



April 24, 2020

Ms. Sheri Reichart, Agent
1101 Gage Inc.
1101 South Prairie Avenue
Waukesha, WI 53186

SUBJECT: Review of the May 31, 2019 "Supplemental Site Investigation Report & Remedial Action Plan" and the February 28, 2020 "Site Investigation Work Plan" Schaefer Brush, 1101 South Prairie Avenue, Waukesha, WI
WDNR BRRTS Activity #: 02-68-563736; FID #: 268138750

Dear Ms. Reichart:

On June 6, 2019 the Wisconsin Department of Natural Resources (DNR) received the "Supplemental Site Investigation Report & Remedial Action Plan" by Key Engineering Group, LTD. (Key), and the associated review fee, for the site identified above. The DNR met with Key in December 2019 and January 2020 to discuss this document and what additional work is needed to address the potential for vapor intrusion. Based on these discussions Key prepared a "Site Investigation Work Plan" (Work Plan) proposing additional sampling and other activities intended to complete the site investigation and demonstrate the effectiveness of the positive pressure system to prevent vapor intrusion.

The purpose of this letter is to provide feedback on the collection of field measurements and samples proposed in the Work Plan, present other activities needed to demonstrate that the positive pressure system is effective at mitigating the vapor intrusion risk and provide guidance for meeting other closure requirements. This letter will provide information for assessing building conditions, the operation of the air exchange system, and evaluating the sewer lines as a potential vapor migration pathway. The DNR discussed the need to complete these other activities with Key during our December and January meetings. We hope that you and Key will find this to be useful guidance on how to meet the requirements for case closure (as outlined in Wis. Admin. Code §§ NR 700 to NR 754) and protect the safety of those who work at this facility.

Vapor Intrusion Investigation

Office and basement vapor intrusion sampling

After discussions with the DNR regarding the site investigation, Key collected three samples each of sub-slab vapor and indoor air from the office portion of the building to assess the risk of vapor intrusion in that area. One of the sub-slab vapor samples and one of the indoor air samples were collected from the basement. Testing was conducted in February 2020 to ensure conditions during the heating season, recognized as being the time period expected to have the most significant vapor intrusion risk, would be assessed. The Work Plan proposed to conduct similar sampling in March, June, and August 2020. The DNR previously provided concurrence with Key's proposal to conduct the March sampling event as proposed, and now extends this to also include the June and August sampling events. Sub-

slab vapor sampling may be suspended at locations where contaminant concentrations are found to exceed a vapor risk screening level. Indoor air samples should continue to be collected as proposed, with an additional indoor air sample collected in the bathroom adjacent to the IA-8 sampling location during the remaining sampling rounds. Results of samples collected during the winter or summer months may dictate the need for further assessment beyond that which is proposed.

To confirm that the proposed sampling in the office portion is sufficient to assess the potential for vapor intrusion the DNR requests that the following details regarding building layout and construction be provided (Wis. Admin. Code § NR 716.11(5)(b)). This information can be provided within the letter report proposed to be submitted at the conclusion of sampling activities or may be provided to the DNR earlier to obtain feedback on how the building has been assessed.

- A description of the makeup and condition of the foundation;
- Whether indoor air is generally isolated within the different portions of the building (office, manufacturing, shipping) or whether air can flow between these areas without restriction;
- How the use of a positive pressure system in the manufacturing area affects pressure differentials in the office portion and how the use of the system influences air movement within the building;
- Whether the basement is more prone to vapor intrusion than other areas of the building and if this increases the risk within the office portion;
- How the basement sump is sealed so that it does not provide an entry point for vapors into the building.

The DNR previously recommended collecting indoor air samples in areas that are more prone to vapor intrusion to obtain a conservative measure of indoor air contaminants. This includes areas where building pressure would be lower due to the operation of a venting fans, areas near penetrations in the floor where vapor could migrate, and near other sampling locations where elevated PCE concentrations were detected. Discuss how this was a consideration in the selection of sample locations. Efforts should be made to sample remaining portions of the office area prone to vapor intrusion if not already assessed.

Vapor intrusion sampling in the shipping and manufacturing departments

Six sample locations within the manufacturing and shipping portions of the building are identified in the Work Plan where indoor air and sub-slab samples will be collected in February, March, June, and August 2020. Three sample locations are located along the north side of the building, and three are located along the south side of the building. No samples are proposed to be collected in the central portion of the building near the locations of SS-1, SS-9, SS-10, and SS-5. The DNR received the Work Plan after the February sampling event was conducted but did provide comments to Key on the proposed activities prior to the March sampling event. As the purpose of the annual sampling is to assess the effectiveness of the pressurization system the DNR made the following recommendations for the March and summer events:

- Further sub-slab vapor samples will not be required for analysis of CVOCs in the manufacturing and shipping portion of the building from locations already sampled. Prior sampling has already confirmed impacted vapors under the building and the need to operate a vapor mitigation system.
- Sub-slab vapor samples should be collected from the central portion of the building at SS-1, SS-9, and SS-10 where conditions have not been assessed.
- A minimum of three indoor air sample locations should be identified in the central portion of the building (2 from the manufacturing area, 1 from the shipping department) where samples can be

collected on a quarterly basis. The samples should be collected along the same line as SS-1, SS-9, and SS-10, but do not need to be collected at those exact locations.

- Indoor air samples should be collected from locations IA-5, IA-12, IA-14, IA-19, IA-20, and IA-21 as proposed.

Assess whether CVOCs have been discharged to sewer laterals, and if this has impacted indoor air, soil, or groundwater (Wis. Admin. Code § NR 716.11(5)(a))

The Work Plan did not propose actions to evaluate whether hazardous substances were discharged to the sewer lines within the building and, if present, whether these contaminants are subsequently impacting indoor air, soil, or groundwater. This potential pathway will need to be assessed as part of the site investigation. As discussed with Key, the DNR recommends the locations of all sewer laterals and drains (active and not) be identified on site figures to evaluate what is present in sewer lines under the building and how the on-site sewer lines connect to the main lines in the street. Collect air sample(s) from within the sewer pipe to determine whether there is a source of CVOCs within the lines. DNR recommends that at least one of these samples be collected within the office area, preferably through a clean-out behind a plumbing trap. A remedial action may be required to remove CVOC contamination if found to remain in the sewers. Depending on the results, soil and groundwater samples may also need to be collected from along the laterals to assess whether contaminants have been discharged from breaks in the sewer lines.

Mitigation Evaluation

Assessment of pressurization system operation

The operation of the recently modified HVAC system could be considered a mitigation system that prevents exposure to hazardous vapors if it can continuously maintain positive pressure throughout the building. It is particularly important that the system performs reliably to prevent even short-term exposure to trichloroethene (TCE). Demonstrate system effectiveness by providing information regarding the operation of the building and expected air flow to support that the system will operate as intended. The following information can be provided within the letter report proposed to be submitted at the conclusion of sampling activities, or may be provided earlier to request DNR feedback on whether the building has been adequately assessed:

- Confirm that the make-up air unit that provides positive pressure to the building handles all of the HVAC functions for the building and no other HVAC units consistently operate.
- Confirm that the cement blocks used to make the building walls are partially filled, and how this effects vapor intrusion into the building.
- Explain what the ‘Environmental Technology Verification Program’ is that was used to assess the operation of the HVAC system, and how the system complies with the requirements of the Program.
- Provide the air exchange rate the HVAC system produces within the building. Discuss how this is determined initially and how it could be verified in the future. Discuss how air exchange in the building contributes to vapor mitigation efforts.
- Describe where the various floor penetrations drain to. Provide a few pictures of sealed floor penetrations to confirm that these are not acting as conduits for sub-slab vapors.
- Describe how it was verified that floor cracks in the manufacturing area do not penetrate the floor.

Verification that positive pressure is being maintained within the building

It must be demonstrated that the air exchange system can maintain positive pressure within the building through annual seasonal variations, by measuring pressure differentials, before it will be considered an effective mitigation system. Pressures in such large buildings can vary considerably as can points of entry for vapor intrusion. Even if pressures are positive at the make-up unit, negative pressures can occur in areas of the building where air returns and exhaust fans are located.

A series of pressure readings are proposed by the Work Plan to be collected four times during the heating and cooling seasons, concurrently with vapor and indoor air sample collection events, to provide this information. Building pressure relative to outdoor air is proposed to be measured at 6 locations (BPP-1 to BPP-6) along the outer walls of the manufacturing and shipping portion of the building. Building pressure was previously assessed by collecting readings at 9 locations distributed throughout the inside of the building (BP-1 to BP-9). Continue to monitor and evaluate indoor air pressure while addressing the following:

- Pressure readings were collected at BPP-1 to BPP-6 and BP-1 to BP-9 during the February and March sampling events. The DNR recommends that this continue with the June and August events. Previously, indoor pressure readings measured at BP-1 to BP-9 were occasionally measured to be less than the stated goal of 0.01. If this trend is verified through future readings you will need to assess what this indicates about the operation of the system and whether performance needs to be further improved.
- Vapor intrusion is more likely to occur where there is less pressure differentiation between the inside of the building and the sub-slab. The location of any features in the building which could cause lower localized indoor air pressure, including all exhaust fans, return air chases and plenums, stand-alone HVAC units, and exterior openings, must be identified. Assess whether the existing indoor air pressure measurement locations are determining the effect these features have on indoor air pressure or readings need to be collected from more areas of the facility.
- Discuss how the indoor air pressure readings are measured relative to atmospheric pressure, and how the devices used to take these measurements are calibrated.

Sub-slab pressure readings are proposed to be measured at 13 locations (SS-1 to SS-13) distributed throughout the building on a quarterly basis. The DNR agrees that this could provide the data needed to confirm the pressure differential above and below the building slab. The installation of additional vapor pins to collect these readings is not being recommended at this time. The DNR recognizes that similar pressure readings were previously collected in July and October 2018. All pressure readings measured at the 10 sub-slab pins in July 2018 were '0'; in October only 2 locations met the performance goal of 0.004 inches of water. Sub-slab pressure readings have so far not suggested a significant pressure differential exists. If similar readings are obtained in the future, you will need to provide an evaluation as to why this does not indicate that the system is ineffective at maintaining pressure. During our recent meetings, Key as explained that the system that creates positive pressure in the building also affects shallow sub-slab conditions. This explanation will need to be documented if future pressure readings indicate that this is occurring.

The DNR expects that the automatic pressure sensor and data logger installed at the make-up unit will continue to operate. Pressure reading recorded by the data logger should be presented to help demonstrate maintenance of positive pressure throughout the year. Determine if temporary lapses of positive pressure at the make-up unit continue during the summer months and how this influences the effectiveness of the system. These were attributed to the opening of the overhead doors or airing out the facility on a hot day. Discuss whether the system can be enhanced to prevent or minimize these episodes. Document how and where these pressures readings are taken.

Groundwater Level Measurements and Sampling

Concentrations of chlorinated volatile organic compounds (CVOCs) detected in groundwater samples collected at MW-3 and MW-7 over the course of the investigation have not yet provided a clear indication that groundwater contamination is defined. The DNR recommends continuing to sample these two wells on a quarterly basis until it is clearly demonstrated that natural attenuation will result in a declining or stable plume. Two quarters of sampling are proposed in the Work Plan. Further sampling of these wells, or installation of additional down-gradient wells, may be required if the data does not demonstrate a declining or stable plume, to show that the plume is limited to the southern portion of the cemetery. The DNR had not considered additional sampling at MW-2 and MW-4 or further assessment of groundwater flow direction as necessary to assess groundwater contamination at this site but encourages you to obtain any information needed to demonstrate a stable plume.

Reporting

At the conclusion of the field sampling a letter report should be prepared as proposed in the Work Plan. In accordance with Wis. Admin. Code § NR 716.13(2), analytical results collected during this investigation should also be provided to the DNR within 10 days of receiving a report from the laboratory.

If it is demonstrated that the positive pressure system is successfully preventing vapor intrusion into the building continued operation of the system will be required as a condition of closure until a vapor risk no longer exists. An operation and maintenance plan will need to be developed to ensure the system will continue to work as intended.

Remediation of Contamination Posing a Risk Through Vapor Intrusion

Wis. Admin. Code § NR 726.05(8)(b) provides that a site or facility is not eligible for closure until the following criteria have been met: Where vapors were present above the vapor risk screening level a remedial action has been conducted and reduced the mass and concentration of volatile compounds to the extent practicable and the vapor exposure pathway has been interrupted or mitigated. Reducing the mass of the contaminant source is especially important at this site as any lapse in mitigation may result in exposure to TCE that poses an acute risk. We recommend that you provide an explanation as to how you intend to meet this requirement and request DNR approval of the approach.

The DNR appreciates your continued efforts to restore the environment at this site. If you have any questions regarding any of the above items, or would like to discuss the status of this site in more detail, please contact me at (262) 574-2166 or by email at paul.grittner@wisconsin.gov.

Sincerely,



Paul Grittner

Hydrogeologist, Remediation & Redevelopment Program

c: Toni Schoen, Key, 735 North Water St., Suite 510, Milwaukee, WI 53202 (electronic)