DRAFT Engineering Evaluation
Postscript Collective, LLC
499 Jackson Street
San Francisco, CA 94111
Application No. 31782
Plant No. 25238

BACKGROUND

Postscript Collective is applying for an Authority to Construct and Permit to Operate for the following equipment:

S-1 Batch Coffee Roaster, Loring S-15 Falcon, 110 lb/hr Capacity with Integral Cyclone and Afterburner, 130,000 Btu/hr

The equipment will be located at 499 Jackson St., San Francisco, CA 94111

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 1200 to 1400 degrees F. The proposed burner is fueled by natural gas.

EMISSION CALCULATIONS

Basis: *Maximum Operating Rate:* 110 lbs/hr
Hours of Operation (365 days/yr, 10 hrs/day): 3,650 hrs/yr
Coffee Throughput: 401,500 lbs/yr
Roaster Firing Rate: 0.13 MMBtu/hr
Yearly Fuel Throughput: 474.5 MMBtu/yr
Heat Capacity: 1,020 MMBtu/MMscf natural gas

Criteria pollutant originate from two sources, batch roasting [1] and gas combustion [2]. A summary of the emissions from batch roasting and gas combustion is given in Table 1.

Table 1. Emissions from Roasting Operation and Natural Gas Combustion

Pollutant	Roasting Operation			Natural Gas Combustion			Total
	Green Bean Throughput (TPY)	Emission Factor [1] (lb/ton)	Emission Rate (lb/yr)	Fuel Usage (MMscf/yr)	Emission Factor [2] (lb/MMscf)	Emission Rate (lb/yr)	Emission Rate (lb/yr)
NO_X	N/A			0.465	100.0	46.52	46.52
POC	200.75	0.047	9.44	0.465	5.5	2.56	12.03
CO	200.75	0.55	110.41	0.465	84.0	39.08	149.90
PM_{10}	200.75	0.207	41.56	0.465	7.6	3.54	45.21
SO_2	N/A			0.465	0.6	0.28	0.28
Methane	N/A			0.465	2.3	1.07	1.07

[1] 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.

[2] Emission factors for NO_X and CO taken from AP-42 1.4-1 for small boilers (<100 MMBtu/hr). Emissions factor for SO_2, PM_{10}, POC and NPOC (Methane) taken from AP-42 Table 1.4-2.

[1] Filterable PM from batch roaster with thermal oxidizer (0.12 lb/ton), continuous cooler with cyclone (0.028 lb/ton), and green coffee bean screening, handling, and storage system with fabric filter (0.059 lb/ton)
[2] AP-42 Chapter 1.4 Natural Gas Combustion

Toxic Risk Screening

Both coffee roasting and gas combustion produce TAC emissions. 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 Air 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 their determined toxic emission factors are used in this calculation.

A District Policy[3] dated September 7, 2005 ("Emission Factors for Toxic Air Contaminants from Miscellaneous Natural Gas Combustion Sources") was referenced for the roaster's natural gas TAC emission factors (benzene, formaldehyde, and toluene).

Table 2. TAC Emissions from Roasting Operation and Natural Gas Combustion

TAC	Roasting Operation			Natural Gas Combustion			Total
	Green Bean Throughput (TPY)	Emission Factor (lb/ton)	Emission Rate (lb/yr)	Fuel Usage (MMscf/yr)	Emission Factor (lb/MMscf)	Emission Rate (lb/yr)	Emission Rate (lb/yr)
Formaldehyde	200.75	0.0008	0.1606	0.47	7.5E-02	0.0349	0.1955
Acetaldehyde	200.75	0.0005	0.1004	N/A			0.1004
Benzene	N/A			0.47	2.1E-03	0.0010	0.0010
Toluene	N/A			0.47	3.4E-03	0.0016	0.0016

Project Potential to Emit

Table 3 summarizes the criteria pollutant and TAC emissions from the new source S-1.

Table 3. New Source (S-1) Potential to Emit Review

Pollutant		Calculated Emissions			
		lb/hr	*lb/day*	*lb/yr*	*tons/yr*
Criteria Pollutants	**NO_X**	0.0127	0.127	46.52	0.023
	POC	0.0033	0.033	12.03	0.006
	CO	0.0411	0.411	149.90	0.075
	PM_{10}	0.0124	0.124	45.21	0.023
	SO_2	0.0001	0.001	0.28	0.000
	Methane	0.0003	0.003	1.07	0.001
Toxic Air Contaminants (TACs)	**Formaldehyde**	5.36E-04	5.36E-03	1.95E-01	9.77E-05
	Acetaldehyde	2.75E-04	2.75E-03	1.00E-01	5.02E-05
	Benzene	2.68E-06	2.68E-05	9.77E-04	4.88E-07
	Toluene	4.33E-06	4.33E-05	1.58E-03	7.91E-07

[3] http://www.baaqmd.gov/~/media/Files/Engineering/policy_and_procedures/TACEmFacfromNatGasCombustion.ashx

Plant Cumulative Emissions

S-1 located at 499 Jackson St., San Francisco, CA 94111 is a new facility. Therefore, there are no existing emissions at the plant. Table 4 summarizes the cumulative increase in criteria pollutant emissions that will result from the operation of S-1.

Table 4. Cumulative Emissions Increase (TPY)

Pollutant	Existing	New	Total
NO_X	0.000	0.023	0.023
POC	0.000	0.006	0.006
CO	0.000	0.075	0.075
PM_{10}	0.000	0.023	0.023
SO_2	0.000	0.000	0.000

HEALTH RISK ASSESSMENT

Table 5 summarizes the TAC emissions associated with the current application in comparison with the respective HRA trigger levels set forth in BAAQMD Regulation 2-5, Table 1. All TAC emissions are below the respective trigger levels. Therefore, an HRA is not required.

Table 5. Proposed TAC Emissions vs. HRSA Trigger Levels

TAC	Total Net Emissions		Trigger Levels		HRSA Triggered?
	Hourly (lb/hr)	Annual (lb/yr)	Acute (lb/hr)	Chronic (lb/yr)	(Yes/No)
Formaldehyde	5.36E-04	1.95E-01	2.4E-02	1.4E+01	No
Acetaldehyde	2.75E-04	1.00E-01	2.1E-01	2.9E+01	No
Benzene	2.68E-06	9.77E-04	1.2E-02	2.9E+00	No
Toluene	4.33E-06	1.58E-03	2.2E+00	1.6E+04	No

GRAIN LOADING RATE

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:* 3,650 hr/yr
Roaster emission point: 320 dscfm at 1,500 degrees F

[(0.0124 lb PM_{10}/hr) × (7000 grain/lb)] / [(60 min/hr) × (320 dscfm)] = 0.00466 grain/dscf

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

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, SO_2 or PM_{10}.

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 NOx. Based on the emissions displayed in Table 3, 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

Source S-1 will comply with Regulation 6, Rule 1, since its estimated particulate emissions of 4.66×10^{-3} grain/dscf are less than the limit of 0.15 grains/dscf.

The project is 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, Coffee Roasting)

The facility is located within 1,000 feet from of the outer boundary of Edwin and Anita Lee Newcomer school, and therefore is subject to the public notification requirements of Regulation 2-1-412.

The facility is not located within 1000 feet of an Overburdened Community as defined in Regulation 2-1-243.

PSD does not apply.

PERMIT CONDITIONS

Condition #00000 ----------

1. The owner/operator shall not roast more than 401,500 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 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-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]

RECOMMENTATION

Issue a Permit to Operate to Postscript Collective, LLC for the following equipment:

S-1 Batch Coffee Roaster, Loring S-15 Falcon, 110 lb/hr Capacity with Integral Cyclone and Afterburner, 130,000 Btu/hr

By: _____ Date: 8/4/2022

Sadegh Sadeghipour
Air Quality Engineer