

**Draft Engineering Evaluation
Catahoula Coffee Company
Application No. 26094
Plant No. 16461**

BACKGROUND

Catahoula Coffee Company is applying for an Authority to Construct and Permit to Operate for the following equipment:

S-2 Batch Coffee Roaster, Loring Kestrel S35, 250 lb/hr capacity with integral afterburner, 280,000 Btu/hr

The equipment will be located at 12472 San Pablo Avenue, Richmond, CA 94805.

The Loring coffee roaster uses a closed-loop technology to heat the roasting process. A single burner, located in the cyclone, provides the hot air for the roasting chamber and acts as an afterburner, incinerating the process smoke and odor in the recirculated air. This process operates at temperatures of 1,400 to 1,600 degrees F. The proposed burner is fueled by natural gas.

EMISSION CALCULATIONS

Basis: *Maximum Operating Rate:* 250 lbs/hr
Hours of Operation: 2,080 hr/yr
Coffee Throughput: 520,000 lbs/yr
Roaster Firing Rate: 0.28 MMBtu/hr
Yearly Fuel Throughput: 582.4 MMBtu/yr
Heat Capacity: 1,050 MMBtu/MMscf natural gas

Emissions factors for NO_x and CO taken from AP-42 1.4-1 for small boilers (<100 MMBtu/hr)
Emissions factors for SO₂, PM₁₀, POC and NPOC taken from AP-42 Table 1.4-2

Emissions per MMBtu of Natural Gas

NO_x = (100 lb/MMscf)/(1050 MMBtu/MMscf) = 0.095 lb/MMBtu
CO = (84 lb/MMscf)/(1050 MMBtu/MMscf) = 0.08 lb/MMBtu
SO₂ = (0.6 lb/MMscf)/(1050 MMBtu/MMscf) = 5.7 x 10⁻⁴ lb/MMBtu
PM₁₀ = (7.6 lb/MMscf)/(1050 MMBtu/MMscf) = 0.00724 lb/MMBtu
POC = (5.5 lb/MMscf)/(1050 MMBtu/MMscf) = 0.00524 lb/MMBtu
Methane = (2.3 lb/MMscf)/(1050 MMBtu/MMscf) = 0.00219 lb/MMBtu

Calculating Yearly Combustion Emission Calculations

NO_x = (582.4 MMBtu/yr)(0.095 lb/MMBtu) = 55.5 lb/yr
CO = (582.4 MMBtu/yr)(0.08 lb/MMBtu) = 46.6 lb/yr
SO₂ = (582.4 MMBtu/yr)(5.7 x 10⁻⁴ lb/MMBtu) = 0.3 lb/yr
PM₁₀ = (582.4 MMBtu/yr)(0.00724 lb/MMBtu) = 4.2 lb/yr
POC = (582.4 MMBtu/yr)(0.00524 lb/MMBtu) = 3.1 lb/yr
Methane = (582.4 MMBtu/yr)(0.00219 lb/MMBtu) = 1.3 lb/yr

Table 1. Combustion Emissions

| Pollutant | Annual Emissions (lb/yr) | Daily Emissions (lb/day) | TPY |
|------------------|--------------------------|--------------------------|-------|
| NO _x | 55.5 | 0.21 | 0.028 |
| CO | 46.6 | 0.18 | 0.023 |
| SO ₂ | 0.3 | 0.00 | 0.000 |
| PM ₁₀ | 4.2 | 0.02 | 0.002 |
| POC | 3.1 | 0.01 | 0.002 |
| Methane | 1.3 | 0.00 | 0.000 |

Emissions from Batch Roaster

Emission factors (batch roaster with thermal oxidizer) 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/yr) | Maximum Annual Emissions (TPY) |
|------------------|---------------------------|------------------|--------------------------|--------------------------------|
| PM ₁₀ | 0.12 | 260.0 | 31.20 | 0.016 |
| POC | 0.047 | 260.0 | 12.22 | 0.006 |
| CO | 0.550 | 576.6 | 317.12 | 0.159 |

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:* 2,080 hr/yr
Roaster emission point: 493 acfm at 1600 degrees F

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

$$\text{Scfm} = 493 \times [(68+460) / (1600+460)] = 126 \text{ scfm}$$

$$[(0.7 + 3.5) \text{ lb PM}_{10}/\text{yr} \times 7000 \text{ grain/lb}] / [60 \text{ min/hr} \times 2080 \text{ hr/yr} \times 126 \text{ scfm}] = 1.8 \times 10^{-3} \text{ grain/dscf}$$

Therefore, S-2 does not emit matter in excess of 0.15 grain/dscf and complies with Regulation 6-1-310.

PLANT CUMULATIVE EMISSIONS

Table 3 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-2.

Table 3. Cumulative Emissions Increase in ton/yr

| Pollutant | Existing | New | Total |
|------------------|----------|-------|-------|
| NO _x | 0.252 | 0.028 | 0.280 |
| CO | 0.062 | 0.182 | 0.244 |
| SO ₂ | 0.001 | 0.000 | 0.001 |
| PM ₁₀ | 0.000 | 0.018 | 0.018 |
| POC | 0.001 | 0.008 | 0.009 |

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

| Pollutant | Emission Factors (lb/ton) | Coffee Throughput (TPY) | Annual Emissions (lb/yr) | Trigger Level (lb/yr) | Hourly Emissions (lb/hr) | Trigger Level (lb/hr) |
|------------------|----------------------------------|--------------------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|
| Formaldehyde | 0.0008 | 260 | 0.2 | 30 | Neg. | 0.21 |
| Acetaldehyde | 0.0005 | 260 | 0.1 | 64 | -- | -- |

Therefore, a toxic risk screen is not triggered.

BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

In accordance with Regulation 2-2-301, 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_x, CO, SO₂ or PM₁₀.

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

OFFSETS

Per Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits more than 10 tons/yr of POC or NO_x. Based on the emissions displayed in Table 1, offsets are not required for this application.

NEW SOURCE PERFORMANCE STANDARDS (NSPS)

S-2 is not affected by any subpart of 40 CFR Part 60.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

S-2 is not affected by any subpart of 40 CFR Part 63.

STATEMENT OF COMPLIANCE

Source S-2 will comply with Regulation 6, Rule 1, since its estimated particulate emissions are less than the limit of 0.15 grains/dscf.

The project is considered to be ministerial under the District's CEQA 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 emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3.1)

This facility is located within 1,000 feet from the nearest school (listed below) and therefore is subject to public notification requirements of Regulation 2-1-412. A public notice was prepared and will be sent to the

parents or guardians of children enrolled in any school within one-quarter mile of the source and to each address within a radius of 1,000 feet of the source.

Wilson Elementary
629 42nd St.
Richmond, CA 94805

PSD does not apply.

PERMIT CONDITIONS

COND# 25757 -----

1. The owner/operator shall not roast more than 520,000 pounds of green coffee beans at Coffee Roaster, S-2 in any consecutive 12-month period. [basis: Cumulative Increase]
2. The owner/operator shall abate S-2 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 1200° F 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 a 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 or of such opacity as to obscure an observer's view to an equivalent or greater degree. [basis: BACT]
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-2 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-2 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]

End of Conditions

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 1,000 feet of a school, which triggers the public notification requirements of District Regulation 2-1-412.6. 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 an Authority to Construct for the following source:

S-2 Batch Coffee Roaster, Loring Kestrel S35, 250 lb/hr capacity with integral afterburner, 280,000 Btu/hr

By: _____
Simrun Dhoot
Air Quality Engineer

Date: _____