Appendix B

GSI MANN-KENDALL TOOLKIT
for Constituent Trend Analysis

Evaluation Date: **6-Apr-20**
Facility Name: **Hounsfield Heights and North Hill Mall**
Conducted By: **Stephen d'A.**

Job ID: **Sears Canada**
Constituent: **Benzene**
Concentration Units: **mg/L**

Sampling Point ID:		BH1904	BH1905	BH1906	BH1907	BH1910	BH1911	BH1912
Sampling Event	Sampling Date	BENZENE CONCENTRATION (mg/L)						
1	15-Jun-15	0.35	0.0714	1.92	0.0572	0.324	0.302	0.727
2	15-Sep-15	0.246	0.11	2.01	0.0742	0.118	0.509	0.688
3	16-Nov-15	0.218	0.0938	1.81	0.0909	0.154	0.701	0.54
4	11-May-16	0.19	0.055	2.1	0.047	0.31	1	0.57
5	4-Nov-16	0.17	0.058	1.8	0.036	0.21	0.82	0.43
6	4-May-17	0.21	0.042	2	0.042	0.42	0.8	0.25
7	26-Mar-18	0.2	0.028	1.9	0.56	0.31	0.43	0.18
8	7-Nov-18	0.25	0.037	2.4	0.0037	0.66	0.51	0.14
9	1-May-19	0.22	0.018	2.3	0.032	0.8	0.14	0.0002
10	3-Jan-20	0.19	0.037	2..4	0.098	0.54	0.15	0.066
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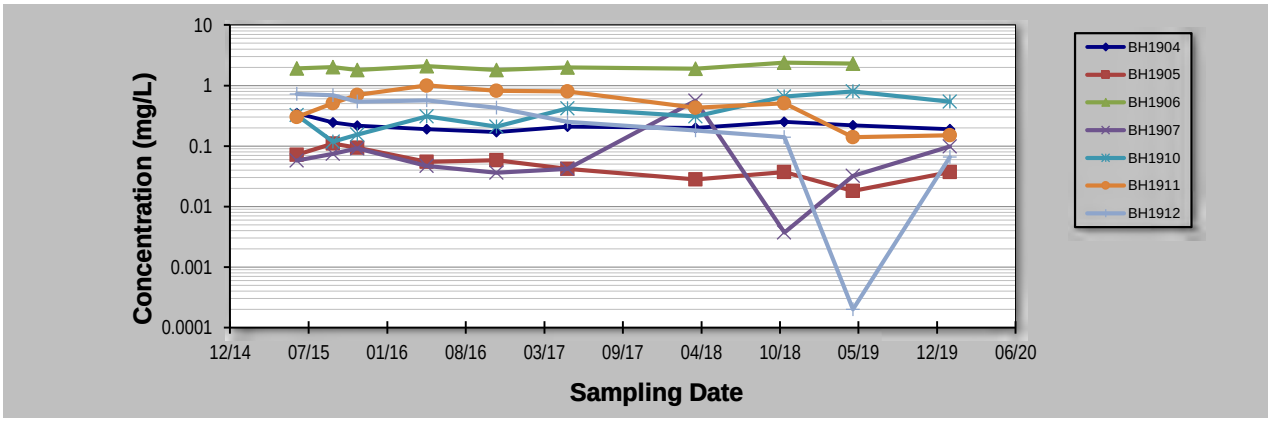
Coefficient of Variation:		0.23	0.53	0.10	1.56	0.58	0.54	0.74
Mann-Kendall Statistic (S):		-12	-32	10	-7	26	-11	-41
Confidence Factor:		83.2%	99.9%	82.1%	70.0%	98.9%	81.0%	>99.9%
Concentration Trend:		Stable	Decreasing	No Trend	No Trend	Increasing	Stable	Decreasing



Notes:

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for Constituent Trend Analysis

Evaluation Date: **6-Apr-20**
Facility Name: **Hounsfield Heights and North Hill Mall**
Conducted By: **Stephen d'A.**

Job ID: **Sears Canada**
Constituent: **Benzene**
Concentration Units: **mg/L**

Sampling Point ID:		BH1915	BH1921	BH1924	BH1925	BH1928	BH1929	BH1936
Sampling Event	Sampling Date	BENZENE CONCENTRATION (mg/L)						
1	17-Jun-15	1.1	0.417	6.32	1.5	4.93	0.681	0.484
2	8-Sep-15	0.51	0.174	3.9	2.54	2.57	0.77	0.0589
3	12-Nov-15	0.466	0.187	2.45	3.28	3.08	0.664	0.0199
4	10-May-16	0.35	0.12	2.2	2.1	2.5	0.47	0.15
5	3-Nov-16	0.47	0.17	2.8	1.8	3.5	0.31	0.015
6	17-May-17	0.2	0.1	2.6	0.43	4.2	0.22	0.015
7	5-Apr-18	0.053	0.044	1.6	0.32	2.5	0.1	0.018
8	29-Oct-18	0.044	0.002	2.1	0.47	2.7	0.0002	0.03
9	30-Apr-19	0.041		0.77	0.19	2.4	0.0073	0.016
10	9-Dec-19	0.02	0.01	1.6	0.023	3.1	0.0052	0.01
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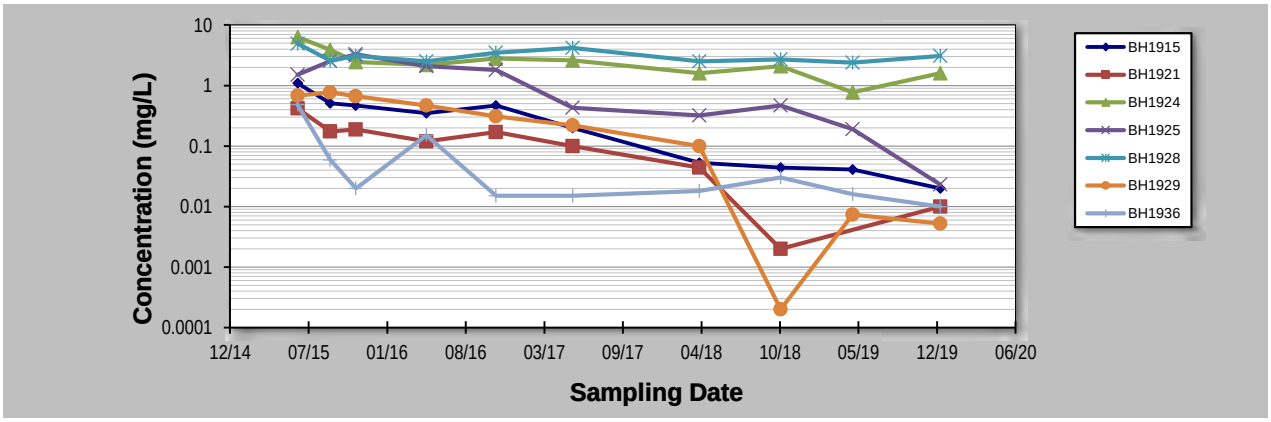
Coefficient of Variation:		1.03	0.93	0.58	0.90	0.27	0.94	1.81
Mann-Kendall Statistic (S):		-41	-30	-32	-31	-10	-39	-24
Confidence Factor:		>99.9%	100.0%	99.9%	99.8%	78.4%	>99.9%	98.2%
Concentration Trend:		Decreasing	Decreasing	Decreasing	Decreasing	Stable	Decreasing	Decreasing



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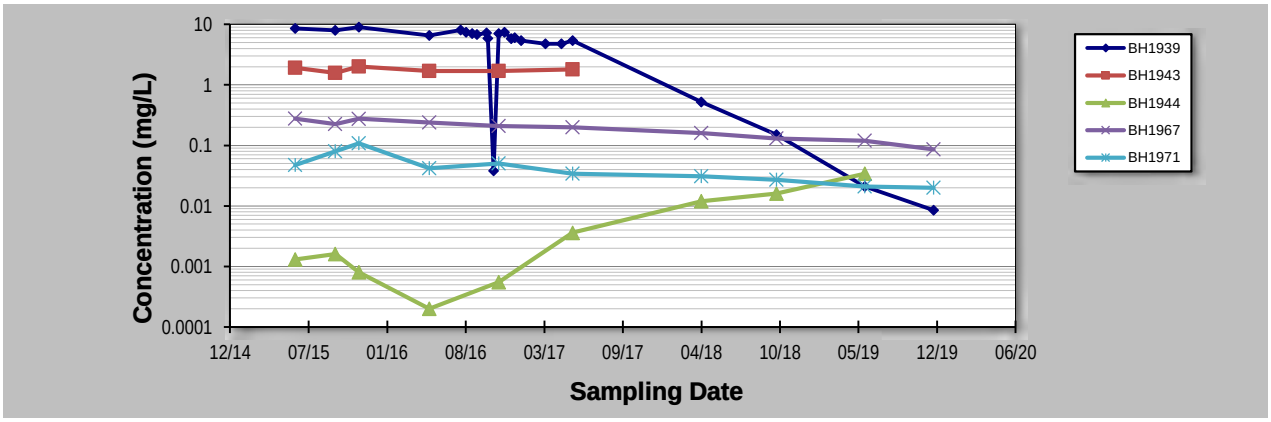
Evaluation Date: **6-Apr-20**
Facility Name: **Hounsfield Heights and North Hill Mall**
Conducted By: **Stephen d'A.**

Job ID: **Sears Canada**
Constituent: **Benzene**
Concentration Units: **mg/L**

Sampling Point ID:	BH1939	BH1943	BH1944	BH1967	BH1971		
Sampling Event	**Sampling Date**	**BENZENE CONCENTRATION (mg/L)**					
1	11-Jun-15	8.57	1.91	0.0013	0.276	0.0474	
2	21-Sep-15	8	1.58	0.0016	0.225	0.0795	
3	20-Nov-15	8.99	2.01	0.0008	0.275	0.108	
4	17-May-16	6.6	1.7	0.0002	0.24	0.042	
5	5-Aug-16	8.1					
6	19-Aug-16	7.4					
7	3-Sep-16	7.1					
8	16-Sep-16	6.8					
9	10-Oct-16	7.2					
10	13-Oct-16	5.9					
11	28-Oct-16	0.038					
12	10-Nov-16	7.1	1.7	0.00055	0.21	0.05	
13	25-Nov-16	7.4					
14	12-Dec-16	5.8					
15	21-Dec-16	6					
16	6-Jan-17	5.4					
17	9-Mar-17	4.8					
18	19-Apr-17	4.8					
19	17-May-17	5.4	1.8	0.0036	0.2	0.034	
20	10-Apr-18	0.52		0.012	0.16	0.031	
21	18-Oct-18	0.15		0.016	0.13	0.027	
22	31-May-19	0.021		0.034	0.12	0.021	
23	22-Nov-19	0.0085		0.021	0.086	0.02	
24							
25							
Coefficient of Variation:		0.56	0.09	1.46	0.34	0.61	
Mann-Kendall Statistic (S):		-183	0	29	-41	-35	
Confidence Factor:		>99.9%	39.3%	100.0%	>99.9%	100.0%	
Concentration Trend:		Decreasing	Stable	Increasing	Decreasing	Decreasing	



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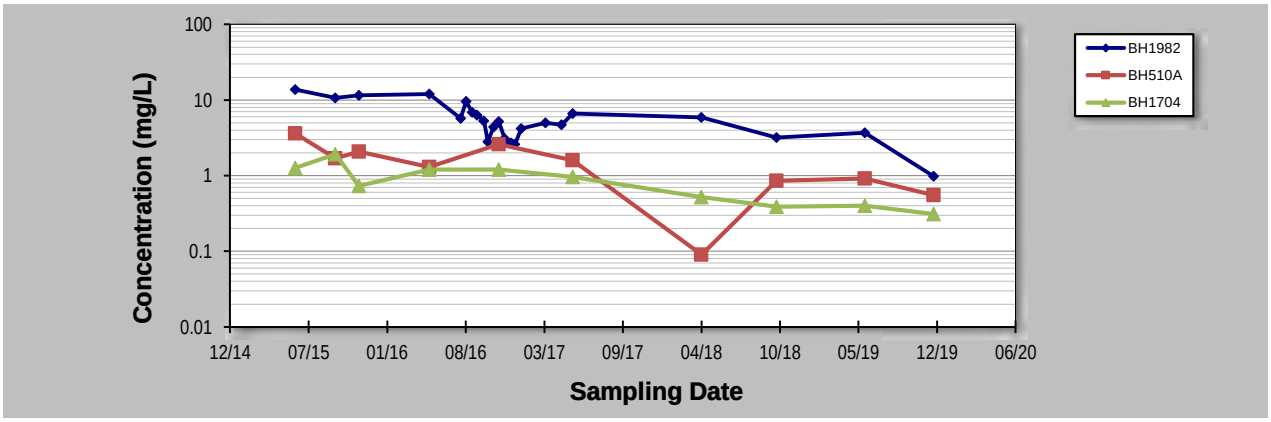
Facility Name: **Hounsfield Heights and North Hill Mall**
Conducted By: **Stephen d'A.**

Job ID: **Sears Canada**
Constituent: **Benzene**
Concentration Units: **mg/L**

Sampling Point ID:		BH1982	BH510A	BH1704	EX-1	EX-2	EX-3	
Sampling Event	Sampling Date	BENZENE CONCENTRATION (mg/L)						
1	11-Jun-15	13.8	3.61	1.26	10.2	2.01	0.0016	
2	21-Sep-15	10.7	1.7	1.92	7.66	1.95	0.0015	
3	20-Nov-15	11.6	2.07	0.731	7.97	1.75	0.0032	
4	17-May-16	12	1.3	1.2	9.3	1.1	0.019	
5	5-Aug-16	5.7						
6	19-Aug-16	9.6						
7	3-Sep-16	6.9						
8	16-Sep-16	6.3						
9	3-Oct-16	5.3						
10	13-Oct-16	2.8						
11	28-Oct-16	4.4						
12	10-Nov-16	5.2	2.6	1.2	6.3	0.97	0.0002	
13	25-Nov-16	3.1						
14	12-Dec-16	2.7						
15	21-Dec-16	2.6						
16	6-Jan-17	4.2						
17	9-Mar-17	5						
18	19-Apr-17	4.7						
19	17-May-17	6.6	1.6	0.96	0.058	0.19	0.000225	
20	10-Apr-18	5.9	0.09	0.52	0.3	0.47	0.0002	
21	18-Oct-18	3.2	0.86	0.39	0.13	0.41	0.0002	
22	31-May-19	3.7	0.92	0.4	0.087	0.2	0.003	
23	22-Nov-19	0.98	0.55	0.31	0.0002	0.11	0.016	
24								
25								
Coefficient of Variation:		0.57	0.68	0.58	1.05	0.83	1.55	
Mann-Kendall Statistic (S):		-137	-27	-34	-33	-39	-2	
Confidence Factor:		>99.9%	99.2%	100.0%	99.9%	>99.9%	53.5%	
Concentration Trend:		Decreasing	Decreasing	Decreasing	Decreasing	Decreasing	No Trend	



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Facility Name: **Hounsfield Heights and North Hill Mall**
Conducted By: **Stephen d'A.**

Job ID: **Sears Canada**
Constituent: **1,2 -DCA**
Concentration Units: **mg/L**

Sampling Point ID:	1905	1906	1910	1911	1912	1915	1921
Sampling Event	Sampling Date	1,2 -DCA CONCENTRATION (mg/L)					
1	25-Feb-15	0.076					
2	11-Jun-15	0.076	0.032	0.03	0.0005	0.035	0.041	0.089
3	8-Sep-15	0.075	0.042	0.032	0.035	0.041	0.024	0.084
4	17-Nov-15	0.079	0.042	0.028	0.045	0.044	0.036	0.084
5	12-May-16	0.08	0.04	0.028	0.083	0.04	0.024	0.084
6	8-Nov-16	0.064	0.049	0.029	0.076	0.044	0.037	0.1
7	5-May-17	0.083	0.05	0.038	0.07	0.054	0.017	0.087
8	6-Apr-18	0.051	0.032	0.021	0.039	0.045		0.074
9	7-Nov-18	0.058	0.032	0.048	0.04	0.041	0.01	0.068
10	1-May-19	0.057	0.04	0.039	0.013	0.033	0.022	0.067
11	3-Jan-20	0.013	0.032	0.05	0.021	0.03	0.0087	0.085
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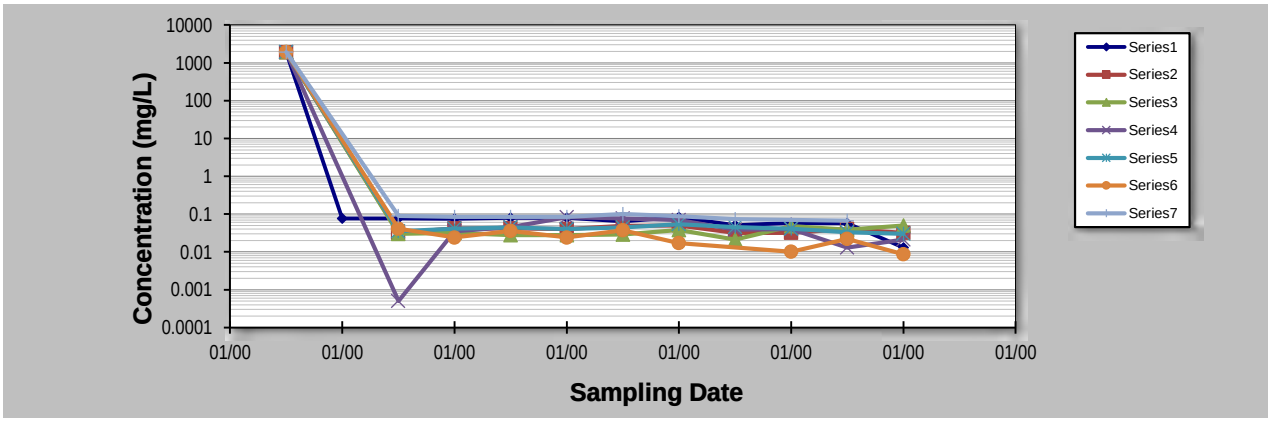
Coefficient of Variation:		0.31	0.18	0.27	0.65	0.17	0.48	0.12
Mann-Kendall Statistic (S):		-24	-7	18	-5	-5	-23	4
Confidence Factor:		96.4%	70.0%	93.4%	63.6%	63.6%	99.1%	64.0%
Concentration Trend:		Decreasing	Stable	Prob. Increasing	Stable	Stable	Decreasing	No Trend



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Job ID: **Sears Canada**
Constituent: **1,2 -DCA**
Concentration Units: **mg/L**

Sampling Point ID:	1925	1928	1929	1939	EX-1	1956	1967
Sampling Event	Sampling Date	1,2 -DCA CONCENTRATION (mg/L)					
1	12-Jun-15	0.041	0.208	0.075	0.154	0.047	0.066	0.032
2	4-Sep-15	0.055	0.198	0.083	0.167	0.048	0.057	0.035
3	20-Nov-15	0.079	0.208	0.09	0.16	0.053	0.051	0.036
4	9-May-16	0.053	0.25	0.099	0.00025	0.045	0.02	0.046
5	7-Nov-16	0.06	0.3	0.084	0.21	0.062	0.028	0.04
6	8-May-17	0.042	0.27	0.086	0.17	0.02	0.019	0.041
7	29-Mar-18	0.026	0.26	0.048	0.15	0.05	0.0097	0.028
8	15-Oct-18	0.022	0.31	0.00082	0.12	0.048	0.028	0.028
9	27-May-19	0.029	0.28	0.02	0.099	0.023		0.026
10	10-Dec-19	0.011	0.24	0.013	0.073	0.049	0.0051	0.027
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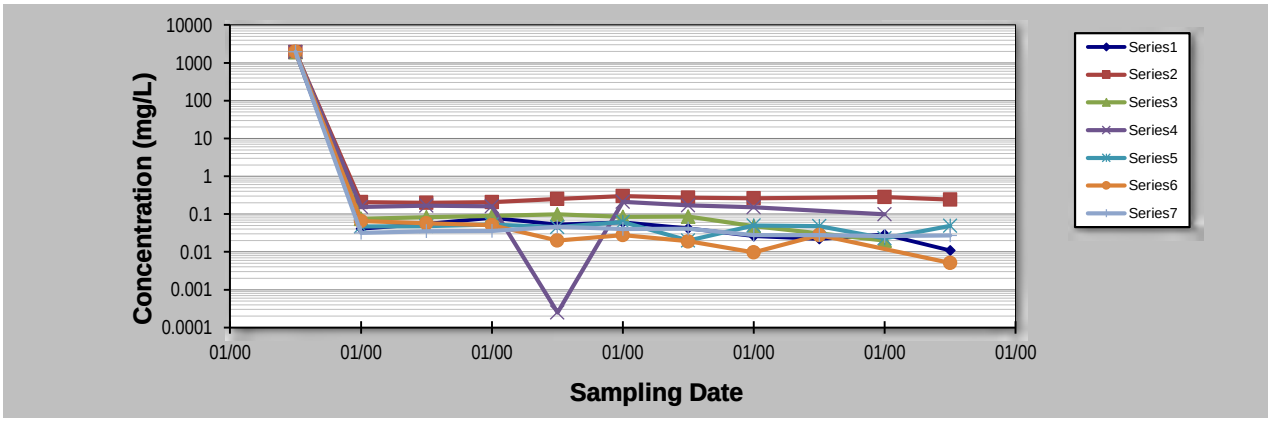
Coefficient of Variation:		0.49	0.14	0.36	0.46	0.29	0.68	0.20
Mann-Kendall Statistic (S):		-25	20	9	9	-2	-27	-16
Confidence Factor:		98.6%	97.8%	83.2%	83.2%	53.5%	99.8%	90.7%
Concentration Trend:		Decreasing	Increasing	No Trend	No Trend	Stable	Decreasing	Prob. Decreasing



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Conducted By: **Stephen d'A.**

Job ID: **Sears Canada**
Constituent: **1,2 - DCA**
Concentration Units: **mg/L**

Sampling Point ID:		1971	1974	1981	1982	510A	1704	1924
Sampling Event	Sampling Date	1,2 - DCA CONCENTRATION (mg/L)						
1	19-Jun-15	0.076	0.041	0.0005	0.159	0.036	0.058	0.271
2	16-Sep-15	0.142	0.081	0.015	0.177	0.037	0.05	0.189
3	17-Nov-15	0.124	0.083	0.016	0.15	0.037	0.04	0.129
4	9-May-16	0.1	0.051	0.027	0.21	0.039	0.069	0.13
5	2-Nov-16	0.19	0.098	0.032	0.073	0.058	0.049	0.2
6	10-May-17	0.11	0.032	0.028	0.13	0.056	0.048	0.18
7	27-Mar-18	0.21	0.058	0.019	0.11	0.0027	0.049	0.14
8	10-Oct-18	0.13	0.023	0.021	0.068	0.044	0.048	0.11
9	10-May-19	0.17	0.039	0.019	0.13	0.037	0.051	0.089
10	12-Dec-19	0.17	0.040	0.0097	0.042	0.056	0.049	0.073
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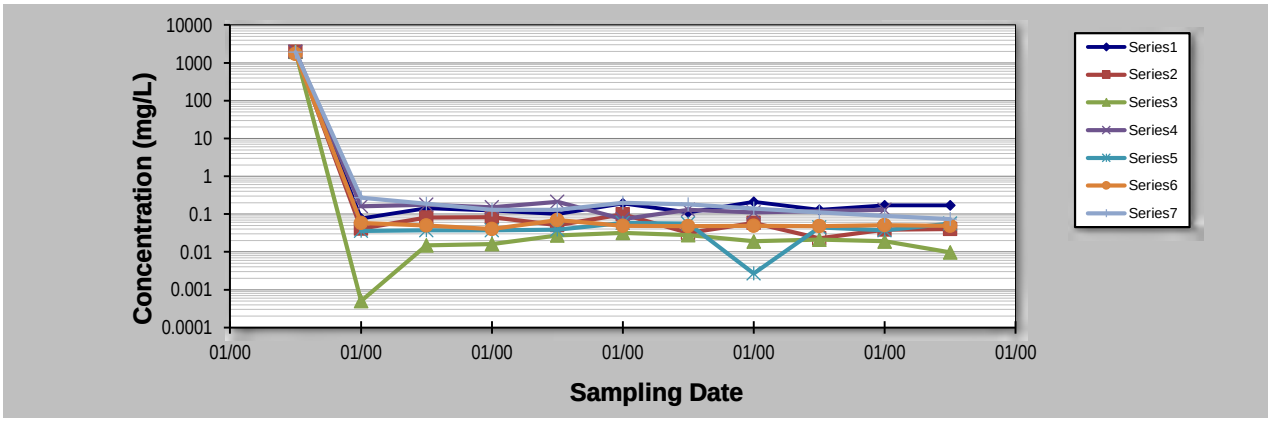
Coefficient of Variation:		0.30	0.46	0.49	0.29	0.40	0.15	0.39
Mann-Kendall Statistic (S):		18	-13	6	2	13	-7	-29
Confidence Factor:		93.4%	85.4%	66.8%	54.8%	85.4%	70.0%	99.5%
Concentration Trend:		Prob. Increasing	Stable	No Trend	No Trend	No Trend	Stable	Decreasing



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for Constituent Trend Analysis

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Facility Name: **Hounsfield Heights and North Hill Mall**
Conducted By: **Stephen d'A.**

Job ID: **Sears Canada**
Constituent: **1,2 - DCA**
Concentration Units: **mg/L**

Sampling Point ID: **EX-3**

Sampling Event	Sampling Date	1,2 - DCA CONCENTRATION (mg/L)						
1	19-Jun-15	0.0005						
2	16-Sep-15	0.0005						
3	17-Nov-15	0.002						
4	9-May-16	0.006						
5	2-Nov-16	0.00025						
6	10-May-17	0.00025						
7	27-Mar-18	0.00025						
8	10-Oct-18	0.00025						
9	10-May-19	0.00025						
10	12-Dec-19	0.0028						
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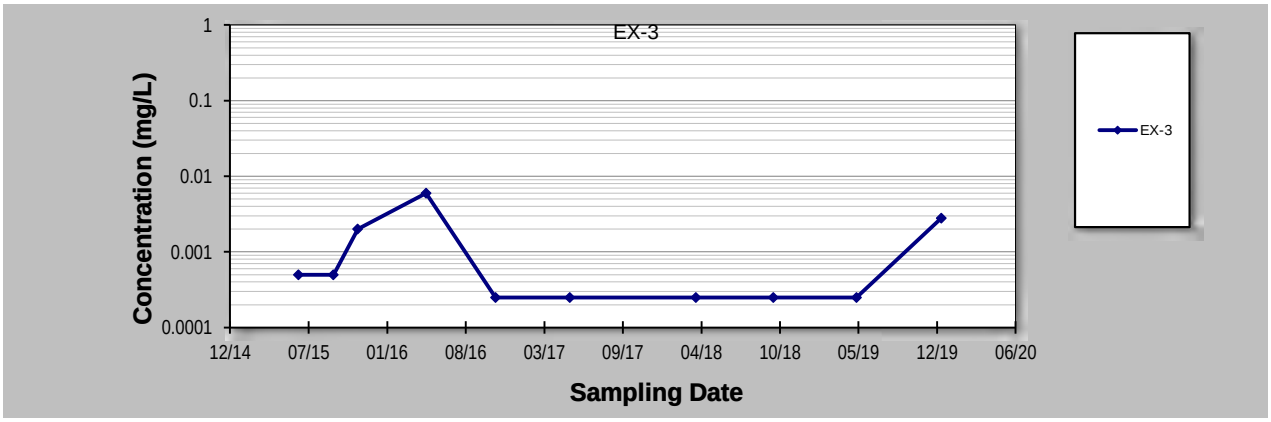
Coefficient of Variation:		1.44						
Mann-Kendall Statistic (S):		-8						
Confidence Factor:		72.9%						
Concentration Trend:		No Trend						



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Appendix C

Clifton

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1908 Lions Park upgradient of DPVE

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

	Date	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene			
1	*2015-04-28*	*0.0016*			
2	*2015-06-15*	*0.0165*			
3	*2015-09-16*	*0.0107*			
4	*2015-11-17*	*0.0082*			
5	*2016-05-09*	*0.0004*			
6	*2016-11-02*	*0.0097*			
7	*2017-05-10*	*0.0056*			
8	*2018-03-27*	*0.00083*			
9	*2018-10-11*	*0.00083*			
10	*2019-05-13*	*0.004*			
11	*2019-12-06*	*0.004*			
12					
13					
14					
15					

Print Historical Data

2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○ **Benzene** 0.005

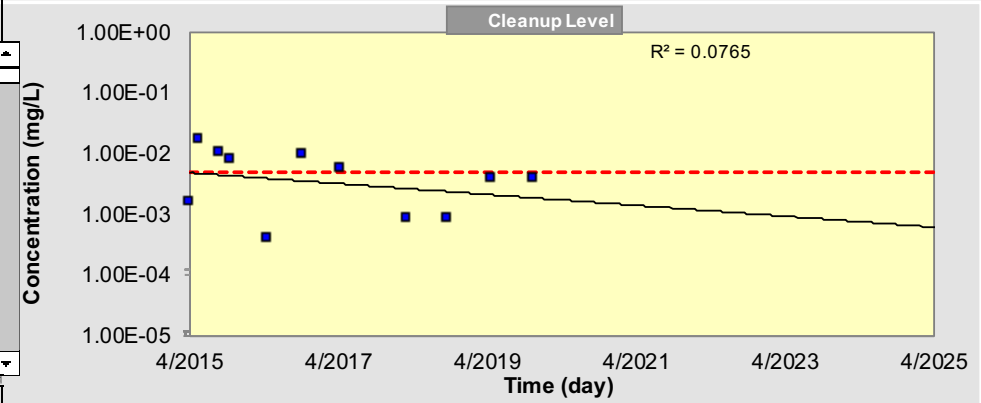
Constituent B (mg/L)

Constituent C (mg/L)

Constituent D (mg/L)

3. OUTPUT GRAPH

DISSOLVED BENZENE CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph 10 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: **2015**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2015 (Lower Limit on Confidence Interval) to **Can t Calc (+ve Trend)** (Upper Limit on Confidence Interval)

2.06E 01

(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1912 Mall Area

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

	Date (mm/dd/yy)	Concentration: Constituent A *Benzene*	Constituent B	Constituent C	Constituent D
1	2015-03-01	0.942			
2	2015-06-15	0.799			
3	2015-09-15	0.727			
4	2015-11-15	0.688			
5	2016-05-10	0.54			
6	2016-11-01	0.57			
7	2017-05-15	0.43			
8	2017-10-29				
9	2018-04-01	0.25			
10	2018-11-01	0.18			
11	2019-05-15	0.14			
12	2019-12-31	0.066			
13					
14					
15					

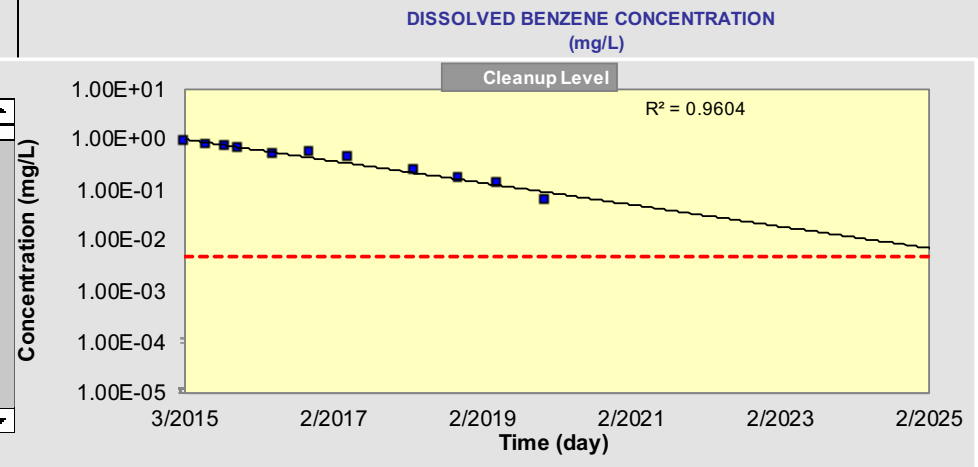
Print Historical Data

2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

- ● **Benzene** 0.005
- ○ Constituent B
- ○ Constituent C
- ○ Constituent D (mg/L)

3. OUTPUT GRAPH



Number of Years Over Which to Plot Graph: 10 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup:

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2024 to **2028**

Source Decay Rate Constant (1/year): **4.95E 01**

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1915 Mall Area

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

	Date (mm/dd/yy)	Concentration: Constituent A	Constituent B	Constituent C	Constituent D
		Benzene	***1,2 DCA***		
1	2015-03-01	1.01	0.044		
2	2015-06-15	0.24	0.055		
3	2015-09-15	0.51	0.024		
4	2015-11-15	0.466	0.036		
5	2016-05-10	0.35	0.024		
6	2016-11-01	0.57	0.043		
7	2017-05-15	0.21	0.025		
8	2017-10-29	0.078	0.01		
9	2018-04-01	0.044	0.017		
10	2018-11-01	0.041	0.018		
11	2019-05-15	0.023	0.022		
12	2019-12-31		0.011		
13					
14					
15					

Print Historical Data

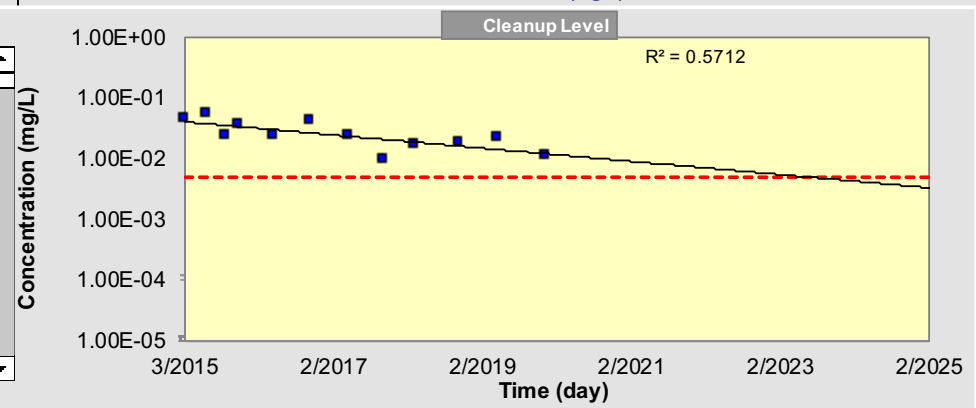
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○	Benzene	0.005
●	**1,2 DCA**	0.005
○	Constituent C	(mg/L)
○	Constituent D	(mg/L)

3. OUTPUT GRAPH

DISSOLVED 1,2 DCA CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph: 10 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: [redacted]

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2019 (Lower Limit on Confidence Interval) to **2040** (Upper Limit on Confidence Interval)

Source Decay Rate Constant (1/year): **2.50E 01**
(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

Return To Main Screen | ***New Site/Clear Screen*** | ***Paste Example Data Set*** | ***HELP***

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1915 Mall Area

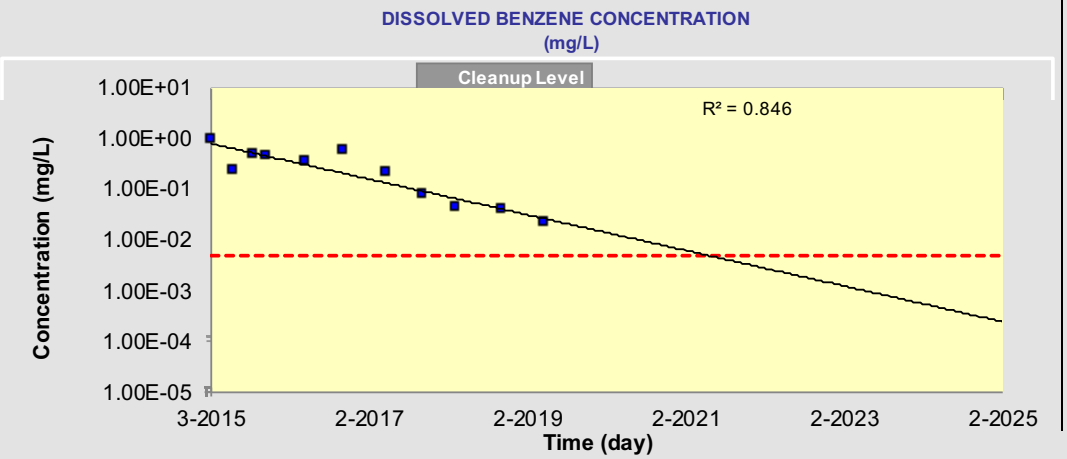
Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

Concentration mg/L

	Date (mm/dd/yy)	Constituent A	Constituent B	Constituent C	Constituent D
		Benzene	***1,2 DCA***		
1	*2015-03-01*	*1.01*	*0.044*		
2	*2015-06-15*	*0.24*	*0.055*		
3	*2015-09-15*	*0.51*	*0.024*		
4	*2015-11-15*	*0.466*	*0.036*		
5	*2016-05-10*	*0.35*	*0.024*		
6	*2016-11-01*	*0.57*	*0.043*		
7	*2017-05-15*	*0.21*	*0.025*		
8	*2017-10-29*	*0.078*	*0.01*		
9	*2018-04-01*	*0.044*	*0.017*		
10	*2018-11-01*	*0.041*	*0.018*		
11	*2019-05-15*	*0.023*	*0.022*		
12	*2019-12-31*		*0.011*		
13					
14					
15					

3. OUTPUT GRAPH



Number of Years Over Which to Plot Graph: 10 *(yr)* Update Graph

2. WHICH CONSTITUENT TO PLOT?

● **Benzene**	0.005
1,2 DCA	0.005
Constituent C	
Constituent D	

Predicted Date to Achieve Cleanup: [redacted]

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2019 to **2025**

Source Decay Rate Constant (1/year): **8.11E 01**

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1921 Downgradient of DPVE

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

	Date	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene	***1,2 DCA***		
1	*2015-04-28*	*0.47*			
2	*2015-06-22*				
3	*2015-09-04*	*0.174*			
4	*2015-11-20*	*0.187*			
5	*2016-05-13*	*0.12*			
6	*2016-11-10*	*0.17*			
7	*2017-05-11*	*0.1*			
8	*2018-03-29*	*0.044*			
9	*2018-10-16*				
10	*2019-05-28*				
11	*2019-11-27*	*0.01*			
12					
13					
14					
15					

Print Historical Data

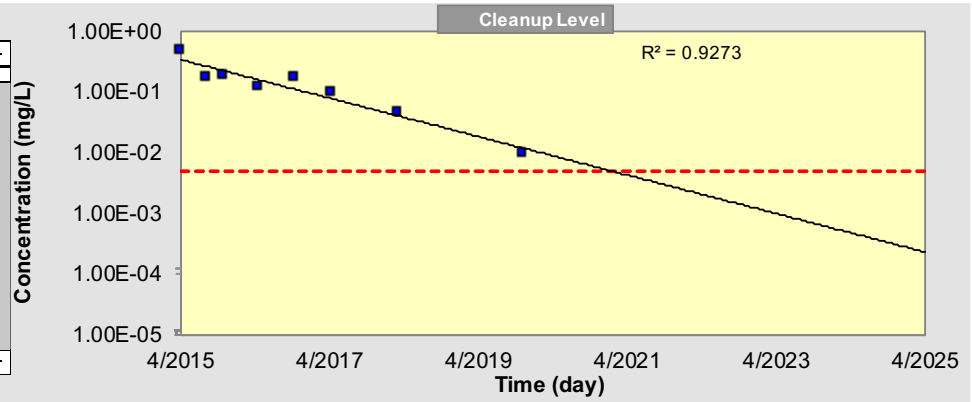
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○ **Benzene**	0.005	
1,2 DCA	0.005	(mg/L)
Constituent C		(mg/L)
Constituent D		(mg/L)

3. OUTPUT GRAPH

DISSOLVED BENZENE CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph: 10 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: **2021**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2019 (Lower Limit on Confidence Interval) to **2024** (Upper Limit on Confidence Interval)

7.30E 01

(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1924 Lions Park upgradient of DPVE

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

Concentration mg/L

	Date (mm/dd/yy)	Constituent A	Constituent B	Constituent C	Constituent D
		Benzene	***1,2 DCA***		
1	*2015-05-07*	*3.04*	*0.144*		
2	*2015-06-19*	*6.32*	*0.271*		
3	*2015-09-16*	*3.9*	*0.189*		
4	*2015-11-17*	*2.45*	*0.129*		
5	*2016-05-09*	*2.2*	*0.13*		
6	*2016-11-02*	*3.1*	*0.23*		
7	*2017-05-10*	*2.6*	*0.18*		
8	*2018-03-27*	*1.6*	*0.14*		
9	*2018-10-10*	*2.1*	*0.11*		
10	*2019-05-10*	*1.1*	*0.089*		
11	*2019-12-12*	*1.6*	*0.084*		
12					
13					
14					
15					

Print Historical Data

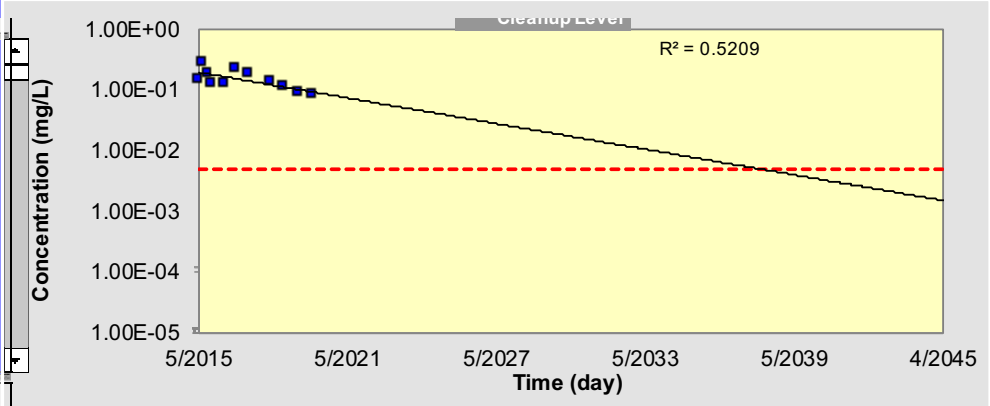
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○ Benzene	0.005	
1,2 DCA	0.005	(mg/L)
Constituent C		(mg/L)
Constituent D		(mg/L)

3. OUTPUT GRAPH

DISSOLVED 1,2 DCA CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph 30 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: **2037**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2027 (Lower Limit on Confidence Interval) to **2103** (Upper Limit on Confidence Interval)

Source Decay Rate Constant (1/year): **1.62E 01**
(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1924 Lions Park upgradient of DPVE

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

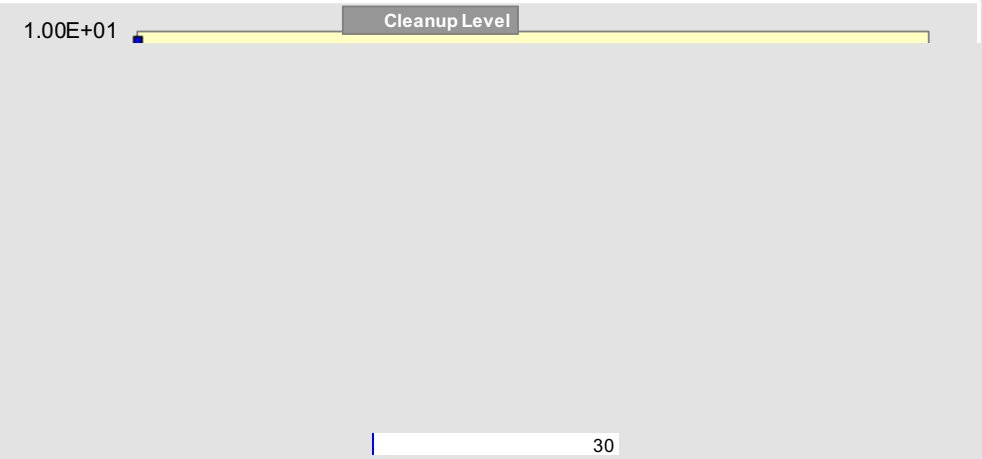
	Date (mm/dd/yy)	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene	***1,2 DCA***		
1	*2015-05-07*	*3.04*	*0.144*		
2	*2015-06-19*	*6.32*	*0.271*		
3	*2015-09-16*	*3.9*	*0.189*		
4	*2015-11-17*	*2.45*	*0.129*		
5	*2016-05-09*	*2.2*	*0.13*		
6	*2016-11-02*	*3.1*	*0.23*		
7	*2017-05-10*	*2.6*	*0.18*		
8	*2018-03-27*	*1.6*	*0.14*		
9	*2018-10-10*	*2.1*	*0.11*		
10	*2019-05-10*	*1.1*	*0.089*		
11	*2019-12-12*	*1.6*	*0.084*		
12					
13					
14					
15					

What is the cleanup level?

○	**Benzene**	0.005
○	1,2 DCA	0.005
○	Constituent C	
○	Constituent D	

3. OUTPUT GRAPH

DISSOLVED BENZENE CONCENTRATION (mg/L)



Predicted Date to Achieve Cleanup: **2043**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2032 **2081**

2.33E 01

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1925 Downgradient of DPVE

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

Concentration mg/L

	Date (mm/dd/yy)	Constituent A	Constituent B	Constituent C	Constituent D
		Benzene	***1,2 DCA***		
1	*2015-05-07*	*1.82*	*0.04*		
2	*2015-06-12*	*1.5*	*0.041*		
3	*2015-09-04*	*2.54*	*0.055*		
4	*2015-11-20*	*3.28*	*0.079*		
5	*2016-05-09*	*2.1*	*0.053*		
6	*2016-11-07*	*1.8*	*0.06*		
7	*2017-05-08*	*0.43*	*0.042*		
8	*2018-03-29*	*0.32*	*0.026*		
9	*2018-10-15*	*0.47*	*0.022*		
10	*2019-05-27*	*0.19*	*0.029*		
11	*2019-12-10*	*0.023*	*0.011*		
12					
13					
14					
15					

Print Historical Data

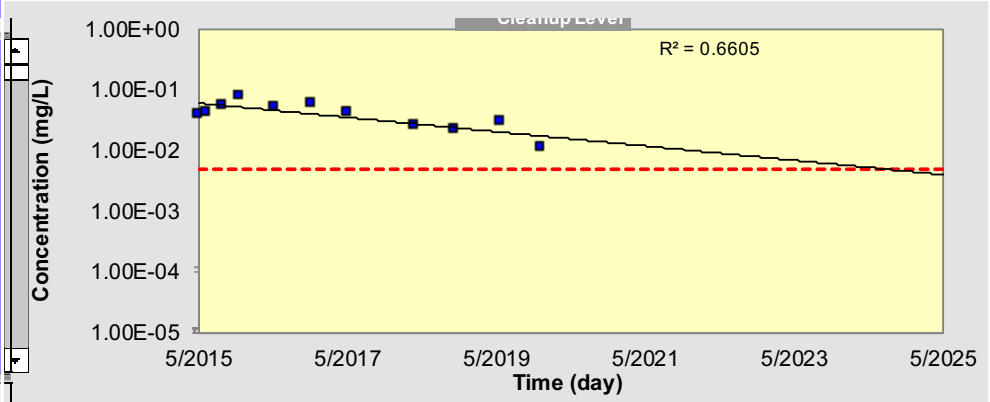
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○ Benzene	0.005	
1,2 DCA	0.005	(mg/L)
Constituent C		(mg/L)
Constituent D		(mg/L)

3. OUTPUT GRAPH

DISSOLVED 1,2 DCA CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph 10 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: **2024**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2020 (Lower Limit on Confidence Interval) to **2038** (Upper Limit on Confidence Interval)

Source Decay Rate Constant (1/year): **2.71E 01**
(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1925 Downgradient of DPVE

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

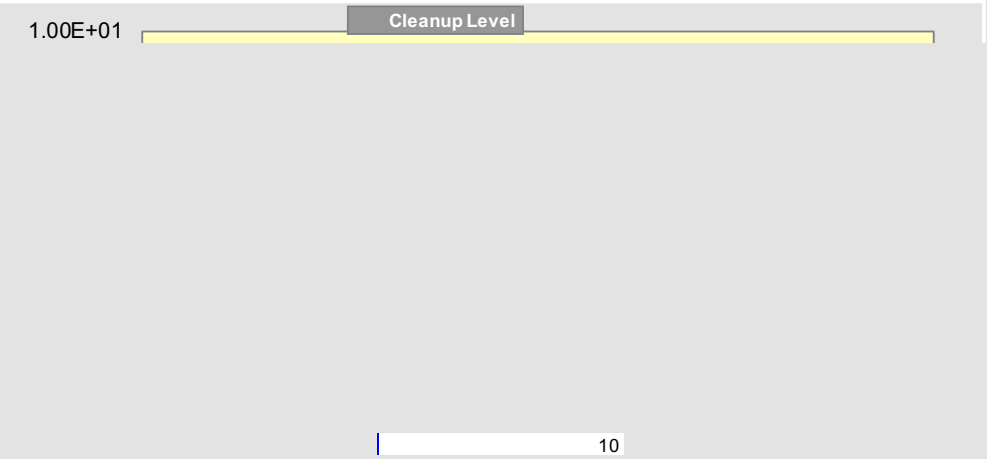
	Date (mm/dd/yy)	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene	***1,2 DCA***		
1	*2015-05-07*	*1.82*	*0.04*		
2	*2015-06-12*	*1.5*	*0.041*		
3	*2015-09-04*	*2.54*	*0.055*		
4	*2015-11-20*	*3.28*	*0.079*		
5	*2016-05-09*	*2.1*	*0.053*		
6	*2016-11-07*	*1.8*	*0.06*		
7	*2017-05-08*	*0.43*	*0.042*		
8	*2018-03-29*	*0.32*	*0.026*		
9	*2018-10-15*	*0.47*	*0.022*		
10	*2019-05-27*	*0.19*	*0.029*		
11	*2019-12-10*	*0.023*	*0.011*		
12					
13					
14					
15					

What is the cleanup level?

○	**Benzene**	0.005
○	1,2 DCA	0.005
○	Constituent C	
○	Constituent D	

3. OUTPUT GRAPH

DISSOLVED BENZENE CONCENTRATION (mg/L)



Predicted Date to Achieve Cleanup: **2023**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2020 **2029**

8.07E 01

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1928 Downgradient of Permeable Reactive Barrier

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

	Date	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene	***1,2 DCA***		
1	*2015-05-05*				
2	*2015-06-16*	*4.93*			
3	*2015-09-18*	*4.72*			
4	*2015-11-24*	*3.08*			
5	*2016-05-16*	*2.5*			
6	*2016-11-09*	*4*			
7	*2017-05-15*	*4.2*			
8	*2018-04-03*	*3*			
9	*2018-10-15*	*2.7*			
10	*2019-05-29*	*2.4*			
11	*2019-11-21*	*3.1*			
12					
13					
14					
15					

Print Historical Data

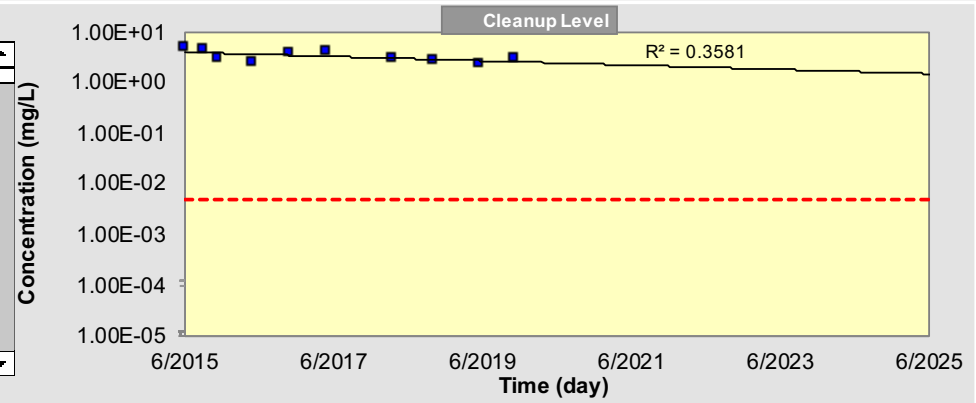
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○ **Benzene**	0.005	
1,2 DCA	0.005	(mg/L)
Constituent C		(mg/L)
Constituent D		(mg/L)

3. OUTPUT GRAPH

DISSOLVED BENZENE CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph: 10 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: **2083**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2046 (Lower Limit on Confidence Interval) to **Can t Calc (+ve Trend)** (Upper Limit on Confidence Interval)

9.79E 02

(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1929 Downgradient of Permeable Reactive Barrier

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

Concentration mg/L

	Date (mm/dd/yy)	Constituent A	Constituent B	Constituent C	Constituent D
		Benzene	***1,2 DCA***		
1	*2015-05-04*	*0.92*	*0.093*		
2	*2015-06-18*	*0.681*	*0.08*		
3	*2015-09-03*	*0.77*	*0.083*		
4	*2015-11-24*	*0.664*	*0.09*		
5	*2016-05-13*	*0.47*	*0.099*		
6	*2016-11-09*	*0.31*	*0.084*		
7	*2017-05-15*	*0.22*	*0.086*		
8	*2018-03-28*	*0.1*	*0.048*		
9	*2018-10-12*				
10	*2019-05-29*	*0.0073*	*0.02*		
11	*2019-11-22*	*0.0052*	*0.013*		
12					
13					
14					
15					

Print Historical Data

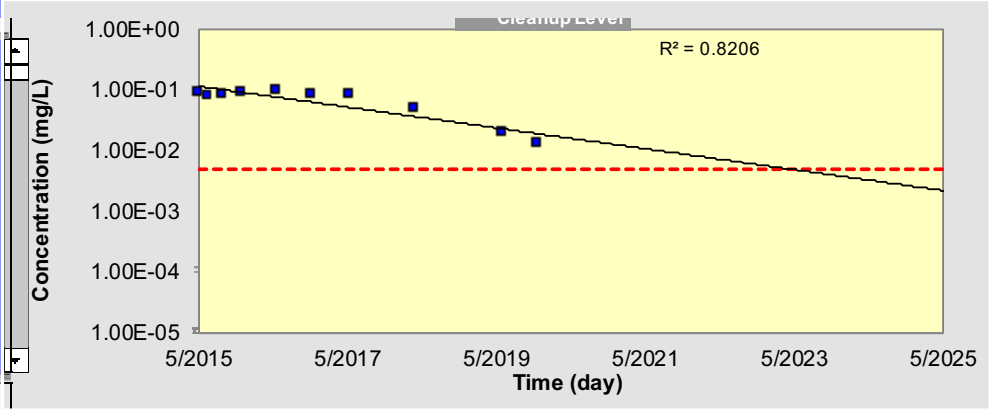
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○ Benzene	0.005	
1,2 DCA	0.005	(mg/L)
Constituent C		(mg/L)
Constituent D		(mg/L)

3. OUTPUT GRAPH

DISSOLVED 1,2 DCA CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph 10 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: **2023**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2020 (Lower Limit on Confidence Interval) to **2029** (Upper Limit on Confidence Interval)

Source Decay Rate Constant (1/year): **3.95E 01**
(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1929 Downgradient of Permeable Reactive Barrier

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

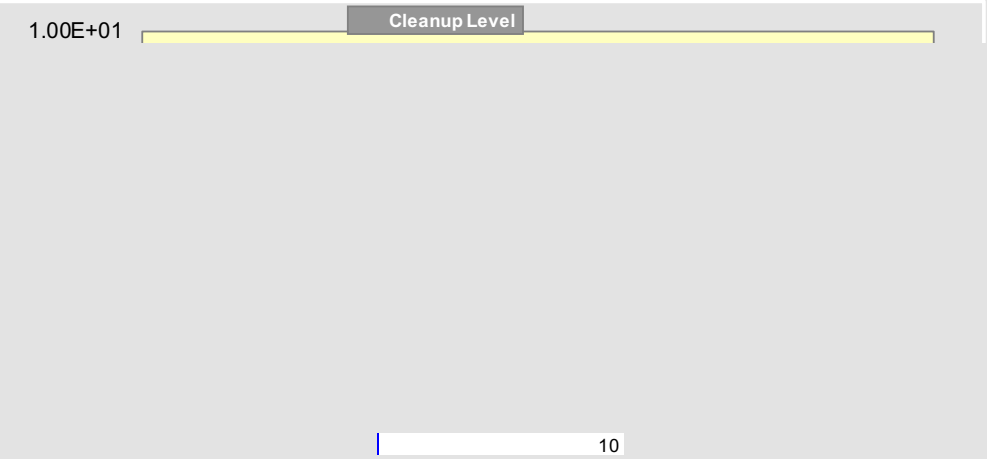
	Date (mm/dd/yy)	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene	***1,2 DCA***		
1	*2015-05-04*	*0.92*	*0.093*		
2	*2015-06-18*	*0.681*	*0.08*		
3	*2015-09-03*	*0.77*	*0.083*		
4	*2015-11-24*	*0.664*	*0.09*		
5	*2016-05-13*	*0.47*	*0.099*		
6	*2016-11-09*	*0.31*	*0.084*		
7	*2017-05-15*	*0.22*	*0.086*		
8	*2018-03-28*	*0.1*	*0.048*		
9	*2018-10-12*				
10	*2019-05-29*	*0.0073*	*0.02*		
11	*2019-11-22*	*0.0052*	*0.013*		
12					
13					
14					
15					

What is the cleanup level?

○	**Benzene**	0.005
○	1,2 DCA	0.005
○	Constituent C	
○	Constituent D	

3. OUTPUT GRAPH

DISSOLVED BENZENE CONCENTRATION (mg/L)



Predicted Date to Achieve Cleanup: **2020**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval

● 95 % Confidence Interval

2019 **2021**

1.13E+00

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1936 Downgradient of Permeable Reactive Barrier

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

Concentration mg/L

	Date (mm/dd/yy)	Constituent A	Constituent B	Constituent C	Constituent D
		Benzene	***1,2 DCA***		
1	*2015-05-04*	*0.201*	*0.123*		
2	*2015-06-15*	*0.484*	*0.138*		
3	*2015-09-03*	*0.0589*	*0.091*		
4	*2015-11-24*	*0.0199*	*0.081*		
5	*2016-05-13*	*0.15*	*0.12*		
6	*2016-11-14*	*0.015*	*0.05*		
7	*2017-05-16*	*0.015*	*0.059*		
8	*2018-03-28*	*0.018*	*0.06*		
9	*2018-10-17*	*0.03*	*0.078*		
10	*2019-05-30*	*0.016*	*0.063*		
11	*2019-12-12*	*0.02*	*0.025*		
12					
13					
14					
15					

Print Historical Data

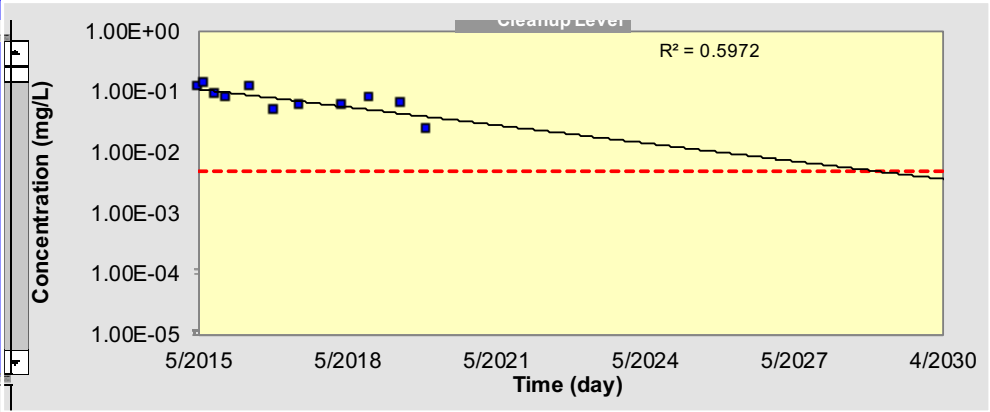
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○ Benzene	0.005	
1,2 DCA	0.005	(mg/L)
Constituent C		(mg/L)
Constituent D		(mg/L)

3. OUTPUT GRAPH

DISSOLVED 1,2 DCA CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph 15 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: **2028**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2022 (Lower Limit on Confidence Interval) to **2055** (Upper Limit on Confidence Interval)

Source Decay Rate Constant (1/year): **2.28E 01**
(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1936 Downgradient of Permeable Reactive Barrier

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

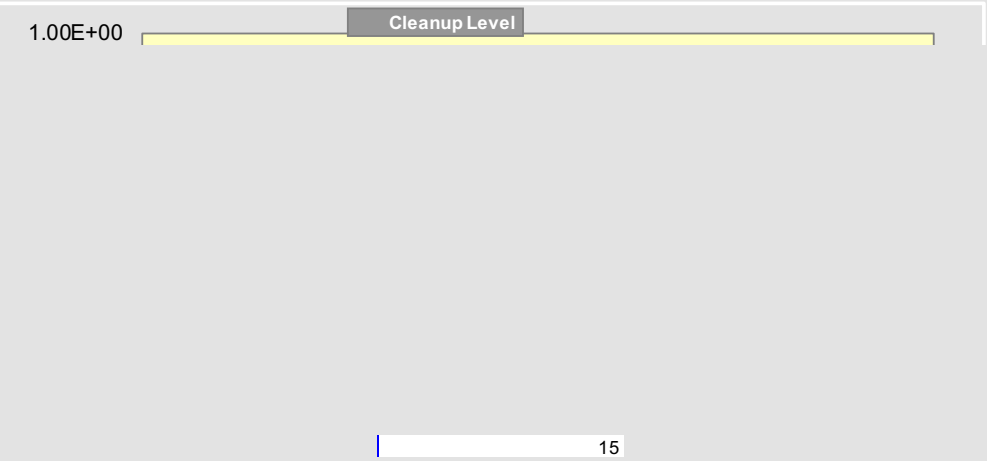
	Date (mm/dd/yy)	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene	***1,2 DCA***		
1	*2015-05-04*	*0.201*	*0.123*		
2	*2015-06-15*	*0.484*	*0.138*		
3	*2015-09-03*	*0.0589*	*0.091*		
4	*2015-11-24*	*0.0199*	*0.081*		
5	*2016-05-13*	*0.15*	*0.12*		
6	*2016-11-14*	*0.015*	*0.05*		
7	*2017-05-16*	*0.015*	*0.059*		
8	*2018-03-28*	*0.018*	*0.06*		
9	*2018-10-17*	*0.03*	*0.078*		
10	*2019-05-30*	*0.016*	*0.063*		
11	*2019-12-12*	*0.02*	*0.025*		
12					
13					
14					
15					

What is the cleanup level?

○	**Benzene**	0.005
○	1,2 DCA	0.005
○	Constituent C	
○	Constituent D	

3. OUTPUT GRAPH

DISSOLVED BENZENE CONCENTRATION (mg/L)



Predicted Date to Achieve Cleanup: **2021**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2017 **2089**

4.82E 01

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1956 Downgradient of DPVE

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

Concentration mg/L

	Date (mm/dd/yy)	Constituent A	Constituent B	Constituent C	Constituent D
		Benzene	***1,2 DCA***		
1	*2015-05-06*	*0.456*	*0.023*		
2	*2015-06-18*	*1.43*	*0.034*		
3	*2015-09-18*	*3.04*	*0.066*		
4	*2015-11-19*	*1.73*	*0.051*		
5	*2016-05-09*	*0.41*	*0.02*		
6	*2016-11-07*	*0.22*	*0.028*		
7	*2017-05-11*	*0.031*	*0.019*		
8	*2018-04-10*	*0.04*	*0.0097*		
9	*2018-05-15*	*0.36*	*0.028*		
10	*2019-05-24*	*0.024*	*0.0093*		
11	*2019-12-12*	*0.0057*	*0.0051*		
12					
13					
14					
15					

Print Historical Data

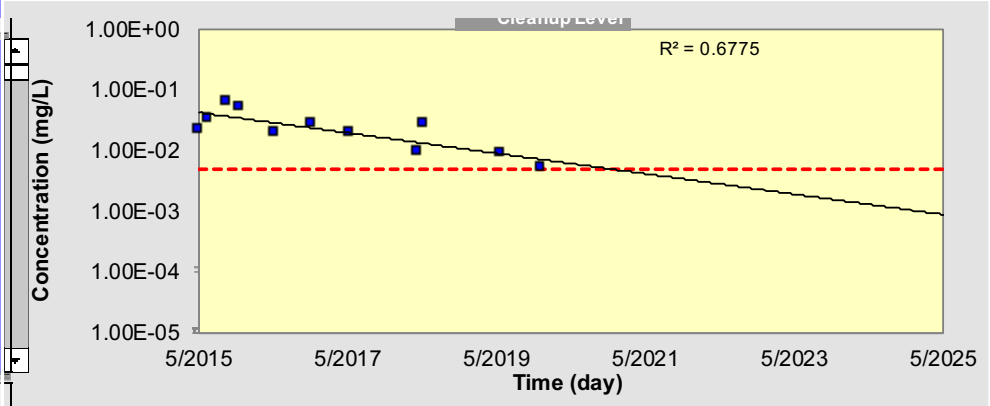
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○ Benzene	0.005	
1,2 DCA	0.005	(mg/L)
Constituent C		(mg/L)
Constituent D		(mg/L)

3. OUTPUT GRAPH

DISSOLVED 1,2 DCA CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph 10 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: **2020**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2018 (Lower Limit on Confidence Interval) to **2029** (Upper Limit on Confidence Interval)

Source Decay Rate Constant (1/year): **3.87E 01**
(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1956 Downgradient of DPVE

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

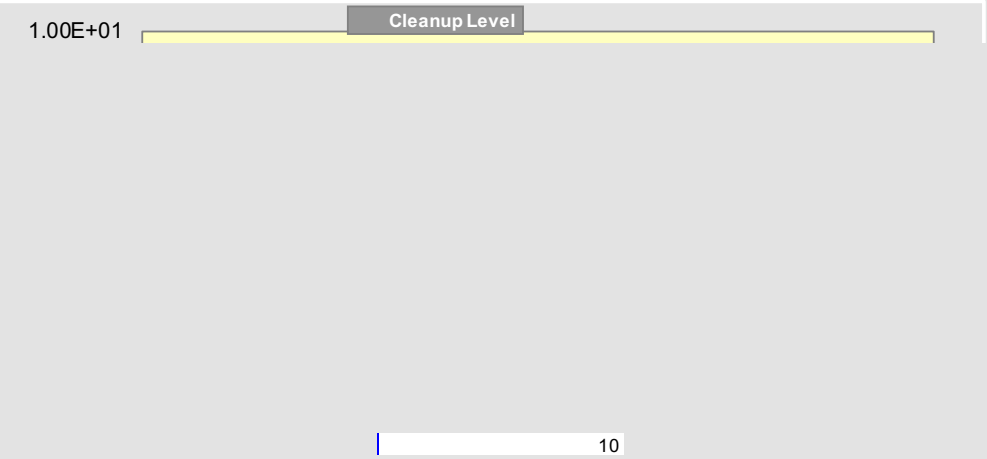
	Date (mm/dd/yy)	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene	***1,2 DCA***		
1	*2015-05-06*	*0.456*	*0.023*		
2	*2015-06-18*	*1.43*	*0.034*		
3	*2015-09-18*	*3.04*	*0.066*		
4	*2015-11-19*	*1.73*	*0.051*		
5	*2016-05-09*	*0.41*	*0.02*		
6	*2016-11-07*	*0.22*	*0.028*		
7	*2017-05-11*	*0.031*	*0.019*		
8	*2018-04-10*	*0.04*	*0.0097*		
9	*2018-05-15*	*0.36*	*0.028*		
10	*2019-05-24*	*0.024*	*0.0093*		
11	*2019-12-12*	*0.0057*	*0.0051*		
12					
13					
14					
15					

What is the cleanup level?

○	**Benzene**	0.005
○	1,2 DCA	0.005
○	Constituent C	
○	Constituent D	

3. OUTPUT GRAPH

DISSOLVED BENZENE CONCENTRATION (mg/L)



Predicted Date to Achieve Cleanup: **2020**

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval

● 95 % Confidence Interval

2018 **2026**

1.08E+00

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 → *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1982 Downgradient of Permeable Reactive Barrier

Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

	Date (mm/dd/yy)	Concentration			
		Constituent A	*Constituent B*	*Constituent C*	*Constituent D*
		Benzene	***1,2 DCA***		
1	*2015-04-01*	*13.1*	*0.124*		
2	*2015-06-11*	*13.8*	*0.159*		
3	*2015-09-21*	*10.7*	*0.177*		
4	*2015-11-20*	*11.6*	*0.15*		
5	*2016-05-17*	*12*	*0.21*		
6	*2016-11-10*	*5.2*	*0.099*		
7	*2017-05-17*	*6.6*	*0.13*		
8	*2018-04-10*	*5.9*	*0.11*		
9	*2018-10-18*	*3.2*	*0.068*		
10	*2019-05-31*	*3.7*	*0.13*		
11	*2019-11-22*	*0.98*	*0.042*		
12	*2020-04-02*	*0.57*			
13					
14					
15					

Print Historical Data

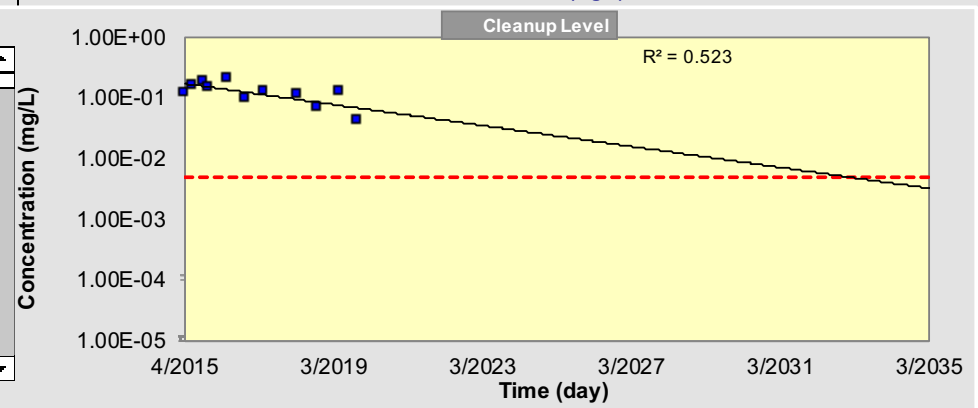
2. WHICH CONSTITUENT TO PLOT?

What is the cleanup level?

○	Benzene	0.005	
●	**1,2 DCA**	0.005	
○	Constituent C		(mg/L)
○	Constituent D		(mg/L)

3. OUTPUT GRAPH

DISSOLVED 1,2 DCA CONCENTRATION (mg/L)



Number of Years Over Which to Plot Graph: 20 *(yr)* Update Graph

4. RESULTS

Predicted Date to Achieve Cleanup: [redacted]

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2024 (Lower Limit on Confidence Interval) to **2085** (Upper Limit on Confidence Interval)

Source Decay Rate Constant (1/year): **1.99E 01**
(positive numbers represent shrinking plumes while negative numbers represent expanding plumes)

Return To Main Screen | ***New Site/Clear Screen*** | ***Paste Example Data Set*** | ***HELP***

SourceDK

Remediation Timeframe Decision Support System

Air Force Center for Engineering and Environment *Version 2.0*

TIER 1 Empirical Data

Data Input Instructions:

10.80 → *Enter value directly.*

10.80 *Value calculated by model. (Don't enter any data).*

Site Location and I.D.: BH1982 Downgradient of Permeable Reactive Barrier

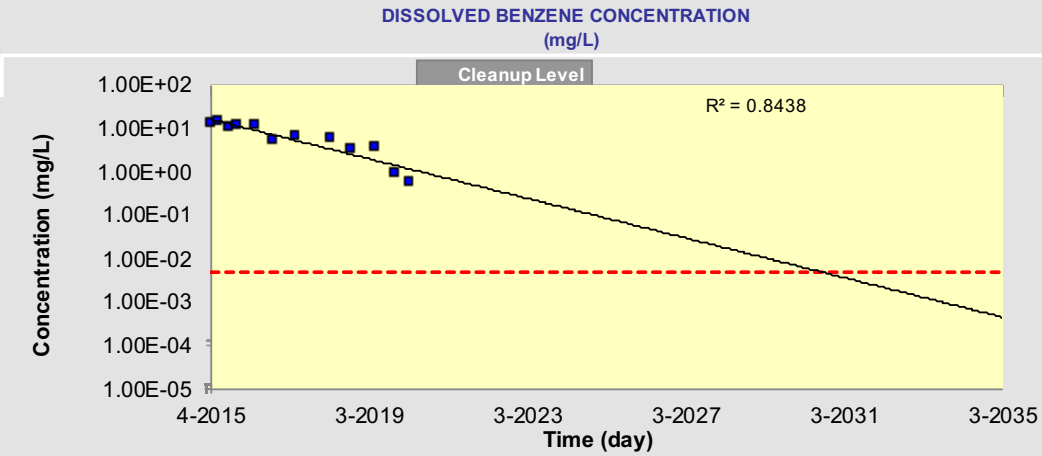
Constituent of Interest: Benzene and 1,2 DCA

1. ENTER CONSTITUENT NAME AND HISTORICAL DATA

Concentration mg/L

	Date (mm/dd/yy)	Constituent A	Constituent B	Constituent C	Constituent D
		Benzene	***1,2 DCA***		
1	*2015-04-01*	*13.1*	*0.124*		
2	*2015-06-11*	*13.8*	*0.159*		
3	*2015-09-21*	*10.7*	*0.177*		
4	*2015-11-20*	*11.6*	*0.15*		
5	*2016-05-17*	*12*	*0.21*		
6	*2016-11-10*	*5.2*	*0.099*		
7	*2017-05-17*	*6.6*	*0.13*		
8	*2018-04-10*	*5.9*	*0.11*		
9	*2018-10-18*	*3.2*	*0.068*		
10	*2019-05-31*	*3.7*	*0.13*		
11	*2019-11-22*	*0.98*	*0.042*		
12	*2020-04-02*	*0.57*			
13					
14					
15					

3. OUTPUT GRAPH



2. WHICH CONSTITUENT TO PLOT?

●	**Benzene**	0.005
	1,2 DCA	0.005
	Constituent C	
	Constituent D	

Number of Years Over Which to Plot Graph: 20 *(yr)* Update Graph

Predicted Date to Achieve Cleanup:

Confidence Interval on Predicted Cleanup Date:
(at least 3 data points needed to calculate confidence intervals)

○ 90 % Confidence Interval
● 95 % Confidence Interval

2026 to **2038**

Source Decay Rate Constant (1/year): **5.25E 01**

Appendix D

Clifton

Record of Site Condition

1 REPORT AND FORM INFORMATION

Title of report	2019 Fall Groundwater Monitoring and Sampling Report		
Report date (*dd-mon-yyyy*)	30-Apr-2020	Record of Site Condition (RSC) ID No.[Ψ]	

2 SITE IDENTIFICATION AND PHYSICAL LOCATION

2.1 Site name	North Hill Mall and Hounsfield Heights		
2.2 Address of site			
	Municipality	Calgary	**Alberta**

2.3 Legal land description of site *(if multiple, list all.)*

Plan, Block, Lot (PBL)			Alberta Township System (ATS)					
Plan	Block	Lot	LSD	Quarter	Section	Township	Range	Meridian
				NE	20	24	01	W5M

3 STAKEHOLDERS

3.1 Operator

Company	BentallGreenOak and City of Calgary	Contact person	BGO - Dave Mclean; CoC - Tyson Allan
Mailing address	BGO - Suite 1300, 112 4th Ave SW, T2P 0H3 CoC - PO Box 2100, Station M, T2P 2M5	Position held	BOG - VP Asset Mgmt; CoC - Environmental Specialist
		Business phone No.	BGO-403 542-4739; CoC - 403-268-1933
		Business fax No.	
		Business e-mail	david.mclean@bentallgreenoak.com; tyson.allan@calgary.ca

3.2 Consultant ☐ Not applicable

Company	Clifton Assoicates Ltd	Contact person	Stephen d'Abadie
Mailing address	**2222-30th Avenue NE, Calgary, AB T2E 7K9**	Position held	Project Manager
		Business phone No.	403-263-2556
		Business fax No.	403-234-9033
		Business e-mail	stephen_dabadie@clifton.ca

3.3 Landowner(s)

Land type	☒ Private ☐ Special Areas ☐ Parks and protected area ☒ Public (*if not private, provide Disposition No.: _____)*
Landowner(s)	☒ Same as operator ☐ Other

Ψ: Do not fill in. Reserved for internal administrative purposes only.

3.4 Occupant(s)			
Are there occupants at the site?	☒ Yes	☐ No	☐ To be determined (TBD)
Occupant(s)	☐ Same as operator	☒ Same as landowner	☒ Other
What is the type of occupancy?	☐ Apartment building	☐ Town house	☒ Single detached house
	☐ Agricultural	☐ Industrial	☒ Commercial
	☐ Other (*specify*) _____		

4 OPERATING STATUS

☐ Operating ☐ Suspended ☐ Abandoned ☐ Decommissioning in progress ☐ Closed
☐ Reclaimed (*provide Reclamation Certificate No.(s):* _____) ☒ Not applicable

5 TYPE OF ACTIVITY AND SITE

5.1 Petroleum Storage Tank Site ☐ Yes

5.1.1 ESRD file No.(s)		PTMAA site No.	

5.1.2 Types of activity

☐	Retail gas station	☐	Aviation fuelling station	☐	Bulk fuel	☐	Other *(specify)*: _____

5.2 Upstream Oil and Gas Facility ☐ Yes

5.2.1 ESRD file No.(s)		**AER approval No.(s)**	

5.2.2 AER authorization type ☐ Approval ☐ License ☐ Permit ☐ Order ☐ Other (*specify*)_____

5.2.3 Types of activity

☐	Wellsite and associated facility	☐	Satellite	☐	Battery	☐	Pipeline
☐	Compressor and pumping station	☐	Other (*specify*): _____				

5.3 Approved Facility Under Environmental Protection and Enhancement Act (EPEA) ☐ Yes

5.3.1 ESRD approval No.(s)		**AER approval No.(s)**	

5.3.2 Types of approved activity

☐	Chemical manufacturing plant	☐	Enhanced recovery in-situ oil sands or heavy oil processing plant	☐	Fertilizer manufacturing plant	☐	Landfill
☐	Metal manufacturing plant	☐	Oil refinery	☐	Oilsands processing plant	☐	Oil production site
☐	Pesticide manufacturing plant	☐	Petrochemical manufacturing plant	☐	Pipeline	☐	Power plant
☐	Pulp and paper processing plant	☐	Sour gas processing plant	☐	Sulphur manufacturing or processing plant	☐	Waste management facility
☐	Wood treatment plant	☐	Other *(specify)*: _____				

5.4 Facility Under EPEA Code of Practice							☐ Yes
5.4.1 ESRD registration No.(s)				AER registration No.(s)			
5.4.2 Type of Code of Practice							
☐	Asphalt paving plant	☐	Compressor and pumping station	☐	Concrete producing plant	☐	Landfill
☐	Pesticides	☐	Pipeline	☐	Land treatment of soils containing hydrocarbons	☐	Sand and gravel pit
☐	Small incinerator	☐	Sweet gas processing plant	☐	Other *(specify)*: _____		

5.5 Other Activity					☐ Yes
5.5.1 ESRD file No.(s)	00141934	Other site ID No.(s)		Authorized by	
5.5.2 Types of activity					
☐	Dry cleaning operation	☐	Highway maintenance yard	☐	Transportation
☐	Other *(specify)*: Shopping center, public park, residential community				

6 SITE CHARACTERIZATION

6.1 What Environmental Site Assessments (ESA) Have Been Conducted and Completed to Date?

☐ Phase I ESA

☒ Phase II ESA (*check all that apply.*)

☒ Initial intrusive sampling ☒ delineation completed ☒ post-remediation monitoring ☐ final confirmatory sampling

6.2 Contaminants of Potential Concern (COPC)

6.2.1 Does the site have any of the conditions that require the mandatory use of *Alberta Tier 2 Soil and Groundwater Remediation Guidelines* (ESRD, 2007 and updates)? *(check all that apply in Section 6.2.1.1.)*

☐ Yes ☒ No *(➔proceed to Section 6.2.2.)*

6.2.1.1 Identify any conditions that require the approaches of the Alberta Tier 2 guidelines. *(see Alberta Tier I Soil and Groundwater Remediation Guidelines (ESRD, 2007 and updates), for details.)*

☐	Contamination within 30 cm of building foundation	☐	Unusual building feature (*eg. earthen floor*)	☐	Contamination within 10 m distance of surface water body
☐	Fractured bedrock	☐	Potentially high hydraulic conductivity *(> 10^{-5} m/sec.)*	☐	Other (*see Alberta Tier 1 guidelines and specify):* _____

6.2.1.2 Did the Alberta Tier 2 approach lead to a soil or groundwater guideline that was lower than the corresponding Tier 1 guideline for the same contaminant(s)?

☐ Yes ☐ TBD ☒ No *(➔proceed to Section 6.2.2.)*

6.2.1.3 If you answered 'yes' or 'TBD' to Section 6.2.1.2, identify the group of contaminants for each COPC with a mandatory Tier 2 guideline that is lower than the corresponding Tier 1 guideline (*check all that apply*, *see Alberta Tier 1 guidelines, Tables 1-4 for detailed listing).*

☐	General and inorganic parameters	☐	Metals
☐	Hydrocarbons	☐	Halogenated aliphatics
☐	Chlorinated aromatics	☐	Pesticides
☐	Other organics	☐	Radionuclides
☐	Salt	☐	Other (*specify*): _____

6.2.1.4 Did any past or current ESA relevant to this investigation identify an exceedance of the mandatory Tier 2 guidelines referred to in Section 6.2.1.3 (e.g. Tier 2 guidelines that are lower than the corresponding Tier 1 guidelines)? ☐ Yes ☐ No ☐ TBD

6.2.1.5 If you answered 'yes' in Section 6.2.1.4, have all relevant COPC been remediated to meet the mandatory Tier 2 guidelines? ☐ Yes ☐ No

6.2.2. Did any past or current ESA relevant to this investigation identify a drilling waste disposal area?

☐ Yes ☒ No (*➔proceed to Section 6.2.3.)*

6.2.2.1 If a drilling waste disposal area was identified, did any past or current ESA identify non-compliance with the compliance options outlined in *Assessing Drilling Waste Disposal Areas: Compliance Options for Reclamation Certification* (AER, 2014), as amended?

☐ Yes ☐ No

6.2.2.2 If you answered 'yes' in Section 6.2.2.1, have all COPC been remediated to meet the compliance options outlined in *Assessing Drilling Waste Disposal Areas: Compliance Options for Reclamation Certification* (AER, 2014), as amended?

☐ Yes ☐ No

6.2.2.3 For any COPC that did not meet the compliance options in Assessing Drilling Waste Disposal Areas, identify the group of contaminants (*check of all that apply*, *see the Alberta Tier 1 guidelines, Tables 1-4 for detailed listing).*

☐	General and inorganic parameters	☐	Metals
☐	Hydrocarbons	☐	Halogenated aliphatics
☐	Chlorinated aromatics	☐	Pesticides
☐	Other organics	☐	Radionuclides
☐	Salt	☐	Other (*specify*): _____

6.2.3 For all areas and COPCs not assessed under Sections 6.2.1 or 6.2.2, did any ESA relevant to this investigation identify an exceedance over the Alberta Tier 1 guidelines?

☒ Yes ☐ No (*➔proceed to Section 6.3.)*

6.2.3.1 If you answered 'yes' in Section 6.2.3, have all COPC been remediated to meet the Alberta Tier 1 guidelines?

☐ Yes ☒ No ☐ TBD

6.2.3.2 For any COPC that exceeded Alberta Tier 1 guidelines in Section 6.2.3.1, identify the group of contaminants. (*check all that apply*, *see the Alberta Tier 1 guidelines, Tables 1-4 for detailed listing.)*

☐	General and inorganic parameters	☐	Metals
☒	Hydrocarbons	☐	Halogenated aliphatics
☐	Chlorinated aromatics	☐	Pesticides
☐	Other organics	☐	Radionuclides
☐	Salt	☐	Other (*specify*): _____

6.3 Status of Investigation

6.3.1 Identify soil and groundwater guidelines used to assess the COPCs that are the subject of this investigation *(check all that apply).*

☒ *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* – 2007 and updates,
☐ Coarse grained ☒ Fine grained

☒ *Alberta Tier 2 Soil and Groundwater Remediation Guidelines* – 2007 and updates,
☒ Pathway exclusion ☒ Guideline adjustment ☐ Site specific remediation objectives

☐ *Assessing Drilling Waste Disposal Areas: Compliance Options for Reclamation Certification* (AER, 2014), as amended

☐ Other (*specify*): _____

6.3.2 What land use classification(s) is used?

☐ Natural ☐ Agricultural ☒ Residential ☒ Commercial ☐ Industrial ☐ Other (*specify:*_____)

6.3.3 What is the outcome of the investigation? *(check one only.)*

☐ For all COPCs on-site and off-site, no exceedance has been found above any applicable soil and groundwater guidelines in any prior and current assessments.

☐ All contamination on-site and off-site has been completely remediated and meets the applicable soil and groundwater guidelines.

☒ One or more COPC still exceeds the applicable soil or groundwater guidelines.

6.3.4 How many contaminated areas are there currently at the site?

one ☐ None ☐ TBD

6.3.5 Are all contaminated areas and potential contaminated areas assessed during this investigation?

☒ Yes ☐ No

6.3.6 For all areas of potential environmental concern, list the dates when the contamination was discovered *(specify dd-mon-yyyy)*: **1995; _____**

6.3.7 For all areas that have been identified in Section 6.3.4, have all substance releases been reported to ESRD?

☒ Yes ☐ No ☐ Not applicable

6.3.8 If the answer to Section 6.3.7 is 'yes', list all Incident No.(s) (*attach separate sheet if necessary*):

_____; _____ ☐ Not assigned

6.3.9 What is the approximate, cumulative amount of land area remaining exceeding applicable remediation guidelines? 45000 (m^2) ☐ None ☐ TBD

6.3.10 Is there non-aqueous phase liquid (NAPL) product remaining on site? ☐ Yes ☒ No ☐ TBD

6.3.11 Is there non-aqueous phase liquid (NAPL) product remaining off site? ☐ Yes ☐ No ☒ TBD

6.3.12 What is the remediation status of the contaminated areas at site?

☐	No remediation required	☐	Site has exceedance but no remediation plan
☒	Remediation plan developed	☒	Active remediation
☐	Remediation completed	☐	Post remediation assessment completed
☒	Ongoing risk management plan – on-site	☒	Ongoing risk management plan – off-site
☐	Remediation Certificate issued for some area(s) *(provide Remediation Certificate No.(s):_____)*		
☐	Remediation Certificate cancelled for some area(s) *(provide Remediation Certificate No.(s):_____)*		

Direction for Completing the Remainder of the Form

Attach the analytical summary tables of the COPCs that are the subject of this investigation and still present at this site. A detailed listing of COPCs can be found with Tables 1-4 in *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (ESRD, 2007 and updates), as amended. Refer to the *RSC User's Guide* for detailed information on format and other requirements regarding the summary table.

For the remainder of the form, follow the directions below:

- If the COPCs on-site and off-site have never exceeded any applicable soil and groundwater guidelines in any prior and current assessments, ➔proceed to Section 8, or
- If the COPCs on-site and off-site have been completely remediated and meet the applicable soil and groundwater guidelines, ➔proceed to Section 8, or
- For all other circumstances, continue with Section 6.4.

6.4 Key Transport Factors for Existing COPCs

6.4.1 What is the horizontal distance to the nearest water well from the edge of the nearest contaminated area?

☐ 0-50 m ☐ 50-100 m ☐ 100-300 m ☐ 300-1000 m ☒ > 1000 m

6.4.2 What is the horizontal distance to the nearest surface water body from the edge of the contaminated area?

☐ ≤10 m ☐ 10-50 m ☐ 50-100 m ☐ 100-300 m ☐ 300-1000 m ☒ > 1000 m

6.4.3 Does delineation achieve closure above the groundwater water table that is nearest to the ground surface?

☐ Yes (➔ *go to Section 6.5.)* ☒ No ☐ TBD

6.4.4 Is the groundwater that is nearest the ground surface a domestic use aquifer (DUA) as defined in Alberta Tier 2 guidelines?

☒ Yes ☐ No ☐ TBD ☐ Not required (NR)

6.4.5 Is there a hydraulic barrier, as defined in Alberta Tier 2 guidelines, between the base of the contaminated area and the DUA?

☐ Yes ☒ No ☐ TBD ☐ NR

6.4.6 If you answered 'yes' to Section 6.4.5, provide the measured largest value of the hydraulic conductivity (as value $\times 10^{-7}$ m/sec.) for the 5.0 m vertical layer from the bottom of the contaminated zone.

_____($\times 10^{-7}$ m/sec.) ☐ TBD ☐ NR

6.5 On-site Characterization

6.5.1 What is the dominant soil texture that governs substance transport at the site?

☐ Coarse grained ☒ Fine grained ☐ TBD ☐ Not applicable (*must identify reason in Section 6.2.1.1.)*

6.5.2 What are the shallowest and deepest measured depths (meters below ground surface) of the water table at site?

Shallowest: **1.01** (m) Deepest: 14.10(m) ☐ TBD ☐ NR (*specify max. depth assessed*: _____(m))

6.5.3 What is the dominant horizontal direction of groundwater flow for the near surface water table?

(*N, NW, etc.:* South) ☐ TBD ☐ NR

6.5.4 What is the existing land use classification?

☐ Natural ☐ Agricultural ☒ Residential ☒ Commercial ☐ Industrial ☐ Other (*specify*) _____

6.5.5 What is the end land use classification?

☐ Natural ☐ Agricultural ☒ Residential ☒ Commercial ☐ Industrial ☐ Other (*specify*) _____

6.5.6 Identify exposure pathways for which the applicable guidelines are exceeded on-site *(check all that apply).*			
☐	Vapour inhalation	☐	Soil ingestion
☒	Ingestion of potable water	☐	Soil dermal (skin) contact
☐	Fresh water aquatic life	☐	Soil contact for plants and invertebrates
☐	TBD	☐	Other *(specify)*: _____

6.6 Off-site Characterization

6.6.1 Are there COPCs off-site exceeding applicable soil or groundwater guidelines?

☐ No (➔*if on-site contamination was reported, proceed to Section 7, otherwise, proceed to Section 8.)*
☒ Yes ☐ TBD

6.6.2 What is the current land use classification for any off-site area(s) identified in Section 6.6.1?

☐ Natural ☐ Agricultural ☒ Residential ☐ Commercial ☐ Industrial ☐ Other (*specify*) _____

6.6.3 What is the end land use classification for any off-site area(s) identified in Section 6.6.1?

☐ Natural ☐ Agricultural ☒ Residential ☐ Commercial ☐ Industrial ☐ Other (*specify*) _____

6.6.4 Is there any substance concentration under a road allowance exceeding the applicable soil or groundwater guidelines?

☒ Yes ☐ No (➔*proceed to Section 6.6.6.)* ☐ TBD

6.6.5 What is the most sensitive land use classification adjacent to the road allowance?

☐ Natural ☐ Agricultural ☒ Residential ☐ Commercial ☐ Industrial ☐ Other (*specify*) _____

6.6.6 Identify exposure pathways for which the applicable guidelines are exceeded off-site *(check all that apply).*			
☒	Vapour inhalation	☐	Soil ingestion
☒	Ingestion of potable water	☐	Soil dermal (skin) contact
☐	Fresh water aquatic life	☐	Soil contact for plants and invertebrates
☐	TBD	☐	Other *(specify)*: _____

7 RISK MANAGEMENT PLAN (RMP)

7.1 What is the Plan for Contaminated Areas Still Remaining on and off the Site? *(check one only.)*

☐ Complete remediation (➔*proceed to Section 8).*
☒ Partial remediation with risk management for some residual contamination.
☐ Risk management for all remaining contamination.

7.2 Key Progress of RMP

7.2.1 If the site needs an on-going RMP, answer all the following questions that apply to the RMP.

☒ Yes	☐ No	Are contaminated areas completely delineated horizontally and vertically in soil?
☒ Yes	☐ No	Are contaminated areas completely delineated horizontally and vertically in groundwater?
☒ Yes	☐ No	Is source identified and completely delineated?
☒ Yes	☐ No	Is source migrating or has migrated off-site?
☐ Yes	☒ No	Is source left as is?
☒ Yes	☐ No	Is source partially removed and residual source being managed?
☒ Yes	☐ No	Is source controlled with physical or administrative methods?
☒ Yes	☐ No	Are all pathways of concern identified?
☒ Yes	☐ No	Have all relevant receptors been identified and protected?
☒ Yes	☐ No	Is there a monitoring program in place to verify RMP success?
☒ Yes	☐ No	Are there third parties related to this RMP? (*if the answer is 'no', skip the next question.*)
☐ Yes	☒ No	If there are third parties, have all of them accepted the RMP?
☒ Yes	☐ No	Is there a commitment from person(s) responsible to implement and monitor the RMP until final remediation guidelines are achieved?
☒ Yes	☐ No	Is there a contingency plan in place should the RMP fail?
☒ Yes	☐ No	Is the RMP implemented for the site?

Public Disclosure and Privacy Notification

The *Record of Site Condition* form is a public record that is disclosed in accordance with section 35 of the *Environmental Protection and Enhancement Act, Disclosure of Information Regulation*, and *Ministerial Order 23/2004*. Reasonable efforts have been made to minimize collection of personal information where possible. Personal information on the form is collected under the authority of section 12(c) and other provisions of the *Environmental Protection and Enhancement Act* and is in compliance with section 33(a) and 33(c) of the *Freedom of Information and Protection of Privacy Act* (FOIP). Personal information collected on this form will be used by Alberta Environment and Sustainable Resource Development (ESRD) or the Alberta Energy Regulator (AER), as the case may be, for the purposes of administering its programs.

Accuracy of Information

The information in this document has been submitted by persons other than ESRD or the AER. The Department, the Government of Alberta, and the AER cannot and do not warrant that the information in this document is current, accurate, complete, or free of errors. Persons accessing the information provided should not rely on it, and any reliance on the information provided is taken at the sole risk of the user. Users of this information are advised to conduct their own due diligence to satisfy themselves of the environmental condition of the property of interest.

8 DECLARATION

This *Record of Site Condition* form was prepared for the purpose of reporting on the state of environmental site conditions and, where applicable, for the purpose of remediation or reclamation, for:
Sears North Hill Mall and Hounsfield Heights area (site name) (the "Site").

I, as the licensed operator or authorized representative, have reviewed all information that was used in preparation of this form and I am satisfied that it was prepared in a manner consistent with the Applicable Standard[11] together with any relevant additional guidance that is available from Alberta Environment and Sustainable Resource Development as of this date for conducting environmental site assessments.

Having conducted reasonable inquiries to obtain all relevant information, to my knowledge, the statements made in this form are true as of this date. I have disclosed all pertinent information of which I am aware concerning the historical and current environmental condition of the Site to the Director.

Any use which a third party, other than the Crown in right of Alberta or the AER, makes of this form, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. The undersigned accepts no responsibility for damages, if any, suffered by any third party, other than the Crown in right of Alberta and the AER, as a result of decisions made or actions based on this form. Any exclusions or disclaimers to the contrary contained in any attachment to this form are of no force or effect as against the Crown in right of Alberta and the AER.

Footnote [11]:

"Applicable Standard" means

a) for the purposes of upstream oil and gas sites,

i) *2010 Reclamation Criteria for Wellsites and Associated Facilities Application Guidelines* (ESRD 2011),

ii) CSA Standard Z769, *Phase II Environmental Site Assessment,* as amended, for any Phase II site assessment information used in preparation of this form on all upstream oil and gas sites not included in a) i);

b) for the purposes of all other sites, CSA Standard Z768, *Phase I Environmental Site Assessment,* as amended, for any Phase I site assessment information and with CSA Standard Z769, *Phase II Environmental Site Assessment,* as amended, for any Phase II site assessment information used in preparation of this form.

By signing below, I as the licensed operator or authorized representative, confirm the information provided herein is correct and complete, to the best of my knowledge and belief.

Clifton Associates Ltd.	David G. Pritchard	Principal Environmental Geoscientist		30 April 2020
Name of operator	Name of authorized representative	Title of authorized representative (*e.g. officer, director*)	Signature	Date (*dd-mon-yyyy*)