



Indoor Air and Sub-Slab Vapor Quality at the Drop Hammer Building

January 2022

In May 2020, August 2020, February 2021, and August 2021 Lockheed Martin's Environment, Safety and Health team evaluated the potential for vapor intrusion (VI) at the Drop Hammer Building, which is located just west of A-Building in the Middle River Complex (MRC). The team sampled both indoor air and vapors beneath the foundational slab. While this sampling showed that indoor air is safe for employees, levels of site contaminants of concern beneath the building floor were found to be high enough that, in an abundance of caution, Lockheed Martin decided to install a Sub-Slab Depressurization System (SSDS) in the Drop Hammer Building to prevent vapors from moving into the building.

Why Was the Drop Hammer Building Sampled?

Over the past several years, Lockheed Martin has assessed soil, groundwater, soil vapor, and indoor air quality throughout the Middle River Complex. During this process, a plume of groundwater, contaminated primarily with trichloroethene (TCE), was identified west of A-Building. The plume was thought to be far enough away and deep enough in the ground that concentrations of any contaminants in soil vapor beneath the Drop Hammer Building would likely be low. Additionally, while there is very little information about whether TCE may have been used in the Drop Hammer Building, or whether any spills of volatile organic compounds (VOCs) ever occurred there, longtime employees have suggested TCE might have been used there. Therefore, Lockheed Martin decided to assess the potential for vapor intrusion in the building. Visual inspection of the Drop Hammer Building, which was constructed in the 1930's, indicated the overall structural condition of the building is sound, which would limit the potential for vapors to enter the building.

What Did Sampling Show?

Initial vapor intrusion sampling proceeded in two phases:

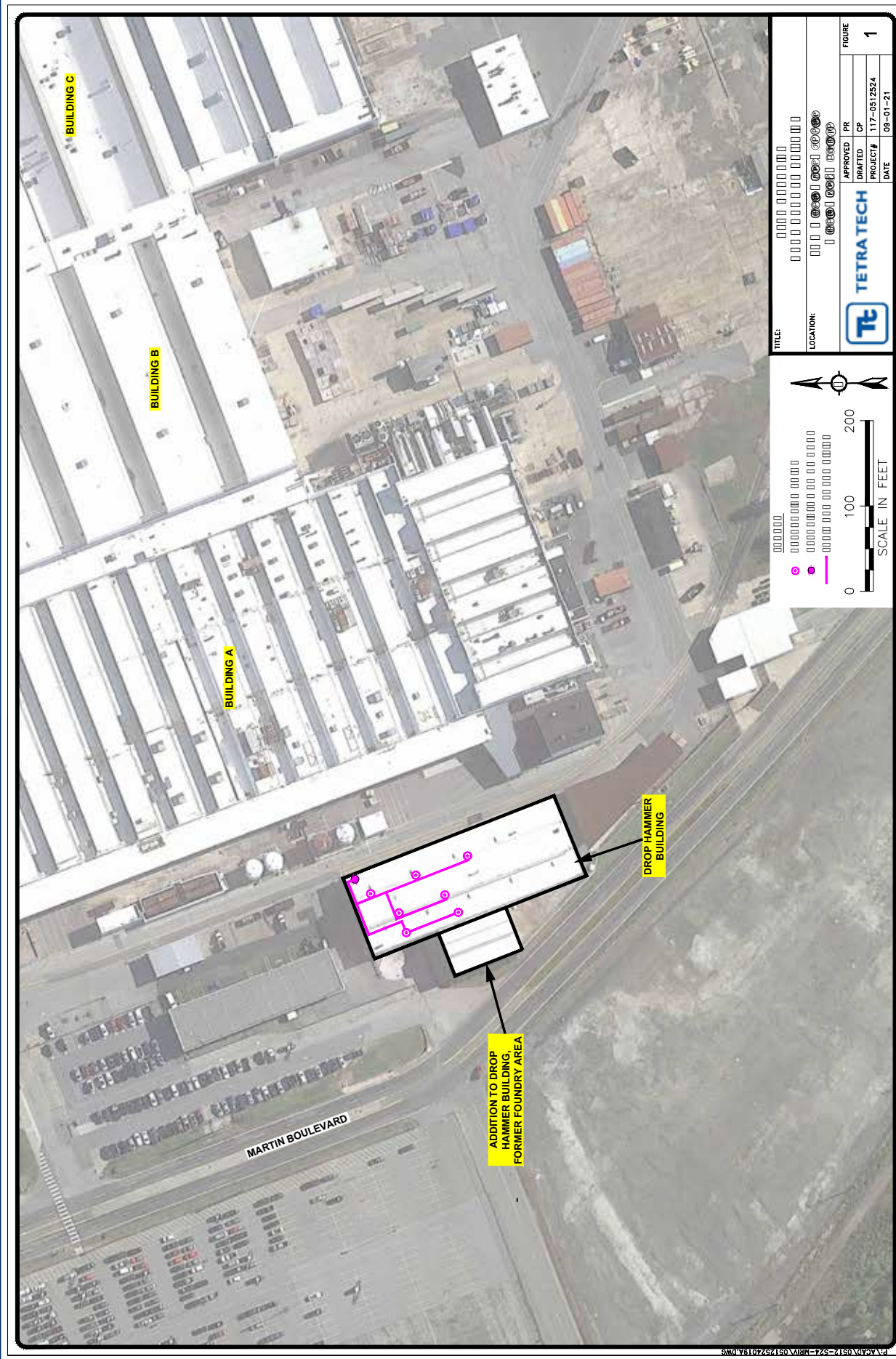
1. a screening of indoor air in multiple locations

throughout the Drop Hammer Building and sampling beneath the floor slab of the building in May 2020, and

2. more comprehensive follow-on sampling of indoor air and sub-slab vapors in August 2020.

Nineteen locations were screened, including air ducts; breathing zones (areas where the building occupants are likely to be breathing the air) in the main floor and basement; the utility corridor leading to the A-Building basement; and floor drains and storm sewer manholes. Two of these screening locations, both in the southern portion of the building, revealed low concentrations of trichloroethene (TCE) at vents previously used to heat the building. No TCE was detected in the building during subsequent, more rigorous indoor air sampling using highly sensitive, stand-alone canisters. In contrast, samples of vapors under the floor of the northwest corner of the building, the area closest to the known groundwater plume, registered elevated concentrations of TCE. Those concentrations exceeded the Maryland Department of the Environment (MDE) sub-slab screening level of 293 micrograms per cubic meter, with the highest level being 62,000 micrograms per cubic meter. Additional sampling conducted in February and August 2021 confirmed these findings.

The August 2021 sampling also identified elevated tetrachloroethene (PCE) detections in indoor air, with the highest level being 6,400 micrograms per cubic meter. For comparison, the OSHA permissible exposure level for PCE is 678,000 micrograms per cubic meter, and this standard presumes active use of a product containing PCE. Therefore, there is no immediate risk to building occupants. In contrast to TCE, soil vapor concentrations for PCE are significantly low with the highest historical concentration at 89 micrograms per cubic meter during the August 2021 sampling event. Previous sampling events detected PCE in indoor air at much lower concentrations ranging from 0.28 to 0.35 micrograms per cubic meter. Based on this recent isolated high PCE detection in indoor air and the minimal PCE concentrations in soil vapor, the presence of PCE is



The Drop Hammer Building is located southwest of A-Building adjacent to Martin Boulevard. The location for the new sub-slab depressurization system (SSDS) piping (shown in pink) is inside the building.

likely due to the introduction of a product containing PCE being used indoors. Potential sources of PCE in indoor air are metal degreasers, lubricants and grease, metal and stone polishes, paints and coatings (and removers), mold removers and anti-mold sealants, and dry cleaning.

Lockheed Martin has informed the property owner and tenant management of the elevated PCE detection so that steps to identify the indoor source can be taken. The first step towards source identification of PCE in indoor air was performed by Lockheed Martin on Dec. 7, 2021. Real-time indoor air screening was conducted with a Frog5000™ portable gas chromatograph field instrument. Sampling locations included existing indoor air monitoring locations on the main floor and in the basement, as well as certain areas of the building that may have contributed to the PCE detections in the August 2020 round. All sampling results from all locations were non-detect for TCE and PCE. Subsequently, indoor air samples were collected in Summa® canisters on Dec. 9 to determine if PCE concentrations remain present above indoor air screening levels.

The results of the Dec. 9 sampling indicated the presence of PCE in 8 of 11 indoor air samples, TCE in 1 of 11 indoor air samples, and 1,1,2-Trichloroethane in all 11 samples. All of the findings were low concentrations, with none exceeding the indoor air screening levels.

Sub-Slab Depressurization System (SSDS) Installation

Although indoor air data does not indicate a concern, because the concentrations of trichloroethene (TCE) vapors beneath the Drop Hammer Building foundational slab are high, Lockheed Martin has decided to install a sub-slab depressurization system in an abundance of caution, ensuring its commitment to maintaining safe air for employees. This system will collect vapors containing volatile organic compounds (VOCs) from beneath the Drop Hammer Building's foundational slab and discharge the air into the atmosphere above roof level.

The system includes five extraction points on the northern portion of the main floor, which, in this area, serves as the foundational slab, and two extraction points in the basement. Holes were bored through the floor, into which two-inch diameter screened PVC (polyvinyl chloride) pipes were inserted that extend approximately two feet into the soil. The PVC pipes extract the contaminated vapor from the soil. The PVC pipes are routed to follow existing pipe racks to the blower, which are mounted on the roof in the

northeastern corner of the Drop Hammer Building. The exhaust pipe extends above the roofline of the building, where extracted air is released to outside air.

Construction of the SSDS occurred during November and December 2021. During an initial start-up period of 28 days, vapors were extracted and treated prior to discharge by a temporary blower system located in the northeast corner of the building. Vapor concentrations were expected to diminish rapidly, and after this was demonstrated with sampling results, the discharge was moved to being released to outside air above the roofline of the building.

What If Employees Have Questions?

Employees with any questions or concerns are encouraged to contact:

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