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September 1, 2023

VIA FEDERAL EXPRESS

Daniel A. McGeen
Environmental Quality Analyst, Air Quality Division (AQD)
Michigan Department of Environment, Great Lakes and Energy (EGLE)
252 W. Allegan Street
P.O. Box 30242
Lansing, MI 48909

Re: Response to Violation Notice – SRN U442203492, Lapeer County

Dear Mr. McGeen:

This letter responds to the August 11, 2023 Violation Notice (Notice) issued to the Advanced Drainage Systems, Inc. (ADS) facility operating at 4800 Marlette Road in Clifford, Michigan (Facility).

As a responsible corporate citizen, ADS is committed to being a good neighbor and takes their environmental compliance obligations very seriously. As such, we have been working to collect all available information regarding EGLE's odor concerns. That includes our Freedom of Information Act (FOIA) request No. E316261-072423. While we appreciate EGLE's recent response to that request, it did not include any documentation regarding the concerns raised in the Notice. For example, the response did not include complaint reports for June 26 and 27, 2023, and July 5, 12, and 17, 2023, or investigation reports describing any observed odors during EGLE's June 28, 2023 and July 19, 2023 site visits. Nor was such information included with the Notice.

Given the lack of supporting information and the contrary observations of our employees who are deeply familiar with our processes and on-site at all times, there is insufficient legal or factual basis indicating the presence of odors of a "sufficient intensity, frequency, and duration to constitute unreasonable interference with the comfortable enjoyment of life and property" under Rule 901(b). As a result, ADS denies any violation of Rule 901(b) of Michigan's Air Pollution Control Rules – including on the dates referenced in the Notice.

Nonetheless, ADS continues to invest substantial time and effort into investigating EGLE's odor concerns. As you know, ADS has retained experienced environmental consultants at Ramboll who have developed an Odor Investigation Plan (OIP) to conduct an objective investigation of the presence and nature of any odors. We appreciate AQD's technical engagement with Ramboll on the OIP, including your recent discussion on August 14, 2023. At AQD's recommendation, Ramboll has updated the attached OIP to include an odor panel assessment. This assessment will be conducted by the third-party experts AQD suggested – St. Croix Sensory, Inc. Their assessment will include samples both upwind and downwind of the Facility, which will be collected over representative periods during three working days in September to ensure a fulsome evaluation.

ADS remains committed to working with EGLE to fully and finally address the concerns raised in the Notice. If you have additional feedback on the updated OIP, please let ADS know at your earliest convenience as we will need to begin assessment work shortly. Also please feel free to contact me at (216) 479-8296 or allen.kacenjar@squirepb.com with any other questions you may have or to arrange a meeting to discuss any aspect of this response.

Sincerely,

Allen A. Kacenjar

AAK/amb

Enclosure

Copy to: Jenine Camilleri
Enforcement Unit Supervisor, EGLE, AQD
P.O. Box 30260
Lansing, Michigan 48909-7760

Prepared for
Advanced Drainage Systems, Inc.

Prepared by
Ramboll US Corporation
Brentwood, Tennessee

Date
August 31, 2023

ODOR INVESTIGATION PLAN (Revision 1)

ADVANCED DRAINAGE SYSTEMS, INC.
CLIFFORD, MICHIGAN

RAMBOLL

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1 ODOR INVESTIGATION PLAN

1.1 Introduction

The State of Michigan Department of Environment (DOE), Great Lakes, and Energy, Air Quality Division (AQD), launched an investigation of odors associated with operations at the Advanced Drainage Systems, Inc. (Advanced Drainage Systems) Clifford, Michigan facility (the Clifford facility). This investigation was prompted by a complaint submitted to AQD. AQD asserts that the Clifford facility violated Rule 901(b) with the statement that "Odors detected offsite were of sufficient intensity, frequency, and duration to constitute unreasonable interference with the comfortable enjoyment of life and property."

In response to AQD's statements and violation notice, Advanced Drainage Systems submitted an Odor Investigation Plan (OIP) to the AQD on June 6, 2023. The AQD provided comments and suggestions on the OIP and as a result, Advanced Drainage Systems has modified the OIP and has prepared this OIP Revision 1.

Advanced Drainage Systems plans to collect ambient air samples to assess potential odors associated with operations at the Clifford facility. The purpose of this revised Odor Investigation Plan (OIP) is to describe the equipment specifications, general site locations, sampling procedures, field procedure, sample handling and documentation, and laboratory procedures to collect samples and have them analyzed for odors and specific compounds including volatile organic compounds (VOCs) and aldehydes.

The OIP will follow procedures to sample ambient air at two locations - one upwind and one downwind of the Clifford facility. Advanced Drainage Systems has conducted employee exposure assessments at similar facilities for inhalation exposure to chemicals released from the pipe extrusion process following US Occupational Safety and Health Administration (OSHA) sampling and analysis protocols. Those sampling efforts focused on volatile organic compounds (VOCs) and Aldehyde compounds (Aldehydes), which can be released during the extrusion process, may be associated with odors and are possible sources that resulted in the AQD odor violation notice. Therefore, this OIP will focus on collecting samples upwind and downwind from the Advanced Drainage Systems facility on three consecutive workdays.

1.2 Sampling Locations

The general location of the two Clifford facility sampling locations is provided in **Figure 1**. Upwind and downwind of the Clifford facility are determined by using the daily prevailing wind speed. Exact sampling locations will be located outside of the facility building and within Advanced Drainage Systems the property boundary. Final locations will be determined by access, safety, and security.

1.3 Program References and Guidance Documents

All sampling protocols and procedures will follow quality assurance procedures that dictate all odor investigation objectives and requirements to ensure data collection meets all applicable quality assurance requirements to ensure valid data collection. The field sampling and analytical procedures for the OIP will consist of filling 10-L Tedlar bags and submittal to a qualified laboratory for analysis. The field sampling with be completed in accordance with established criteria for Tedlar bag sampling. The samples will be submitted to St. Croix Sensory Laboratory (https://www.fivesenses.com/) for odor analysis following utilizing the following methods:

- EN13725:2022 & ASTM E679-19 (odor analysis)

- ASTM E544-18 (odor intensity via Butanol Referencing)
- Odor Characterization and Hedonic Tone
- Odor Persistency (dose response
- VOCs (using Selected ion flow tube mass spectrometry (SIFT-MS))
- Aldehydes (using SIFT-MS)

1.4 Sampling and Analysis Parameters

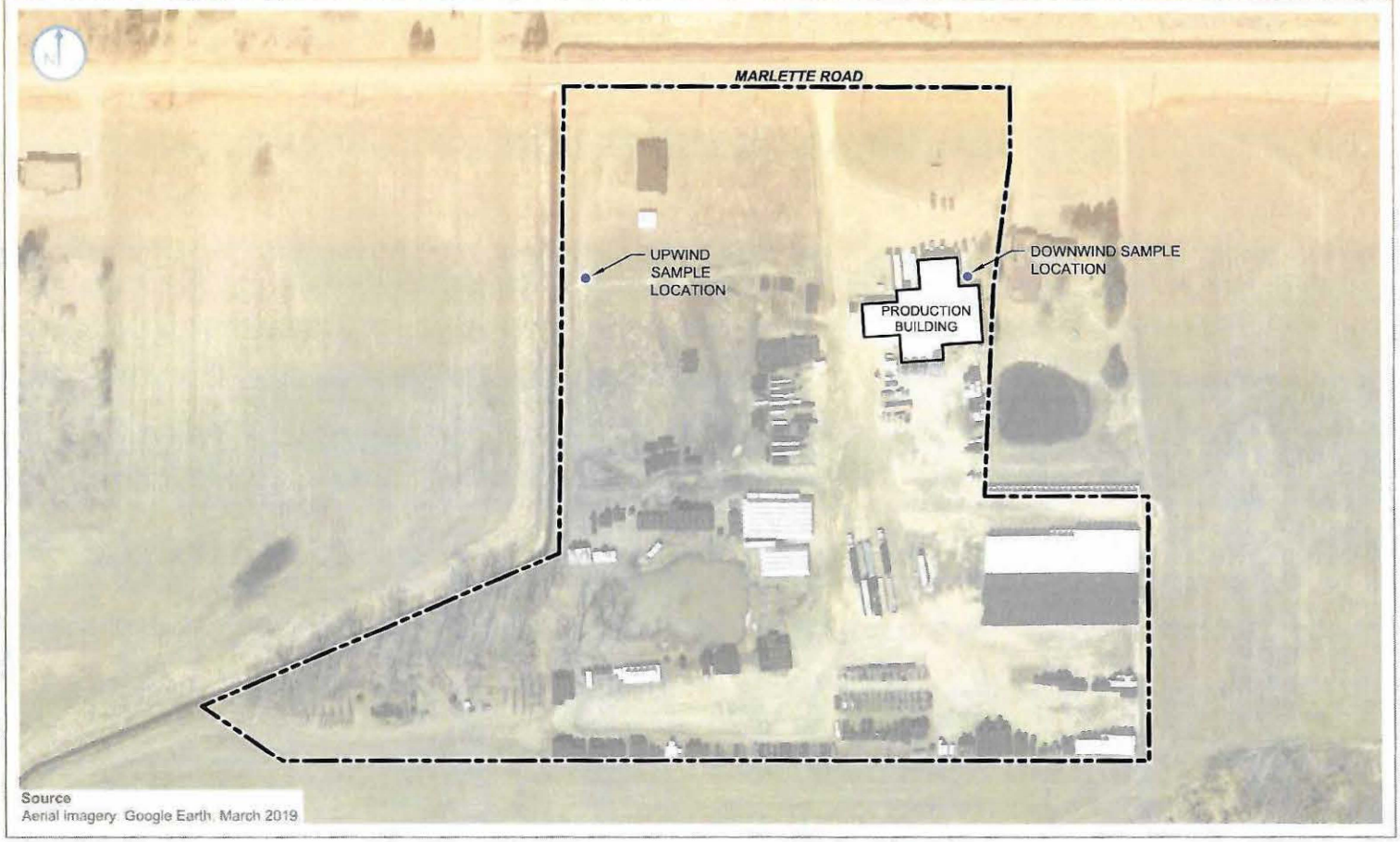
The sampling program includes daily samples collected over three (3) consecutive workdays for a period of between 3-4 hours each day. Each daily sample event will collect two 10-Liter (L) Tedlar bag samples, one upwind and one downwind.

This sampling approach will result in a total of three (3) upwind samples and three (3) downwind samples that will be analyzed for the complete odor panel, VOCs and Aldehydes. A summary of equipment, and sampling/analysis specifications is provided in **Table 1**.

All samples will be collected using 10-L Tedlar bags in conjunction with a vacuum chamber sampling module and low volume pump which uses negative vacuum pressure to fill the bags in approximately 3-4 hours. Sampling will occur during representative operating periods, and sample start times for each of the 3 days will vary to capture different portions of the workday.

All samples will be collected and handled according to established criteria by personnel experienced with collecting air samples utilizing the equipment described herein, and assigned a sample identification according to the following nomenclature (note: date of September 19, 2023 used as example).

- Upwind Sample ID: UP1-091923 (indicates sample collected at upwind site on September 19, 2023
- Downwind Sample ID: DN1-091923 (indicates sample collected at downwind site on September 19, 2023
- Upwind Sample ID: UP2-092023 (indicates sample collected at upwind site on September 20, 2023
- Downwind Sample ID: DN2-092023 (indicates sample collected at downwind site on September 20, 2023
- Upwind Sample ID: UP3-092123 (indicates sample collected at upwind site on September 21, 2023
- Downwind Sample ID: DN3-092123 (indicates sample collected at downwind site on September 21, 2023



FACILITY BOUNDARY (APPROXIMATE)
SAMPLING LOCATION

0 200 Feet

AIR SAMPLING LOCATIONS
ODOR INVESTIGATION PLAN

ADVANCED DRAINAGE SYSTEMS
4800 MARLETTE ROAD
CLIFFORD, MICHIGAN

FIGURE 01

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A RAMBOLL COMPANY

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Each Tedlar bag will be properly labeled and shipped under Chain of Custody to St. Croix for analysis.

Table 1. Advanced Drainage Systems Odor Investigation Sampling and Analysis Specifications

Location	Parameter	Equipment	Sample Flow Rate/Duration	Analytical Methods	Method Summary
Station 1 (upwind)	Odors	10-L Tedlar bag with vacuum chamber and pump	50 ml per minute/3-to-4-hour sample	EN13725:2022, ASTM E679-19, ASTM E544-18)	Detection & Recognition, Intensity, Characterization & Hedonic Tone, Dose Response
	VOCs			SIFT MS	Reports for 37 VOC compounds
	Aldehydes			US EPA Compendium Method TO-11A	Reports for 11 Aldehyde compounds
Station 2 (downwind)	Odors	10-L Tedlar bag with vacuum chamber and pump	50 ml per minute/3-to-4-hour sample	EN13725:2022, ASTM E679-19, ASTM E544-18)	Detection & Recognition, Intensity, Characterization & Hedonic Tone, Dose Response
	VOCs			SIFT MS	Reports for 37 VOC compounds
	Aldehydes			US EPA Compendium Method TO-11A	Reports for 11 Aldehyde compounds

1.5 Summary Report

A sample summary report will be completed withing three weeks of receipt of all laboratory analysis reports. The report will include the following information:

- Summary of the sampling program, any noteworthy field observations,
- Summary of all analytical data,
- Copies of all laboratory reports and field notes associated with the sampling program,
- Conclusions from the results of sampling and analysis,
- Next steps to address odors if warranted.

1.6 Schedule

The projected schedule for the odor investigation is summarized below.

- Initiate investigation sampling: 2-3 weeks after AQD approval,
- Receive laboratory results: 2-3 weeks after all sample collected,
- Report: completed within 3 weeks of receiving laboratory results.

APPENDIX A
TECHNICAL BULLETIN SUMMARIZING ODOR ANALYSIS

St. Croix Sensory, Inc.

Parameters of Odor

St. Croix Sensory specializes in quantification of perceived odors of environmental air samples and commercial products and materials. Odors are the sensory perception resulting from odorants (chemicals) stimulating olfactory receptors [ASTM E253].

Odors can be quantified by five parameters that profile the human response. These parameters include: odor threshold values, odor intensity, odor persistency, hedonic tone, and odor characterization.

The following is a brief explanation of these parameters of odor evaluation services provided by St. Croix Sensory. For environmental odor samples, an odorous air sample, collected in an air sample bag, is evaluated. For product and material testing, the sample may also be from an air sample bag or it may be a direct observation of a headspace developed around the sample or from an environmental test chamber.

Odor Thresholds

The most common measure of odorous air samples is the odor threshold value (OTV), also referred to as the "odor concentration". Odor concentration is quantified by determining the amount of dilution needed to bring the odorous air sample to its threshold. The higher the threshold value, the more dilution is needed to bring the odor to threshold, thus the "stronger" the odor.

The odor threshold is determined by trained human assessors observing presentations of the odorous air sample dynamically diluted with an olfactometer. The testing procedures follow ASTM International E679, *Standard Practice for Determination of Odor and Taste Thresholds by a Forced-Choice Ascending Concentration Series Method of Limits*, and EN13725, *Air Quality – Determination of Odour Concentration by Dynamic Olfactometry*. EN13725, the official standard of all European Union countries, exceeds the requirements of ASTM E679 with additional, detailed QA/QC requirements.

These testing standards utilize a presentation method called *3-alternative forced-choice* (3-AFC) also known as *triangular forced-choice* (TFC). Each assessor performs the odor evaluation task by sniffing diluted odorous air from the olfactometer. The assessor sniffs three sample presentations; one contains the diluted odor while the other two are odor-free air. They must then select the one of the three that is *different* from the other two. The assessor is required (forced) to choose one of the three and acknowledge their response as a "guess", "detection", or "recognition", as defined by ASTM E679.

After the first set of presentations, the assessor is then presented with the next dilution level. At this next level, the assessor is again presented with three sample choices, one of which is the diluted odor sample. However, this next dilution level presents the odor at a higher concentration (i.e. two times higher), which is one-half the dilution ratio (fewer number of dilutions = higher concentration). The first dilution level presented to the assessors is below the odor threshold (subthreshold). The assessor proceeds to higher levels of sample presentation following these methods until the odor concentration is above the recognition threshold. This presentation sequence is called the *ascending concentration series*.

The Individual Threshold Estimates (ITEs) are computed for each assessor based on the dilution levels where correct *detection* or *recognition* responses are recorded. The responses of all assessors are averaged to determine the sample's detection and recognition thresholds.

The dynamic dilution of an odorous emission is the physical process that occurs in the atmosphere down-wind of the odor source or during mixing within an indoor space as an individual or citizen from the community observes the diluted odor. The dilution ratio is an estimate of the number of dilutions needed to make the actual odor emission just detectable. This is known as the Detection Threshold (DT). The Recognition Threshold (RT) is the dilution ratio at which the assessor first detects the odor's character ("smells like..."). The recognition threshold value is always lower than the detection threshold value since it takes more dilution to bring an odor to its detection threshold (no odor present) compared to its recognition threshold (odor is not recognizable).

The odor threshold is reported as a dimensionless dilution ratio; however, often the pseudo-dimensions of *odor units* (ou) are used. Units of *odor units per cubic meter* (ou/m^3) are also commonly applied in order to calculate odor emission rates.

For the testing, St. Croix Sensory utilizes an AC'SCENT® International Olfactometer, a dynamic dilution triangle olfactometer, operating at 20-LPM with 5-10 assessors, who complete the threshold determination a minimum of two times [EN13725]. Final results are retrospectively screened in order to evaluate and identify assessors who may have a specific hypersensitivity or anosmia to the odor sample presented.

The assessors are tested and "certified" with a standard odorant (n-butanol) and are required to meet specific sensitivity criteria outlined in the European testing standard, EN13725. These assessors are required to have an average n-butanol detection threshold between 20-80 ppb based on their last 20 evaluations. Assessors also must maintain a defined standard deviation of n-butanol threshold measurements in order to satisfy repeatability requirements of the standard.

Below are example odor threshold value results of two odor samples, inlet and outlet samples of an example odor control system. The inlet is considerably higher in odor than the outlet sample with detection threshold values of 13,000 for the inlet and 450 for the outlet. These results show an odor control reduction efficiency of 97% ([13,000-450]/13,000 * 100%) [EN13725].

Project Name: **Odor Control Performance Test** Samples I

#	Field No.	Sample Description	DT	RT	I
1	102-In	Inlet - Odor Control System	13,000	8,000	6.3
2	102-Out	Outlet - Odor Control System	450	260	2.7

Odor Intensity

Odor intensity is the perceived strength of the odor above the Recognition Threshold (suprathreshold). The intensity of an odor is referenced on the ASTM Odor Referencing Scale described in ASTM E544, *Standard Practice for Referencing Suprathreshold Odor Intensity*. St. Croix Sensory utilizes a 10-point static scale of aqueous butanol solutions for the standard procedure of odor intensity referencing.

The odor intensity referencing is accomplished by assessors comparing the odor intensity of the sample to the reference odorant, n-butanol, aqueous solutions in 10 glass sniffing jars that make-up a series of increasing concentrations of the butanol. The series starts at 25-ppm butanol in water and has an increasing concentration ratio of 2 (binary scale), as shown in the table below.

Each assessor observes the odorous air sample and determines the odor intensity on the 10-point scale. The average scale value of the panel of assessors is the reported intensity for the odor sample. A larger value of butanol concentration means a stronger odor. The Odor Intensity Referencing Scale serves as a standard method to quantify the intensity of odors for documentation and comparison purposes.

The odor evaluation report example above includes the odor intensity values for the inlet and outlet odor control system samples. These results show the odor intensity of the inlet sample, 6.3 (~900ppm n-butanol in water), is considerably stronger than the outlet sample, 2.7 (~80ppm n-butanol in water).

St. Croix Sensory's Odor Intensity Referencing Scale (ASTM E544). The 10-point scale is a series of concentrations of n-butanol in water with starting point of 25ppm and an increasing concentration step factor of two.

Static Scale Level	Word Scale Reference	n-Butanol Concentration (ppm in water)
0	no odor	0
1	just perceptible	25
2	very slight	50
3	slight	100
4	slight-moderate	200
5	moderate	400
6	slightly strong	800
7	moderately strong	1,600
8	strong	3,200
9	very strong	6,400
10	extremely strong	12,800

Odor Persistency (Dose-Response Function):

Odor is a psychophysical phenomenon; the perceived odor intensity changes with concentration. Odor persistency is a term used to describe the rate at which the perceived intensity decreases as the odor is diluted, i.e. in the atmosphere down-wind from the odor source. The rate of change in intensity versus odor concentration is not the same for all odors.

The odor intensity is related to the odor concentration by the following equation (Steven's Law),

$$I = k\,(C)^n$$

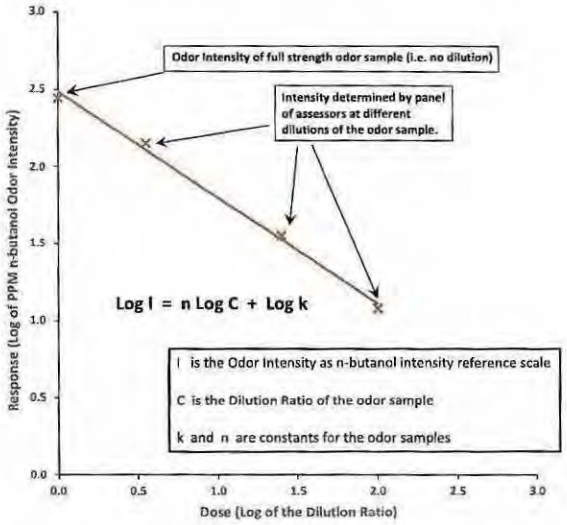
Where:
I is the odor intensity expressed in ppm n-butanol;
C is the odor concentration expressed in number of dilutions (dilution ratio); and
k & n are constants that are different for specific odorants or odorant mixtures.

This odor persistency relationship is a *Dose-Response* function (a psychophysical power function), which is linear on a log-log scale with the following equation:

$$\text{Log } I = n \text{ Log } C + \log k$$

The Dose-Response function is determined from intensity measurements of an odor at a minimum of three dilutions, utilizing ASTM E544, *Standard Practice for Referencing Suprathreshold Odor Intensity*. The plotted logarithmic values of the presented odor dilution ratios (concentrations) and the reported odor intensities create the Dose-Response function of the odor sample. The resultant straight line of the log-log plot is specific for each odor, with the slope of the line, n, representing relative persistency and the y-axis intercept, k, representing the full-strength intensity. A flatter slope of an odorant mixture represents a more persistent odor.

The following figure shows this Dose-Response function with data collected at St. Croix Sensory. In this graphic, intensity is displayed as the log of the butanol reference concentration.



This Dose-Response, persistency, graph can be converted to a Power Law graph showing how the intensity changes with the odor concentration, represented in odor units. This conversion is completed by taking the recognition threshold of the odorous air sample, the full-strength odor concentration, into consideration.

The number of odor units presented at each diluted odor presentation can be determined by dividing the Recognition Threshold (RT) by the Dose-Response dilution ratio test points. For example, if the RT (full strength odor concentration) is 2000 ou and the assessor is presented with this odor at 40 dilutions, then the assessor was presented with an odor that is has 50 ou. The power law relationship can then be represented as:

$$\text{Log } I = n' \text{ Log } (RT/C) + \text{Log } k'$$

This equation will have a positive slope. The slopes of the two curves are related by

$$n = -n'$$

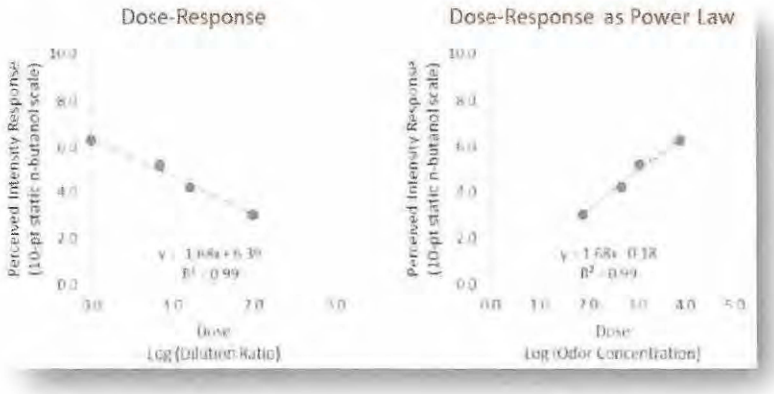
This positive slope of the Power Law graph illustrates that the odor intensity of odorants increases as the mass concentration increases.

The following graphs illustrate the persistency curves for the odor control system examples. The 10-point n-butanol scale used at St. Croix Sensory is a geometric progression (logarithmic) and thus a log conversion of the values is not necessary for plotting the Dose-Response function.

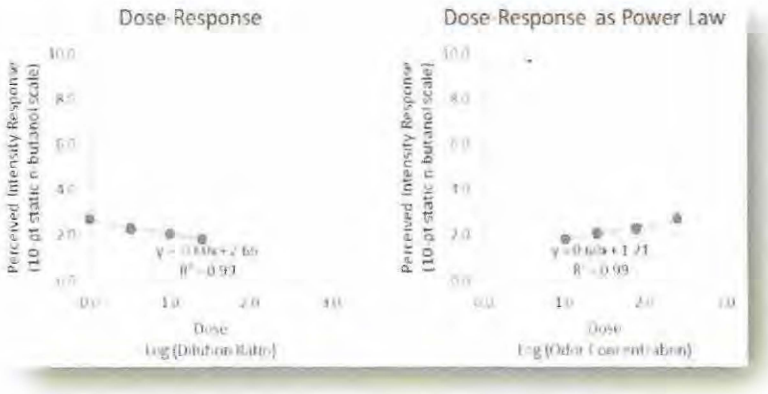
The inlet sample has a recognition threshold of 8,000 ou. The assessors were presented with this odor sample at full strength and at dilution ratios of 7, 16, and 100. The outlet sample was presented to assessors at full strength and at dilution ratios of 3, 10, and 20.

The odor control system outlet has a flatter slope than the inlet sample, intensity drops less per unit of dilution. The lower left graphic shows that by 20 dilutions, the odor intensity of the outlet has already decreased to faint odor intensity less than 2.0. The lower right graphic shows that at this odor intensity the odor concentration is 10 ou.

Odor Control System Inlet



Odor Control System Outlet



Hedonic Tone

Hedonic Tone (HT) is a measure of the pleasantness or unpleasantness of an odor sample. An arbitrary but common scale for ranking odor by hedonic tone is the use of a 21-point scale:

+10	Most Pleasant
0	Neutral
-10	Most Unpleasant

The assigning of a hedonic tone value to an odor sample by an assessor is "subjective" to the assessor. An assessor uses her/his personal experiences and memories of odors as a referencing scale. The assessor, during training, becomes aware of their individual odor experience and memory referencing.

The average value of all assessors is the reported hedonic tone (HT) for the odor sample.

It is important to note that the hedonic tone values provided by the trained assessors should not be considered to represent the opinions of the general population. The values should be used for relative comparison of the pleasantness between samples within one test session since they would be observed by the same panel of assessors.

The hedonic tone values for the odor control system samples show a change in the unpleasant odors. The inlet has a hedonic tone value of -4.5, while the outlet has a more neutral hedonic tone of -0.8.

Project Name: **Odor Control Performance Test** Samples Evalu

#	Field No.	Sample Description	DT	RT	I	HT
1	102-In	Inlet - Odor Control System	13,000	8,000	6.3	-4.5
2	102-Out	Outlet - Odor Control System	450	260	2.7	-0.8

Odor Characterization

The character of an odor, also referred to as "odor quality," is reported using standard descriptor lists. Assessors report both what the odor "smells like" (e.g. earth, fruit, etc.) and what the odor "feels like" (e.g. burning, cooling, etc.) Assessors also report relative strengths of the different character descriptors identified.

Odor Descriptors

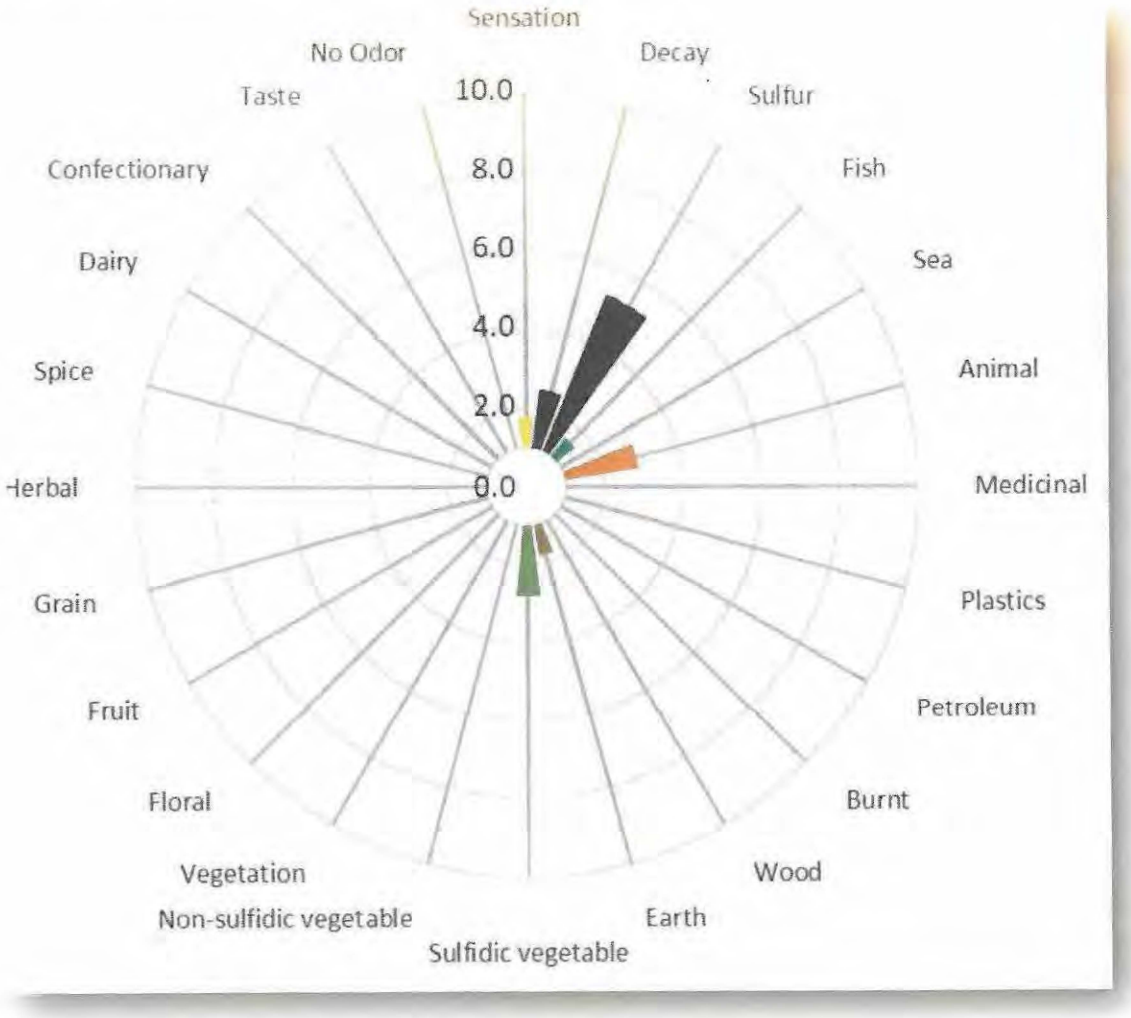
Numerous standard odor descriptor lists are available to use as a referencing vocabulary. St. Croix Sensory has developed an odor descriptor wheel based on eight (8 recognized odor descriptor categories, including **Naturally Offensive** (e.g. sulfur, decay), **Marine** (e.g. fish), **Animal** (e.g. sweat, urine), **Chemical** (e.g. petroleum, plastics, medicinal), **Earth** (e.g. wood, burnt, earthy), **Vegetation** (e.g. vegetables and vegetation), **Naturally Pleasant** (e.g. Fruity and Floral), and **Culinary** (e.g. grain, herbal, spice, dairy, confectionary). Subcategories (2nd tier) and example specific descriptors (3rd tier) within each of these odor categories are presented in the *odor wheel*. Additionally, categories for **Trigeminal Sensations** (e.g. burn, tingle, cool) and **Taste** experiences (e.g. sweet, sour) are presented.

Odor Wheel ©2016 St. Croix Sensory, Inc.

Each assessor rates the second-tier subcategories of these descriptors on the 10-point Odor Intensity Referencing Scale. The average results of the panel of all assessors are plotted on an Odor Rose™ diagram for each sample.

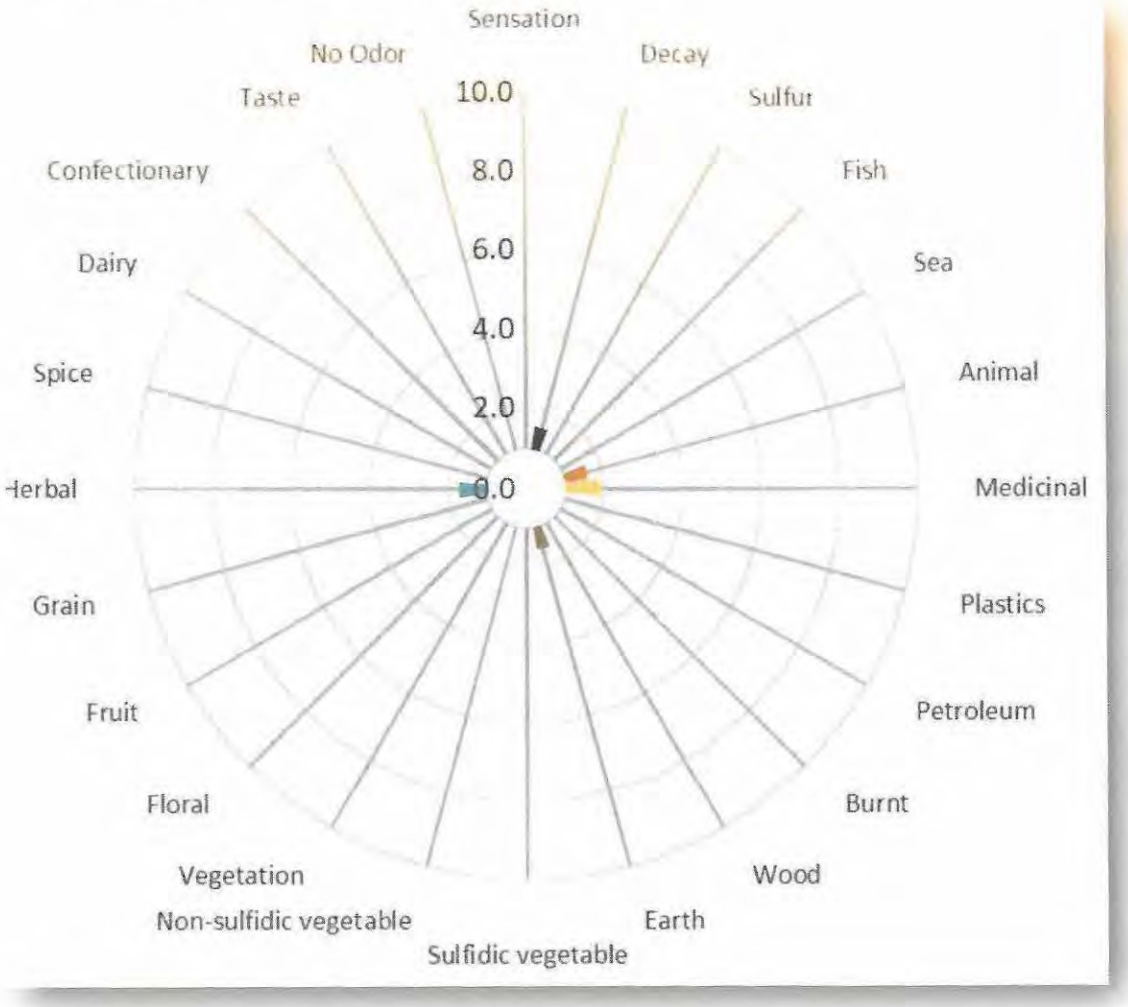
An example Odor Rose for the odor control system inlet shows highest intensity of the sulfur character attribute, followed by low intensity of decay, fish, animal, earth, and sulfidic vegetable, as well as reporting of trigeminal sensations.

Odor Control System Inlet

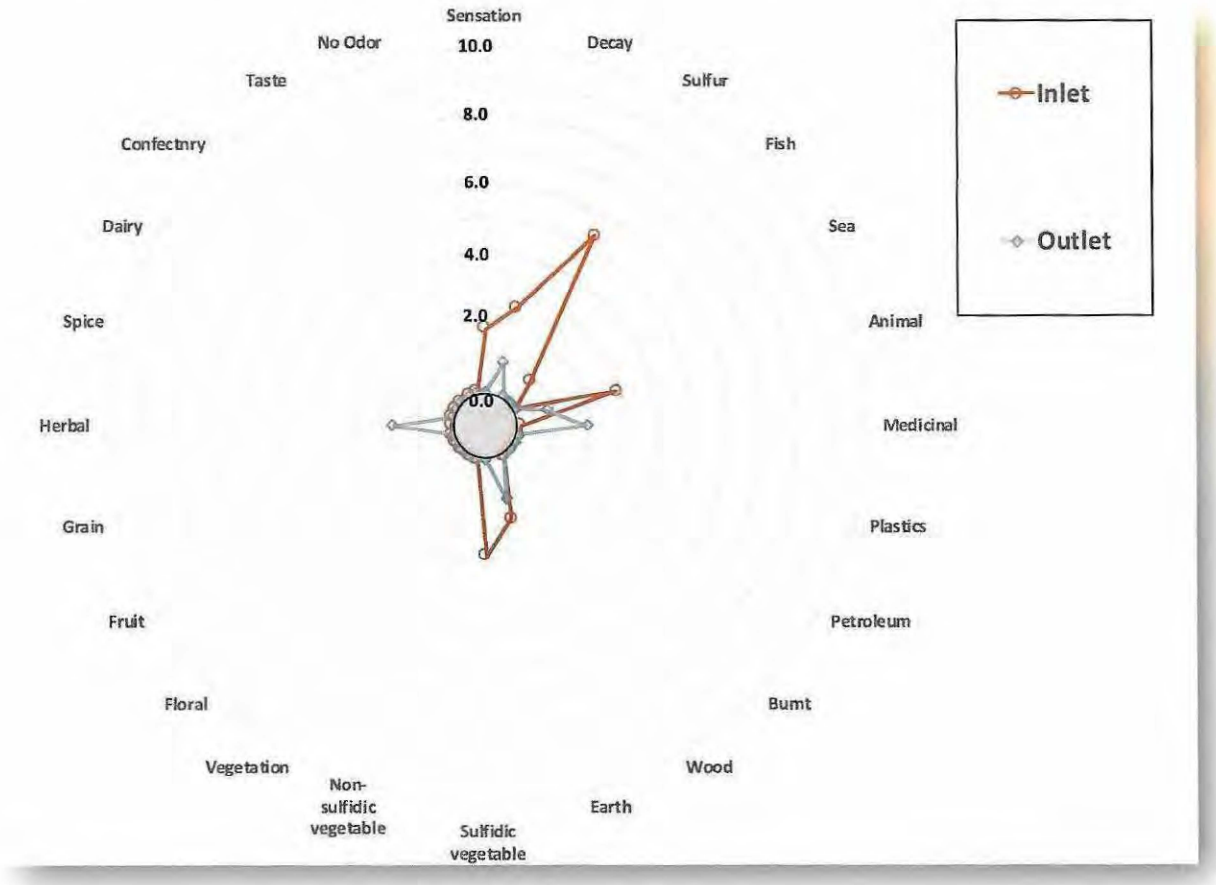


The Odor Rose for the odor control system outlet shows a reduction in the intensity of all odor characters. Sulfur, fish, sulfidic vegetable characters and trigeminal sensations are now not reported. Decay, animal, and earth are reduced in intensity. Herbal character is now present in the outlet at low intensity.

Odor Control System Outlet



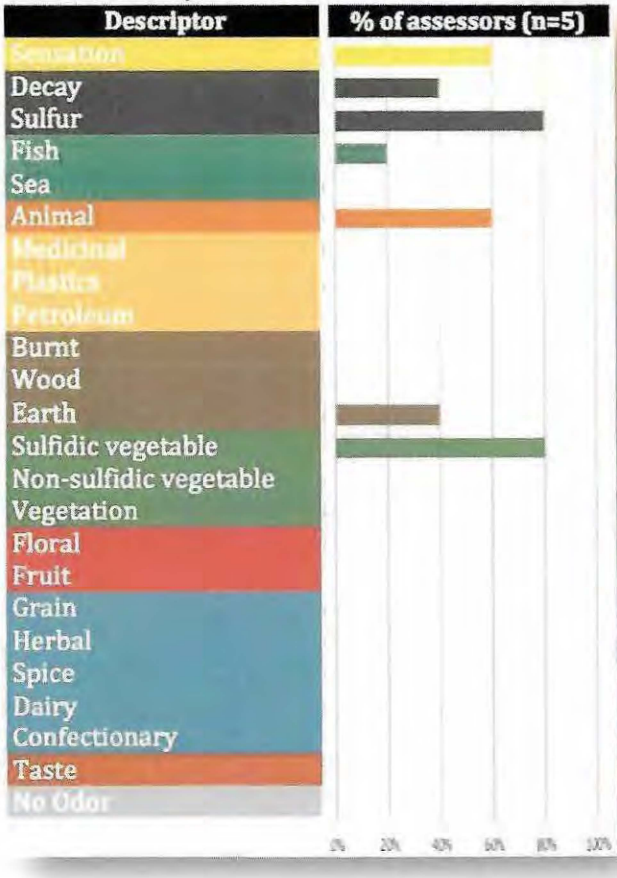
A spider graph (i.e. radar or polar plot) can be utilized to directly compare samples by overlaying the character profiles of multiple samples. Here the inlet and outlet samples are overlaid to show the reduction in intensity of the odor descriptors.



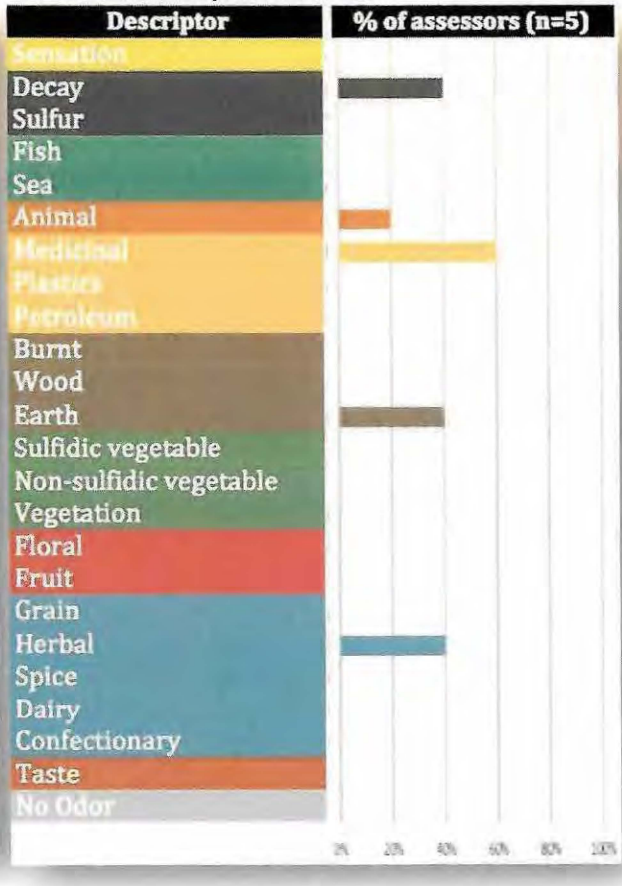
A histogram presents the percentage of assessors in the panel that assigned specific descriptors to the odor sample. Some odors are very distinguishable and show few characters with higher percentages of assessors reporting. Complex odors often have more characters listed with fewer numbers of assessors reporting each.

Fewer assessors reported trigeminal sensation, sulfur, fish, animal, and sulfidic vegetable characters in the outlet sample. The outlet sample had an increase in the number of assessors reporting medicinal and herbal characters. The same number of assessors reported decay and earth character in both the inlet and outlet samples.

Odor Control System Inlet



Odor Control System Outlet



St. Croix Sensory technical staff works closely with our clients to discuss the specific odor evaluation needs of each project to provide valuable results.

APPENDIX B
VOC AND ALDEHYDE LIST

St. Croix Sensory
VOC and Aldehyde Chemical Analysis List

TO-17 VOCs (Modified for SIFT-MS)	
Compound	CAS No.
1,1,1-trichloroethane	71-55-6
1,1,2,2-tetrachloroethane	79-34-5
1,1,2-trichloroethane	79-00-5
1,1-dichloroethane	75-34-3
1,2,4-trichlorobenzene	120-82-1
1,2-dibromo-3-chloropropane	96-12-8
1,2-dichloropropane	78-87-5
1,3,5-trimethylbenzene	108-67-8
1,3-butadiene	106-99-0
1,3-dichlorobenzene	541-73-1
1,4-dioxane	123-91-1
2-hexanone	591-78-6
2-propanol	67-63-0
(E)-1,2-dichloroethene	156-60-5
(Z)-1,3-dichloropropene	10061-01-5
acetone	67-64-1
bromoform	75-25-2
butanone	78-93-3
Carbon disulfide	75-15-0
Chlorobenzene	108-90-7
Chloroethene	75-01-4
Cyclohexane	110-82-7
dichlorodifluoromethane	75-71-8
dichloromethane	75-09-2
ethanol	64-17-5
Ethyl chloride	75-00-3
ethylbenzene	100-41-4
hexachlorobutadiene	87-68-3
hexane	110-54-3
naphthalene	91-20-3
octane	111-65-9
p-xylene	106-42-3
styrene	100-42-5
tetrahydrofuran	109-99-9
toluene	108-88-3
trichloroethylene	79-01-6
trichlorofluoromethane	83589-40-6

St. Croix Sensory
VOC and Aldehyde Chemical Analysis List

Aldehydes	
Compound	CAS No.
1-propanol	71-23-8
2-butenal	4170-30-3
2-methylbenzaldehyde	529-20-4
3-methylbutanal	590-86-3
4-methylbenzaldehyde	104-87-0
Acetaldehyde	75-07-0
Benzaldehyde	100-52-7
Butanal	123-72-8
Formaldehyde	50-00-0
Hexanal	66-25-1
Pentanal	110-62-3