PUGET SOUND
Clean Air Agency

Documentation for General Order of Approval for Coffee Roasters

1. Introduction and Summary

The Puget Sound Clean Air Agency (Agency) intends to create a General Order of Approval for coffee roasters with a rated capacity below 26.5 lb/batch (12 kg/batch) green coffee. The purpose of this document is to provide documentation for the development of the General Order of Approval as per WAC 173-400-560.

Coffee roasters convert raw "green" coffee beans into roasted saleable product. The facilities eligible for this General Order are area sources, meaning sources with facility-wide emissions below Title V "major source" levels (see WAC 173-401-200(19)).

The Agency currently issues case-by-case permits known as Notice of Construction (NOC) Orders of Approval for the installation of coffee roasters. The expected coffee roasting at these facilities ranges from 8 tons green beans per year up to 172 tons green beans per year[1]. Agency staff reviewed numerous Notice of Construction Orders of Approval issued between 2017 and September 2021 and noted that about one-half of the approvals were issued for roasters with a capacity below 26.5 pounds per batch.

The purpose of the General Order of Approval is to streamline the process such that case-by-case permit review is not necessary for each commercially manufactured coffee roaster, if it meets the requirements of the General Order of Approval. Additionally, since roasters often occupy leased space and since roasting equipment is relatively portable, coffee roasting businesses may relocate more often than other source categories. A General Order could potentially help facilitate the relocation process by alleviating the need to go through the entire permitting process for the new location. Roasters that cannot meet the conditions of the General Order of Approval may apply for case-by-case permits through the Notice of Construction program in Agency Regulation I, Section 6.03.

The General Order of Approval contains specific conditions that each roaster must meet. The complete requirements are detailed in Section 7 below, but the primary requirements are:

- Coffee roaster design capacity is under 26.5 lb/batch (12 kg/batch)
- Daily roasting production is limited to 950 lb/day green coffee.
- Emissions from the roaster and the cooling tray must be controlled by natural gas-fired, electric, or propane-fired thermal or catalytic oxidizer meeting minimum temperature and residence time requirements.
- Coffee roaster design utilizes chaff cyclone.
- Exhaust from the roaster and cooling tray are routed through vertical, unobstructed stack a minimum of 3 feet above the building roofline.

[1] Applicants specified their anticipated actual green coffee throughput within coffee roasting NOC applications for Orders of Approval issued between January 2017 and September 2021. The 8 ton/year – 172 ton/year range represented the lowest and highest anticipated actual production specified within those applications.

- The catalytic or thermal oxidizer must reach minimum operating temperature from the time the beans reach 270°F until the completion of the cooling process or for such additional time to achieve zero visible emissions.
- Thermocouples must be installed serving the catalytic or thermal oxidizer and the roaster and must meet ongoing calibration/testing/replacement requirements.
- The owner or operator must perform quarterly visible emission checks and complete associated recordkeeping to demonstrate compliance with a zero visible emissions requirement.

Once the General Order of Approval is adopted, owners or operators can submit an application for coverage of each new coffee roaster under the General Order of Approval. The Agency will review each application. If staff agrees that the roaster meets the requirements for coverage, staff will issue a General Order of Approval for the roaster and send the approval to the applicant within 30 days of the receipt of the application.

2. Authority to Create a General Order

WAC 173-400-560 specifies the applicability criteria under which a permitting authority may issue a General Order of Approval. It states:
"(1) …A General Order of Approval shall identify criteria by which an emission unit or source may qualify for coverage under the associated General Order of Approval and shall include terms and conditions under which the owner or operator agrees to install and/or operate the covered emission unit or source. At a minimum, these terms and conditions shall include:
(a) Applicable emissions limitations and/or control requirements;
(b) Best available control technology (BACT);
(c) Appropriate operational restrictions, such as:
    (i) Criteria related to the physical size of the unit(s) covered;
    (ii) Criteria related to raw materials and fuels used;
    (iii) Criteria related to allowed or prohibited locations; and
    (iv) Other similar criteria determined by a permitting authority;
(d) Monitoring, reporting and recordkeeping requirements to ensure compliance with the applicable emission limits and control requirements;
(e) Appropriate initial and periodic emission testing requirements;
(f) Compliance with chapter 173-460 WAC, and WAC 173-400-112(2)(c) or 173-400-113(3) as applicable;
(g) Compliance with 40 CFR Parts 60, 61, 62, and 63; and
(h) The application and approval process to obtain coverage under the specific General Order of Approval."

Section 6 outlines how the above criteria are met for the Coffee Roaster General Order of Approval.

3. Registration & Emission Reporting

Each coffee roaster is required to register with the Agency, as per Regulation I, Section 5.03(a). As registered sources, facilities must pay annual registration and emission fees in accordance with Section 5.07 of Agency Regulation I.

Some large coffee roasting operations may need to report annual emissions under Agency Regulation I, Section 5.05(b) depending on the facility-wide actual emissions. Reporting will be required if facility-wide emissions exceed the following thresholds:

- 2.5 tons/yr (5,000 lb/yr) any single hazardous air pollutant (HAP)
- 6.25 tons/yr (12,500 lb/yr) total HAP
- 25.0 tons/yr (50,000 lb/yr) VOC, CO, NO_X, PM_{10}, $PM_{2.5}$, or SO_2

Emissions of VOC, CO, NO_X, PM_{10}, $PM_{2.5}$, and SO_2 are discussed in detail later in this report. For a 26.5 lb/batch roaster with emissions from both the roaster and the cooling tray routed to a thermal or catalytic oxidizer, VOC emissions are estimated at 8 lb/yr, CO emissions are estimated at 378 lb/yr, PM_{10} emissions are estimated at 31 lb/yr, $PM_{2.5}$ emissions are estimated at 21 lb/yr, and NOX emissions are estimated at 463 lb/yr. These quantities are well below reporting thresholds.

Hazardous Air Pollutants (as defined in Section 112 of the Clean Air Act) and Toxic Air Pollutants (as defined in WAC 173-460-150) emissions are specifically discussed in Section 6f of this document. For a single roaster meeting the eligibility criteria of this General Order, total HAP emissions will be below the reporting threshold. The single HAP that may come closest to the 5000 lb/yr reporting threshold is formaldehyde. As discussed in Table 5 below, emissions of formaldehyde from a roaster could be as high as 18 lb/yr.

While criteria pollutant emissions and HAP emissions from a single roaster eligible for permitting under this General Order is below the reporting threshold, if the facility were to install additional roasters or other equipment, emissions could be above the reporting threshold.

4. State Environmental Policy Act

The State Environmental Policy Act (SEPA) applies to the issuance of the Coffee Roaster General Order of Approval. As part of the rule making for this General Order, the Agency will prepare a SEPA checklist and issue a SEPA threshold determination. The SEPA threshold determination will be made available for public review and comment during the 30-day public comment period for the General Order of Approval. The Agency will reconsider the threshold determination if warranted by the public comments.

The SEPA determination issued by the Agency is only for the coffee roasting equipment. It does not include the construction of the building in which the roaster will be housed. The building itself is evaluated by the local City or County with jurisdiction for the area. The Agency will rely on the City or County's review of the building.

5. Tribal Consultation

On November 21, 2019, the Agency's Interim Tribal Consultation Policy was adopted by the Board. Criteria requiring tribal consultation are listed in Section II.A of the policy and include establishment of a new air operating permit source, establishment of a new emission reporting source, modification of an existing emission reporting source to increase production capacity, or establishment or modification of certain equipment or activities. In addition, if the Agency receives an NOC application that does not meet the criteria in Section II.A but may represent similar types and quantities of emissions, the Agency has the discretion to provide additional consultation opportunities.

This project does not meet any of the criteria for consultation listed in Section II.A of the Agency's Interim Tribal Consultation Policy.

6. Compliance with General Order of Approval Requirements, WAC 173-400-560

Agency staff has performed a worst-case analysis at a non-specific site to determine the potential impacts of a coffee roaster. The analysis includes verifying that a coffee roaster allowed under this General Order of Approval will comply with all applicable requirements of Agency Regulations I, II, and III, WAC 173-400, WAC 173-460, and the Federal Clean Air Act. Organization of this section follows the WAC 173-400-560 criteria for issuing a General Order of Approval, which are listed in Section 2 of this document. Each of the following subsections summarizes how the criteria in WAC 173-400-560 are addressed and met.

a. WAC 173-400-560 Applicable Emission Limitations and/or Control Requirements

i. Particulate

A review of particulate emissions demonstrates that any coffee roaster allowed under the General Order of Approval will be able to comply with the following limits:

- Regulation I, Section 9.03(a) – Opacity is not to exceed 20%.
  Best Available Control Technology review, discussed in Section 6iv, requires roasters and cooling trays achieve zero visible emissions out of the exhaust stack. Use of thermal control (either catalytic oxidizer or thermal oxidizer) have historically been utilized and should meet this standard.

- Regulation I, Section 9.09 – Particulate matter from equipment used in a manufacturing process is not to exceed 0.05 gr/dscf. Emission calculations below indicate expected grain loading of 0.003 gr/dscf.

Emission Calculation Assumptions:

Hourly production: 91.2 lb green beans/hr (design maximum of Diedrich IR-12 26.5 lb/batch roaster)

PM emission factor for combined roaster and bean handling: 0.18 lb/ton green beans (AP-42)

Exhaust stack flowrate: 300 cfm (lower end of exhaust configurations for coffee roaster applications received 2017- September 2021 for roasters sized 26.5 lb/batch and below)

Annual PM emissions:

$$\frac{91.2\ lb\ green\ bean}{hr} \times \frac{1\ ton\ green\ beans}{2000\ lb\ green\ bean} \times \frac{0.18\ lb\ PM}{ton\ green\ bean} = 0.008 \frac{lb\ PM}{hr}$$

Grain loading *(Note that this calculation conservatively assumes the lowest observed exhaust flow rate with the highest possible particulate emissions.)*

$$\frac{0.008\ lb\ PM}{hr} \times \frac{7000\ gr}{lb} \times \frac{1\ min}{300\ ft^3} \times \frac{1\ hr}{60\ min} = 0.003 \frac{gr}{ft^3}$$

ii. Regulation I, Section 9.07 – Sulfur Dioxide Emission Standard

Regulation I Section 9.07 states that "It shall be unlawful for any person to cause or allow the emission of sulfur dioxide from any source in excess of 1,000 parts per million by volume on a dry basis, 1-hour average (corrected to 7% oxygen for fuel burning equipment and refuse burning equipment)".

Roasters and oxidizers will be required to utilize natural gas or propane for operation such that SO_2 emissions are estimated to be 0.00059 lb/MMBtu, corresponding to ~0.4 ppm @ 7% O_2 as converted below (assuming 7% O_2 in combustion exhaust):

$$0.00059\ \frac{lb\ SO_2}{MMBtu} \times \frac{1}{8760} \frac{MMBtu}{dscf} \times \frac{385}{64.1\ lb/lbmol} = 0.4\ ppm$$

iii. Regulation I, Section 9.11 – Emission of Air Contaminant: Detriment to Person or Property

Regulation I Section 9.11 states that "it is unlawful for any person to cause or allow the emission of any air contaminant in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property."

Section 9.11(b) states that the Agency may take enforcement action with respect to odors if the following conditions are documented:
1) Agency representative documents a level 2 or greater odors (as defined in the rule), and
2) An affidavit of a complaint regarding the odor is signed by a complainant, and
3) The odor can be traced back to the source.

There is potential for odor from coffee roasting facilities. The Best Available Control Technology (BACT) discussion for odor in Section 6iv requires roasters applying under this General Order utilize catalytic or thermal oxidizers for odor control. Oxidizers are highly effective at destroying odor-causing compounds and reducing odor from coffee roasting facilities. On-site inspection evaluations of roasters permitted between 2017 and September 2021 occurring during active roasts (evaluation 29378-4) have noted no odors. There are no identified coffee roaster odor complaints recorded in the PSCAA database between 2017 and 2021 for facilities with roasters of 26.5 lb/batch capacity or lower.

Because of the variable and subjective nature of meeting the requirements of Agency Reg. I Section 9.11(b), the primary tool for avoiding odor complaints is to require that emissions from both the roaster and the cooling tray be routed through the oxidizer. A General Order of Approval will not be issued unless the applicant provides information showing that all of these emissions will be properly controlled.

iv. Regulation I, 9.20 Maintenance of Equipment

Regulation I Section 9.20 requires that equipment and air pollution control equipment be maintained in good working order. Section 9.20(a) states "It shall be unlawful for any person to cause or allow the operation of any features, machines or devices constituting parts of or called for by plans, specifications, or other information submitted pursuant to Article 6 of Regulation I unless such features, machines or devices are maintained in good working order." Section 9.20(b) states "It shall be unlawful for any person to cause or allow the operation of any equipment as defined in Section 1.07 or control equipment not subject to Section 9.20(a) unless the equipment or control equipment is maintained in good working order."

In addition to any maintenance needed to keep the roaster, handling system, and thermal control device in good working order, this Order will require the regular calibration of thermocouples serving the roaster and oxidizer.

b. WAC 173-400-560 Best Available Control Technology (BACT)

A generalized compilation of case-by-case BACT and tBACT reviews for coffee roasters ≤26.5 lb/batch utilizing either thermal and catalytic oxidizers completed by PSCAA is the basis for the BACT and tBACT determination for this General Order.

Table 1 through Table 5 below summarize the BACT and tBACT determinations for similar PSCAA orders.

Table 1 PM BACT Similar PSCAA Orders

NOC Number	Date Issued	BACT/tBACT
11943	8/21/2020	No visible emissions are allowed to be emitted at any time from the roaster or cooling tray exhausts. Roaster and cooling tray emissions vented through thermal oxidizer
11875	12/11/19	
11815	8/27/19	
11694	1/24/19	
11642	12/10/18	
11719	3/26/19	No visible emissions are allowed to be emitted at any time from the roaster or cooling tray exhausts. Roaster and cooling tray emissions vented through catalytic oxidizer (operation within 600°F -900°F)
11566	9/18/18	
11632	9/13/18	
11367	7/10/17	
11487	12/6/17	

Table 2 VOC, Odor BACT & Acetaldehyde, Acrolein, Formaldehyde tBACT Similar PSCAA Orders

NOC Number	Date Issued	BACT/tBACT
11943	8/21/2020	Emissions will not exceed 0.047 lb/ton beans roasted Roaster and cooling tray emissions vented through thermal oxidizer
11875	12/11/19	
11815	8/27/19	
11694	1/24/19	
11642	12/10/18	
11719	3/26/19	Emissions will not exceed 0.047 lb/ton beans roasted Roaster and cooling tray emissions vented through catalytic oxidizer (operation within 600°F -900°F)
11566	9/18/18	
11632	9/13/18	
11367	7/10/17	
11487	12/6/17	

Table 3 NOx BACT Similar PSCAA Orders

NOC Number	Date Issued	BACT/tBACT
11875	12/11/19	Emissions shall not exceed 0.2 lb/MMBTU Proper operation and maintenance of the roaster burner and the oxidizer.
11815	8/27/19	
11694	1/24/19	
11367	7/10/17	
11719	3/26/19	Emissions shall not exceed 0.2 lb/MMBTU Proper operation and maintenance of the roaster burner and the oxidizer.
11566	9/18/18	
11632	9/13/18	
11367	7/10/17	
11487	12/6/17	

Table 4 CO BACT Similar PSCAA Orders

NOC Number	Date Issued	BACT/tBACT
11875	12/11/19	Emissions shall not exceed 0.4lb/MMBTU Proper operation and maintenance of the roaster burner and the thermal oxidizer.
11815	8/27/19	
11694	1/24/19	
11642	12/10/18	
11631	8/15/18	
11719	3/26/19	Emissions shall not exceed 0.4lb/MMBTU Proper operation and maintenance of the roaster burner and the catalytic oxidizer.
11566	9/18/18	
11632	9/13/18	
11367	7/10/17	
11487	12/6/17	

Table 5 SO_2 BACT Similar PSCAA Orders

NOC Number	Date Issued	BACT/tBACT
11875	12/11/19	Natural gas firing
11815	8/27/19	
11694	1/24/19	
11642	12/10/18	
11719	3/26/19	
11566	9/18/18	
11632	9/13/18	
11367	7/10/17	
11487	12/6/17	

Table 6 through Table 10 below summarize the BACT and tBACT determinations for similar coffee roasters in the jurisdictions of other regulatory agencies.

Table 6 PM BACT Other Regulatory Agencies

Agency	BACT
BAAQMD Coffee roasting 110,000 BTU/hr to 3.5 MM BTU/hr	• 0.01 gr/dscf [Achieved in Practice] • Natural gas firing with cyclone and afterburner (> 0.3 sec retention time at >1400F) [Typical Technology]
San Diego County Coffee Roasters	• Natural gas with cyclone and afterburner (0.3 sec retention time at 1200 degrees F)
South Coast Air Quality Management District Roaster < 110,000 BTU/hr	• Natural gas with cyclone and afterburner (≥0.3 second retention time at ≥ 1200 degrees F)

Table 7 VOC BACT Other Regulatory Agencies

Agency	BACT
BAAQMD Coffee roasting 110,000 BTU/hr to 3.5 MM BTU/hr	• VOC emissions ≤ 0.047 lb/ton beans roasted [Achieved in Practice]. Emission limit for VOC as a surrogate for TAPs and odor. • Afterburner (>0.3 sec. retention time at >1400F)[Typical Technology]
San Diego County Coffee Roasters	• Afterburner (0.3 sec retention time at 1200 degrees F)
South Coast Air Quality Management District Roaster < 110,000 BTU/hr	• Afterburner (≥0.3 second retention time at ≥ 1200 degrees F)

Table 8 NOx BACT Other Regulatory Agencies

Agency	BACT
BAAQMD Application 27373 (2-15-2018)	• 1.94 lb/ton green coffee [Achieved in Practice] • Natural Gas Firing[Typical Technology]
San Diego County Coffee Roasters	• Natural gas with heat recovery on afterburner exhaust to reduce fuel consumption
South Coast Air Quality Management District Roaster < 110,000 BTU/hr	• Natural gas with Heat Recovery on afterburner to reduce fuel consumption

Table 9 CO BACT Other Regulatory Agencies

Agency	BACT
BAAQMD Application 27373 (2-15-2018)	• 4.20 lb/ton green beans [Achieved in Practice] • Good combustion practice [Typical Technology]

Table 10 SO_2 BACT Other Regulatory Agencies

Agency	BACT
BAAQMD Coffee roasting 110,000 BTU/hr to 3.5 MM BTU/hr	• Natural Gas Firing [Achieved in Practice]

San Diego County Coffee Roasters	• Natural gas firing
South Coast Air Quality Management District Roaster < 110,000 BTU/hr	• Natural gas

Analysis:

Pollution emitted from roasting coffee beans includes particulate matter (PM), volatile organic compounds (VOC), air toxics, organic acids, odor, and natural gas combustion products. Several operations are sources of PM emissions, including the cleaning and destoning equipment, roaster and cooler. The roaster is the main source of gaseous pollutants, including alcohols, aldehydes, organic acids, and nitrogen and sulfur compounds. Because roasters are typically natural gas-fired, carbon monoxide (CO) and carbon dioxide (CO_2) emissions are expected as a result of fuel combustion as well as toxic air emissions associated with combustion of natural gas. Emissions from the grinding and packaging operations are not typically vented to the atmosphere.

Thermal or catalytic oxidizers are the most commonly installed emission control devices for coffee roasters.

- AP-42[2] discusses the use of both thermal oxidizers (afterburners) and thermal catalytic oxidizers to control gaseous emissions from coffee roasters. AP-42 Section 9.13.2 states that the desired operating temperature for thermal oxidizers is between 1200°F and 1500°F.
- BAAQMD, San Diego County, and SCAQMD require a residence time of at least 0.3 seconds from their respective BACT guidelines.
- Bay Area AQMD[3] discusses the use of thermal or catalytic oxidizer with a cyclone for coffee roasters in the 110,000 Btu/hr – 3.5MMBTU/hr size range, and identifies the afterburner as achieved in practice.
- PSCAA has compiled coffee roasting afterburner stack test results[4] for coffee roasting activities with thermal oxidizers for PM, VOC and odor control. The source test reports with thermal oxidizer temperature noted ranged from 1286°F- 1480°F. The catalytic oxidizer source test data in this summary was from an oxidizer operated at 790°F.

Odor BACT

Odor associated with roasting activities will be controlled by ducting gaseous emissions from the roaster and cooling tray to a thermal or catalytic oxidizer.
Use of an unobstructed vertical stack will maximize dispersion of odor as well as VOC and toxic aldehydes.

PM BACT

[2] AP-42, Chapter 9.13.2 Coffee Roasting and Emission Factor Documentation for AP-42 Section 9.13.2
[3] BAAQMD BACT Guideline revised 6/12/15
[4] PSCAA Source Test Summary.xls

Particulate matter emissions from the receiving, storage, and cleaning, roasting, cooling, and stoning operations are ducted to a cyclone before being emitted to the atmosphere. The General Order will require use of either a thermal oxidizer or a catalytic oxidizer and a roaster with built-in chaff cyclone to control particulate matter emissions. The cyclone will control larger particles and the oxidizer will control smaller particulate/smoke from the roasting process. Coffee beans begin to produce smoke when their temperature reaches 330°F-375°F. Once the bean temperature reaches 220°F, steam will begin to be released from the beans with most of the steam production occurring around 330°F. Once the bean temperature reaches 385°F the beans may experience the "first crack," however this can happen at temperatures as high as 415°F. Once the temperature of the bean reaches 270°F the thermal or catalytic oxidizer must be at minimum operating temperature, 1250°F (thermal) or 600°F (catalytic) to control PM emitted as smoke. A set-point of 270°F allows for safety buffer before the beans reach 330°F. All air flow must be routed through the thermal or catalytic oxidizer for the duration of the roasting and cooling process. There should be no visible emissions from the oxidizer.

TAP and VOC BACT

Gaseous emissions from the roasting operation will be ducted to a thermal or catalytic oxidizer following PM removal by a cyclone. Volatile organic compounds (VOC), air toxics, organic acids, and natural gas combustion products are produced in the roasting process. The thermal or catalytic oxidizer will heat the roasting gases passing over their surface to fully oxidize the partially combusted products. Once heated, VOC react with oxygen and produce carbon dioxide and water vapor. This thermal or catalytic oxidation process will also control HAPs; since the HAPs produced in the roasting process are also VOC and are oxidized through the same mechanisms. A minimum residence time of 0.5 seconds and a minimum operating temperature of 1250°F for thermal oxidizers or an operating temperature range of 600°F-900°F for catalytic oxidizers will be requirements for use of the General Order. The specification of minimum residence time and temperature are a surrogate for testing for destruction efficiency, given that the roasters subject to the General Order will not be required to complete initial or periodic compliance testing due to their small size.

CO BACT:

Carbon Monoxide (CO) is formed in the combustion process for the coffee roaster and is generated through fuel combustion for the oxidizer and through the VOC oxidation process. Emissions of CO from combustion can be minimized through good combustion practice. Prior to 2018, BAAQMD had imposed a 0.4 lb/MMBTU CO limit for coffee roasters of this size. In the Application 27373 addendum from February 2018, BAAQMD presented a CO limit of 4.20 lb/ton coffee roasted. The updated CO emission factor was adjusted from the 0.4 lb/mmbtu limit previously determined by BAAQMD due to (1) compilation of stack tests for roasters in BAAQMD jurisdiction through 2017 and (2) inaccuracies in the use of a lb/mmbtu limit for afterburners from coffee roasters because the fuel used includes the coffee roasting exhaust in addition to natural gas. The methodology for conversion of CO emissions from concentrations to a lb/mmbtu emission limit uses a conversion factor which assumes that the only fuel being combusted is natural gas and does not account for the exhaust gas portion of the fuel.

Based on the increased dataset of tests reviewed by BAAQMD and the argument for emission limits in terms of lb CO/tons of green coffee, PSCAA proposes adopting the BAAQMD CO BACT limit of 4.20 lb CO/ton green coffee for the roasters subject to the General Order. Compliance with this limit is to be demonstrated by roaster design and by good combustion practices.

NOx BACT:

Nitrogen Oxides (NO_x) are formed in the combustion process for the coffee roaster and are generated through fuel combustion for the oxidizer. Emissions of NO_x from combustion can be minimized by good combustion practices for natural gas firing. Based on a stack test performed on a Starbucks roaster in 2006, NOx emissions with the thermal oxidizer will be approximately 0.2 lb/MMBTU. This number is based on an emission factor of 1.44lb NOx/ton green coffee multiplied by 1.6 tons of green coffee per hour and divided by 12MMBTU/hr. Agency stack test results for coffee roasters controlled with a thermal oxidizer on average show NOx emissions below 0.2lb/mmbtu. The Agency has been issuing a BACT limit for NOx of 0.2 lb/MMBTU NOx since mid-2017, NOC 11367.

The units of lb/MMBtu are based on expected NOx emissions for natural gas boilers that are similarly sized to a coffee roaster. These units are used with the idea that natural gas emissions from a boiler can be a proxy for a coffee roaster and that the emissions will scale with fuel use. Compliance with this limit is to be demonstrated by roaster design and by good combustion practices.

SO_2 BACT:

Sulfur Oxides (SOx) should only be emitted in trace quantities when burning natural gas.

The table below summarizes the BACT and tBACT generalized determination for this General Order:

Table 11 Summary BACT & tBACT

Pollutant	BACT/tBACT	Implementation of Method
NO_x	Emissions shall not exceed 0.2 lb/MMBTU	Proper operation and maintenance of the roaster burner and the oxidizer.
SO_2	Natural gas firing	Natural gas Firing
CO	Emissions shall not exceed 4.20 lb/ton	Proper operation and maintenance of the roaster burner and the oxidizer. Good combustion practices
Total VOCs	Emissions will not exceed 0.047 lb/ton beans roasted	Roaster and cooling tray emissions vented through thermal oxidizer operating no lower than 1250°F with residence time of at least 0.5 seconds or catalytic oxidizer operating no lower than 600°F; vertical and unobstructed stack
PM	No visible emissions are allowed to be emitted at any time from the roaster or cooling tray exhausts.	Natural gas firing and roaster and cooling tray emissions vented through thermal oxidizer
Odor	All emissions vented through afterburner for full roasting and cooling process	Complaint response plan

Pollutant	BACT/tBACT	Implementation of Method
	Vertical unobstructed flow	
Formaldehyde	Use of thermal oxidizer operating at no lower than 1250°F with residence time of at least 0.5 seconds.	Roaster and cooling tray emissions vented through thermal oxidizer
Acetaldehyde		
Acrolein		

c. WAC 173-400-560 Appropriate Operational Restrictions (criteria i through iv)

i. Criteria related to the physical size of the unit(s)

- Roaster rated capacity must be ≤26.5 lb/batch
- Stack must be vertical with unobstructed exhaust

The roaster capacity requirement ensures that the full scope of potential emissions for a coffee roaster under this General Order has been reviewed. The requirement for a vertical and unobstructed stack is primarily to ensure proper dispersion from the roaster exhaust stack.

ii. Criteria related to raw materials and fuels used

Permit Conditions:

- ≤950 lb/day green coffee bean production
- Propane, natural gas or electrical roaster and oxidizer

Raw Materials: The limit on daily input of green coffee to the roasting system is necessary to maintain compliance with WAC 173-460.

Fuel: Roasters and the associated oxidizer under this General Order must be powered by either natural gas, propane, or electric. The natural gas/propane fuel requirement is related to SO_2 BACT as summarized in Table 11. Additionally, combustion emissions from the roaster and oxidizer were calculated utilizing worst-case emission factors from propane and natural gas. In some cases, smaller roasters may be electrically powered. Electrically powered roasters would be covered under this General Order provided all other applicable requirements are met.

iii. Criteria related to allowed or prohibited locations

- Coffee roasters may not be installed in areas that are not zoned for such activities. The application for the General Order of Approval will require that the applicant provide

information about zoning so that roasters are not accidentally approved in areas where coffee roasting is prohibited.

- Coffee roaster stack must exhaust at least 3 feet above the building roofline. Modeling, as discussed in Section 6(f)(i), was completed with a stack exhaust 3 feet above the building roofline and this condition ensures that the modeled review reflects the permitted operation.

iv. Other similar criteria determined by a permitting authority
Permit Condition:

- The thermal or catalytic oxidizer shall be operated at a temperature greater than or equal to 1250°F or 600°F, respectively, from at least the time the roast air temperature reaches 270°F until the completion of the cooling process or for such additional time as needed to meet Condition 5 (no visible emissions). If the beans produce smoke before the temperature reaches 270°F the oxidizer must reach 1250°F at a lower bean temperature
- Residence time in the thermal or catalytic oxidizer must be greater than or equal to 0.5 seconds.

The requirement that the thermal or catalytic oxidizer be at operating temperature at or before the beans reach 270°F is a consequence of the BACT requirements to have all emissions from the roaster and cooling tray controlled by the oxidizer. A discussion of the temperatures at which the beans begin to produce smoke can be found in the Analysis portion of Section 6(b).

The requirement of a minimum oxidizer residence time is also part of the BACT review to confirm that the control devices covered under the General Order will be designed to achieve sufficient destruction of VOC, volatile toxics, PM and odor.

d. WAC 173-400-560 Monitoring, Reporting and Recordkeeping Requirements to Ensure Compliance with the Applicable Emission Limits and Control Requirements

- The owner or operator shall install and operate gauges to measure the bean temperature on the roaster (+/- 10 degrees F) and gauges to measure oxidizer chamber operating temperature (+/-10 degrees F) on the oxidizer. In the event of a gauge failure or malfunction, the roasting process shall be shut down until corrective action is taken. The dates of all gauge failures and corrective actions taken shall be logged
- The owner or operator shall annually test or replace the thermocouples serving the oxidizer and the thermocouples serving the roaster. If performed, the test shall consist of either a physical or electronically simulated comparison and shall follow manufacturer specifications. The results of the test readings must be within +/- 10 degrees F. If the results of the test readings exceed +/- 10 degrees of the reference value then the thermocouple must be replaced or adjusted to read within +/- 10 degrees of the reference value. The owner or operator shall keep records of the date and results of each test, the test method used, and a record of who performed the test. If the thermocouple is replaced, the owner or operator shall keep a record of the date it was replaced and who replaced it.

- The owner or operator shall make the bean temperature for the roaster and the temperature from the thermal or catalytic oxidizer available for instantaneous readout by Puget Sound Clean Air Agency personnel at any time.
- The owner or operator shall record the Agtron number or an equivalent parameter identifying the darkness of the roast for each batch of coffee roasted on the roaster. Agtron tiles can be used to determine the Agtron number.
- If quarterly observations show that the roaster is out of compliance with the zero visible emission or oxidizer temperature requirements, the roasting process for the roaster and associated oxidizer shall be shut down at the end of the observation and no roasting may occur until the problem is fixed except for testing to confirm the problem has been corrected. The date of the noncompliance, a description of the noncompliance and actions taken to resolve it shall be logged at the time the actions are taken.
- In the event of an oxidizer thermocouple failure or in the event of any other failure such that the owner or operator cannot meet emission and operational limits, the affected roasting process shall be shut down until the problem is fixed. The date of the failure, a description of the failure and actions taken to resolve it shall be logged at the time the actions are taken.
- All logs or records maintained in compliance with this Order of Approval shall be kept for at least two years and made available to Agency personnel upon request. Electronic data collection and storage of temperature readings is acceptable.

Installation and proper maintenance of the thermocouples serving the roaster and oxidizer are necessary in order to demonstrate compliance with the oxidizer operating temperature conditions (both minimum and maximum operating temperature and duration into roast when the oxidizer must be at operating temperature). Quarterly observations of roaster exhaust stacks for compliance with visible emissions requirements, as well as recordings of the oxidizer and roaster temperature are the compliance demonstration for the zero visible emissions condition and provide ongoing confirmation that the roaster and oxidizer are operating within permit specifications.

e. WAC 173-400-560 Appropriate Initial and Periodic Emission Testing Requirements

- For the roaster and associated oxidizer, at least once every calendar quarter, while roasting a batch of the darkest coffee processed during the previous 30 day period, the owner or operator shall observe the emissions from the oxidizer stack throughout the entire roast cycle. During the observations, the owner or operator shall record the oxidizer operating temperature and the bean temperature in 30-second intervals from the beginning of the roasting period, until the completion of the cooling process. For each quarterly observation, the owner or operator shall record the date and time of the beginning and end of the observation, the observer's name, whether visible emissions were observed, the time period when visible emissions were observed, the Agtron number, the oxidizer temperature and bean temperature throughout the entire observation.

The Agency has issued numerous Orders of Approval for coffee roasters of the sizes that are included in this General Order. Initial or periodic emission testing has not been found to be

necessary for these permits; however ongoing visible emission checks are required, as described above.

f. WAC 173-400-560: Compliance with WAC 173-460, and 173-400-112(2)(c) or 173-400-113 as Applicable

WAC 173-400-112 lists requirements for sources located in areas that are out of attainment with regard to National Ambient Air Quality Standards (NAAQS), and WAC 173-400-113 lists requirements for sources located in attainment areas. There are not areas within the Agency's jurisdiction which are currently designated as nonattainment. The requirements of WAC 173-400-113 apply to emissions throughout the Agency's four county jurisdiction.

The facilities eligible for this General Order are area sources, meaning sources with facility-wide emissions below Title V "major source" levels (see WAC 173-401-200(19)). For non-major source projects such as this one, the requirements of WAC 173-400-113 are:

- Meet the requirements of all applicable federal, state, and local regulations (see Sections 3, 4, 5, and 6)
- Apply BACT (see Section 6b)
- Do not cause an ambient air quality standard to be exceeded, nor violate the requirements for reasonable further progress established by the State Implementation Plan (SIP) to achieve attainment status. As discussed in Table 12 below, the total NO_x, PM_{10}, $PM_{2.5}$, and SO_2 emissions from a coffee roaster of the size range to qualify for this General Order are expected to correspond to ambient concentrations below the Cause or Contribute Threshold Values for Nonattainment Area Impacts identified in WAC 173-400-113. This small amount of emissions will not cause an ambient air quality standard to be exceeded nor violate the requirement for reasonable further progress in the SIP. Further analysis is not needed because of the small amount of emissions of all relevant pollutants.

WAC 173-400-113(4) establishes limits for carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), and nitrogen dioxide (NO_2) emissions from new or modified sources in attainment areas. Compliance with the requirements of WAC 173-400-113(4) is discussed below in Section (6)(f)(i), Criteria Pollutants.

WAC 173-460 discusses controls for new sources of toxics. A new source must demonstrate that the increase in emissions of toxics from the new or modified emission unit(s) is sufficient to protect human health and safety. A source is deemed to be in compliance with these requirements if the emission increases from the new or modified source, after taking into account controls, are below the small quantity emission rate (SQERs) thresholds or the ambient source impact levels (ASILs). Compliance with WAC 173-460 is discussed below in Section 5(f)(ii), TACs.

i. Criteria Pollutants

Emissions of CO, SO_2, PM, NO_X, and VOC are addressed below. These pollutants can be generated from the burning of natural gas for heat to roast the coffee beans. Additionally, CO, VOC and particulate can be generated by off-gassing from hot beans in the roaster and the cooling tray.

Actual emissions anticipated for roasters under the general order were estimated based on production of 506 lb green coffee/day (an average of observed NOC applications 1943, 11872, 11916, 11718, and 11879) and estimate 5 active roasting hours per day. Potential maximum coffee roasted per hour based on permit limit of 950 lbs coffee roasted per day. Maximum ton/hr coffee roasting based on Diedrich IR-12 (26.5 lb/batch) specification of 91.2 lb/hour roasting capacity. Annual potential emissions are based on 365 days of roasting per year.

Table 12 Criteria Pollutant Emissions

Pollutant	Emission Factor	Units	Actual Annual Emissions lb/yr	Potential Annual Emissions lb/yr	Potential Annual Emissions ton/yr
PM Total	**0.18**	**lb/ton green beans**	**12**	**31**	**0.02**
VOC	**0.047**	**lb/ton green beans**	**3**	**8**	**0.004**
CO	**2.18**	**lb/ton green beans**	**143**	**378**	**0.2**
SO2	**0.00059**	**lb/MMBtu**	**4**	**17**	**0.009**
Lead	**0.00000049**	**lb/MMBtu**	**0**	**0**	**7.0E-6**
NOx (as NO2)	**2.67**	**lb/ton green beans**	**176**	**463**	**0.2**

The requirements of WAC 173-400-113(4) are considered to be met for each criteria pollutant if the projected impact from the increase in emissions do not exceed the cause or contribute values identified in Table 13 below for each averaging period identified:

Table 13 WAC 173-400-113(4) Table 4a Cause of Contribute Values for Nonattainment Area Impacts

Pollutant	Annual Avg	24-hour Avg	8-Hour Avg	3 Hour Avg	1 Hour Avg
CO	-	-	0.5 mg/m^3	-	2 mg/m^3
SO2	1.0 ug/m^3	5 ug/m^3	-	25 ug/m^3	30 ug/m^3
PM_{10}	1.0 ug/m^3	5 ug/m^3	-	-	-
$PM_{2.5}$	0.3 ug/m^3	1.2 ug/m^3	-	-	-
NO_2	1.0 ug/m^3	-	-	-	-

Emissions of each criteria pollutant were modeled using AERSCREEN with an emission rate of 1 g/s and then scaling the corresponding ambient concentrations based on the potential emission rates of each pollutant. As shown in Table 14, the modeled emissions are below the WAC 173-400-113(4) thresholds.

Table 14 Modeled Criteria Pollutant Emissions vs. WAC 173-400-113(4) limits

Pollutant	Emission Rate	Modeled Concentration[1]				
		Annual	24-Hour[2]	8-Hour	3-hour	1-Hour

	(lb/yr)	(g/s)	(ug/m3)	(ug/m3)	(mg/m3)	(ug/m3)	mg/m3 for CO, ug/m3 for SO2
CO	378	0.013	-	-	0.01	-	0.01
SO2	17	0.001	0.07	0.39	-	2.65	0.66
PM10	31	0.001	0.12	0.73	-	-	-
PM2.5[3]	21	0.001	0.08	0.48	-	-	-
NO2	88	0.003	0.34	-	-	-	-

Table Footnotes:
1: The AERCREEN modeling parameters are summarized in Table 15 below.
2. 24-hr concentrations determined by AERSCREEN based on an hourly mass emission rate of 0.0171 lb/hr (derived from lb/ton green coffee roasted PM emission factor multiplied by 91.2
3: Assume emissions of PM=PM_{10} emissions and assume $PM_{2.5}$ emissions are only from roaster emissions (bean handling dust and chaff emissions are expected to be larger diameter with only 3% by weight constituting PM_{10}).[5] PM emissions from the roaster stack have not been size characterized; emission factors utilized for this review are based on source testing of roasters utilizing EPA Method 5 which measures filterable particulate but does not include any size separation prior to measurement. PM emissions are conservatively all assumed to be $PM_{2.5.}$

Screen modeling to determine whether criteria pollutant emissions were below the WAC 173-400-113(4) limits used the 26.5 lb/batch coffee roaster operating at the maximum production. Table 14 shows the chosen modeling parameters and the modeled concentration for a unit emission input rate of 1 gram per second.

The AERSCREEN parameters used looked to both WA Department of Ecology's January 16, 2019 Memo regarding AERSCREEN modeling used to relate revised Acceptable Source Impact Levels (ASILs) to Small Quantity Emission Rates (SQER) during rulemaking for WAC 173-460 and recently issued PSCAA coffee roaster Notice of Construction applications. Surface characteristics used by Department of Ecology were less suited to Puget Sound specifically and urban surface characteristics were used instead of the Ecology surface selections.

Table 15 AERSCREEN Model Parameters

Parameter	Value	Units	Source
Emission Rate:	1	g/s	Used for factor development
Stack Height:	5.9	m	Stack 3 feet above roofline as permit condition
Stack diameter	0.3	m	Median of stack diameters from Notice of Construction Applications 2018-2021
Exit Velocity:	5	m/s	Corresponds to median exhaust flow from Notice of Construction Applications 2018-2021
Stack Temperature:	801.65	K	Average exhaust temp from Notice of Construction Applications 2018-2021
Stack location	Building centroid		WA Ecology January 16, 2019 Memo parameters
Ambient Temperature:	250-310	K	WA Ecology January 16, 2019 Memo
Building Height:	5	m	Engineering judgment for one story building
Building Width:	6.1	m	Average building size corresponding to

[5] 1HE30_Cyclone_Calcualtion_Result.pdf from NOC 11769 application submitted 3/21/2019

			1 story building for NOC applications 2018-2021
Building Length:	5.05	m	Average building size corresponding to 1 story building for NOC applications 2018-2021
Terrain Classification:	Urban		Engineering judgment for PSCAA jurisdiction
Distance to Fenceline:	1	m	Engineering judgment
Receptor Distances	5 to 50 meters		WA Ecology January 16, 2019 Memo
Terrain Effects:	No		WA Ecology January 16, 2019 Memo
Surface Characteristics:	Urban		Engineering judgment for PSCAA jurisdiction

The screening summary results are included below and were scaled to produce the pollutant specific concentrations listed in Table 14.

Table 16 AERSCREEN Results Summary for 1 g/s

Averaging Period	Max Conc.		Distance from stack	
Maximum 1-hr concentration:	**1171**	**µg/m^3**	**8**	**M**
Maximum 3-hr concentration:				
Maximum 8-hr concentration:	**1054**			
Maximum 24-hr concentration:	**702.5**	**µg/m^3**	**8**	**M**
Maximum Annual concentration:	**117.1**	**µg/m^3**	**8**	**M**

ii. TACs

Toxic Air Contaminant (TAC) emission estimates were made based on available compiled source test data for toxic aldehdyes emitted from coffee roasting: acetaldehyde, acrolein, and formaldehyde. Source test data sets are separated based on the type of emission control: thermal oxidizer or catalytic oxidizer. The average from each data set was calculated and the average with the higher value was utilized for emission calculation. Emissions calculated in this manner were compared to the SQERs and ASILs. Emissions calculated were below the SQER except for acrolein. The TAP emissions are included below in Table 17.

Table 17 TAP Emissions and SQER

Pollutant	Potential Annual Emissions ton/yr	SQER, lb/avg period	SQER/ASIL avg. period	Emission Rate (lb/Averaging Period)	Below SQER?
CO	**0.19**	**50.4**	**hr**	**0.1**	**yes**
SO2	**0.0085**	**1.45**	**hr**	**0.002**	**yes**
Lead	**0.0000070**	**16.0**	**yr**	**0.014**	**yes**
NOx (as NO2)	**0.2**	**1.0**	**hr**	**0.1**	**yes**
Formaldehyde	**0.009**	**27**	**yr**	**17.9**	**yes**
Acetaldehyde	**0.002**	**60.0**	**yr**	**3.6**	**yes**
Acrolein	**0.001**	**0.0026**	**24-hr**	**0.0028**	**no**

Acrolein emissions were modeled using the same AERSCREEN parameters as discussed in Section (6)(f)(i) and the results are included in Table 18 and indicate ambient concentrations below the ASIL.

Table 18 Acrolein Modeled Concentration

Pollutant	Emission Rate		Modeled Concentration		
	lb/24-hr	g/s	24-hr ug/m3	ASIL	Pass?
Acrolein	0.0028025	1.47E-05	1.03E-02	3.50E-01	pass

g. WAC 173-400-560: Compliance with 40 CFR Parts 60, 61, 62, and 63

There are no applicable requirements in 40 CFR Parts 60, 61, 62, or 63.

7. Application and Approval Process to Obtain Coverage Under the Coffee Roaster General Order of Approval

h. Application

The Agency has developed an application for owners/operators who wish to install a coffee roaster in the capacity range that qualifies for this General Order of Approval. Owners/operators will need to complete the checklist to determine whether or not a roaster is eligible for coverage under the General Order of Approval.

The Agency has also developed an application form to be completed by the owner and/or operator of each roaster that meets the criteria in the applicability checklist. For those owners and/or operators that install more than one roaster, the owner and/or operator shall submit a separate application for each roaster.

i. Approval Process

After completing the applicability checklist, the owner/operator will know whether the proposed operation is eligible for coverage under this General Order of Approval. If it is eligible, the owner/operator may complete the General Order of Approval application form and send it to the Agency for review. Within 30 days after receipt of the application, the Agency will respond in writing stating one of the following outcomes:

1) The proposed roaster qualifies and has been granted coverage under the General Order of Approval; OR

2) The proposed roaster has been denied coverage under the General Order of Approval because the application is incomplete. The owner/operator will have the option to either complete the application and re-apply for a General Order of Approval or file a case-by-case permit application in accordance with Agency Regulation I Section 6.03; OR

3) The proposed roaster has been denied coverage under the General Order of Approval because the project does not meet the eligibility criteria for a General Order of Approval. The owner/operator will have the option to either modify the project to fit the criteria for a General Order of Approval, and re-apply, or file a case-by-case permit application in accordance with Agency Regulation I Section 6.03.

8. Applicable Conditions for Coverage Under the Coffee Roaster General Order of Approval

A coffee roaster, if operated as described in the General Order of Approval, is considered to be in compliance with the applicable rules and regulations as adopted pursuant to Chapter 70.94 RCW including WAC 173-400, WAC 173-460, and Agency Regulations I, II, and III, provided that the following conditions are met:

1. Approval is hereby granted as provided in Article 6 of Regulation 1 of the Puget Sound Clean Air Agency to the applicant to install or establish the equipment, device or process described hereon at the INSTALLATION ADDRESS in accordance with the plans and specifications on file in the Engineering Division of the Puget Sound Clean Air Agency.

2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

3. All gases from the roaster and associated cooling tray shall be vented through a thermal or catalytic oxidizer at all times.

4. The roaster permitted under this order must limit daily production to 950 lb/day green coffee or less. Compliance with this condition to be demonstrated through production records.

5. The roaster and oxidizer permitted under this order must utilize either natural gas, propane, or electricity for operation.

6. The roaster permitted under this order must utilize a chaff cyclone.

7. The exhaust stack from the thermal or catalytic oxidizer shall be vertical and unobstructed. The oxidizer exhaust stack shall not utilize a rain cap that would in any way obstruct the exhaust. The exhaust stack height must be at least three feet above the building roofline.

8. There shall be no visible emissions from the thermal or catalytic oxidizer exhaust stack.

9. The thermal or catalytic oxidizer shall be operated at a temperature greater than or equal to 1250°F for thermal oxidizers and 600°F-900°F for catalytic oxidizers from at least the time the roast air temperature reaches 270 °F, until the completion of the cooling process or for such additional time as needed to meet Condition 8 (no visible emissions). If the beans produce smoke before the temperature reaches 270°F the oxidizer must reach the minimum operating temperature at a lower bean temperature as needed to meet Condition 8.

10. Residence time in the thermal or catalytic oxidizer must be greater than or equal to 0.5 seconds.

11. The owner or operator shall install and operate gauges to measure the roast air temperature and the oxidizer temperature. Temperature gauge accuracy shall be ±10°F. In the event of a gauge failure or malfunction, the roasting process shall be shut down until corrective action is taken. The date of all gauge failures and corrective actions taken shall be logged.

12. The owner or operator shall annually test or replace the thermocouples serving the oxidizer and the thermocouples serving the roaster. If performed, the test shall consist of either a physical or electronic comparison and shall follow manufacturer specifications. The results of the test readings must be within ±10°F. If the results of the test readings exceed ±10°F of the reference value then the thermocouple must be replaced or adjusted to read within ±10°F of the reference value. The owner or operator shall record the date and results of each test and a record of who performed the test. The owner or operator shall keep a record of the date a thermocouple was replaced and who replaced the thermocouple.

13. The owner or operator shall make the roast air temperature and oxidizer temperature available for instantaneous readout by Puget Sound Clean Air Agency personnel at any time.

14. The owner or operator shall record the Agtron number or an equivalent parameter identifying the darkness of the roast for each batch of coffee roasted. Agtron tiles can be used to determine the Agtron number, but other methods of identifying the darkness of roast are acceptable.

15. Ongoing compliance with Conditions 8 and 9 shall, at a minimum be demonstrated through quarterly observations. At least once every calendar quarter, while roasting a batch of the darkest coffee processed during the previous 30 day period, the owner or operator shall observe the emissions from the oxidizer stack throughout the entire roast cycle. During the observations, the owner or operator shall record:

    a. The date and time of the beginning and end of the observation;

    b. The observer's name;

    c. Presence or absence of visible emissions and time of visible emission observation if applicable;

    d. Agtron number or equivalent parameter for identifying the darkness of the roast; and

    e. Records of 30-second interval readings of the roaster air temperature and of the thermal or catalytic oxidizer temperature throughout the entire observation.

16. If observations taken under Condition 15 show that the roaster is out of compliance with Condition 8 or 9, or in the event of any failure such that the owner or operator cannot meet Condition 8 or 9, the roasting process shall be shut down until the problem is fixed. The date of the noncompliance, a description of the noncompliance and actions taken to resolve the noncompliance shall be logged at the time the actions are taken.

17. CO emissions from the oxidizer stack shall not exceed 4.20 lb/ton green bean roasted.

18. NOx emissions from the oxidizer stack shall not exceed 0.2 lb/MMBTU.

19. VOC emissions from the oxidizer stack shall not exceed 0.047 lb/ton green coffee roasted.

20. Stack tests to determine compliance shall be conducted if requested by the Agency. If requested by the Agency the owner/operator must perform a stack test to demonstrate ongoing compliance

with conditions 17, 18, or 19. The owner/operator must conduct stack testing in accordance with Section 3.07 of PSCAA Regulation I. If a test is required by the Agency, the owner/operator must submit a stack test plan at least 60 days before performing the stack test.

21. All logs or records maintained in compliance with this Order of Approval shall be kept for at least two years and made available to Agency personnel upon request. Electronic data collection of temperature readings is acceptable.

9. Compliance with Other Laws, Regulations, and Requirements

Coverage under the coffee roaster General Order of Approval does not relieve the owner and/or operator of any requirement of the Puget Sound Clean Air Agency or any other governmental agency.

10. Appeal Rights

Pursuant to Puget Sound Clean Air Agency's Regulation I, Section 3.17 and RCW 43.21B.310, this General Order of Approval and each subsequent determination of coverage under this General Order of Approval may be appealed to the Pollution Control Hearings Board (PCHB). To appeal to the PCHB, a written notice of appeal must be filed with the PCHB and a copy served upon Puget Sound Clean Air Agency within 30 days of the date the Order is published or the determination for coverage is received by the applicant.

11. Public Notice & Comments

The proposed General Order was published for comment, along with the SEPA DNS, on DATE in the Daily Journal of Commerce and on the Agency website. The Agency also sent notice of the proposal to its Permit Action email list, its Regulatory Action email list, and several coffee roaster manufacturers. The Agency accepted comments on the proposed General Order and DNS for 30 days.

Summary of comments and any changes made: to be completed after comment period