Vapor Intrusion Interim Measures Quarterly Report No. 11

Chamberlain Manufacturing Corporation
Former Facility at
550 Esther Street
Waterloo Iowa
EPA Docket Nos.
RCRA-07-2010-002
CERCLA-07-2010-0005

April 30, 2014
Terracon Project No. 05149070

Prepared for:
Chamberlain Manufacturing Corporation
Elmhurst, Illinois

Prepared by:
Terracon Consultants, Inc.
Omaha, Nebraska

Terracon

April 30, 2014

United States Environmental Protection Agency
Region 7 - Air and Waste Management Division
11201 Renner Blvd
Lenexa, Kansas 66219

Attn: Mr. Bruce Morrison

Re: Vapor Intrusion Interim Measures Quarterly Report No. 11
Chamberlain Manufacturing Corporation
Former Facility at 550 Esther Street
Waterloo, Iowa
EPA Docket Nos. RCRA-07-2010-002 and CERCLA-07-2010-0005

Dear Mr. Morrison:

Terracon Consultants, Inc. (Terracon) is pleased to submit this Vapor Intrusion Interim Measures (VIIM) Quarterly Report for activities conducted between January 1, 2014 and March 31, 2014 in conjunction with the site referenced above. The VIIM Quarterly Report presents a summary of activities related to the installation, operation, and monitoring of vapor mitigation systems in residential structures as requested by the USEPA. This report also presents analytical results from a routine indoor air quality sampling event.

Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,

Terracon Consultants, Inc.

Michael E. Hagemeister, P.E.*
Senior Principal
**Licensed in NE*

Nancy Martin for David M. Svingen, P.E.
Senior Principal
Iowa No. 11802

MEH/DMS:meh/nlm

Distribution: Addressee (1 bound)

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ACRONYMS & ABBREVIATIONS

CERCLA ..... Comprehensive Environmental Response, Compensation, and Liability Act
City ..... City of Waterloo
COC ..... Chain of Custody
EPA ..... Environmental Protection Agency
Facility ..... Chamberlain Manufacturing facility
HASP ..... Health and Safety Plan
HVAC ..... Heating, Ventilating, and Air Conditioning
IAQ ..... Indoor Air Quality
NELAC ..... National Environmental Laboratory Accreditation Conference
PCE ..... Tetrachloroethene (or Perchloroethene)
PID ..... Photoionization Detector
ppm ..... parts per million
QA ..... Quality Assurance
QAM ..... Quality Assurance Manual
QAPP ..... Quality Assurance Project Plan
QC ..... Quality Control
RCRA ..... Resource Conservation and Recovery Act
RSL ..... Regional Screening Level
SOP ..... Standard Operating Procedure
SOW ..... Statement of Work
TCE ..... Trichloroethene
TestAmerica ..... TestAmerica, Inc.
TSOP ..... Terracon Standard Operating Procedure
UAO ..... Unilateral Administrative Order
USEPA ..... United States Environmental Protection Agency
VIC ..... Vapor Intrusion Characterization
VIIM ..... Vapor Intrusion Interim Measures
VMS ..... Vapor Mitigation System
VOC ..... Volatile Organic Compound

VAPOR INTRUSION INTERIM MEASURES
QUARTERLY REPORT NO. 11
CHAMBERLAIN MANUFACTURING CORPORATION
FORMER FACILITY AT
550 ESTHER STREET
WATERLOO, IOWA

Terracon Project No. 05149070
April 30, 2014

1.0 INTRODUCTION

Terracon has developed this VIIM Quarterly Report to identify interim remedial measures completed in residential structures in which vapor concentrations related to shallow groundwater contamination from the former Chamberlain Manufacturing Facility (Facility) exceed indoor air screening levels for the period of January 1, 2014 through March 31, 2014. This VIIM Quarterly Report is submitted in accordance with the requirements of the UAO, Docket Nos. RCRA 07-2010-002 and CERCLA 07-2010-005 dated April 20, 2010, and Task IA of the SOW attached to the UAO. Capitalized terms not defined herein have the definitions set forth the in the UAO or the SOW.

This VIIM Quarterly Report also provides a summary of indoor analytical results that have been obtained from the residences sampled during the period from January 1, 2014 through March 31, 2014. The residences sampled this period have not required the installation of vapor mitigation based on concentrations observed at these properties or the resident (Residence No. 73) previous preference to continue monitoring.

1.1 Site Conditions

The Facility is an irregularly shaped parcel containing approximately 22.8 acres and located at 550 Esther Street in Waterloo, Iowa. A Topographic Vicinity Map is included as Exhibit 1, Appendix A. A Site Diagram is included as Exhibit 2, Appendix A.

The Facility manufactured metal washer wringers and projectile metal parts from approximately 1919 until 1996 when it was sold to Atlas Warehouse L.C. for use as a storage facility. The Facility was subsequently abandoned and is currently vacant. The City of Waterloo (City) acquired the Facility from Atlas Warehouse L.C in 2005 in an effort to facilitate redevelopment and has demolished a significant portion of the Facility, including the removal of hard surface paving. As of April 21, 2014, significant regrading is apparent at the site but Vieth

(subcontractor to the city for the site demolition) had trailers and equipment staged at the property.

The Facility is zoned Heavy Industrial (M-2) by the City. The Facility is adjoined by park land to the north and south, single family residential housing to the west, and Virden Creek followed by a golf course to the east. Virden Creek is within approximately 100 feet of the Facility at its closest point. Gates Park adjoins the Facility to the north across Louise Street, to the east across Virden Creek, and to the south across the railroad tracks. Single family residences are located across East 4th Street to the west of the Facility. Single family residences are also located along the east side of East 4th between Anita and Louise Streets.

1.2 Previous Assessment Activities

Beginning in 2004, the City conducted an environmental assessment of the site using a USEPA Brownfields Grant. Results of assessment activities identified impacts to soil and groundwater at the site including a chlorinated solvent plume that extends offsite to the south and west. Site assessment activities were not completed due to funding restrictions of the Brownfields Grant program.

Subsequently, environmental assessment activities of onsite soil and groundwater conditions and the offsite chlorinated solvent plume were conducted by Chamberlain. The lateral extent of the chlorinated solvent plume extends south and west from the Facility into an area of residential development. The USEPA's preliminary evaluation identified the potential for vapor intrusion into residential structures based on the vapor intrusion to indoor air pathway resulting from the groundwater contaminant plume.

To further evaluate the vapor intrusion pathway, the USEPA conducted subslab vapor sampling of selected residences in November 2008. Due to problems with the sampling and analysis equipment, the sampling activities were repeated in April and May 2009. Subslab vapor samples were collected from ten homes located along and near East 4th Street and analyzed for VOCs. In addition, one indoor air sample was collected from one of the ten homes. The results of sampling activities identified PCE and TCE in excess of subslab vapor screening levels. The elevated concentrations were generally located within the 2200, 2300, and 2400 block of East 4th Street.

In accordance with the approved VIC Work Plan, Terracon initially conducted vapor intrusion characterization at 22 residences that responded with completed Sampling Request Forms and Access Agreements from both the property owner and current renter. Initial subslab, indoor air, and ambient air sampling was conducted between April 25, 2011 and May 3, 2011. Additional indoor air samples were collected from four residences on June 16, 2011, and from one residence on September 14, 2011. Based on the analytical results, the reported concentrations of indoor air samples in seven residences were greater than the applicable indoor air screening

levels. Subslab and indoor air sample results were presented in the VIC Report dated July 5, 2011.

In accordance with the approved VIC Report, Terracon offered vapor sampling to 14 additional residences located on the west side of the 300 block of Boston Avenue and the east side of the 400 block of Boston Avenue. Terracon also reoffered vapor sampling to those residences that did not respond to previous submittals and contacted residences that requested sampling through the USEPA or that had previously authorized sampling, but could not be reached to schedule an appointment. Supplemental subslab, indoor air, and ambient air sampling was conducted at nine residences between December 12, and December 14, 2011. Analytical results for subslab samples collected from two residences exceeded subslab screening levels and as such, additional indoor air samples were collected at these locations on March 23, 2012. Analytical results for supplemental sampling activities were submitted to the USEPA on April 19, 2012. During the second quarter 2012, indoor air samples were collected at Residences 48 and 73 and were reported in Terracon's July 19, 2012, VIIM Quarterly Report No. 4.

Terracon has been conducting routine indoor air sampling of select homes consistent with the requirements of the UAO and July 5, 2011 VIC Report. In addition to indoor air sampling, Chamberlain has periodically checked required vapor mitigation systems for proper operation. Results of this work has been summarized in Terracon's Quarterly VIIM reports. This report covers the period of January 1, 2014 to March 31, 2014.

1.3 Project Objectives

The objective of this VIIM Quarterly Report is to present the information required by Section 4.0 of the approved VIIM Work Plan dated October 14, 2010, revised on August 1, 2011, and amended July 19, 2011. This information includes system design "as-builts," information on the expected operational life of the system, a recommendation for the frequency for monitoring and maintaining the system, criteria for determining its effectiveness, a schedule for system replacement in whole or in part (as appropriate), the frequency of system inspection by the Respondent, the results of post-installation system monitoring and any approved deviations from the approved VIIM Work Plan.

2.0 SCOPE OF SERVICES

The scope of services for the First Quarter 2014 period included the following services:

- Conducting an indoor air monitoring event at residences No. 20, 33, 38, 40, 47, 48, 60, 73, and 76.

2.1 Site Access

2.1.1 Indoor Air Quality Sampling Activities

Residents were contacted at least 48 hours in advance of sampling to arrange a time and date for conducting the proposed activities. Residents provided access to collect routine indoor air samples.

2.1.2 Routine Mitigation System Inspections

Routine mitigation system inspections were not required this period. However, Terracon knocked on the door of Residence No. 4 (access has not been available due to change in tenants) and the tenant provided ownership information and their name to the Terracon professional to contact in the future. In addition, the tenant allowed Terracon to check the mitigation system for proper operation. However, the tenant would not allow indoor air sampling without formal approval by the owner.

2.2 Mitigation Determination

During the 1st quarter of 2014, indoor air samples were collected from nine residences. The results of Residence No. 73 exceeded indoor air screening level for TCE. The USEPA has previously offered a mitigation system to Residence No. 73 but the homeowner elected to have continued routine indoor air monitoring. Based on sampling activities this period and the stated preference of Residence No. 73, no residences are proposed to have mitigation systems installed. The remaining homes sampled had results that were below indoor air screening levels for each chemical of concern. This includes the results from Residence No. 38 for both the basement and first floor samples.

3.0 PROCEDURES FOR SYSTEM DESIGN, INSTALLATION AND COMMISSIONING

Vapor mitigation systems were not designed, installed, commissioned or decommissioned during the 1st calendar quarter of 2014.

4.0 COMPLETED SYSTEM INSTALLATIONS

Interim mitigation systems were previously offered to, accepted by, and installed at eight residences. Interim mitigation systems were subsequently shut off at three residences. System installations were not conducted during the 1st calendar quarter of 2014.

5.0 COMPLETED SYSTEM INSPECTION AND REPAIR

In accordance with the approved VIIM Work Plan, system inspections are to occur on an annual basis following installation through the period of required operation. The purpose of the site inspection is to check each operating system for general condition using visual observation. The inspection includes checking for: proper operation of the blower, possible cracks or disconnections in visible piping, piping attachments, and checking manometer to confirm system vacuum. The next routine system inspections period is scheduled for August/September 2014 at Residence Nos. 4, 22, 28, 45, and 46.

The tenant at Residence No. 4 provided access on February 25, 2014 to conduct an inspection. An inspection of the system at Residence No, 4 was not conducted in 2012 or 2013 because of unsuccessful attempts of trying to reach the tenant of the home (tenant had changed). Since an inspection had not been completed at Residence No. 4 in more than two years, Terracon performed an inspection on this date. Based on observations, the system at Residence No.4 was noted to be in good repair for the above items and appeared to be operating as intended with a vacuum reading of 3.3 inches of water. A field inspection form was completed by the field professional during the inspection visit and signed by tenant. A copy of the form is included in Appendix D.

6.0 INDOOR MONITORING RESULTS

6.1 Sampling Activities

Indoor air sampling was conducted at No. 20, 33, 38, 40, 47, 48, 60, 73, and 76 on February 26 and February 27, 2013. These residences do not have active mitigation systems. These residences are subject to a routine annual monitoring schedule per the USEPA approved VIC Report where sub-slab concentrations exceed sub-slab screening levels, but indoor air concentrations are below indoor air screening levels. Since there had been a sampling event in September 2013, the 3rd Quarter 2013 VIIM Report (October 31, 2013) indicated that the next major IAQ sampling event would occur in September 2014. Mr. Morrison indicated in a November 13, 2013 letter to move the next sampling event to January/February 2014. As such, a major sampling event was conducted in February 2014 with the next major IAQ event scheduled to occur in January/February 2015.

Indoor air samples were collected using laboratory prepared 6-liter Summa canisters and flow controllers. The flow controllers were pre-set by the laboratory to collect samples over a 24-hour period. Terracon requested that occupants close doors and windows and operate the HVAC system for the period beginning 24-hours prior to the start of sample collection to the end of sample collection.

Consistent with VIC activities and in accordance with the EPA approval letter dated January 6, 2011, indoor air sampling was conducted in the basement and in the lowest occupied living area of each residence. A finished basement is considered to be an occupied living space. Terracon attempted to position sample containers in the same general location used for previous indoor air sampling.

Terracon field personnel connected the flow controller to the Summa canister by removing the brass cap on the canister and tightening the stainless steel Swagelok fitting on the flow controller to the threads on the canister. A wrench was used to firmly tighten the fitting.

Once sample containers were positioned, pertinent information on the air sampling forms (i.e. project information, equipment identifiers, sample location, and start time) was entered and the forms were attached to the canisters. A Soil Vapor/Indoor Air Sampling Information Form indicating appropriate project and sample collection information was executed for each indoor air sample. A chain-of-custody indicating the collection date and times for each sample was also executed and maintained throughout the sampling event.

To open the canister, the valve was rotated counter-clockwise at least one full turn or otherwise opened. Approximately 24-hours after opening the canisters, Terracon personnel returned to the residences, closed the valve on each canister and recorded the time and vacuum remaining in the Summa canister on the Terracon sampling forms and on the chain-of-custody. The canisters and flow controllers were then transported to the laboratory.

Indoor air monitoring activities are summarized in Table 6-1.

Table 6-1 Semiannual Indoor Air Monitoring

Residence No.	Sample Date	Basement Sample	1st Floor Sample
20	02/26/14	X	---[1]
33	02/26/14	X	X
38	02/26/14 and 02/27/14	X[2]	X[2]
40	02/26/14	X	X
47	02/26/14	X	X
48	02/26/14	X	X
60	02/26/14	X	X
73	02/27/14	X	---[1]
76	02/26/14	X	---[1]

[1] – Basement contains a finished family room; therefore, the basement is the lowest occupied level. Per the USEPA letter of January 6, 2011, sampling is not required on the first floor.

[2] – Canisters were installed on the first floor and in the basement samples of Residence No. 38 to collect samples on February 26, 2014. Due to a faulty flow controller on the canister, the basement sample was recollected on February 27, 2014.

6.2 Indoor Air Monitoring Results

Indoor air samples were collected using 6-liter Summa canisters. The Summa canisters were submitted for analysis of PCE, TCE, vinyl chloride, trans-1,2-dichloroethene (trans-DCE), cis-1,2-dichloroethene (cis-DCE), 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-trichloroethane (TCA), and 1,1,2- trichloroethane, using EPA Method TO-15. Blind duplicates were collected from Residence No. 73 and Residence No. 38 (first floor). The blind duplicate results were comparable with the actual samples. The data has been reviewed and validated in accordance with the USEPA-approved QAPP and is considered valid for use.

Laboratory procedures were conducted by TestAmerica of Knoxville, Tennessee. TestAmerica is NELAC accredited for the laboratory methods referenced above. The laboratory QAM is on file with the USEPA. A copy of the SOPs for the specified method was included as Appendix F of the VIC Work Plan. The TestAmerica data is reported in accordance with the QAM and SOP. Results of indoor air monitoring activities conducted over this current period are summarized in Table 1, Appendix B. Copies of analytical reports for samples collected over this period are provided on the CD in Appendix C.

The analytical results for air samples collected at residence Nos. 20, 33, 38, 40, 47, 48, 60, and 76 had reported concentrations that were below applicable thresholds established in the VIC Work Plan and subsequent USEPA-approved modifications. As such, the installation of additional vapor mitigation systems is not required at these residences based on analytical results covered under this report.

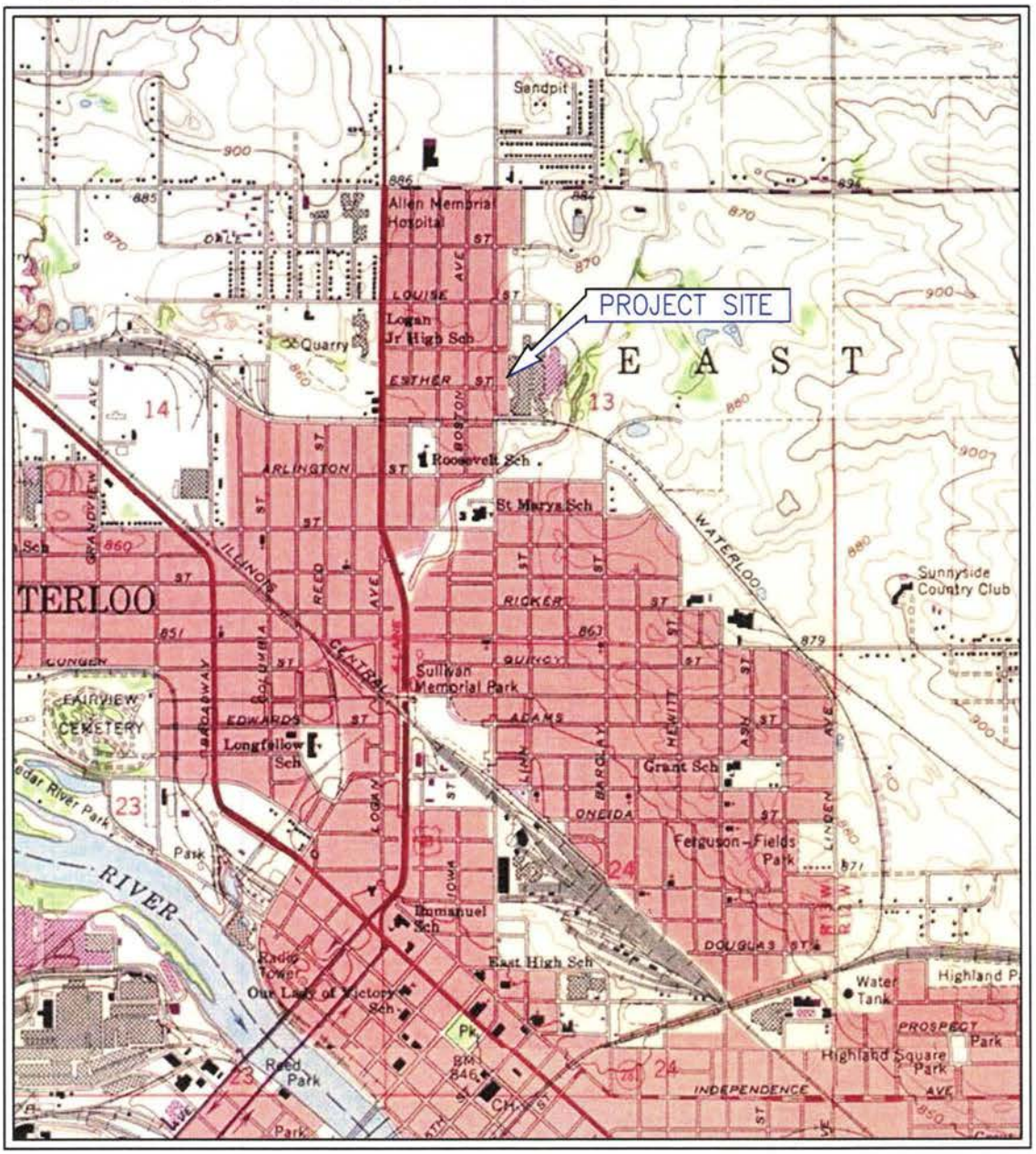
The air samples collected from the basement and first floor of residence No. 38 were below applicable thresholds. In September 2013, the TCE result in the first floor sample was above but the basement sample was below the TCE threshold. With this current result, Terracon recommends a routine annual sampling schedule for Residence No. 38.

The air sample collected at residence No. 73 exceeded the applicable threshold for TCE. The resident has previously been offered a mitigation system but elected continued routine semi-annual monitoring. In accordance with the resident's previous preference for continued monitoring, Terracon intends to continue with routine semi-annual indoor air monitoring at this time.

Since the annual monitoring event was conducted in February 2014, the fall 2014 sampling event will be limited to Residence No. 73. Residence No. 4 will also be sampled for IAQ in the fall of 2014 should access be granted by the tenant and homeowner.

Appendix A

UNITED STATES – DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY



SCALE 1:24,000

1 0 .5 0 KILOMETERS 1 2

1000 0 METERS 1000 2000

1 .5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

N

WATERLOO NORTH, IOWA
QUADRANGLE
1972
7.5 MINUTE SERIES (TOPOGRAPHIC)

Project Mngr: MEH	Project No: 05149070	Terracon Consulting Engineers and Scientists	SITE LOCATION TOPOGRAPHIC MAP
Drawn By: PAI	Scale: AS SHOWN	15080 A CIRCLE OMAHA, NE 68144	VIIM QUARTERLY REPORT NO. 11
Checked By: MEH	File No: 05149070C01	PH: (402) 330-2202 FAX: (402) 330-7606	FORMER CHAMBERLAIN MANUFACTURING FACILITY
Approved By: DMS	Date: 4/25/14		550 ESTHER STREET
			WATERLOO IOWA

EXHIBIT 1

P:\2014\05149070\PROJECT DOCUMENTS (Reports-Letters-Drafts To Clients)\Diagrams-Drawings-Figures\05149070C01.dwg Layout: TOPO 4/25/2014 10:49 AM

RES.

RES.

RES.

RES.

LOUISE STREET

RES.

RES.

	71
	70
	67
	66
	64
	63
	61
	58
	57

72	
69	
68	
65	
62	
60	
59	
56	

ANITA STREET

RES.

SHERMAN AVENUE

RES.

BOSTON AVENUE

86	55
85	54
84	53
83	52
82	51
81	50
80	49
79	

EAST 4TH STREET

ESTHER STREET

RES.	78
	77
	76
	75
	74
	73

33	9	48
32		47
31		46
30		45
29		44
28		

HANOVER STREET

	27
	25
	23
	21
	18
	17
	15
	12
	10
2	3

26		43
24		42
22		41
20		40
19		39
16		38
14		37
13		36
11		35
6	7	34
		8

EAST ARLINGTON STREET

RES.

1

4

5

VIRDEN CREEK

GATES PARK

APPROXIMATE WESTHERN FENCE BOUNDARY

WATERLOO RAILROAD

LESTHER STREET

RES.

LINN ST.

RES.

CHARLES STREET

N

0 100 200 400

SCALE IN FEET

NOTE: SITE FEATURES (SHOWN IN LIGHT GRAY AT THE SITE) WERE DEMOLISHED BY THE CITY OF WATERLOO. THE BUILDINGS, RAIL AND A MAJORITY OF THE CONCRETE HAVE BEEN REMOVED WITH SITE GRADING AS WELL. CONTRACTOR EQUIPMENT IS STILL ON SITE. OBSERVATIONS MADE AS OF APRIL 21, 2014.

LEGEND

40 — RESIDENCES INCLUDED IN STUDY AREA WITH ID NUMBER

REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
15080 A CIRCLE OMAHA, NE 68144
PH. (402) 330-2202 FAX. (402) 330-7606

SITE PLAN

VIIM QUARTERLY REPORT NO. 11

FORMER CHAMBERLAIN MANUFACTURING FACILITY

550 ESTHER STREET

WATERLOO IOWA

EXHIBIT

PROJECT MGR:	MEH
DRAWN BY:	PAI
APPVD. BY:	DMS
SCALE:	AS SHOWN
DATE:	4/25/14
PROJECT NO.	05149070
FILE NAME:	05149070C01
SHEET NO.:	2 OF 2

Appendix B

TABLE 1
INDOOR AIR ANALYTICAL RESULTS
1st Quarter 2014
VAPOR INTRUSION INTERIM MEASURES QUARTERLY REPORT NO. 11
CHAMBERLAIN MANUFACTURING

	Sample ID	IA-B-20-6[5]	IA-I-33-6	IA-B-33-6	IA-1-38-6	Dup # 1 (IA-1-38-6)	IA-B-38-6	IA-1-40-6	IA-B-40-6	IA-1-47-5	Reporting Limit	Analytical Method Detection Limit	Indoor Air Screening Level [2]
	Date	2/26/2014	2/26/2014	2/26/2014	2/26/2014	2/26/2014	2/27/2014	2/26/2014	2/26/2014	2/26/2014			
Analyte	**Units**												
1,1,1-Trichloroethane	µg/m^3	0.47 J	0.080 J	0.12 J	0.068 J	0.066 J	<0.065	<0.065	<0.065	<0.065	0.44	0.065	5200
1,1,2-Trichloroethane	µg/m^3	<0.23	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	0.44 [1]	0.11	0.15
1,1-Dichloroethane	µg/m^3	<0.081	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.32	0.04	1.5
1,1-Dichloroethene	µg/m^3	<0.11	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	0.32	0.056	210
cis-1,2-Dichloroethene	µg/m^3	<0.19	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	0.32	0.095	63
Tetrachloroethene	µg/m^3	<0.22	<0.11	1.0	<0.11	0.12 J	<0.11	0.26 J	0.34 J	0.12 J	0.54	0.11	9.4 [3]
trans-1,2-Dichloroethene	µg/m^3	<0.16	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	0.32	0.079	63
Trichloroethene	µg/m^3	<0.15	0.20 J	0.33	0.19 J	0.18 J	0.11 J	0.15 J	0.23	0.19 J	0.21	0.075	0.43 [4]
Vinyl chloride	µg/m^3	<0.15	<0.074	<0.074	<0.074	<0.074	<0.074	<0.074	<0.074	<0.074	0.2 [1]	0.074	0.165

	Sample ID	IA-B-47-5	IA-1-48-7	IA-B-48-7	IA-I-60-5	IA-B-60-5	IA-B-73-5	Dup # 2 (IA-B-73-5)	IA-B-76-4	Reporting Limit	Analytical Method	Indoor Air Screening
	Date	2/26/2014	2/26/2014	2/26/2014	2/26/2014	2/26/2014	2/27/2014	2/27/2014	2/26/2014			
Analyte	**Units**											
1,1,1-Trichloroethane	µg/m^3	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065	<0.065	0.44	0.065	5200
1,1,2-Trichloroethane	µg/m^3	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	<0.11	0.44 [1]	0.11	0.15
1,1-Dichloroethane	µg/m^3	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.32	0.04	1.5
1,1-Dichloroethene	µg/m^3	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	<0.056	0.32	0.056	210
cis-1,2-Dichloroethene	µg/m^3	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	<0.095	0.32	0.095	63
Tetrachloroethene	µg/m^3	<0.11	2.4	3.3	<0.11	<0.11	0.16 J	0.15 J	<0.11	0.54	0.11	9.4 [3]
trans-1,2-Dichloroethene	µg/m^3	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	0.32	0.079	63
Trichloroethene	µg/m^3	0.13 J	0.14 J	0.36	0.076 J	0.090 J	0.89	0.88	0.12 J	0.21	0.075	0.43 [4]
Vinyl chloride	µg/m^3	<0.074	<0.074	<0.074	<0.074	<0.074	<0.074	<0.074	<0.074	0.2 [1]	0.074	0.165

NOTES: µg/m3 - micrograms per cubic meter
ppm - parts per million
J - The contaminant is present at a concentration greater than the Analytical Method Detection Limit, but less than the Reporting Limit.
[1] - Indoor Air Screening Level is less than Reporting Limit. The USEPA has approved the use of the Reporting Limit as the screening level for this site due to the technical inability to accurately quantify the detection of these compounds at the current USEPA screening level.
[2] - Per USEPA approved VIC Work Plan
[3] - Revised Action Threshold for PCE per USEPA e-mail dated February 17, 2012
[4] - Revised per USEPA's letter dated October 27, 2011 and as an accommodation to USEPA without waiver of Chamberlain's concerns expressed in its email to USEPA dated November 14, 2011.

SAMPLE ID NOMENCLATURE: First 2 letters identify sample type: SS - Sub-Slab, IA - Indoor Air, AA - Ambient Air, and EB - Equipment Blank
The numeric value following the sample type identify the Residence ID Number

Appendix C – Analytical Reports

Appendix D

Terracon

Street Address: 322 Arlington
Name of Resident: Hailey Bunger

Annual System Monitoring

Date of Visit: 2/25/14

Time of Arrival: 1600 **Time of Departure:** 1615

Names of Terracon Representatives: Rob Bergman

✓ Introduce Terracon Representatives and Show Terracon Identification

✓ Verify identity of resident; confirm authority to allow entry

✓ Explain purpose of visit to perform annual system monitoring. (It includes visually observing the exterior portions of the vapor mitigation system for general condition issues. System monitoring will include reading the in-line manometer and observing blower motor operation.)

Observation of exterior portions of the vapor mitigation system:

Any cracks? Yes ___ No ✓

Any leaks? Yes ___ No ✓

Any other visible problems? Yes ___ No ✓

Note any issues or problems ___

In-Line Manometer Reading: 3.3

Observation of Blower Motor Operation:

Normal ✓

Any observed problems in operation:

Rob Bergman
Terracon Representative Signature

Hailey Bunger
Resident Signature