

MEMORANDUM

DATE : July 15, 2023

TO : Shane LaFave / Roers Companies, LLC

FROM : Pratap Singh, Ph.D., PE / KSingh

SUBJECT : Weekly Progress Report for Week Ending 07/15/2023
Community Within the Corridor - East Block

COPY TO : Que El-Amin / Scott Crawford, Inc., Robert Reineke, PE, Robert Fedorchak, PE
Project #40441B

The purpose of this memorandum is to summarize the work performed as a part of the emergency response for the referenced project for the week ending 07/15/2023. This document is intended to serve two purposes:

1. Summarizing the tasks performed during the past week, and
2. The action items for the following week.

The first half of July has shown significant improvements made toward depressurization throughout the building, and reduction of TCE concentrations both inside the residential units as well as beneath the concrete slab. The three primary goals of acceptable indoor air quality standards, effective depressurization, and sub-slab TCE detections have shown dramatic improvements based on the corrective actions implemented in June 2023.

There are isolated areas which will require additional remediation. Efforts moving forward will focus on these areas and will include source removal, Biochar application, and supplemental fan installation. With the proposed improvements, we are confident that the Vapor Mitigation System's performance will be protective of public health and the environment.

Please see below for the tasks that were performed this week:

1. Task #1 – GC Testing by KSingh
KSingh continues to work on conducting gas chromatograph (GC) testing for measurement of TCE in various units of the East Block focused on the residential units that are occupied by tenants. Attachment A is comprised of Figure 1, a floor plan for reference of Unit locations, vapor pins, and blowers, with the test results of TCE shown in Tables 1 to 5.

A comprehensive data table of Indoor Air Monitoring Data for TCE is provided in Table 7 (Attachment C). Note that highlighted cell values in green indicate levels that are **lower** than the vapor risk screening levels for **residential** facilities. Graphs showing comprehensive data can be found in Attachment D. The findings of portable continuous and discrete testing for TCE are as follows:

- TCE detections ranged from 1.5 $\mu\text{g}/\text{m}^3$ to 2.4 $\mu\text{g}/\text{m}^3$ in Unit 1045 with an average of 1.7 $\mu\text{g}/\text{m}^3$.
- TCE detections ranged from 0.5 $\mu\text{g}/\text{m}^3$ to 1.662 $\mu\text{g}/\text{m}^3$ in Unit 1050 with an average of 0.86 $\mu\text{g}/\text{m}^3$.
- Continuous monitoring results in Units 1045 and 1050 are displayed in Figure 3. The continuous monitoring data shows a direct correlation with the barometric pressure and ambient temperature with the values of TCE.
- The diurnal variations in temperatures appeared to have aided the volatilization of TCE leading to higher ambient and sub-slab concentrations.
- TCE detections in Unit 1045 appear to have improved to be at $\sim 1.7 \mu\text{g}/\text{m}^3$ with the most recent data indicating a level of 1.6 $\mu\text{g}/\text{m}^3$.
- Overall, there was a **significant decline** in the indoor air concentrations in all the residential units on the 1st, 2nd, and 3rd floor of buildings 1B-W, 1B-SW, and 1B-S. **All units comply to the Vapor Action Levels (VAL) set forth by WDNR. This has shown improvement from last week's levels.**

2. Task #2 – Sub-Slab TCE Concentration Distribution

Weekly readings of sub-slab vapor concentrations were recorded from the vapor pin installations to evaluate the magnitude and variation of sub-slab vapor contamination in the soil. Results include:

- Sub-slab vapor concentrations taken from various locations show a similar trend to previous weeks data.
- More than 75% of the residential units/common areas tested demonstrated lower values than the Vapor Risk Screening Level (VRSL) set forth by WDNR.
- The values of sub-slab TCE can be observed in Appendix D (Table 8). A major hotspot can be observed in the areas between Units 1043 – 1050, extending to the Laundry and Storage Room, which will require additional action.
- The south-west section of the garage continues to indicate a high value of sub-slab TCE coupled with no vacuum making it another area of concern. Soil borings are planned to evaluate the plume delineation in that region.

3. Task #3 – VMS Operations

Blowers 1 – 6 continue to operate at the intended capacity resulting in depressurization in most areas. However, Blower 2 was out of operation over the weekend through 07/11/23 and Blower 7 was out of service due to a mechanical fault. Blower 2 was restored to full service on 7/12/23 and Blower 7 will be replaced next week.

4. Task #4 – Depressurization

The results of vacuum measurements are shown in Table 6. Please note the following:

- The operational issues of Blower 2 and 7 resulted in low vacuum readings in Building 1B – S at the start of the week but were restored later.
- Four additional vapor pins that were installed in the SW and SE Garage areas – 3 in SW Garage and 1 in SE Garage aided the overall understanding of the loss of vacuum in the SW Garage area.

- The vapor pin near the Blower #5 and the pin in the SE Garage demonstrated sufficient vacuum while the other two pins in the SW garage had no vacuum.
- Figure 7 in Attachment E shows the correlation between sub-slab vapor TCE values and the corresponding vacuum levels at all the vapor pin installations. A positive correlation coefficient indicates that presence of higher vacuum would result in lower sub-slab TCE levels giving evidence of the efficient functioning of the VMS system (vacuum readings and sub-slab TCE levels are inversely proportional).
- The decrease in the correlation coefficient can be treated as a temporary skew pending restored functioning of the blowers.

Action Items for Week of July 16, 2023 – July 22, 2023

KSingh plans to perform the following tasks in the upcoming week:

1. Submit work plan for additional remediation to WDNR. The plan includes a combination of source removal, Biochar application, and supplemental radon fan installation.
2. Monitor and complete pilot study on additional sealing of wooden columns using a biochar-alginate compound mix.
3. Conduct soil borings in SW garage to evaluate the plume delineation.
4. Coordinate with Horner Plumbing, Roman Electric, and OBAR for installation of replacement GBR fans.
5. Conduct discrete sampling for units being vacated by residents.
6. Continue discrete sampling in various units and common areas and add results to comprehensive data table.
7. Continue continuous sampling of Units 1045 and 1050.
8. Conduct vacuum measurements at strategic locations within the buildings daily.
9. Continue to measure sub-slab TCE concentrations on a weekly basis to evaluate the performance of the VMS.

Attachments

KSingh has included the following attachments, figures and tables for reference:

- Attachment A: Floor Plan and Summary of Monitoring Results by Date
 - Figure 1 – Floor Plan and Unit Location Map
 - Tables 1-5 – Indoor Air Monitoring Results by Date
- Attachment B/Table 6: Comprehensive Vacuum Measurements (inches H₂O)
- Attachment C/Table 7: Comprehensive Data Table – Indoor Air
- Attachment D/Table 8: Comprehensive Data Table – Sub-Slab Vapor TCE
- Attachment E: Figures 2-7 of TCE Levels through July 14, 2023

Attachment A
Floor Plan and Monitoring Results by Date

East Building Level 1

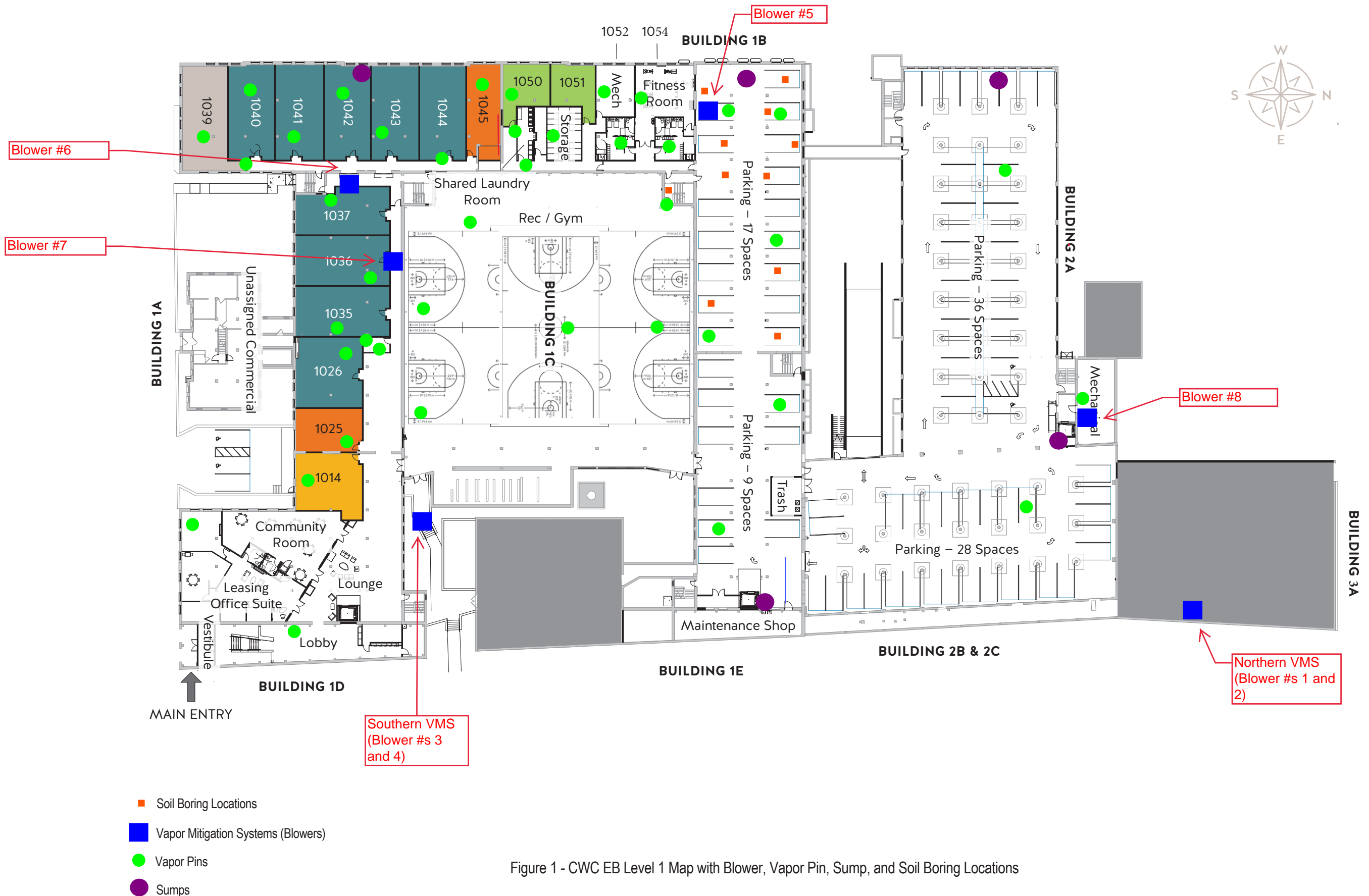


Figure 1 - CWC EB Level 1 Map with Blower, Vapor Pin, Sump, and Soil Boring Locations

Attachment A
Monitoring Results by Date
On-site EPA Method TO-14 Data

Instrument: SRI 8610 Gas Chromatograph with ECD

Operator: KSingh

Table 1: Indoor Air Monitoring Results from 07/10/2023

Sample ID	Sample Location	Sample Time	TCE ($\mu\text{g}/\text{m}^3$)	PCE ($\mu\text{g}/\text{m}^3$)
IA - 1072	1014	13:42	0	ND
IA - 1073	1026	13:51	0	ND
IA - 1074	1035	13:59	0	ND
IA - 1075	1037	14:08	0	ND
IA - 1076	1039	14:16	0	ND
IA - 1077	2040	14:34	0	ND
IA - 1078	2042	8:55	0	ND
IA - 1079	2022	14:48	0	ND
IA - 1080	2025	15:56	0	ND
IA - 1081	2016	15:04	0	ND
IA - 1082	2017	15:17	0	ND
IA - 1083	1st Hallway Center	15:27	0	ND
IA - 1084	2nd Hallway Center	15:36	0	ND
IA - 1085	3rd Hallway Center	15:46	0	ND
Reporting Limit ($\mu\text{g}/\text{m}^3$)			0.6	0.6
ND Indicates Not Detected at listed reporting level				

Table 2: Indoor Air Monitoring Results from 07/11/2023

Sample ID	Sample Location	Sample Time	TCE ($\mu\text{g}/\text{m}^3$)	PCE ($\mu\text{g}/\text{m}^3$)
IA - 1091	2063	9:49	0	ND
IA - 1092	2065	9:56	0	ND
IA - 1093	2068	10:14	0	ND
IA - 1094	2077	10:11	0	ND
IA - 1095	2079	10:20	0	ND
IA - 1096	2116	10:33	0	ND
IA - 1097	2114	10:40	0	ND
IA - 1098	2112	10:49	0	ND
IA - 1099	3109	10:56	0.11	ND
IA - 1100	3079	11:04	0.21	ND
IA - 1101	NE Gym	11:22	0.44	ND
Reporting Limit ($\mu\text{g}/\text{m}^3$)			0.6	0.6
ND Indicates Not Detected at listed reporting level				

Table 3: Indoor Air Monitoring Results from 07/12/2023

Sample ID	Sample Location	Sample Time	TCE ($\mu\text{g}/\text{m}^3$)	PCE ($\mu\text{g}/\text{m}^3$)
IA - 1110	1041	7:55	0.19	ND
IA - 1111	1042	8:03	0	ND
IA - 1112	1044	8:10	1.76	ND
IA - 1113	1051	8:18	0.26	ND
IA - 1114	2014	8:37	0	ND
IA - 1115	2056	8:44	0	ND
IA - 1116	2057	8:52	0	ND
IA - 1117	2058	9:00	0	ND
IA - 1118	2059	9:08	0	ND
IA - 1119	3057	9:19	0	ND
IA - 1120	3062	9:27	0	ND
IA - 1121	3026	9:34	0	ND
IA - 1122	3014	9:42	0	ND
IA - 1123	3021	9:50	0	ND
IA - 1124	3020	9:58	0	ND
IA - 1125	3016	10:06	0	ND
Reporting Limit ($\mu\text{g}/\text{m}^3$)			0.6	0.6
ND Indicates Not Detected at listed reporting level				

Table 4: Sub-Slab Monitoring Results from 07/13/2023

All samples from sub-surface taken from the vapor pins

Sample ID	Sample Location	Sample Time	TCE ($\mu\text{g}/\text{m}^3$)	PCE ($\mu\text{g}/\text{m}^3$)
IA - 1126	1055	13:29	9.89	ND
IA - 1127	1054	13:37	2.23	ND
IA - 1128	1053	13:48	26.5	ND
IA - 1129	Oppo. 1054	13:55	53.3	ND
IA - 1130	Stairwell 4	14:05	14.2	ND
IA - 1131	1052	14:13	4.97	ND
IA - 1132	1051	14:23	12.6	ND
IA - 1133	1049	14:30	2.25	ND
IA - 1134	1048	14:38	556	1.62
IA - 1135	1050	14:47	275	ND
IA - 1136	Out 1050	14:54	72.8	ND
IA - 1137	1045	15:02	222	2.77
IA - 1138	Out 1044	15:10	376	34.6
IA - 1139	1043	15:18	10.7	ND
IA - 1140	1042	15:31	6.43	ND
IA - 1141	1041	15:39	18.8	ND
IA - 1142	1040	15:47	3.83	ND
IA - 1143	1040 - out	15:56	5	ND
IA - 1144	1039	16:04	16.5	ND
IA - 1145	1037	16:11	43.7	17.5
IA - 1146	1036	16:19	6.13	11
IA - 1147	1035	16:27	1.61	ND
IA - 1148	1035 - out	16:35	95.1	3.4
IA - 1149	1058 E	16:43	181	12.1
IA - 1150	1058 W	16:51	3.19	ND
IA - 1151	1026	16:58	14.8	1.99
Reporting Limit ($\mu\text{g}/\text{m}^3$)			0.6	0.6
ND Indicates Not Detected at listed reporting level				

Table 5: Sub-Slab Monitoring Results from 07/14/2023

All samples from sub-surface taken from the vapor pins

Sample ID	Sample Location	Sample Time	TCE (µg/m ³)	PCE (µg/m ³)
IA - 1152	1025	8:09	2.15	ND
IA - 1153	1014	8:18	44.7	4.27
IA - 1154	1011	8:26	0.6	ND
IA - 1155	SE Lobby	8:35	0	ND
IA - 1156	BB 1	8:43	571	68
IA - 1157	BB 2	8:50	43	15.3
IA - 1158	BB 3	8:59	7.5	7.4
IA - 1159	BB 4	9:07	3.37	7.47
IA - 1160	BB 5	9:17	86.5	15
IA - 1161	SW Garage (2)	9:30	317	2.6
IA - 1162	SW Garage (26)	9:38	22.3	ND
IA - 1163	SW Garage (6)	9:46	2.7	ND
IA - 1164	SW Garage (19)	9:54	2.61	ND
IA - 1165	SE Garage (11)	10:05	17.8	ND
IA - 1166	SE Garage (14)	10:04	1.99	0.49
IA - 1167	NW Garage (80)	10:22	21.2	ND
IA - 1168	NE Garage (36)	10:43	6.07	0.98
IA - 1169	N Mech Room	10:53	0.98	ND
IA - 1170	1041	11:01	1.66	ND
IA - 1171	1042	11:09	0.82	ND
IA - 1172	1044	11:17	2.1	ND
IA - 1173	1051	11:28	1.35	ND
IA - 1174	2014	11:48	0.54	ND
IA - 1175	2056	11:55	1.23	ND
IA - 1176	2057	12:04	0.49	ND
IA - 1177	2058	12:14	1.05	ND
IA - 1178	2059	12:21	0.21	ND
IA - 1179	3057	12:32	0.43	ND
IA - 1180	3062	12:41	1.56	ND
IA - 1181	1st FI Hallway South	12:53	0.39	ND
IA - 1182	Stairwell 3	13:01	0.42	ND
IA - 1183	Front Lobby	13:09	0.56	ND
IA - 1184	NE Garage (36)	13:16	0.46	ND
IA - 1185	NE Gym	13:24	0.48	ND
Reporting Limit (µg/m ³)			0.6	0.6
ND Indicates Not Detected at listed reporting level				

Attachment B

Table 6: Comprehensive Vacuum Measurements (inches H₂O)

Note	Obar @ 75%	Obar @ 90%				Average
		10-Jul	11-Jul	12-Jul	13-Jul	
Date	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul	
Time	15:20	10:00	11:00	9:30	8:15	
Location						Average
1055		-0.449	-0.446	-0.449	-0.455	-0.450
1054		-0.926	-0.935	-0.935	-0.961	-0.939
1053		-0.499	-0.496	-0.496	-0.508	-0.500
Oppo. 1054	-0.266	-0.325	-0.308	-0.308	-0.328	-0.307
Stairwell 4	-0.006	0	0	0	0	-0.001
1052		-0.934	-0.915	-0.937	-0.923	-0.927
1051	-0.181	-0.219	-0.22	-0.225	-0.23	-0.215
1049		-0.215	-0.219	-0.215	-0.227	-0.219
1048	-0.061	-0.087	-0.099	-0.086	-0.104	-0.087
1050	-0.076	-0.11	-0.095	-0.101	-0.111	-0.099
Out 1050	-0.104	-0.129	-0.137	-0.139	-0.134	-0.129
1045	-0.041	-0.061	-0.071	-0.051	-0.057	-0.056
Out 1044	-0.112	-0.129	-0.156	-0.14	-0.149	-0.137
1043	-0.017	-0.037	-0.039	-0.036	-0.04	-0.034
1042	-0.016	-0.021	-0.016	-0.018	-0.017	-0.018
1041	-0.035	-0.036	-0.041	-0.045	-0.058	-0.043
1040	-0.044	-0.041	-0.043	-0.047	-0.052	-0.045
Out 1040	-0.063	-0.059	-0.079	-0.081	-0.084	-0.073
1039	-0.016	0	-0.013	-0.013	-0.01	-0.010
1037	-0.01	0	0	0	0	-0.002
1036	-0.005	0	0	0	-0.013	-0.004
1035	-0.001	0	0	0	-0.01	-0.002
Out 1035	0	0	0	0	0	0.000
1058 E	-0.005	0	0	-0.013	-0.014	-0.006
1058 W	-0.004	0	-0.009	-0.014	-0.018	-0.009
1026	-0.009	-0.01	-0.021	-0.023	-0.02	-0.017
1025	-0.005	-0.011	-0.029	-0.042	-0.038	-0.025
1014	-0.055	-0.061	-0.212	-0.219	-0.202	-0.150
1011	-0.011	-0.018	-0.062	-0.061	-0.054	-0.041

SE Lobby	-0.181	-0.19	-0.612	-0.605	-0.573	-0.432
BB 1	0	0	-0.019	-0.018	-0.004	-0.008
BB 2	0	0	-0.013	-0.011	0	-0.005
BB 3	-0.009	-0.013	-0.056	-0.039	-0.045	-0.032
BB 4	0	0	-0.013	-0.012	0	-0.005
BB 5	0	0	-0.017	-0.025	-0.02	-0.012
SW Garage (2)	0	0	0	0	0	0.000
SW Garage (26)	-0.301	-0.302	-0.308	-0.305	-0.302	-0.304
SW Garage (6)	0	0	0	0	0	0.000
SW Garage (19)	0	0	-0.005	0	0	-0.001
SE Garage (11)	-0.019	-0.022	-0.031	-0.023	-0.026	-0.024
SE Garage (14)	-0.036	-0.043	-0.06	-0.041	-0.039	-0.044
NW Garage (80)	-0.035	-0.036	-0.039	-0.033	-0.019	-0.032
NE Garage (36)	-1.599	-1.618	-1.615	-1.6	-1.61	-1.608
N Mech Room	0	0	0	0	0	0.000
Red highlighted cells indicate values below the desired level on -0.01 inH2O						

Attachment C
Comprehensive Data Table – Indoor Air

Attachment D
Table 8: Comprehensive Data Table – Sub-Slab Vapor TCE

Green cells indicate the VRSL levels below the DNR limit of 70 ug/m3							
Location	Location Reference	Week Ending					
		6/3/23	6/17/23	6/24/23	7/1/23	7/8/23	7/15/23
1055	Women's Locker Room		46.5	17.3	13.5	25.8	9.89
1054	Fitness Room	596	0.8	4.8	0.483	2.6	2.23
1053	Men's Locker Room		102.3	71.31	55.7	76.2	26.5
Oppo. 1054			58.9	55.6	46.9	48.2	53.3
Stairwell 4			252.5	6.3	27.4	22.1	14.2
1052	Mechanical Room		63.9	38.1	14.9	5.96	4.97
1051			47.3	32.4	22.7	25.8	12.6
1049	Storage Room	426	2.6	3.38	1.76	2	2.25
1048	Laundry Room	322	679	572	561	637	556
1050		1443	303.4	377	265	283	275
Out 1050		971	113.1	10.1	64.1	46.3	72.8
1045		750	271.6	206	253	238	222
Out 1044		456	380.5	364	419	205	376
1043			178.5	185	7.92	14.3	10.7
1042		11.8	15.93	10.4	2.67	1.22	6.43
1041			108.7	13.2	4.48	4.24	18.8
1040		1.6	11.7	16.1	3.22	1.13	3.83
1040 - out				21.3	3.1	10.3	5
1039		23.5	62.2	4.3	15.2	23.8	16.5
1037			240.4	4.3	11.04	50.1	43.7
1036			17.2	5.5	2.85	10.2	6.13
1035			0.8	7	0.534	1.4	1.61
1035 - out			87	55.4	73.2	98.9	95.1
1058 E	Electric Room		433.8	1.5	87	307	181
1058 W	Electric Room		73.3	6.99	0.1	5.3	3.19

1026			16.7	6.6	7.39	20.8	14.8
1025			2.2	2.1	1.01	10.5	2.15
1014			23.9	2.2	21.2	124	44.7
1011	Conference Room		17.5	1.6	1.5	5.24	0.6
SE Lobby	Near Exit	328	0.46	0.5	0.1	0.37	0
BB 1	SW of the Gym			73	25.1	553	571
BB 2	South part of the Gym		30.8	1.5	286	65	43
BB 3	SE part of the Gym		2.2	1.6	0.733	1.05	7.5
BB 4	N of the Gym		2.6	1.9	0.569	0.77	3.37
BB 5	Center of the Gym		58.9	1.9	27.5	87	86.5
SW Garage (2)			227.4	63.7	300	307	317
SW Garage (26)						24.3	22.3
SW Garage (6)						43.9	2.7
SW Garage (19)						7.49	2.61
SE Garage (11)						49.5	17.8
SE Garage (14)			10.3	1.6	1.24	2.02	1.99
NW Garage (80)			141.5	4.7	12.7	27.2	21.2
NE Garage (36)			24.8	2.8	9.87	13	6.07
N Mech Room			60.2	147	27.07	18.7	0.98

Attachment E Figures of TCE Levels through July 14, 2023

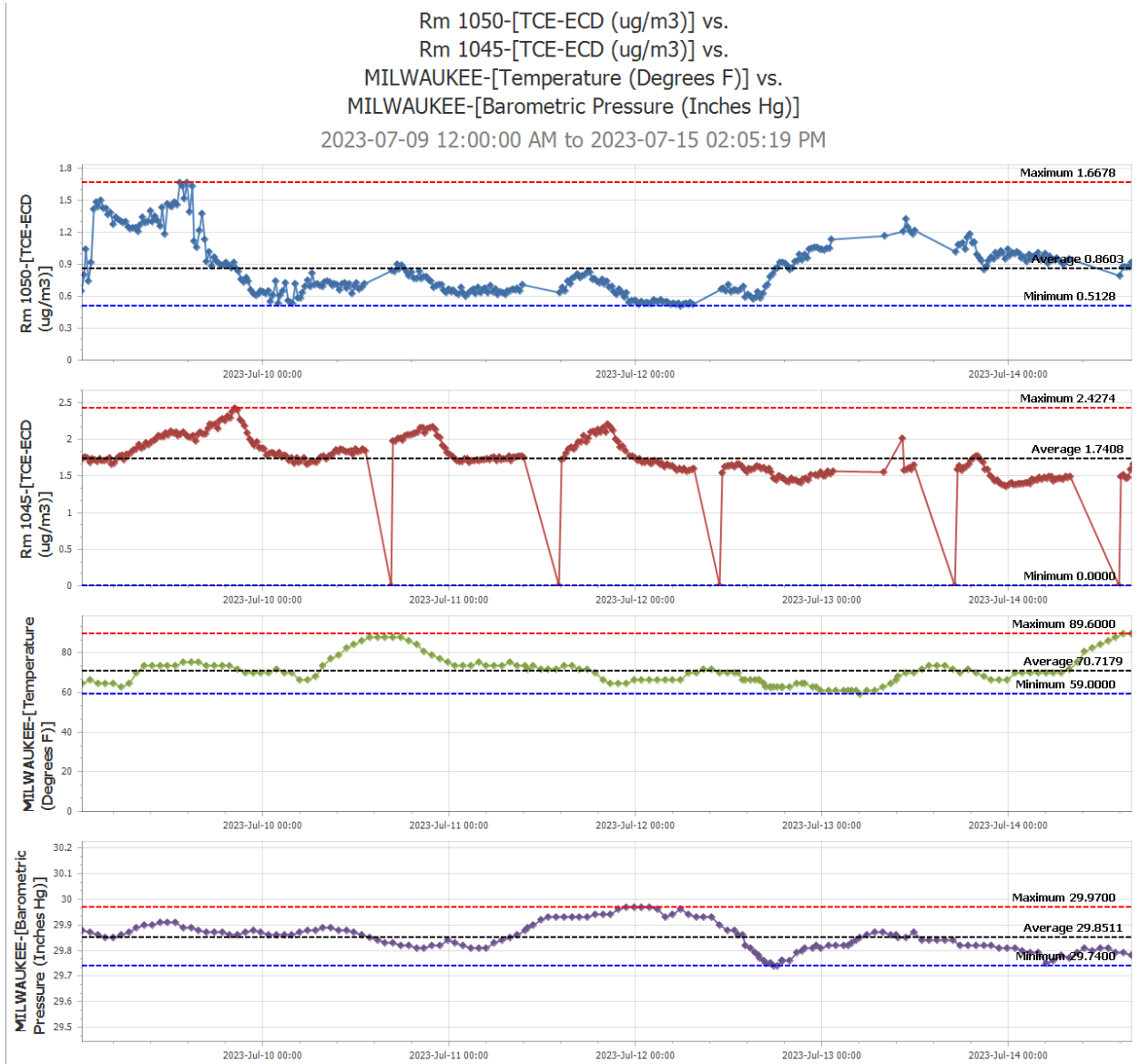


Figure 2 – Continuous Monitoring Data for Units 1045 and 1050

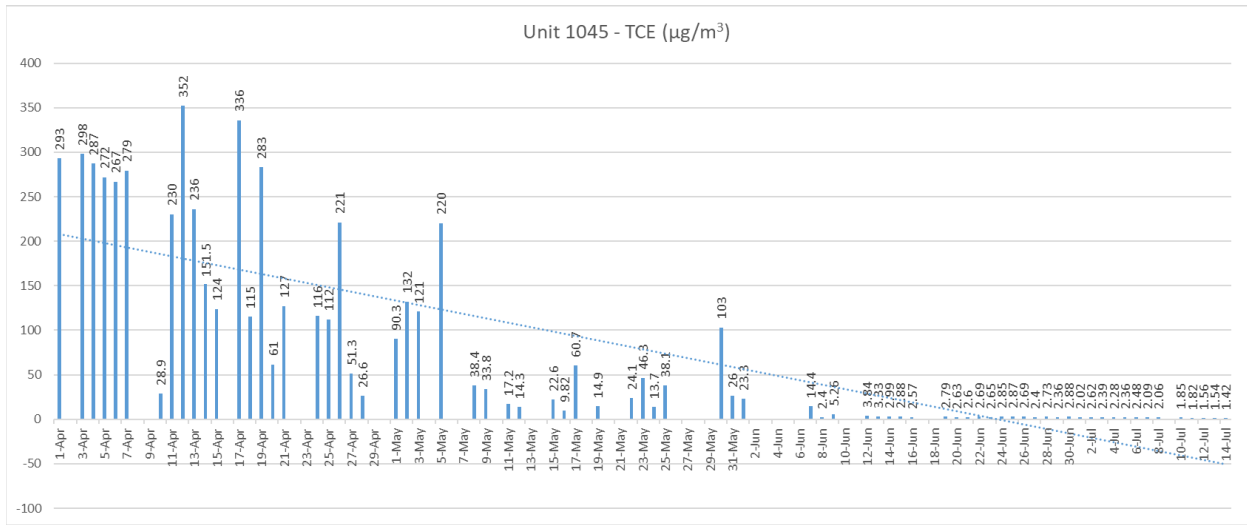


Figure 3 – YTD Data of TCE Concentration in Unit 1045

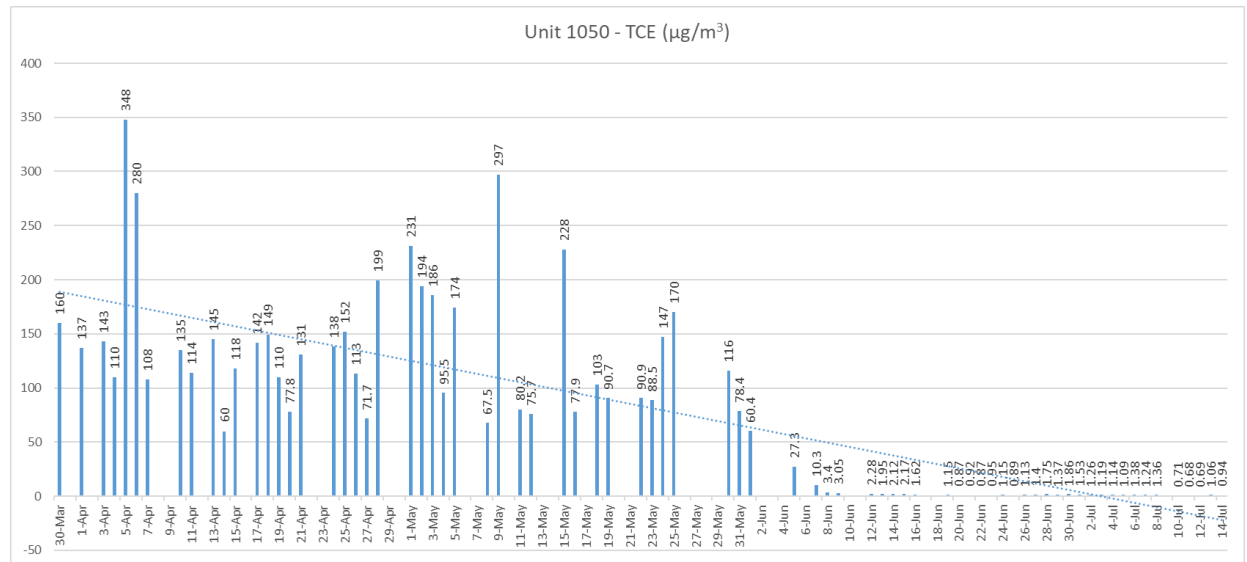


Figure 4 – YTD Data of TCE Concentration in Unit 1050

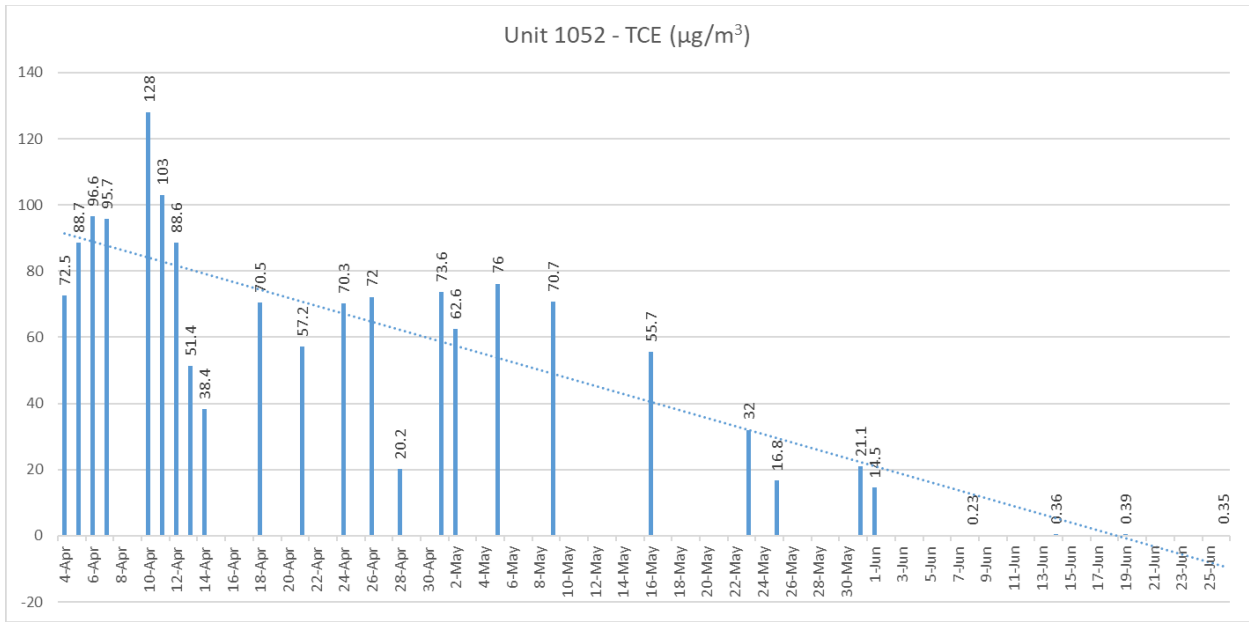


Figure 5 – YTD Data of TCE Concentration in Unit 1052

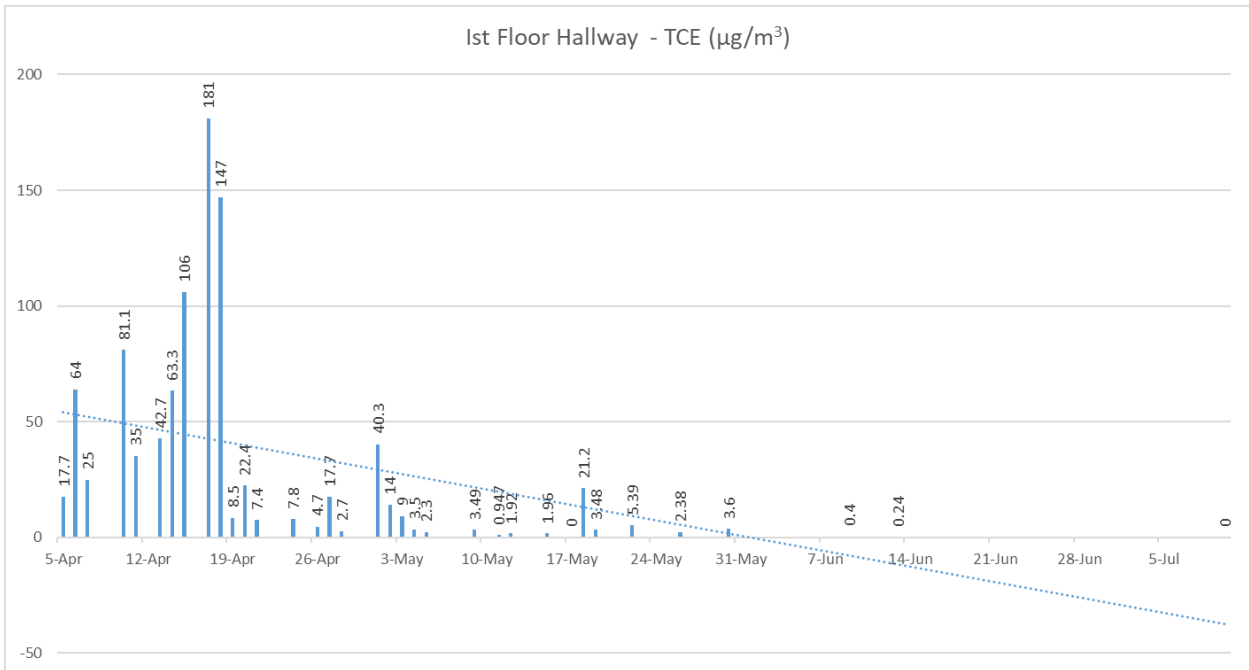


Figure 6 – YTD Data of TCE Concentration in 1st Floor Hallway

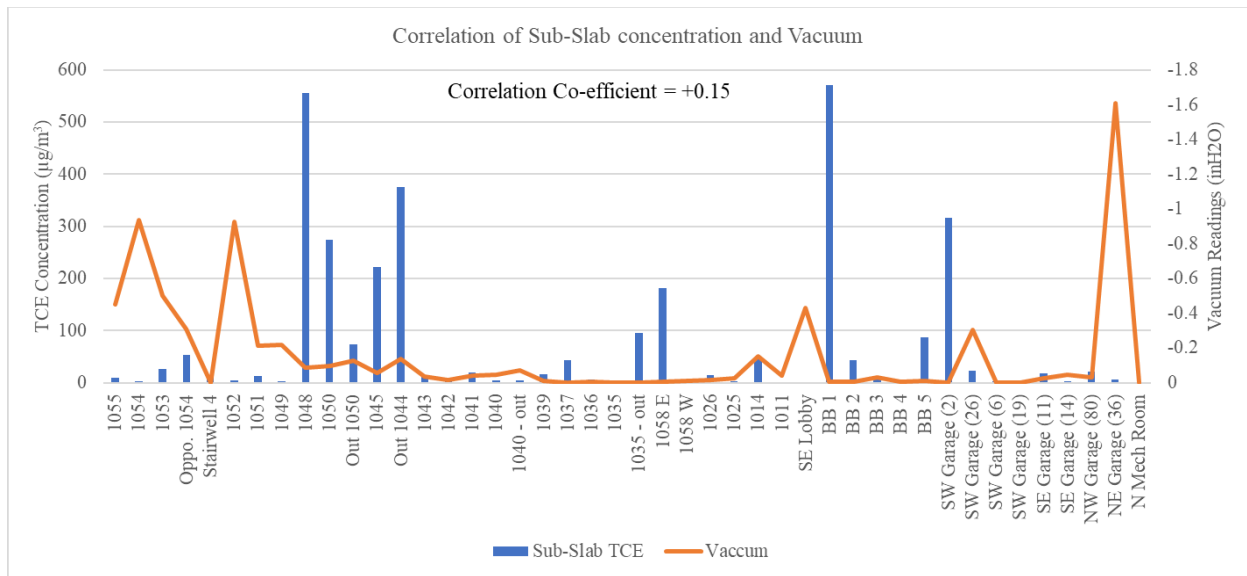


Figure 7 – Correlation of TCE Concentration with Vacuum Measurements