

2021-Annual Ambient Monitoring Report for Petrochemicals-Industry Standard

Average 1,3 Butadiene Concentrations and Monitor Location Map

ARLANXEO/DPCC - 2021 1, 3 Butadiene Ambient Monitoring

Monitor #	Location	2018	2019	2020	2021
1	E 0383543 N 4755905	0.72	1.13	0.60	0.47
2	E 0383781 N 4756013	3.72	2.37	2.19	0.97
3	E 0384093 N 4756013	1.52	1.37	1.07	0.60
4	E 0383953 N 4755328	0.41	0.81	0.63	0.37
5	E 0383953 N 4755328	1.10	1.02	0.94	0.35
6	E 0383213 N 4755589	0.19	0.43	0.20	0.17



## 2021 1,3 Butadiene Monitoring Results

Diamond Petrochemicals Canada Corporation: 1,3-Butadiene Fenceline Monitoring - 2021								
Monitor Location #1			Monitor Location #2			Monitor Location #3		
E 0383543 N 4755905			E 0383781 N 4756013			E 0384093 N 4756833		
Sample Start Date	Sample End Date	1,3-Butadiene (ug/m <sup>3</sup> )	Sample Start Date	Sample End Date	1,3-Butadiene (ug/m <sup>3</sup> )	Sample Start Date	Sample End Date	1,3-Butadiene (ug/m <sup>3</sup> )
December 22/20	January 6	<0.31	December 22/20	January 6	<0.31	December 22/20	January 6	0.42
January 6	January 20	<0.34	January 6	January 20	<0.34	January 6	January 20	0.35
January 20	February 3	<0.34	January 20	February 3	<0.34	January 20	February 3	<0.34
February 3	February 17	1.43	February 3	February 17	NA <sup>(1)</sup>	February 3	February 17	NA <sup>(1)</sup>
February 17	March 3	<0.34	February 17	March 3	0.63	February 17	March 3	0.54
March 3	March 17	0.51	March 3	March 17	0.63	March 3	March 17	0.42
March 17	March 31	0.49	March 17	March 31	0.67	March 17	March 31	<0.34
March 31	April 14	0.76	March 31	April 14	0.93	March 31	April 14	0.43
April 14	April 28	0.52	April 14	April 28	1.28	April 14	April 28	0.89
April 28	May 12	0.54	April 28	May 12	0.44	April 28	May 12	0.52
May 12	May 26	<0.33	May 12	May 26	NA <sup>(1)</sup>	May 12	May 26	1.03
May 26	June 9	<0.33	May 26	June 9	0.99	May 26	June 9	1.04
June 9	June 23	0.47	June 9	June 23	2.28	June 9	June 23	1.11
June 23	July 7	<0.33	June 23	July 7	2.17	June 23	July 7	1.17
July 7	July 21	0.70	July 7	July 21	0.53	July 7	July 21	0.44
July 21	August 4	<0.33	July 21	August 4	1.63	July 21	August 4	0.99
August 4	August 18	<0.33	August 4	August 18	1.18	August 4	August 18	1.21
August 18	September 1	<0.33	August 18	September 1	0.37	August 18	September 1	<0.33
September 1	September 15	<0.33	September 1	September 15	0.85	September 1	September 15	0.37
September 15	September 29	0.36	September 15	September 29	1.19	September 15	September 29	<0.33
September 29	October 13	1.37	September 29	October 13	0.79	September 29	October 13	<0.33
October 13	October 27	<0.33	October 13	October 27	1.43	October 13	October 27	0.66
October 27	November 10	1.68	October 27	November 10	2.34	October 27	November 10	1.35
November 10	November 24	1.01	November 10	November 24	1.29	November 10	November 24	0.82
November 24	December 8	<0.34	November 24	December 8	0.62	November 24	December 8	<0.34
December 8	December 22	<0.37	December 8	December 22	<0.83	December 8	December 22	<0.43
Average		0.47	Average		0.97	Average		0.60
Monitor Location #4			Monitor Location #5			Monitor Location #6		
E 0383953 N 4755328			E 0383589 N 4755252			E 0383213 N 4755589		
Sample Start Date	Sample End Date	1,3-Butadiene (ug/m <sup>3</sup> )	Sample Start Date	Sample End Date	1,3-Butadiene (ug/m <sup>3</sup> )	Sample Start Date	Sample End Date	1,3-Butadiene (ug/m <sup>3</sup> )
December 22/20	January 6	<0.31	December 22/20	January 6	<0.31	December 22/20	January 6	<0.31
January 6	January 20	<0.34	January 6	January 20	<0.34	January 6	January 20	<0.34
January 20	February 3	<0.34	January 20	February 3	<0.34	January 20	February 3	<0.34
February 3	February 17	NA <sup>(1)</sup>	February 3	February 17	NA <sup>(1)</sup>	February 3	February 17	NA <sup>(1)</sup>
February 17	March 3	<0.34	February 17	March 3	<0.34	February 17	March 3	<0.34
March 3	March 17	0.54	March 3	March 17	0.41	March 3	March 17	<0.34
March 17	March 31	<0.34	March 17	March 31	0.58	March 17	March 31	<0.34
March 31	April 14	0.51	March 31	April 14	0.38	March 31	April 14	<0.33
April 14	April 28	0.73	April 14	April 28	0.59	April 14	April 28	<0.34
April 28	May 12	0.88	April 28	May 12	0.43	April 28	May 12	<0.33
May 12	May 26	<0.33	May 12	May 26	<0.33	May 12	May 26	<0.33
May 26	June 9	<0.33	May 26	June 9	0.49	May 26	June 9	<0.33
June 9	June 23	0.94	June 9	June 23	0.82	June 9	June 23	<0.33
June 23	July 7	<0.33	June 23	July 7	<0.33	June 23	July 7	<0.33
July 7	July 21	0.71	July 7	July 21	0.38	July 7	July 21	<0.33
July 21	August 4	1.36	July 21	August 4	0.72	July 21	August 4	<0.33
August 4	August 18	<0.33	August 4	August 18	<0.33	August 4	August 18	<0.33
August 18	September 1	<0.33	August 18	September 1	0.54	August 18	September 1	<0.33
September 1	September 15	<0.33	September 1	September 15	<0.33	September 1	September 15	<0.33
September 15	September 29	<0.33	September 15	September 29	0.35	September 15	September 29	<0.33
September 29	October 13	<0.33	September 29	October 13	<0.33	September 29	October 13	<0.33
October 13	October 27	0.64	October 13	October 27	0.66	October 13	October 27	<0.33
October 27	November 10	<0.33	October 27	November 10	0.53	October 27	November 10	<0.33
November 10	November 24	<0.34	November 10	November 24	<0.34	November 10	November 24	<0.34
November 24	December 8	<0.34	November 24	December 8	<0.34	November 24	December 8	<0.34
December 8	December 22	<0.33	December 8	December 22	<0.33	December 8	December 22	<0.33
Average		0.37	Average		0.35	Average		0.17

<sup>1</sup> February 17th sample results not available - Lab Instrumentation (GCMS analyzer) went off-line during sample analysis

<sup>2</sup> May 26th sample results not available -Power interruption during sample analysis

\*Indicates that Technical Standard Registration (1,3-Butadiene) transferred to Diamond Petrochemicals Canada Corporation (DPC) on August 3, 2021

## Statistical Analysis Calculations

There is no statistically significant increase in the concentration of 1,3 Butadiene. The test statistics calculated are below the Table 7-62 Column 2 values. There has been a decrease for all monitors. Therefore no action is required as outlined by S.63.

Section 62 - Statistical Analysis of Ambient Monitor 1,3-Butadiene Concentration Measurements

	Monitor Location #1		Monitor Location #2		Monitor Location #3		Monitor Location #4		Monitor Location #5		Monitor Location #6	
	ug/m <sup>3</sup>	log <sub>e</sub> (x)	ug/m <sup>3</sup>	log <sub>e</sub> (x)	ug/m <sup>3</sup>	log <sub>e</sub> (x)	ug/m <sup>3</sup>	log <sub>e</sub> (x)	ug/m <sup>3</sup>	log <sub>e</sub> (x)	ug/m <sup>3</sup>	log <sub>e</sub> (x)
January 6, 2021	0.16	-1.83258146	0.16	-1.83258146	0.42	-0.86750057	0.16	-1.83258146	0.16	-1.83258146	0.16	-1.83258146
January 20, 2021	0.17	-1.77195684	0.17	-1.77195684	0.35	-1.04982212	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
February 3, 2021	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
February 17, 2021	1.43	0.357674444	sample analysis unavailable		sample analysis unavailable		sample analysis unavailable		sample analysis unavailable		sample analysis unavailable	
March 3, 2021	0.17	-1.77195684	0.63	-0.46203546	0.54	-0.61618614	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
March 17, 2021	0.51	-0.67334455	0.63	-0.46203546	0.42	-0.86750057	0.54	-0.61618614	0.41	-0.89159812	0.17	-1.77195684
March 31, 2021	0.49	-0.71334989	0.67	-0.40047757	0.17	-1.77195684	0.17	-1.77195684	0.58	-0.54472718	0.17	-1.77195684
April 14, 2021	0.76	-0.27443685	0.93	-0.07257069	0.43	-0.84397007	0.51	-0.67334455	0.38	-0.96758403	0.17	-1.77195684
April 28, 2021	0.52	-0.65392647	1.28	0.246860078	0.89	-0.11653382	0.73	-0.31471074	0.59	-0.52763274	0.17	-1.77195684
May 12, 2021	0.54	-0.61618614	0.44	-0.82098055	0.52	-0.65392647	0.88	-0.12783337	0.43	-0.84397007	0.17	-1.77195684
May 26, 2021	0.17	-1.77195684	sample analysis unavailable		1.03	0.029558802	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
June 9, 2021	0.17	-1.77195684	0.99	-0.01005034	1.04	0.039220713	0.17	-1.77195684	0.49	-0.71334989	0.17	-1.77195684
June 23, 2021	0.17	-1.77195684	2.28	0.824175443	1.11	0.104360015	0.94	-0.0618754	0.82	-0.19845094	0.17	-1.77195684
July 7, 2021	0.17	-1.77195684	2.17	0.774727168	1.17	0.157003749	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
July 21, 2022	0.36	-1.02165125	0.53	-0.63487827	0.44	-0.82098055	0.71	-0.34249031	0.38	-0.96758403	0.17	-1.77195684
August 4, 2021	1.37	0.31481074	1.65	0.500775288	0.99	-0.01005034	1.36	0.3074847	0.72	-0.32850407	0.17	-1.77195684
August 18, 2021	0.17	-1.77195684	1.18	0.165514438	1.21	0.19062036	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
September 1, 2021	1.68	0.518793793	0.37	-0.99425227	0.17	-1.77195684	0.17	-1.77195684	0.54	-0.61618614	0.17	-1.77195684
September 15, 2021	0.17	-1.77195684	0.85	-0.16251893	0.37	-0.99425227	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
September 29, 2021	0.36	-1.02165125	1.19	0.173953307	0.17	-1.77195684	0.17	-1.77195684	0.35	-1.04982212	0.17	-1.77195684
October 13, 2021	1.37	0.31481074	0.79	-0.23572233	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
October 27, 2021	0.17	-1.77195684	1.43	0.357674444	0.66	-0.41551544	0.66	-0.41551544	0.66	-0.41551544	0.17	-1.77195684
November 10, 2021	1.68	0.518793793	2.34	0.850150929	1.35	0.300104592	0.17	-1.77195684	0.53	-0.63487827	0.17	-1.77195684
November 24, 2021	1.01	0.009950331	1.29	0.254642218	0.82	-0.19845094	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
December 8, 2021	0.17	-1.77195684	0.62	-0.4780358	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
December 22, 2021	0.19	-1.66073121	0.42	-0.86750057	0.22	-1.51412773	0.17	-1.77195684	0.17	-1.77195684	0.17	-1.77195684
Mean		-0.9970981		-0.284545		-0.75118759		-1.29713449		-1.20095639		-1.77438183
Standard Deviation Squared		0.784086579		0.607851208		0.550164433		0.536187299		0.354482733		0.000147014
Test Statistic		-1.40163172		-3.8864099		-3.76826823		-2.32430481		-2.19224745		-2.88656544
Degrees of Freedom		47.5		47.4		49.3		48.0		81.5		76.2
Table 7-62		3.551		3.551		3.551		3.551		3.46		3.460
Number of Samples		26		24		25		25		25		25
Number of samples -1		25		23		24		24		24		24
<p><b>IF TABLE 7-62 VALUE IS &gt; Test Statistic there is no significant increase in concentration at that monitor</b></p> <p><b>paragraph 2</b> logarithm of sample result</p> <p><b>paragraph 3</b> mean of sample result logarithms</p> <p><b>paragraph 4</b> square of standard deviation of sample result logarithms (<math>S_1^2</math>, 3YR or <math>S_2^2</math>, ThisYR)</p> <p><b>paragraph 5</b> test statistic (T), where  <math>T = (Y - X) / \text{Sqrt} (S_1^2/m + S_2^2/n)</math>                      Y = Paragraph 3 (this worksheet)                      X = Paragraph 3 (3YR worksheet)  <math>S_1^2</math> = Paragraph 4 (3YR worksheet)  <math>S_2^2</math> = Paragraph 4 (this worksheet)                      m = number of samples (3YR worksheet)                      n = number of samples (this worksheet)</p> <p><b>Paragraph 6</b> Degrees of freedom (v), where  <math>v = [(S_1^2/m + S_2^2/n)^2 / (S_1^2/m)^2(m-1) + (S_2^2/n)^2(n-1)]</math></p> <p><b>Paragraph 7</b> Table 7-62 Column 2</p>												