

**NORTH CAROLINA DIVISION OF
AIR QUALITY**

Air Permit Review

Permit Issue Date:

Region: Mooresville Regional Office
County: Cabarrus
NC Facility ID: 1300051
Inspector's Name: Melinda Wolanin
Date of Last Inspection: 04/14/2010
Compliance Code: 3 / Compliance - inspection

Facility Data			Permit Applicability (this application only)
Applicant (Facility's Name): S & D Coffee, Inc. Facility Address: S & D Coffee, Inc. 300 Concord Parkway South Concord, NC 28026 SIC: 2095 / Roasted Coffee NAICS: 31192 / Coffee and Tea Manufacturing Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V			SIP: NSPS: NESHAP: PSD: PSD Avoidance: NC Toxics: 112(r): Other:
Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	Application Number: 1300051.10A Date Received: 06/30/2010 Application Type: Renewal Application Schedule: TV-Renewal Existing Permit Data Existing Permit Number: 05029/T12 Existing Permit Issue Date: 05/01/2008 Existing Permit Expiration Date: 03/31/2011
Carl Teten Engineering Manager (704) 782-3121 P O Box 1628 Concord, NC 28026	Jerry Collier Vice President of Operations (704) 782-3121 P. O. Box 1628 Concord, NC 28026	Carl Teten Engineering Manager (704) 782-3121 P O Box 1628 Concord, NC 28026	
Review Engineer: Jenny Kelvington Review Engineer's Signature: _____ Date: _____		Comments / Recommendations: Issue 05029/T13 Permit Issue Date: Permit Expiration Date:	

I. Purpose of Application

This permitting action is a renewal of an existing Title V permit pursuant to 2Q .0513. The existing Title V permit (**05029T12**) was issued on May 1, 2008 and is scheduled to expire on March 31, 2011. The renewal application was received on June 30, 2010, at least nine months prior to the expiration date. Therefore, the existing permit shall not expire until the renewal permit has been issued or denied. All terms and conditions of the existing permit shall remain in effect until the renewal permit has been issued or denied.

For the renewal, S&D Coffee requests a reduction in the monitoring frequency on the six coffee roasters and associated cyclones permitted (ES-R1 through ES-R6) for visible emissions (VE) from once per week to once per month. This request is based upon a review of the past 12 consecutive months of VE monitoring conducted on the emission points for ES-R1 through ES-R6, including the cooling and de-stoning cyclones which demonstrated no VEs have been observed by S&D Coffee personnel during this time frame. Given this historical data, S&D Coffee believes a reduction in the monitoring frequency is warranted and requests NCDENR take this into consideration when preparing the Title V permit renewal.

II. Facility Description

S&D Coffee, Inc. roasts green coffee beans to make dry coffee beans at their plant in Concord, Cabarrus County, North Carolina. Existing operations include six natural gas-fired coffee bean roasters each controlled by either a catalytic or thermal oxidizer, six cooling and de-stoning systems controlled by simple cyclones, and two green bean handling operations controlled by bagfilters.

III. Title V Permit History

Date	Permit No.	Description
May 1, 2008	05029T12	Modification to add the sixth coffee roaster.
June 27, 2006	05029T11	Administrative amendment to remove the quarterly TAP reporting requirement.
April 24, 2006	05029T10	Initial TV Permit was issued. The facility became a Title V facility when they requested their 10/25 tpy HAP limit be removed. The facility's < 100 tpy VOC emission limit remained to avoid RACT.

IV. Statement of Compliance

The DAQ has reviewed the compliance status of this facility. Ms. Melinda Wolanin, Mooresville Regional Office (MRO), last inspected the facility on April 14, 2010. According to the inspection report, the facility appeared to be operating in compliance with applicable air quality regulations. Ms. Wolanin made the following observations during the inspection.

- Roaster 1 was operating with no visible emissions.
- Roaster 2 was operating with no visible emissions.
- Roaster 3 was not in operation at the time of the inspection.
- Roaster 4 was not operating at the time of the inspection. It runs small batches and is usually run only every couple of months.
- Roaster 5 was in operation with no visible emissions.
- Roaster 6 was operating with no visible emissions.
- Bean handling system 1 was operating with no visible emissions. Bags were being ripped open and the dust could be seen going into the dust collection system. There were no visible emissions from the dust collecting system outside.
- Bean handling system 2 was operating with no visible emissions. There were no visible emissions from the dust collecting system outside.

During the past five annual compliance inspections, DAQ has not observed any visible emissions from the roasters or the bean handling systems.

S&D Coffee has received three notices of violations (NOVs) and two notices of recommended enforcement (NREs) since the initial TV permit was issued as shown below:

March 19, 2007	NOV/NRE	Failure to submit the Annual Compliance Certification by March 1. A civil penalty of \$2,244.00 was assessed on May 24, 2007 and paid in full on June 1, 2007.
March 13, 2008	NOV/NRE	Failure to submit the Annual Compliance Certification by March 1. A civil penalty of \$4,253.00 was assessed on May 7, 2008 and paid in full on May 27, 2008.
August 14, 2009	NOV	Failure to submit the Annual Compliance Certification to the EPA. No penalty was assessed.

All required reports have been submitted and have shown compliance in the past year including the Annual Compliance Certification received February 23, 2010. Continued compliance is expected.

V. Permit Changes

The following table lists all modifications associated with this permit action:

Page(s)	Section	Description of Change(s)
Insignificant Activities List	N/A	Added footnotes to the table of insignificant activities.
1	Permit Cover Page	Amended permit revision numbers and issuance/effective dates.
5	2.1 A.3.c.	Reduced visible emissions monitoring frequency from weekly to monthly.
7	2.1 B.2.c.	Reduced visible emissions monitoring frequency from weekly to monthly.
10-19	3.0	Updated General Provisions with the most recent revision (v. 3.2).
N/A	N/A	Removed Part II

VI. Regulatory Review– Specific Emission Source Limitations

A. Coffee bean roasting operations consisting of the following:

Roaster 1 – 8.0 million Btu per hour natural gas-fired coffee bean roasting operation with a maximum process throughput of 7,400 pounds per hour (ID No. ES-R2), with associated receiving cyclone (ID No. EP-R1-RVC; 40 inches in diameter), controlled by a natural gas-fired thermal oxidizer (ID No. ES-R1-TO; 3.5 million BTU per hour maximum heat input) in series with a cooling system (ID No. ES-R1C; 4,400 pounds per hour maximum process throughput rate) controlled by a cooling/destoning cyclone (ID No. EP-R1-C/DC; 21.5 inches in diameter),

Roaster 2 – 4.0 million Btu per hour natural gas-fired coffee bean roasting operation with a maximum process throughput of 7,400 pounds per hour (ID No. ES-R1), with associated receiving cyclone (ID No. EP-R2-RVC; 40 inches in diameter), controlled by a natural gas-fired catalytic oxidizer (ID No. ES-R2-CO; 4.0 million BTU per hour maximum heat input) in series with a cooling and destoning system (ID No. ES-R2C; 7,400 pounds per hour maximum process throughput rate) controlled by a cooling cyclone (ID No. EP-R2-CC; 60 inches in diameter) in series with a destoning cyclone (ID No. ES-R2-DC; 36 inches in diameter),

Roaster 3 – 7.0 million Btu per hour natural gas-fired coffee bean roasting operation with a maximum process throughput of 8,800 pounds per hour (ID No. ES-R3), with associated receiving cyclone (ID No. EP-R3-RVC; 40 inches in diameter), controlled by a natural gas-fired catalytic oxidizer (ID No. ES-R2-CO; 2.6 million BTU per hour maximum heat input) in series with a cooling and destoning system (ID No. ES-R3C; 8,800 pounds per hour maximum process throughput rate) controlled by a cooling cyclone (ID No. EP-R3-CC; 88 inches in diameter) in series with a destoning cyclone (ID No. ES-R3-DC; 60 inches in diameter),

Roaster 4 – 0.4 million Btu per hour natural gas-fired specialty coffee bean roasting operation with a maximum process throughput of 405 pounds per hour (ID No. ES-R4) controlled by a natural gas-fired thermal oxidizer (ID No. ES-R4-TO; 1.4 million BTU per hour maximum heat input),

Roaster 5 – 7.0 million Btu per hour natural gas-fired coffee bean roasting operation with a maximum process throughput of 8,800 pounds per hour (ID No. ES-R5), with associated receiving cyclone (ID No. EP-R5-RVC; 88 inches in diameter), controlled by a natural gas-fired catalytic oxidizer (ID No. ES-R5-CO; 2.6 million BTU per hour maximum heat input) in series with a cooling and destoning system (ID No. ES-R5C; 8,800 pounds per hour maximum process throughput rate) controlled by a cooling cyclone (ID No. CD-R5-CC; 88 inches in diameter) in series with a destoning cyclone (ID No. CD-R5-DC; 88 inches in diameter), and

Roaster 6 – 3.0 million Btu per hour natural gas-fired coffee bean roasting operation with a maximum process throughput of 6,850 pounds per hour (ID No. ES-R6), with associated receiving cyclone (ID No. EP-R6-RVC; 72 inches in diameter), controlled by a natural gas-fired catalytic oxidizer (ID No. ES-R6-CO; 4.2 million BTU per hour maximum heat input) in series with a cooling and destoning system (ID No. ES-R6C; 6,850 pounds per hour maximum process throughput rate) controlled by a cooling cyclone (ID No. CD-R6-CC; 60 inches in diameter) in series with a destoning cyclone (ID No. CD-R6-DC; 36 inches in diameter).

1. 15A NCAC 2D .0515: PARTICULATES FROM MISCELLANEOUS INDUSTRIAL PROCESSES

Emissions of particulate matter from the roasters shall not exceed: $E = 4.10 \times P^{0.67}$. As shown in the table below, uncontrolled particulate emissions are in compliance with the particulate limits and thus no control is required.

Roaster	Maximum Process Rate (tons/hour)	Allowable Emissions Rate, lb/hr	Potential Emissions, lb/hr (before controls)	Potential Emissions, lb/hr (after controls)
#1	2.2	6.95	2.34	0.60
#2	3.7	9.85	3.93	1.00
#3	4.4	11.1	4.75	1.21
#4	0.2	1.41	0.13	0.04
#5	4.4	11.1	4.75	1.21
#6	3.4	9.35	1.40	0.28

The facility maintains production records specifying the amount of coffee beans processed and makes these records available to the DAQ. Compliance is indicated.

2. 15A NCAC 2D .0516: SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES

Emissions of sulfur dioxide from the roasting operations shall not exceed 2.3 pounds per million Btu heat input. No monitoring is required since SO₂ emissions from natural gas combustion are inherently low. Compliance is indicated.

3. 15A NCAC 2D .0521: CONTROL OF VISIBLE EMISSIONS

Visible emissions from the roasters are limited to 20 percent opacity. The facility currently performs weekly VE observations and has consistently remained in compliance for the past five years. Because no visible emissions have been observed during the annual compliance inspections and because no visible emissions were observed by the facility during the past 12 months, the monitoring frequency will be reduced from once a week to once a month. Continued compliance is expected.

STATE-ONLY REQUIREMENT

4. TOXIC AIR POLLUTANT EMISSIONS LIMITATION AND REQUIREMENT - Pursuant to 15A NCAC 2D .1100 and in accordance with the approved application for an air toxic compliance demonstration, the following permit limit shall not be exceeded:

EMISSION SOURCE	ACETIC ACID (lbs/hour)	ACETALDEHYDE (lbs/hour)	ACROLEIN (lbs/hour)	FORMALDEHYDE (lbs/hour)
ES-R1	0.28	0.13	0.018	0.62
ES-R2	1.75	1.71	0.02	0.868
ES-R3	2.09	2.03	0.024	1.04
ES-R4	0.026	0.012	0.00162	0.057
ES-R5	2.09	2.03	0.02	1.04
ES-R6	1.62	1.58	0.019	0.81

The modeling analysis, approved February 14, 2008, demonstrates compliance for all pollutants on a source-by-source basis with the respective acceptable ambient level (AAL) at the maximum emission rates.

As shown below, the acetic acid and acrolein allowable emission rates are based upon testing performed on coffee roasters R1 and R2 in 2001 by Trigon Engineering Consultants, Inc. (Trigon) and have been scaled to the maximum production rate for each roaster. The formaldehyde allowable emission rates are based upon stack testing performed on these same two roasters in 2002 and have been scaled to the maximum production rate for each roaster and increased by a factor of 1.63 for roasters R1 and R4 and by a factor of 1.1 for roasters R2, R3, R5, and R6 to conservatively account for all possible emissions. At the allowable emission rates, the maximum impacts are 31% of AAL for formaldehyde; 2% of AAL for acetic acid, <1% of AAL for acetaldehyde, and 1% of AAL for acrolein. In accordance with the approved application, the Permittee maintains operational records demonstrating compliance. Continued compliance is expected.

**Table 1: Emission Rates
S&D Coffee, Inc.
Concord, North Carolina**

Source ID	Description	Pollutant	Emission Factor	
			lb/hr	g/s
R1	Coffee Roaster	Acetic Acid	0.282	3.55E-02
		Acrolein	0.017	2.15E-03
R2	Coffee Roaster	Acetic Acid	1.753	2.21E-01
		Acrolein	0.020	2.53E-03
R3	Coffee Roaster	Acetic Acid	2.085	2.63E-01
		Acrolein	0.024	3.01E-03
R4	Coffee Roaster	Acetic Acid	0.026	3.27E-03
		Acrolein	0.002	1.98E-04

Notes:

Emission rates scaled from stack tests to maximum production rates, 8760 hrs/yr

Roaster	Production (tested)	Production (max)
1	4121 lbs/hr	4400 lbs/hr
2	7006 lbs/hr	7400 lbs/hr
3 ¹	Not Tested	8800 lbs/hr
4 ²	Not Tested	405 lbs/hr

¹ Similar to Roaster No. 2

² Similar to Roaster No. 1

Example (Acetic Acid, Roaster 1):

$$\begin{aligned}
 \text{Max Emission Rate} &= \text{Tested Emission Rate} \times \text{Max Production Rate} / \text{Tested Production Rate} \\
 &= 0.264 \text{ lb/hr} \times 4400 \text{ lbs/hr} / 4121 \text{ lbs/hr} \\
 &= 0.282 \text{ lbs/hr}
 \end{aligned}$$

STATE-ONLY REQUIREMENT

5. **TOXIC AIR POLLUTANT EMISSIONS LIMITATION REQUIREMENT** - Pursuant to 15A NCAC 2Q .0711, S&D Coffee is required to obtain an air quality permit prior to exceeding any of the following toxic permit emission rates (TPERs).

Pollutant (CAS Number)	Chronic Toxicants(lb/day)	Acute Systemic Toxicants (lb/hr)
Phenol (108-95-2)		0.24
Hexane (110-54-3)	23	

Since maximum phenol and hexane rates from all of the roasters combined are below the TPERs, no permit is required.

6. **CONTROL AND PROHIBITION OF ODOROUS EMISSIONS**

Pursuant to 15A NCAC 2D .1806, S&D Coffee shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary. Since the last inspection, no complaints of odors have been received by the DAQ. Continued compliance is expected.

7. **RACT AVOIDANCE**

In order to avoid applicability of 15A NCAC 2D .0902, VOC emissions from the six roasters combined with the two green bean handling systems are limited to less than 100 tons per consecutive 12-month period. The permit requires the facility to perform monthly VOC emission calculations using the following emission factors:

- **1.69 lb/ton coffee roasted for the thermal oxidizer controlled roasters No. 1 and 4.**
- **2.66 lb/ton coffee roasted for the catalytic oxidizer controlled roasters No. 2, 3, 5, and 6.**

Stack testing performed in March 2001 showed the following after control VOC emissions from f roasters R1 and R2:

Roaster 1 - 2.91 lbs VOC/hr during 4,121 lbs/hr production -- 1.412 lbs VOC/ton beans roasted
Roaster 2 - 7.82 lbs VOC/hr during 7,006 lbs/hr production -- 2.232 lbs VOC/ton beans roasted

The intent of the 2001 testing was to determine destruction efficiency but there was a problem with the inlets sampling location on each roaster discovered after the lab analysis was received. The inlet sample location was compromised due to the infusion of ambient air from a quenching cycle at a point just downstream from the inlet sample port. The inlet results (before control) were lower than the outlet results. It appears that the permit emission factors are based upon the stack testing and multiplied by a safety factor of 1.19 since the test measured VOC's as methane.

For this renewal, the RACT avoidance condition was reviewed to see if the operation of the afterburners and catalytic oxidizers are required to remain below the 100 tpy VOC limit. The current permit does not require any monitoring of the control devices to ensure their proper operation. NC DAQ expects uncontrolled VOC emissions from the six roasters to remain below the permit emission factors for the following reasons:

1. The 2001 stack testing was unable to determine the control efficiency of the afterburners and catalytic oxidizers; and
2. The permit emission factors are higher than EPA's AP-42 emission factor of 1.4 lbs VOC/ton for uncontrolled continuous coffee roasters.

CONTINUOUS COFFEE ROASTERS AP-42 EMISSION FACTORS

Ref No.	Rating	Control	VOC as methane (lb/ton)	
			Range	Average
UNCONTROLLED				
4	A	N/A	0.777 to 2.35	1.40
5	A	N/A	1.08-1.29	1.17
7	A	N/A	0.527-0.573	0.547
12	A	N/A	1.90-2.68	2.42
			0.527-2.68	1.4 (AP-42 Factor is 1.4)
CONTROLLED				
4	A	TO	0.136-0.290	0.212
5	A	TO	0.0788-0.191	0.117
6	NR	TO	0.571-1.03	0.819
7	B	TO	0.0037-0.0039	0.00379
12	A	CO	0.30-0.335	0.321
			0.0037-1.03	0.3 (AP-42 Factor is 0.16)

TO = thermal oxidizer (afterburner)

CO = thermal catalytic oxidizer

Therefore, NC DAQ has determined that no monitoring, inspections, or maintenance is required for the roaster control devices since annual uncontrolled emissions are expected to remain less than 100 tpy.

S&D Coffee submits a summary of 12-month rolling averages of VOC emissions based on the permit emission factors twice each year. The semiannual reports have consistently indicated compliance. VOC emissions for the calendar year 2009 were 62.10 tons. Continued compliance is expected.

B. Green bean handling systems (ID Nos. ES-BH1 and ES-BH2)

1. 15A NCAC 2D .0515: PARTICULATES FROM MISCELLANEOUS INDUSTRIAL PROCESSES

Emissions of particulate matter from the green bean handling systems shall not exceed: $E = 4.10 \times P^{0.67}$.

As shown in the table below, particulate emissions must be controlled in order to meet the emission standard.

Source	Maximum Process Rate (tons/hour)	Allowable Emissions Rate, lb/hr	Potential Emissions, lb/hr (before controls)	Potential Emissions, lb/hr (after controls)
BH1	5.70	13.16	3400	0.34
BH2	22.8	33.31	13500	1.35

To ensure the bagfilters are adequately controlling particulate emissions, S&D Coffee performs monthly visual inspections of the system ductwork and material collection units for leaks, annual internal inspections of the structural integrity of the bagfilters, and submits semiannual summary reports of the inspections. Compliance is indicated.

2. 15A NCAC 2D .0521: CONTROL OF VISIBLE EMISSIONS

Visible emissions from the roasters are limited to 20 percent opacity. The facility currently performs weekly VE observations and has consistently remained in compliance for the past five years. Because no visible emissions have been observed during the annual compliance inspections and because no visible emissions were observed by the facility during the past 12 months, the monitoring frequency will be reduced from once a week to once a month. Continued compliance is expected.

3. RACT AVOIDANCE

In order to avoid applicability of 15A NCAC 2D .0902, VOC emissions from the six roasters combined with the two green bean handling systems are limited to less than 100 tons per consecutive 12-month period. S&D Coffee calculates VOC emissions monthly using the following emission factors:

- 1.69 lb/ton coffee roasted for the thermal oxidizer controlled roasters No. 1 and 4.
- 2.66 lb/ton coffee roasted for the catalytic oxidizer controlled roasters No. 2, 3, 5, and 6.

Semiannual reports of VOC emissions have been submitted in a timely manner and have consistently indicated compliance. VOC emissions for the calendar year 2009 were 62.10 tons. Continued compliance is expected.

VII. NSPS, NESHAPS, PSD, Attainment Status, 112(r), CAM

NSPS – The facility is not subject to any new source performance standards.

NESHAPS – The facility is not subject to any MACTs.

PSD – This facility is an existing “major” stationary source with potential HAP emissions greater than 10/25 tpy.

Attainment Status - S&D Coffee is located in the Metrolina ozone non-attainment area. The area is classified as Moderate. As such major sources are required to apply RACT to both new and existing sources. Major sources are defined as having potential emissions exceeding 100 tpy of NO_x and/or VOC. These pollutants are considered ozone precursors leading to the formation of ground-level ozone. S&D Coffee has the potential to emit over 100 tons per year of VOC, while potential NO_x emissions are less than 100 tpy. The permit contains a 100 tpy VOC limit to avoid triggering RACT.

112(r) – The facility is not subject to Section 112(r) of the Clean Air Act requirements because it does not store regulated substances in quantities above the thresholds in the Rule. The permit renewal does not affect this status.

CAM - Compliance assurance monitoring (CAM) does **not** apply to this facility. Based on AP-42 emission factors, none of the coffee bean roasters have potential pre-control device VOC emissions equal to or greater than 100 tpy. Similarly, CAM does not apply to the bagfilters controlling emissions from the green bean handling systems since pre-controlled PM₁₀ emissions are less than 100 tpy.

VIII. Facility Emissions Review

The following is an emission summary for the facility. Potential emissions include the facility wide potential emissions listed in the initial TV permit review (T10) combined with the potential emissions from Roaster #6 from the T12 permit review. Actual emissions are for year 2009 as reported in the emissions inventory.

Pollutant	Potential Emissions After Controls/Limits Tons/Year	2009 Actual Emissions Tons/Year
PM	28	8.1
CO	10.5	2.4
NO _x	19.2	4.7
SO ₂	0.12	0.05
VOC	<100	62.1
Single/total HAPs	>10/25	10.1/16.3

IX. Public Notice/EPA and Affected State Review

This renewal is required to undergo a 30-day public comment period and a concurrent 45-day EPA review period. A notice of intent to renew the Title V permit for an additional five years will be published in the local newspaper and will provide an opportunity to comment and request a public hearing.

X. Conclusions, Comments, and Recommendations

Recommend issuance of permit No. 05029T13.