

A.1 Technology Name

Radiello Passive Sampler

A.1.1 Source

Semi-Annual indoor Air Post-Mitigation Sampling – June 2019, X Facility, Santa Ana, California, CDM Smith (Irvine, CA), August 27, 2019

A.1.2 Summary

Media:	Indoor Air
Study Type:	Indoor air monitoring using passive sampling
Technology:	Radiello 130
Peer Reviewed:	No
Publication Date:	August 27, 2019

A.1.3 Site Description

General site description and conditions

The Site occupies approximately 15-acres with several buildings used for industrial manufacturing, a maintenance shop, chemical storage warehouse, and a wastewater treatment plant with small laboratory, office and maintenance shop. An asphalt parking lot occupies approximately half the Site surface area, and a highway is approximately 0.5 mile from the Site.

Contaminants of concern (COCs)

Contamination of Site media resulted from solvent degreasers, plating and surface preparation activities. COCs are volatile organic compounds (VOCs), and included tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), vinyl chloride (VC), and benzene.

Sampling frequency of COCs

Indoor air monitoring is conducted semi-annually. The passive sampling conducted with the Waterloo Membrane System with Thermal Desorption (WMS-TD) and Radiello 130 (RAD130) sampler were 7-day sampling periods. One 24-hour indoor air sample was also collected using a Summa canister, for comparison to the RAD130. This case study also reports results from limited indoor air sampling conducted at this Site from January 2017 through July 2019.

Technology Used

This Site employed Waterloo Membrane Samplers with Thermal Desorption (WMS-TD) with 7-day sampling period to monitor indoor and ambient air for this Site. However, the analytical laboratory used for analysis of indoor air samples for this Site discontinued WMS-TD analysis and recommended the Radiello 130 (RAD130) passive sampler with 7-day sampling period to provide similar reporting limits as the 7-day WMS-TD. U.S. EPA Method TO-17 was used to

analyze WMS-TD samples. RAD130 employs Solvent Extraction (SE) for analysis with modified U.S. EPA Method TO-17, similar to the WMS-SE and WMS-LU. Summa canister sampling for analysis by U.S. EPA Method TO-15 were also conducted for a side-by-side comparison with the Radiello samples.

A.1.4 Remedial Phase

This semi-annual indoor air sampling was conducted to evaluate potential intrusion of vapor forming chemicals from the subsurface, for post-remedial monitoring.

A.1.5 Outcome

This case study presents data from semi-annual indoor air sampling events using WMS-TD and RAD130 passive samplers, in different sampling events. One Summa canister sample was taken side-by-side with a RAD130 sample, for comparison of results. Air sampling results are shown in Table, below.

The Study concluded that the 7-day RAD130 sampling results were similar to previous sampling conducted using the WMS-TD 7-day sampling. Comparison of the 7-day RAD130 sampler to the co-located 24-hr Summa canister sample indicated a good correlation with similar reported concentrations or concentrations in the same magnitude for most of the chemicals reported. However, there were chemicals reported with analysis of the Summa canister samples that were not analyzed for in the RAD130.

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2,4-Trichlorobenzene
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples							
TO-17	Confrm-122716	WMS	1/3/2017	0.18 U	0.25 U	0.28 U	0.023 UJ
TO-17	FB1-122716	WMS (FB)	1/3/2017	0.18 U	0.25 U	0.28 U	0.022 UJ
TO-17	Office-1-122716	WMS	1/3/2017	0.18 U	0.25 U	0.28 U	0.023 UJ
TO-17	Office-2-122716	WMS	1/3/2017	0.18 U	0.25 U	0.28 U	0.023 UJ
TO-17	Room1-122716	WMS	1/3/2017	0.18 U	0.25 U	0.28 U	0.023 UJ
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples							
TO-17	CONFRM-061917	WMS	6/26/2017	0.18 U	0.25 U	0.28 U	0.012 UJ
TO-17	FB-061917	WMS (FB)	6/26/2017	0.18 U	0.25 U	0.28 U	0.012 UJ
TO-17	Office-1-061917	WMS	6/26/2017	0.18 U	0.25 U	0.28 U	0.012 UJ
TO-17	Office-2-061917	WMS	6/26/2017	0.18 U	0.25 U	0.28 U	0.012 UJ
TO-17	Room-1-061917	WMS	6/26/2017	0.18 U	0.25 U	0.28 U	0.012 UJ
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples							
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	0.16 U	0.16 UJ	0.52 UJ	0.39 UJ
TO-15	007-SUM-121417	SUMMA	12/15/2017	0.037 J	0.16 U	0.076 U	7.1 UJ
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	0.16 U	0.16 UJ	0.52 UJ	0.39 UJ
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples							
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	0.16 U	0.16 UJ	0.52 UJ	0.39 UJ
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	0.16 U	0.16 UJ	0.52 UJ	0.39 UJ
Post-Mitigation (Approx 26 months) Confirmation Samples							
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	0.16 U	0.16 UJ	0.52 UJ	0.39 UJ
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples							
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	0.16 U	0.16 UJ	0.53 UJ	0.39 UJ
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	0.16 U	0.16 UJ	0.53 UJ	0.39 UJ
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples							
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	0.16 U	0.16 UJ	0.53 UJ	0.39 UJ
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	0.16 U	0.16 UJ	0.53 UJ	0.39 UJ

50

51

52

53

54

55

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	1,2,4-Trimethylbenzene	1,2-Dichloroethane	1,3,5-Trimethylbenzene	1,3-Butadiene
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples							
TO-17	Confrm-122716	WMS	1/3/2017	0.36	0.18 U	0.11	--
TO-17	FB1-122716	WMS (FB)	1/3/2017	0.34 U	0.18 U	0.0064 J	--
TO-17	Office-1-122716	WMS	1/3/2017	0.48	0.18 U	0.15	--
TO-17	Office-2-122716	WMS	1/3/2017	0.31 J	0.18 U	0.1	--
TO-17	Room1-122716	WMS	1/3/2017	0.38	0.18 U	0.13	--
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples							
TO-17	CONFRM-061917	WMS	6/26/2017	0.16 J	0.18 U	0.0087 J	--
TO-17	FB-061917	WMS (FB)	6/26/2017	0.34 U	0.18 U	0.077 U	--
TO-17	Office-1-061917	WMS	6/26/2017	0.34 U	0.18 U	0.011 J	--
TO-17	Office-2-061917	WMS	6/26/2017	0.34 U	0.18 U	0.0096 J	--
TO-17	Room-1-061917	WMS	6/26/2017	0.34 U	0.18 U	0.077 U	--
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples							
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	0.20 U	0.13 U	0.19 UJ	--
TO-15	007-SUM-121417	SUMMA	12/15/2017	0.61 J	0.045 J	0.29 J	0.14 J
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	0.36	0.040 J	0.098 J	--
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples							
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	0.20 U	0.13 U	0.18 UJ	--
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	0.086 J	0.068 J	0.19 UJ	--
Post-Mitigation (Approx 26 months) Confirmation Samples							
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	0.16 J	0.13 U	0.19 UJ	--
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples							
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	0.20 U	0.13 U	0.19 UJ	--
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	0.23	0.13 U	0.19 UJ	--
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples							
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	0.096 J	0.13 U	0.19 UJ	--
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	0.085 J	0.13 U	0.19 UJ	--

56

57

58

59

60

61

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	1,4-Dichlorobenzene	2,2,4-Trimethylpentane	2-Butanone	2-Propanol	4-Ethyltoluene
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples								
TO-17	Confrm-122716	WMS	1/3/2017	0.40 U	--	2.4 J	--	--
TO-17	FB1-122716	WMS (FB)	1/3/2017	0.40 U	--	0.26 J	--	--
TO-17	Office-1-122716	WMS	1/3/2017	0.083 J	--	2.7 J	--	--
TO-17	Office-2-122716	WMS	1/3/2017	0.40 U	--	2.4 J	--	--
TO-17	Room1-122716	WMS	1/3/2017	0.067 J	--	2.7 J	--	--
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples								
TO-17	CONFRM-061917	WMS	6/26/2017	0.40 U	--	0.75 J	--	--
TO-17	FB-061917	WMS (FB)	6/26/2017	0.40 U	--	3.9 U	--	--
TO-17	Office-1-061917	WMS	6/26/2017	0.40 U	--	0.69 J	--	--
TO-17	Office-2-061917	WMS	6/26/2017	0.40 U	--	0.78 J	--	--
TO-17	Room-1-061917	WMS	6/26/2017	0.40 U	--	0.48 J	--	--
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples								
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	0.20 U	--	0.12 U	--	--
TO-15	007-SUM-121417	SUMMA	12/15/2017	0.23 U	1.4 J	3.1	90	0.52 J
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	0.20 U	--	2.7	--	--
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples								
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	0.19 U	--	0.12 U	--	--
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	0.19 U	--	0.34	--	--
Post-Mitigation (Approx 26 months) Confirmation Samples								
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	0.20 U	--	0.21	--	--
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples								
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	0.20 U	--	0.13 U	--	--
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	0.29	--	0.59	--	--
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples								
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	0.20 U	--	0.26	--	--
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	0.20 U	--	0.27	--	--

62

63

64

65

66

67

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	4-Methyl-2-pentanone	Acetone	Benzene	Carbon Tetrachloride	Chlorobenzene
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples								
TO-17	Confrm-122716	WMS	1/3/2017	0.12 J	5.2 UJ	1.4 U	0.17 U	0.020 J
TO-17	FB1-122716	WMS (FB)	1/3/2017	0.79 U	2.1 J	0.75	0.17 U	0.063 U
TO-17	Office-1-122716	WMS	1/3/2017	0.087 J	4.4 UJ	1.5 U	0.17 U	0.063 U
TO-17	Office-2-122716	WMS	1/3/2017	0.13 J	3.7 UJ	0.72 U	0.17 U	0.063 U
TO-17	Room1-122716	WMS	1/3/2017	0.079 J	3.7 UJ	1.1 U	0.11 J	0.063 U
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples								
TO-17	CONFRM-061917	WMS	6/26/2017	1.4 U	6.9 UJ	1.8 U	0.14 J	0.063 U
TO-17	FB-061917	WMS (FB)	6/26/2017	1.2	2.7 J	2.2	0.17 U	0.028 J
TO-17	Office-1-061917	WMS	6/26/2017	0.79 U	7.7 UJ	2.1 U	0.14 J	0.063 U
TO-17	Office-2-061917	WMS	6/26/2017	0.79 U	9.3 UJ	2.0 U	0.14 J	0.063 U
TO-17	Room-1-061917	WMS	6/26/2017	0.80 U	5.4 UJ	1.6 U	0.15 J	0.064 U
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples								
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	0.30 U	0.26 U	0.50 U	0.15 U	0.15 U
TO-15	007-SUM-121417	SUMMA	12/15/2017	0.79 U	22	0.82	0.20 J	0.88 U
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	0.71	10	0.61	0.23	0.15 U
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples								
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	0.29 U	0.26 U	0.49 U	0.15 U	0.14 U
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	0.26 J	2.5	0.26 J	0.49	0.14 U
Post-Mitigation (Approx 26 months) Confirmation Samples								
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	0.32	0.93	0.50 U	0.24	0.15 U
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples								
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	0.30 U	--	0.50 U	0.15 U	0.15 U
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	0.18 J	--	0.55	0.27	0.15 U
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples								
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	0.19 J	--	0.50 U	0.32	0.15 U
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	0.22 J	--	0.50 U	0.34	0.15 U

68

69

70

71

72

73

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	Chloroform	Chloromethane	cis-1,2-Dichloroethene	Isopropylbenzene	Cyclohexane
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples								
TO-17	Confrm-122716	WMS	1/3/2017	0.12 U	--	0.21 U	0.057 UJ	0.16 J
TO-17	FB1-122716	WMS (FB)	1/3/2017	0.12 U	--	0.21 U	0.057 UJ	0.17 U
TO-17	Office-1-122716	WMS	1/3/2017	0.12 U	--	0.12 J	0.057 UJ	0.19
TO-17	Office-2-122716	WMS	1/3/2017	0.12 U	--	0.099 J	0.057 UJ	0.10 J
TO-17	Room1-122716	WMS	1/3/2017	0.084 J	--	0.12 J	0.057 UJ	0.19
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples								
TO-17	CONFRM-061917	WMS	6/26/2017	0.044 J	--	0.16 J	0.0049 J	0.099 J
TO-17	FB-061917	WMS (FB)	6/26/2017	0.12 U	--	0.21 U	0.047 UJ	0.17 U
TO-17	Office-1-061917	WMS	6/26/2017	0.039 J	--	0.14 J	0.0048 J	0.11 J
TO-17	Office-2-061917	WMS	6/26/2017	0.041 J	--	0.15 J	0.0053 J	0.15 J
TO-17	Room-1-061917	WMS	6/26/2017	0.033 J	--	0.13 J	0.0040 J	0.10 J
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples								
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	0.13 U	--	0.16 UJ	--	0.18 U
TO-15	007-SUM-121417	SUMMA	12/15/2017	0.19	1.0 J	0.16	0.94 U	0.39 J
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	0.12 J	--	0.23 J	--	0.30
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples								
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	0.13 U	--	0.16 UJ	--	0.18 U
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	0.12 J	--	0.60 J	--	0.67
Post-Mitigation (Approx 26 months) Confirmation Samples								
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	0.078 J	--	0.38 J	--	0.17 J
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples								
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	0.13 U	--	0.16 UJ	--	0.18 U
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	0.15	--	0.58 J	--	0.30
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples								
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	0.096 J	--	0.65 J	--	0.20
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	0.094 J	--	0.73 J	--	0.19

74

75

76

77

78

79

80

81

82

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	Cyclohexane	Ethanol	Ethylbenzene	Trichloro fluoromethane	Freon 113
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples								
TO-17	Confrm-122716	WMS	1/3/2017	0.16 J	--	0.32	--	--
TO-17	FB1-122716	WMS (FB)	1/3/2017	0.17 U	--	0.026 J	--	--
TO-17	Office-1-122716	WMS	1/3/2017	0.19	--	0.45	--	--
TO-17	Office-2-122716	WMS	1/3/2017	0.10 J	--	0.31	--	--
TO-17	Room1-122716	WMS	1/3/2017	0.19	--	0.39	--	--
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples								
TO-17	CONFRM-061917	WMS	6/26/2017	0.099 J	--	0.073 U	--	--
TO-17	FB-061917	WMS (FB)	6/26/2017	0.17 U	--	0.052	--	--
TO-17	Office-1-061917	WMS	6/26/2017	0.11 J	--	0.078 U	--	--
TO-17	Office-2-061917	WMS	6/26/2017	0.15 J	--	0.073 U	--	--
TO-17	Room-1-061917	WMS	6/26/2017	0.10 J	--	0.066 U	--	--
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples								
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	0.18 U	--	0.15 U	--	--
TO-15	007-SUM-121417	SUMMA	12/15/2017	0.39 J	1000 J	0.49	0.86 J	1.5 U
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	0.30	--	0.24	--	--
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples								
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	0.18 U	--	0.14 U	--	--
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	0.67	--	0.066 J	--	--
Post-Mitigation (Approx 26 months) Confirmation Samples								
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	0.17 J	--	0.070 J	--	--
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples								
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	0.18 U	--	0.15 U	--	--
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	0.30	--	0.18	--	--
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples								
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	0.20	--	0.15 U	--	--
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	0.19	--	0.15 U	--	--

83

84

85

86

87

88

89

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	Freon 114	Freon 12	Heptane	Hexane	m,p-Xylene	Methyl tert-butyl ether
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples									
TO-17	Confrm-122716	WMS	1/3/2017	--	--	0.42 J	0.41 J	1.1	0.22 U
TO-17	FB1-122716	WMS (FB)	1/3/2017	--	--	0.056 J	1.2 U	0.53 U	0.22 U
TO-17	Office-1-122716	WMS	1/3/2017	--	--	0.47 J	0.42 J	1.6	0.22 U
TO-17	Office-2-122716	WMS	1/3/2017	--	--	0.36 J	0.32 J	1.1	0.22 U
TO-17	Room1-122716	WMS	1/3/2017	--	--	0.43 J	0.42 J	1.4	0.22 U
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples									
TO-17	CONFRM-061917	WMS	6/26/2017	--	--	0.94 U	1.2 U	0.16 J	0.22 U
TO-17	FB-061917	WMS (FB)	6/26/2017	--	--	0.10 J	0.13 J	0.53 U	0.22 U
TO-17	Office-1-061917	WMS	6/26/2017	--	--	0.95 U	1.2 U	0.17 J	0.22 U
TO-17	Office-2-061917	WMS	6/26/2017	--	--	0.95 U	1.2 U	0.15 J	0.22 U
TO-17	Room-1-061917	WMS	6/26/2017	--	--	0.95 U	1.2 U	0.14 J	0.22 U
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples									
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	--	--	0.17 U	0.15 U	0.14 U	0.15 U
TO-15	007-SUM-121417	SUMMA	12/15/2017	0.089 J	2.0	0.71 J	1.0	1.7	0.014 J
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	--	--	0.34	0.62	0.76	0.15 U
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples									
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	--	--	0.17 U	0.15 U	0.14 U	0.15 U
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	--	--	0.15 J	0.41	0.18	0.15 U
Post-Mitigation (Approx 26 months) Confirmation Samples									
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	--	--	0.17 U	0.15 U	0.15	0.15 U
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples									
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	--	--	0.17 U	0.15 U	0.28 U	0.15 U
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	--	--	0.22	0.36	0.50	0.15 U
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples									
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	--	--	0.082 J	0.14 J	0.16	0.15 U
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	--	--	0.093 J	0.16	0.17	0.15 U

90

91

92

93

94

95

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	Methylene Chloride	Naphthalene	o-Xylene	n-Propyl benzene	Styrene
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples								
TO-17	Confrm-122716	WMS	1/3/2017	--	0.077 UJ	0.39 J	0.082 J	0.74
TO-17	FB1-122716	WMS (FB)	1/3/2017	--	0.077 UJ	0.48 U	0.43 U	0.099 J
TO-17	Office-1-122716	WMS	1/3/2017	--	0.077 UJ	0.51	0.11 J	1
TO-17	Office-2-122716	WMS	1/3/2017	--	0.077 UJ	0.38 J	0.070 J	0.76
TO-17	Room1-122716	WMS	1/3/2017	--	0.077 UJ	0.48 J	0.094 J	0.87
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples								
TO-17	CONFRM-061917	WMS	6/26/2017	--	0.077 UJ	0.48 U	0.44 U	0.60 U
TO-17	FB-061917	WMS (FB)	6/26/2017	--	0.012 J	0.031 J	0.024 J	0.32 J
TO-17	Office-1-061917	WMS	6/26/2017	--	0.078 UJ	0.48 U	0.44 U	0.53 U
TO-17	Office-2-061917	WMS	6/26/2017	--	0.077 UJ	0.48 U	0.44 U	0.64 U
TO-17	Room-1-061917	WMS	6/26/2017	--	0.078 UJ	0.48 U	0.44 U	0.46 U
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples								
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	--	0.40 U	0.15 U	0.17 U	0.16 U
TO-15	007-SUM-121417	SUMMA	12/15/2017	1.6	--	0.66	0.15 J	0.60 J
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	--	0.40 U	0.27	0.061 J	0.12 J
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples								
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	--	0.39 U	0.15 U	0.17 U	0.16 U
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	--	0.39 U	0.068 J	0.17 U	0.16 U
Post-Mitigation (Approx 26 months) Confirmation Samples								
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	--	0.40 U	0.050 J	0.17 U	0.16 U
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples								
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	--	0.80 U	0.15 U	0.18 U	0.16 U
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	--	0.80 U	0.19	0.18 U	0.16 U
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples								
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	--	0.40 U	0.15 U	0.18 U	0.16 U
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	--	0.40 U	0.15 U	0.18 U	0.16 U

Sample Analysis ^a	Sample ID	Sample Type	Sample Date ^b	Tetrachloroethene	Toluene	Trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride
1st Semi-Annual Post-Mitigation (Approx 6 months) Samples								
TO-17	Confrm-122716	WMS	1/3/2017	0.12	3.8 U	0.093 J	0.75	0.43 U
TO-17	FB1-122716	WMS (FB)	1/3/2017	0.086 U	0.80 J	0.25 U	0.10 U	0.43 U
TO-17	Office-1-122716	WMS	1/3/2017	0.18	5.2	0.16 J	1.3	0.43 U
TO-17	Office-2-122716	WMS	1/3/2017	0.11	3.8 U	0.25 U	0.76	0.43 U
TO-17	Room1-122716	WMS	1/3/2017	0.15	4.5	0.14 J	1.2	0.43 U
2nd Semi-Annual Post-Mitigation (Approx 12 months) Samples								
TO-17	CONFRM-061917	WMS	6/26/2017	0.086 U	2.4 U	0.14 J	1.0	0.43 U
TO-17	FB-061917	WMS (FB)	6/26/2017	0.087 U	1.2 J	0.25 U	0.10 U	0.43 U
TO-17	Office-1-061917	WMS	6/26/2017	0.087 U	2.4 U	0.16 J	1.2	0.43 U
TO-17	Office-2-061917	WMS	6/26/2017	0.087 U	2.4 U	0.14 J	0.73	0.43 U
TO-17	Room-1-061917	WMS	6/26/2017	0.087 U	2.4 U	0.15 J	1.0	0.43 U
3rd Semi-Annual Post-Mitigation (Approx 18 months) Samples								
Mod. TO-17	FB-121417	RAD130 (FB)	12/21/2017	0.17 U	0.13 U	0.33 UJ	0.14 U	--
TO-15	007-SUM-121417	SUMMA	12/15/2017	0.16 J	3.2	0.17 J	0.90	0.049 U
Mod. TO-17	007-RAD-121417	RAD130	12/21/2017	0.14 J	1.8	0.24 J	1.1	--
4th Semi-Annual Post-Mitigation (Approx 24 months) Samples								
Mod. TO-17	FB-061918	RAD130 (FB)	6/26/2018	0.17 U	0.13 U	0.33 UJ	0.14 U	--
Mod. TO-17	007-RAD-061918	RAD130	6/26/2018	0.075 J	1.1	0.53 J	4.0	--
Post-Mitigation (Approx 26 months) Confirmation Samples								
Mod. TO-17	007-RAD-081418	RAD130	8/21/2018	0.053 J	0.81	0.37 J	1.2	--
5th Semi-Annual Post-Mitigation (Approx 28 months) Samples								
Mod. TO-17	FB-122118	RAD130 (FB)	12/28/2018	0.17 U	0.14 U	0.33 UJ	0.14 U	--
Mod. TO-17	007-RAD-122118	RAD130	12/28/2018	0.16 J	1.9	0.60 J	2.0	--
6th Semi-Annual Post-Mitigation (Approx 34 months) Samples								
Mod. TO-17	007-RAD-062819	RAD130	7/5/2019	0.17 U	2.1	0.62 J	1.9	--
Mod. TO-17	FD-062819	RAD130 (FD)	7/5/2019	0.073 J	2.3	0.66 J	2.1	--

All units in micrograms per cubic ($\mu\text{g}/\text{m}^3$) ; U = Not detected below detection limit; UJ = Results are not detected and estimated; "--" = Not analyzed; FB = Field Blank; NE =Not Established; J =Results are detected below the reporting limit or are qualified as estimated in data validation

a -U.S. EPA Method TO-15- Analysis used for Summa canister sample; U.S. EPA Method TO-17- Analysis used for WMSs; U.S. Modified EPA Method TO-17 Analysis used for RAD130s

b - Sample date indicated is the completion date