

December 7, 2022
File No. 25222269.00

Ms. Jennifer Borski
Wisconsin Department of Natural Resources
625 E. County Road Y, STE. 700
Oshkosh, WI 54901-9731

Subject: Inspection of Vapor Mitigation System
Golden Flame Restaurant (Former WI DOT Susie's Restaurant - LGU-SL)
WDNR BRRTS No. 02-36-000516
2604 Custer St, Manitowoc, WI 54220

Dear Ms. Borski:

SCS Engineers (SCS) has prepared this report to summarize the visual inspection and vacuum verification performed for the vapor mitigation system (VMS) installed at the Golden Flame Restaurant in Manitowoc, Wisconsin (**Figure 1**). The VMS is maintained to prevent migration of chlorinated volatile organic compound (CVOC) vapors into the building. The regulatory case was closed by the Wisconsin Department of Natural Resources (WDNR) on September 30, 2021, with continuing obligations to maintain the VMS. The post-closure VMS inspection work and preparation of this report were performed under the Vapor Intrusion Zone Contract (VIZC) at the request of WDNR.

The VMS inspection was performed on November 29, 2022, and included visual inspection of the VMS fan, piping, alarms, pickup point and sump seals, exhaust, and building floor. Vacuum was measured at Pickup Point 1 and at three sub-slab ports to evaluate fan performance and pressure field extension. No issues requiring maintenance or repair were observed for the VMS. Inspection documentation, including WDNR inspection form 4400-321, and SCS photos are included in **Attachment A**. The vacuum measurements are summarized in **Table 1** along with previous measurements collected during VMS commissioning. Additional details are provided below.

VAPOR MITIGATION SYSTEM INSPECTION

SCS visually inspected and photographed the VMS, including the VMS fan, piping, manometer, alarm, pickup point and sump seals, exhaust, and building floor. The VMS components appeared to be in working order with no damage or obstructions noted. The floor appeared to be in good condition with no significant cracks or damage noted. SCS is not aware of any changes to the floor slab or penetrations made after construction of the VMS. VMS fan vacuum and sub-slab vacuum readings were generally consistent with previous measurements (**Table 1**), indicating no significant change in VMS system effectiveness.



RECOMMENDATIONS

It is our understanding that the prior inspection performed by others did not identify any issues, and no repairs to the VMS or cap were recommended or required. Based on our November 29, 2022 inspection, it is our opinion that the VMS appears to be in working order and requires no maintenance or repairs at this time.

Please feel free to contact Robert Langdon at (608) 212-3995 or rlangdon@scsengineers.com if you have any questions or comments regarding the inspection.

Sincerely,



Jacob Krause, P.G.
Project Hydrogeologist
SCS Engineers



Robert Langdon
Senior Project Manager
SCS Engineers

JJK/lmh/REL/RT

Attachments: Table 1 – VMS Fan and Pressure Field Extension Testing Results
Figure 1 – Vapor Mitigation System
Attachment A – VMS Inspection Log, Form 4400-321

I:\25222269.00\25222269.00 Golden Flame VMS Inspection\Deliverables\VMS Inspection\221207_Borski_VMS Inspection Summary Golden Flame.docx

**Table 1. VMS Fan and Pressure Field Extension Testing Results
Golden Flame Family Restaurant - Manitowoc, Wisconsin
SCS Engineers Project #25222269.00 (WDNR VIZC)**

Date	VMS Manometer	VOP-1	VOP-2	VOP-3
10/4/2019	1.40	-0.258	-0.225	-0.350
12/2/2019	1.25	-0.278	-0.285	-0.288
2/11/2020	1.00	-0.206	-0.210	-0.216
11/29/2022	1.00	-0.278	-0.279	-0.281
Performance Standard	NA	-0.004	-0.004	-0.004

Abbreviations:

VMS = Vapor Mitigation System

NA = Not Applicable

Notes:

Vacuums in inches of water.

VMS vacuum from manometer on Pickup Point 1.

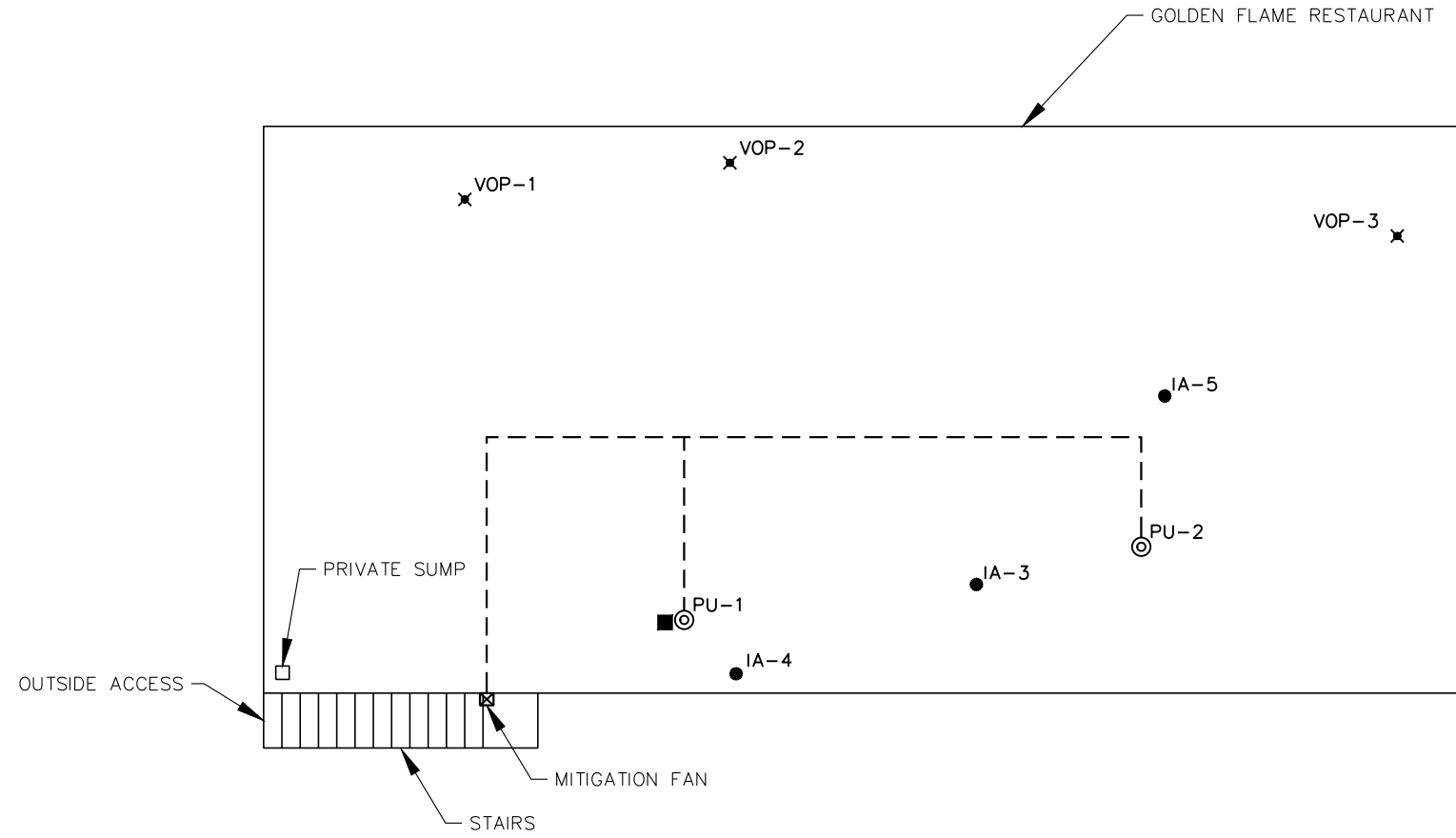
Sub-slab vacuums for VOP-1 through VOP-3 measured using digital manometer.

Performance standard from Wisconsin Department of Natural Resources January 2018 RR-800 vapor intrusion guidance document, Appendix D Commissioning Guidelines for Active Depressurization Systems.

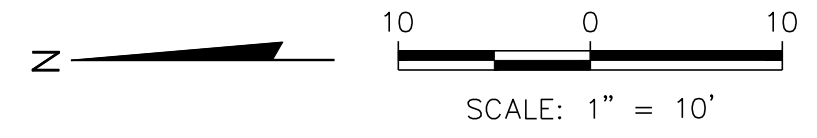
Created by:	<u>REL</u>	Date:	<u>9/9/2020</u>
Last Rev by:	<u>JJK</u>	Date:	<u>12/5/2022</u>
Checked by:	<u>REL</u>	Date:	<u>12/6/2022</u>
Proj Mgr QA/QC:	<u>REL</u>	Date:	<u>12/6/2022</u>

I:\25222269.00\252222269.00 Golden Flame VMS Inspection\Deliverables\VMS Inspection\[Table 1 - VMS Vacuum and Pressure Field Extension Testing Summary.xlsx]Vapor Intrusion

I:\25219179\00\Drawings\Vapor System.dwg, 9/8/2020, 2:21:56 PM



- LEGEND
- INDOOR AMBIENT AIR TESTING LOCATION
 - ⊙ VAPOR PICK-UP POINT
 - ✕ VACUUM OBSERVATION POINT
 - VACUUM MANOMETER
 - - - 3" DIA. PVC MITIGATION PIPE



WISCONSIN DEPARTMENT OF NATURAL RESOURCES 2984 SHAWANO AVENUE GREEN BAY, WI 54313	SUSIE'S RESTAURANT-LGU-WIDOT 1020 SOUTH 26TH STREET MANITOWOC, WISCONSIN	VAPOR MITIGATION SYSTEM GOLDEN FLAME RESTAURANT 2604 CUSTER STREET, MANITOWOC, WISCONSIN
	PROJECT NO. 25219179.00 DRAWN: 01/30/2020 REVISED: 09/08/2020	ENGINEER KP REL REL 09/08/2020
CLIENT		FIGURE 1

Attachment A

VMS Inspection Log, Form 4400-321

Notice: In accordance with s. NR 727.05(1)(b)3., Wis. Admin. Code, use of this form for documenting the inspections and maintenance of certain vapor-related continuing obligations is required. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Public Records law [ss. 19.31-19.39, Wis. Stats.].

Directions: This form was developed to provide the results of a site inspection of a vapor related continuing obligation, typically a vapor mitigation system. See the approval letter for this site for requirements regarding the submittal of this form to the Department of Natural Resources. A copy of this inspection log is required to be maintained either on the property, or at a location specified in the approval letter. The letter may be found in the database, [BRRTS on the Web](#), by searching for the site using the BRRTS ID number and then looking in the "Action" section for code 56.

Activity (Site) Name: WI DOT Susie's Restaurant (Former) - LGU-SL BRRTS No.: 02-36-000516
 Address Being Inspected (e.g., 123 N. Main St.): 2604 Custer St, Manitowoc, WI 54220 Date of Inspection: 11/29/2022
 Inspection Performed By (Name & Title/Company): Robert Langdon, Project Manager, SCS Engineers


When submittal of this form is required, submit an electronic version or a scanned copy of this completed form to the [RR Submittal Portal](#).

HOW TO USE THIS FORM

The Activity (Site) Name, BRRTS No., Address Being Inspected and Date of Inspection entered above will auto-populate the table. Complete only the applicable rows/components. Check "Not Applicable" for components that do not apply. For example, if there is no sump sealed and vented as part of the system, check "Not Applicable" in the "NOTES" section for that component.

Multiple components: For systems with multiple components (e.g., two manometers or two fans), add an additional row for that component by clicking the "+" (plus) symbol at the end of the row. After a system component row is added, a "-" (minus) symbol is shown so the added row may be deleted.

Photos: Click on the placeholder photo shown in each row to replace it with your own site-specific photo. Site-specific photos are optional but strongly recommended. Enter specific details and observations within the "NOTES" section to assist the DNR in understanding status of the system components.

SYSTEM COMPONENT				Date of Inspection:
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?
Manometer or Differential Pressure Gauge	Measures differential pressure between vacuum side of vent pipe and indoor space. This measurement confirms there is a vacuum being pulled by the fan.	Liquid Level on Manometer or Gauge	Liquid level in manometer should be offset (not level with each other).	A change in liquid level indicates a change in the vacuum below foundation. This could be caused by failure of fan, blockage of vent pipe, change in water level below building, or other conditions. Hire a professional to identify cause and repair if needed.
PHOTO 				NOTES: (Record the reading on the gauge. Identify specific building and location description:) <input type="checkbox"/> Not Applicable Pickup Point No. 1 with liquid manometer and alarm. Manometer reads 1.0 inch water vacuum. Tested the alarm by temporarily shutting off the radon fan. Both the alarm light and the audible alert are working properly.

BRRTS No. 02-36-000516

Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL


Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 2 of 10

SYSTEM COMPONENT				Date of Inspection:	11/29/2022
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?	
Fan	<p>Fan creates a vacuum and lowers pressure below foundation.</p> <p>The fan also removes soil gases from below foundation for discharge to atmosphere.</p>	<p>Fan Operation</p> <p>Fan Location</p> <p>Motor Noise</p>	<p>Fan is on.</p> <p>Fan mounted outside & secure.</p> <p>Fan motor is quiet (loud motor may indicate problem).</p>	<p>Replace the fan immediately once the fan stops running. Fans typically run for 10-20 years, but it may be less.</p> <p>Replacement fan to have similar specifications as original with respect to flow and vacuum.</p> <p>After a fan is replaced, the system should be evaluated by a mitigation professional to verify effectiveness, which includes pressure readings.</p> <p>Original Fan Make and Model: AMG Eagle</p>	

<p>PHOTO</p> 	<p>NOTES: (Identify specific building and location description:)</p> <p><input type="checkbox"/> Not Applicable</p> <p>Fan is operating as intended. No damage or excessive motor noise observed.</p>
---	--

BRRTS No. 02-36-000516


Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL

Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 3 of 10

SYSTEM COMPONENT		Date of Inspection: 11/29/2022		
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?
Suction Drop Point w/ Vent Pipe	<p>Suction Point : Soil gases are collected in a void space below the foundation, and tight seal prevents soil gas from getting inside the home.</p> <p>Vent Pipe: Pipe conveys the vacuum from the fan, and collects soil gases for discharge to the atmosphere.</p>	<p>Suction Point Seal</p> <p>Vent Pipe Condition</p>	<p>Seal is air tight around pipe penetration.</p> <p>Vent pipe is connected to fan, has not cracked.</p>	<p>Suction point seal or vent pipe may need to be sealed or replaced if cracks or leaks appear.</p> <p>If any piping or sealing of the system is altered or replaced, the system should be evaluated by a mitigation professional to verify effectiveness, which includes pressure readings.</p>
PHOTO		<p>NOTES: (Identify specific building and location description:)</p> <p><input type="checkbox"/> Not Applicable</p> <p>Pickup Point No. 1. Vent piping is secure and connected to the fan. No damage to piping observed. Used smoke pen to test pickup point floor seal and found no leakage.</p>		
				

BRRTS No. 02-36-000516


Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL

Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 4 of 10

SYSTEM COMPONENT				Date of Inspection:	11/29/2022
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?	
Suction Drop Point w/ Vent Pipe	Suction Point : Soil gases are collected in a void space below the foundation, and tight seal prevents soil gas from getting inside the home. Vent Pipe : Pipe conveys the vacuum from the fan, and collects soil gases for discharge to the atmosphere.	Suction Point Seal	Seal is air tight around pipe penetration.	Suction point seal or vent pipe may need to be sealed or replaced if cracks or leaks appear. If any piping or sealing of the system is altered or replaced, the system should be evaluated by a mitigation professional to verify effectiveness, which includes pressure readings.	
		Vent Pipe Condition	Vent pipe is connected to fan, has not cracked.		
PHOTO			NOTES: (Identify specific building and location description:) <input type="checkbox"/> Not Applicable		
			Pickup Point No. 2. Vent piping is secure and connected to the fan. No damage to piping observed. Used smoke pen to test pickup point floor seal and found no leakage.		

BRRTS No. 02-36-000516

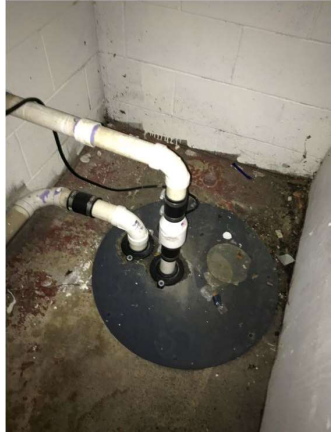
Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL

Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 5 of 10

SYSTEM COMPONENT		Date of Inspection: 11/29/2022		
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?
Sealed Sump w/Vent Pipe	<p>Sump Cover: Soil gases are collected in sump and the cover prevents soil gas from getting inside home.</p> <p>Vent Pipe: Pipe transports the soil gas from the sump for discharge to the atmosphere.</p>	Suction Point Seal	Seal is airtight to floor.	<p>Sump cover or vent pipe may need to be sealed or replaced if cracks or leaks appear.</p> <p>If any piping or sealing of the system is altered or replaced, the system should be evaluated by a plumber or a mitigation professional to verify effectiveness, which includes pressure readings.</p>
		Vent Pipe Seal Condition	Vent pipe is connected to the sump cover and is not cracked.	
PHOTO			<p>NOTES: (Identify specific building and location description:)</p> <p><input type="checkbox"/> Not Applicable</p> <p>Used smoke pen to test sump lid fittings and floor seal and found no leakage. No damage to piping observed. Sump pump did not appear to cycle while present, but restaurant owner indicated it was operating properly.</p>	
				

BRRTS No. 02-36-000516


Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL

Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 6 of 10

SYSTEM COMPONENT				Date of Inspection:	11/29/2022
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?	
Outdoor Vent Pipe	Pipe transports the soil gas from beneath the foundation for discharge to the atmosphere.	Vent Pipe Condition Vent Pipe Location	Vent pipe remains connected to fan. End of pipe free from obstructions. The exhaust is more than 15 feet from windows or air intakes.	Vent pipe may require replacement, or cleaning to remove ice or debris. If any piping or sealing of the system is altered or replaced, the system should be evaluated by a mitigation professional to verify effectiveness, which includes pressure readings.	
PHOTO			NOTES: (Identify specific building and location description:) <input type="checkbox"/> Not Applicable		
			Vent pipe appears solid and connected to fan, no damage observed. Checked exhaust end for obstructions. No obstructions observed. The exhaust appears to be more than 15 feet from windows or air intakes.		

BRRTS No. 02-36-000516

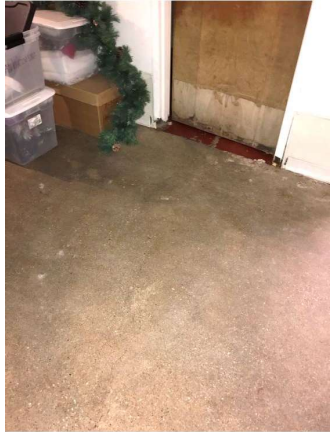
Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL

Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 7 of 10

SYSTEM COMPONENT				Date of Inspection:	11/29/2022
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?	
Foundation Floor	Foundation is a barrier that minimizes soil gas entry into building, and helps fan to work efficiently.	Foundation Condition	No penetrating cracks or holes in foundation.	Seal cracks or other penetrations as you would to prevent water from entering.	
		Foundation Footprint	Check if there have been alterations or additions to building or footprint.	If building floor plan has changed, notify DNR and contact a mitigation professional to evaluate if modifications to the vapor mitigation system are necessary.	
PHOTO			NOTES: (Identify specific building and location description:) <input type="checkbox"/> Not Applicable Some minor cracks observed in floor at southwest corner of basement near bathroom. The cracks are less than approximately 1/8" diameter and are east-west trending for several feet. No leakage observed. The cracks appear to be old and were likely present when the vapor mitigation system was installed. There do not appear to be any alterations to the building that would influence the vapor mitigation system.		
					

BRRTS No. 02-36-000516


Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL

Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 8 of 10

SYSTEM COMPONENT				Date of Inspection:	11/29/2022
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?	
Sub Slab Vapor Port	This is a sample port to measure vacuum or take sample of soil gas if needed. It needs to remain sealed when not in use to prevent soil gas entry into the home.	Port Seal/Cap	If able to measure the vacuum with a micromanometer, the pressure differential should be at least 0.004 inches of H ₂ O or at least one Pascal.	Repair or replace the seal and cover as needed.	
		Port Condition	Port is sealed and capped when not in use.	Permanently seal hole if sample port is ever removed.	
PHOTO			<p>NOTES: (If taken, record the pressure differential reading. Identify specific building and location description:)</p> <p><input type="checkbox"/> Not Applicable</p> <p>Sub-slab Vacuum Observation Point 1 was missing plastic cover, but port cap was still in place. Installed new cover and measured vacuum using digital manometer at 0.278 inches water. No damage to port observed.</p>		
					

BRRTS No. 02-36-000516


Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL

Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 9 of 10

SYSTEM COMPONENT				Date of Inspection:	11/29/2022
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?	
Sub Slab Vapor Port	This is a sample port to measure vacuum or take sample of soil gas if needed. It needs to remain sealed when not in use to prevent soil gas entry into the home.	Port Seal/Cap	If able to measure the vacuum with a micromanometer, the pressure differential should be at least 0.004 inches of H ₂ O or at least one Pascal.	Repair or replace the seal and cover as needed.	
		Port Condition	Port is sealed and capped when not in use.	Permanently seal hole if sample port is ever removed.	
PHOTO			<p>NOTES: (If taken, record the pressure differential reading. Identify specific building and location description:)</p> <p><input type="checkbox"/> Not Applicable</p>		
			<p>Sub-slab Vacuum Observation Point 2 vacuum measured using digital manometer at 0.279 inches water. No missing components or damage to point observed.</p>		

BRRTS No. 02-36-000516


Site Name: WI DOT Susie's Restaurant (Former) - LGU-SL

Address Being Inspected: 2604 Custer St, Manitowoc, WI 54220

Vapor Mitigation System Inspection Log

Form 4400-321 (R 03/22)

Page 10 of 10

SYSTEM COMPONENT				Date of Inspection:	11/29/2022
NAME	WHAT DOES IT DO?	WHAT DO I CHECK?	WHAT SHOULD I SEE?	WHAT TO FIX?	
Sub Slab Vapor Port	This is a sample port to measure vacuum or take sample of soil gas if needed. It needs to remain sealed when not in use to prevent soil gas entry into the home.	Port Seal/Cap	If able to measure the vacuum with a micromanometer, the pressure differential should be at least 0.004 inches of H ₂ O or at least one Pascal.	Repair or replace the seal and cover as needed.	
		Port Condition	Port is sealed and capped when not in use.	Permanently seal hole if sample port is ever removed.	
PHOTO			<p>NOTES: (If taken, record the pressure differential reading. Identify specific building and location description:)</p> <p><input type="checkbox"/> Not Applicable</p>		
			<p>Sub-slab Vacuum Observation Point 3 vacuum measured using digital manometer at 0.281 inches water. No missing components or damage to point observed.</p>		