

## ENGINEERING EVALUATION REPORT

<b>Plant Name:</b>	<b>Moksha Coffee Roasting, LLC</b>
<b>Application Number:</b>	<b>27145</b>
<b>Plant Number:</b>	<b>23030</b>

### BACKGROUND

The applicant, Moksha Coffee Roasting, LLC, is applying for an Authority to Construct/Permit to Operate for a new coffee roasting operation located at 1931 Old Middlefield Way, Ste 201, Mountain View, CA 94043.

The applicant is requesting an Authority to Construct/Permit to Operate for the following equipment:

#### **S-1 Coffee Batch Roaster with Integral Cyclone and Catalytic Afterburner; Revelation 22K, 50 lb/hr, 0.3 MM Btu/hour**

### CRITERIA POLLUTANT EMISSION CALCULATIONS

#### Emissions from Batch Roaster

PM<sub>10</sub> and POC emission factors for batch roasting of green coffee beans are taken from AP 42, Chapter 9.13.2, "Coffee Roasting." NO and CO emission factors are from source testing performed by Peet's Coffee and Tea (Application 13807). The emission factors used are as follows:

PM <sub>10</sub>	1.26	lb/ton
POC	0.86	lb/ton
NO <sub>x</sub>	0.1	lb/ton
CO	0.4	lb/ton

#### Natural Gas Emissions

Natural gas is used to fire the coffee roasting equipment. Emission factors are from AP 42, Chapter 1.4, "Natural Gas Combustion." The emission factors used are as follows:

PM <sub>10</sub>	0.12	lb/MM Btu
POC	0.86	lb/MM Btu
NO <sub>x</sub>	0.1	lb/MM Btu
SO <sub>2</sub>	0.0006	lb/MM Btu
CO	0.4	lb/MM Btu

With these emission factors, the total criteria pollutant potential to emit for this coffee roasting operation operating at maximum capacity (8,760 hours/year) will be as follows:

**TABLE 1 - CRITERIA POLLUTANT EMISSIONS**

	ROASTING OPERATIONS			NATURAL GAS COMBUSTION			Total	Total
	Throughput (tons/year)	Emission Factor (lbs/ton)	Emissions (lbs/year)	Throughput (MM Btu/year)	Emission Factor (lbs/MM Btu)	Emissions (lbs/year)	Emissions (lbs/year)	Emissions (tons/year)
PM10	219.0	1.26	276	249.6	0.00745	1.86	277.80	0.139
POC	219.0	0.86	188	249.6	0.00539	1.35	189.69	0.095
NOx	219.0	0.1	22	249.6	0.09804	24.47	46.37	0.023
SO2				249.6	0.00059	0.15	0.15	0.000
CO	219.0	0.4	88	249.6	0.08235	20.56	108.16	0.054

**TOXIC POLLUTANT EMISSIONS**

Neither CATEF nor AP 42, Chapter 9.13.2 have any emission factors for toxic air pollutants; however, emission factors for acetaldehyde and formaldehyde<sup>1</sup> were obtained from source testing performed by Puget Sound Clean Air Agency (see Application 13807). Toxic emissions based on these factors are as follows:

**TABLE 2 - TOXIC POLLUTANT EMISSIONS**

Substance	COFFEE ROASTING			NATURAL GAS COMBUSTION			Total
	Throughput (tons/year)	Emission Factor (lbs/ton)	Chronic Emissions (lbs/year)	Throughput (MM Btu/year)	Emission Factor (lbs/MM Btu)	Chronic Emissions (lbs/year)	Chronic Emissions (lbs/year)
Acetaldehyde	219.0	6.20E-02	13.578				13.578
Benzene				2628	2.06E-06	0.005	0.005
Formaldehyde	219.0	3.60E-02	7.884	2628	7.35E-05	0.193	8.077
Toluene				2628	3.33E-06	0.009	0.009

Based on the trigger levels set out in Regulation 2, Rule 5, Table 2-5-1, the proposed emissions from the operation at maximum potential to emit do not exceed any chronic or acute trigger levels:

Substance	Total Chronic Emissions (lbs/year)	Chronic Trigger (lbs/year)	Over Chronic Trigger?	Total Acute Emissions (lbs/hour)	Acute Trigger (lbs/hour)	Over Acute Trigger?
Acetaldehyde	13.578	38	NO	1.55E-03	1.0	NO
Benzene	0.005	3.8	NO	6.18E-07	2.9	NO
Formaldehyde	8.077	18	NO	9.22E-04	0.12	NO
Toluene	0.009	12,000	NO	9.99E-07	82.0	NO

<sup>1</sup> Puget Sound Clean Air Agency also provided an emission factor of 0.018 lb/ton for acrolein; however, the California Air Resources Board does not accept the source test methodology for acrolein. Until CARB approves a source test methodology for acrolein, BAAQMD is not evaluating risk based on acrolein emissions.

Since none of the chronic or acute toxic pollutant emissions exceed the trigger levels set in Regulation 2, Rule 5 on the date that the application was deemed complete by the District, a health risk assessment is not required for this project.

**PARTICULATE POLLUTANT EMISSIONS**

Estimate exhaust gas flow from the coffee roaster thermal oxidizer is estimated to be 388.18 scfm at 70°F (520 acfm at 250°F). At this flow rate, the estimated grain loading for the coffee roasting process is calculated as follows: (275.94 lb/yr PM10)\*(7000 grains/lb)/(8760 hrs/year)/(60 min/hour)/(388.17 dscf/min) = 0.0095 grains/dscf. This particulate weight emissions complies with the Regulation 6-310 requirement that no operations may exceed a particulate weight emission of 0.15 grains/dscf.

**OLD SOURCES: EMISSION REDUCTIONS**

The applicant is not planning to shut down any sources on start-up of the new source, therefore no on-site emission reductions were calculated.

**OFFSETS**

The total Potential to Emit for the facility after start-up of the new source will be less than 100 TPY for each criteria pollutant and less than 10 TPY for each ozone precursor (NO<sub>x</sub> and POC).

Since the facility does not have the potential to emit more than 10 tons per year of nitrogen oxide or precursor organic compounds emissions on a pollutant-specific basis, the facility is not subject to NO<sub>x</sub> or POC offsets under Regulation 2-2-302.

Since the facility will not have the potential to emit more than 100 tons per year of any criteria pollutant, the facility is not a "Major Facility" as defined in Regulation 2-1-203, and is not subject to PM<sub>10</sub> or SO<sub>2</sub> offsets under Regulation 2-2-303.

**CUMULATIVE EMISSIONS INCREASE**

Changes to the cumulative emissions inventory are as follows:

**TABLE 3 - CUMULATIVE EMISSION INCREASE INVENTORY**

	<b>Current Balance (tons/year)</b>	<b>Emission (Increases (tons/year)</b>	<b>On-Site Reductions (tons/year)</b>	<b>Off-sets from DSFB (tons/year)</b>	<b>New Total (tons/year)</b>
<b>PM</b>	<b>0.000</b>	<b>0.014</b>	<b>0.000</b>	<b>0.000</b>	<b>0.014</b>
<b>POC</b>	<b>0.000</b>	<b>0.095</b>	<b>0.000</b>	<b>0.000</b>	<b>0.095</b>
<b>NO<sub>x</sub></b>	<b>0.000</b>	<b>0.023</b>	<b>0.000</b>	<b>0.000</b>	<b>0.023</b>
<b>SO<sub>2</sub></b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
<b>CO</b>	<b>0.000</b>	<b>0.054</b>	<b>0.000</b>	<b>0.000</b>	<b>0.054</b>

## **BACT/TBACT REVIEW**

Under Regulation 2, Rule 2, any new source which results in an increase of 10 lbs/day or more of any criteria pollutant must be evaluated for adherence to BACT and TBACT control technologies. Based on Table 1 above, the coffee roaster will not emit more than 10 lbs/day of any criteria pollutant, and is therefore not subject to BACT and TBACT limitations.

## **PSD REVIEW**

Since the facility will not have the potential to emit more than 100 tons per year of any criteria pollutant, the facility is not a "Major Facility" as defined in Regulation 2-1-203, and is not subject to PSD permitting requirements under Regulation 2-2-304.

## **TITLE V REVIEW**

Since the facility will not have the potential to emit more than 100 tons per year of any criteria pollutant, the facility is not a "Major Facility" as defined in Regulation 2-1-203, and is not subject to Title V permitting requirements under Regulation 2-6-301.

## **PUBLIC NOTICE**

The proposed coffee roaster set is located within 1,000 feet of one or more schools providing educational services to students enrolled in kindergarten or grades 1 through 12. Under the California Health and Safety Code §42301.6 and Regulation 2-1-412, notification of the proposed new source must be mailed to the parents or guardians of all 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, in order to give these parties an opportunity to provide public comment on the proposed actions.

## **COMPLIANCE DETERMINATION**

The coffee roaster in this application is covered under ministerial exemption, Chapter 11.3 of the BAAQMD Permit Handbook. CEQA is not triggered for small coffee roasters based on Regulation 2-1-428, and based on the specific procedures, fixed standards, and objective measurements set out in Chapter 11.3 of the District's Permit Handbook.

The coffee roaster is subject to and will comply with **Regulation 6, "Particulate Matter, General Requirements,"** by restricting fuel use to natural gas only. From AP 42, Section 1-4, default PM<sub>10</sub> emission factor for natural gas combustion is estimated at 7.6 E-6 lb/dscf flue gas exhaust (0.006 gr/dscf flue gas exhaust) at 0% oxygen, which is below the limit of 0.15 gr/dscf flue gas exhaust set out in Regulation 6, Rule 1-310.

The coffee roaster is subject to and will comply with **Regulation 9, Rule 1, "Inorganic Gaseous Pollutants, Sulfur Dioxide,"** by restricting fuel use to natural gas only. Combustion of natural gas is expected to produce a SO<sub>2</sub> concentration of no more than 1 ppmv of SO<sub>2</sub><sup>2</sup>, thereby meeting the requirement of a maximum outlet concentration of 300 ppmv of SO<sub>2</sub> prescribed in Regulation 9, Rule 1-302.

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<sup>2</sup> SO<sub>2</sub> ppmv = (0.0006 lb/MM BTU)/(1 ft<sup>3</sup> SO<sub>2</sub>/10<sup>6</sup> sdtft<sup>3</sup> flue)/[(20.9)/(20.9-3)]/(385.546 ft<sup>3</sup> SO<sub>2</sub>/lb mol SO<sub>2</sub>)/(64.0644 lb SO<sub>2</sub>/lb mol SO<sub>2</sub>)/(8710 sdtft<sup>3</sup> flue/MM BTU) = 0.355 ppmv at 3% O<sub>2</sub>

The proposed coffee roaster is not subject to any **NESHAP** or **NSPS** requirements.

**PERMIT CONDITIONS**

Condition #26036 setting out the operating and recordkeeping requirements for operations at source S-1 shall be made a part of the source's Authority to Construct/Permit to Operate.

**RECOMMENDATION**

The proposed 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 California Health and Safety Code §42301.6 and Regulation 2-1-412.

I recommend that the District initiate a public notice, and consider any comments received before taking final action on issuance of an Authority to Construct for the following sources:

**S-1 Coffee Batch Roaster with Integral Cyclone and Catalytic Afterburner; Revelation 22K, 50 lb/hr, 0.3 MM Btu/hour**

subject to Condition #26036.

By \_\_\_\_\_ Date \_\_\_\_\_  
*Catherine Fortney*

COND# 26036 -----

1. The owner/operator shall not roast more than 212 tons of green coffee beans at Source S-1 during any consecutive 12-month period. [Basis: Cumulative Increase]
2. The owner/operator shall not use more than 26,280 therms of natural gas at S-1 during any consecutive twelve-month period. [Basis: Cumulative Increase]
3. The owner/operator shall abate S-1 Coffee Roaster at all times by A-1 Thermal Oxidizer. [Basis: Cumulative Increase]
4. The owner/operator shall maintain a minimum furnace temperature of at least 1200°F and maintain a residence time of at least 0.3 seconds in A-1 Thermal Oxidizer. Basis: Regulation 2-1-403]
5. The owner/operator shall ensure that A-1 Thermal Oxidizer is equipped with a temperature-measuring device capable of continuously measuring and recording the temperature in A-1 Thermal Oxidizer. This device shall be accurate to within 10 degrees Fahrenheit (10°F), and shall be maintained in accordance with the manufacturer's recommendations. This temperature monitor shall be used to determine compliance with the temperature requirements in Part 4 above. [Basis: Regulation 1-521]
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, including the following information:
  - a. Monthly records of the quantity of green coffee beans roasted at S-1 Coffee Roaster in pounds, and a summary of the quantity of green coffee bean used at S-1 Coffee Roaster on a rolling 12-month period.
  - b. Monthly records of natural gas usage at S-1 Coffee Roaster in therms, and a summary of the quantity of natural gas used at S-1 Coffee Roaster on a rolling 12-month period.
  - c. Records of continuous temperature measurements at A-1 Thermal Oxidizer whenever S-1 Coffee Roaster is in operation.The owner/operator shall retain these records for at least two years from date of entry and shall make these records available to District staff upon request. [Basis: Cumulative Increase]