

**DRAFT**  
**Engineering Evaluation**  
**Pacific Bay Coffee Company**  
**Plant No. 19126; Application No. 26534**

**1495 Newell Avenue, Walnut Creek, CA 94596**

**BACKGROUND**

Pacific Bay Coffee Company has applied for a Permit to Operate for the following equipment:

**S-1 Coffee Roaster, Diedrich IR-12, 150 lbs/hr capacity with A-1 Afterburner, 90,000 Btu/hr**

The above equipment is located at 1495 Newell Avenue, Walnut Creek, CA 94596.

This is an existing unpermitted source. The initial operation date was in March 2010. Five years of back fees were charged and paid in full.

There is an afterburner on site to eliminate smoke and odor at S-1. This process operates at a temperature of 1300 degrees Fahrenheit. The burner is fueled by natural gas.

This source is located within 1,000 feet of a school: Las Lomas High School, 1460 South Main Street, Walnut Creek, CA 94596; therefore, this application requires Public Notification per District's Regulation 2-1-412. A Public Notice was prepared and will be sent out to home address of the students of the school and to each address within a radius of 1,000 feet of the source.

**EMISSION CALCULATIONS**

Basis:

- Maximum Operating Rate: 150 lbs/hr
- Hours of Operation: 8,736 hr/yr
- Coffee Throughput: 1,310,400 lbs/yr
- Roaster Firing Rate: 0.09 MMBtu/hr
- Yearly Fuel Throughput: 786 MMBtu/yr
- Heat Capacity: 1050 MMBtu/MMscf Natural Gas

Emission Factors for NO<sub>x</sub> and CO are taken from EPA AP-42 Table 1.4-1 for small boilers (< 100 MMBtu/hr)  
Emission Factors for SO<sub>2</sub>, PM<sub>10</sub>, POC and Methane are taken from EPA AP-42 Table 1.4-2

**Emissions per MMBtu of Natural Gas**

$$\begin{aligned} \text{NO}_x &= (100 \text{ lb/MMscf}) / (1050 \text{ MMBtu/MMscf}) = 0.095 \text{ lb/MMBtu} \\ \text{CO} &= (84 \text{ lb/MMscf}) / (1050 \text{ MMBtu/MMscf}) = 0.08 \text{ lb/MMBtu} \\ \text{SO}_2 &= (0.6 \text{ lb/MMscf}) / (1050 \text{ MMBtu/MMscf}) = 0.00057 \text{ lb/MMBtu} \\ \text{PM}_{10} &= (7.6 \text{ lb/MMscf}) / (1050 \text{ MMBtu/MMscf}) = 0.00724 \text{ lb/MMBtu} \\ \text{POC} &= (5.5 \text{ lb/MMscf}) / (1050 \text{ MMBtu/MMscf}) = 0.00524 \text{ lb/MMBtu} \\ \text{Methane} &= (2.3 \text{ lb/MMscf}) / (1050 \text{ MMBtu/MMscf}) = 0.00219 \text{ lb/MMBtu} \end{aligned}$$

**Calculating Yearly Combustion Emission Calculations**

$$\begin{aligned} \text{NO}_x &= (786 \text{ MMBtu/yr}) (0.095 \text{ lb/MMBtu}) = 74.9 \text{ lb/yr} \\ \text{CO} &= (786 \text{ MMBtu/yr}) (0.08 \text{ lb/MMBtu}) = 62.9 \text{ lb/yr} \\ \text{SO}_2 &= (786 \text{ MMBtu/yr}) (5.7 \times 10^{-4} \text{ lb/MMBtu}) = 0.4 \text{ lb/yr} \\ \text{PM}_{10} &= (786 \text{ MMBtu/yr}) (0.00724 \text{ lb/MMBtu}) = 5.7 \text{ lb/yr} \\ \text{POC} &= (786 \text{ MMBtu/yr}) (0.00524 \text{ lb/MMBtu}) = 4.1 \text{ lb/yr} \\ \text{Methane} &= (786 \text{ MMBtu/yr}) (0.00219 \text{ lb/MMBtu}) = 1.7 \text{ lb/yr} \end{aligned}$$

**Table 1. Annual and maximum daily emissions from operation of S-1**

Pollutant	Annual Emissions [lb/yr]	Daily Emissions [lb/day]	Annual Emissions [TPY]
NO <sub>x</sub>	74.9	0.206	0.037
CO	62.9	0.173	0.031
SO <sub>2</sub>	0.4	0.001	0.000
PM	5.7	0.016	0.003
POC	4.1	0.011	0.002
Methane	1.7	0.005	0.001

Emissions from Batch Roaster

Emission factors (batch roaster with thermal oxidizer and continuous cooler with cyclone) for emissions of particulate and organics are taken from AP-42 Table 9.13.2-1 and Table 9.13.2-2.

**Table 2. Emissions from Batch Roaster**

Pollutant	Emission Factors [lb/ton]	Throughput [TPY]	Annual Emissions [lb/year]	Maximum Annual Emissions [TPY]
PM	0.148*	655.20	96.970	0.048
POC	0.047	655.20	30.794	0.015
CO	0.550	576.58	317.119	0.159

\*Filterable PM from batch roaster with thermal oxidizer and continuous cooler with cyclone

Compliance with Regulation 6-310 Particulate Weight Limitations

Regulation 6-1-310, Particulate Weight Limitation, states that any source may not emit matter in excess of 0.15 grain/dscf of exhaust gas volume.

Basis: *Operating hours:* 8,736 hr/yr  
*Roaster emission point:* 350 acfm at 1400 degrees F

$$\text{Scfm} = \text{acfm} \times ((68 + 460) / (T_{\text{actual}} + 460))$$

$$\text{Scfm} = 350 \times [(68+460) / (1400+460)] = 99 \text{ scfm}$$

$$[(0.7 + 3.5) \text{ lb PM}_{10}/\text{yr} \times 7000 \text{ grain/lb}] / [60 \text{ min/hr} \times 8736 \text{ hr/yr} \times 99 \text{ scfm}] = 0.00057 \text{ grain/dscf}$$

Therefore, S-1 does not emit matter in excess of 0.15 grain/dscf and complies with Regulation 6-1-310.

**PLANT CUMULATIVE EMISSIONS**

Pacific Bay Coffee located at 1495 Newell Avenue, Walnut Creek, CA 94596 is a new facility. Therefore, there are no existing emissions at the plant. Table 3 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-1.

**Table 3. Cumulative Emissions Increase in tons/year**

Pollutant	Existing Emissions [TPY]	New Emissions [TPY]	Total Emissions [TPY]
NO <sub>x</sub>	0.000	0.037	0.0374
CO	0.000	0.190	0.1900
SO <sub>2</sub>	0.000	0.0002	0.0002
PM	0.000	0.051	0.0513
POC	0.000	0.017	0.0175
Methane	0.000	0.001	0.0009

### **TOXIC RISK SCREENING**

According to Chapter 9.13.2 of AP-42, Coffee Roasting, the roaster is the main source of gaseous pollutants, including aldehydes and acrolein. However, the California Air Resources Board (CARB) has invalidated the source test method for acrolein. Until CARB approves a new test method and acrolein emissions are estimated from factors developed using the new test method, the District is not evaluating risk for acrolein. There are no California Air Toxic Emission Factors (CATEF) factors for the aldehydes from coffee roasting. However, source testing was performed at Peet's Coffee and Tea, Inc. and determined the following toxic emission factors:

**Table 2. Emissions from Batch Roaster**

<b>Pollutant</b>	<b>Emission Factors (lb/ton)</b>	<b>Coffee Throughput (TPY)</b>	<b>Annual Emissions (lb/yr)</b>	<b>Trigger Level (lb/yr)</b>	<b>Hourly Emissions (lb/hr)</b>	<b>Trigger Level (lb/hr)</b>
Formaldehyde	0.0008	655.2	0.52	30	Neg.	0.21
Acetaldehyde	0.0005	655.2	0.33	64	--	--

Emissions of toxic air contaminants from S-1 do not exceed any District trigger level in Regulation 2-5. Therefore, toxic risk screen is not required.

### **BEST AVAILABLE CONTROL TECHNOLOGY (BACT)**

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NO<sub>x</sub>, CO, SO<sub>2</sub> or PM<sub>10</sub>.

Based on the emission calculations above, BACT is not triggered for any pollutant since the maximum daily emissions of each pollutant does not exceed 10 pounds/ day.

### **OFFSETS**

Offsets must be provided for any new or modified source at a facility that emits more than 10 tons/year of POC or NO<sub>x</sub> per Regulation 2, Rule 2, Section 302. Based on the calculations above, offsets are not required for this application.

### **New Source Performance Standards (NSPS)**

S-1 is not affected by any subpart of 40 CFR Part 60.

### **National Emission Standards for Hazardous Air Pollutants (NESHAP)**

S-1 is not affected by any subpart of 40 CFR Part 63.

### **STATEMENT OF COMPLIANCE**

S-1 will comply with Regulation 6, Rule 1, since its estimated particulate emissions of 0.00057 grain/dscf are less than the limit of 0.15 grans/ dscf.

This application is considered to be ministerial under the District's Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 11.3.

This source is located within 1,000 feet of a school: Las Lomas High School, 1460 South Main Street, Walnut Creek, CA 94596; therefore, this application requires Public Notification per District's Regulation 2-1-412. A Public Notice was prepared and will be sent out to home address of the students of the school and to each address within a radius of 1,000 feet of the source.

PSD is not triggered.

**PERMIT CONDITIONS**

S-1 will be subject to permit conditions #25927 as shown below.

CONDITION 25927 -----

1. The owner/operator shall not roast more than 1,310,400 pounds of green coffee beans at Coffee Roaster, S-1 in any consecutive 12-month period.  
[Basis: Cumulative Increase]
2. The owner/operator shall abate S-1 Coffee Roaster at all times while operating by the built-in afterburner.  
[Basis: Cumulative Increase]
3. The owner/operator shall maintain a minimum furnace temperature of 1275° F at the afterburner and maintain a residence time of at least 0.3 seconds. [Basis: Regulation 2-1-403]
4. The owner/operator shall ensure that the afterburner is equipped with a temperature-measuring device capable of continuously measuring and recording the temperature in the thermal oxidizers. This device shall be accurate to within 10 degrees Fahrenheit (° F) and shall be maintained in accordance with manufacturer's recommendations. These temperature monitors shall be used to determine compliance with the temperature requirements in Part 3. [Basis: Regulation 1-521]
5. The owner/operator shall not emit from any source for period or periods aggregating more than three minutes in any hour, a visible emission which is as dark or darker than No. 0.5 on the Ringelmann Chart of of such opacity as to obscure an observer's view to an equivalent or greater degree. [Basis: Regulation 6-1]
6. To demonstrate compliance with the above conditions, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions, including the following information:
  - a. Monthly records of the quantity of green coffee beans roasted at S-1 Coffee Roasters.
  - b. Monthly records of natural gas usage.
  - c. Monthly usage records shall be totaled for each consecutive 12-month period.
  - d. Records of continuous temperature measurements of afterburner whenever S-1 Coffee Roasters are in operation.

All records shall be retained onsite for two years from the date of entry, and made available for inspection by District staff upon request. These record-keeping requirements shall not replace the record keeping requirements contained in any applicable District Regulations. [Basis: Cumulative Increase]

**RECOMMENDATION**

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct for the equipment listed below. However, the proposed source will be located within 1000 feet of a school which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of a Permit to Operate for the following source:

**S-1 Coffee Roaster, Diedrich IR-12, 150lbs/hr capacity with A-1 Afterburner, 90,000 Btu/hr**

Prepared by: \_\_\_\_\_

Flora Chan  
Air Quality Engineer

Date: \_\_\_\_\_