



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

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July 30, 2018

Mr. Paul Klansnic  
TB TS/RELP LLC  
2025 First Avenue, Suite 1212  
Seattle, Washington 98121

Re: **Troy Laundry Property: Vapor Intrusion Assessment Report**

Dear Mr. Klansnic,

On June 28, 2018, the Washington State Department of Ecology (Ecology) received an Email from SoundEarth Strategies, Inc., which included a copy of the *Vapor Intrusion Assessment Report* mailed to Mr. Paul Klansnic. The Vapor Intrusion Assessment Report (VI Report) was submitted in accordance with Touchstone's Agreed Order (AO) 8996, and was preceded by a draft Report, submitted on March 22, and a June 20 meeting with SoundEarth representatives at their Seattle offices. Thank you for submitting the document.

The VI Report provides the results of a garage-air sampling event conducted last March. A large number of air samples were collected on levels P1 through P5 of the below-grade parking garage, including two samples collected in a northern stairway, a sample obtained from an elevator shaft, and an ambient (outdoor) air sample. According to Tables 1 and 2 in the Report, three chlorinated VOC (CVOC) compounds and two petroleum hydrocarbon fractions were detected in one or more of the samples during the sampling event. Detected CVOCs included tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride. When detected at all – the only locations where the compounds were detected were at the P1 and P5 levels of the northern stairway – the concentrations of each of these VOCs were low.

EC5-8 and EC9-12 aliphatics were detected in several samples. Like the CVOCs, EC9-12 aliphatics were found in the two northern stairway samples. They were also detected on garage level P3. EC5-8 aliphatics, on the other hand, were detected in every sample analyzed for this fraction (including ambient air). The petroleum hydrocarbon concentrations inside the garage exceeded ambient air levels at several locations, but were not elevated from a risk perspective. In fact, all detections of EC5-8 and EC9-12 aliphatics, as well as the concentrations reported for PCE, TCE, and vinyl chloride, were below standard Method B air cleanup levels.

Based on our review of the June VI Report Ecology has the following comments:



1. On page 6, as part of the discussion of “Field Quality Control,” the Report acknowledges that sample IA-05’s final pressure reading was 17.5 inHg.<sup>1</sup> This sample collected air in an elevator shaft about three days after other samples from the garage were collected. Based on the final pressure reading, SoundEarth estimates that about 2.5 liters of sample were obtained – about half the total volume intended. Ecology agrees that this is a reasonable collection estimate, but we do not know when – over the 24-hour period – the canister was drawing-in about 3 ml/min of air and when the flowrate was significantly lower (or how low). For this reason, in our comments on the draft Report we encouraged SoundEarth to consider the resulting IA-05 VOC concentrations *qualified*, or *uncertain*. We also informed them that Section H.6 (Final Canister Vacuum Pressure and Data Usability) of New Jersey DEP’s VI Guidance states that: “in situations where the residual pressure is in excess of -10 inHg vacuum, the potential for a clogged critical orifice is significant. The designated sample timeframe has likely been shortened or the flow rates were changed sometime during the sampling period resulting in a non-representative sample. Under these circumstances, the canister should not be analyzed.”

Ecology therefore disagrees that the air data associated with the IA-05 sample provide a “high level of certainty.” While these results may, in a general sense, be “valid,” and are “useable” for certain purposes, from Ecology’s perspective they should not be relied upon to conclude that CVOC levels in the elevator shaft on the day of sampling were necessarily below reporting limits.

2. On page 6 the Report also states that based “on the data validation results...” the analytical results provided in the document “are acceptable to the meet the objectives of the...evaluation.” Other than the data associated with sample IA-05, Ecology agrees that the air results appear to be of adequate quality to assess potential VI impacts on the day of sampling. However, no data validation report, or section devoted to a discussion of data validation efforts, has been included within the June VI Report.
3. On page 7 in the second full paragraph the Report states that “[b]ased on the results from the indoor air assessment,...” interim action goals for indoor air have been “achieved” and the conclusions in the seven bullets that follow “can be drawn.” From Ecology’s perspective:
  - a) The Report’s first bulleted conclusion is reasonable for the day of sampling, except for the reference to the elevator shaft. While Ecology agrees it is likely that CVOC levels due to VI were at or below protective concentrations in the shaft on the day it was sampled, canister-filling problems prevent us from concluding this was *shown*.
  - b) The second bulleted conclusion is also reasonable for the day of sampling, except, again, for the reference to the elevator shaft. The sample collected in the shaft was not analyzed for petroleum fractions.
  - c) Ecology agrees that indoor VOC sources may have been responsible, or partially responsible, for the detections of PCE, TCE, and vinyl chloride in the northern

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<sup>1</sup> The Report’s use of “mmHg” is assumed to be an error.

stairway. At this time we do not know what the source, or sources, of these detections were. We do know, however, that there were detections of PCE and TCE in the soils just beyond the western wall of the garage. We also know that in 2017 TCE and/or vinyl chloride were detected in shallow groundwater samples from as many as eight of the site's monitoring wells. How this contamination in soils and groundwater affects soil gas levels of CVOCs -- or the spatial patterns of those levels -- below and around the building/garage is unknown (has not been measured).

- d) The fourth bullet's mention of possible interior sources of PCE is reasonable, and Ecology is aware that some products/materials also continue to contain TCE. As noted above, from our perspective the source or sources of the stairway detections is an unknown at this point.

In this bullet the Report additionally states that there is "no air exchange in the stairwells." While Ecology has assumed that the stairways may not be intentionally (mechanically) ventilated by the garage or building's HVAC systems, we do not understand how SoundEarth has concluded there is no air exchange at all in these areas. Since site COCs were detected in the air of the only stairway sampled, the Report should have explained how air is expected to typically move within the stairways.

- e) Ecology disagrees with statements in the fifth bullet, as well as the sentence we refer to above that begins the paragraph. The Report's authors are, in our view, using the results from a single 24-hour air sampling event to draw broad conclusions about the potential for vapor intrusion to adversely impact indoor air quality. Our response to this portion of the Report is provided below.

The SoundEarth VI Report states that based on the results of the garage-air sampling conducted last March, interim action goals for indoor air have been "achieved" and there is no need to perform additional air sampling to confirm that VI is not unacceptably impacting air in the garage or the overlying building. These conclusions appear to assume the following:

- (1) the results from the March 2018 garage (and stairway and elevator) air sampling conservatively represent any VI impacts to the air within the garage during the 24 hour sampling event itself;
- (2) these results also conservatively represent any VI impacts to air quality on days other than the sampling day(s) itself;
- (3) the results indicate that, on the day(s) of sampling, we can be confident that any VI impacts did not result in unacceptable indoor air concentrations within the building overlying the garage; and,
- (4) the results also indicate that any VI impacts to the building's indoor air occurring at times other than during the March 2018 sampling period(s) will be minimal, and not result in unacceptable VOC levels.

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Ecology agrees with the first assumption, although we believe there is uncertainty regarding the conservativeness of the elevator shaft results. This uncertainty is discussed in Comments #1, 3a, and 3b above.

Since garage air has only been sampled one time, and no soil gas data are available for locations adjacent to the garage walls or beneath the P5 floor, Ecology has not concluded that the second assumption is necessarily conservative. We believe that the results from a single air-sampling event could easily under-represent the higher end of VI-caused concentrations and possibly even long-term average concentrations. That said, the protective garage-air RELs for the VOCs of interest are very high concentrations and much higher than the levels detected (and not detected at low reporting limits) in March. For that reason, and also considering recent groundwater monitoring VOC results (diminishing concentrations) and relatively low post-excavation soil VOC detections, it is reasonable to conclude that current receptors in the garage are not being unacceptably exposed to any VI-contaminated air. That is, even if VOC concentrations in garage air are sometimes significantly higher than the levels measured on March 4, it is very unlikely that these concentrations – much less the average concentrations of these compounds – exceed the protective garage-air RELs.

With respect to the third assumption: the VI-related air assessment at the Troy site has, from our perspective, three objectives. These are:

- a) determine if VI could be resulting in unacceptable air quality for those persons using the parking garage for short periods of time;
- b) determine, indirectly, if VI could be unacceptably contaminating indoor air quality inside the building above, which is being used for commercial purposes; and,
- c) provide air concentration information that can be used to inform the FS, selection of the remedy for the site, and CAP.

Since the protective garage-air RELs are very high concentrations, and neither SoundEarth nor Ecology expected measured levels to exceed them, the primary question the VI assessment has been designed to answer is: could VI be unacceptably contaminating air quality inside the building above the garage? However, instead of measuring indoor air within the building itself to answer this question (which was earlier proposed by SoundEarth), we opted to sample air spaces belowground. The rationale for this approach was based on the premise that any VI impacts on the building's indoor air would be due to contamination migrating from belowground spaces, and if VI-caused VOC air concentrations within the different P-levels of the garage, garage stairways, and elevator shafts were very low, building concentrations would also be at least this low.

As the VI Report states, measured VOC air levels in the P1, 2, 3, 4, and 5 levels of the garage on March 4 were low. However, to ascertain what impacts, if any, air contamination below grade may be having on the building's indoor air quality we must also consider the following:

- there is uncertainty associated with the March elevator shaft results, as noted above;
- PCE, TCE, and vinyl chloride (as well as some PHC fractions) were detected in March in the northern stairway. Concentrations were below the Method B air cleanup levels, but

barely so for TCE.<sup>2</sup> Although the northern stairway ends at the street-level entry to the parking garage, and the stairwell does not serve aboveground portions of the building, TCE and PCE were detected at both P5 and P1 levels of the stairway. If these detections were due, or in part due, to VI, they suggest that VI impacts could have resulted in air contamination capable of migrating to areas very close to the building; and,

- at least one other stairway connects the parking garage to the building above. This stairway is located closer to Thomas St and continues aboveground into the building. We did not choose to sample the air in this stairway during the March 2018 sampling event, but instead selected the more northern stairway to provide information about possible levels of VOC air contamination in the stairways,

Based on these considerations and the sampling results discussed above, Ecology believes it is unlikely that unacceptable, VI-caused indoor air concentrations would have been measured had we sampled the building itself last March. But we are not confident this would have been the case.

As noted above, garage air has only been sampled one time, and no soil gas data are available for locations adjacent to the garage walls or beneath the P5 floor. Nor has air inside the building been sampled. Therefore, Ecology has yet to conclude that VI impacts to the building's indoor air are not resulting in unacceptable VOC levels. VI impacts on indoor air quality are known to be temporally variable; in some cases this variability can span a range of two orders of magnitude or more. In general, then, the results from a single air-sampling event could easily under-represent the higher end of VI-caused concentrations and even long-term average concentrations. As we discussed during our meeting on June 20, multiple indoor air sampling events are typically needed during a VI investigation to "screen-out" potential VI concerns. Even when the building has been designed to be positively-pressurized with respect to VI migration routes, this is especially true when soil gas concentrations are elevated or have not been measured.

#### NEXT STEPS

A second air sampling event should be scheduled at the Troy building. This second event should be preceded by a focused SAP, submitted for Ecology approval, which contains proposals designed to fill the following data gaps:

- (1) CVOC (and particularly, PCE, TCE, and vinyl chloride) air concentrations in the northern stairway.

Additional data are needed to help determine how temporally representative (over time) the previous stairway sampling results at P1 and P5 levels were, and whether these first results were likely affected by indoor sources. Prior to sampling, actions should be taken to minimize the influence of any indoor sources – such as locating the sampler

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<sup>2</sup> The note to Table 1's "MTCA Method B Indoor Air Cleanup Levels" describes these values as "Noncancer" concentrations. For PCE, TCE, and vinyl chloride this is incorrect. The values are based on each of these compound's potential carcinogenicity.

intake point away from the walls, ensuring that no cleaning or maintenance activities in the stairway precede the sampling event (say, within the two weeks prior to the event), making sure that the materials (if any) used to elevate the canisters above the floor are not composed of volatile COCs, etc.

Although levels of EC5-8 and EC9-12 aliphatics were detected at both northern stairway locations, the concentrations of the EC5-8 aliphatics were more than an order of magnitude below Table 2's "MTCA Method B Indoor Air Cleanup Levels." Levels of EC9-12 aliphatics, on the other hand, were about a third of the "Method B Indoor Air Cleanup Levels" and higher in the stairway than in other garage samples. Concentrations of EC9-12 aliphatics *could*, therefore, be considered a data gap for a second sampling event, since they have only been measured once in garage/stairway air. Considering the March results, as well as the levels of historic soil GRO and DRO detections and the amenability of petroleum hydrocarbons to vapor-phase biodegradation, however, Ecology is not requiring that this petroleum fraction be added to the stairways' second event's analyte lists.

- (2) CVOC (and particularly, PCE, TCE, and vinyl chloride) air concentrations in the southern stairway.

Air data are needed at the P5 level and near the stairway's exit into the building's ground floor lobby area to help determine if the stairways can transport VI-caused air contamination from the garage into the building itself, and, if so, how high the stairway VOC levels may be. The air in this stairway has not been sampled previously, but the results from the March 2018 sampling of the northern stairway suggest the possibility of detecting volatile site COCs in stairways that communicate with the parking garage. Prior to the southern stairway's sampling, SoundEarth should take reasonable measures to minimize the influence of any indoor sources.

- (3) CVOC concentrations in the shaft of an elevator which stops inside the building as well as at the P1-5 garage levels.

Additional data are needed to help determine how representative the previous elevator shaft sampling results were. Even if these previous results accurately represented 24-hour concentrations on March 7 and 8 (see our comments above regarding canister fill-times and the related uncertainty), VI impacts on shaft air may vary temporally and one event may not conservatively capture the variability. If SoundEarth believes that pressure changes within the shaft will affect canister pressure readings and/or fill rates, passive diffusive samplers should be deployed as well.

The CVOC concentrations in the air spaces described above should be sampled during a period when: a) the parking garage and stairways are in use, and b) VI impacts on those air spaces in communication with the building (such as the southern stairway and elevator shaft) are expected to be near worst-case.

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Thank you for submitting the Vapor Intrusion Assessment Report, and your efforts to address Ecology comments on the March 22 draft document. Please submit a draft version of the focused SAP requested above within 30 days.

If you have any questions about today's letter, or would like to schedule a conference call or meeting to discuss our comments or requests, please contact me at (425) 649-7187 or [hlin461@ecy.wa.gov](mailto:hlin461@ecy.wa.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Sunny Becker", with a long, sweeping horizontal line extending to the right.

Sunny Becker

Site Manager

Toxics Cleanup Program

cc: Ed Jones

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