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EMISSIONS EVALUATION REPORT

ALUF Plastics, Inc.

Prepared on Behalf of

Orangetown, New York

Prepared by

TRC Environmental Corporation

Windsor, Connecticut

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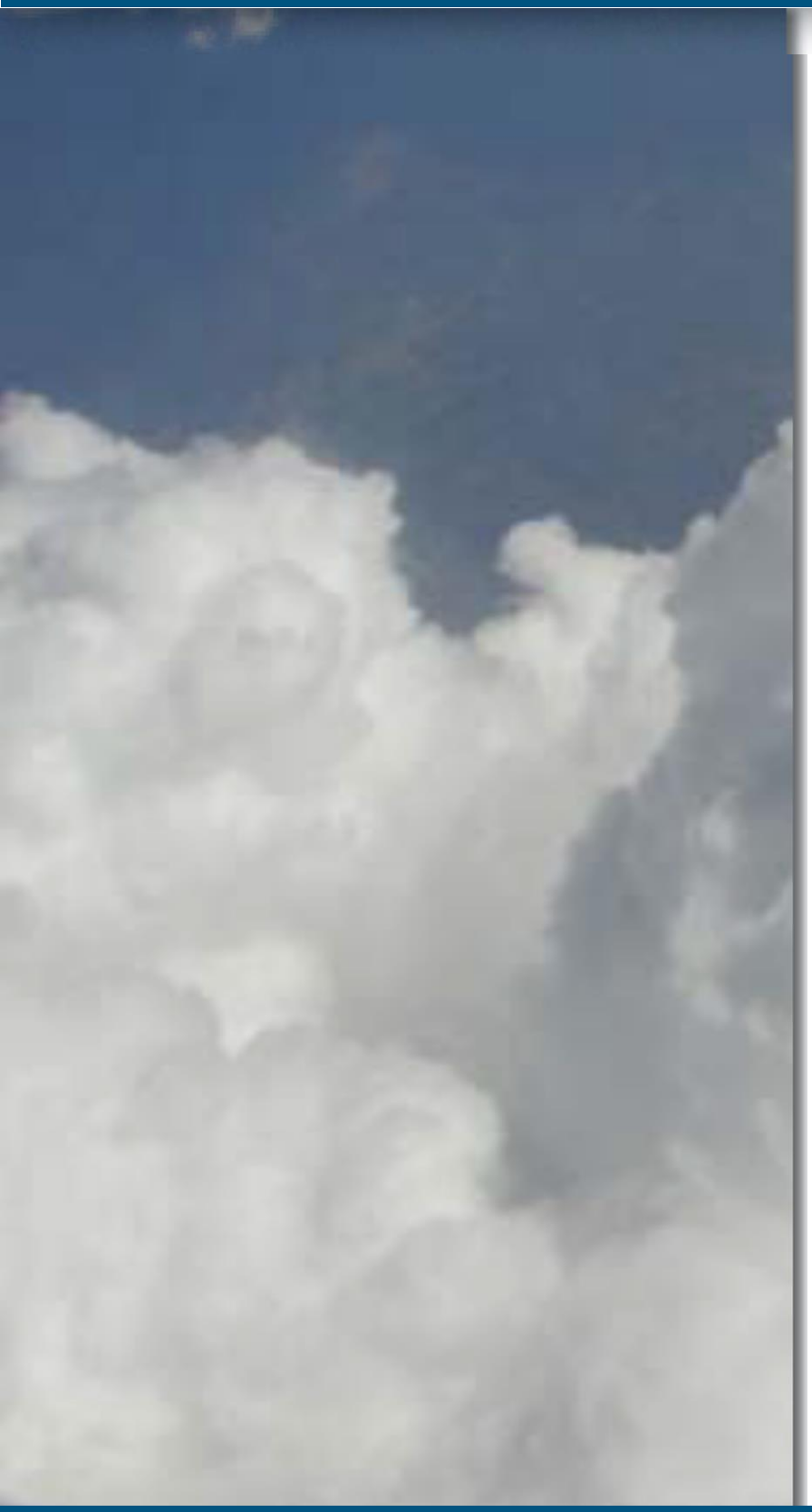

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1.0 INTRODUCTION

Aluf Plastics Incorporated (API) manufactures plastic bags. API utilizes two different type of processes to make their products. The first is an internal bubble cooling (IBC) operation that utilizes raw materials to produce the final product. The second is a reprocessing process that utilizes recycled materials to generate additional raw materials for input into the first process. The emissions from both process types are captured and then controlled by cyclones, HEPA filters and carbon media prior to being discharged to the atmosphere through the rooftop exhaust stacks. In addition, each area in the facility has wall and/or rooftop fans, blowers or vents which exhaust room air to the outdoors. These sources are not controlled.

API has been the subject of odor complaints in the neighborhoods surrounding the facility. There were 107 submitted complaints (some with multiple dates and time of odor detection) from March 1, 2017 – August 11, 2017 submitted to the Town of Orangetown (the Town). The odor descriptions included burning/burnt plastic, with and without a floral odor; melting plastic, with and without a floral odor; plastic; floral/perfume; chemical; "Aluf odor"; choking, noxious and "urinal cake". Other non-specific descriptions such as strong odor/smell and potent smell were also provided. Figure 1 provides a summary of the locations of the odor detections provided in the complaints. Figure 2 presents the facility's location and surrounding area. Appendix A provides the complaint log, including odor descriptions, which was compiled by the Town.

1.1 Previous Studies

TRC has conducted an odor survey of the neighboring areas surrounding API (Odor Survey Report, Aluf Plastics Incorporated, August 2017) as well as two rounds of ambient air monitoring for volatile organic compounds (VOCs) in the neighboring areas surrounding API (Air Quality Monitoring Report, Phase I: VOC Air Sampling & Meteorological Monitoring, October 2017; Air Quality Monitoring Report, Phase II: VOC Air Sampling & Meteorological Monitoring, April 2018). TRC also evaluated the potential health risks associated with the measured VOCs for both rounds of sampling.

1.2 Objectives

A baseline odor study had not been conducted at the facility. The objective of this odor study was to determine the facility's current offsite odor impacts and was conducted for API on behalf of Orangetown, NY. In order to achieve this objective, TRC accomplished the following tasks:

- Collected air samples directly from the five exhaust stacks and the room exhaust fans/vents on the roof and sidewalls of the facility for odor evaluation.
- Obtained field measurements and stack parameters required for modeling.
- Collected a subset of air samples for chemically analysis.
- Performed dispersion modeling to estimate maximum current ground-level odor concentrations and present potential areas around the facility where odor concentrations greater than 7 D/T may occur.
- Performed dispersion modeling to estimate maximum 1-hour and maximum annual ground-level chemical concentrations and compared them to NYS DEC Annual Guideline Concentrations (AGCs) and Short-term Guideline Concentrations (SGCs).

This study only evaluated odors directly emanating from the current IBC, Retail and Reprocessing exhaust stacks and the room fans and vents exhausting from the sidewalls and the roof of the facility, and did not take into account potential odors from other sources in the vicinity of API.

2.0 SAMPLING AND ANALYSIS

2.1 Odor Sampling and Evaluation

TRC collected a total of twenty (20) samples on March 19, 2018, five (5) from the API rooftop exhaust stacks and fifteen (15) from the room fans and vents. There were five additional wall fans that were inaccessible with available equipment and therefore were not sampled. API is sectioned into five (5) different departments; low-density, high-density, reprocessing (Repro), retail and warehouse. Samples were obtained from the following areas and sources:

- Retail area
    - Retail IBC Exhaust Stack (EP-00021)
    - 4 High Bay fans

- Reprocessing Area
    - Repro Exhaust Stack (EP-00011)
    - Blower 1
- Blending Room
    - Wall fan
- High Density Department
    - 4 Wall fans
- Low Density East Department
    - 2 IBC Exhaust Stacks (EP-00024 and -00023)
    - 2 Mushroom roof vents
    - 1 Wall fan
- Low Density West Department
    - 1 IBC Exhaust Stacks (EP-00022)
    - 2 Wall fans

All samples were collected through Teflon® sample probe lines into 10 liter Tedlar® bags using an evacuated drum technique. For stacks or exhaust vents, sample lines were inserted directly into the ducts or stacks. Samples were collected into pre-conditioned Tedlar® bags (i.e, the Tedlar® bag was partially filled with the air sample, the air was exhausted from the bag and then the bag was fully filled with the air sample) over a five minute sampling period. The wall mounted exhaust fans were accessed using a man-lift. In the Low Density Areas there are a total of eight wall mounted exhaust fans, however only three could be safely accessed. These fans exhaust room air in the Low Density Area and are expected to be similar, thus the fans that could not be sampled have been assumed to have flow rates, exhaust temperature, odor and chemical concentrations equal to the average of the three Low Density Area fans that were sampled. The effective diameter was calculated from the average flow rate and average exit velocity to create a reasonable exhaust flow for that estimated source. All other stack and emission points at API were sampled.

A subset of the emission samples were submitted to Mayfly Odor Laboratory, Mystic, CT for independent chemical testing. The samples selected were deemed representative of the facility's emissions and included:

- Stack #5 in the Retail Area (EP-00021)
- Stack #2 in the Low Density Area (EP-00024)
- High Bay exhaust fan (HB-4) in the Retail Area
- Stack #4 in the Reprocess Area (EP-00011)

- Wall Fan-1 (WF-1) in the Low Density Area
- Wall Fan-3 (HDF3) in the High Density Area

At the end of the sampling day, samples were delivered to TRC's Olfactory Laboratory in Windsor, Connecticut. The samples were evaluated the next day on March 20th by a trained seven-member odor panel for odor detectability and odor intensity following American Society for Testing and Materials (ASTM) procedures, as well as for odor character.

Odor detectability was measured using a dynamic dilution, forced-choice triangle olfactometer (Scentroid SC302, 2014). The olfactometer uses carbon-filtered, odor-free air to make dilutions of the odorous sample air. A series of dilutions is presented to the odor panelist in an ascending manner, each series representing approximately a threefold concentration step. The dilution ratios are computer controlled with a mass flow controller and were set at 1/2048, 1/676, 1/223, 1/74, 1/24, and 1/8. Each dilution level is presented to the panelist by means of three stainless steel sniff ports. Two ports dispense only carbon-filtered air, while the third dispenses the diluted odor. Flow rates from the sniff ports are maintained at a rate of 5 liters per minute (lpm). Panelists choose which port, if any, differ from the other two, i.e., whether there is a detection of odor.

The odor detectability is reported as the dilution-to-threshold (D/T) value. This value represents the ratio of the volume of odor-free air that must be added to the odorous sample to reach threshold. For example, a D/T of 100 means that 100 volumes of odor-free air must be added to one volume of odorous air to dilute it to threshold. The D/T ratio represents that dilution required for 50% of the panel to detect a difference between the odorous stimuli and the blank air. On the triangle olfactometer, this is the point at which the panelist successfully identifies the sniff port containing the odor.

The perceived odor intensity was measured with a butanol wheel arranged in a "lazy Susan" configuration. Concentrations of 1-butyl alcohol (ASTM Standard Practice E 544) are presented in twofold concentration steps. Panelists compare the ports of the triangle olfactometer with the ports on the butanol wheel and indicate the comparable level. The intensity is reported by comparing the odorous sample to port numbers 1 through 6. Ports 1 through 2 are considered weak odors; ports 3 and 4 are considered moderate odors; and ports 5 and 6 are strong odors. The reported numbers are then averaged for a mean odor intensity score for each dilution level.

The perceived odor character (what the odor smells like) is recorded according to the description provided by the odor panelists. The panelists make the determination of odor character at the last dilution cup (i.e. highest concentration administered) of the olfactometer.

2.2 Odor Evaluation Results

Table 1 presents the results of the odor evaluation of each of the samples. The data presented in the table includes the sample location and sample ID, the measured D/T value for each source, the odor character, the extrapolated odor intensity at the source (i.e. at a "zero" dilution) and the relative strength of the odor (weak, moderate, or strong) based on the odor intensity rating scale. The odor intensities are extrapolated using linear regression, which is shown on the individual data worksheets provided in Appendix B. Appendix B provides the odor worksheets and dilutions-to-intensity graphs for each sample.

As shown in Table 1, the Low Density East Department exhaust stack (EP-00024) has the highest D/T (D/T of 128) followed by the Repro exhaust stack (EP-00011) (D/T of 80), however, based upon the extrapolated odor intensity at a zero dilution, all the sources would be characterized as having a weak odor intensity. Generally values less than 30 D/T are typical of ambient odors, while those ranging from 30 to 300 D/T are typical of outlets from odor control devices (McGinley and McGinley, 2006[1]).

2.3 Results of Chemical Analysis

Mayfly Odor Laboratory's chemical analysis reports can be found in Appendix C. As further discussed in Section 3.1, the detected concentrations were compared to the previously reported ambient air quality sample concentrations collected in the community (TRC's Air Quality Monitoring Report Phase I and Phase II: VOC Air Sampling & Meteorological Monitoring, October 2017 and February 2018). Compounds found in both the emissions and the ambient samples were then ordered by their emission rates and the lowest NYDEC Annual Guideline Concentrations (AGCs). The four compounds with the highest emissions and the greatest toxicity (lowest AGCs) were selected for dispersion modeling:

[1] McGinley, C.M. and McGinley, M.A. 2006. An Odor Index Scale for Policy and Decision Making Using Ambient and Source Odor Concentrations. Presented at: WEF/AWMA Specialty Conference: Odors and Air Emissions. April 9-12.

- O,P-xylene
- hexane
- ethyl benzene
- benzene

The results of the modeling are discussed in Section 3.2.2. Additionally, a qualitative evaluation of acrolein was conducted. Due to the type of sampling that was performed, a quantitative evaluation was not possible and outside of the scope of this study. However, Mayfly was able to obtain a positive qualitative result confirming low levels of acrolein present in the air emitted from the fans/vents, although the actual concentration of the acrolein emitted is unknown.

3.0 MODELING

3.1 Odor Modeling Methodology

3.1.1 Model Inputs

Current impacts from the API emission sources were modeled with the latest version of the Environmental Protection Agency's (EPA) AERMOD model (version 16216r). The model's regulatory default options were used, which includes stack tip downwash. Building downwash (the effect of building structures on airflow) was characterized by entering the dimensions for facility buildings into the Building Profile Input Program for PRIME (BPIPPRM) version 04274, which calculated the appropriate building geometry settings to use in AERMOD.

Following EPA guidance, buildings included in the BPIPPRM analysis were the facility structure itself and a warehouse structure to the north. Structure and source exhaust heights for API were estimated using Google Earth Pro's 3D Path ruler. The structure heights and base elevations, determined using elevation data and topographic maps, were incorporated into a BPIPPRM input file along with the source stack heights using a TRC created program. That input file was run through the BPIPPRM program to create downwash information for input in AERMOD. That information was also used to create a Google Earth (kml) file using a TRC created program to present in Google Earth for location confirmation. The 3-D structure view is presented in Figure 3.

Five years (2012-2016) of Westchester County Airport (WBAN 94745) National Weather Service (NWS) hourly surface data with Brookhaven (WBAN 94703) upper air data were selected as being climatologically representative of API since those stations are the closest to the facility with the appropriate data available. Those AERMET processed data were provided by the New York State Department of Environmental Conservation via email request (John Kent – NYDEC on March 30, 2018) for meteorological data appropriate for Orangeburg, NY where API is located. Figure 4 presents the frequency of wind direction and speed in a windrose of the AERMET processed data for Westchester County Airport.

The modeling receptor array was developed using AERMAP (version 11103), EPA's terrain pre-processor for AERMOD. The terrain elevation assigned to each receptor was found using the 1/3-Arc Second (10 meter) National Elevation Dataset (NED). These modeling analyses were performed using a square (i.e. Cartesian) receptor grid to assess odor impacts:

- Property line receptors spaced at 10 meters;
- Fine grid receptors were spaced at intervals of 50 meters within a distance of 2 kilometers from the approximate center of the source locations;
- Medium grid receptors were spaced at intervals of 500 meters from 2 kilometers to 5 kilometers;
- Coarse grid receptors were spaced at intervals of 1 kilometer from 5 kilometers to 10 kilometers.

The near-field receptor locations are presented in Figure 5. The far-field receptor locations are presented in Figure 6.

3.1.2 Source Emission Rates and Parameters

The odor threshold or dilution-to-threshold (D/T) values at each source described in Table 1 were used to derive the odor emission rates for the current scenarios. Source odor emission rates were calculated as the product of the D/T value and the flow rate (cubic meters/second) for each point source. A total of twenty (20) sources were included in the odor modeling which included exhaust stacks, fans and vents. Each source was sampled for odor and an odor emission rate for source was calculated as presented in Table 2.

Stack parameters for each source were collected, calculated, and/or estimated using a combination of information found during the odor sampling, with Google Earth Pro, and information for similar sources using an online search. Exhaust temperatures, exhaust flow rates, and stack exhaust diameters were collected during the sampling program for each source with the exception of the exhaust flow rate and diameter of the "mushroom" roof vents and Low Density Areas Wall Fans 4-8 as the configuration or location of those sources made it difficult to collect that information. The stack parameters were estimates for Low Density Areas Wall Fans 4-8 as described in Section 2.1. Neither API, nor town representatives were able to provide manufacturer's information for the mushroom vents or fan driven exhausts. The diameter of the mushroom vent was measured in both Google Earth Pro and ArcMap programs on aerial imagery and both measurement tools in those programs showed a diameter of approximately 2 meters or 80 inches. An online search for a similar mushroom roof fan yielded an information sheet for a fan with an outer diameter of 70 inches. The maximum flow rate for the similar model fan (RB60T11000) was conservatively used to calculate the exhaust velocity and odor emission rate for those two mushroom roof fan sources. Source exhaust heights were estimated using Google Earth Pro as described above in the building downwash discussions as those were not provided by API or town representatives. The stack exhaust heights as measured in Google Earth Pro are approximately 20 meters above grade. A schematic for the exhaust stacks was also provided indicating the stack exhausts would be designed at 65 ft (19.81 meters) above grade and that was the height used for those sources.

3.1.3 Impact Averaging and Threshold D/T

For the current and the future scenarios, a peak to mean concentration ratio was utilized to account for the fact that AERMOD predicts hourly mean concentrations while peak odors are actually perceived on a time span of several seconds, the duration of a human breath. Without this factor, the AERMOD model would under-predict likely odor concentrations. During the course of an hour, an emission plume meanders both horizontally and vertically. A receptor point might be "in the plume" for part of an hour, during which a peak concentration would occur and the odor might be detectible. During the remainder of the hour, the receptor might be "out of the plume" and the odor would not be detectible. A model predicted hourly average concentration represents the average concentration during the

full hour, when the receptor is both in and out of the instantaneous plume. To account for this plume meander, the model predicted hourly average impacts were multiplied by a peak-to-mean concentration ratio of six. This ratio was derived using "A Conversion Scheme for the ISC Model in Odor Modeling" (Cha et al, Presented at 85th Annual Meeting and Exhibition of the Air and Waste Management Association, Kansas City, MO, June 21-29, 1992). This approach is conservative and TRC has found good agreement between model predictions and observed ambient odor strengths using this approach. A sample or predicted impact with an odor D/T value greater than 7.0 is considered to be above the odor recognition threshold and may potentially evoke complaints. This threshold of 7.0 D/T will be used in discussion of odor impacts with the results.

3.1.4 Chemical Modeling

The AERMOD model was also used to predict chemical concentrations from API's emissions. The building parameters, meteorological data, receptor arrays and source parameters for each emission point (stack, vent or fan) were identical to those described above for the odor modeling. The Mayfly reported compound concentrations (Appendix C) were compared to the previously reported ambient air quality sample concentrations collected in the community (TRC's Air Quality Monitoring Report Phase I and Phase II: VOC Air Sampling & Meteorological Monitoring, October 2017 and February 2018). Compounds found in both the emissions and the ambient samples were then ordered by their emission rates and the lowest NYDEC Annual Guideline Concentrations (AGCs). The four compounds with the highest emissions and the greatest toxicity (lowest AGCs) were selected for dispersion modeling:

- O,P-xylene
- hexane
- ethyl benzene
- benzene

The samples for which chemical analyses were conducted were used to represent concentrations of the compounds in other sources within their production area. The following chemical samples were used to represent the listed sources:

- Stack #5 in the Retail Area: Stack #5
- Stack #2 in the Low Density Area: Stacks #1-3
- High Bay exhaust fan (HB-4) in the Retail Area: High Bay Fans 1-4
- Stack #4 in the Reprocess Area: Stack #4, Blending Room Fan, Blower #1
- Wall Fan-1 (WF-1) in the Low Density Area: WF-1 through WF-8, Mushroom Vents 1&2
- Wall Fan-3 (HDF3) in the High Density Area: Wall Fans HDF 1-4

The flow rate measured at each emission point was multiplied by the measured concentrations of each compound to determine the gram per second (g/s) emission rate of each pollutant from each source. As discussed above, average values were used to model the emissions from the Low Density Area Wall Fans 4-8. Table 3 shows the calculated emission rate for each modeled source.

3.2 Modeling Results

3.2.1 Odor Modeling Results: Current Configuration Scenario

Maximum predicted odor impacts attributed to API under the current configuration are presented in Table 4. The maximum impacts of all sources combined is greater than the 7 D/T threshold with a maximum combined odor impact of 76.09 D/T for all sources. Also presented in Table 4 are impacts from source groups representing each department or processing area as well each individual stack as stack height adjustments could potentially be used to mitigate nuisance odor in the surrounding area. Note that the maximum hourly impact for each group is not the contribution to the maximum impact for all sources, but the maximum hourly impact for that group only, which could occur in a time and or location different than the maximum odor impact for all sources combined. Source groups with maximum odor impacts greater than 7 D/T are the Low Density East Department, Retail Area, High Density Department and Reprocessing Area. The maximum impact for each individual stack was not greater than 7 D/T indicating that adjustment of stack heights probably will not result in any great reduction of odor in the surrounding area. The Low Density East Department was the source group with the greatest impact almost as high as the impacts from all Sources combined. This group was comprised of Wall Fan #2, Wall Fans #4-8, Stack 1 and 2, and the mushroom vents. An adjustment or control to the non-stack sources from this group would probably result in lower predicted odor impacts. Also the mushroom fans source parameters were estimated by TRC using information found online as

manufacturer information was not provided. The use of non-manufacturer information for these sources could also have resulted in predicted odor impacts greater than what would have been shown with manufacturer information.

The current scenario spatial extents of maximum predicted impacts greater than 7 D/T are presented in Figure 7 and extend at maximum 400 meters (1,312 feet) from the property line. The areas included in the 7 D/T area are mostly commercial, but the Bike Trail to the west and some residential areas are with in the area to the northwest, southeast and west of the property. This indicates that under certain conditions odors attributed to the facility could be detected and identified in those areas. The maximum impact for all sources is predicted to be on the central west property boundary which indicates that odor greatly decreases as distance from the property increases.

3.2.2 Chemical Modeling Results: Current Configuration Scenario

The AERMOD predicted maximum one-hour and annual average concentrations for the modeled compounds are presented in Tables 5 and 6, respectively. As shown in Tables 5 and 6, none of the modeled maximum 1-hour (Table 5) or maximum annual (Table 6) chemical concentrations exceed their respective SGCs or AGCs.

4.0 CONCLUSIONS

The odor modeling portion of this study shows that odors emanating from the existing stacks and wall fans/roof vents at the API facility are relatively low with the maximum predicted D/T of 76 occurring at the facility fenceline near Glenshaw Road (see Figure 7). However, the predicted impacts from the modeling show that the spatial extent of the predicted impacts greater than 7 D/T extend at maximum 400 meters (1,312 feet) from the property line from the source, and the impacts decrease with distance. The area within the 7 D/T impact contour mostly includes commercial property as well as the Bike Trail and some residential areas. Although not a New York State regulatory standard, a 7 D/T is commonly used as an odor nuisance criteria, i.e. at or above that threshold the odor can be considered objectionable.

The modeling of chemicals emitted from the stacks, wall fans and roof vents indicates that the maximum predicted 1-hour and annual concentrations are less than NYS DEC's AGCs and SGCs.

TABLES

Table 1. Odor Evaluation Results
Date Sampled –March 19, 2018, Evaluated March 20, 2018

Source/Sample ID	D/T Value	Odor Character	Odor Intensity[1]	Odor Intensity Scale[2]
Retail Area Retail IBC Stack Exhaust (EP-00021)	42	Perfume, Lysol, sweet chemical, chemical	3.17	Weak
High Bay Fan 1	36	Chemical, burnt, perfume, apples, fragrance	2.58	Weak
High Bay Fan 2	42	Sweet chemical, chemical, burnt	2.78	Weak
High Bay Fan 3	49	Sweet chemical, chemical, burnt, perfume	3.16	Weak
High Bay Fan 4	31	Chemical, burnt, sweet, perfume, sweet chemical	2.31	Weak
Reprocessing Area Repro Exhaust Stack (EP-00011)	80	Vinegar, sweet, pine, acetone, sweet chemical	3.17	Weak
Blower 1	22	Solvent, glue, smoky, burnt	1.67	Weak
Blending Room Wall Fan	26	Gassy, smoky, burnt	1.34	Weak
High Density Department High Density Fan 1	26	Burnt, acrid, chemical, smoky	2.07	Weak
High Density Fan 2	26	Chemical, burnt, acrid chemical, smoky	2.51	Weak
High Density Fan 3	36	Oily chemical, smoky, burnt, chemical	1.92	Weak
High Density Fan 4	22	Sour chemical, chemical, smoky, burnt	1.82	Weak
Low Density East Department LDE IBC Exhaust Stack (EP-00023)	31	Smoky, burnt	2.34	Weak
LDE IBC Exhaust Stack (EP-00024)	128	Chemical, smoky, burnt	2.55	Weak
Mushroom Vent 1	68	Vinegar, acrid, chemical, acrid chemical	2.67	Weak
Mushroom Vent 2	22	Burnt cooking oil, smoky, burning	1.54	Weak
Wall Fan 2	26	Burnt, chemical	1.68	Weak
Low Density West Department LDW IBC Exhaust Stack (EP-00022)	68	Smoke, smoky, burnt, chemical	2.35	Weak
Wall Fan 1	10	Plastic, burnt, chemical	0.83	Weak
Wall Fan 3	31	Chemical, burnt, smoky, solvent	2.00	Weak

Notes:
[1] Calculated Odor Intensity at the source ("Zero dilution"). See Appendix B for individual worksheets and dilutions-to-intensity graphs.
[2]Odor Intensity Scale:
1 to 3 = weak odors
4 to < 6 = moderate odors
> 6 = strong odors

Table 2: Source Emission Rates and Parameters

Source Type	Source Description	Stack ID	Easting (NAD83 Zone 12) (meters)	Northing (NAD83 Zone 12) (meters)	Grade (feet)	Grade (meters)	Exhaust Release Height above Grade (meters)*	Stack Exhaust Configuration	Stack Length (inches)	Stack Width (inches)	Stack Diameter or Equivalent (inches)	Stack Diameter or Equivalent (meters)	Flow Rate (ACFM)**	Flow Rate (m^3/sec)	Exit Velocity (ft/s)	Exit Velocity* (m/s)	Temperature (ºF)	Temperature (ºK)	Odor Sample Value (D/T)	Odor Emission Rate (D/T)*(m^3/sec)
POINTHOR	WF-1 (Low Density Area West)	WF01	588167.6	4545317.3	120	36.58	12.00	Horizontal	44	44	49.65	1.261	1613	0.76	2.00	0.61	75	297	10	8
POINTHOR	WF-2 (Low Density Area East)	WF02	588209.0	4545366.2	120	36.58	17.00	Horizontal	48	48	54.16	1.376	24800	11.70	25.83	7.87	75	297	26	304
POINTHOR	WF-3 (Low Density Area West)	WF03	588165.1	4545374.6	120	36.58	15.00	Horizontal	48	48	54.16	1.376	11188	5.28	11.65	3.55	75	297	31	164
POINTHOR	HB-1 (High Bay Fan)	HB01	588183.5	4545621.4	120	36.58	14.00	Horizontal	60	60	67.70	1.720	28750	13.57	19.17	5.84	75	297	36	488
POINTHOR	HB-2 (High Bay Fan)	HB02	588184.4	4545609.5	120	36.58	14.00	Horizontal	60	60	67.70	1.720	49375	23.30	32.92	10.03	75	297	42	979
POINTHOR	HB-3 (High Bay Fan)	HB03	588185.5	4545597.4	120	36.58	14.00	Horizontal	60	60	67.70	1.720	21875	10.32	14.58	4.45	75	297	49	506
POINTHOR	HB-4 (High Bay Fan)	HB04	588185.9	4545584.9	120	36.58	14.00	Horizontal	60	60	67.70	1.720	17500	8.26	11.67	3.56	75	297	31	256
POINTHOR	HD-1 (High Density Area)	HD01	588214.0	4545452.6	120	36.58	7.50	Horizontal	48	48	54.16	1.376	9480	4.47	9.88	3.01	75	297	26	116
POINTHOR	HD-2 (High Density Area)	HD02	588214.9	4545438.5	120	36.58	7.50	Horizontal	48	48	54.16	1.376	9236	4.36	9.62	2.93	75	297	26	113
POINTHOR	HD-3 (High Density Area)	HD03	588215.7	4545429.3	120	36.58	7.50	Horizontal	48	48	54.16	1.376	11080	5.23	11.54	3.52	75	297	36	188
POINTHOR	HD-4 (High Density Area)	HD04	588216.6	4545421.5	120	36.58	7.50	Horizontal	48	48	54.16	1.376	10880	5.13	11.33	3.45	75	297	22	113
POINTHOR	Blending Room Fan	BLND	588207.4	4545527.3	120	36.58	5.50	Horizontal	48	48	54.16	1.376	11256	5.31	11.73	3.57	75	297	26	138
POINTHOR	Blower #1	BLOW01	588192.7	4545548.4	120	36.58	2.00	Horizontal	39	54	51.78	1.315	39853	18.81	45.42	13.84	75	297	22	414
POINT	Stack 1 - LD2 - I.B.C. Exhaust (EP-00023)	Stack01	588220.4	4545332.9	120	36.58	19.80	Vertical	n/a	n/a	24.00	0.610	13300	6.28	70.56	21.51	75	297	31	195
POINT	Stack 2 - LD3 - I.B.C. Exhaust (EP-00024)	Stack02	588219.2	4545400.4	120	36.58	19.80	Vertical	n/a	n/a	24.00	0.610	13800	6.51	73.21	22.31	82	301	128	834
POINT	Stack 3 - LD1 - I.B.C. Exhaust (EP-00022)	Stack03	588153.5	4545332.2	120	36.58	19.80	Vertical	n/a	n/a	24.00	0.610	14400	6.80	76.39	23.29	78	299	68	462
POINT	Stack 4 - Repro Exhaust (EP-00011)	Stack04	588194.5	4545575.7	120	36.58	19.80	Vertical	n/a	n/a	24.00	0.610	19300	9.11	102.39	31.21	60	289	80	729
POINT	Stack 5 - Retail I.B.C. Exhaust (EP-00021)	Stack05	588194.9	4545618.1	120	36.58	19.80	Vertical	n/a	n/a	24.00	0.610	14000	6.61	74.27	22.64	74	296	42	278
POINTCAP	Mushroom Vent 1	MV01	588210.6	4545406.9	120	36.58	10.50	Vertical Capped	n/a	n/a	78.74	2.000	61562	29.05	30.34	9.25	75	297	68	1976
POINTCAP	Mushroom Vent 2	MV02	588197.1	4545405.4	120	36.58	10.50	Vertical Capped	n/a	n/a	78.74	2.000	61562	29.05	30.34	9.25	75	297	22	639
POINTHOR	WF-4-8 (Low Density Area)***	WF04_08	588205.6	4545320.3	120	36.58	15.00	Horizontal			121.0	3.07	62668	29.58	13.08	3.99	75	297	22	661

*Measured Using Google Earth Pro, Ruler Tool with 3D Path, but chose the most common height for Stacks from the previous modeling report from September 2017

**All flow rate were measured except those of the Mushroom Vents. Mushroom vent flow assumed based on flow found for a 70" diameter RB Belt Drive Roof Exhauster

***WF-4-8 Flow rates, exhaust temperature, odor and chemical concentrations equal to the average of the three Low Density Area fans that were sampled. The effective diameter was calculated from the average flow rate and average exit velocity to create a reasonable exhaust flow for that estimated source.

Table 3. Chemical Emission Rates

Source Type	Source Description	Stack ID	Benzene	Ethyl Benzene	Hexane	o- & p- Xylene
			g/s	g/s	g/s	g/s
POINTHOR	WF-1 (Low Density Area West)	WF01	3.86E-06	1.09E-05	2.69E-06	3.64E-05
POINTHOR	WF-2 (Low Density Area East)	WF02	5.94E-05	1.68E-04	4.14E-05	5.59E-04
POINTHOR	WF-3 (Low Density Area West)	WF03	2.68E-05	7.59E-05	1.87E-05	2.52E-04
POINTHOR	HB-1 (High Bay Fan)	HB01	5.43E-05	1.85E-04	7.17E-04	5.80E-04
POINTHOR	HB-2 (High Bay Fan)	HB02	9.33E-05	3.17E-04	1.23E-03	9.97E-04
POINTHOR	HB-3 (High Bay Fan)	HB03	4.13E-05	1.40E-04	5.46E-04	4.41E-04
POINTHOR	HB-4 (High Bay Fan)	HB04	3.31E-05	1.12E-04	4.37E-04	3.53E-04
POINTHOR	HD-1 (High Density Area)	HD01	7.48E-06	2.53E-05	1.58E-05	1.06E-04
POINTHOR	HD-2 (High Density Area)	HD02	7.28E-06	2.46E-05	1.54E-05	1.04E-04
POINTHOR	HD-3 (High Density Area)	HD03	8.74E-06	2.96E-05	1.85E-05	1.24E-04
POINTHOR	HD-4 (High Density Area)	HD04	8.58E-06	2.90E-05	1.82E-05	1.22E-04
POINTHOR	Blending Room Fan	BLND	4.54E-05	5.57E-05	1.88E-05	1.74E-04
POINTHOR	Blower #1	BLOW01	1.61E-04	1.97E-04	6.65E-05	6.15E-04
POINT	Stack 1 - LD2 - I.B.C. Exhaust (EP-00023)	Stack01	3.05E-05	7.96E-05	6.31E-04	2.66E-04
POINT	Stack 2 - LD3 - I.B.C. Exhaust (EP-00024)	Stack02	3.13E-05	8.15E-05	6.47E-04	2.72E-04
POINT	Stack 3 - LD1 - I.B.C. Exhaust (EP-00022)	Stack03	3.29E-05	8.57E-05	6.80E-04	2.86E-04
POINT	Stack 4 - Repro Exhaust (EP-00011)	Stack04	8.01E-05	9.82E-05	3.31E-05	3.06E-04
POINT	Stack 5 - Retail I.B.C. Exhaust (EP-00021)	Stack05	4.98E-05	8.58E-05	8.17E-04	2.65E-04
POINTCAP	Mushroom Vent 1	MV01	1.47E-04	4.18E-04	1.03E-04	1.39E-03
POINTCAP	Mushroom Vent 2	MV02	1.47E-04	4.18E-04	1.03E-04	1.39E-03
POINTHOR	WF-4-8 (Low Density Area)***	WF04_08	1.50E-04	4.25E-04	1.05E-04	1.41E-03

Table 4. Maximum Model Predicted Impacts per Source and Combined

Group or Source Description	Model ID	Maximum Modeled Hourly Impacts (D/T)
Low Density Dept East (WF-2, WF-4-8, Stacks 1 and 2, Mushroom Vents)	LOWDENSE	73.59
Low Density Dept West (WF-1 and WF-3, Stacks 3)	LOWDENSW	2.13
Retail Area (All Four High Bay Fans, Stack 5)	RETAIL	46.47
High Density Dept (All four High Density Fans)	HIGHDENS	15.25
Blending Room Fan	BLND	6.15
Reprocessing Area (Blower 1, Stack 4)	REPRO	17.04
Stack 1 - LD2 - I.B.C. Exhaust (EP-00023)	Stack01	0.23
Stack 2 - LD3 - I.B.C. Exhaust (EP-00024)	Stack02	1.86
Stack 3 - LD1 - I.B.C. Exhaust (EP-00022)	Stack03	0.54
Stack 4 - Repro Exhaust (EP-00011)	Stack04	1.85
Stack 5 - Retail I.B.C. Exhaust (EP-00021)	Stack05	0.31
All Sources	ALL	76.09

Table 5: Maximum Hourly AERMOD Predicted Chemical Concentrations

Group or Source Description	Model ID	Maximum Modeled Hourly Impacts ($\mu g/m^3$)			
		Benzene	Ethylbenzene	Hexane	Xylene
Low Density Dept East (WF-2, Stacks 1 and 2, Mushroom Vents)	LOWDENSE	1.33	3.79	0.94	12.62
Low Density Dept West (WF-1 and WF-3, Stacks 3)	LOWDENSW	0.06	0.17	0.14	0.55
Retail Area (All Four High Bay Fans, Stack 5)	RETAIL	0.77	2.61	10.13	8.20
High Density Dept (All four High Density Fans)	HIGHDENS	0.15	0.50	0.31	2.11
Blending Room Fan	BLND	0.34	0.41	0.14	1.29
Reprocessing Area (Blower 1, Stack 4)	REPRO	1.10	1.35	0.46	4.22
Stack 1 - LD2 - I.B.C. Exhaust (EP-00023)	Stack01	0.01	0.02	0.12	0.05
Stack 2 - LD3 - I.B.C. Exhaust (EP-00024)	Stack02	0.01	0.03	0.24	0.10
Stack 3 - LD1 - I.B.C. Exhaust (EP-00022)	Stack03	0.01	0.02	0.13	0.06
Stack 4 - Repro Exhaust (EP-00011)	Stack04	0.03	0.04	0.01	0.13
Stack 5 - Retail I.B.C. Exhaust (EP-00021)	Stack05	0.01	0.02	0.15	0.05
All Sources	ALL	1.36	3.89	10.15	13.01
NYS DEC Short-term Guideline Concentrations		1,300	None	None	22,000

Table 6: Maximum Annual AERMOD predicted compound concentrations

Group or Source Description	Model ID	Maximum Modeled Annual Impacts ($\mu g/m^3$)			
		Benzene	Ethylbenzene	Hexane	Xylene
Low Density Dept East (WF-2, Stacks 1 and 2, Mushroom Vents)	LOWDENSE	0.021	0.060	0.025	0.201
Low Density Dept West (WF-1 and WF-3, Stacks 3)	LOWDENSW	0.001	0.004	0.011	0.012
Retail Area (All Four High Bay Fans, Stack 5)	RETAIL	0.029	0.095	0.385	0.300
High Density Dept (All four High Density Fans)	HIGHDENS	0.004	0.014	0.009	0.060
Blending Room Fan	BLND	0.006	0.008	0.003	0.024
Reprocessing Area (Blower 1, Stack 4)	REPRO	0.023	0.028	0.010	0.088
Stack 1 - LD2 - I.B.C. Exhaust (EP-00023)	Stack01	0.0003	0.001	0.005	0.002
Stack 2 - LD3 - I.B.C. Exhaust (EP-00024)	Stack02	0.0005	0.001	0.009	0.004
Stack 3 - LD1 - I.B.C. Exhaust (EP-00022)	Stack03	0.001	0.001	0.011	0.005
Stack 4 - Repro Exhaust (EP-00011)	Stack04	0.001	0.001	0.000	0.002
Stack 5 - Retail I.B.C. Exhaust (EP-00021)	Stack05	0.001	0.003	0.024	0.008
All Sources	ALL	0.045	0.119	0.397	0.375
NYS DEC Annual Guideline Concentrations		0.13	1,000	700	100

FIGURES

Figure 1: Complaint Locations Surrounding API

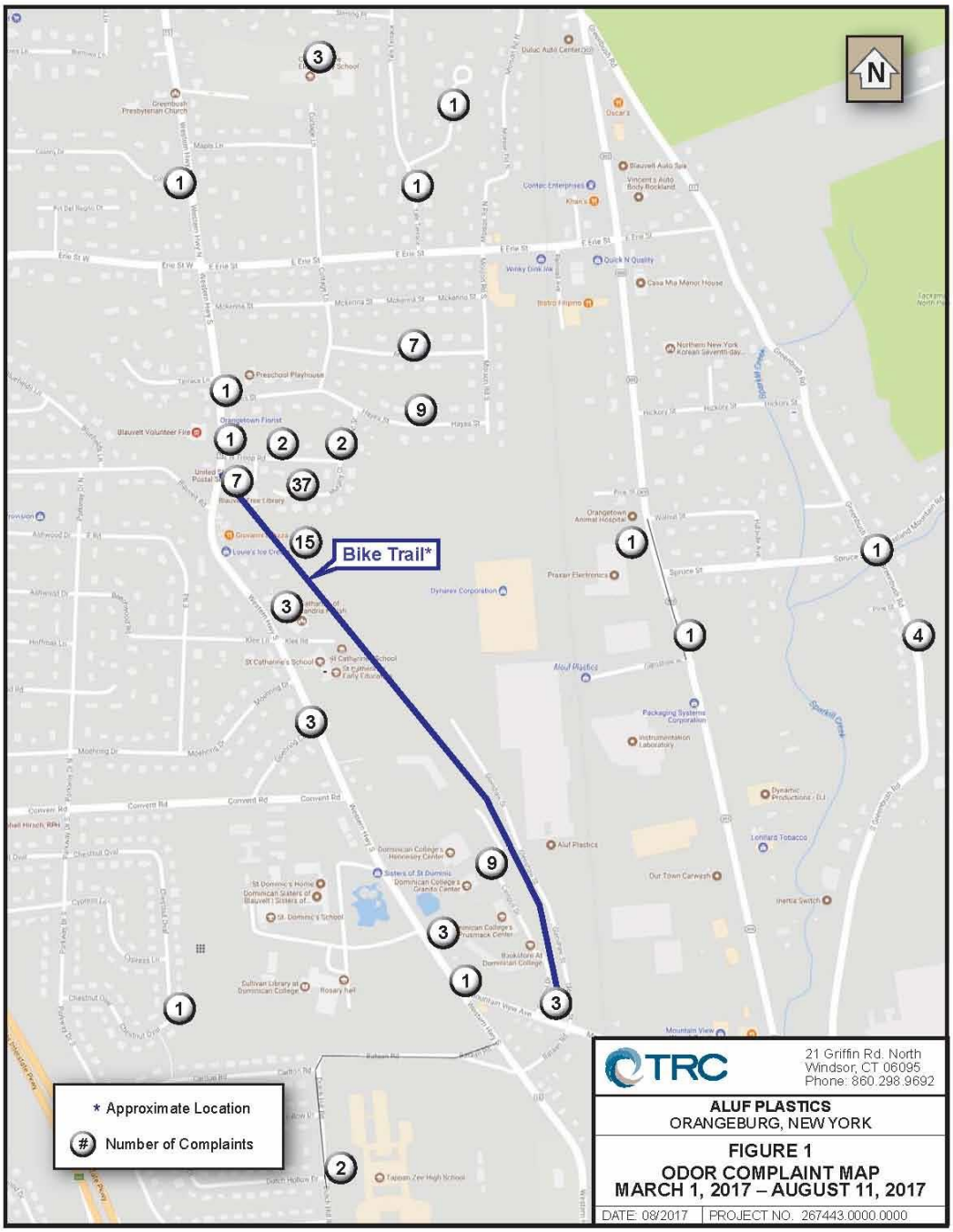


Figure 2: API Location

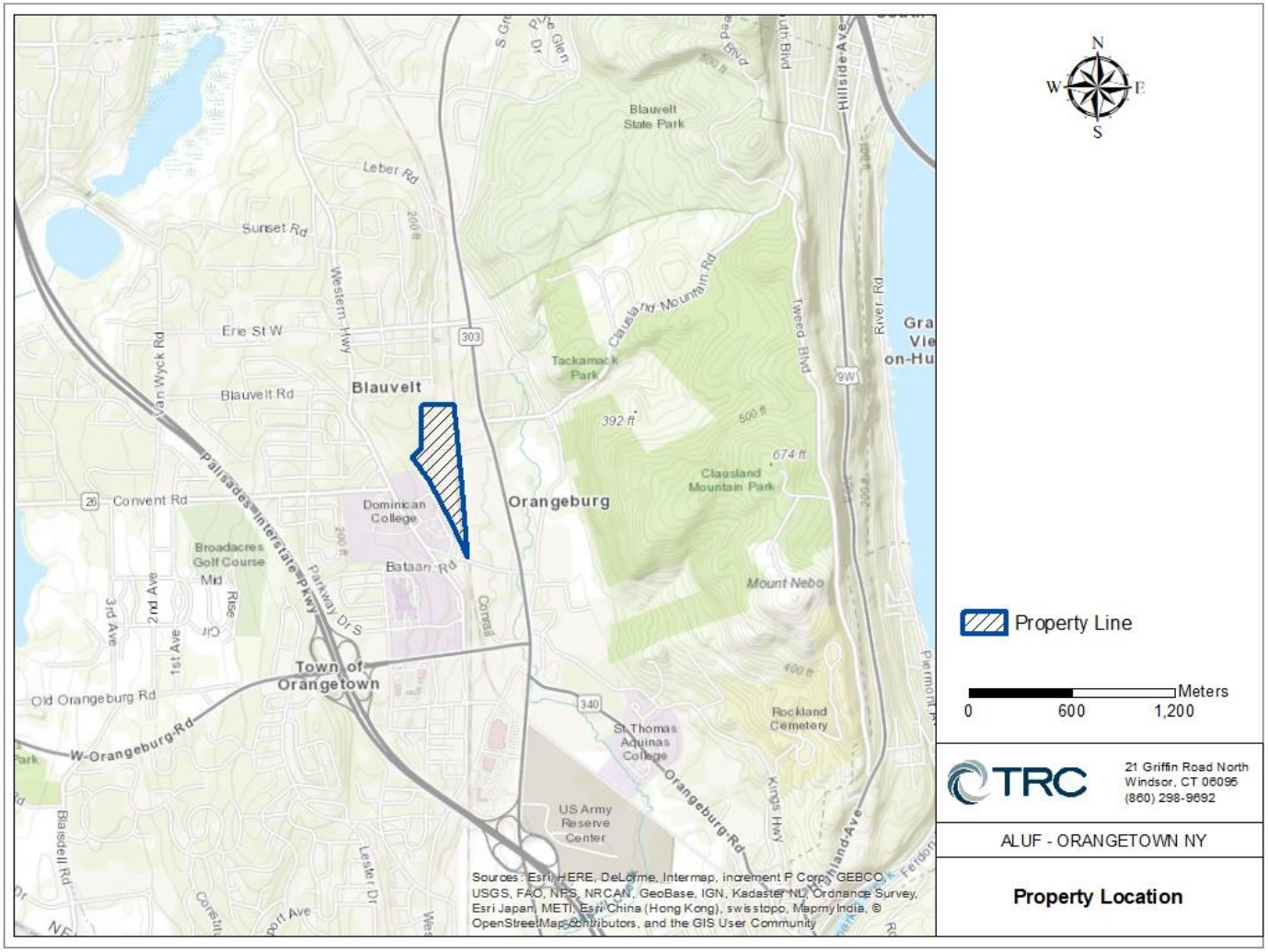


Figure 3: Sources and Structures Included in Downwash Input

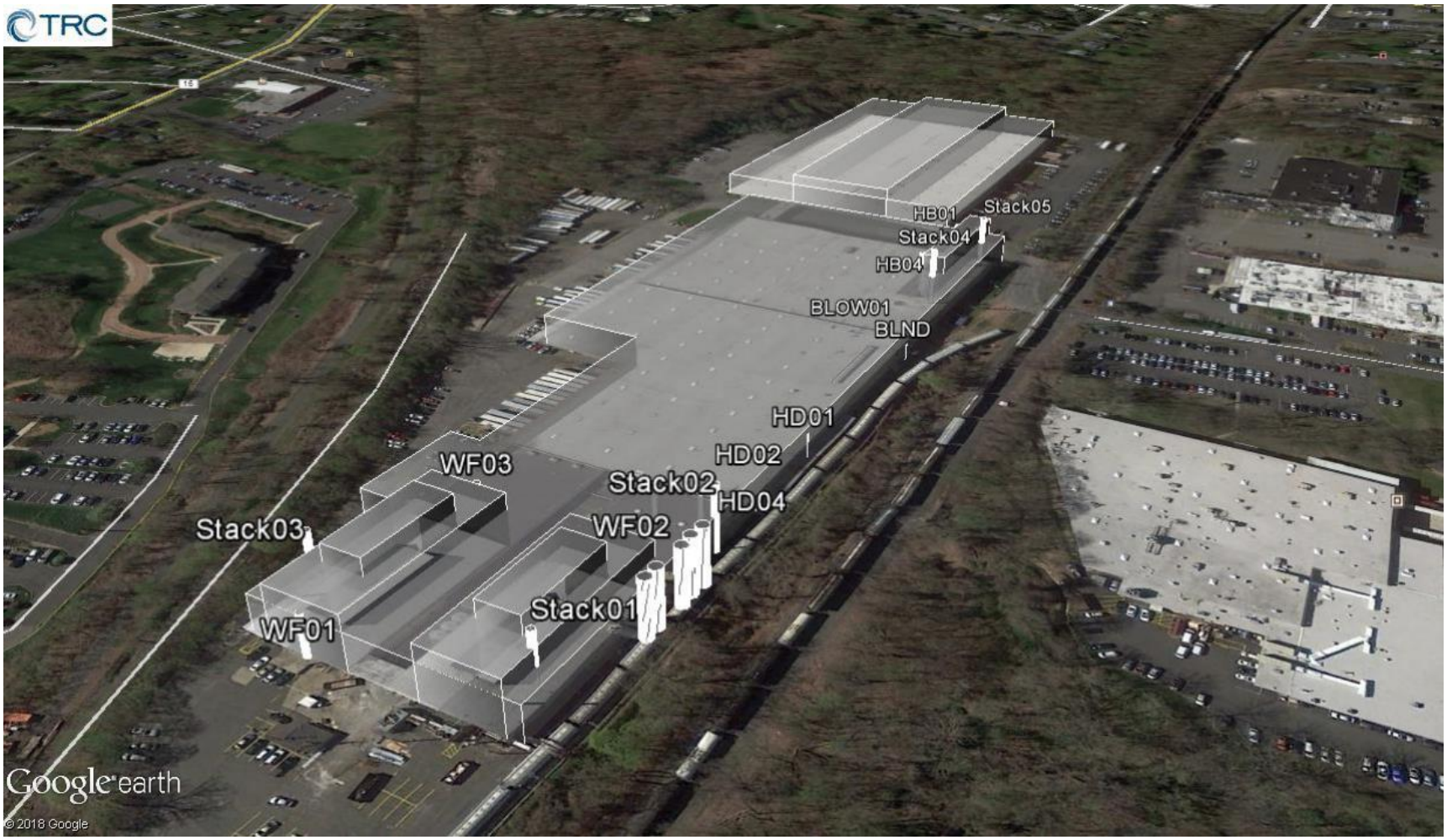


Figure 4: Windrose for Westchester County Airport

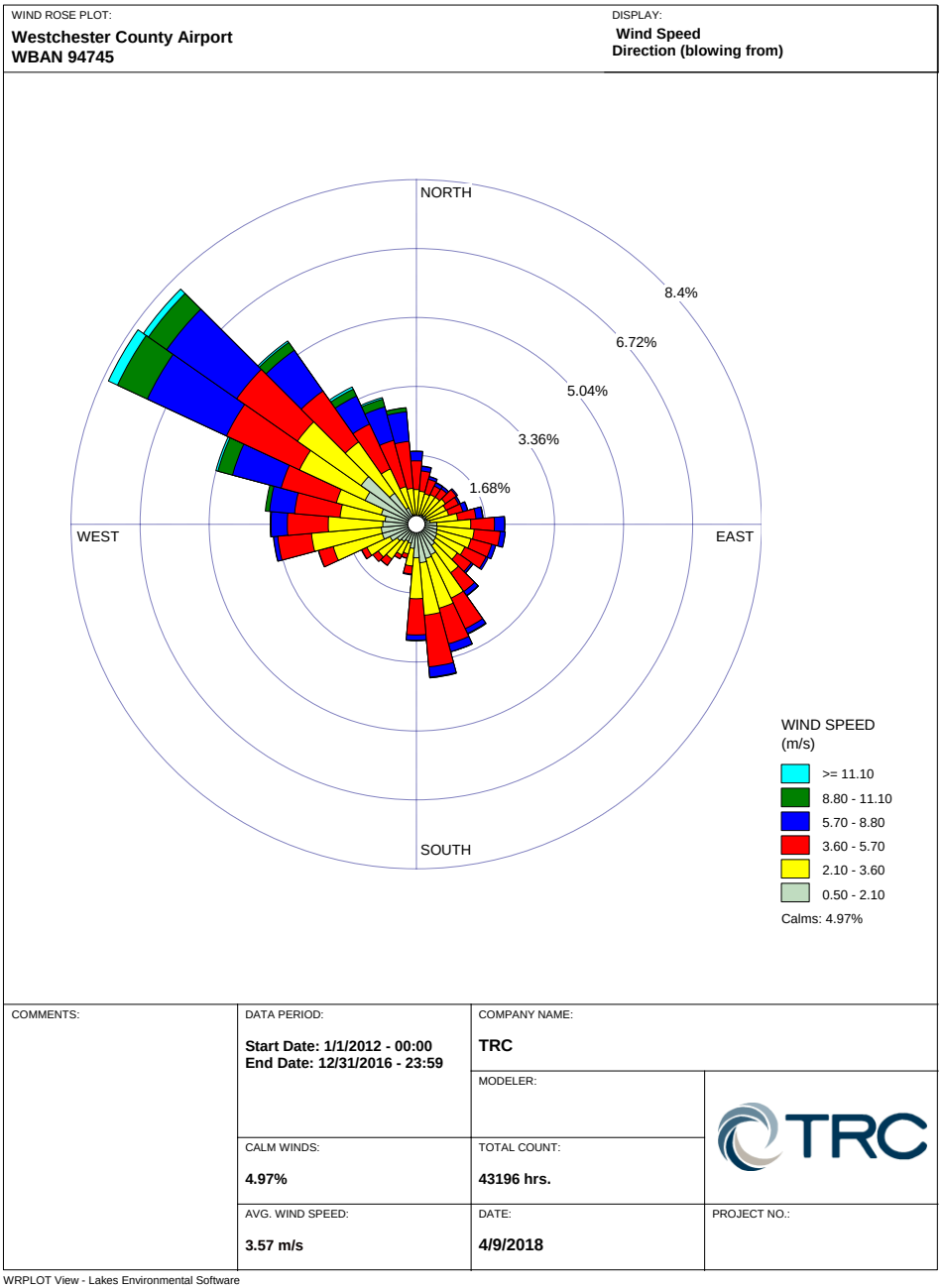


Figure 5: Receptor Locations – Near Field

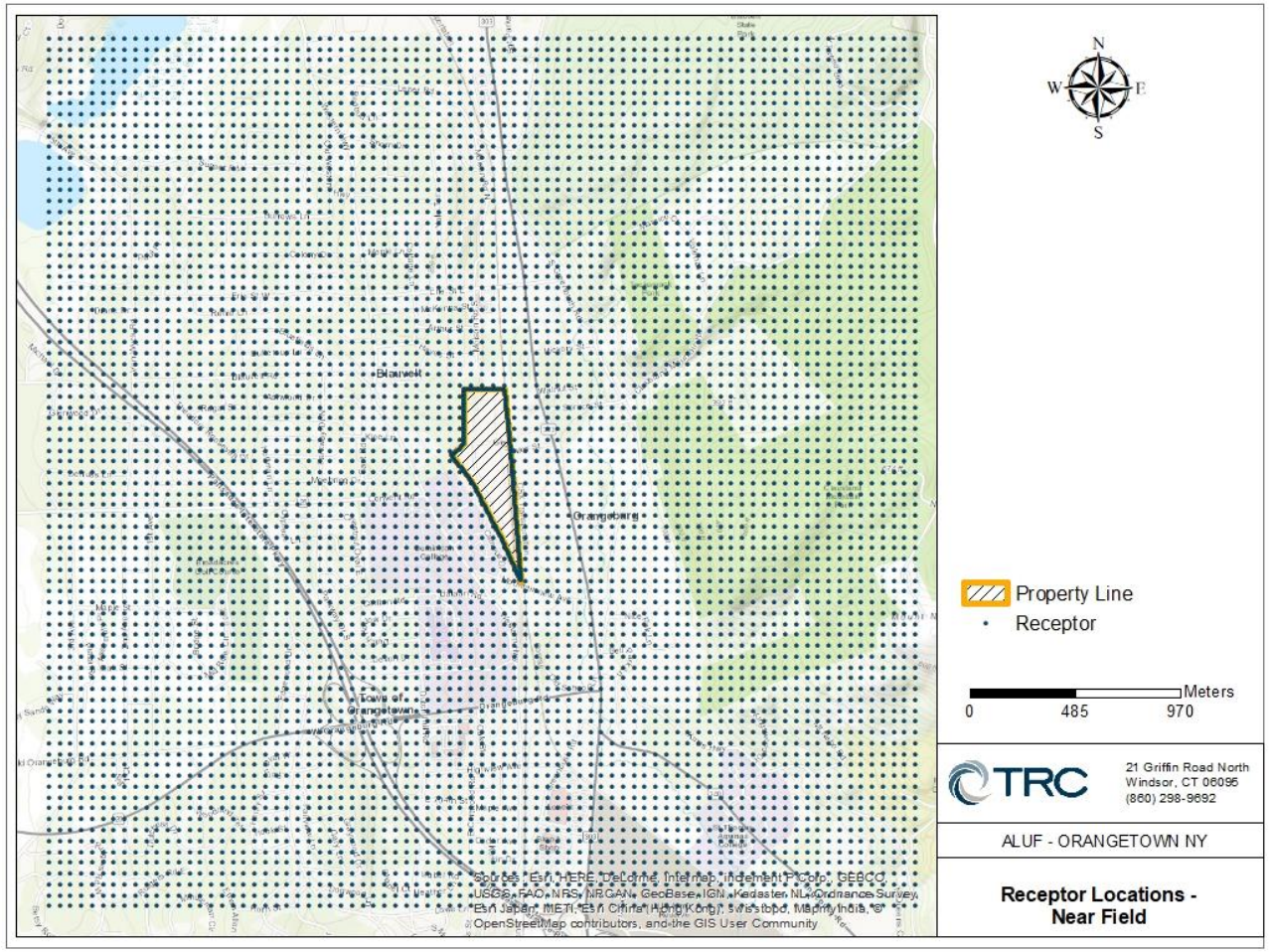


Figure 6: Receptor Locations – Far Field

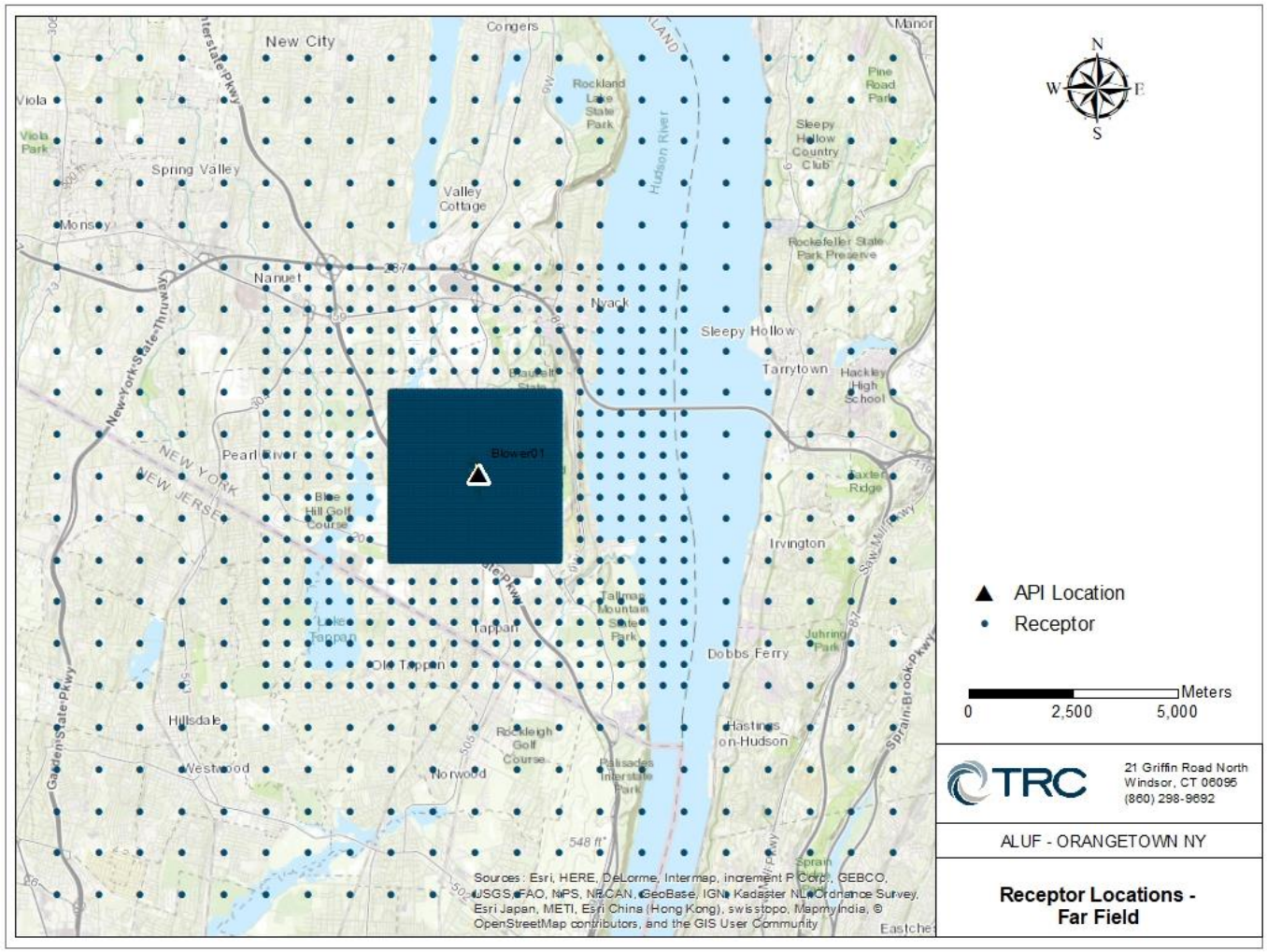
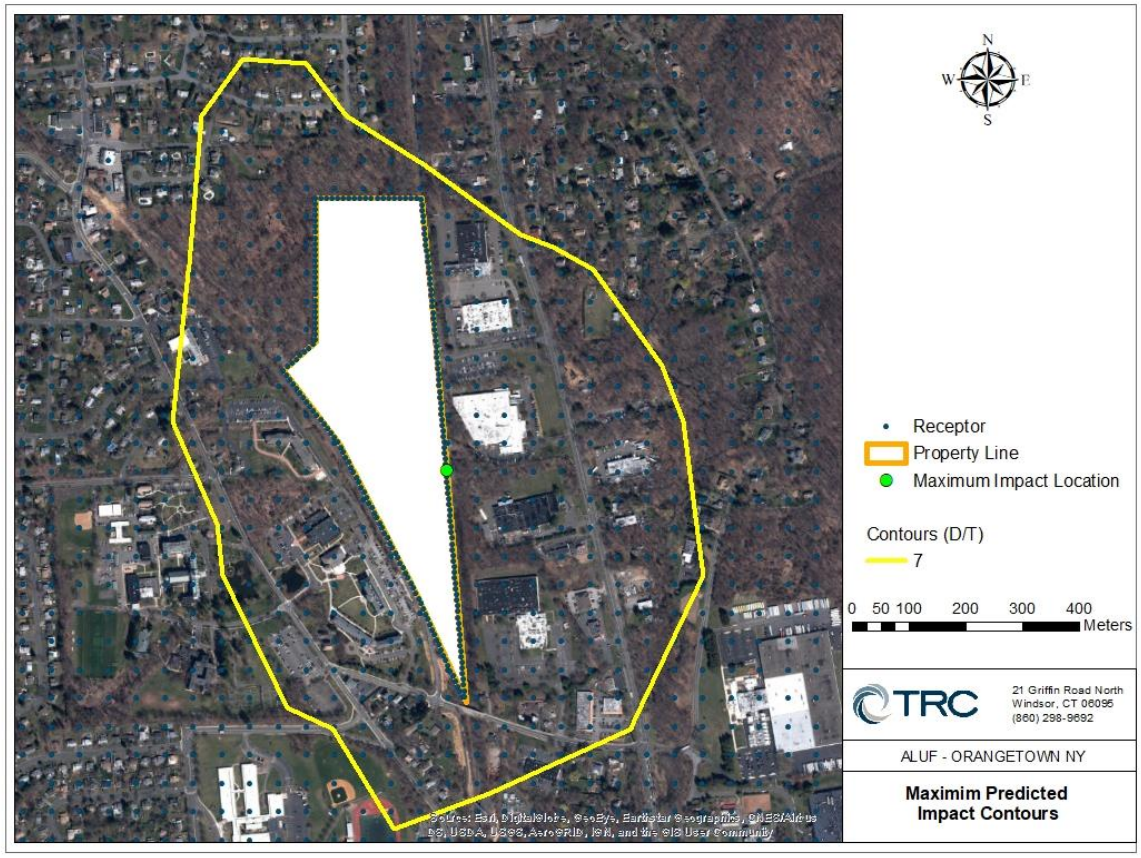


Figure 7: Maximum Predicted Odor Impacts Greater than 7 D/T



APPENDIX A

Orangetown Odor Log

Town of Orangetown

Town Hall • 26 W. Orangeburg Road • Orangeburg, NY 10962
Telephone: (845) 359-5100 • Fax: (845) 359-2623
e-mail: supervisor@orangetown.com
website: www.orangetown.com

Andrew Y. Stewart, Ph.D.
Supervisor

MEMORANDUM

TO: TOM DIVINY
FROM: VICKI CARAMANTE
SUBJECT: COMPLAINTS RECEIVED – ALUF PLASTICS
DATE: AUGUST 11, 2017
CC: ANDY STEWART

Per your request, based on the emails we've received please find a list of complaints about Aluf over the past six months. Please note that unless a specific time was given in the complaint, the time noted is the time the email was received:

8/11/17, 8:54 AM – plastic smell
8/9/17, 11:14 PM – smell at Murphy Court
8/9/17, 6:28 PM – Strong odors at Hayes Street
8/8/17 7:50 PM - strong smell on the Rail Trail behind Louie's Ice Cream
8/8/17, 8:01 PM – Strong smell of plastic & fragrance on Hayes St
8/8/17, 11:00 AM – potent smell by Dominican College burned the complainant's nose
8/6/17, 3:28 PM – family forced indoors from the smell, Spruce & S. Greenbush Rd
8/3/17, 11:24 PM – chemical smell near Cottage Lane Elementary/Arthur St
8/3/17, 8:06 PM – smell detectable Hays St, east of Garfield
8/2/17, 8:40 PM – Floral scent, Western Hwy, Mountainview Ave
8/1/17, 8:00 PM – Strong burning plastic smell Murphy Court at North Troop
7/30/17, 8:00 PM - Strong burning plastic smell, Rail Trail at Mountainview Ave
7/26/17, 8:00 PM - Strong burning plastic smell, Rail Trail between Aluf & Dominican College
7/23/17, 5:00 PM – Burning plastic smell at Murphy Court
7/18/17, 9:07 PM – Faint whiffs of Aluf odor, Arthur St
7/7/17, 11:28 AM & 2:35 PM – intense smell of burning plastic along the Rail Trail
7/6/17, 8:00 PM – strong smell at Blauvelt Library
7/4/17, afternoon – strong smell on Rail Trail (no further details)
7/3/17, 10:35 PM – strong odor from Aluf, 87 Chestnut Oval
6/28/17, 5:35 AM – plastic smell, vicinity of 602 Western Hwy
6/22/17, 8:00 AM – burnt plastic and floral smell on the Rail Trial in Blauvelt
6/22/17, 8:50 AM - by floral, molten plastic smells western hwy, from Lions Park to Bataan Road, and back to Dutch Hill Rd across from Tappan Zee HS
6/22/17, 8AM – burning plastic smell, Goherhing Dr

6/22/17, 8:13 AM – Plastic smell with fragrance, Murphy Court/Rail Trail
6/22/17, 7:30 AM – plastic smell Murphy Court
6/21/17, 6:45 PM – Horrible plastic smell Route 303 near Aluf
6/12/17, 6:22 AM – plastic smell, Murphy Court/Troop Rd
6/8/17, 7:30-8:00 PM – burning plastic, Murphy Court and near St. Catherine's
6/2/17, 8:29 AM – plastic smell, Cottage lane Elementary
5/29/17, 9:34 PM – melting plastic smell on and off all day, Murphy Court
5/28/17, 5:45 PM – Plastic smell, Rail Trail at Murphy Court
5/24/17, 8:45 PM – floral smell 28 Parkway Dr N (also smelled the previous night at 10:30 PM)
5/24/17, late afternoon – plastic smell on & off near Blauvelt Library
5/24/17, 7:49 PM – chemical floral smell very strong at St. Catherines
5/24/17, 7:00 PM – burnt smell, Murphy Court
5/24/17, 6:55 PM – heavy, thick melting plastic/floral smell, Murphy Court, Rail Trail, Library
5/17/17, 11:31 AM – burnt plastic smell very bad at 7AM and at 3PM on 5/14 (Mother's Day)
5/17/17, 6:25 AM – melting plastic smell, Rail Trail, Murphy Court, Western Hwy/Deli
5/17/17, 6:40 AM – burning plastic, Murphy Ct
5/16/17, 6:00 AM – burning plastic smell Goehring Curve
5/12/17, 3:36 PM – Aluf smell Rail Trail at Dominican College at 6:30 AM on both 5/11 & 5/12
5/10/17, 7:10 PM – strong burning plastic smell, Goehring Curve and on Rail Trail near Library
5/10/17, 6:00 AM – strong melting plastic smell Rail Trail/Glenshaw Rd
5/9/17, 8:28 PM – burning plastic smell @TZHS
5/9/17, 2:30 PM – Aluf smell burned complainant's throat & lungs, Rail Trail near Aluf
5/4/17, 8:30 PM – perfume chemical odor, N. Troop Rd/Hayes St
5/1/17, 6:00 PM/8:50 PM – strong chemical plastic smell, slight fragrance, Arthur St
5/1/17, 6:30 PM – Awful smell on Rail Trail behind Dominican College
5/1/17, 8:30 PM – Aluf odor near Library
5/1/17, 7:15 PM – perfumed chemical smell, Murphy Court
5/1/17, 9:07 PM – burning plastic smell, Hayes St at Moison Ave
5/1/17, 5:59 PM – "urinal cake" smell, Hayes St
5/1/17, 4:30 PM – very bad perfumed burnt plastic smell, Murphy Court
5/1/17, 3:30 PM – intense chemical smell, Murphy Court/Rail Trail/Troop Rd
4/30/17, 10:10 PM – nauseating floral smell, Murphy Ct
4/30/17, 3:50 PM – burning plastic smell, Rail Trail between Aluf & Dominican College
4/30/17, 4:00 PM - very bad perfumed burnt plastic smell, Murphy Ct
4/30/17, 3:13 PM – very strong burning platic chemical odor, Arthur St
4/30/17, 2:46 PM – slight smell of chemicals, not floral, Arthur St
4/30/17, Noon – burnt plastic non floral smell, Murphy Ct/Rail Trail
4/30/17, 11:50 AM – strong melting plastic smell, Murphy Ct
4/27/17, 4:45 PM – nasty burnt plstic smell Murphy Ct/Rail Trail
4/27/17, 4:21 PM – melting plastic smell, Murphy Ct
4/24/17, 5:00 PM - melting plastic smell, Murphy Ct
4/23/17, 4:00 PM – burnt plastic smell, Murphy Ct/Rail Trail
4/20/17, 9:33 AM – plastic smell with fragrance, Hayes St
4/20/17, 7:40 PM – melting plastic with floral scent, Murphy Ct
4/20/17, 7:30 PM – burnt plastic smell, Murphy Ct
4/13/17, 5:50 PM – meltig plastic smell at Blue Hill Commons Bldg 7
4/13/17, 4:49 PM – strong melting plastic smell, Dominican College/Rail Trail
4/13/17, 11:44 AM – melting plastic smell, Rail Trail

4/13/17, 4:34 PM – Aluf-like odors, Blauvelt
4/9/17, 9:21 PM – odor, Hayes St.
4/9/17, 7:00 PM – Melting plastic smell, Rail Trail/St. Catherine's to Dominican College
4/9/17, 1:26 PM – burnt plastic non perfumed, Murphy Ct (and earlier at 6:30 AM)
4/9/17, 6:45 AM – melting plastic smell, Rail Trail/Murphy Ct to Dominican College
4/5/17, 6:00 PM – Burnt plastic odor not perfumed, Murphy Ct
4/4/17, 8:00 PM – burning plastic smell, Goehring Curve
4/4/17, 7:00 PM – Aluf odor, Western Hwy/St. Catherine's
4/3/17, 9:00 PM – thick plastic smell, Arthur St
4/3/17, 6:30 AM - thick plastic smell, Arthur St
4/3/17, 5:30 PM – burnt smell non perfumed, Murphy Ct
4/3/17, 4:30-5:00 PM – strong melting plastic smell, Murphy Ct
4/3/17, 8:28 AM – burning plstic smell, Goehring Curve
4/3/17, 6:45 AM – burning plastic and floral scent, Murphy Ct
4/3/17, 6:37 AM – burning plst smell, Murphy Ct
4/2/17, 6:00 PM – bad burnt plastic smell, Murphy Ct
4/2/17, 6:00 PM – Railroad tracks, Greenbush & Western Hwy
4/2/17, 6:30 PM – strong burnt plastic odor, Murphy Ct/Rail Trail
4/2/17, 6:13 PM – strong melting plastic smell, Rail Trail/Mountainview Ave
3/31/17, 9:15 AM – choking smells, Western Hwy/Dominican College
3/30/17, 9:58 AM – reports of choking smells, Western Hwy/Dominican College earlier in the week
3/23/17, 9:47 PM – strong odor, Hayes St
3/21/17, 4:30 PM – two mornings the previous week (5:00 AM) and one afternoon (5:30 PM), 210 South Greenbush Rd
3/21/17, 1:00 PM – burning plastic smell, 250 Greenbush Rd
3/21/17, 8:00 AM – burning plastic smell Gohering Curve
3/21/17, 9:00 AM – noxious odors Western Hwy/Hayes St to Cottage Lane Elementary
3/21/17, 5:45 AM – strong burnt plstic smell not perfumed, Murphy Ct
3/21/17, 6:45 AM – burning plastic and floral scent, Murphy Ct
3/21/17, 6:26 AM – noxious, burning smell, Blauvelt
3/21/17, 6:13 AM – strong, intense melting plastic smell, Murphy Ct
3/13/17, 6:30 PM – melting plastic smell, Murphy Ct/Library
3/9/17, 8:20 AM-8:45 AM – burning pastic floral smell, 516 Rt 303 to Orantetown Animal Hospital/Glenshaw St
3/8/17, 8:12 PM – strong burning plastic floral smell on 2/21 at 4:00 AM and 3/8 at 4:00 AM near 20 Tygert Rd; and 2/28 at 4:40 PM near Blauvelt Library & Dominican College
3/7/17, 6:30 AM – bad burnt plastic smell not floral, Murphy Ct
3/7/17, 6:23 AM - intense emlting plastic smell, Troop Rd/Rail Trail
3/1/17, 4:20 PM – noticeable melting plastic smell, Murphy Ct
3/1/17, 7:35 AM – choking plastic smell, Yale Terrace

APPENDIX B

Odor Panel D/T Worksheets

Client: Aluf
Sample ID: Stack - 5 Retail I.B.C. (EP-00021)
Date Evaluated 03/20/18
Best Estimate Threshold 42

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	2	3	4
	2	0	0	0	0	0	1
	3	0	0	0	1	2	3
	4	0	0	0	0	2	3
	5	0	0	0	0	0	0
	6	0	0	0	2	4	5
	7	0	0	0	0	3	4
average=		0.0	0.0	0.0	0.7	2.0	2.9

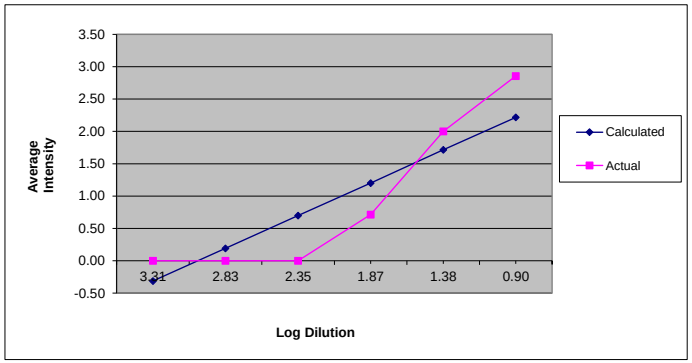
Description	Best Estimate Threshold (BET) Value
Perfume	128
Perfume	14
lysol	128
sweet chemical	42
NDO	5
sweet chemical	128
chemical	42

	Group BET
Geo. Mean:	42

Extrapolated higher leve		3.79	6205				
Extrapolated lower level		0.42	3				
PANELIST							
	1	0	0	0	128.46011	42.142615	13.856406
	2	0	0	0	0	0	13.856406
	3	0	0	0	128.46011	42.142615	13.856406
	4	0	0	0	0	42.142615	13.856406
	5	0	0	0	0	0	4.5958799
	6	0	0	0	128.46011	42.142615	13.856406
	7	0	0	0	0	42.142615	13.856406

Panelist BET
128
14
128
42
5
128
42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.31
676	2.83	0.00	2.83	0.19
223	2.35	0.0	2.35	0.70
74	1.87	0.7	1.87	1.20
24	1.38	2.0	1.38	1.72
8	0.90	2.9	0.90	2.22
			0.00	3.17



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.9746528
R Square	0.9499482
Adjusted R Square	0.9374352
Standard Error	0.2430531
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	4.4847893	4.4847893	75.917146	0.00095558
Residual	4	0.2362992	0.0590748		
Total	5	4.7210884			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3.1654013	0.2726837	11.608328	0.0003147	2.40831012	3.9224926
X Variable 1	-1.0503087	0.1205444	-8.7130446	0.0009556	-1.3849935	-0.7156238

Client: Aluf
Sample ID: High Bay Fan - 1
Date Evaluated 03/20/18
Best Estimate Threshold 36

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	0	2	3
	2	0	0	0	0	0	1
	3	0	0	0	1	1	2
	4	0	0	0	0	0	2
	5	0	0	0	0	1	2
	6	0	0	0	0	2	4
	7	0	0	0	0	2	3
average=		0.0	0.0	0.0	0.1	1.1	2.4

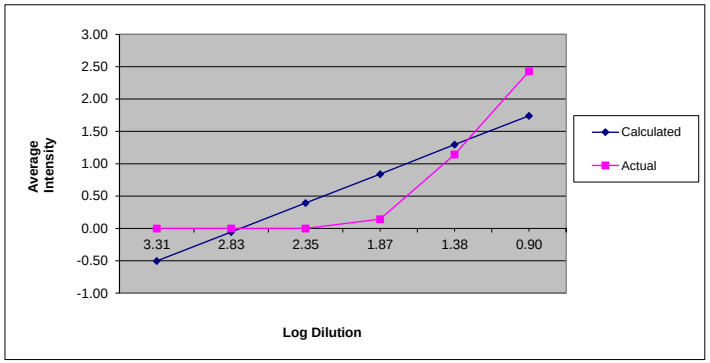
Description	Best Estimate Threshold (BET) Value
chemical	42
burnt	14
burnt	128
perfume	14
apples	42
fragrance	42
perfume	42

Group BET
Geo. Mean: 36

Extrapolated higher level	3.79	6205
Extrapolated lower level	0.42	3

PANELIST							Panelist BET
1	0	0	0	0	42.142615	13.856406	42
2	0	0	0	0	0	13.856406	14
3	0	0	0	128.46011	42.142615	13.856406	128
4	0	0	0	0	0	13.856406	14
5	0	0	0	0	42.142615	13.856406	42
6	0	0	0	0	42.142615	13.856406	42
7	0	0	0	0	42.142615	13.856406	42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.50
676	2.83	0.00	2.83	-0.05
223	2.35	0.0	2.35	0.39
74	1.87	0.1	1.87	0.84
24	1.38	1.1	1.38	1.30
8	0.90	2.4	0.90	1.74
			0.00	2.58



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.846632902
R Square	0.71678727
Adjusted R Square	0.645984088
Standard Error	0.590523255
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3.5302992	3.5302992	10.123659	0.0334785
Residual	4	1.3948709	0.3487177		
Total	5	4.9251701			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.582498992	0.662514	3.8980295	0.0175707	0.7430653	4.4219326
X Variable 1	-0.931862172	0.2928754	-3.1817698	0.0334785	-1.7450147	-0.1187096

Client: Aluf
Sample ID: High Bay Fan - 2
Date Evaluated 03/20/18
Best Estimate Threshold 42

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	2	3	4
	2	0	0	0	0	0	1
	3	0	0	0.5	1	2	3
	4	0	0	0	0	2	4
	5	0	0	0	0	0	1
	6	0	0	0	0	1	3
	7	0	0	0	0	0	2
average=		0.0	0.0	0.1	0.4	1.1	2.6

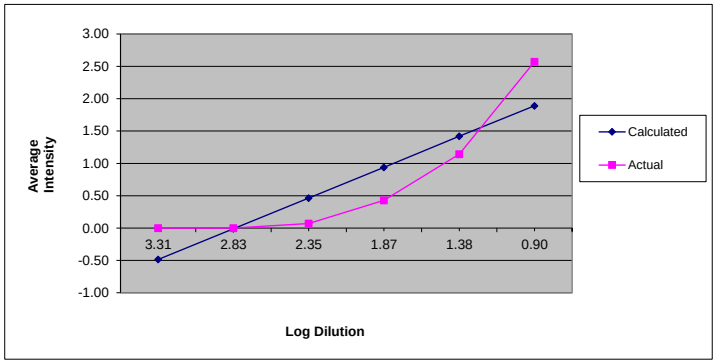
Description	Best Estimate Threshold (BET) Value
sweet chemical	128
chemical	14
burnt	388
burnt	42
burnt	14
burnt	42
sweet chemical	14

Group BET
Geo. Mean: 42

Extrapolated higher level	3.79	6205	
Extrapolated lower level	0.42	3	

PANELIST							Panelist BET
1	0	0	0	128.46011	42.142615	13.856406	128
2	0	0	0	0	0	13.856406	14
3	0	0	388.2628	128.46011	42.142615	13.856406	388
4	0	0	0	0	42.142615	13.856406	42
5	0	0	0	0	0	13.856406	14
6	0	0	0	0	42.142615	13.856406	42
7	0	0	0	0	0	13.856406	14

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	From equation of line y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.49
676	2.83	0.00	2.83	-0.01
223	2.35	0.1	2.35	0.46
74	1.87	0.4	1.87	0.94
24	1.38	1.1	1.38	1.42
8	0.90	2.6	0.90	1.89
			0.00	2.78



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.876861326
R Square	0.768885786
Adjusted R Square	0.711107232
Standard Error	0.545337055
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3.9575388	3.9575388	13.30746	0.021811115
Residual	4	1.18957	0.2973925		
Total	5	5.1471088			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.781249289	0.6118191	4.5458686	0.0104504	1.082567106	4.4799315
X Variable 1	-0.986639542	0.2704649	-3.6479391	0.0218111	-1.73757053	-0.2357086

Client: Aluf
Sample ID: High Bay Fan - 3
Date Evaluated 03/20/18
Best Estimate Threshold 49

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	0.5	3	4
	2	0	0	0	0	0.5	1
	3	0	0	0	0	1	2
	4	0	0	0	1	2	4
	5	0	0	0	0		1
	6	0	0	0	0	2	4
	7	0	0	0	0	2	3
average=		0.0	0.0	0.0	0.2	1.8	2.7

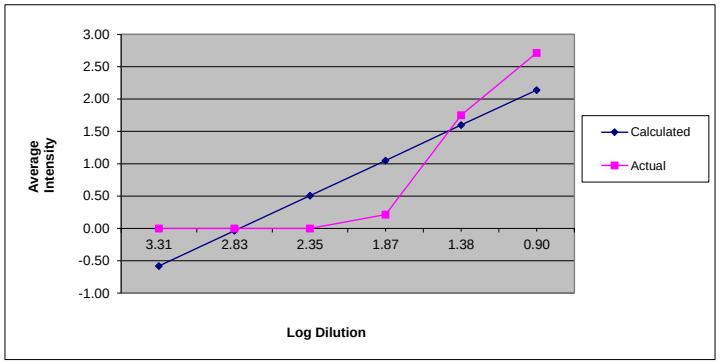
Description	Best Estimate Threshold (BET) Value
sweet chemical	128
chemical	42
burnt	42
burnt	128
perfume	14
perfume	42
sweet chemical	42

	Group BET
Geo. Mean:	49

Extrapolated higher leve		3.79	6205				
Extrapolated lower level		0.42	3				
PANELIST							
	1	0	0	0	128.46011	42.142615	13.856406
	2	0	0	0	0	42.142615	13.856406
	3	0	0	0	0	42.142615	13.856406
	4	0	0	0	128.46011	42.142615	13.856406
	5	0	0	0	0	0	13.856406
	6	0	0	0	0	42.142615	13.856406
	7	0	0	0	0	42.142615	13.856406

Panelist BET
128
42
42
128
14
42
42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.58
676	2.83	0.00	2.83	-0.04
223	2.35	0.0	2.35	0.51
74	1.87	0.2	1.87	1.05
24	1.38	1.8	1.38	1.60
8	0.90	2.7	0.90	2.14
			0.00	3.16



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.871342118
R Square	0.759237086
Adjusted R Square	0.699046357
Standard Error	0.641059926
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	5.1837622	5.1837622	12.613854	0.02376445
Residual	4	1.6438313	0.4109578		
Total	5	6.8275935			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3.15899465	0.7192116	4.3923024	0.0117615	1.16214323	5.1558461
X Variable 1	-1.129193737	0.3179395	-3.5515988	0.0237644	-2.01193544	-0.246452

Client: Aluf
Sample ID: High Bay Fan - 4
Date Evaluated 03/20/18
Best Estimate Threshold 31

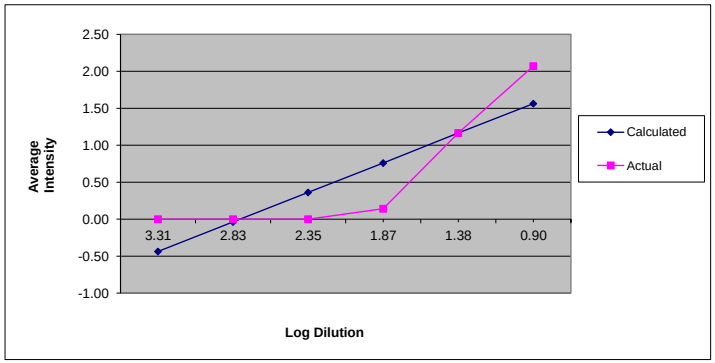
		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	0	2	3
	2	0	0	0	0	0	1
	3	0	0	0	1	2	3
	4	0	0	0	0	0	0.5
	5	0	0	0	0		2
	6	0	0	0	0	2	3
	7	0	0	0	0	1	2
average=		0.0	0.0	0.0	0.1	1.2	2.1

Description	Best Estimate Threshold (BET) Value
chemical	42
Burnt	14
Burnt	128
--	14
sweet	14
perfume	42
sweet chemical	42

Group BET
Geo. Mean: 31

Extrapolated higher level		3.79	6205				
Extrapolated lower level		0.42	3				
PANELIST							Panelist BET
	1	0	0	0	0	42.142615	13.856406	42
	2	0	0	0	0	0	13.856406	14
	3	0	0	0	128.46011	42.142615	13.856406	128
	4	0	0	0	0	0	13.856406	14
	5	0	0	0	0	0	13.856406	14
	6	0	0	0	0	42.142615	13.856406	42
	7	0	0	0	0	42.142615	13.856406	42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.44
676	2.83	0.00	2.83	-0.04
223	2.35	0.0	2.35	0.36
74	1.87	0.1	1.87	0.76
24	1.38	1.2	1.38	1.17
8	0.90	2.1	0.90	1.56
			0.00	2.31



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.862599224
R Square	0.744077421
Adjusted R Square	0.680096777
Standard Error	0.490945632
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.8030853	2.8030853	11.629727	0.02702147
Residual	4	0.9641105	0.2410276		
Total	5	3.7671958			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.313067006	0.5507968	4.1994922	0.0137014	0.78380984	3.8423242
X Variable 1	-0.83035553	0.243489	-3.4102385	0.0270215	-1.50638934	-0.1543217

Client: Aluf
Sample ID: Stack - 4 Repro (EP-00011)
Date Evaluated 03/20/18
Best Estimate Threshold 80

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	1	2	3
	2	0	0	0	1	2	0
	3	0	0	1	1	2	3
	4	0	0	0	0	0	1
	5	0	0	0	2	3	4
	6	0	0	0	0	0	0
	7	0	0	2	3	4	5
average=		0.0	0.0	0.4	1.1	1.9	2.3

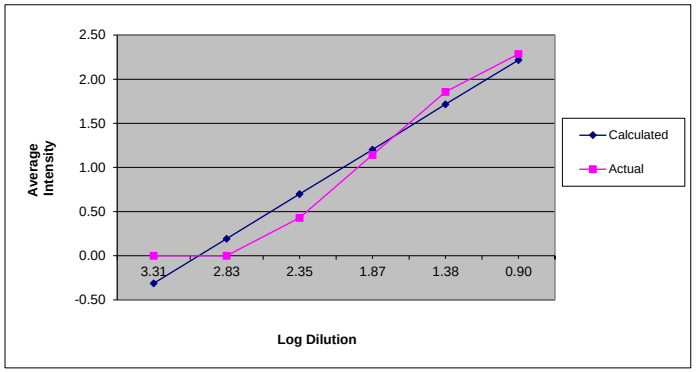
Description	Best Estimate Threshold (BET) Value
Vinegar	128
sweet pine	128
acetone	388
sweet chemical	14
Vinegar	128
Vinegar	5
chemical	388

	Group BET
Geo. Mean:	80

Extrapolated higher leve	3.79	6205	
Extrapolated lower level	0.42	3	

PANELIST							Panelist BET
1	0	0	0	128.46011	42.142615	13.856406	128
2	0	0	0	128.46011	42.142615	4.5958799	128
3	0	0	388.2628	128.46011	42.142615	13.856406	388
4	0	0	0	0	0	13.856406	14
5	0	0	0	128.46011	42.142615	13.856406	128
6	0	0	0	0	0	4.5958799	5
7	0	0	388.2628	128.46011	42.142615	13.856406	388

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.31
676	2.83	0.00	2.83	0.19
223	2.35	0.4	2.35	0.70
74	1.87	1.1	1.87	1.20
24	1.38	1.9	1.38	1.72
8	0.90	2.3	0.90	2.22
			0.00	3.17



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.97465284
R Square	0.94994816
Adjusted R Square	0.9374352
Standard Error	0.24305306
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	4.4847893	4.4847893	75.917146	0.0009556
Residual	4	0.2362992	0.0590748		
Total	5	4.7210884			

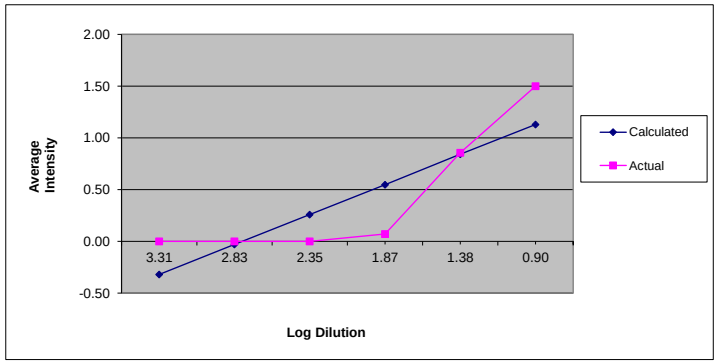
	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	3.16540133	0.2726837	11.608328	0.0003147	2.4083101	3.9224926
X Variable 1	-1.05030866	0.1205444	-8.7130446	0.0009556	-1.3849935	-0.7156238

Client: Aluf
Sample ID: Blower 1
Date Evaluated 03/20/18
Best Estimate Threshold 22

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at		
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90		
D/T---->		2048	676	223	74	24	8		Best Estimate Threshold (BET)
PANELIST								Description	Value
	1	0	0	0	0	2	3	solvent, glue	42
	2	0	0	0	0	0	0	NDO	5
	3	0	0	0	0.5	1	2	smoky	128
	4	0	0	0	0	0	0.5	--	14
	5	0	0	0	0	0	0	NDO	5
	6	0	0	0	0	2	3	burnt	42
	7	0	0	0	0	1	2	smoky	42
average=		0.0	0.0	0.0	0.1	0.9	1.5		Group BET
								Geo. Mean:	22

Extrapolated higher level		3.79	6205					
Extrapolated lower level		0.42	3					
PANELIST								Panelist BET
	1	0	0	0	0	42.142615	13.856406	42
	2	0	0	0	0	0	4.5958799	5
	3	0	0	0	128.46011	42.142615	13.856406	128
	4	0	0	0	0	0	13.856406	14
	5	0	0	0	0	0	4.5958799	5
	6	0	0	0	0	42.142615	13.856406	42
	7	0	0	0	0	42.142615	13.856406	42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.32
676	2.83	0.00	2.83	-0.03
223	2.35	0.0	2.35	0.26
74	1.87	0.1	1.87	0.55
24	1.38	0.9	1.38	0.84
8	0.90	1.5	0.90	1.13
			0.00	1.67



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.856297297
R Square	0.733245061
Adjusted R Square	0.666556326
Standard Error	0.365829379
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.4714782	1.4714782	10.995036	0.029491936
Residual	4	0.5353245	0.1338311		
Total	5	2.0068027			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.672388394	0.4104277	4.0747459	0.0151637	0.532858553	2.8119182
X Variable 1	-0.601620794	0.1814364	-3.3158764	0.0294919	-1.1053691	-0.0978725

Client: Aluf
Sample ID: Blending Room Fan
Date Evaluated 03/20/18
Best Estimate Threshold 26

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	1	2	3
	2	0	0	0	0	0	0
	3	0	0	0	1	1	0
	4	0	0	0	0	0	1
	5	0	0	0	0	0	0
	6	0	0	0	0	1	2
	7	0	0	0	0	0.5	2
average=		0.0	0.0	0.0	0.3	0.6	1.1

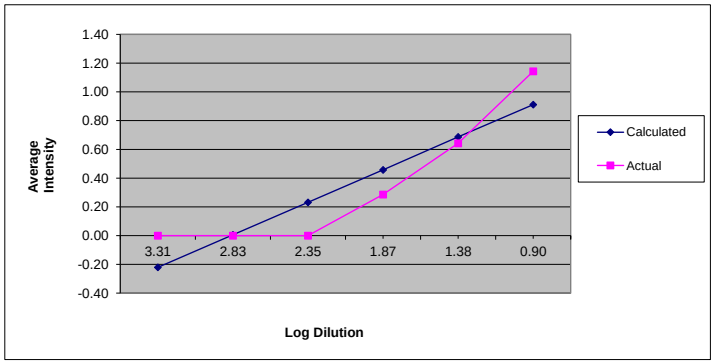
Description	Best Estimate Threshold (BET) Value
Gassy	128
NDO	5
smoky	128
smoky	14
NDO	5
burnt	42
smoky	42

Group BET
Geo. Mean: 26

Extrapolated higher leve	3.79	6205
Extrapolated lower level	0.42	3

PANELIST							Panelist BET
1	0	0	0	128.46011	42.142615	13.856406	128
2	0	0	0	0	0	4.5958799	5
3	0	0	0	128.46011	42.142615	4.5958799	128
4	0	0	0	0	0	13.856406	14
5	0	0	0	0	0	4.5958799	5
6	0	0	0	0	42.142615	13.856406	42
7	0	0	0	0	42.142615	13.856406	42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	From equation of line y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.22
676	2.83	0.00	2.83	0.01
223	2.35	0.0	2.35	0.23
74	1.87	0.3	1.87	0.46
24	1.38	0.6	1.38	0.69
8	0.90	1.1	0.90	0.91
			0.00	1.34



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.909569081
R Square	0.827315913
Adjusted R Square	0.784144891
Standard Error	0.216514981
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.8983694	0.8983694	19.163686	0.01189687
Residual	4	0.1875149	0.0468787		
Total	5	1.0858844			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.335709334	0.2429103	5.4987753	0.0053324	0.66128214	2.0101365
X Variable 1	-0.470081761	0.1073826	-4.3776348	0.0118969	-0.7682236	-0.1719399

Client: Aluf
Sample ID: High Density Fan 1
Date Evaluated 03/20/18
Best Estimate Threshold 26

	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->	3.31	2.83	2.35	1.87	1.38	0.90
D/T---->	2048	676	223	74	24	8
PANELIST						
1	0	0	0	0	0	0
2	0	0	0	0	0	2
3	0	0	0	0	1	2
4	0	0	0	0	2	3
5	0	0	0	0	0	2
6	0	0	0	0.5	1	2
7	0	0	0	0	2	3
average=	0.0	0.0	0.0	0.1	0.9	2.0

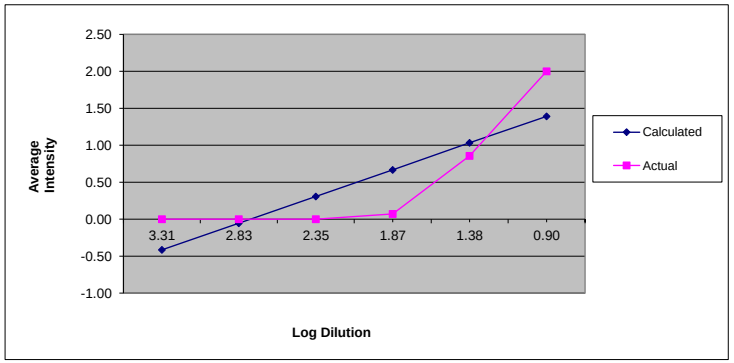
Description	Best Estimate Threshold (BET) Value
NDO	5
Burnt	14
Burnt	42
acrid, chemical	42
smoky	14
burnt, acrid	128
smoky	42

	Group BET
Geo. Mean:	26

Extrapolated higher level	3.79	6205
Extrapolated lower level	0.42	3

PANELIST							Panelist BET
1	0	0	0	0	0	4.5958799	5
2	0	0	0	0	0	13.856406	14
3	0	0	0	0	42.142615	13.856406	42
4	0	0	0	0	42.142615	13.856406	42
5	0	0	0	0	0	13.856406	14
6	0	0	0	128.46011	42.142615	13.856406	128
7	0	0	0	0	42.142615	13.856406	42

Dilution Level	x log(D)	y intensity Data B	From equation of line y=mx+b x log(D)	y intensity Data A
2048	3.31	0.00	3.31	-0.41
676	2.83	0.00	2.83	-0.05
223	2.35	0.0	2.35	0.31
74	1.87	0.1	1.87	0.67
24	1.38	0.9	1.38	1.03
8	0.90	2.0	0.90	1.39
			0.00	2.07



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.830800712
R Square	0.690229823
Adjusted R Square	0.612787278
Standard Error	0.506323806
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.284919	2.284919	8.9127989	0.04052065
Residual	4	1.0254552	0.2563638		
Total	5	3.3103741			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.067704943	0.5680498	3.6400067	0.0219645	0.49054597	3.6448639
X Variable 1	-0.749689323	0.2511159	-2.9854311	0.0405206	-1.44689893	-0.0524797

Client: Aluf
Sample ID: High Density Fan 2
Date Evaluated 03/20/18
Best Estimate Threshold 26

	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->	3.31	2.83	2.35	1.87	1.38	0.90
D/T--->	2048	676	223	74	24	8
PANELIST						
1	0	0	0	0	2	3
2	0	0	0	0	0	0
3	0	0	0	0	1	2
4	0	0	0	0	0	2
5	0	0	0	0	2	3
6	0	0	0	0	2	3
7	0	0	0	0	2	3
average=	0.0	0.0	0.0	0.0	1.3	2.3

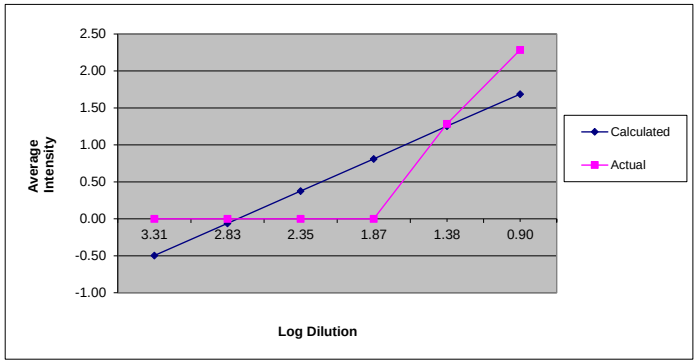
Best Estimate Threshold (BET)	
Description	Value
chemical	42
NDO	5
burnt	42
acrid chemical	14
smoky	42
burnt, acrid	42
smoky	42

	Group BET
Geo. Mean:	26

Extrapolated highe	3.79	6205
Extrapolated lowe	0.42	3

PANELIST							Panelist BET
1	0	0	0	0	42.142615	13.856406	42
2	0	0	0	0	0	4.5958799	5
3	0	0	0	0	42.142615	13.856406	42
4	0	0	0	0	0	13.856406	14
5	0	0	0	0	42.142615	13.856406	42
6	0	0	0	0	42.142615	13.856406	42
7	0	0	0	0	42.142615	13.856406	42

			From equation of line	
		y		y=mx+b
Dilution Level	x log(D)	intensity Data B	x log(D)	intensity Data A
2048	3.31	0.00	3.31	-0.50
676	2.83	0.00	2.83	-0.06
223	2.35	0.0	2.35	0.38
74	1.87	0.0	1.87	0.81
24	1.38	1.3	1.38	1.25
8	0.90	2.3	0.90	1.69
			0.00	2.51



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.8387116
R Square	0.7034372
Adjusted R Square	0.6292965
Standard Error	0.5935439
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3.3425231	3.3425231	9.4878687	0.036923032
Residual	4	1.4091776	0.3522944		
Total	5	4.7517007			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.5057581	0.6659029	3.7629482	0.0197245	0.656915297	4.354601
X Variable 1	-0.9067407	0.2943736	-3.0802384	0.036923	-1.72405277	-0.0894287

Client: Aluf
Sample ID: High Density Fan 3
Date Evaluated 03/20/18
Best Estimate Threshold 36

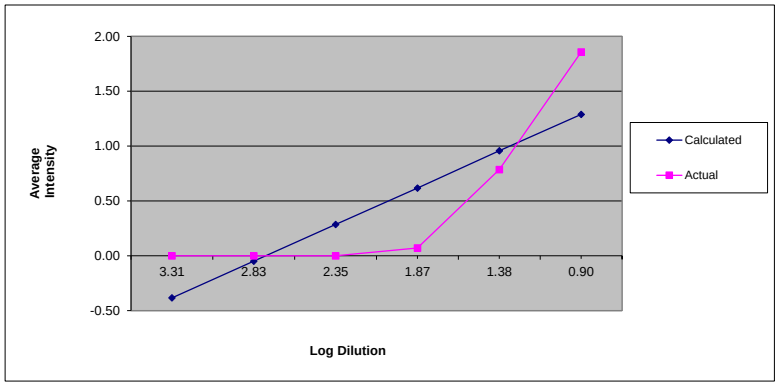
		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	0.5	1	2
	2	0	0	0	0	0	1
	3	0	0	0	0	1	2
	4	0	0	0	0	0.5	2
	5	0	0	0	0	0	1
	6	0	0	0	0	2	3
	7	0	0	0	0	1	2
average=		0.0	0.0	0.0	0.1	0.8	1.9
Extrapolated higher level		3.79	6205				
Extrapolated lower level		0.42	3				

Description	Best Estimate Threshold (BET) Value
Oily chemical	128
smoky	14
smoky, burnt	42
smoky	42
smoky	14
smoky	42
chemical	42

	Group BET
Geo. Mean:	36

PANELIST							Panelist BET
1	0	0	0	128.46011	42.142615	13.856406	128
2	0	0	0	0	0	13.856406	14
3	0	0	0	0	42.142615	13.856406	42
4	0	0	0	0	42.142615	13.856406	42
5	0	0	0	0	0	13.856406	14
6	0	0	0	0	42.142615	13.856406	42
7	0	0	0	0	42.142615	13.856406	42

		y		From equation of line y=mx+b
Dilution Level	x log(D)	intensity Data B	x log(D)	intensity Data A
2048	3.31	0.00	3.31	-0.38
676	2.83	0.00	2.83	-0.05
223	2.35	0.0	2.35	0.28
74	1.87	0.1	1.87	0.62
24	1.38	0.8	1.38	0.96
8	0.90	1.9	0.90	1.29
			0.00	1.92



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.830554795
R Square	0.689821267
Adjusted R Square	0.612276584
Standard Error	0.469575562
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.961532583	1.961532583	8.8957906	0.04063499
Residual	4	0.882004832	0.220501208		
Total	5	2.843537415			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.915946426	0.526821534	3.636803554	0.0220268	0.45325536	3.3786375
X Variable 1	-0.694614249	0.232890306	-2.982581204	0.040635	-1.3412214	-0.048007

Client: Aluf
Sample ID: High Density Fan 4
Date Evaluated 03/20/18
Best Estimate Threshold: 22

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	0	2	3
	2	0	0	0	0	0	1
	3	0	0	0	0	1	2
	4	0	0	0	0	0	1
	5	0	0	0	0	0	0
	6	0	0	0	0	2	3
	7	0	0	0	0	1	2
average=		0.0	0.0	0.0	0.0	0.9	1.7

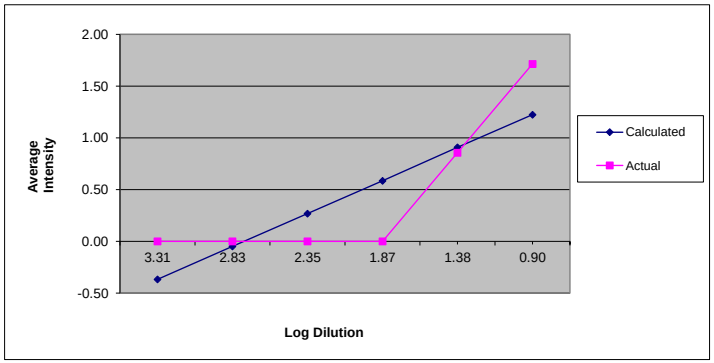
Description	Best Estimate Threshold (BET) Value
sour chemical	42
chemical	14
smoky	42
smoky	14
NDO	5
smoky	42
burnt	42

Group BET
Geo. Mean: 22

Extrapolated higher level	3.79	6205	
Extrapolated lower level	0.42	3	

PANELIST							Panelist BET
1	0	0	0	0	42.142615	13.856406	42
2	0	0	0	0	0	13.856406	14
3	0	0	0	0	42.142615	13.856406	42
4	0	0	0	0	0	13.856406	14
5	0	0	0	0	0	4.5958799	5
6	0	0	0	0	42.142615	13.856406	42
7	0	0	0	0	42.142615	13.856406	42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	From equation of line y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.37
676	2.83	0.00	2.83	-0.05
223	2.35	0.0	2.35	0.27
74	1.87	0.0	1.87	0.59
24	1.38	0.9	1.38	0.91
8	0.90	1.7	0.90	1.22
			0.00	1.82



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.831004122
R Square	0.69056785
Adjusted R Square	0.613209813
Standard Error	0.446005233
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.7757459	1.7757459	8.926905	0.04042618
Residual	4	0.7956827	0.1989207		
Total	5	2.5714286			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.821102206	0.5003777	3.6394548	0.0219752	0.43183086	3.2103735
X Variable 1	-0.660900887	0.2212004	-2.9877927	0.0404262	-1.2750516	-0.0467502

Client: Aluf
Sample ID: Stack - 1 LDE I.B.C. (EP-00023)
Date Evaluated 03/20/18
Best Estimate Threshold: 31

	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->	3.31	2.83	2.35	1.87	1.38	0.90
D/T---->	2048	676	223	74	24	8
PANELIST						
1	0	0	0	0	2	3
2	0	0	0	0	0	0
3	0	0	1	2	3	4
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	1	2
7	0	0	0.5	2	3	4
average=	0.0	0.0	0.2	0.6	1.3	1.9

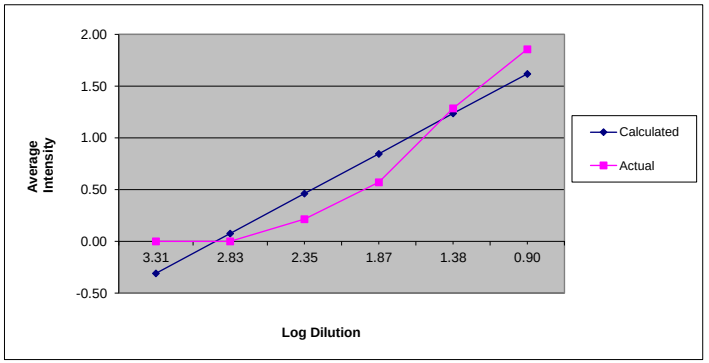
Description	Best Estimate Threshold (BET) Value
Smoky	42
NDO	5
Smoky	388
NDO	5
NDO	5
burnt	42
Smoky	388

Group BET
Geo. Mean: 31

Extrapolated higher level	3.79	6205
Extrapolated lower level	0.42	3

PANELIST							Panelist BET
1	0	0	0	0	42.142615	13.856406	42
2	0	0	0	0	0	4.5958799	5
3	0	0	388.2628	128.46011	42.142615	13.856406	388
4	0	0	0	0	0	4.5958799	5
5	0	0	0	0	0	4.5958799	5
6	0	0	0	0	42.142615	13.856406	42
6	0	0	388.2628	128.46011	42.142615	13.856406	388

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.31
676	2.83	0.00	2.83	0.08
223	2.35	0.2	2.35	0.46
74	1.87	0.6	1.87	0.85
24	1.38	1.3	1.38	1.24
8	0.90	1.9	0.90	1.62
			0.00	2.34



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.947473432
R Square	0.897705904
Adjusted R Square	0.87213238
Standard Error	0.272433037
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.6053318	2.6053318	35.102941	0.0040661
Residual	4	0.296879	0.0742198		
Total	5	2.9022109			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.341493253	0.3056454	7.6608173	0.0015605	1.4928857	3.1901008
X Variable 1	-0.800529699	0.1351157	-5.9247735	0.0040661	-1.1756709	-0.4253885

Client: Aluf
Sample ID: Stack - 2 LDE I.B.C. (EP-00024)
Date Evaluated 03/20/18
Best Estimate Threshold 128

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0.5	0.5	1	2	3
	2	0	1	0	0	0	0.5
	3	0	0	1	2	3	4
	4	0	0	0	0	0.5	1
	5	0	0	0	0	0	0
	6	0	0	0	0	1	2
	7	0	0	0	2	3	4
average=		0.0	0.2	0.2	0.7	1.4	2.1

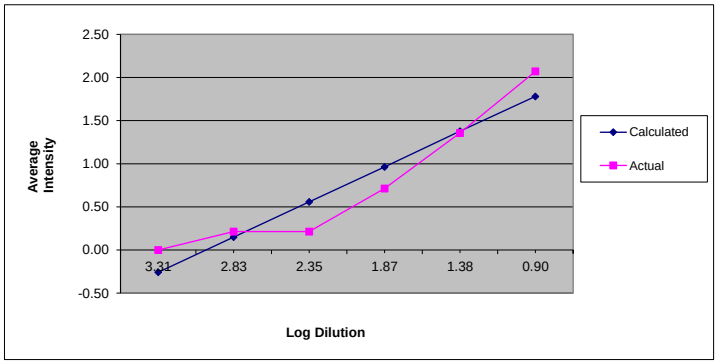
Description	Best Estimate Threshold (BET) Value
chemical	1177
--	1177
smoky	388
smoky	42
NDO	5
burnt	42
smoky	128

Group BET
Geo. Mean: 128

Extrapolated higher level	3.79	6205	
Extrapolated lower level	0.42	3	

PANELIST							Panelist BET
1	0	1176.6257	388.2628	128.46011	42.142615	13.856406	1177
2	0	1176.6257	0	0	0	13.856406	1177
3	0	0	388.2628	128.46011	42.142615	13.856406	388
4	0	0	0	0	42.142615	13.856406	42
5	0	0	0	0	0	4.5958799	5
6	0	0	0	0	42.142615	13.856406	42
6	0	0	0	128.46011	42.142615	13.856406	128

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	From equation of line y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.26
676	2.83	0.21	2.83	0.15
223	2.35	0.2	2.35	0.56
74	1.87	0.7	1.87	0.96
24	1.38	1.4	1.38	1.38
8	0.90	2.1	0.90	1.78
			0.00	2.55



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.94707955
R Square	0.896959675
Adjusted R Square	0.871199593
Standard Error	0.289420238
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.9166444	2.9166444	34.819753	0.004126757
Residual	4	0.3350563	0.0837641		
Total	5	3.2517007			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.546567403	0.3247035	7.8427478	0.0014276	1.645046048	3.4480888
X Variable 1	-0.847008298	0.1435406	-5.9008265	0.0041268	-1.24554095	-0.4484756

Client: Aluf
Sample ID: LDE Mushroom Roof Vent 1
Date Evaluated 03/20/18
Best Estimate Threshold: 68

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	2	3	4
	2	0	0	0	0	0	0.5
	3	0	0	0.5	0.5	1	2
	4	0	0	0	0	2	3
	5	0	0	0	0	0.5	0.5
	6	0	0	0	0	2	4
	7	0	0	0	0.5	1	2
average=		0.0	0.0	0.1	0.4	1.4	2.3

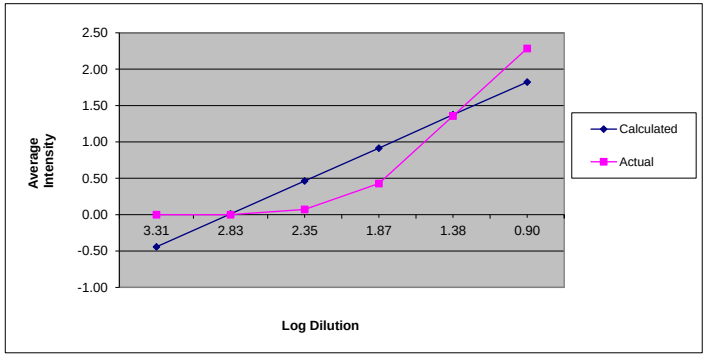
Description	Best Estimate Threshold (BET) Value
Vinegar	128
--	14
acrid chemical	388
chemical	42
--	42
Vinegar	42
acrid	128

Group BET
Geo. Mean: 68

Extrapolated higher leve	3.79	6205	
Extrapolated lower level	0.42	3	

PANELIST							Panelist BET
1	0	0	0	128.46011	42.142615	13.856406	128
2	0	0	0	0	0	13.856406	14
3	0	0	388.2628	128.46011	42.142615	13.856406	388
4	0	0	0	0	42.142615	13.856406	42
5	0	0	0	0	42.142615	13.856406	42
6	0	0	0	0	42.142615	13.856406	42
7	0	0	0	128.46011	42.142615	13.856406	128

			From equation of line	
		y		y=mx+b
Dilution Level	x log(D)	intensity Data B	x log(D)	intensity Data A
2048	3.31	0.00	3.31	-0.44
676	2.83	0.00	2.83	0.01
223	2.35	0.1	2.35	0.46
74	1.87	0.4	1.87	0.91
24	1.38	1.4	1.38	1.37
8	0.90	2.3	0.90	1.82
			0.00	2.67



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.904441759
R Square	0.818014896
Adjusted R Square	0.77251862
Standard Error	0.447142053
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3.5948138	3.5948138	17.979821	0.013260777
Residual	4	0.7997441	0.199936		
Total	5	4.3945578			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.671786914	0.5016532	5.3259645	0.0059815	1.278974468	4.0645994
X Variable 1	-0.940338294	0.2217642	-4.2402619	0.0132608	-1.55605443	-0.3246222

Client: Aluf
Sample ID: LDE Mushroom Roof Vent 2
Date Evaluated 03/20/18
Best Estimate Threshold 22

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	0	1	3
	2	0	0	0	0	0	0.5
	3	0	0	0	1	1	2
	4	0	0	0	0	0	0
	5	0	0	0	0	0	0
	6	0	0	0	0	1	3
	7	0	0	0	0	1	2
average=		0.0	0.0	0.0	0.1	0.6	1.5

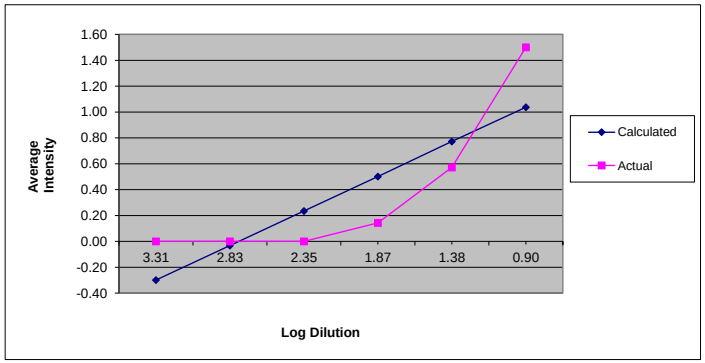
Description	Best Estimate Threshold (BET) Value
burnt cooking oil	42
--	14
smoky	128
NDO	5
NDO	5
burning	42
smoky	42

	Group BET
Geo. Mean:	22

Extrapolated higher leve	3.79	6205
Extrapolated lower level	0.42	3

PANELIST							Panelist BET
1	0	0	0	0	42.142615	13.856406	42
2	0	0	0	0	0	13.856406	14
3	0	0	0	128.46011	42.142615	13.856406	128
4	0	0	0	0	0	4.5958799	5
5	0	0	0	0	0	4.5958799	5
6	0	0	0	0	42.142615	13.856406	42
7	0	0	0	0	42.142615	13.856406	42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	From equation of line y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.30
676	2.83	0.00	2.83	-0.03
223	2.35	0.0	2.35	0.24
74	1.87	0.1	1.87	0.50
24	1.38	0.6	1.38	0.77
8	0.90	1.5	0.90	1.04
			0.00	1.54



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.838390931
R Square	0.702899353
Adjusted R Squar	0.628624191
Standard Error	0.36358232
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.2509935	1.2509935	9.463451	0.0370658
Residual	4	0.5287684	0.1321921		
Total	5	1.7797619			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.537852233	0.4079067	3.7701082	0.0196026	0.4053218	2.6703827
X Variable 1	-0.554719521	0.180322	-3.0762723	0.0370658	-1.0553736	-0.0540654

Client: Aluf
Sample ID: LDE Wall Fan-2
Date Evaluated 03/20/18
Best Estimate Threshold 26

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	2	3	4
	2	0	0	0	0	0	0
	3	0	0	0	0.5	1	2
	4	0	0	0	0	0	0
	5	0	0	0	0	0	0
	6	0	0	0	0.5	1	3
	7	0	0	0	0	0.5	1
average=		0.0	0.0	0.0	0.4	0.8	1.4

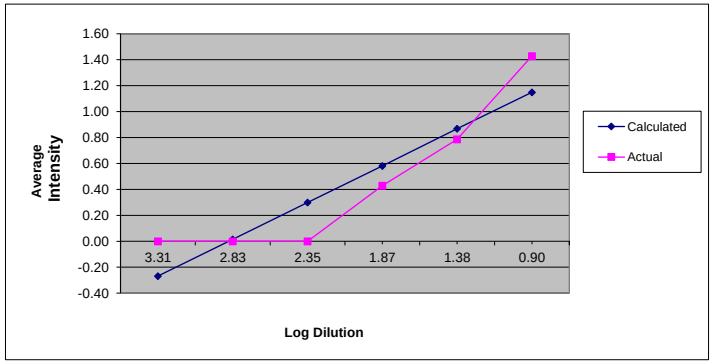
Description	Best Estimate Threshold (BET) Value
Burnt	128
NDO	5
burnt	128
NDO	5
NDO	5
Burnt	128
Chemical	42

	Group BET
Geo. Mean:	26

Extrapolated higher level	3.79	6205	
Extrapolated lower level	0.42	3	

PANELIST							Panelist BET
1	0	0	0	128.46011	42.142615	13.856406	128
2	0	0	0	0	0	4.5958799	5
3	0	0	0	128.46011	42.142615	13.856406	128
4	0	0	0	0	0	4.5958799	5
5	0	0	0	0	0	4.5958799	5
6	0	0	0	128.46011	42.142615	13.856406	128
7	0	0	0	0	42.142615	13.856406	42

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	From equation of line y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.27
676	2.83	0.00	2.83	0.01
223	2.35	0.0	2.35	0.30
74	1.87	0.4	1.87	0.58
24	1.38	0.8	1.38	0.87
8	0.90	1.4	0.90	1.15
			0.00	1.68



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.916231682
R Square	0.839480495
Adjusted R Square	0.799350618
Standard Error	0.259473967
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.4084141	1.4084141	20.91909	0.0102318
Residual	4	0.269307	0.0673267		
Total	5	1.6777211			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.6806415	0.2911064	5.7732885	0.0044692	0.8724004	2.4888826
X Variable 1	-0.588587604	0.1286885	-4.5737392	0.0102318	-0.9458841	-0.2312911

Client: Aluf
Sample ID: Stack - 3 LDW I.B.C (EP-00022)
Date Evaluated 03/20/18
Best Estimate Threshold 68

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	1	2	3
	2	0	0	0	0	0	1
	3	0	0	0.5	1	1	2
	4	0	0	0	0	0.5	1
	5	0	0	0	0	0	1
	6	0	0	0	2	3	4
	7	0	0	0	0.5	1	2
average=		0.0	0.0	0.1	0.6	1.1	2.0

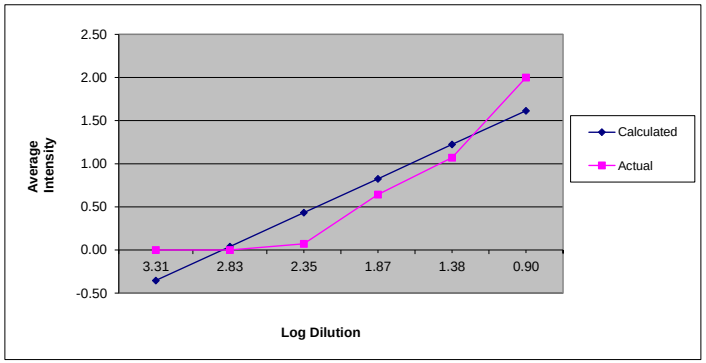
Description	Best Estimate Threshold (BET) Value
Smoke	128
smoky	14
smoky	388
smoky	42
smoky	14
burnt	128
chemical	128

	Group BET
Geo. Mean:	68

Extrapolated higher level	3.79	6205	
Extrapolated lower level	0.42	3	

PANELIST							Panelist BET
1	0	0	0	128.46011	42.142615	13.856406	128
2	0	0	0	0	0	13.856406	14
3	0	0	388.2628	128.46011	42.142615	13.856406	388
4	0	0	0	0	42.142615	13.856406	42
5	0	0	0	0	0	13.856406	14
6	0	0	0	128.46011	42.142615	13.856406	128
7	0	0	0	128.46011	42.142615	13.856406	128

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.35
676	2.83	0.00	2.83	0.04
223	2.35	0.1	2.35	0.43
74	1.87	0.6	1.87	0.83
24	1.38	1.1	1.38	1.22
8	0.90	2.0	0.90	1.61
			0.00	2.35



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.924304457
R Square	0.85433873
Adjusted R Square	0.817923412
Standard Error	0.340173077
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.7148502	2.7148502	23.460972	0.0083779
Residual	4	0.4628709	0.1157177		
Total	5	3.1777211			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.352770714	0.3816436	6.1648375	0.0035146	1.2931582	3.4123832
X Variable 1	-0.817182128	0.168712	-4.8436527	0.0083779	-1.2856016	-0.3487626

Client: Aluf
Sample ID: LDW Wall Fan-1 LDW
Date Evaluated 03/20/18
Best Estimate Threshold 10

	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->	3.31	2.83	2.35	1.87	1.38	0.90
D/T---->	2048	676	223	74	24	8
PANELIST						
1	0	0	0	0	2	3
2	0	0	0	0	0	0
3	0	0	0	0	0	1
4	0	0	0	0	0	0
5	0	0	0	0	0	0
6	0	0	0	0	0	1
7	0	0	0	0	0	1
average=	0.0	0.0	0.0	0.0	0.3	0.9

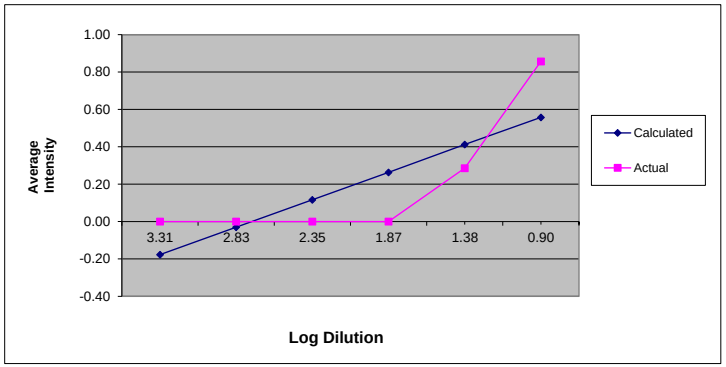
Description	Best Estimate Threshold (BET) Value
plastic	42
NDO	5
burnt	14
NDO	5
NDO	5
burnt	14
Chemical	14

Group BET
Geo. Mean: 10

Extrapolated higher leve	3.79	6205
Extrapolated lower level	0.42	3

PANELIST							Panelist BET
1	0	0	0	0	42.142615	13.856406	42
2	0	0	0	0	0	4.5958799	5
3	0	0	0	0	0	13.856406	14
4	0	0	0	0	0	4.5958799	5
5	0	0	0	0	0	4.5958799	5
6	0	0	0	0	0	13.856406	14
7	0	0	0	0	0	13.856406	14

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	From equation of line y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.18
676	2.83	0.00	2.83	-0.03
223	2.35	0.0	2.35	0.12
74	1.87	0.0	1.87	0.26
24	1.38	0.3	1.38	0.41
8	0.90	0.9	0.90	0.56
			0.00	0.83



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.794592266
R Square	0.631376869
Adjusted R Square	0.539221086
Standard Error	0.234878879
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.3779671	0.3779671	6.851191	0.05895519
Residual	4	0.2206724	0.0551681		
Total	5	0.5986395			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	0.832929239	0.263513	3.1608662	0.0341557	0.10129994	1.5645585
X Variable 1	-0.304910884	0.1164903	-2.617478	0.0589552	-0.6283399	0.0185181

Client: Aluf
Sample ID: LDW Wall Fan-3
Date Evaluated 03/20/18
Best Estimate Threshold: 31

		Intensity at	Intensity at	Intensity at	Intensity at	Intensity at	Intensity at
log D/T-->		3.31	2.83	2.35	1.87	1.38	0.90
D/T---->		2048	676	223	74	24	8
PANELIST							
	1	0	0	0	0	2	3
	2	0	0	0	0	0	0
	3	0	0	0	1	2	3
	4	0	0	0	0	0	1
	5	0	0	0	0	0	0
	6	0	0	0	1	2	3
	7	0	0	0	0.5	1	2
average=		0.0	0.0	0.0	0.4	1.0	1.7

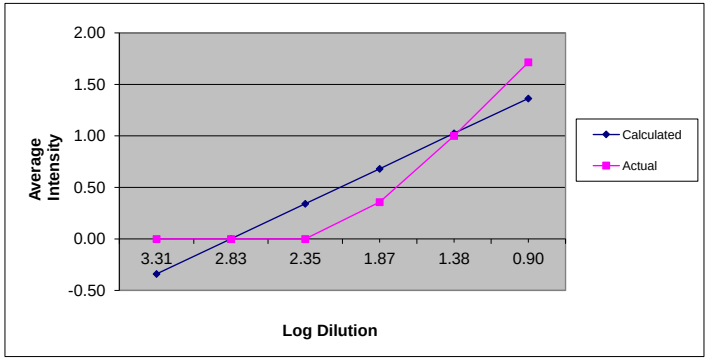
Description	Best Estimate Threshold (BET) Value
chemical, solvent	42
NDO	5
smoky	128
smoky	14
NDO	5
burnt	128
burnt	128

Group BET
Geo. Mean: 31

Extrapolated higher leve	3.79	6205	
Extrapolated lower level	0.42	3	

PANELIST							Panelist BET
1	0	0	0	0	42.142615	13.856406	42
2	0	0	0	0	0	4.5958799	5
3	0	0	0	128.46011	42.142615	13.856406	128
4	0	0	0	0	0	13.856406	14
5	0	0	0	0	0	4.5958799	5
6	0	0	0	128.46011	42.142615	13.856406	128
7	0	0	0	128.46011	42.142615	13.856406	128

Dilution Level	x log(D)	y intensity Data B	From equation of line x log(D)	y=mx+b intensity Data A
2048	3.31	0.00	3.31	-0.34
676	2.83	0.00	2.83	0.00
223	2.35	0.0	2.35	0.34
74	1.87	0.4	1.87	0.68
24	1.38	1.0	1.38	1.03
8	0.90	1.7	0.90	1.36
			0.00	2.00



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.90307452
R Square	0.815543589
Adjusted R Square	0.769429487
Standard Error	0.339132375
Observations	6

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.0340045	2.0340045	17.68534	0.0136365
Residual	4	0.4600431	0.1150108		
Total	5	2.4940476			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.0022619	0.380476	5.2625181	0.0062438	0.9458911	3.0586327
X Variable 1	-0.707329684	0.1681958	-4.2053942	0.0136365	-1.1743161	-0.2403432

APPENDIX C

Mayfly Odor Laboratory Report

Client: **TRC Solutions** Date: Received: 3**/20/18** Analyzed: 3**/20/18** Reported: 4/3/18						
Project ID: **8021** Sample ID: **Air** Sample Type: **Tedlar Bag** Sample Volume: 100						
API Odor Evaluation						
Page 1 of 6				**Volatile Organic Compounds**		
		Mol.	**Ret.**	**#5 STACK**	**STACK #2**	**HB-4**
Aromatics Compounds	**Cas#**	**Wt.**	**Time**	**PPB**	**PPB**	**PPB**
Benzene	71-43-2	78	13.7	**2.3**	**1.5**	**1.2**
Toluene	108-88-3	92	18.3	**20**	**16**	**17**
Ethyl Benzene	100-41-4	106	21.8	**3.0**	**2.9**	**3.1**
O,P-Xylene	106-42-8	106	22.1	**9.2**	**9.7**	**9.8**
M-Xylene	108-38-3	106	23.0	**2.9**	**4.3**	**2.4**
Styrene	100-42-5	104	23.1	**0.3**	**0.3**	**<1**
1,2,3-Trimethyl benzene	526-73-8	120	26.3	**1.2**	**1.3**	**<1**
Halogen Compounds (No halogenated Detected)						
Hydrocarbons						
Methyl Butane	78-78-4	72	5.1	**35**	**54**	**179**
Pentane	109-66-0	60	5.8	**34**	**56**	**193**
2-Methyl Butene	563-35-9	70	6.5	**<1**	**4.2**	**<1**
1,3-Pentadiene, (Z)	1574-41-0	68	8.6	**<1**	**<1**	**<1**
Hexane	110-54-3	86	9.6	**35**	**28**	**15**
3-Methyl-1,3-Pentadiene, (E)	2787-43-1	82	11.9	**<1**	**<1**	**<1**
Cyclohexane	110-82-7	84	12.8	**62**	**15**	**2.5**
Dimethyl Pentane	590-35-2	100	13.1	**<1**	**<1**	**<1**
3-Methyl Hexane	589-34-4	100	13.4	**17**	**<1**	**<1**
Heptane	142-82-5	100	14.0	**0.0**	**4.4**	**4.6**
2-Methyl-1-Heptene	6094-02-6	98	15.2	**<1**	**<1**	**<1**
2,3,4-Trimethyl Pentane	565-75-3	114	16.8	**128**	**4.6**	**<1**
3-Methyl heptane	589-81-1	114	17.4	**0.0**	**4.0**	**<1**
2,2,5-Trimethyl Hexane	3522-94-9	128	17.7	**261**	**<1**	**<1**
[2,2,5-Trimethylhexane	3522-99-9	128	17.7	**<1**	**8.2**	**12**
Octane	11-65-9	114	18.6	**<1**	**<1**	**<1**
3,5,5-Trimethyl Cyclohexene	933-12-0	109	20.1	**1.7**	**<1**	**<1**
2,2,5,5-Tetramethyl-Hexane	1071-81-4	142	24.1	**<1**	**<1**	**<1**
Trimethyl Octane	62016-14-2	156	24.2	**<1**	**1.4**	**<1**
2,5,6-Trimethyl Decane	62338-09-4	184	25.1	**<1**	**<1**	**<1**
N-Decane	124-18-5	142	25.3	**<1**	**4.5**	**<1**
2,2,4,5,6-Pentamethyl-Heptane	13475-82-6	170	25.8	**<1**	**2.9**	**<1**
2,6-Dimethyloctane	2051-30-1	142	26.0	**<1**	**<1**	**2.3**
2,3,5,8-Teyramethyl Decane	192823-15-7	198	26.4	**<1**	**2.8**	**<1**
2,6,10-TrimethylDodecane	3891-98-3	212	26.6	**<1**	**<1**	**<1**
Ethyl-methyl-octane	62016-19-7	156	27.0	**3.2**	**5.5**	**<1**

Client: **TRC Solutions** Date: Received: 3/**20/18** Analyzed: 3/**20/18** Reported: 4/3/18						
Project ID: **8021** Sample ID: **Air** Sample Type: **Tedlar Bag** Sample Volume: 100						
API Odor Evaluation						
Page 2 of 6				**Volatile Organic Compounds**		
		Mol.	Ret.	**#5 STACK**	**STACK #2**	**HB-4**
Hydrocarbon Compounds	Cas#	Wt.	Time	**PPB**	**PPB**	**PPB**
2,4-Dimethyl-1-Decane	62625-25-6	168	27.5	**<1**	**0.4**	**<1**
Tetradecane	629-59-4	198	30.3	**<1**	**<1**	**<1**
Dodecane	112-40-3	170	30.6	**<1**	**29**	**2.2**
Oxygen & Nitrogen Compounds						
Ethanol	64-17-5	46	6.2	**46**	**21**	**80**
Acetone	67-64-1	58	7.1	**36**	**59**	**43**
Isopropyl Alcohol	67-63-0	60	7.4	**900**	**65**	**23**
n-Propanol	71-23-8	60	10.4	**<1**	**<1**	**<1**
Methyl Butanone	563-80-4	86	11.1	**211**	**7.2**	**641**
Methyl Ethyl Ketone	78-93-3	72	11.2	**53**	**1.8**	**13**
Ethyl Acetate	141-78-6	88	11.7	**206**	**2.0**	**64**
Tertahydrofuran	109-99-9	72	12.4	**<1**	**<1**	**<1**
2-Methyl-1-Propanol	78-83-1	74	13.6	**154**	**3.1**	**8.9**
2-Pentanone	107-87-9	86	14.1	**101**	**<1**	**<1**
1-Butanol	71-36-3	74	15.0	**<1**	**<1**	**<1**
N-Propyl Acetate	109-60-4	102	16.3	**<1**	**6.1**	**<1**
3-Methyl-1-Butanol	123-51-3	88	18.1	**41**	**2.9**	**<1**
Pentyl Furan	3777-69-3	138	25.6	**1.6**	**0.6**	**0.5**
Aldehydes						
Propanal	123-38-6	58	6.7	**9.0**	**14.0**	**0.9**
Butanal	123-72-8	72	11.0	**53**	**<1**	**<1**
2-Ethyl Butanal	96-17-3	86	11.2	**211**	**1.5**	**65**
2-Methyl Butanal (2-M-Butraldehyde)	96-17-3	86	14.1	**44**	**3.4**	**2.5**
1-Pentanal (Isovaleraldehyde)	110-62-3	86	15.9	**14**	**1.5**	**<1**
Octanal	72-69-5	130	26.7	**26**	**4.3**	**<1**
Nonanal	124-19-6	142	29.4	**1.4**	**1.5**	**0.2**
Decanal	112-31-2	156	31.9	**0.7**	**0.6**	**<1**
Fatty Acids						
Acetic Acid	64-19-7	60	15.4	**102**	**89**	**16**
Propanoic Acid	79-09-4	74	18.8	**6.1**	**5.8**	**10**
N-Butyric Acid (Butanoic Acid)	107-92-6	88	21.3	**0.9**	**<1**	**<1**
Hexanoic Acid	142-62-1	116	26.9	**0.3**	**0.4**	**0.1**
Octanoic Acid	124-07-2	144	31.6	**<1**	**0.2**	**<1**
Nananoic Acid	112-05-0	158	33.9	**0.4**	**<1**	**0.1**
Decanoic Acid	334-48-5	172	36.0	**0.2**	**0.1**	**0.1**

Client: **TRC Solutions** Date: Received: 3/**20/18** Analyzed: 3/**20/18** Reported: 4/3/18						
Project ID: **8021** Sample ID: **Air** Sample Type: **Tedlar Bag** Sample Volume: 100						
API Odor Evaluation						
Page 3 of 6				**Volatile Organic Compounds**		
		Mol.	Ret.	**#5 STACK**	**STACK #2**	**HB-4**
Fatty Acids	Cas#	Wt.	Time	**PPB**	**PPB**	**PPB**
Dodecanoic Acid	143-07-7	186	39.6	**0.1**	**0.3**	**<1**
Tetradecanoic Acid	544-63-8	228	44.4	**0.1**	**0.5**	**<1**
Terpenes & Fragrance Compounds						
ά-Pinene	80-56-8	136	23.6	**1.3**	**0.4**	**<1**
Camphene	79-92-5	136	24.3	**<1**	**<1**	**<1**
beta-Pinene	18172-67-3	136	25.2	**1.3**	**0.3**	**0.1**
bata-Ocimene	3891-98-3	212	26.0	**0.1**	**<1**	**<1**
Limonene	138-86-3	136	26.5	**70**	**18**	**13**

Client: **TRC Solutions** Date: Received: 3/**20/18** Analyzed: 3/**20/18** Reported: 4/3/18						
Project ID: **8021** Sample ID: **Air** Sample Type: **Tedlar Bag** Sample Volume: 100						
API Odor Evaluation				**Volatile Organic Compounds**		
Page 4 of 6						
		Mol.	**Ret.**	**STACK 4**	**WF-1**	**HDF 3**
Aromatics Compounds	**Cas#**	**Wt.**	**Time**	**PPB**	**PPB**	**PPB**
Benzene	71-43-2	78	13.7	**2.7**	**1.6**	**0.5**
Toluene	108-88-3	92	18.3	**9.6**	**11**	**6.2**
Ethyl Benzene	100-41-4	106	21.8	**2.4**	**3.3**	**1.3**
O,P-Xylene	106-42-8	106	22.1	**7.5**	**11.0**	**5.5**
M-Xylene	108-38-3	106	23.0	**1.8**	**3.1**	**1.0**
Styrene	100-42-5	104	23.1	**<1**	**0.3**	**<1**
1,2,3-Trimethyl benzene	526-73-8	120	26.3	**3.5**	**<1**	**3.9**
Halogen Compounds (No halogenated Detected)						
Hydrocarbons						
Methyl Butane	78-78-4	72	5.1	**46**	**2.5**	**14**
Pentane	109-66-0	60	5.8	**226**	**14**	**21**
2-Methyl Butene	563-35-9	70	6.5	**2.6**	**<1**	**<1**
1,3-Pentadiene, (Z)	1574-41-0	68	8.6	**9.8**	**<1**	**<1**
Hexane	110-54-3	86	9.6	**<1**	**<1**	**<1**
3-Methyl-1,3-Pentadiene, (E)	2787-43-1	82	11.9	**5.5**	**<1**	**<1**
Cyclohexane	110-82-7	84	12.8	**<1**	**7.3**	**<1**
Dimethyl Pentane	590-35-2	100	13.1	**<1**	**0.8**	**<1**
3-Methyl Hexane	589-34-4	100	13.4	**<1**	**<1**	**<1**
Heptane	142-82-5	100	14.0	**<1**	**<1**	**<1**
2-Methyl-1-Heptene	6094-02-6	98	15.2	**<1**	**<1**	**<1**
2,3,4-Trimethyl Pentane	565-75-3	114	16.8	**<1**	**1.9**	**<1**
3-Methyl heptane	589-81-1	114	17.4	**<1**	**<1**	**3.5**
2,2,5-Trimethyl Hexane	3522-94-9	128	17.7	**<1**	**<1**	**<1**
[2,2,5-Trimethylhexane	3522-99-9	128	17.7	**<1**	**<1**	**5.6**
Octane	11-65-9	114	18.6	**<1**	**<1**	**38**
3,5,5-Trimethyl Cyclohexene	933-12-0	109	20.1	**<1**	**<1**	**<1**
2,2,5,5-Tetramethyl-Hexane	1071-81-4	142	24.1	**0.3**	**7.0**	**<1**
Trimethyl Octane	62016-14-2	156	24.2	**<1**	**0.3**	**<1**
2,5,6-Trimethyl Decane	62338-09-4	184	25.1	**1.4**	**<1**	**<1**
N-Decane	124-18-5	142	25.3	**<1**	**<1**	**59**
2,2,4,5,6-Pentamethyl-Heptane	13475-82-6	170	25.8	**<1**	**14**	**<1**
2,6-Dimethyloctane	2051-30-1	142	26.0	**<1**	**<1**	**<1**
2,3,5,8-Teyramethyl Decane	192823-15-7	198	26.4	**<1**	**15**	**<1**
2,6,10-TrimethylDodecane	3891-98-3	212	26.6	**1.2**	**2.0**	**<1**
Ethyl-methyl-octane	62016-19-7	156	27.0	**1.0**	**29**	**1.7**

Client: **TRC Solutions** Date: Received: 3/**20/18** Analyzed: 3/**20/18** Reported: 4/3/18

Project ID: **8021** Sample ID: **Air** Sample Type: **Tedlar Bag** Sample Volume: 100

API Odor Evaluation

Volatile Organic Compounds

Hydrocarbon Compounds	Cas#	Mol. Wt.	Ret. Time	STACK 4 PPB	WF-1 PPB	HDF 3 PPB
2,4-Dimethyl-1-Decane	62625-25-6	168	27.5	**<1**	**<1**	**<1**
Tetradecane	629-59-4	198	30.3	**1.5**	**3.6**	**<1**
Dodecane	112-40-3	170	30.6	**<1**	**<1**	**8.8**
Oxygen & Nitrogen Compounds						
Ethanol	64-17-5	46	6.2	**48**	**69**	**22**
Acetone	67-64-1	58	7.1	**146**	**77**	**42**
Isopropyl Alcohol	67-63-0	60	7.4	**64**	**9.7**	**4.9**
n-Propanol	71-23-8	60	10.4	**197**	**1.3**	**<1**
Methyl Butanone	563-80-4	86	11.1	**52**	**0.1**	**3.3**
Methyl Ethyl Ketone	78-93-3	72	11.2	**62**	**<1**	**<1**
Ethyl Acetate	141-78-6	88	11.7	**14**	**3.6**	**<1**
Tertahydrofuran	109-99-9	72	12.4	**0.2**	**<1**	**<1**
2-Methyl-1-Propanol	78-83-1	74	13.6	**3.1**	**<1**	**<1**
2-Pentanone	107-87-9	86	14.1	**0.0**	**<1**	**<1**
1-Butanol	71-36-3	74	15.0	**15.8**	**<1**	**<1**
N-Propyl Acetate	109-60-4	102	16.3	**2.9**	**<1**	**<1**
3-Methyl-1-Butanol	123-51-3	88	18.1	**0.2**	**0.3**	**23**
Pentyl Furan	3777-69-3	138	25.6	**<1**	**<1**	**<1**
Aldehydes						
Propanal	123-38-6	58	6.7	**22**	**<1**	**11**
Butanal	123-72-8	72	11.0	**<1**	**<1**	**<1**
2-Ethyl Butanal	96-17-3	86	11.2	**14**	**<1**	**3.3**
2-Methyl Butanal (2-M-Butraldehyde)	96-17-3	86	14.1	**0.6**	**3.1**	**<1**
1-Pentanal (Isovaleraldehyde)	110-62-3	86	15.9	**<1**	**<1**	**0.2**
Octanal	72-69-5	130	26.7	**<1**	**22**	**7.3**
Nonanal	124-19-6	142	29.4	**0.5**	**2.3**	**1.1**
Decanal	112-31-2	156	31.9	**<1**	**1.4**	**0.4**
Fatty Acids						
Acetic Acid	64-19-7	60	15.4	**92**	**77**	**35**
Propanoic Acid	79-09-4	74	18.8	**10**	**15**	**10**
N-Butyric Acid (Butanoic Acid)	107-92-6	88	21.3	**1.5**	**3.0**	**0.1**
Hexanoic Acid	142-62-1	116	26.9	**<1**	**0.9**	**0.4**
Octanoic Acid	124-07-2	144	31.6	**0.1**	**0.1**	**0.1**
Nananoic Acid	112-05-0	158	33.9	**<1**	**0.3**	**<1**
Decanoic Acid	334-48-5	172	36.0	**0.1**	**1.1**	**0.1**

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Project ID: **8021** Sample ID: **Air** Sample Type: **Tedlar Bag** Sample Volume: 100

API Odor Evaluation

				Volatile Organic Compounds		
		Mol.	Ret.	**STACK 4**	**WF-1**	**HDF 3**
Fatty Acids	Cas#	Wt.	Time	**PPB**	**PPB**	**PPB**
Dodecanoic Acid	143-07-7	186	39.6	**0.1**	**1.1**	**<1**
Tetradecanoic Acid	544-63-8	228	44.4	**<1**	**1.9**	**<1**
Terpenes & Fragrance Compounds						
ά-Pinene	80-56-8	136	23.6	**0.3**	**0.6**	**0.4**
Camphene	79-92-5	136	24,27	**<1**	**<1**	**<1**
beta-Pinene	18172-67-3	136	25.2	**0.2**	**0.8**	**0.3**
bata-Ocimene	3891-98-3	212	26.0	**0.1**	**0.1**	**<1**
Limonene	138-86-3	136	26.5	**13**	**41**	**18**

Client: **TRC Solutions** Date: Received: 3/**20/18** Analyzed: 3/**20/18** Reported: 4/3/18

Project ID: **8021** Sample ID: **Air** Sample Type: **Tenax Tubes** Sample Volume:

API Odor Evaluation

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Acrolein **Cas# 107-02-8**

Media Used	**Location**	**Results**	**Air Volume**
GO175587	#5 STACK	**Possible**	**appr. 400 ml**
DO030584	STACK #2	**Possible**	**appr. 400 ml**
DO22337	HB-4	**Positive**	**appr. 400 ml**
DO29542	STACK 4	**Positive**	**appr. 400 ml**
DO28681	WF-1	**Positive**	**appr. 400 ml**
Tedlar Bag	HDF 3	**Positive**	**100 ml**

Possitive - All major acrolein mass spectra ions are present at the correct retention time
Possible - Some major acrolein mass spectra ions are present at the correct retention time

A acrolein reference material was purchased. A Tedalr bag was spiked with acrolein. Two spiked thermal desorptions tubes were injected unto the GC/MS. One at a low low ppb level. The second at a 10 times higher level. The results indicate that the samples contained low ppb levels of acrolein. Also that acrolein is relatively stable in tedlar bags.

Client: **TRC Solutions** Date: Received: 3/**20/18** Analyzed: 3/**20/18** Reported: 4/3/18

Project ID: **8021** Sample ID: **Air** Sample Type: **Tenax Tubes** Sample Volume:

API Odor Evaluation

Page 1 of 1

Acrolein **Cas# 107-02-8**

Media Used	Location	Results	Air Volume
GO175587	#5 STACK	**Possible**	**appr. 400 ml**
DO030584	STACK #2	**Possible**	**appr. 400 ml**
DO22337	HB-4	**Positive**	**appr. 400 ml**
DO29542	STACK 4	**Positive**	**appr. 400 ml**
DO28681	WF-1	**Positive**	**appr. 400 ml**
Tedlar Bag	HDF 3	**Positive**	**100 ml**

Possitive - All major acrolein mass spectra ions are present at the correct retention time
Possible - Some major acrolein mass spectra ions are present at the correct retention time

A acrolein reference material was purchased. A Tedalr bag was spiked with acrolein. Two spiked thermal desorptions tubes were injected unto the GC/MS. One at a low low ppb level. The second at a 10 times higher level. The results indicate that the samples contained low ppb levels of acrolein. Also that acrolein is relatively stable in tedlar bags.