FINAL REPORT

EXHAUST DISPERSION ASSESSMENT

PLASTICAIR INC.

MISSISSAUGA, ONTARIO

Project Number: 04-1506B

Date: March 10, 2005

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1. EXECUTIVE SUMMARY

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Plasticair Inc. to assess the performance of a revised air-induction stack design by conducting concentration and velocity profile measurements through the use of physical modelling in a boundary-layer wind tunnel. These tests were performed in continuation to a previous assessment conducted in 2004, for which a final report was issued on August 3, 2004 (RWDI Report #04-1506A). In addition to the above, concentration and velocity measurements were also conducted for a bifurcated stack design and for a second Plasticair stack design.

The stacks' performances were assessed by calculating entrainment ratios (ER) while varying inlet and outlet flow conditions such as discharge velocities, wind speeds and wind approach angle to the stacks. Performance was also assessed by measuring the discharge velocities at the top of the stack and by using smoke to visually observe inlet and outlet flows.

Based on our findings, we conclude that on average, an ER of 1.89 would be obtained independently of the wind speed (up to 20 mph), approach angle of the wind and nozzle velocity (between 3,500 and 4,000 fpm). Approximately 99% of the time, we expect that ERs calculated would fall within a range of 1.80 to 1.97 for Design #1. While an average ER of 2.05 was calculated for Design #2 at 4,000 fpm, we expect that ERs ranging between 1.92 to 2.18 would be obtained 99% of the time under those specific operational conditions. Data for the bifurcated stack was also found to be similar under varying nozzle speed and wind angle, but showed statistically meaningful differences under 10 and 20 mph, with ERs ranging between 1.22 to 2.43. Although included in the report, velocity measurements were not used to assess the performance of any stack design because of the large degree of variability observed in the measurements.

2. INTRODUCTION

RWDI was retained by Plasticair Inc. to assess the performance of two Plasticair and one bifurcated nozzle design. Photos of each stack configuration as installed and tested in our wind tunnel are shown in Figures 1 to 3. The Plasticair Designs #1 and #2, along with the measurement points sampled, are shown in Figures 4 and 5, while the bifurcated nozzle design is shown in Figures 6 and 7. While the nozzles between the two Plasticair configurations, Design #1 and #2, remained the same, differences between the two stacks included increased porosity of the wind foils and the addition of a baseboard and blockage at the base of the stack.

3. METHODOLOGY

Similar test protocols and methodologies as those described in our previous final report (RWDI Report #04-1506A) were used for this round of tests. Tests were conducted using both tracer gas and velocity measurements. Tests were conducted for two inlet speeds of 3,500 and 4,000 fpm for the two Plasticair stack designs. Flow rates to the bifurcated stack were adjusted to obtain nozzle discharge velocities of approximately 3,500 and 4,000 fpm which, based on our experience, are below optimum operational conditions. Tests were conducted for three wind conditions (i.e., 0, 10 and 20 mph) and for two wind approach angles (i.e., P1 and P2) as shown in Figures 4 to 7. The performance of each nozzle design was assessed by calculating the entrainment ratio (ER), which represents the ratio between the total air volume at the top of the stack and total air volume coming into the stack through the fan.

4. PROJECT OBJECTIVES

The main objectives of this project were to:

- Assess the performance of the Plasticair and bifurcated stack designs by calculating ERs;
- Determine how ERs vary with wind speed, wind approach angle and nozzle velocity; and
- Conduct visual observations of the stacks using smoke.

5. FINDINGS AND DISCUSSION

Raw data for the tracer gas measurements (in parts per million (ppm) of carbon monoxide) obtained at the top of the stacks and for each stack design tested are presented in Appendix A. Velocity measurements (in feet per minute) are presented in Appendix B.

5.1 Entrainment Ratios (ERs)

A summary of the ERs calculated using concentrations, and for each of the scenarios tested, are presented in Table 1. ERs calculated using velocity measurements are presented in Table 2.

Although raw velocities (see Appendix B) and ERs calculated based on those measurements are included in this report, we recommend against their use due to the high degree of variability found within the data. Velocity measurements were highly sensitive to location of the sampling point; in some instances, velocities more than doubled when moving the sampling port less than ½ inch from one location to another. We believe that this large degree of variability is due to the complex nature of the velocity profile at the top of the stack. This variability also increased with discharge velocity.

Table 1: Summary of Entrainment Ratios (based on concentration measurements)

Tested Wind Speed (mph)	Plasticair Design #1				Plasticair Design #2				Bifurcated Design			
	3,500 fpm		4,000 fpm		3,500 fpm		4,000 fpm		3,500 fpm		4,000 fpm	
	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
0	1.93		1.65		--		1.57		1.98		1.96	
10	1.88	1.88	1.90	1.90	--	--	2.09	1.99	2.09	1.91	2.22	2.13
20	1.92	1.93	1.86	1.84	--	--	2.10	2.04	1.70	1.50	1.97	1.71

Note:
– Not tested in the wind tunnel.

Table 2: Summary of Entrainment Ratios (based on velocity measurements)

Tested Wind Speed (mph)	Plasticair Design #1				Plasticair Design #2				Bifurcated Design			
	3,500 fpm		4,000 fpm		3,500 fpm		4,000 fpm		3,500 fpm		4,000 fpm	
	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
0	1.68		2.21		--		2.23		1.48		1.33	
10	2.24	2.03	2.21	2.03	--	--	2.22	2.01	1.33	1.59	1.29	1.50
20	1.91	1.58	2.15	1.80	--	--	2.11	1.79	1.38	1.28	1.31	1.07

Note:
– Not tested in the wind tunnel.

As shown in Table 1, ERs calculated with concentrations varied between 1.65 and 1.93 for Plasticair Design #1, while those calculated for Plasticair Design #2 varied between 1.57 and 2.10. ERs calculated for the bifurcated stack varied within similar ranges, between 1.50 and 2.22 as shown above. One of the notable features of the bifurcated design is the low velocity measured on the outer ring at the top of the windband (i.e., at Receptors 4, 10, 14, 19, 23, 29, 34 and 38) which indicate poor entrainment within that area.

As shown in Appendix A, downwash of tracer gas on the downwind side of the nozzle (see Receptor 24) was observed for Plasticair Design #1, especially under higher winds, and was found to decrease with increased nozzle speeds. Downwash at the downwind receptor of Plasticair Design #2 was not evident from the concentration measurements, but was visually observed in localized areas using smoke. It is unclear whether the absence of impacts is the result of design modifications between Designs #1 and #2, or the result of a different location for the downwash receptor which was brought closer to the base of the stack for Design #2. Although downwash was also noted for the bifurcated stack design, the magnitude of tracer gas concentrations was lower than that measured for Design #1.

5.2 Data Interpretation

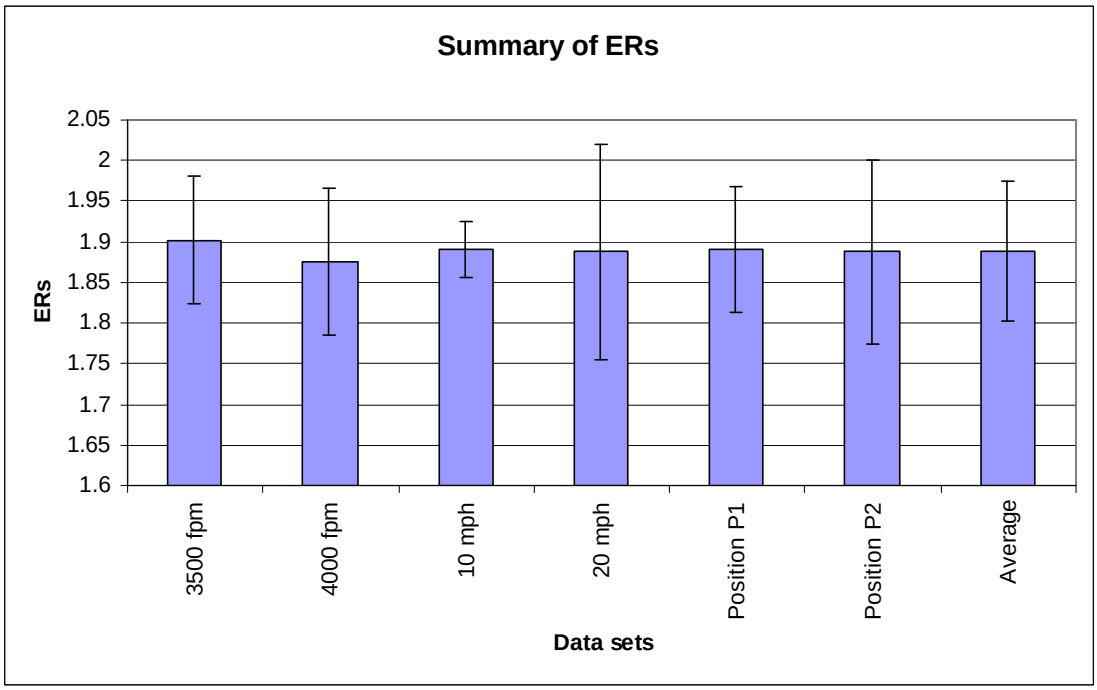
When comparing data sets against each other, it is important to statistically analyse the data to determine if the differences between measurements are simply the result of variability and repeatability of the measurement methods. A statistical analysis of the data determines whether or not the differences observed are in fact the result of the varying test parameters.

Several statistical tests are available to determine if variability within data sets is statistically meaningful. Of the methods available, RWDI selected and conducted Student t-tests for the concentration ERs shown in Table 1 to determine if the differences observed between data collected for inlet velocities of 3,500 and 4,000 fpm; approaching wind speeds of 10 and 20 mph; and between wind positions P1 and P2 are indeed from the changes in test parameters or from repeatability variations in the data. Data sets collected between the Plasticair Design #1 and #2 were also compared against each other. The Student t-test statistical method is well suited to compare two small data sets against each other.

The results of these statistical analyses showed that differences observed between ERs calculated for 3,500 and 4,000 fpm are in fact not statistically meaningful and can be attributed to repeatability of the test method. In other words, operating the stack at 3,500 or 4,000 fpm does not significantly increase ERs. The same is also true for ERs calculated for 10 and 20 mph, and for ERs calculated for wind angles P1 and P2. Thus, meaningful differences cannot be attributed to changes in inlet velocities, wind speeds or approach angles within the ranges tested.

Average ERs calculated for each of the data sets are presented in Figure 8 below. The associated error bars represent a 99% interval, which means that ERs for each of the different scenarios would fall within each of the ranges shown approximately 99% of the time. Since differences between each data sets were not significant, an overall average ER was calculated for Design #1. Based on these results, we expect that on average, an ER of 1.89 would be obtained independently of the wind speed (up to 20 mph), approach angle of the wind and nozzle velocity (between 3,500 and 4,000 fpm). Approximately 99% of the time, we expect that ERs calculated would fall within a range of 1.80 to 1.97.

Figure 8: Summary of ERs Calculated for Each of the Data Sets (Plasticair Design #1)



The ERs calculated for 4,000 fpm and for Plasticair Designs #1 and #2 were also statistically compared against each other. In this case, differences between the two data sets were found to be statistically meaningful; an average ER of 1.89 was calculated for Design #1, while an average ER of 2.05 was calculated for Design #2 (which was only tested at a velocity of 4,000 fpm). Approximately 99% of the time, we expect that ERs calculated for Design #2 would fall within a range of 1.92 to 2.18.

Data for the bifurcated stack was also statistically analysed using the same methodology described above. The following data sets were compared against each other; data collected at 3,500 and 4,000 fpm; at wind positions P1 and P2; and at 10 and 20 mph. Based on the results of this analysis, we find that no significant differences can be noted between ERs calculated for the 3,500 and 4,000 fpm, nor for the P1 and P2 data sets. However, differences between data measured at 10 and 20 mph were noted. These results imply differences in performance under these wind speeds, with ERs ranging between 1.75 and 2.43 at 10 mph, and between 1.22 and 2.22 at 20 mph. Thus, the ERs are lower for the higher wind speed.

5.3 Smoke Flow Visualization

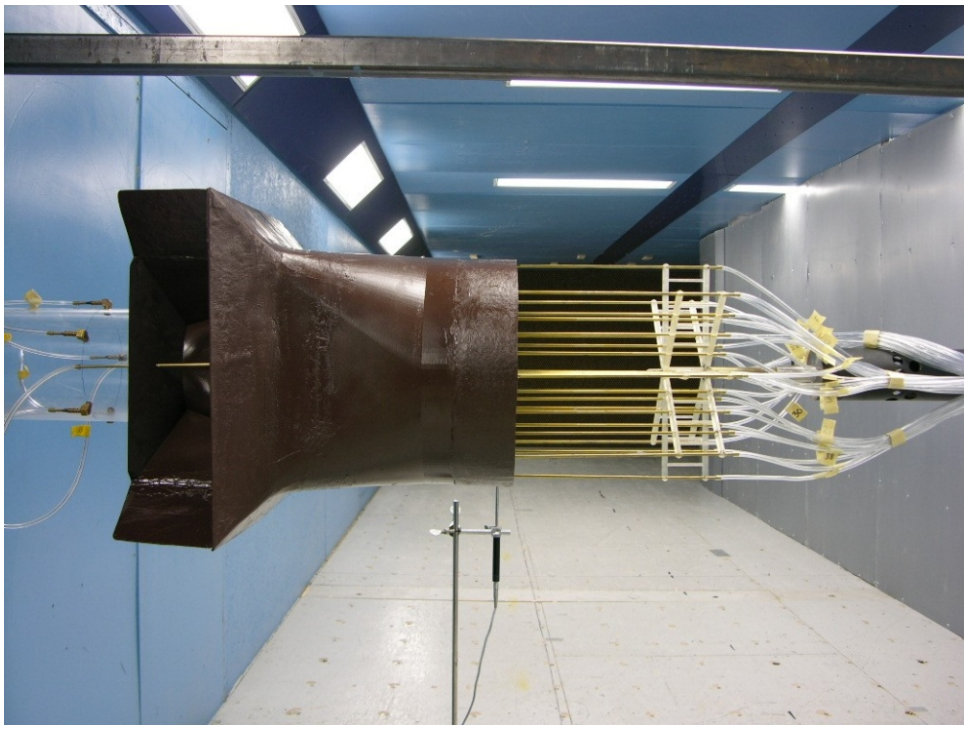
Smoke flow visualization was conducted for each of the three stack designs tested. The following observations were made for each of the stacks:

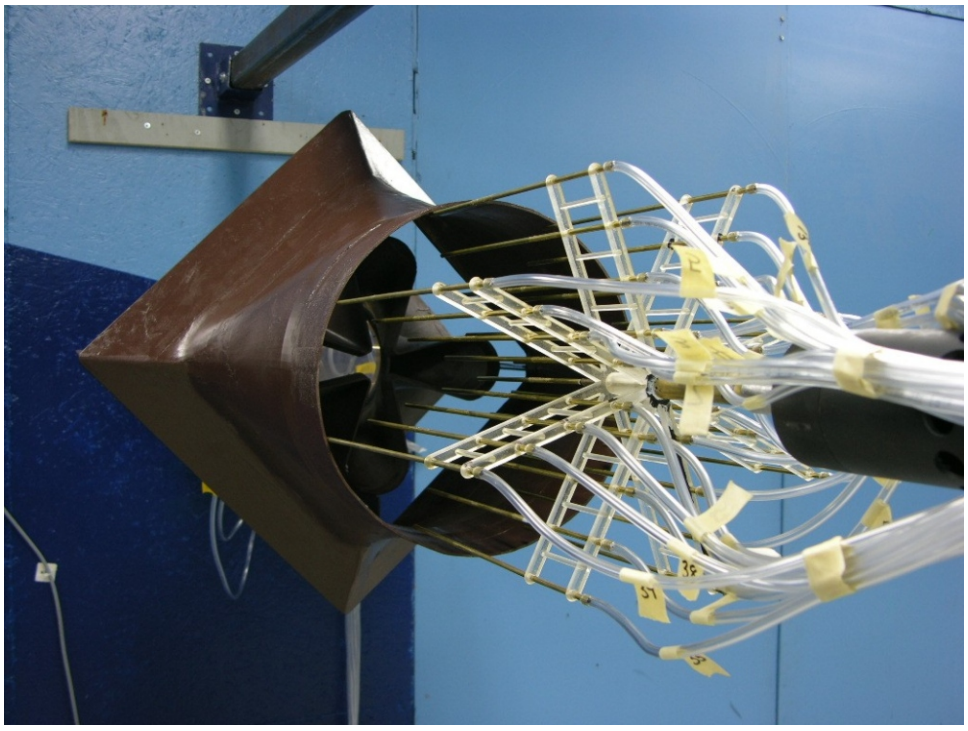
- A large wake region was observed behind the Plasticair stack. This zone appeared to be larger than that observed for the bifurcated stack, which may lead to greater stack tip downwash.
- Air foils located on the bottom portion of the Plasticair Designs #1 and #2 did not appear to re-direct the wind as intended (i.e., towards the centre of the foils).
- No notable suction on the downwind or upwind sides of either the Plasticair or bifurcated stacks was observed, especially under the higher wind cases. In both cases, entrainment was observed only immediately beneath the windband.
- Although dead zones were noticeable for the Plasticair designs, the velocity profile appeared more uniform than the one observed for the bifurcated stack.
- Entrainment did not appear to take place between the two nozzles of the bifurcated stack. Flow visualization showed that air flowed freely between the gap when the wind was perpendicular.

6. CONCLUSIONS

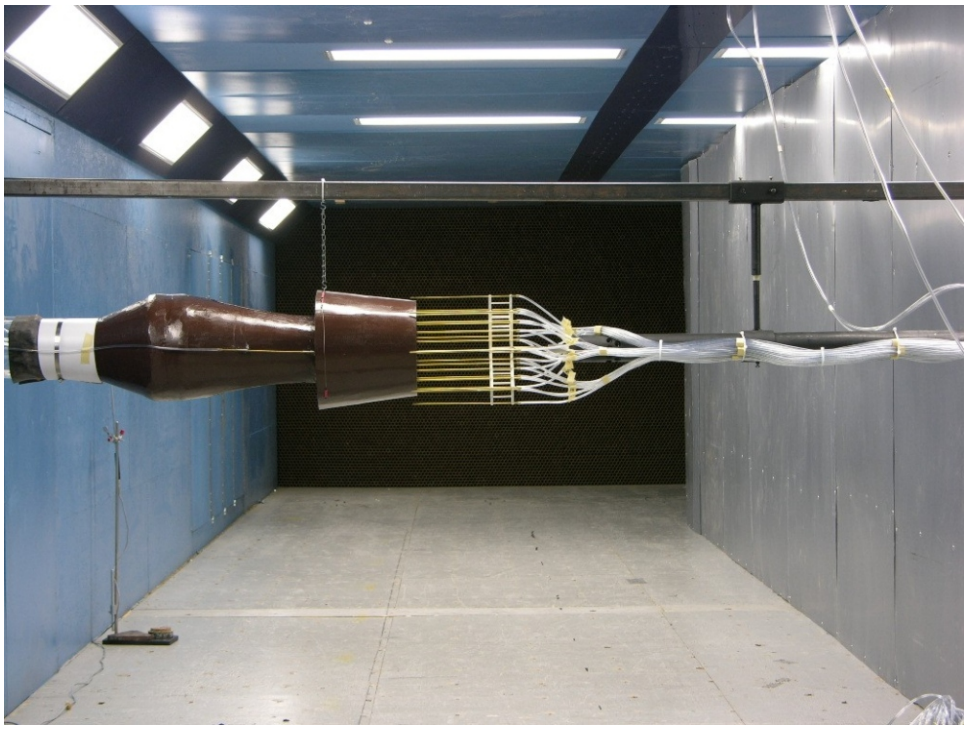
Based on our findings, we conclude that on average, an ER of 1.89 would be obtained independently of the wind speed (up to 20 mph), approach angle of the wind and nozzle velocity (between 3,500 and 4,000 fpm). Approximately 99% of the time, we expect that ERs calculated would fall within a range of 1.80 to 1.97 for Design #1. While an average ER of 2.05 was calculated for Design #2, we expect that ERs ranging between 1.92 to 2.18 would be obtained 99% of the time under those specific operational conditions. Data for the bifurcated stack was also found to be similar under varying nozzle speed and wind angle, but showed statistically meaningful differences under 10 and 20 mph, with ERs ranging between 1.22 to 2.43 which were noticeably lower at the higher wind speed. Although included in the report, velocity measurements were not used to assess the performance of any stack design because of the large degree of variability in the measurements.

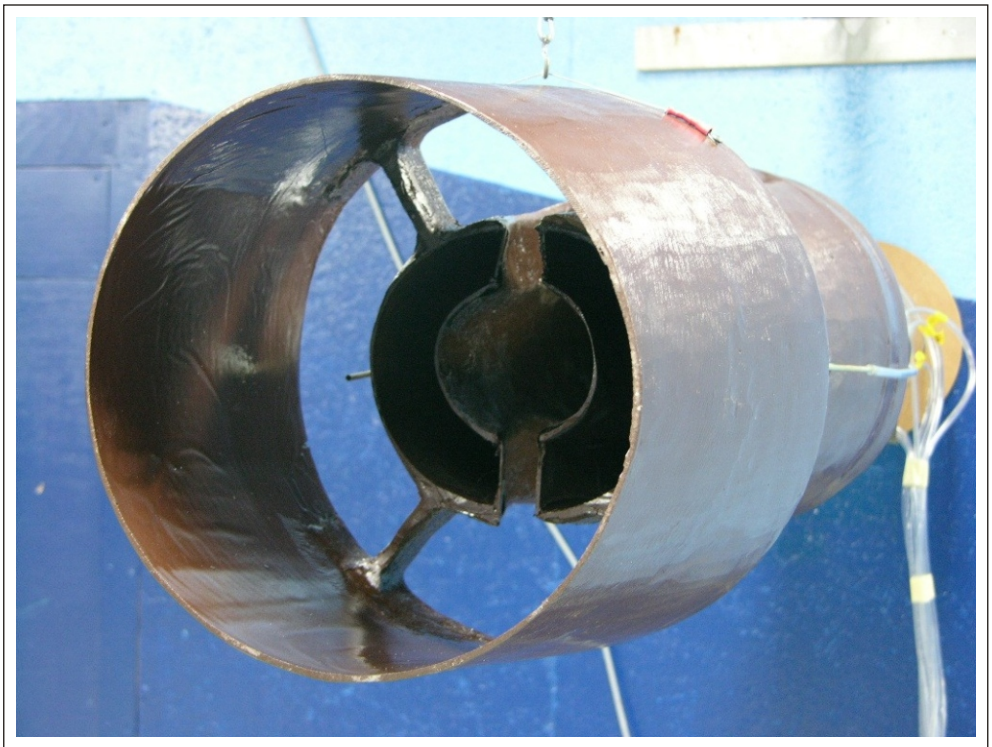
FIGURES





Wind Tunnel Study Model **Plasticair Design #1** Plasticair - Mississauga, Ontario Project #04-1506	Figure No. 1 Date: March 7, 2005	RWDI





Wind Tunnel Study Model
Bifurcated Stack Design

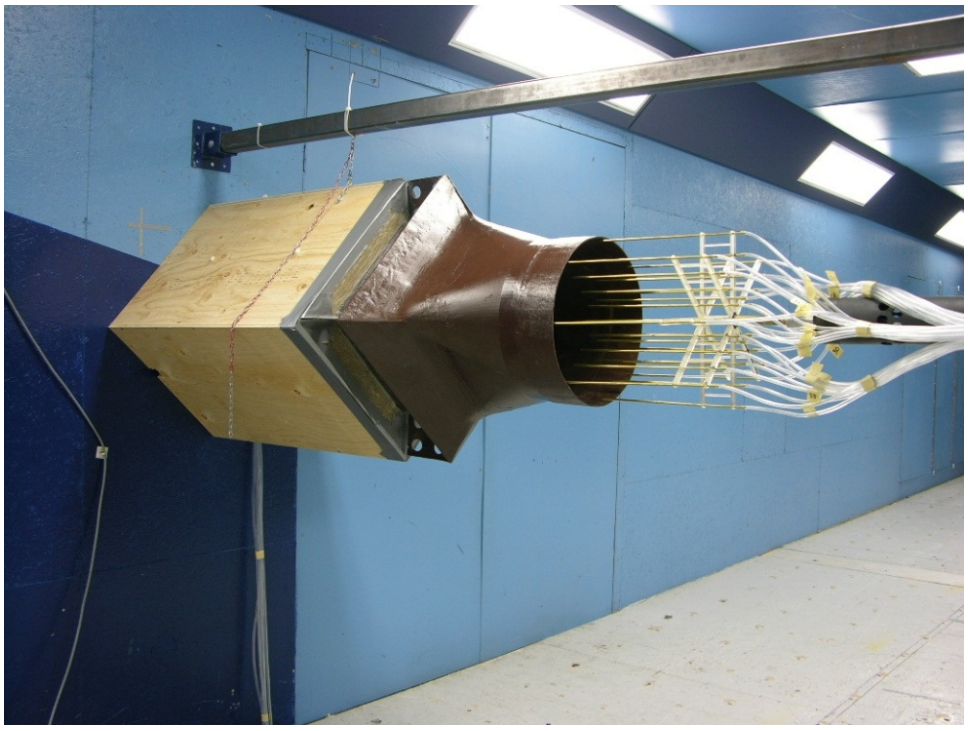
Plasticair - Mississauga, Ontario

Project #04-1506

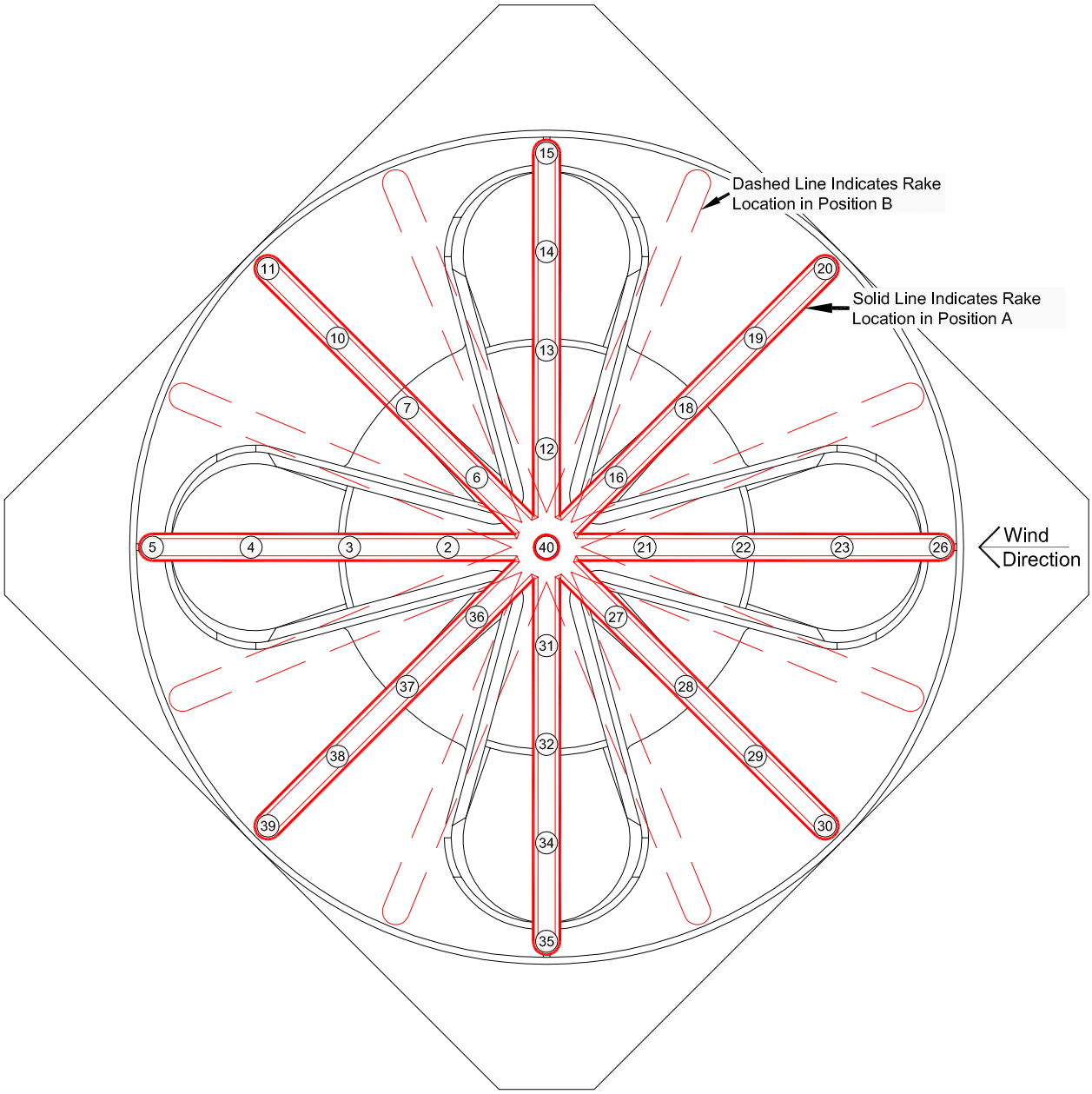
Figure No. 2

Date: March 7, 2005

RWDI



Wind Tunnel Study Model **Plasticair Design #2** Plasticair - Mississauga, Ontario Project #04-1506	Figure No. 3 Date: March 7, 2005	RWDI



0 1.25 2.5in

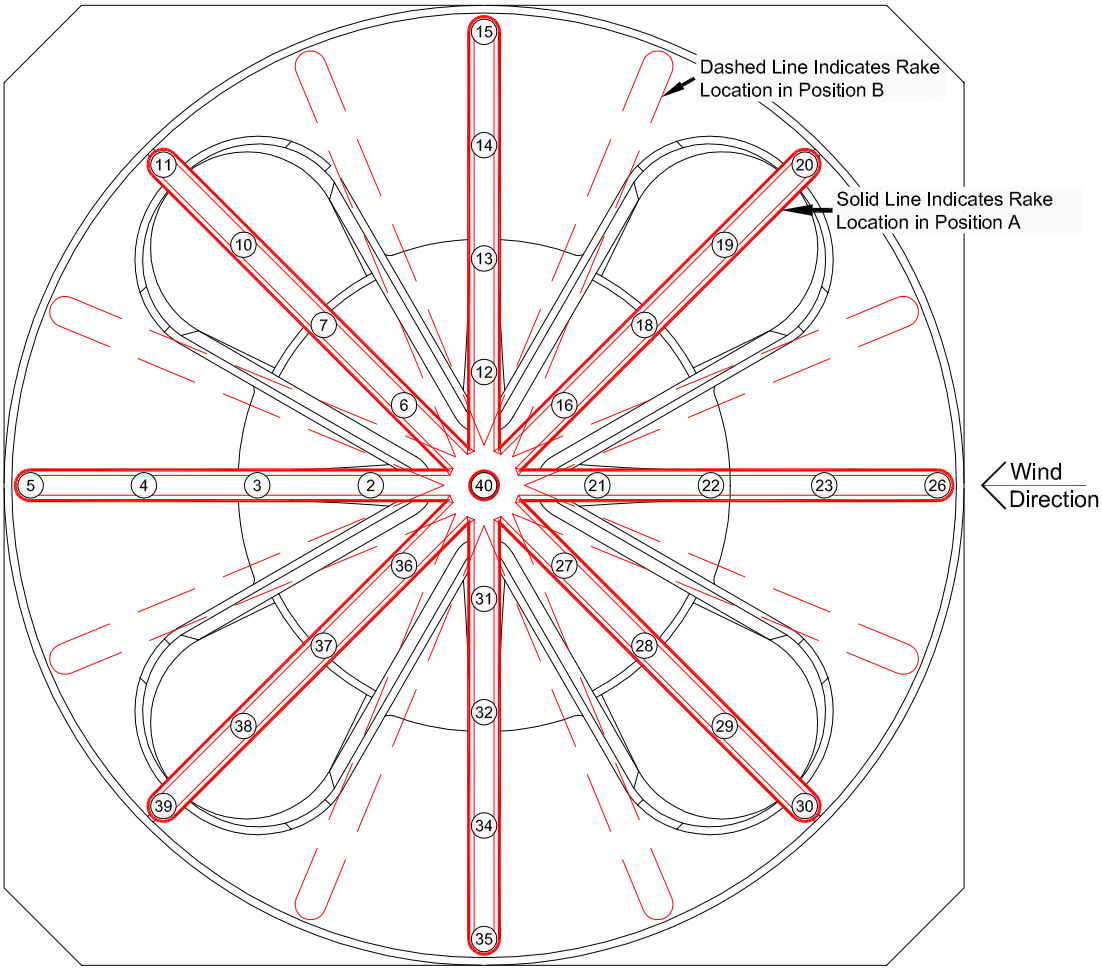
Receptor Location at Stack Tip - Position 1

Plasticair - Mississauga, Ontario

Project #04-1506

Drawn by:	KO	Figure:	4
Approx. Scale:			1"=2.5"
Date Revised:			Mar. 7, 2005

RWDI



0 1.25 2.5in

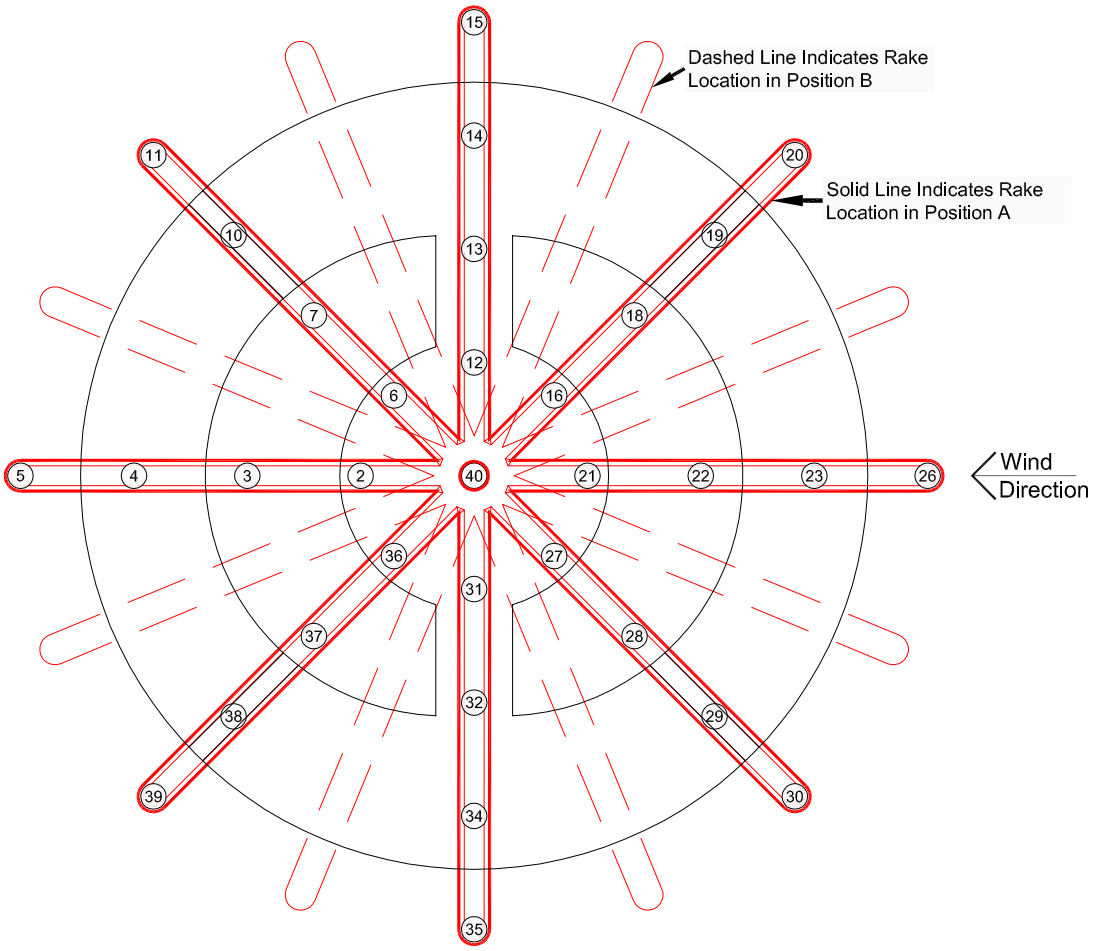
Receptor Location at Stack Tip - Position 2

Plasticair - Mississauga, Ontario

Project #04-1506

Drawn by:	KO	Figure:	5
Approx. Scale:			1"=2.5"
Date Revised:			Mar. 7, 2005

RWDI



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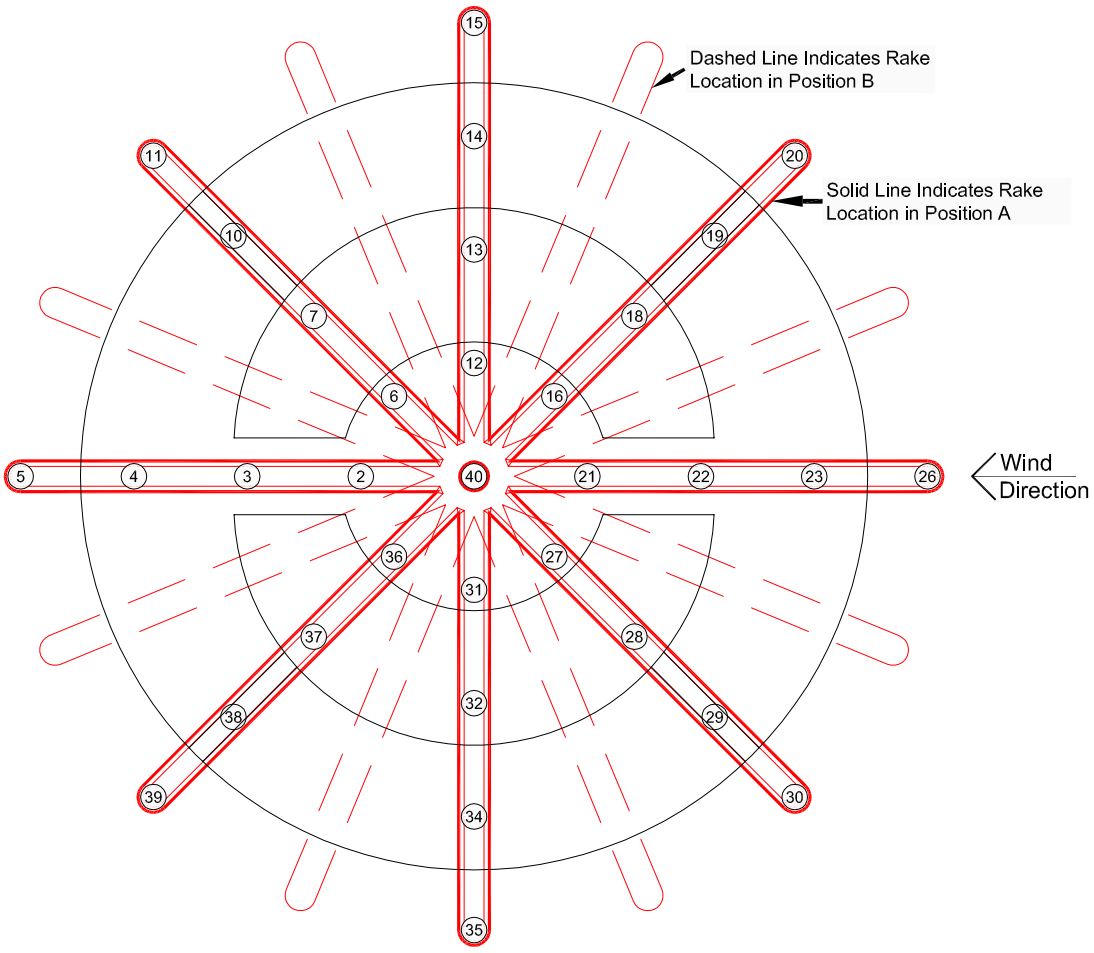
Receptor Location at Stack Tip - Position 1	Drawn by: KO	Figure: 6	RWDI
	Approx. Scale:	1"=2.5"	
Plasticair - Mississauga, Ontario Project #04-1506	Date Revised: Mar. 10, 2005		



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Receptor Location at Stack Tip - Position 2	Drawn by: KO	Figure: 7	RWDI
	Approx. Scale:	1"=2.5"	
Plasticair - Mississauga, Ontario Project #04-1506	Date Revised:	Mar. 10, 2005	

APPENDIX A

Table A1 - Concentration Measurements (ppm of CO) for Inlet Velocity of ~3,500 fpm for Plasticair Design #1

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
1	–	–	78.9	76.6	79.4	79.2	80.3	79.1	80.5	80.0	80.4	79.2
9	–	–	75.4	79.3	78.8	78.4	79.8	78.3	79.8	79.5	79.5	78.5
17	–	–	74.5	78.3	78.9	78.7	80.1	79.0	80.4	79.9	80.3	79.1
25	–	–	73.5	79.0	78.7	78.5	79.8	78.9	80.3	80.0	79.9	78.9
33	–	–	73.9	80.3	79.1	78.7	79.9	79.0	80.1	79.7	79.9	78.7
8	–	–	***	2.0	***	***	***	***	***	***	***	***
24	–	–	9.8	4.1	***	***	***	***	34.4	48.4	2.3	2.4
2	–	–	33.3	34.5	37.2	37.4	37.8	32.9	37.9	33.7	45.6	42.0
3	–	–	30.3	30.6	45.8	45.6	33.9	37.7	56.3	46.9	54.7	53.3
4	–	–	11.4	33.3	55.2	52.5	35.0	31.5	71.0	66.7	54.8	54.8
5	–	–	29.9	47.2	66.4	63.0	41.6	49.0	76.8	69.8	59.8	66.5
6	–	–	27.3	28.5	37.7	36.5	37.4	37.0	26.0	14.2	39.0	30.9
7	–	–	28.7	27.3	42.7	39.6	45.6	42.2	52.5	38.6	50.2	47.3
10	–	–	51.7	48.9	43.9	49.4	57.5	53.5	63.5	66.6	58.7	57.1
11	–	–	60.3	59.5	46.7	48.3	55.8	50.8	46.9	36.7	71.5	66.7
12	–	–	22.6	29.5	33.0	31.8	34.2	36.7	12.6	18.1	25.1	13.8
13	–	–	26.4	29.1	35.5	25.0	38.7	38.6	19.6	18.1	43.2	33.7
14	–	–	37.1	51.1	59.6	31.0	34.8	42.9	61.7	8.3	54.1	60.1
15	–	–	42.0	54.7	56.8	38.4	44.0	61.0	46.3	***	51.6	44.3
16	–	–	28.4	36.3	31.1	34.7	30.4	28.8	21.6	27.2	7.2	2.2
18	–	–	25.7	28.8	22.6	35.8	42.9	22.8	32.1	45.6	24.2	2.9
19	–	–	58.6	48.4	12.2	47.9	58.4	23.1	14.8	41.5	63.8	2.6
20	–	–	56.2	56.5	8.8	45.6	44.8	50.4	6.9	36.2	17.4	1.2
21	–	–	31.6	32.7	36.5	34.6	22.4	29.0	28.9	28.1	***	***
22	–	–	15.8	29.2	41.3	35.9	13.1	17.0	49.0	43.4	***	***
23	–	–	7.1	40.4	62.7	52.1	9.1	28.2	63.6	56.1	***	25.2
26	–	–	13.0	50.7	51.2	47.6	7.5	60.5	47.5	50.4	***	***
27	–	–	34.8	36.6	34.4	34.6	21.3	28.2	25.9	19.1	3.0	12.0
28	–	–	31.9	26.0	21.0	22.4	29.3	33.2	34.6	15.5	16.5	38.1
29	–	–	54.3	50.8	15.5	29.2	55.6	49.7	34.2	5.5	67.0	62.6
30	–	–	50.7	56.9	9.0	32.1	64.4	65.2	37.7	1.1	7.1	42.5
31	–	–	19.4	18.3	34.9	37.5	44.6	36.0	17.4	20.2	25.2	37.3
32	–	–	24.6	21.2	34.2	37.4	39.4	31.7	13.9	36.5	44.3	51.1
34	–	–	33.3	48.7	56.9	49.7	39.1	36.1	30.9	61.6	57.9	62.4
35	–	–	40.0	53.9	61.4	55.4	51.7	52.2	49.6	57.0	59.3	63.7
36	–	–	24.4	29.7	36.1	36.6	41.7	33.8	22.7	31.4	41.3	44.9
37	–	–	26.9	30.1	37.7	39.2	37.4	37.9	43.7	50.4	51.3	49.6
38	–	–	50.3	44.3	44.8	50.8	53.5	50.6	64.6	69.3	64.1	57.1
39	–	–	57.8	62.6	49.2	57.0	69.0	60.0	67.2	75.3	72.2	68.4
40	–	–	34.3	36.9	42.4	42.2	39.3	37.2	24.6	24.2	15.6	17.3

Table A2 - Concentration Measurements (ppm of CO) for Inlet Velocity of ~4,000 fpm for Plasticair Design #1

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
1	–	–	81.2	79.3	78.9	80.7	79.8	79.8	80.3	80.7	80.0	80.3
9	–	–	81.3	78.2	77.8	79.6	78.8	78.8	79.7	79.8	78.9	79.1
17	–	–	80.4	78.2	78.8	80.7	79.7	79.8	80.4	80.5	80.1	80.2
25	–	–	80.3	78.5	78.5	80.5	79.6	79.8	80.3	80.6	80.0	79.7
33	–	–	80.2	78.0	78.3	80.4	79.6	79.6	80.3	80.2	80.2	79.8
8	–	–	10.9	11.1	***	***	***	***	***	***	***	***
24	–	–	8.2	6.8	***	***	***	***	23.7	24.5	***	1.4
2	–	–	40.5	39.4	36.7	37.1	38.0	40.5	46.6	46.6	41.1	38.4
3	–	–	39.5	43.5	42.6	42.2	38.3	37.4	60.8	60.8	51.1	52.4
4	–	–	36.3	53.2	56.9	49.3	36.4	38.7	67.8	68.3	52.8	58.7
5	–	–	43.1	57.8	60.8	61.2	36.3	57.8	71.9	70.4	55.1	63.3
6	–	–	45.7	45.9	35.0	33.9	42.2	41.6	33.1	40.3	41.6	42.9
7	–	–	47.5	43.2	39.5	40.6	42.9	44.0	47.5	54.8	52.9	51.6
10	–	–	61.5	46.1	38.1	53.9	54.6	52.9	57.2	58.6	61.3	54.1
11	–	–	69.1	64.3	38.8	47.9	68.2	55.1	49.6	59.2	72.4	64.4
12	–	–	45.8	43.3	29.1	28.4	37.7	29.1	20.0	22.8	27.1	34.9
13	–	–	42.5	40.8	36.9	23.7	39.7	35.8	22.6	35.9	47.7	52.3
14	–	–	42.5	52.0	61.8	26.9	44.4	46.3	56.5	66.0	58.8	64.5
15	–	–	49.3	57.3	60.8	38.3	46.8	62.9	47.3	46.7	60.8	68.4
16	–	–	46.1	40.7	28.6	32.7	24.1	16.4	26.6	23.5	11.3	18.8
18	–	–	41.9	37.6	22.7	35.9	31.6	19.7	33.6	18.4	40.8	42.5
19	–	–	59.6	45.8	13.6	52.1	58.3	37.7	18.2	8.7	61.1	59.0
20	–	–	72.4	59.9	6.8	46.2	68.4	38.0	17.5	2.9	37.1	63.5
21	–	–	41.7	37.3	35.6	37.9	15.1	19.4	31.5	29.5	3.2	7.3
22	–	–	33.0	33.3	36.9	34.7	9.1	13.4	48.8	49.1	3.9	25.8
23	–	–	38.9	47.4	59.8	45.9	12.8	23.4	63.4	52.4	1.7	32.9
26	–	–	42.6	58.2	59.4	54.2	12.0	48.1	51.7	43.6	3.7	6.6
27	–	–	37.5	39.5	35.7	36.6	25.1	31.1	25.0	29.7	4.1	2.2
28	–	–	45.2	39.0	22.0	25.8	27.7	38.3	26.8	36.8	6.8	1.2
29	–	–	58.9	42.0	8.8	34.3	40.8	51.1	27.7	55.3	46.5	11.6
30	–	–	68.9	55.7	6.0	42.6	61.3	64.3	24.8	51.9	48.8	7.0
31	–	–	33.2	39.3	39.1	40.5	33.7	35.3	20.3	20.8	23.1	11.4
32	–	–	23.4	40.3	35.1	39.0	32.8	31.8	20.6	12.6	38.5	23.1
34	–	–	33.9	45.3	54.1	48.6	35.7	39.1	55.1	7.8	52.7	51.8
35	–	–	42.4	55.7	59.0	56.5	48.9	47.2	49.0	2.6	60.8	59.8
36	–	–	36.5	32.5	37.0	37.7	34.1	35.9	36.8	27.4	35.0	27.3
37	–	–	44.0	27.4	37.5	41.3	35.0	38.7	51.3	41.0	48.6	43.3
38	–	–	58.1	35.1	43.9	55.3	49.3	52.0	66.2	63.9	63.4	58.5
39	–	–	66.0	58.8	47.7	51.0	57.9	51.8	64.7	56.3	67.7	60.1
40	–	–	41.1	42.1	40.8	42.1	32.5	32.9	32.8	32.2	13.6	11.8

Table A3 - Concentration Measurements (ppm of CO) for Inlet Velocity of ~4,000 fpm for Plasticair Design #2

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
1	79.4	79.8	–	–	80.1	79.1	78.1	79.3	78.6	79.4	79.2	78.6
9	79.0	78.5	–	–	79.0	78.3	77.5	78.0	77.8	78.5	78.4	77.9
17	80.0	79.8	–	–	79.8	79.2	78.0	79.1	78.3	79.4	79.3	78.3
25	80.4	80.2	–	–	79.6	79.0	78.0	78.7	78.1	79.3	79.2	78.4
33	80.7	81.9	–	–	79.5	78.8	78.1	78.7	78.4	79.3	79.2	78.4
8	11.3	8.1	–	–	***	***	***	***	***	***	***	***
24	22.6	23.2	–	–	***	***	***	***	***	***	***	***
2	41.1	40.6	–	–	32.6	31.0	36.7	36.9	39.5	36.6	41.5	41.1
3	54.4	52.9	–	–	36.0	35.0	31.0	34.9	47.5	47.8	44.5	45.6
4	63.5	57.7	–	–	58.9	47.8	24.5	39.1	59.9	56.7	46.1	49.0
5	60.8	59.9	–	–	59.5	53.9	31.3	50.0	64.7	59.8	51.1	57.6
6	40.9	34.9	–	–	31.4	28.5	35.2	35.4	30.0	22.2	39.1	34.8
7	37.8	40.2	–	–	33.3	35.7	38.9	42.1	42.7	37.3	47.6	45.3
10	40.3	55.0	–	–	34.1	50.8	57.1	52.8	50.7	57.3	60.0	56.6
11	52.8	58.6	–	–	39.7	44.3	57.0	53.5	42.5	39.9	66.8	60.8
12	42.1	41.7	–	–	26.3	22.1	30.2	28.4	12.2	6.6	26.2	20.3
13	46.7	39.8	–	–	36.7	21.7	36.8	35.3	20.0	3.8	40.7	37.0
14	64.0	42.3	–	–	63.0	26.6	43.1	50.5	46.9	***	52.9	56.7
15	65.4	57.0	–	–	53.4	29.0	46.9	51.1	38.9	***	50.8	36.0
16	44.8	41.6	–	–	21.6	23.1	24.0	20.1	7.8	12.3	14.7	9.3
18	36.3	42.9	–	–	13.4	22.2	33.1	20.7	28.0	29.7	31.1	10.4
19	31.7	57.3	–	–	8.8	48.2	57.6	31.7	23.4	52.0	59.6	15.1
20	34.0	56.5	–	–	8.0	52.2	52.5	30.3	29.6	46.3	23.7	***
21	44.2	43.0	–	–	28.4	24.6	17.5	20.6	17.8	17.2	4.9	6.5
22	46.0	37.2	–	–	29.2	22.2	5.2	13.9	24.0	20.7	***	11.5
23	65.1	52.4	–	–	58.5	47.5	1.8	31.8	56.9	47.0	***	20.1
26	64.8	59.6	–	–	59.5	58.9	5.8	31.3	54.5	58.9	***	***
27	39.3	48.2	–	–	19.4	21.9	24.6	28.0	13.6	12.8	12.5	18.9
28	33.8	41.4	–	–	10.9	22.5	29.1	32.8	14.4	7.0	27.1	32.6
29	40.3	59.1	–	–	15.7	36.5	56.9	53.0	29.1	4.6	59.1	58.3
30	40.1	54.5	–	–	30.4	28.7	50.9	52.5	45.5	3.9	15.4	31.9
31	45.5	46.0	–	–	28.8	31.7	32.1	35.4	19.9	27.0	26.8	32.5
32	46.6	44.3	–	–	32.9	30.1	32.2	35.7	25.6	39.2	37.7	40.9
34	65.7	56.2	–	–	60.0	40.1	39.1	47.2	52.6	55.1	49.3	52.4
35	69.2	63.7	–	–	48.7	50.7	42.6	49.6	41.8	39.8	52.1	53.6
36	47.9	49.5	–	–	31.9	31.7	33.7	35.0	33.0	36.8	34.7	37.5
37	43.9	50.3	–	–	28.7	33.0	34.8	33.3	41.7	44.1	41.3	41.5
38	39.7	52.4	–	–	26.1	47.0	54.1	46.3	52.2	58.5	56.6	52.5
39	43.6	60.7	–	–	38.3	53.7	58.1	58.4	48.5	57.8	64.0	63.2
40	50.5	52.2	–	–	33.8	33.8	34.1	35.0	26.5	26.7	21.2	22.4

Table A4 - Concentration Measurements (ppm of CO) for Nozzle Velocity of ~3,500 fpm for Bifurcated Stack

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
1	–	–	80.0	79.7	80.6	80.6	79.8	79.9	79.7	80.0	80.2	80.7
9	–	–	79.6	79.6	80.6	80.2	79.6	79.9	79.6	80.0	80.3	80.6
17	–	–	79.8	79.5	80.2	79.9	79.5	79.9	79.7	79.9	80.0	80.5
25	–	–	80.3	79.7	80.4	80.0	79.5	79.5	79.8	80.0	79.8	80.4
33	–	–	80.3	79.9	79.9	79.7	79.3	79.7	79.1	79.8	80.2	80.3
8	–	–	9.5	13.2	4.4	2.4	2.8	2.4	6.6	7.2	21.0	21.0
24	–	–	7.6	17.6	***	***	4.9	5.5	9.0	10.0	23.0	23.6
2	–	–	71.2	68.7	72.1	71.2	72.5	70.8	63.5	65.8	74.4	71.3
3	–	–	78.7	61.5	32.7	26.8	58.9	34.6	28.2	38.6	63.1	53.4
4	–	–	53.2	24.9	11.1	4.8	33.1	10.0	21.2	33.7	40.5	33.7
6	–	–	69.4	70.5	75.8	78.9	82.5	79.7	76.0	80.1	70.7	71.8
7	–	–	50.8	45.9	43.6	34.1	32.5	43.8	53.7	64.4	49.8	61.1
10	–	–	13.5	15.2	24.6	17.7	6.9	10.2	39.4	49.2	24.0	34.0
12	–	–	67.4	66.5	71.2	67.3	64.1	60.7	67.2	66.4	69.3	69.3
13	–	–	37.4	40.9	66.3	48.3	51.0	51.9	63.8	51.3	67.9	68.3
14	–	–	8.3	17.0	39.8	42.0	32.6	36.2	53.8	37.7	53.6	57.1
16	–	–	65.8	66.6	72.1	69.3	60.8	62.6	66.3	67.9	70.0	71.2
18	–	–	37.0	51.3	31.9	43.4	50.1	55.4	37.7	39.9	63.1	65.0
19	–	–	16.9	30.1	4.5	10.7	27.9	37.6	23.9	26.2	54.2	55.4
21	–	–	68.2	68.3	75.6	72.6	64.1	63.3	70.9	72.3	72.3	73.8
22	–	–	65.6	51.4	49.7	42.1	80.4	69.1	50.1	54.3	70.0	65.7
23	–	–	35.9	25.4	10.5	6.2	49.6	41.2	27.5	27.1	58.2	46.2
27	–	–	67.6	70.5	76.5	76.3	61.9	64.0	74.5	76.7	72.9	72.1
28	–	–	36.8	36.6	50.2	49.8	52.2	48.8	47.6	54.9	57.4	55.5
29	–	–	15.9	20.9	14.8	12.5	27.9	22.1	26.3	30.7	33.8	28.7
31	–	–	73.2	74.6	77.6	76.8	69.2	74.0	76.0	73.7	72.7	73.1
32	–	–	42.7	57.5	65.4	66.8	59.4	46.9	70.1	58.0	56.2	56.6
34	–	–	14.8	19.3	48.3	35.9	30.6	16.4	48.5	47.9	33.5	39.8
36	–	–	69.3	74.1	73.6	75.3	68.9	71.4	67.8	63.7	71.9	73.8
37	–	–	58.3	59.2	29.7	43.3	26.1	34.8	41.4	30.2	53.1	54.7
38	–	–	22.8	29.4	14.5	31.9	20.8	22.9	47.4	44.3	40.7	38.9
40	–	–	59.4	60.4	71.6	70.9	61.7	63.3	71.9	72.0	73.2	73.6

Table A5 - Concentration Measurements (ppm of CO) for Nozzle Velocity of ~4,000 fpm for Bifurcated Stack

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
1	80.6	80.0	–	–	79.4	79.0	79.8	80.2	80.1	79.5	79.8	79.8
9	80.1	79.1	–	–	79.3	78.9	79.6	80.1	80.0	79.5	79.8	79.7
17	80.7	80.1	–	–	79.4	79.1	79.6	80.0	79.9	79.5	80.0	79.8
25	80.2	79.5	–	–	79.3	79.0	79.6	80.1	79.6	79.8	79.8	79.6
33	80.8	79.5	–	–	79.0	78.7	79.6	80.2	79.7	79.6	79.9	79.7
8	4.2	12.3	–	–	3.2	3.3	***	***	4.1	4.0	11.8	12.2
24	16.6	15.9	–	–	***	***	***	***	3.2	2.5	19.2	19.0
2	67.1	67.2	–	–	69.4	69.4	72.3	68.8	63.9	65.2	73.0	69.3
3	44.3	40.1	–	–	24.8	28.4	54.4	26.1	26.2	34.0	62.7	48.6
4	5.8	13.8	–	–	5.5	9.9	33.0	12.0	17.1	24.2	40.2	26.6
6	64.6	66.9	–	–	71.3	71.7	71.0	71.9	68.8	68.0	69.7	69.3
7	40.3	56.7	–	–	38.7	49.0	23.2	38.9	51.4	59.2	48.3	57.1
10	8.7	22.1	–	–	20.3	28.1	3.8	9.1	32.7	42.0	20.1	30.4
12	64.4	65.0	–	–	70.4	70.0	66.1	60.5	66.1	64.8	66.5	65.4
13	66.9	54.7	–	–	65.4	48.7	48.2	51.1	62.2	49.4	61.6	58.8
14	34.6	24.4	–	–	36.3	11.5	19.4	22.5	38.6	18.3	42.5	35.7
16	65.5	68.9	–	–	71.1	72.4	57.9	58.2	65.7	67.2	65.7	68.5
18	39.6	42.9	–	–	33.3	38.7	50.5	56.3	40.1	42.5	55.6	61.0
19	10.5	21.2	–	–	2.4	2.8	21.9	33.2	17.3	19.5	35.6	37.2
21	73.1	72.9	–	–	74.9	74.6	59.9	59.2	70.9	72.1	70.4	70.8
22	57.7	54.2	–	–	49.0	52.0	69.4	59.7	46.5	50.2	66.5	60.0
23	19.5	21.1	–	–	12.2	13.3	49.2	41.2	20.6	20.9	45.4	30.9
27	74.3	74.0	–	–	75.1	75.3	57.7	62.1	74.6	75.5	69.9	67.9
28	49.8	65.6	–	–	49.4	70.1	51.4	50.7	47.9	48.5	51.6	50.4
29	22.0	39.9	–	–	12.4	44.4	23.9	19.9	15.4	20.2	20.2	19.0
31	74.5	74.6	–	–	76.9	75.9	69.1	73.7	75.2	71.8	69.6	70.1
32	69.5	52.2	–	–	59.9	38.6	59.0	40.3	68.0	53.3	51.2	52.8
34	54.7	28.3	–	–	44.0	23.0	26.9	11.6	37.0	40.6	27.1	35.2
36	71.8	70.9	–	–	71.1	66.2	69.0	69.4	65.6	62.6	71.0	73.3
37	47.5	40.5	–	–	24.5	17.2	19.5	32.1	32.9	26.4	51.3	52.4
38	26.9	17.8	–	–	3.0	2.8	5.4	14.6	29.5	26.8	36.4	33.0
40	63.9	63.3	–	–	70.5	70.5	62.4	64.0	69.1	69.2	70.1	70.1

APPENDIX B

Table B1 - Velocity Measurements (in fpm) for Inlet Velocity of ~3,500 fpm for Plasticair Design #1

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
2	1082	1019	–	–	1237	2174	1352	1415	1983	1988	1449	1459
3	1362	1248	–	–	1655	1477	797	1343	1211	1184	0	421
4	2144	1483	–	–	2468	1655	962	2058	1530	1252	0	572
5	1827	1254	–	–	2591	1556	1115	1691	1854	1485	0	953
6	1292	1253	–	–	1536	1375	1759	1374	1477	1642	1641	1549
7	1024	1193	–	–	1097	1345	1615	1000	1275	1097	1007	719
10	729	1480	–	–	1036	1705	2607	1546	1138	968	1791	884
11	1096	2154	–	–	1594	2583	2099	2456	1587	1296	1595	1758
12	1541	1348	–	–	2026	1766	2056	1922	1222	1354	1743	1673
13	1158	1021	–	–	2010	1371	1559	1796	1540	1542	1401	1062
14	1927	1690	–	–	2771	1951	1488	2344	2324	2079	1195	1437
15	2350	1608	–	–	3232	2299	1614	1931	2453	2230	1705	1289
16	1724	1656	–	–	2040	2116	1654	1968	1288	1280	1597	1685
18	1188	1390	–	–	1414	1689	1845	1862	1537	1238	1773	1923
19	965	1518	–	–	1381	1905	3064	2317	1383	1640	2799	2425
20	1346	2390	–	–	1133	2737	2303	2638	1246	1569	1690	2007
21	1737	1690	–	–	2414	2203	1301	1441	1761	1547	1549	1537
22	1462	1241	–	–	2447	1697	716	1145	2217	2113	1079	984
23	2208	1863	–	–	3403	2795	577	1895	2208	1680	1196	1173
26	2089	2031	–	–	2426	2214	746	1599	1299	961	1075	925
27	1611	1678	–	–	2011	2161	1805	1460	1720	2065	1724	1643
28	1178	1201	–	–	1243	1782	1971	1396	1485	2116	1763	1469
29	721	1576	–	–	1321	2515	2855	1814	1521	2440	2468	2292
30	1337	2322	–	–	1436	2890	2562	2391	1092	1599	1726	1236
31	1225	1480	–	–	1979	1916	1763	1845	1284	1331	1665	1725
32	1502	1552	–	–	2331	1854	1068	1618	1567	1191	1041	1687
34	2225	1610	–	–	3015	1942	862	1984	2558	1723	633	1631
35	1667	1498	–	–	2126	1728	1498	2194	2525	1804	1388	2199
36	923	1031	–	–	1356	1677	1529	1722	1870	1826	1476	1596
37	778	1068	–	–	1286	1633	1468	1163	1614	1938	600	756
38	835	1737	–	–	1060	2149	2361	1546	1415	2107	1569	1219
39	1380	1809	–	–	1874	2262	2368	2238	1883	2026	1544	1743
40	1622	1652	–	–	2223	2174	2178	2239	2137	2041	1811	1786

Note: Receptors 1, 9, 17, 25, 33 were used to measure the inlet conditions. Therefore, no velocity measurements were recorded at those receptors.
Receptors 8 and 24 were used to measure downwash along the side of the stack. No velocity measurements were recorded.

Table B2 - Velocity Measurements (in fpm) for Inlet Velocity of ~4,000 fpm for Plasticair Design #1

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
2	2078	2247	–	–	1696	2708	2064	2001	2178	2326	2103	2122
3	2643	2323	–	–	2011	2052	1171	1905	1622	1751	1385	1422
4	3232	2490	–	–	3121	2543	1085	2517	2352	1788	442	1834
5	2202	1914	–	–	2253	1913	1446	2461	2214	1457	1431	2612
6	1689	1823	–	–	1525	1531	2346	2418	2107	2124	1896	1929
7	1166	1826	–	–	1065	1467	2029	1858	1355	1388	1007	1303
10	1003	2302	–	–	1130	2206	3297	2385	986	1495	2494	1925
11	1115	2606	–	–	1594	2693	2335	2958	1795	1813	2402	2894
12	1874	1789	–	–	2010	1825	2091	2298	1795	1953	1863	1890
13	2203	1788	–	–	2288	1702	1656	1798	2143	2103	1747	1170
14	3288	2403	–	–	3315	2408	1575	2478	3130	2522	1529	2052
15	2692	1862	–	–	3081	2129	1934	2487	3286	2691	1931	1878
16	1910	1900	–	–	1989	2036	1503	1789	1571	1572	1398	1609
18	1338	1819	–	–	1500	1777	2083	2292	1982	1677	1822	2399
19	1062	2278	–	–	1475	1903	3440	3106	1784	1913	3183	3129
20	1641	2964	–	–	1243	2349	2176	2742	1346	1850	1730	1998
21	2342	2096	–	–	2541	2163	1022	992	2237	1718	1207	1041
22	2261	1670	–	–	2405	1801	0	1195	2860	2455	805	510
23	3436	2757	–	–	3473	2981	292	1936	3314	2669	851	805
26	3058	2599	–	–	2663	2035	756	1320	1935	1475	693	564
27	2632	2529	–	–	2573	2751	1543	1286	2114	2545	1589	1275
28	1770	2240	–	–	1584	2254	2424	1399	1606	2417	1793	1289
29	1094	2315	–	–	1382	2603	3347	2298	1800	3248	3283	1939
30	1508	2880	–	–	1386	2980	2522	2138	1478	2466	2292	1018
31	2338	2406	–	–	2463	2537	1908	1947	2041	1918	1912	1792
32	2280	1954	–	–	2442	2057	1477	2203	2416	1560	1699	2192
34	3482	2532	–	–	3575	2352	1187	2562	3419	1948	1265	2878
35	2837	2903	–	–	2955	2521	1484	2134	2996	2076	1837	2348
36	2023	2224	–	–	2149	2278	2150	1969	2400	2411	2062	2323
37	1456	1677	–	–	1601	1737	1902	1622	1841	2450	1165	1234
38	1033	2387	–	–	1398	2400	3196	2008	1535	2605	2687	1920
39	1893	3042	–	–	2278	2791	2215	2412	2274	2628	2053	2037
40	2558	2614	–	–	2668	2708	2182	2035	2818	2813	1847	1760

Note: Receptors 1, 9, 17, 25, 33 were used to measure the inlet conditions. Therefore, no velocity measurements were recorded at those receptors.
Receptors 8 and 24 were used to measure downwash along the side of the stack. No velocity measurements were recorded.

Table B3 - Velocity Measurements (in fpm) for Inlet Velocity of ~4,000 fpm for Plasticair Design #2

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 2A	Position 2B	Position 1A	Position 1B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
2	–	–	2079	2249	1697	2720	2065	2002	2180	2327	2105	2124
3	–	–	2654	2335	2025	2066	1196	1920	1640	1767	1406	1442
4	–	–	3242	2504	3132	2556	1115	2530	2366	1806	513	1852
5	–	–	2215	1929	2266	1928	1466	2473	2228	1477	1451	2623
6	–	–	1691	1825	1527	1533	2348	2420	2108	2126	1897	1931
7	–	–	1187	1839	1087	1483	2041	1871	1373	1406	1031	1322
10	–	–	1006	2304	1133	2208	3298	2386	989	1498	2495	1927
11	–	–	1118	2607	1596	2694	2337	2959	1797	1815	2404	2895
12	–	–	1892	1808	2026	1843	2107	2313	1813	1970	1881	1908
13	–	–	2216	1804	2300	1719	1674	1814	2156	2117	1764	1195
14	–	–	3289	2404	3316	2409	1577	2479	3131	2523	1531	2053
15	–	–	2701	1875	3088	2141	1946	2497	3293	2700	1944	1891
16	–	–	1928	1917	2006	2053	1525	1808	1592	1593	1422	1629
18	–	–	1340	1821	1502	1778	2084	2293	1984	1679	1824	2400
19	–	–	1085	2288	1491	1916	3447	3114	1798	1926	3190	3137
20	–	–	1661	2976	1270	2363	2192	2754	1371	1868	1750	2015
21	–	–	2354	2110	2552	2176	1050	1021	2250	1735	1231	1069
22	–	–	2262	1672	2406	1803	0	1197	2862	2456	809	516
23	–	–	3444	2765	3480	2989	367	1949	3322	2678	879	835
26	–	–	3059	2600	2664	2037	760	1322	1937	1477	697	569
27	–	–	2645	2543	2586	2763	1564	1312	2130	2558	1610	1301
28	–	–	1789	2255	1605	2269	2438	1423	1627	2431	1811	1315
29	–	–	1121	2327	1403	2614	3355	2311	1816	3257	3292	1953
30	–	–	1510	2881	1388	2981	2523	2139	1480	2468	2293	1021
31	–	–	2348	2416	2473	2547	1921	1960	2053	1931	1925	1806
32	–	–	2294	1971	2456	2073	1500	2218	2430	1582	1719	2207
34	–	–	3483	2534	3576	2354	1189	2564	3420	1950	1268	2879
35	–	–	2847	2913	2964	2532	1504	2148	3006	2090	1852	2360
36	–	–	2039	2239	2165	2292	2166	1986	2414	2425	2079	2337
37	–	–	1476	1694	1619	1753	1917	1640	1856	2461	1189	1257
38	–	–	1036	2388	1401	2401	3197	2010	1537	2606	2688	1922
39	–	–	1906	3050	2289	2799	2226	2422	2284	2637	2065	2049
40	–	–	2571	2627	2681	2720	2198	2052	2830	2825	1865	1779

Table B4 - Velocity Measurements (in fpm) for Inlet Velocity of ~3,500 fpm for Birfurcated Stack

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
2	2289	2239	–	–	2664	2238	2820	2657	2524	2437	2735	2478
3	1395	1171	–	–	922	795	2452	1240	0	946	2361	1532
4	0	0	–	–	0	0	1463	647	0	0	754	0
6	2083	2079	–	–	2342	2202	2641	2501	2272	1998	2166	2128
7	1597	2017	–	–	1083	1787	1031	1522	1539	2167	1254	1622
10	0	0	–	–	0	0	799	577	0	838	0	0
12	2394	2291	–	–	2393	2500	2380	2140	2066	2189	1920	1851
13	2588	1540	–	–	2530	1408	2020	1720	2341	1444	2075	1403
14	1119	0	–	–	566	0	0	0	1079	0	0	0
16	2564	2804	–	–	2605	2719	2020	1887	2344	2559	1746	1977
18	714	768	–	–	0	462	1451	1985	516	742	1195	1478
19	0	0	–	–	0	0	0	0	0	0	0	0
21	2982	3053	–	–	2920	2887	1971	2053	2734	2792	2148	2225
22	1367	1584	–	–	1338	1434	2550	1851	968	1505	2134	1857
23	0	0	–	–	0	0	1376	0	0	0	888	0
27	3006	3009	–	–	2914	2945	2182	2363	2918	2870	2243	2324
28	1197	2108	–	–	1479	2270	1276	1271	1775	1970	1043	840
29	0	0	–	–	0	253	0	214	0	0	0	0
31	2832	2563	–	–	2829	2776	2612	2881	2878	2679	2450	2452
32	2995	1850	–	–	2946	1666	2352	1643	2847	2108	1111	1397
34	1794	0	–	–	1968	0	645	501	1462	825	0	0
36	2544	2509	–	–	2746	2731	2882	2848	2628	2460	2660	2822
37	1563	1096	–	–	1166	550	1024	1152	1268	442	1439	1718
38	0	0	–	–	0	0	472	764	0	0	0	0
40	1842	1939	–	–	2141	2238	2201	2274	2245	2253	2251	2297

Note: Receptors 5, 11, 15, 20, 26, 30, 35 and 39 are not included above since measurements were not taken at those points

Table B5 - Velocity Measurements (in fpm) for Inlet Velocity of ~4,000 fpm for Birfurcated Stack

	0 mph wind speed				*10 mph wind speed*				*20 mph wind speed*			
Receptor	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B	Position 1A	Position 1B	Position 2A	Position 2B
2	2828	2661	–	–	3010	2407	3060	2907	2725	2626	2697	2466
3	810	693	–	–	670	0	2784	1487	530	1137	2336	1396
4	0	0	–	–	0	0	1809	564	0	0	600	0
6	2478	2258	–	–	2801	2567	2846	2687	2428	2211	2142	2021
7	1220	1955	–	–	872	1625	1152	1651	1747	2270	1264	1733
10	0	247	–	–	0	469	927	679	0	472	0	0
12	2428	2430	–	–	2510	2602	2528	2339	2179	2295	1827	1760
13	2785	1878	–	–	2751	1852	2139	1945	2511	1672	1967	1563
14	1270	0	–	–	962	0	0	0	494	0	0	0
16	2508	2701	–	–	2638	2771	2130	2148	2492	2681	1721	2015
18	1022	1327	–	–	863	1107	1410	1979	961	1489	1034	1451
19	0	0	–	–	0	0	0	0	0	0	0	0
21	2894	2943	–	–	2821	2808	2187	2164	2888	2925	2038	2186
22	2267	1910	–	–	2122	2079	2645	1995	1740	2038	1978	1688
23	0	0	–	–	0	0	1324	0	0	0	497	0
27	2892	3104	–	–	2842	3015	2292	2471	3036	3063	2260	2238
28	1719	2968	–	–	1906	3109	1414	1380	1906	2022	835	593
29	0	375	–	–	0	1301	0	0	0	0	0	0
31	2980	2930	–	–	3080	3129	2706	3006	2995	2945	2430	2443
32	2742	1670	–	–	2540	1308	2435	1939	2991	2100	1108	1452
34	1820	0	–	–	1680	265	697	542	1494	1086	0	0
36	2906	2999	–	–	3083	2995	3063	3097	2757	2749	2611	2783
37	1060	582	–	–	679	0	1230	1284	975	504	1478	1776
38	0	0	–	–	0	0	679	668	0	0	0	0
40	2186	2240	–	–	2337	2407	2222	2258	2425	2386	2245	2245

Note: Receptors 5, 11, 15, 20, 26, 30, 35 and 39 are not included above since measurements were not taken at those points