



November 6, 2017

VIA REMIR Online Reporting

Metro Vancouver,
Legal and Legislative Services Department
4330 Kingsway
Burnaby, BC V5H 4G8

Attention: Brendon Smith

RE: AIR PERMIT GVA1088 – STORAGE PILES

Harvest Fraser Richmond Organics (“Harvest”) has prepared this letter detailing odour concentration and discharge rate in the emissions for Emission Sources 04 (ES04, Waste Receiving and Handling discharging through a Storage Pile(s)), 09 (ES09, Overs, Middlings and Fines Storage Piles discharging through a Storage Pile(s)), and 10 (ES10, Finished Products Storage Piles discharging through a Storage Pile(s)), as per requirements of Air Permit GVA1088 (the Permit).

Samples were submitted to Environmental Odour Consulting in Ontario, BC, for odour analysis. Sample collection and analysis was conducted in accordance with procedures specified in EN 13725:2003. Results for this testing are as follows:

Source #	Source Description	Net ODTV (OU)	Hedonic Tone
04	Waste Receiving and Handling	280	-1
09	Overs	1054	-2
	Middlings	646	-2
	Fines	442	-1
10	Finished Product Storage Piles	810	-2

Notes: ODTV – odour detection threshold value
 OU – odour units

Laboratory certificates are attached.

We trust that this meets your needs. If you have any questions or require clarification, please contact Chelsea MacPherson at 604-270-7500 ext. 3921.

HARVEST FRASER RICHMOND ORGANICS LTD.

Per:

Chelsea MacPherson, B.Sc., P.Geo.
Regulatory Compliance Officer

Report

Odour Evaluation

Report to:

Harvest Power

Ms. Chelsea MacPherson, B.Sc., P.Geo.

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Prepared by:

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Date of Report

September 6, 2017

6 pages

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1. INTRODUCTION

EOC Environmental Odour Consulting Corporation (EOC) was contracted by Harvest Power (Harvest) to perform an odour evaluation on samples delivered to EOC.

On August 31, 2017, thirteen (13) samples were shipped via Air Canada Cargo. On September 1, 2017, EOC retrieved the samples from the Air Canada Cargo terminal in Mississauga, Ontario for same-day evaluations.

All evaluations for odour detection threshold value (ODTV) were performed according to the European standard EN13725: 2003 (with exceptions) and Ontario Ministry of the Environment Method ON-6 using dynamic olfactometry with screened panelists.

In addition, all samples were evaluated directly for intensity, hedonic tone and character of the odour.

All evaluations were performed within 30 hrs. from the collection of the bags.

All samples were in good condition upon delivery.

2. METHODOLOGY

2.1. ODOUR PANEL EVALUATION

The evaluations were based on the European Standard EN 13725:2003 with the exception that each sample was introduced once to the panel members and eight panel members were used for all evaluations. Odour evaluations were also completed in accordance to the Ontario Ministry of the Environment's Method ON-6 "Determination of Odour Emission from Stationary Sources." The EOC olfactometer is capable of performing evaluations using either the Triangular Forced Choice Method, or the Binary Forced Choice Method. For the Forced Choice Method, the panelist is presented with two or three ports (Triangular, Binary), of which one presents diluted sample and the other(s) neutral gas. The sample is presented randomly over the two or three ports. The panelist is asked to indicate the port with the sample. The panelist is also asked if his/her choice was a guess, inkling or certain. By combining the chosen results and the indicated level of certainty, the response is classified as false or true. The odour evaluation procedure requires the first sample to be presented to the panelist at the dilution that will be below the detection threshold. Therefore, the several initial presentations to the panelists require the panelist to select one port by guessing. Each panelist observes an odour sample in the ascending concentration series (increasing concentration). For this program, a Binary Forced Choice Mode was chosen for odour evaluations. Each sample bag was evaluated by eight panelists with the

option that for each dilution each of the 8 panelists were asked to indicate their responses. Therefore, each panelist was introduced to the same dilution steps.

The panelists' responses were recorded by computer software and were processed to determine the odour detection threshold value (ODTV) for each sample. The ODTV is a dilution factor and therefore has no units. For convenience, however, the ODTV may be expressed in odour units (ou).

A screened odour panel was used for all evaluations. They were tested for odour sensitivity using n- butanol as a reference gas and are considered to be within the normal range according to the European Standard EN 13725:2003 (20 ppb-80ppb n -butanol).

2.2. DIRECT ODOUR EVALUATION

In addition to determining the ODTV, each odour sample was evaluated for the intensity, hedonic tone and character of the odour. To determine the hedonic tone, each panelist was asked to smell a sample and use a hedonic tone scale in order to determine if the detected odour was pleasant or unpleasant.

The following scale was used by the panelists to record their hedonic tone evaluation of a sample:

- -3very unpleasant
- -2unpleasant
- -1slightly unpleasant
- 0.....neutral
- +1slightly pleasant
- +2pleasant
- +3very pleasant

To determine the intensity of the odour the following scale was used:

- 0.....no odour
- 1..... moderate odour
- 3.....strong odour
- 4..... extreme odour

An average for all panelist responses was used for calculating the hedonic tone of each sample. The panelists were also asked to use their own words to describe the character of the detected odour.

The most common descriptor used by the panelists was used as the overall character descriptor for a sample.

3. QUALITY CONTROL MEASURES

EOC provided extensive quality control measures for the evaluations. These included, but were not limited to:

- Keeping constant dilution steps between analysis of the samples from the same source.
- Each sample bag was evaluated by eight panelists with the option that for each dilution each of the 8 panelists were asked to indicate their responses (each panelist was exposed to the same dilution).
- The EOC olfactometer is calibrated by the manufacturer against carbon monoxide at all used ports. The calibrations are within the limits of EN13725 standard.
- The EOC olfactometer is checked before each use for consistent volumetric flow rates at each “sniff port.”
- EOC panelists are screened using European Method EN; 13725 with n-butanol and they are within the range of that standard- all screening data are provided in the report.
- EOC panelists are trained to avoid any odorous products such as perfumes and scented lotions.
- EOC panelists are advised and trained to avoid coffee or spicy food one hour before a session.
- EOC makes sure that the sessions for the odour panel evaluations are not too long.
- EOC provides frequent breaks to avoid any panelist’s fatigue.
- All panelists’ data are computer recorded.

4. RESULTS

Table 1 shows the results for odour detection threshold values for samples evaluated on September 1, 2017.

Table 2 shows the results for the direct odour evaluations

All samples were in good condition upon delivery.

Prepared by:



Anna H. Bokowa, M.Sc.
President, Environmental Odour Consulting Corporation

Table 1: Odour Detection Threshold Values – September 1, 2017

EOC Sample Identification	Client Sample Identification	EOC Proof No:	Dilution	Raw ODTV ou	Net ODTV ou
Sample 1	Blank SM100	K517	1	<6	<6
Sample 2	CUR-01	K509	17	91	1547
Sample 3	CUR-02	K505	17	68	1156
Sample 4	CUR-03	K504	17	101	1717
Sample 5	RA-01	K503	28	11	308
Sample 6	RA-02	K502	28	<6	<168
Sample 7	RA-03	K513	28	9	252
Sample 8	OVS-01	A316	17	62	1054
Sample 9	FINS-01	K508	17	26	442
Sample 10	MIDS-01	A318	17	38	646
Sample 11	FP-01	A39	17	91	1547
Sample 12	FP-02	A304	17	24	408
Sample 13	FP-03	A303	17	28	476

Table 2: Direct Evaluation: September 1, 2017

EOC Sample Identification	Client Sample Identification	Intensity (0-4)	Hedonic Tone (-3 to +3)	Description
Sample 1	Blank SM100	0	NA	NA
Sample 2	CUR-01	3	-3	Sharp/Compost/Rotten
Sample 3	CUR-02	3	-2	Sharp/Compost/Rotten
Sample 4	CUR-03	3	-3	Sharp/Compost/Rotten
Sample 5	RA-01	1	-1	Oily
Sample 6	RA-02	0	NA	NA
Sample 7	RA-03	1	-1	Oily
Sample 8	OVS-01	3	-2	Compost/Sour
Sample 9	FINS-01	2	-1	Wood/Compost
Sample 10	MIDS-01	2	-2	Rotten
Sample 11	FP-01	3	-3	Gas/Oily
Sample 12	FP-02	2	-1	Dusty
Sample 13	FP-03	2	-1	Dusty

NA- not applicable