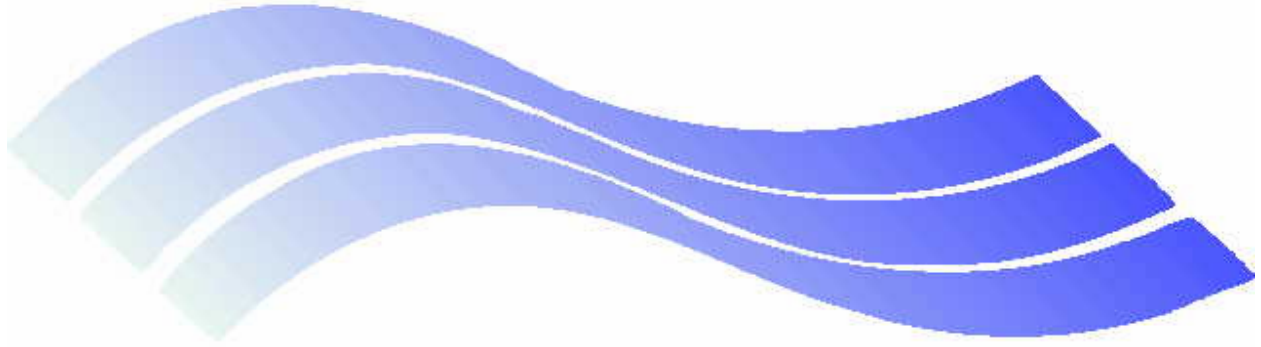


SACRAMENTO METROPOLITAN



AIR QUALITY
MANAGEMENT DISTRICT

Coffee Roasting Operations

Policy Manual

November 24, 2008

Updated: March 17, 2009

Coffee Roasting Operations

A. DESCRIPTION

Coffee beans roasting facilities in Sacramento County ranging from small gourmet coffee shops to medium-sized commercial operations with locally distributed products to large facilities with national product distribution that operate 24 hours per day. Coffee roasting refers to any operation involving the processing of green coffee beans into roasted coffee beans. There are generally two types of coffee roasters, drum type and floating bed roasters. Drum type roasters are the most common types used in the coffee roasting industry. The floating bed type roasters typically have a shorter roast time. The majority of roasters are equipped with natural gas fired burners to provide heat for the roasting process. The various types of equipment used in these roasting operations include: hoppers, chaff collectors, screens, roasters, cooling trays, cyclones and afterburners.

The odorous and visible emissions (smoke) resulting from the roasting process have the most obvious and direct impact on the public.

B. APPLICATIONS

1. Application Requirements

The majority of roasters are equipped with natural gas fired burners to provide heat for the roasting process. Rule 201 Section 112.2 (Combustion Devices) is generally used to determine permitting criteria. However, the majority of roasters commonly used in the smaller coffee shop industry have a maximum heat input capacity of less than 1 million BTU/hr. For these roasting operations, the permitting criteria for these roasters is based on two parameters: roaster type and batch capacity of the roaster.

- a) *Drum roasters with a cyclone* require a permit if:
 - 1) Drum capacity > 18 lbs green coffee beans/batch, or
 - 2) Combined heat input for the roaster burners plus afterburner \geq 1 million BTU/hr.
- b) *Floating bed roasters with a cyclone* require a permit if:
 - 1) Batch capacity > 12 lbs green coffee beans/batch, or
 - 2) Combined heat input for the roaster burners plus afterburner \geq 1 million BTU/hr.

2. Exemption

Coffee roasting equipment meeting the following criteria:

- a) *Drum roasters with a cyclone* do not require a permit if:
 - 1) Drum capacity \leq 18 lbs green coffee beans/batch, and
 - 2) Combined heat input for the roaster burners plus afterburner < 1 million BTU/hr.
- b) *Floating bed roasters with a cyclone* do not require a permit if:
 - 1) Batch capacity \leq 12 lbs green coffee beans/batch, and
 - 2) Combined heat input for the roaster burners plus afterburner < 1 million BTU/hr.

3. Data Forms

The following forms must be completed and submitted by the applicant when applying for an Authority to Construct and/or Permit to Operate any coffee roasting equipment (these forms are used by the District to characterize the type of process, size, flow rates, abatement devices, and exhaust stacks of the system):

- Form G100:** Application for Authority to Construct and/or Permit to Operate
- Form G101:** General Information Form
- Form FF100:** Coffee Roasting Form
- Form VI100:** Vapor Incinerator or Afterburner Form
- Form HRA 100:** Health Risk Assessment Information

4. Additional Information

- a) Site plan and plot plan, with dimensions, showing location of equipment.
- b) If required because of initial health risk screening, submit a risk reduction strategy. Information needed to evaluate the proposed risk reduction measure(s) shall include, but not limited to -- equipment layout with dimensions and location of process equipment; specification of the ventilation system (type of ventilation, rated air flow rate, exhaust stack diameter and stack height), and location of exhaust stack.

C. COMPLETENESS DETERMINATION

An application is deemed complete with the submittal of the following information:

- 1. Completed application Forms G100, G101, FF100, VI100, and HRA 100 with the original signature of the owner/proprietor or responsible officer of the company.
- 2. Applicable permit fee in accordance with Section D - Fees.
- 3. Any additional information that may be requested in order to perform a health risk assessment.

D. FEES

1. New Coffee Roasting Process

Every applicant for an Authority to Construct a new coffee roasting process shall pay at least one half of the initial permit fee specified in Rule 301, Section 308 upon filing the application. Prior to issuance of a Permit to Operate, the applicant shall pay the remaining unpaid portion of the initial permit fee, if applicable. Permit fee for any coffee roasting process will be based on **Schedule 2** [Rule 301, Section 308.3] where the rating is dependent on the cumulative total rated heat input of all burners in the equipment (roaster plus afterburner).

2. Modification of Existing Coffee Roasting Process

When an application is filed for a permit involving modification to existing equipment – either alteration resulting in a change to the existing equipment or a revision of conditions on a permit to operate – the applicant shall pay a permit fee based on Rule 301, Section 306.2.

3. Change of Location or Ownership of Coffee Roasting Process

When an application is filed for a permit because the equipment has been moved to a new location, or ownership has been transferred from one person to another, the applicant shall pay a permit fee equivalent to the permit renewal fee specified in Rule 301, Section 303.

4. APC Afterburner

When a coffee roasting process is permitted with an APC afterburner, a separate application for Authority to Construct is required if the afterburner controls more than one roaster and the maximum heat input capacity of the afterburner is equal to or greater than 1 million BTU/hr.

- a) For an APC afterburner, the applicant shall pay at least one half of the initial permit fee specified in Rule 301, Section 308 upon filing the application. Prior to issuance of a Permit to Operate, the applicant shall pay the remaining unpaid portion of the initial permit fee, if applicable. Permit fee for any APC afterburner will be based on **Schedule 2** [Rule 301, Section 308.3] where the rating is dependent on the maximum heat input capacity of the afterburner.

5. Equipment Installed Without an Authority to Construct:

As per Section 302.1 of Rule 301, any person installing/operating regulated equipment without obtaining a permit from the SMAQMD first, will be required to pay permit renewal back fees for each year of unpermitted operation, to a maximum of 3 years, in addition to the initial permit fee.

E. REGULATIONS

Operation of any type of a coffee roasting process may be subject to some or all of the following rules and regulations.

1. SMAQMD Rules and Regulations

- a) Rule 201 - General Permit Requirements
This rule provides the procedure for the review of new sources and of the modification and operation of existing sources through the issuance of permits.
- b) Rule 202 - New Source Review
This rule provides the review of new and modified stationary air pollution sources and to provide mechanisms, including Best Available Control Technology (BACT) and emission offsets, by which authorities to construct such sources may be granted without interfering with the attainment or maintenance of ambient air quality standards.
- c) Rule 301 - Permit Fees – Stationary Source
This rule establishes fees to be charged to owners/operators of a stationary source required to obtain a permit.
- d) Rule 401 - Ringelmann Chart
This rule limits the discharge of air contaminants into the atmosphere by limiting visible emissions.
- e) Rule 402 - Nuisance
This rule protects the public's health and welfare from the emission of air contaminants, which constitute a nuisance.
- f) Rule 406 - Specific Contaminants
This rule limits emissions of sulfur compounds and combustion contaminants through establishment of emission concentration limitations.
- g) Rule 420 - Sulfur Content of Fuels
This rule limits the sulfur content of gaseous and liquid fuels.

2. State Regulation

- a) California Health & Safety Code §42301.6 -- Permit Approval: Powers & Duties of APCO:
Prior to approving an application for a permit to construct or modify a source which emits hazardous air pollutants, which source is located within 1,000 feet from a school site, the District must prepare a public notice. The notice must be sent to parent or guardians of children enrolled in any school located within 1/4 mile of the source and to each address within a radius of 1,000 feet of the source at least 30 days prior to taking final action on the application.

3. Federal Regulations

None applicable.

F. STANDARDS & REQUIREMENTS

The following standards and/or requirements must be met in order to obtain an Authority to Construct and/or a Permit to Operate:

1. SMAQMD Regulation 4 -- Prohibitory Rules

- a) Rule 401, Section 301: Visible emissions may not exceed No. 1 on the Ringelmann Chart or 20% opacity for more than three minutes in any one hour.
- b) Rule 402, Section 301: A person cannot discharge pollutants which cause injury, detriment, nuisance or annoyance to any considerable number of persons or which endanger the comfort, repose, health or safety of any such person, or which may cause damage to business or property.
- d) Rule 406, Section 302: Combustion contaminant concentration at point of discharge shall not exceed 0.1 grains per dry standard cubic foot of gas, corrected to 12% carbon dioxide.
- e) Rule 420, Section 301: Gaseous fuels shall have a sulfur content not to exceed 50 grains per 100 cubic feet of gaseous fuel calculated as hydrogen sulfide at standard conditions. Liquid or solid fuels shall have a sulfur content not to exceed 0.5% by weight. Standard CARB diesel complies with this requirement at 0.05% sulfur by weight (not expected to be used as a fuel source though).

2. Nuisance – Public Health

- a) Toxics Review (T-BACT):
 - Toxic-Best Available Control Technology is required for all sources that have combined emissions of toxic air contaminants exceeding 1 theoretical lifetime cancer cases per million individuals and/or exceeding a non-cancer health risk Hazard Index (HI) of 1.
 - T-BACT is required for the following situations: For a fuel operation that is located at a facility that has other emission sources with prior public health risk evaluations conducted by the SMAQMD and
 - Excess cancer risk for the project is greater than 1 in one million, and
 - Excess cancer risk for the entire facility is greater than 10 in one million.
- b) T-BACT Determinations:

T-BACT requirements are in general not triggered for coffee roasters. A determination will be made at the time of application if a particular project triggers the requirement and the mitigation needed.

3. SMAQMD Regulation 2 – Permits

a) Rule 202 – New Source Review

- 1) Best Available Control Technology (BACT) – Section 301 requires a new emissions unit or modification of an existing emissions unit to apply BACT if it would result in an increase in quarterly emissions and if the daily potential to emit meets or exceeds the levels specified in Section 302.1 and below:

Pollutant	BACT Trigger Level lb/day
Reactive Organic Compound, ROC	10
Nitrogen Oxides, NOx	10
Sulfur Oxides, SOx	10
Particulate Matter, PM10	10
Carbon Monoxide, CO	550

- 2) BACT is defined as the most effective emission control device, emission limit, or technique which has been required or used for the type of equipment. BACT determinations for coffee roasting operations is the following:
 - a) For Particulate Matter Emissions:
Typically, particulate matter emissions from the roaster, cooler, destoner, and green bean handling equipment are abated by high-efficiency cyclones. Because the majority of particulate matter emitted is larger than 100 microns in diameter, these cyclones are very effective in capturing the particulate matter emitted. Collection efficiencies range from 70% to 90% by weight.
 - b) For ROCs and (Odorous Oils):
Gaseous emissions from roasters are typically abated by catalytic or thermal oxidizers downstream of cyclones. When using an oxidizer, the following minimum requirements must be met:
 1. Achieve a minimum retention time of 0.3 second, and
 2. Achieve a minimum afterburner temperature of 1,200°F, to be reached in the final 5 minutes of the roast.

4. California Environmental Quality Act (CEQA)

The SMAQMD has developed a comprehensive permitting CEQA Guidance document. Project reviews conducted in accordance with the policy manuals contained therein (including this manual) have been determined to meet the CEQA criteria of ministerial and do not require additional CEQA review.

In the event a project falls outside the scope of this policy manual (for example a new BACT determination or other situation already described within the CEQA guidance document), the project shall follow the steps for CEQA review as detailed in the guidance document."

K. EMISSIONS CALCULATION

Typically, particulate matter emissions from the roaster, cooler, destoner, and green bean handling equipment are abated by high-efficiency cyclones. Because the majority of particulate matter emitted is larger than 100 microns in diameter, these cyclones are very effective in capturing the particulate matter emitted. Collection efficiencies range from 70% to 90% by weight.

Gaseous emissions from roasters are typically abated by catalytic or thermal oxidizers downstream of cyclones. Recirculating roasters have reduced emissions since they redirect a portion of the roaster exhaust back through the burners, resulting in the oxidation of some of the pollutants.

The roasting of coffee beans results in the emission of particulate matter, volatile organic compounds, organic acids, and natural gas combustion products. Green coffee beans contain a wide variety of chemical compounds including proteins, fats, sugars, dextrin, cellulose, caffeine, and organic acids. Some of these compounds volatilize, oxidize, or decompose as part of the roasting process. Consequently, toxic compounds such as aldehydes (as formaldehyde), organic acids (as acetic acid) and acrolein are emitted as a result of the coffee roasting process.

The following emission factors can be applied to coffee roasters. In the case of large continuous roasters, manufacturer's guaranteed emission rates should be utilized if available.

1. Emission Factors for Coffee Roasters

Source	Particulate Matter (a) (lb/ton)	PM10 (lb/ton)	ROC (lb/ton)	Formaldehyde (lb/ton)	Acrolein (lb/ton)
Green Bean Handling & Storage	1.18	0.73 (b)	NA	NA	NA
Batch Roaster	2.4	1.49 (b)	1.51 (e)	1.5 (d)	0.0097 (d)
Batch Roaster abated by Thermal Oxidizer	0.12	0.12 (c)	0.151 (e)	0.15 (d)	0.00097 (d)
Continuous Roaster	0.66	0.41 (b)	1.14 (a)	1.133 (f)	0.00733 (f)
Continuous Roaster abated by Thermal Oxidizer	0.192	0.192 (c)	0.01 (a)	0.00994 (f)	0.000064 (f)

- a) Taken from EPA AP-42, Chapter 9.13, 9/95. Uncontrolled Batch Roaster PM emission factor is derived from the controlled emission factor with an oxidizer and an 95% by weight control efficiency.
- b) The CARB PM10 manual indicates a PM10 fraction of 62% in PM for coffee roasting operations.
- c) Assume all Particulate matter from Thermal Oxidizer is PM10.

- d) The Formaldehyde and Acrolein emission factors for a Batch Roaster controlled by a thermal oxidizer are derived from a Starbucks stack test and 1972 Emission Study by the Food and Ag. Industry, provided by Puget Sound CAA. The uncontrolled emission factor is derived assuming that the thermal oxidizer can achieve a minimum control efficiency of 90%.
- e) The ROC emission factors are based on the combined Formaldehyde and Acrolein emission factors.
- f) The Formaldehyde and Acrolein emission factors are based on the same ratios for a Batch Roaster.

2. Emission Factors for Natural Gas Combustion

POLLUTANT	EMISSION FACTOR (A) (lb/mmcf)
ROC	5.5
NOx	100
SOx	0.6
PM10	7.6
CO	84

- a) The emission factors are derived from AP-42, Tables 1.4-1,2 (7/98).

L. RISK ASSESSMENT

The District has the authority and responsibility to protect the public from the discharge of air contaminants or other materials, which endanger health and safety. Hence, the Supplemental Risk Assessment Guidelines for New and Modified Stationary Sources was issued in December 2000.

Any new or modified stationary sources are evaluated if they emit toxic air contaminants included under:

1. All toxic air contaminants listed by the California Air Resources Board pursuant to California Health and Safety Code, Section 39662b.
2. Substances listed as hazardous air pollutants pursuant to subsection (b) of Section 12 of the Federal Act (42 U.S.C. Sec 7412(b)).

The District's *Supplemental Risk Assessment Guidelines for New and Modified Stationary Sources [December 2000]* provides health risk thresholds as shown below:

Excess Cancer Risk	Action Required
≤ 0.1 per million	Exempt from toxic review.
> 0.1 per million but ≤ 1 per million	No significant risk; No action required.
> 1 per million but ≤ 10 per million	Acceptable risk but must provide TBACT
> 10 per million	Denial of permit.

A new or modified coffee roasting facility is acceptable if the excess cancer risk associated with the toxic emissions are less than or equal to 10 per million [10E-06] based on a lifetime exposure of 70 years and Toxic Best Available Control Technology (TBACT) has been applied. If the incremental cancer risk is greater than 10 per million but less than or equal to 100 per million and TBACT has been provided, the applicant shall propose a reasonable risk reduction strategy to reduce the potential risk to an acceptable level.

TBACT is similar to BACT, but applies to any new or modified source of toxic air pollutants which have health risks that exceed the specified levels above. Since the toxic pollutants of concern (Formaldehyde and Acrolein) are both ROCs, the TBACT determination for coffee roasting operation will be similar to the BACT standard. Therefore, TBACT is an from roasting operations are typically abated by catalytic or thermal oxidizers downstream of cyclones. When using an oxidizer, the following minimum requirements must be met:

1. Achieve a minimum retention time of 0.3 second, and
2. Achieve a minimum afterburner temperature of 1,200°F, to be reached in the final 5 minutes of the roast.

M. ENGINEERING EVALUATION [SAMPLE]

Refer to Exhibit 'A'.

N. PERMIT TO OPERATE [SAMPLE]

Refer to Exhibit 'B'.

Exhibit A

Sample Engineering Evaluation Coffee Roasting Operations

**AIR QUALITY
MANAGEMENT DISTRICT**

AUTHORITY TO CONSTRUCT EVALUATION

APPLICATION NO.:	A/C 66666
DATE:	December 1, 2007
EVALUATED BY:	Engineer 1

FACILITY NAME: JAVA SLAVE, INC.

LOCATION: 8000 COFFEE WAY, SACRAMENTO

PROPOSAL: COFFEE BEAN ROASTER EQUIPPED WITH AN AFTERBURNER

INTRODUCTION: The Java Slave, Inc. is proposing to install a coffee roaster equipped with an afterburner (A/C 66666). The roaster burner and the afterburner are fired on natural gas.

EQUIPMENT DESCRIPTION:

Coffee Bean Roaster -

Make - Primo
Model - PRI-50
Serial No. - 514
Roaster Burner - 144,000 Btu/Hr (Nat. Gas)
Capacity - 50 lbs/batch

Afterburner -

Make - U.S. Roaster Corp.
Model - 18/23
Burner - 1,000,000 Btu/Hr (Nat. Gas)
Temp. In - 250°F - 300°F
Temp. Out - 1,300°F - 1500°F
Burner Chamber Area - 39.1 cu. ft. (84" L x 32" D)

CONTROL EQUIPMENT EVALUATION: An afterburner is installed to control the odors and fumes from the coffee roasting operation. The afterburner is designed to maintain a 1,300°F temperature and a retention time of 1.4 seconds, which is sufficient to destroy the odors and fumes (AP-40 pg. 517, 1992). The minimum required burner capacity to achieve these conditions is 596,884 Btu/Hr (see enclosed calculations).

PROCESS RATE/FUEL USAGE:

Roast -150 lb/hr (maximum @ 3 batches/hour)

Roaster Fuel Usage - 240.8 C.F. Natural Gas/day

Afterburner Fuel Usage - 2,000 C.F. Natural Gas/day

OPERATING SCHEDULE: 12 hours/day, 5 days/week, 52 weeks/year.

EMISSIONS CALCULATIONS:

A. HISTORIC POTENTIAL TO EMIT FOR THE EMISSIONS UNITS: This is a new emission unit. Therefore, the historic potential to emit is equal to zero.

B. PROPOSED POTENTIAL TO EMIT FOR THE EMISSIONS UNIT:

Roasting/Afterburner Process

POLLUTANT	EMISSION FACTOR (A) (lb/ton)	DAILY EMISSIONS (B) (lbs/day)	QUARTERLY EMISSIONS (C) (lbs/quarter)
ROC	0.150971	0.272	25
PM10	0.12	0.22	20

(A) The PM10 and CO emission factors are derived from AP-42 Tables 9.13.2-1, 2 (9/95). The ROC emission factor is derived from a Starbucks stack test and 1972 Emission Study by the Food and Ag. Industry, provided by Puget Sound CAA.

(B) The daily emissions are based on 150 lb/hour of green coffee beans processed and 24 hours/day.

(C) The quarterly emissions are based on 92 days/qtr.

Natural Gas Combustion (Roaster & Afterburner – 1.144 mmBTU/hr)

POLLUTANT	EMISSION FACTOR (A) (lb/mmcf)	DAILY EMISSIONS (B) (lbs/day)	QUARTERLY EMISSIONS (C) (lbs/quarter)
ROC	5.5	0.1	14
NOx	100	2.7	249
SOx	0.6	0.0	1
PM10	7.6	0.2	19
CO	84	2.3	209

(A) The emission factors are derived from AP-42, Tables 1.4-1,2 (9/98).

(B) The daily emissions are based on maximum usage (1,144 cf/hour and 24 hours/day natural gas used).

(C) The quarterly emissions are based on 92 days/qtr.

C. CALCULATION OF BACT TRIGGER:

NEI (BACT) = Proposed Potential to Emit - Historic Potential to Emit

MPE = Maximum Potential Emissions on any day (24 hr/day)

Roaster & Afterburner

Pollutant	NEI (BACT) lb/Qtr	Is NEI (BACT) >0 ?	MPE lb/Day	BACT Trigger lb/day	Is BACT Required?
ROC	39	Yes	0.2	> 10	No
NOx	249	Yes	2.7	> 10	No
SOx	2	Yes	0.0	> 10	No
PM10	39	Yes	0.4	> 10	No
CO	209	Yes	2.3	> 550	No

D. CALCULATION OF OFFSET TRIGGER FOR ROC AND NOx:

Permit No.	Emissions Unit	Potential to Emit, lb/qtr	
		NOx	ROC
66666	Coffee Roaster with Afterburner	249	39
Total		249	39
Trigger Level		≥5,000	≥5,000

E. CALCULATION OF OFFSET TRIGGER FOR SOx, PM10, AND CO:

Permit No.	Emissions Unit	Potential to Emit, lb/qtr		
		SOx	PM10	CO
66666	Coffee Roaster with Afterburner	2	39	209
Total		2	39	209
Trigger Level		≥13,650	≥7,500	≥49,500

F. CALCULATION OF EMISSION OFFSETS FOR ROC AND NOx: No offset trigger levels are exceeded. Offsets are not required.

G. CALCULATION OF EMISSION OFFSETS FOR SOx, PM10 AND CO: No offset trigger levels are exceeded. Offsets are not required.

COMPLIANCE WITH RULES AND REGULATIONS:

A. H&S § 42301.6 (AB 3205) COMPLIANCE: The roaster is not located within 1,000 feet from the outer boundary of a school site. Therefore the public noticing requirements of H&S Code § 42301.6 does not apply.

B. NSR COMPLIANCE:

RULE 202 - NEW SOURCE REVIEW

Section 301 – BACT BACT is not triggered for any pollutant.

Section 302 – Offsets The increase in the criteria pollutant emissions are less than the applicable emission offset triggers. Therefore, emission offsets are not required.

Section 307 – Denial, Failure to Meet CEQA The SMAQMD has developed a comprehensive permitting CEQA Guidance document. Project reviews conducted in accordance with the policy manuals contained therein have been determined to meet the CEQA criteria of ministerial and do not require additional CEQA review.

This project falls within the scope of the IC Engine permitting manual and has been determined to be ministerial. No further review is required.

Sections 405-408 – CARB, EPA, and Public Notification:

No emissions from this exceed the exemption level specified in Rule 202, Section 112. Therefore, a CARB, EPA, and public review are unnecessary.

C. PSD COMPLIANCE: NA

D. PROHIBITORY RULE COMPLIANCE

RULE 401 RINGELMANN CHART - The source is subject to the 20% opacity limitation of this rule. The afterburner should help alleviate any visible emissions. The source is expected to be in compliance.

RULE 402 NUISANCE - With the afterburner operating properly, the facility should have no problems preventing any nuisance complaints. A health risk assessment for the formaldehyde and acrolein emissions was made to determine the cancer health risk and the chronic health risk from this operation. Based on a maximum annual production rate of 207 Tons/year, the Cancer Health Risk is 0.99 in a million and the Chronic Hazard Index is 0.01. At these levels, TBACT is not triggered and the health risks are acceptable and are within the District's *Supplemental Risk Assessment Guidelines for New and Modified Stationary Sources [December 2000]*.

RULE 406 SPECIFIC CONTAMINANTS - The facility should comply with the 0.1 grain per dry standard cubic foot, calculated to 12% CO₂, limitation of this rule.

RULE 420 SULFUR CONTENT OF FUELS - This rule limits the sulfur content of all gaseous fuels to less than 50 grains per 100 cubic foot, calculated as hydrogen sulfide (H₂S). Pipeline natural gas for the project will have a sulfur content of 0.22 grains per 100 cubic foot. Therefore, the thermal oxidizer should comply with this section of the rule.

E. NSPS COMPLIANCE: N/A

F. NESHAP COMPLIANCE: N/A

RECOMMENDATIONS: Issue Authority to Construct subject to the following conditions to assure compliance with all applicable rules and regulations:

See A/C 66666.

PREPARED BY: Engineer 1 **DATE:** December 1, 2007

REVIEWED BY: _____ **DATE:** _____

Exhibit B

Sample Permit to Operate Coffee Roasting Operations

PERMIT TO OPERATE

ISSUED TO: **JAVA SLAVE, INC.**

EQUIPMENT LOCATION: 1000 COFFEE WAY, SACRAMENTO, 95814

PERMIT NO.	EQUIPMENT DESCRIPTION
66666	COFFEE BEAN ROASTER, PRIMO, MODEL PRI-50, S.N. 666, 0.144 MMBTU/HR, 50 LBS/BATCH CAPACITY. EQUIPPED WITH AN AFTERBURNER (U.S. ROASTER CORP., MODEL 18/23, 1.0 MMBTU/HR BURNER CAPACITY).

SUBJECT TO THE FOLLOWING CONDITIONS:

GENERAL

1. THE EQUIPMENT SHALL BE PROPERLY MAINTAINED.
2. THE AIR POLLUTION CONTROL OFFICER AND/OR AUTHORIZED REPRESENTATIVES, UPON THE PRESENTATION OF CREDENTIALS SHALL BE PERMITTED:
 - A. TO ENTER UPON THE PREMISES WHERE THE SOURCE IS LOCATED OR IN WHICH ANY RECORDS ARE REQUIRED TO BE KEPT UNDER THE TERMS AND CONDITIONS OF THIS PERMIT TO OPERATE, AND
 - B. AT REASONABLE TIMES TO HAVE ACCESS TO AND COPY ANY RECORDS REQUIRED TO BE KEPT UNDER TERMS AND CONDITIONS OF THIS PERMIT TO OPERATE, AND
 - C. TO INSPECT ANY EQUIPMENT, OPERATION, OR METHOD REQUIRED IN THIS PERMIT TO OPERATE, AND
 - D. TO SAMPLE EMISSIONS FROM THE SOURCE OR REQUIRE SAMPLES TO BE TAKEN.
3. THIS PERMIT DOES NOT AUTHORIZE THE EMISSION OF AIR CONTAMINANTS IN EXCESS OF THOSE ALLOWED BY DIVISION 26, PART 4, CHAPTER 3, OF THE CALIFORNIA HEALTH AND SAFETY CODE OR THE RULES AND REGULATIONS OF THE AIR QUALITY MANAGEMENT DISTRICT.
4. A LEGIBLE COPY OF THIS PERMIT SHALL BE MAINTAINED ON THE PREMISES WITH THE EQUIPMENT.

EMISSIONS LIMITATIONS

5. THE AFTERBURNER SHALL NOT DISCHARGE INTO THE ATMOSPHERE ANY VISIBLE AIR CONTAMINANTS OTHER THAN UNCOMBINED WATER VAPOR, FOR A PERIOD OR PERIODS AGGREGATING MORE THAN THREE MINUTES IN ANY ONE HOUR, WHICH ARE AS DARK OR DARKER THAN RINGELMANN NO. 1 OR EQUIVALENT TO OR GREATER THAN 20% OPACITY.
6. THE EMISSIONS FROM COFFEE BEAN ROASTING SHALL NOT EXCEED THE FOLLOWING LIMITS:

POLLUTANT	EMISSION FACTOR (A) LB/TON	MAXIMUM ALLOWABLE EMISSIONS	
		POUNDS/QUARTER (B)	POUND/YEAR (C)
ROC	0.150971	25	31
PM10	0.12	20	2?

(A) ROC EMISSION FACTOR IS DERIVED FROM THE PUGET SOUND APCD SOURCE TEST (WITH AFTERBURNER, PERFORMED ON ??/??/???) THE EMISSION FACTOR FOR PM10 IS DERIVED FROM AP-42 TABLES 9.13.2-1, 2 (9/95).

- (B) THE QUARTERLY EMISSIONS ARE BASED ON 150 LB/HOUR OF GREEN COFFEE BEANS PROCESSED, 24 HOURS/DAY, 92 DAYS/QUARTER AND THE EMISSION FACTORS LISTED IN THIS TABLE.
- (C) THE ANNUAL EMISSIONS ARE BASED ON 207 TONS/YEAR OF GREEN COFFEE BEANS PROCESSED.

THE EMISSIONS FROM NATURAL GAS COMBUSTION SHALL NOT EXCEED THE FOLLOWING LIMITS (ROASTER AND AFTERBURNER COMBINED):

POLLUTANT	EMISSION FACTOR (A) LB/MMCF	MAXIMUM ALLOWABLE EMISSIONS (B) POUNDS/QUARTER
ROC	5.5	14
NO _x	100	297
SO _x	0.6	2
PM10	7.6	19
CO	84	209

- (A) EMISSION FACTORS WERE OBTAINED FROM AP-42, TABLES 1.4-1, 2 (7/98).
- (B) EMISSIONS BASED ON COMBINED MAXIMUM FUEL USAGE (1,144 CF/HOUR), 24 HOURS/DAY OF NATURAL GAS USED, 92 DAYS/QUARTER AND THE EMISSION FACTORS LISTED IN THIS TABLE.

EQUIPMENT OPERATION

7. THE ROASTER AND AFTERBURNER SHALL USE ONLY NATURAL GAS OR PROPANE AS A FUEL.
8. THE AFTERBURNER SHALL OPERATE DURING THE FINAL 5 MINUTES OF A ROASTING CYCLE.
9. THE COFFEE ROASTING OPERATION SHALL NOT EXCEED THE FOLLOWING LEVELS:

EQUIPMENT	MAXIMUM ALLOWABLE GREEN COFFEE BEAN ROASTED (TONS/YEAR)
ROASTER	207

10. THE AFTERBURNER SHALL HAVE A TEMPERATURE GAUGE WITH READOUT EASILY ACCESSIBLE TO OPERATING PERSONNEL.
11. A TEMPERATURE OF NOT LESS THAN 1,100°F MUST BE REACHED AND MAINTAINED DURING THE LAST 5 MINUTES OF THE ROASTING CYCLE WHEN THE EMISSION OF SMOKE AND ODOR IS AT ITS MAXIMUM.

RECORD KEEPING

12. THE FOLLOWING RECORDS SHALL BE CONTINUOUSLY MAINTAINED ONSITE FOR THE MOST RECENT THREE YEAR PERIOD AND SHALL BE MADE AVAILABLE TO THE AIR POLLUTION CONTROL OFFICER UPON REQUEST. QUARTERLY RECORDS SHALL BE MADE AVAILABLE WITHIN 30 DAYS FOLLOWING THE END OF THE QUARTER.

FREQUENCY	INFORMATION TO BE RECORDED
WHEN OPERATED	AFTERBURNER TEMPERATURE DURING THE LAST 5 MINUTES OF EACH ROASTING CYCLE.
YEARLY	TOTAL WEIGHT OF COFFEE BEANS ROASTED (TONS/YEAR).

YOUR APPLICATION FOR THIS AIR QUALITY PERMIT TO OPERATE WAS EVALUATED FOR COMPLIANCE WITH SACRAMENTO AIR QUALITY MANAGEMENT DISTRICT (AQMD), STATE AND FEDERAL AIR QUALITY RULES. THE FOLLOWING LISTED RULES ARE THOSE THAT ARE MOST APPLICABLE TO THE OPERATION OF YOUR EQUIPMENT. OTHER RULES MAY ALSO BE APPLICABLE.

<u>AQMD RULE NO.</u>	<u>RULE TITLE</u>
201	GENERAL PERMIT REQUIREMENTS
202	NEW SOURCE REVIEW
301	STATIONARY SOURCE PERMIT FEES
401	RINGELMANN CHART
402	NUISANCE
404	PARTICULATE MATTER
406	SPECIFIC CONTAMINANTS
420	SULFUR CONTENT OF FUELS

IN ADDITION, THE CONDITIONS ON THIS PERMIT TO OPERATE MAY REFLECT SOME, BUT NOT ALL, REQUIREMENTS OF THESE RULES. THERE MAY BE OTHER CONDITIONS THAT ARE APPLICABLE TO THE OPERATION OF YOUR EQUIPMENT. FUTURE CHANGES IN PROHIBITORY RULES MAY ESTABLISH MORE STRINGENT REQUIREMENTS WHICH MAY SUPERSEDE THE CONDITIONS LISTED HERE.

FOR FURTHER INFORMATION PLEASE CONSULT YOUR AQMD RULEBOOK OR CONTACT THE AQMD FOR ASSISTANCE.