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WILLIAMS & BECK INC.

CONSULTING ENGINEERS

September 29, 2017

Ms. Caryn E Owens
Environmental Engineer
Air Quality Division
Michigan Department of Environmental Quality
Cadillac District Office
120 West Chapin Street
Cadillac, MI 49601-2158

Regarding: LEELANAU COFFEE ROASTING COMPANY
SRN: U451703771, LEELANAU COUNTY
RESPONSE TO DEQ SEPTEMBER 22 E-MAIL

Dear Ms. Owens,

This letter was prepared on behalf of the Leelanau Coffee Roasting Company (LCRC). It is in response to your e-mail (September 22) and our subsequent telephone conversation concerning LCRC's response to your concerns regarding potential air toxic emissions (dated September 20). In your e-mail, you (MDEQ) requested calculations of uncontrolled emissions of carbon monoxide (CO) and particulate matter (PM).

As requested, we are providing additional information regarding LCRC's Potential to Emit (PTE). The expanded calculations of their PTE, are discussed below and presented on the attached Figure 1. It remains our opinion that LCRC is, has been, and for the foreseeable future will remain, exempt from the requirements of Rule 201 by virtue of their qualifying for an exemption under Rule 291, emission units with "de minimis" emissions.

POTENTIAL TO EMIT:

In your September 22 e-mail, you noted that we reported "ND" (non-detect) as an emission factor for CO and "NA" (not applicable) as an emission factor for PM. You further correctly state that:

> *"There would be carbon monoxide emissions (although minimal) when the batch roaster is uncontrolled because the roaster is fired on natural gas. There are also particulate emissions from the coffee roaster uncontrolled."*

In my e-mail response (also on September 22), I stated:

> "Per AP 42 9.13.2, ND in this case means No Data for CO. For PM I have used NA (not applicable) because AP-42 does not give a factor for PM for batch roasters without control. Since there are no emission factors for these criteria pollutants in AP-42 9.13.2[1] I did not include them.
>
> I agree that there will be minimal CO, and there would also be particulate; however, since EPA did not consider these emissions significant enough to provide emission factors, it does not seem appropriate to pursue this analysis."

You called me later in the afternoon of the 22nd to discuss. In our telephone conversation, you acknowledged that the CO emissions would be lower, but that the MDEQ "needed the "i"s dotted and "t"s crossed for a Rule 291 demonstration.

I agreed to develop a CO factor by simply using a CO factor for natural gas combustion based on burner size of the roasters alone.

With respect to PM, we discussed the difficulty in determining an appropriate PM factor for these roasters. Particulate emissions are a function of the cyclone and bag filter, which are integral with the roasters. The roasters are physically attached to the cyclone and bag filter, and therefore a true "uncontrolled" emission factor cannot really be obtained. Notwithstanding these complications, I also agreed to review the references I was able to find to see if any reasonable factor for PM could be found.

CO Emission Factors: Based on the burner sizer for the 40# and 300# roasters of 350,000 and 1,250,000 BTUs respectively, I applied an emission factor for CO of 84 lb/10^6 scf gas and used a heating value of 1,020Btu/scf, per AP-42, Chapter 1.4 for Natural Gas Combustion[2]. Using this factor for combustion, I converted to pounds of CO per ton green coffee beans, assuming the burners ran non-stop. It is noted that they cannot, there must be a pause between batches; therefore, these factors are very conservative. Using the above procedure, I arrived at emission factors for CO of 0.32 and 0.35 lb/ton respectively.

PM Emission Factor: Based on my review of available information on batch roasters, I have found three emission factors reported as uncontrolled PM: 4.2 lb/ton[3], 2.4 lb/ton[4], and 1.26/lb/ton[5] . All three sources reference AP-42, although I re-read the background report on the development of AP-42 9.13.2[6] and cannot find these numbers discussed anywhere (perhaps they are contained in some of the references to AP-42 itself). I have used the worst-case reported factor (4.2 lbs/ton) in the PTE calculations.

---

[1] (US-EPA), Table 9.13.2-1
[2] (US-EPA), Table 1.4-1
[3] (Air Pollution Control Division - Small Business Assistance Program, 2014), Table 1
[4] (Wade, 2014), pg. 4
[5] (Fortney), pg. 1
[6] (Midwest Research Institute - for OAQPS, US EPA, 1995)

Revised potential to emit calculations, showing both controlled and uncontrolled emissions are presented on Figure 1. These calculations demonstrate that LCRC's PTE is approximately 71% of the Rule 291 limit for the worst-case criteria pollutant (PM).

Based on these emissions, LCRC's PTE (uncontrolled) for CO and PM is 0.58 and 7.1 tons/year respectively as shown of Figure 1. Therefore, LCRC complies with Rule 291 for these criteria pollutants.

CONCLUSIONS:

Based our analysis as discussed above, Leelanau Coffee Roasting Company is exempt from the requirements to obtain a permit to install under Rule 201 based on their PTE being in compliance with applicable Rule 291 limits. We believe that the above information is responsive to the DEQ's concerns with respect to the Violation Notice issued to Leelanau Coffee Roasting Company.

In accordance with Rule 291 requirements, LCRC will demonstrate their continued compliance with the conditions of the Rule 291 exemption by maintaining the following records:

- Per Rule 291 (2)(e), LCRC will maintain a description of the emission unit (process description of each roaster) throughout the life of the unit.
- Records of quantity purchased of green coffee beans on a yearly basis will be sufficient to fulfill the requirements of Rule 291 (2)(f).

We trust that you will concur that LCRC's operations are exempt from the requirement to obtain a Permit to Install, and therefore no violations exist.

If you have questions concerning the above, additional concerns, or need any additional information, please feel free to contact Mr. Steve Arens or me.

Sincerely,

Williams & Beck, Inc.

Marc E. Groenleer, P.E

Attachment

Cc: Steve Arens, President, Leelanau Coffee Roasting Company

References

Air Pollution Control Division - Small Business Assistance Program. (2014). *An Overview of Colorado Air Regulations for: Coffee Roasting.* Colorado Department of Public Health and Environment.

Fortney, C. (n.d.). *Engineering Evaluation Report - Moksha Coffee Roasting, LLC.*

Midwest Research Institute - for OAQPS, US EPA. (1995). *Emission Factor Documentation for AP-42 Section 9.13.2 - Coffee Roasting - Final Report.*

US-EPA. (n.d.). *AP-42 Chapter 9, Section 13.2 Coffee Roasting.*

US-EPA. (n.d.). *AP-42, Chapter 1.4 - Natural Gas Combustion.* US-EPA.

Wade, P. (2014). *Analysis of Ambient Air Quality Impacts from Odacrem Coffee Roaster.* Albuquerue: Class 1 Technical Services.

Leelanau Coffee Roasting Company - Emission Calculations

POTENTIAL TO EMIT

Emission Factors (lb/ton)

Unit / SCC	Maximum Capacity (lbs/hr)	Max. Cycles / Day	Max. Lbs/Day Green Beans	Max. Tons/Day Green Beans	Maximum Tons/Month Green Beans	AP-42 (Criteria Pollutants) VOC	CO	CO_2	PM	Air Toxics Acetaldehyde (75-07-0)	Acrolein (107-02-8)	Formaldehyde (50-00-0)	PTE (tons/year) VOC	CO	CO_2	PM	Acetaldehyde	Formaldehyde	Rule 291 PTE Limits (tons/year) VOC	CO	CO_2	PM
CONTROLLED EMISSIONS																						
40# Roaster SCC 3-02-002-20	180	108	4,320	2.16	65	0.047	0.55	530	0.12	0.0005	NA	0.0008	0.02	0.21	206	0.05	0.0002	0.0003	5	10	75,000	10
300# Roaster SCC 3-02-002-20	600	48	14,400	7.20	216	0.047	0.55	530	0.12	0.0005	NA	0.0008	0.06	0.71	687	0.16	0.0006	0.0010	5	10	75,000	10
				SUBTOTALS	**281**							**Totals**	**0.08**	**0.93**	**893**	**0.20**	**0.0008**	**0.0013**	5	10	75,000	10
																Total Toxics	**0.0022**					
																	Rule 291 Limit 0.12 Tons/year Total Toxics					
UNCONTROLLED EMISSIONS																						
40# Roaster SCC 3-02-002-20	180	108	4,320	2.16	64.8	0.86	0.32	180	4.2	NA	NA	0.0540	0.33	0.13	70	1.6	NA	0.0210	5	10	75,000	10
300# Roaster SCC 3-02-002-20	600	48	14,400	7.20	216	0.86	0.35	180	4.2	NA	NA	0.0540	1.11	0.45	233	5.4	NA	0.0700	5	10	75,000	10
				SUBTOTALS	**281**							**Totals**	**1.45**	**0.58**	**303**	**7.1**	**0.0000**	**0.0910**	5	10	75,000	10
																Total Toxics	**0.09**					
																	Rule 291 Limit 0.12 Tons/year Total Toxics					

ACTUAL EMISSIONS - CONTROLLED (September 2016/August 2017 Production Rates)

Unit / SCC	Average Tons/Month Green Beans	AP-42 (Criteria Pollutants) VOC	CO	CO_2	PM	Air Toxics Acetaldehyde (75-07-0)	Acrolein (107-02-8)	Formaldehyde (Aldehydes) (50-00-0)	Actual Emissions (tons/year) VOC	CO	CO_2	PM	Acetaldehyde	Formaldehyde	Rule 291 PTE Limits (tons/year) VOC	CO	CO_2	PM
Total Roasted SCC 3-02-002-20	10.9	0.047	0.55	530	0.12	0.0005	NA	0.0008	**0.003**	**0.04**	**35**	**0.01**	0.00003	0.00005	5	10	75,000	10
												Total Toxics	**0.0001**					
													Rule 291 Limit 0.12 Tons/year Total Toxics					

Figure 1

Owens, Caryn (DEQ)

From: Marc Groenleer <mgroenleer@williamsandbeck.com>
Sent: Friday, September 22, 2017 12:32 PM
To: Owens, Caryn (DEQ)
Cc: Stephen M. Arens; Nixon, Shane (DEQ)
Subject: Re: Leelanau Coffee Roasting - SRN: U451703771

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Caryn,

Per AP 42 9.13.2, ND in this case means No Data for for CO. For PM I have used NA (not applicable) because AP-42 does not give a factor for PM for batch roasters without control. Since there are no emission factors for these criteria pollutants in AP-42 9.13.2 I did not include them.

I agree that there will be minimal CO, and there would also be particulate; however, since EPA did not consider these emissions significant enough to provide emission factors, it does not seem appropriate to pursue this analysis.

Marc E. Groenleer, P.E.
616-889-9780 (cell)

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Civil • Forensic • Electrical • Structural • Environmental
6585 Belding Rd. NE, Ste. B Rockford MI 49341
Tel. 616-874-2500 Fax 616-874-2590
www.williamsandbeck.com

On Fri, Sep 22, 2017 at 11:38 AM, Owens, Caryn (DEQ) <OwensC1@michigan.gov> wrote:

> Hi Marc,
>
> Thank you for your response on behalf of Leelanau Coffee Roasting Company, and I will keep an eye out for the hard copy. Looking through your calculations, I noticed non-detect (ND) for carbon monoxide and not applicable (NA) for particulate matter when the coffee roasters are uncontrolled. There would be carbon monoxide emissions (although minimal) when the batch roaster is uncontrolled because the roaster is fired on natural gas. There are also particulate emissions from the coffee roaster uncontrolled. Please submit these calculations to me by next Friday, September 29, 2017, to show Leelanau Coffee Roasting Company meets exemption Rule 336.1291.
>
> Thank you,
>
> Caryn Owens
>
> Environmental Engineer
>
> DEQ-AQD

Cadillac District

231-876-4414

From: Marc Groenleer [mailto:mgroenleer@williamsandbeck.com]
Sent: Wednesday, September 20, 2017 10:49 AM
To: Owens, Caryn (DEQ) <OwensC1@michigan.gov>
Cc: Stephen M. Arens <steve@coffeeguys.com>
Subject: Leelanau Coffee Roasting - SRN: U451703771

Dear Ms. Owens,

Attached is LCRC's response to your August 30, 2017 letter. Hard copy is in mail.

Marc E. Groenleer, P.E.

616-889-9780 (cell)

Williams & Beck Inc. Consulting Engineers

Civil • Forensic • Electrical • Structural • Environmental

6585 Belding Rd. NE, Ste. B Rockford MI 49341

Tel. 616-874-2500 Fax 616-874-2590

www.williamsandbeck.com

CIVIL
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WILLIAMS & BECK INC.

CONSULTING ENGINEERS

September 20, 2017

Ms. Caryn E Owens
Environmental Engineer
Air Quality Division
Michigan Department of Environmental Quality
Cadillac District Office
120 West Chapin Street
Cadillac, MI 49601-2158

Regarding: LEELANAU COFFEE ROASTING COMPANY
SRN: U451703771, LEELANAU COUNTY
RESPONSE TO DEQ AUGUST 30 LETTER

Dear Ms. Owens,

This letter was prepared on behalf of the Leelanau Coffee Roasting Company (LCRC). It is in response to your letter (August 30) concerning LCRC's response (dated August 17) to you earlier Violation Notice (VN) (dated July 27, 2017). In this letter, you (MDEQ) question LCRC's exemption from Permit to Install (PTI) requirements under Rule 291. You requested uncontrolled emissions calculations and additional information concerning potential air toxic emissions.

As requested, we are providing additional information regarding LCRC's Potential to Emit (PTE). Expanded calculations of their PTE, as well as updated determination of their actual emissions based on current production records, are discuss below and presented on the attached Figure 1. It remains our opinion that LCRC is, has been, and for the foreseeable future will remain, exempt from the requirements of Rule 201 by virtue of their qualifying for an exemption under Rule 291, emission units with "de minimis" emissions.

POTENTIAL TO EMIT:

In your letter, you correctly state that:

> *"In order to utilize the exemption pursuant to Rule 336.1291, the potential to emit (PTE) calculations without air pollution control credit is necessary."*

In our August 17 letter, we provided the controlled emissions calculations because these resulted in higher total emissions of criteria pollutants (894 tons/year controlled vs. 305 tons/year uncontrolled). This difference is due to the fuel (natural gas) use in the thermal oxidizer.

Revised potential to emit calculations, showing both controlled and uncontrolled emissions are presented on Figure 1. These calculations demonstrate that LCRC's PTE is approximately 20% of the Rule 291 limit for the worst-case criteria pollutant (VOCs).

In your letter, you also state that:

> *"Additionally, the process of roasting coffee without a thermal oxidizer emits toxic air contaminants, so these emissions are necessary in your PTE calculations. If these pollutants cannot be determined then a permit to install is necessary for this facility."*

We do not agree that the inability to determine emission rates for any conceivable air toxic leads to a de facto requirement to obtain a PTI. The background report from EPA on the development of the AP-42 emission factors for coffee roasting discusses the process's emissions of potential air toxics including aldehydes.[1] However, the EPA did not include emission factors for any pollutants other than the criteria pollutants VOCs, CO, CO^2 and PM. In addition, DEQ's own guidance document "Volatile Organic Compound (VOC) Emissions at Food Manufacturing Facilities" makes no mention of air toxics whatsoever.

Notwithstanding our objection to being required to address potential air contaminants not addressed in AP-42, literature review has identified three compounds with MDEQ Air Toxics Screening Levels known to be emitted during the coffee roasting process; these include acetaldehyde, acrolein, and formaldehyde. The screening levels for these compounds are 0.5, 0.16, and 0.08 $\mu g/m^3$ respectively (all greater than 0.04); therefore, per Rule 291 (2)(a), the applicable PTE limit is less than 0.12 tons per year of these compounds combined. Our literature review did not identify any toxic air contaminants associated with coffee roasting operations that have screening levels of less than 0.04 $\mu g/m^3$, nor any asbestos and/or subtilisin proteolytic enzymes.

The available information on emission factors for these compounds is widely variable, and the validity of the methodologies used to calculate acetaldehyde and acrolein emissions is not broadly accepted. Several regulatory agencies do not currently regulate acrolein and/or acetaldehyde emissions.

There also less data available on batch roasters (such as LCRC) and on uncontrolled emissions in particular (since almost all coffee roasters use either conventional or catalytic thermal oxidizers). We have chosen to use what we can find as the most current and/or consistently cited emission factors for the potential toxics. For uncontrolled emissions of batch roasters, we have used the most current source we could find, from the Air Pollution Control Division of the Colorado Department of Public Health and Environment (APCD-CDPHE), dated 2014[2]. The APCD-CDPHE regulates formaldehyde only as they state:

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[1] (Midwest Research Institute - for OAQPS, US EPA, 1995), pg. 2-4

[2] (Air Pollution Control Division - Small Business Assistance Program, 2014)

"Emissions of the toxic compounds acrolein, acetaldehyde, and organic acids may be present in coffee roaster exhaust streams; however, the amounts of these emissions have not been substantiated enough to include in this guidance."[3]

Although the APCD-CDPHE considers formaldehyde emissions from the controlled process to be non-detect[4], for controlled emissions we have used factors published by the Bay Area Air Quality Management District (BAAQMD) for acetaldehyde and formaldehyde that are widely cited (the BAAQMD also considers acrolein data unreliable)[5]. The BAAQMD emission factors are higher than another commonly cited source - the Puget Sound Clean Air District.

Based on these emissions factors, LCRC's PTE of total air toxics is 0.09 tons/year as shown of Figure 1. Therefore, LCRC is in compliance with Rule 291 (2)(a) for air toxic emissions.

ACTUAL EMISSIONS:

Based on updated production records through August 2017, LCRC's actual emissions are approximately two orders of magnitude less than the Rule 291 limits for both criteria pollutants and air toxics as summarized in Figure 1.

CONCLUSIONS:

Based our analysis as discussed above, Leelanau Coffee Roasting Company is exempt from the requirements to obtain a permit to install under Rule 201 based on their PTE being in compliance with applicable Rule 291 limits. We believe that the above information is responsive to the DEQ's concerns with respect to the Violation Notice issued to Leelanau Coffee Roasting Company and satisfies all applicable provisions of Rule 291 (2)(a) to (d) pertaining to air toxics.

In accordance with Rule 291 requirements, LCRC will demonstrate their continued compliance with the conditions of the Rule 291 exemption by maintaining the following records:

- Per Rule 291 (2)(e), LCRC will maintain a description of the emission unit (process description of each roaster) throughout the life of the unit.
- Records of quantity purchased of green coffee beans on a yearly basis will be sufficient to fulfill the requirements of Rule 291 (2)(f).

We trust that you will concur that LCRC's operations are exempt from the requirement to obtain a Permit to Install, and therefore no violations exist.

---

[3] (Air Pollution Control Division - Small Business Assistance Program, 2014), pg. 4
[4] (Air Pollution Control Division - Small Business Assistance Program, 2014), pg. 4
[5] (Lee, M.K. Carol - Engineering Division, 2006), pg. 195

If you have questions concerning the above, additional concerns, or need any additional information, please feel free to contact Mr. Steve Arens or me.

Sincerely,
Williams & Beck, Inc.

Marc E. Groenleer, P.E

Attachment

Cc: Steve Arens, President, Leelanau Coffee Roasting Company

References

Air Pollution Control Division - Small Business Assistance Program. (2014). *An Overview of Colorado Air Regulations for: Coffee Roasting.* Colorado Department of Public Health and Environment.

Lee, M.K. Carol - Engineering Division. (2006). *Engineering Division Permit Handbook.* San Francisco: Bay Area Air uality Management District.

Midwest Research Institute - for OAQPS, US EPA. (1995). *Emission Factor Documentation for AP-42 Section 9.13.2 - Coffee Roasting - Final Report.*

Leelanau Coffee Roasting Company - Emission Calculations

POTENTIAL TO EMIT

Emission Factors (lb/ton)

Unit / SCC	Maximum Capacity (lbs/hr)	Max. Cycles / Day	Max. Lbs/Day Green Beans	Max. Tons/Day Green Beans	Maximum Tons/Month Green Beans	AP-42 (Criteria Pollutants) VOC	CO	CO_2	PM	Air Toxics Acetaldehyde (75-07-0)	Formaldehyde (50-00-0)	PTE (tons/year) VOC	CO	CO_2	PM	Acetaldehyde	Formaldehyde	Rule 291 PTE Limits (tons/year) VOC	CO	CO_2	PM
CONTROLLED EMISSIONS																					
40# Roaster SCC 3-02-002-20	180	108	4,320	2.16	65	0.047	0.55	530	0.12	0.0005	0.0008	0.02	0.21	206	0.05	0.0002	0.0003	5	10	75,000	10
300# Roaster SCC 3-02-002-20	600	48	14,400	7.20	216	0.047	0.55	530	0.12	0.0005	0.0008	0.06	0.71	687	0.16	0.0006	0.0010	5	10	75,000	10
			SUBTOTALS		**281**						**Totals**	**0.08**	**0.93**	**893**	**0.20**	**0.0008**	**0.0013**	5	10	75,000	10
															Total Toxics		**0.0022**				
																	Rule 291 Limit 0.12 Tons/year Total Toxics				
UNCONTROLLED EMISSIONS																					
40# Roaster SCC 3-02-002-20	180	108	4,320	2.16	65	0.86	ND	180	NA	NA	0.0540	0.33	ND	70	NA	NA	0.0210	5	10	75,000	10
300# Roaster SCC 3-02-002-20	600	48	14,400	7.20	216	0.86	ND	180	NA	NA	0.0540	1.11	ND	233	NA	NA	0.0700	5	10	75,000	10
			SUBTOTALS		**281**						**Totals**	**1.45**	**ND**	**303**	**NA**	**0.0000**	**0.0910**	5	10	75,000	10
															Total Toxics		**0.09**				
																	Rule 291 Limit 0.12 Tons/year Total Toxics				

ACTUAL EMISSIONS - CONTROLLED (September 2016/August 2017 Production Rates)

Unit / SCC	Average Tons/Month Green Beans	AP-42 (Criteria Pollutants) VOC	CO	CO_2	PM	Air Toxics Acetaldehyde (75-07-0)	Formaldehyde (Aldehydes) (50-00-0)	Actual Emissions (tons/year) VOC	CO	CO_2	PM	Acetaldehyde	Formaldehyde	Rule 291 PTE Limits (tons/year) VOC	CO	CO_2	PM
Total Roasted SCC 3-02-002-20	10.9	0.047	0.55	530	0.12	0.0005	0.0008	**0.003**	**0.04**	35	**0.01**	0.00003	0.00005	5	10	75,000	10
											Total Toxics		**0.0001**				
													Rule 291 Limit 0.12 Tons/year Total Toxics				

Figure 1

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
CADILLAC DISTRICT OFFICE

RICK SNYDER
GOVERNOR

C. HEIDI GRETHER
DIRECTOR

August 30, 2017

Mr. Steve Arens
Leelanau Coffee Roasting Company
173 East Kasson Road
Maple City, Michigan 49664

SRN: U451703771, Leelanau County

Dear Mr. Arens:

This letter is in reference to your Violation Notice response letter received by the Department of Environmental Quality (DEQ), Air Quality Division, via email on August 17, 2017 for Leelanau Coffee Roasting Company (LCRC) located at 173 East Kasson Road, Kasson Township.

During the review of this response letter, it has been determined that the following additional information is required:

In order to utilize the exemption pursuant to Rule 336.1291, the potential to emit (PTE) calculations without air pollution control credit is necessary. So, in this situation, the after burner (also called the thermal oxidizer in the Violation Notice response letter) cannot be accounted for in the PTE calculations.

Additionally, the process of roasting coffee without a thermal oxidizer emits toxic air contaminants, so these emissions are necessary in your PTE calculations. If these pollutants cannot be determined then a permit to install is necessary for this facility. In your response letter, the PTE calculations did not address Rule 336.1291(2)(a) through (c), which states:

"Rule 291. (2) The requirement of R 336.1201(1) to obtain a permit to install does not apply to any emission unit in which potential emissions meet the conditions listed in subdivisions (a) to (d) of this subrule and table 23 for all air contaminants listed. In addition, records shall be maintained in accordance with subdivisions (e) and (f) of this subrule.

(a) The combined potential emissions of all toxic air contaminants with screening levels greater than or equal to 0.04 micrograms per cubic meter and less than 2 micrograms per cubic meter shall not exceed 0.12 tons per year.

(b) The combined potential emissions of all toxic air contaminants with screening levels greater than or equal to 0.005 micrograms per cubic meter and less than 0.04 micrograms per cubic meter shall not exceed 0.06 tons per year.

(c) The combined potential emissions of all toxic contaminants with screening levels less than 0.005 micrograms per cubic meter shall not exceed 0.006 tons per year."

Please submit a hardcopy written response that includes the aforementioned PTE calculations for toxic air contaminants, particulate matter (PM), carbon monoxide (CO), carbon dioxide (CO_2), and volatile organic compound (VOC) emissions without taking into account for air pollution control equipment by September 20, 2017 (which coincides with 21 calendar days from the date of this letter).

Thank you for your cooperation. If you have any questions, please feel free to contact me.

Sincerely,

Caryn E. Owens

Caryn E. Owens
Environmental Engineer
Air Quality Division
231-876-4414

cc/email: Mr. Shane Nixon, DEQ

Owens, Caryn (DEQ)

From:	Marc Groenleer <mgroenleer@williamsandbeck.com>
Sent:	Thursday, August 17, 2017 4:53 PM
To:	Owens, Caryn (DEQ)
Cc:	Stephen M. Arens
Subject:	Leelanau Coffee Roasting Company - VN Response
Attachments:	DEQ VN Rspn Ltr 8-17-17.pdf; Fig 1 Flow Diagram.pdf; Fig 2 Emissions Calcs.pdf; Fig 3 Prchs Records.pdf
Follow Up Flag:	Follow up
Flag Status:	Flagged

Dear Ms. Owens,

Please see the attached letter and accompanying figure in response to the VN received by LCRC.

Marc E. Groenleer, P.E.
616-889-9780 (cell)

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CONSULTING ENGINEERS

August 17, 2017

Ms. Caryn E Owens
Environmental Engineer
Air Quality Division
Michigan Department of Environmental Quality
Cadillac District Office
120 West Chapin Street
Cadillac, MI 49601-2158

via Email: OwensC1@michigan.gov.com

Regarding: LEELANAU COFFEE ROASTING COMPANY
RESPONSE TO VIOLATION NOTICE

Dear Ms. Owens,

We have prepared this letter on behalf of the Leelanau Coffee Roasting Company (LCRC) in response to your Violation Notice (VN), dated July 27, 2017. In your VN, you allege that the LCRC is in violation of Act 451, Rule 201 for failing to obtain a Permit to Install (PTI) before installing and commencing operation of coffee roasting equipment.

We respectively disagree with the DEQ allegations. It is our opinion that LCRC is, has been, and for the foreseeable future will remain, exempt from the requirements of Rule 201 by virtue of their qualifying for an exemption under Rule 291, emission units with "de minimis" emissions. Our reasoning leading us to that conclusion, together with a description of LCRC's processes, calculations of their Potential to Emit (PTE), as well as their actual emissions based on production records, are presented below.

BACKGROUND:

Processes with Potential To Emit:

LCRC's roasting operations utilize Sivetz style hot air coffee roasters. These roasters utilize natural gas to heat an air stream feeding the roaster; the beans are roasted as a fluidized bed in a batch process. The air stream exiting the roaster passes through a cyclone with a bag filter to separate chaff. Exhaust from the cyclone flows through a gas fired thermal oxidizer, discharging through a stack through the roof of the building. The roast coffee is discharged into a "cooling can", which is vented through the side of the building (heat only, no air added). Cooled coffee is then sent to packaging.

LCRC also adds various flavorings to the coffee. The coffee flavorings contain alcohols and other unspecified (trade secret) VOCs. No VOC or alcohol content information is provided on the MSDS

sheets provided to LCRC by their suppliers. The liquid flavorings are added to roasted coffee beans in sealed plastic drums. The drums are rotated for a set time until all liquid is absorbed (with the exception of a slight film on the walls of the drum); the beans are then removed and sent to packaging. Any emissions from the flavoring process (assumed minimal) are discharged into the plant environment. Given that emissions from the roasting process are so much lower than permitting thresholds (as will be demonstrated below) and that no definitive information on VOC content of the flavorings is available, no additional effort in quantifying the PTE from the flavoring process will be made.

A flow diagram illustrating these processes is provided as Figure 1.

Operational History:
LCRC began operations in January of 1993 in a storefront in Glen Arbor, Michigan. Their initial operations consisted of a 40 lb. Sivetz coffee roaster, equipped with a thermal oxidizer for odor control. At that time, based on a review of the then existing exemption from PTI requirements, this writer (then employed by another company) advised LCRC that they were many orders of magnitude under the threshold to require a PTI.

In the spring of 2016, LCRC acquired a second, larger, (300 lb.) used Sivetz roaster with thermal oxidizer. Purchase of this roaster is the primary reason LCRC relocated their roasting operations to their current facility at 173 East Kasson Road in Maple City. The 300 lb. roaster was placed in operation July 2016 and production has gradually increased to current levels. During startup, some "fine-tuning" of the thermal oxidizer was performed and an extension added to the stack to enhance dispersion of the exhaust gases. The 40 lb. roaster was relocated to the Kasson Road facility and resumed operation in October 2016.

LCRC can produce records tracking their purchase of green coffee beans for many years (at least on an annual basis), and on monthly basis since the summer of 2016 (see attached Figure 3).

POTENTIAL TO EMIT:

The roasting operations are classified as SCC 3-02-002-20, "batch roaster with thermal oxidizer" in AP-42. The cooling operation does not have a SCC, as additional air is not added. The only emission is heat, any trace amount of emissions associated with the cooling process are assumed to be accounted for in the emission factors applied to the roaster itself.

Potential to emit calculations are presented on the attached Figure 2. As demonstrated by those calculations, LCRC's PTE is approximately an order of magnitude less than the Rule 291 limits for the worst-case air contaminant (CO). These calculations also function as a demonstration that Rule 278 does not apply to the process or process equipment.

LCRC is not aware of any data that suggest that they emit any other air contaminants beyond those listed in AP-42 (with the possible exception of the unknown flavoring ingredients discussed above).

Therefore, LCRC has no means by which to evaluate their status with respect to the requirements of Rule 291 (2)(a-d).

ACTUAL EMISSIONS:

Based on monthly average for August 2016 through July 2017 (the largest production volumes in LCRC's history) LCRC's actual emissions are more than two orders of magnitude less than the Rule 291 limit for the worst-case air contaminant (CO).

CONCLUSIONS:

Based our analysis as discussed above, Leelanau Coffee Roasting Company is exempt from the requirements to obtain a permit to install under Rule 201 based on their PTE being more than an order of magnitude less than the Rule 291 limits.

In accordance with Rule 291 requirements, LCRC will demonstrate their continued compliance with the conditions of the Rule 291 exemption by maintaining the following records:

- Per Rule 291 (2)(e), LCRC will maintain a description of the emission unit (process description of each roaster) throughout the life of the unit.
- Records of quantity purchased of green coffee beans on a yearly basis will be sufficient to fulfill the requirements of Rule 291 (2)(f).

We trust that the above information is responsive to the DEQ's concerns with respect to the Violation Notice issued to Leelanau Coffee Roasting Company. We also trust that you will concur that LCRC does not have an obligation to obtain a PTI, and therefore no violations exist.

If you have any questions concerning the above, additional concerns, or need any additional information, please feel free to contact Mr. Steve Arens or me.

Sincerely,
Williams & Beck, Inc.

Marc E. Groenleer, P.E

Attachments

Cc: Steve Arens, President, Leelanau Coffee Roasting Company

Leelanau Coffee Roasting Company

Process Flow Diagrams

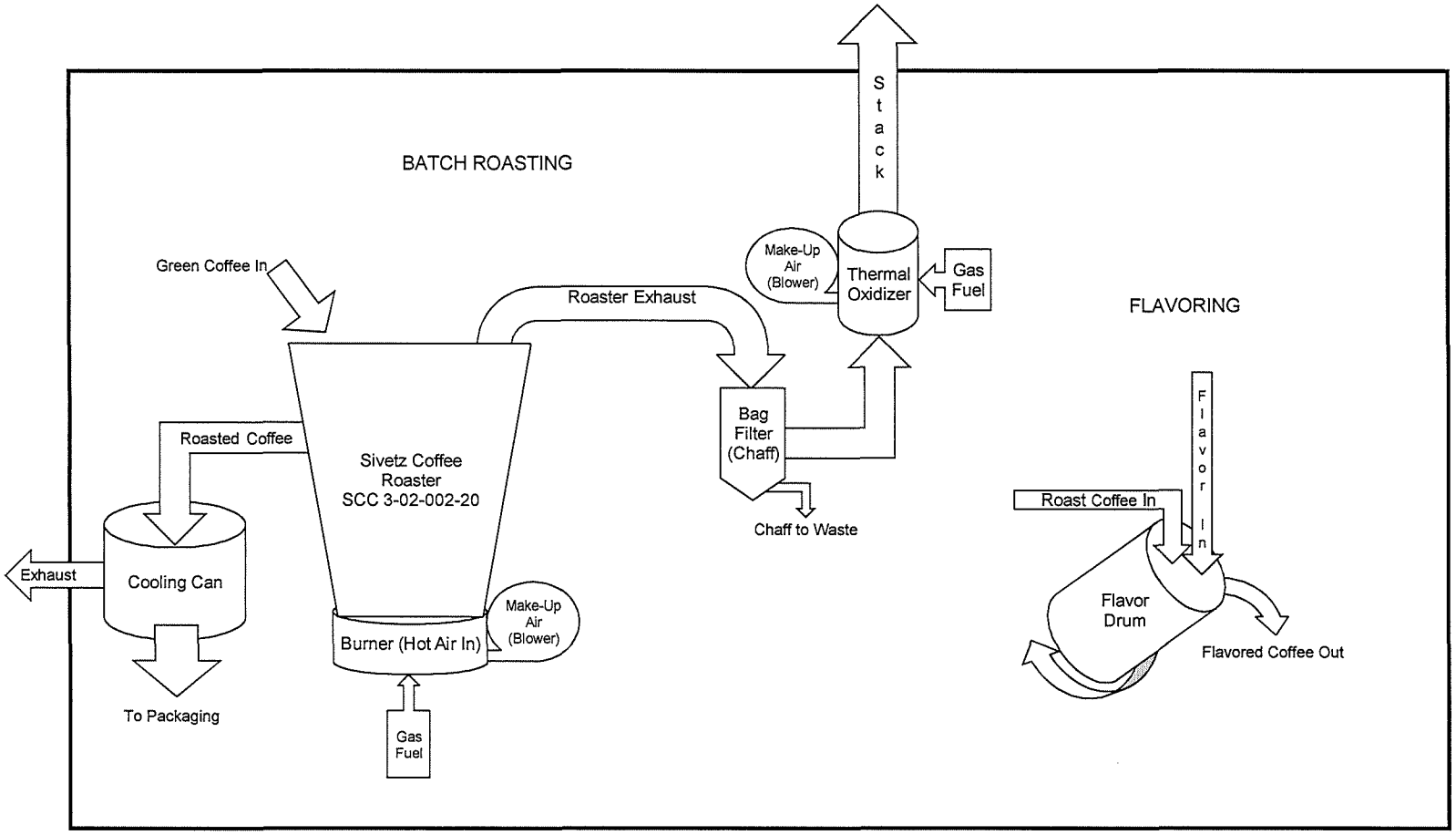

Figure 1

Leelanau Coffee Roasting Company

POTENTIAL TO EMIT

Unit / SCC	Maximum Throughput (lbs/hr)	Max. Cycles / Day	Max. Lbs/Day Green Beans	Max. Tons/Day Green Beans	Maximum Tons/Month Green Beans	AP-42 Emission Factor (lb/ton) VOC	CO	CO_2	PM	PTE (ton/year) VOC	CO	CO_2	PM	Rule 291 PTE Limits VOC	CO	CO_2	PM
40# Roaster SCC 3-02-002-20	180	108	4,320	2.16	65	0.047	0.55	530	0.12	0.02	0.21	206	0.05	5	10	75,000	10
300# Roaster SCC 3-02-002-20	600	48	14,400	7.20	216	0.047	0.55	530	0.12	0.06	0.71	687	0.16	5	10	75,000	10
				SUBTOTALS	**281**					**0.08**	**0.93**	**893**	**0.20**	5	10	75,000	10

ACTUAL EMISSIONS (August 2016/July 2017 Production Rates)

Unit / SCC	Average Tons/Month Green Beans	AP-42 Emission Factor (lb/ton) VOC	CO	CO_2	PM	Actual Emissions (ton/year) VOC	CO	CO_2	PM	Rule 291 PTE Limits VOC	CO	CO_2	PM
Total Roasted SCC 3-02-002-20	10.7	0.047	0.55	530	0.12	0.003	0.04	34	0.01	5	10	75,000	10
				SUBTOTALS		**0.003**	**0.04**	**34**	**0.01**	5	10	75,000	10

Figure 2

Leelanau Coffee Roasting Company

ROASTED COFFEE BY LOG BOOK (LBS)

MONTH	300 LB ROASTER	40 LB ROASTER	TOTAL
JAN 2017	9,775	8,520	18,295
FEB 2017	9,910	6,220	16,130
MARCH 2017	11,765	10,400	22,165
APRIL 2017	10,690	7,200	17,890
MAY 2017	14,565	8,280	22,845
JUNE 2017	15,275	11,000	26,275
JULY 2017	14,850	10,600	25,450
Ave.	**12,404**	**8,889**	**21,293**

GREEN COFFEE PURCHACES BY INVOICE (LBS)

AUG 2016		18,780
SEPT 2016		23,250
OCT 2016		24,430
NOV 2016		29,260
DEC 2016		10,925
		21,329
	12 Month Average	**21,308**

We've typically done on average between 20 and 30 small 40 lb roasts per day, 5 days a week prior to installing the large roaster, which these green coffee purchases confirm

Figure 3

Puite, Tammie (DEQ)

From: Owens, Caryn (DEQ)
Sent: Wednesday, August 30, 2017 10:20 AM
To: Puite, Tammie (DEQ)
Subject: FW: Leelanau Coffee Roasting Company - VN Response
Attachments: DEQ VN Rspn Ltr 8-17-17.pdf; Fig 1 Flow Diagram.pdf; Fig 2 Emissions Calcs.pdf; Fig 3 Prchs Records.pdf

Hi Tammie,

Here is the response from the company regarding the VN that was sent to them. Do you need me to print it off for you? Let me know what works best.

Thank you,

From: Marc Groenleer [mailto:mgroenleer@williamsandbeck.com]
Sent: Thursday, August 17, 2017 4:53 PM
To: Owens, Caryn (DEQ) <OwensC1@michigan.gov>
Cc: Stephen M. Arens <steve@coffeeguys.com>
Subject: Leelanau Coffee Roasting Company - VN Response

Dear Ms. Owens,

Please see the attached letter and accompanying figure in response to the VN received by LCRC.

Marc E. Groenleer, P.E.
616-889-9780 (cell)

Williams & Beck Inc. Consulting Engineers
Civil • Forensic • Electrical • Structural • Environmental
6585 Belding Rd. NE, Ste. B Rockford MI 49341
Tel. 616-874-2500 Fax 616-874-2590
www.williamsandbeck.com