b>Albuquerque</b>	State: <b>NM</b>	Zip: <b>87123</b>
Facility Legal Description: <b>High energy photovoltaics and other advanced semiconductor manufacturing.</b>			

**General Operation Information:** This information shall match the information in the permit application.

Permitting action being requested (please refer to the definitions in 20.11.41 NMAC):

New Permit                       Permit Modification, Current Permit #: **1029-M2-2**

**TR**

**Attachment Information:** The location information provided to the City Planning Department or County Department of Planning and Development Services, as applicable, and reflected in the zoning certification or verifications, as applicable, shall be the same as the Facility location information provided to the Department in the air quality construction permit application.

<input type="checkbox"/> Zoning Certification Provided by: <b>City Planning</b>  <i>This is a use-specific certification.</i>  <b>City Planning Form:</b> <a href="https://www.cabq.gov/planning/code-enforcement-zoning">https://www.cabq.gov/planning/code-enforcement-zoning</a>  <b>County Planning Form:</b> <a href="https://www.bernco.gov/planning/planning-and-land-use/applications-forms/">https://www.bernco.gov/planning/planning-and-land-use/applications-forms/</a>	<input checked="" type="checkbox"/> City Zoning Verification  <input type="checkbox"/> County Zoning Verification  <b>City Planning Form:</b> <a href="https://www.cabq.gov/planning/code-enforcement-zoning">https://www.cabq.gov/planning/code-enforcement-zoning</a>  <b>County Planning Form:</b> <a href="https://www.bernco.gov/planning/planning-and-land-use/applications-forms/">https://www.bernco.gov/planning/planning-and-land-use/applications-forms/</a>
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# City of Albuquerque

## CODE ENFORCEMENT

Plaza Del Sol Building, Suite 500

600 2nd Street NW

Albuquerque, NW 87102

Tel: (505) 924-3850 Fax: (505) 924-3847



Mayor Timothy M.  
Keller

September 30, 2025

**VIA Email, [rebecca.chambers@rocketlabusa.com](mailto:rebecca.chambers@rocketlabusa.com)**

rocket lab usa

Rebecca Chambers

RE: 10420 RESEARCH RD SE, Albuquerque, NM 87123 the "property"  
UPC: 102105505041520166

To Whom It May Concern:

This letter will certify that according to the map on file in this office on September 30, 2025, the referenced property, legally described as: **LOT 2-A BLOCK 4 PLAT OF LOT 2-A IN BLOCK 4 SANDIARESEARCH PARK CONT 7.0406 AC** Albuquerque, Bernalillo County, New Mexico, is Zoned: **NON-RESIDENTIAL - COMMERCIAL ZONE DISTRICT (NR-C)**.

The current use for this site is Light Manufacturing a permissive use in this zone.

This property has been inspected and it was found in compliance, with the applicable provisions of the Integrated Development Ordinance. This site is not controlled by an approved site development plan. There are no special exemptions associated with this site. This site is in the Kirtland AFB Military Influence Area.

If you have any questions regarding this matter please contact me at (505) 924-3363 or by email at [amorefield@cabq.gov](mailto:amorefield@cabq.gov).

Sincerely:

Amanda Morefield,  
Code Compliance Manager, Code Enforcement, Planning Department