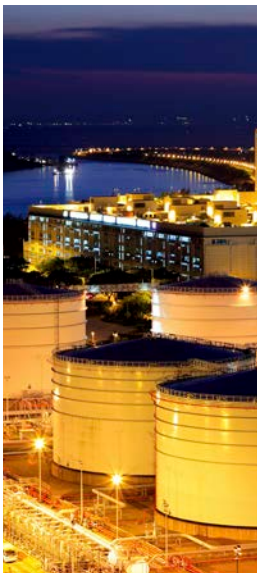
Draft for Review


Vapor Intrusion Investigation Report

Prepared For:
Occidental Chemical Corporation
Tacoma, Washington

651 Colby Drive Waterloo Ontario N2V 1C2
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1. Introduction

GHD has prepared this Vapor Intrusion (VI) Investigation Report on behalf of Occidental Chemical Corporation (OCC) to summarize four rounds of air and vapor sampling activities performed in April 2013, June/July 2013, March 2014, and May/June 2015. The four rounds of sampling were conducted to assess air and vapor concentrations associated with nine buildings at and near the OCC site at 605 Alexander Avenue in Tacoma, Washington. OCC is working with the Washington State Department of Ecology (Ecology) and the United States Environmental Protection Agency (USEPA) to address environmental issues at the OCC Alexander Avenue site and adjacent properties (Site) under an Administrative Order on Consent (AOC) [USEPA Docket No. 10 07 0011 CERCLA]. The purpose of the investigation was to conduct a Tier II Assessment of the vapor intrusion pathway, as described in the Washington State Department of Ecology's (Ecology's) Review Draft *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action* (Draft VI Guidance) (Ecology, 2009). In June 2015, USEPA issued *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (USEPA, 2015), hereafter referred to as Final VI Guidance, that specified a conservative default attenuation factor for calculating sub-slab vapor screening values based on indoor air screening levels, which is incorporated herein. This VI Investigation Report presents multiple lines of evidence to determine recommendations for future actions by Glenn Springs Holdings (GSH).

The Tier II Assessment involves characterizing vadose zone vapor and indoor air quality, and determining whether volatile organic compounds (VOCs) attributable to the OCC site are present in sub-slab vapor below the buildings above screening levels, and ultimately and more importantly, in indoor air at sufficient concentrations attributable to sub-slab vapor concentrations to potentially pose a risk to occupants.

An investigation was performed per:

1. The February 14, 2013 VI Work Plan that was approved by the USEPA on February 22, 2013
2. The March 14, 2013 Conestoga-Rovers & Associates (CRA[1]) technical memorandum which detailed a reduction in the duration of sub-slab (SS) vapor sample collection from approximately 24 hours to approximately 2 hours, which was approved
3. The June 11, 2013 conference call to determine the scope of VI round two sampling, which was approved
4. The March 12, 2014 Final VI Work Plan Addendum that included details of the round three sampling event, which was approved
5. The April 8, 2015 Revised VI Work Plan Draft Addendum that included details for the round four sampling event, which was forwarded to Ecology on April 8, 2015. Follow up telephone communications with Ecology Technical team did not identify any additional data needs for the round four event as presented in the addendum

Figure 1 identifies the nine buildings investigated, including the Army Reserve Facility (ARF), Buildings 326, 407, 532, 592, 595, and 596, and the Guard Shack located on properties owned and/or controlled by the Port of Tacoma (POT), and the OCC Office Building.

[1] CRA name changed on July 1, 2015 to GHD

Background

The February 2013 Work Plan proposed the installation and sampling of 19 SS vapor probes (of which 18 were installed and 17 sampled) and the concurrent collection of indoor air (IA) and outdoor air (OA) samples.

On March 6, 2013, representatives of the POT and CRA met with representatives of Trident Seafoods (Trident), Totem Ocean Trailer Express (TOTE), SafeBoats International (SafeBoats), Washington Industrial Coatings (WIC), and Nano Silicates to inform the tenants of the sampling requirements, what they would entail, where the sampling would occur, and when the results would be made available. On March 18, 2013, a building walkthrough was conducted with affected tenants, during which the sampling locations and work schedules were discussed with tenants to identify potential conflicts. At the time of this meeting, access to the ARF had yet to be established and the ARF was therefore not included in the initial buildings walkthroughs. A meeting was subsequently scheduled for April 8, 2013 with an ARF representative and CRA personnel to discuss the sampling activities and select suitable sampling locations. Following the April 8, 2013 meeting, access to the ARF was granted and sampling locations were confirmed.

Sampling at the nine buildings was conducted over a period of April 17 through April 26, 2013, hereafter referred to as round one. A draft VI investigation report was submitted on June 4, 2013. USEPA comments regarding the round one results were discussed on a June 11, 2013 teleconference between Glenn Springs Holdings (GSH), USEPA, and the POT. The discussions lead to agreement by GSH and approval by USEPA for GSH to conduct additional SS vapor, IA, and OA sampling at five specifically identified buildings, including POT Buildings 326, 532, 592, 595, and 596 at similar locations sampled during round one. At the request of the USEPA, 7-day passive samplers were deployed in lieu of Summa canisters for IA and OA sample collection to better account for potential variability of VOC concentrations over a longer sample collection time and for comparison of the analytical results from the round one Summa canister collection method. Additionally, centrally located IA samples were added to represent potential worst-case (upper bound) vapor intrusion points consistent with USEPA guidance (USEPA, 2015)[2], and agreements arrived at during discussions between USEPA, GSH, and POT on a June 11, 2013 teleconference.

As noted above, a second round of sampling at five buildings (Buildings 326, 532, 592, 595, and 596) was authorized, hereafter referred to as round two. Prior to the round two sampling event, detailed surveys with the involvement of tenants were completed for the selected five buildings. These second building surveys were conducted to determine the potential presence of indoor sources that may contribute to indoor air quality. The surveys included a request from each of the tenants to complete a questionnaire and provide Material Safety Data Sheets (MSDSs) for all chemicals used or stored within the selected buildings. Copies of submitted questionnaires and MSDSs are included in Appendix A. The round two sampling was performed over the period of June 24 through July 9, 2013. A revised draft VI investigation report and responses to comments were submitted on August 30, 2013, which incorporated the round two results and responses to USEPA comments issued on July 19, 2013 regarding the June 4, 2013 draft VI investigation report (round one).

Comments on the August 30, 2013 revised draft VI investigation report were issued by USEPA on November 22, 2013. A second revised draft VI investigation report was submitted on December 17, 2013, which incorporated responses to USEPA comments issued on November 22, 2013.

[2] Note: previously USEPA 2002 guidance.

Additionally, a VI Work Plan Draft addendum was included with the responses to comments. The VI Work Plan Draft addendum included a plan to conduct a third round of sampling at five selected buildings including ARF and POT Buildings 407, 592, 595, and 596, hereafter referred to as round three. The purpose of round three was to conduct sampling during the heating season (cold weather) to account for potential temporally variation of sub-slab vapor concentrations. The addendum included collecting samples using Summa canisters for all SS vapor, IA, and OA locations.

Comments on the December 17, 2013 second revised draft VI investigation report and VI Work Plan Draft addendum were issued by USEPA on January 23, 2014. Responses to the January 23, 2014 comments were submitted to USEPA on February 6, 2014. Sketches of proposed round three VI sample locations were submitted to USEPA on February 12, 2014 following additional building surveys, and a conference call was conducted on February 14, 2014 to discuss the proposed sampling locations. General agreement of the proposed sampling locations with some modifications was achieved during the conference call. Revised sketches of proposed round three VI sample locations were submitted to USEPA on February 24, 2014 in response to the discussion during the conference call and additional building surveys.

Comments on the February 24, 2014 submittal were issued by USEPA on March 3, 2014 that indicated general agreement with the revised sketches pending final building surveys to be conducted prior to sampling. The comments also requested submission of a revised VI Work Plan Draft addendum. As requested by USEPA, a response to the March 3, 2014 Comment 1 was submitted to USEPA on March 4, 2014, which included revised sketches of sampling locations and rationales for the sampling locations. Responses to USEPA March 3, 2014 comments that included a revised VI Work Plan Draft Addendum were submitted to USEPA on March 5, 2014. At the request of USEPA, 7-day passive badge samplers were included in the revised draft addendum, coupled with selected proposed Summa canisters, at designated IA sampling locations (one per building) and OA sampling locations.

USEPA conditionally approved the revised VI Work Plan Draft Addendum on March 6, 2014, with stipulations that information provided by USEPA regarding the 7-day passive badge samplers be incorporated in the VI Work Plan Addendum and Quality Assurance Project Plan (QAPP), and that draft final versions of the marked up Summa canister sample locations figures (sketches) be submitted to USEPA on March 10, 2014, prior to round three sampling. On March 10, 2014, representatives for USEPA accompanied CRA in walk-throughs of the five selected buildings included in the round three sampling and requested moving an IA sample location in POT Building 592. Revised sketches, reflecting the multiple building surveys and walk-throughs, were submitted to USEPA on March 10, 2014 as stipulated. Representatives for USEPA accompanied CRA again on March 11, 2014. In lieu of moving an IA sample as requested by USEPA, GSH added an additional IA sample at the USEPA proposed location for POT Building 592. A revised sketch for POT Building 592 was submitted to USEPA on March 11, 2014 reflecting this additional change.

The revised sketches included the sampling locations from rounds one and two, and the addition of 7 SS vapor probe sample locations and 12 IA sample locations for round three. The above information and information provided by USEPA regarding the 7-day passive badge samplers was incorporated into the Final VI Work Plan Addendum and QAPP as stipulated, all of which was submitted to USEPA on March 12, 2014. One additional change to the Work Plan was approved by USEPA on March 17, 2014. The change included permitting sampling within 24 hours of a rain

event greater than 0.5 inches because of extensive pavement cover that allows little or no infiltration at the site.

The round three sampling began on March 11, 2014 and concluded on March 21, 2014.

A revised draft VI investigation report was submitted to USEPA on May 22, 2014, which incorporated the round three results. At the same time, GSH made the Agencies aware that the Port identified sub-slab HVAC cold air return ducts still in operation beneath Building 326 on May 21, 2014 during a walkthrough that was conducted to initiate vapor mitigation plans. GSH indicated that work would be conducted with the Port to investigate and decommission the sub-slab ducts, and re-route the ducting. Following completion of that work, GSH would conduct a round of indoor air sampling at Building 326 and re-evaluate the mitigation plan for that building. The time line of the vapor mitigation plan is discussed below.

On March 4, 2014, GSH submitted a draft Vapor Mitigation Systems Design Plan for the OCC Office Building and Port Buildings 326 and 532 related to the OCC AOC. Comments on the March 4, 2014 submittal were issued by USEPA on April 4, 2014 that indicated general agreement with the plan. On April 25, 2014, a revised Vapor Intrusion Mitigation Design Plan and responses to comments were submitted to USEPA. Conditional approval of the April 25, 2014 revised plan was issued by USEPA on June 15, 2014 that stipulated incorporation of additional final comments. On July 8, 2014, GSH submitted to USEPA responses to comments and a final revised Vapor Intrusion Mitigation Design Plan that incorporated USEPA's final comment. Following this submittal, Ecology took the lead on the vapor investigation and mitigation work. Mitigations plans were put on hold pending decommission the sub-slab ducts and re-route the ducting at Building 326 and additional sampling.

In 2014 and early 2015, GSH continued to work with the Port to decommission and re-route the sub-slab ducting and obtain access agreements to implement the work. The work was completed in February 2015.

Following the decommissioning and re-routing work in Building 326, a VI Work Plan Draft Addendum was developed for conducting another round of sampling at Port Buildings 326 and 532, hereafter referred to as round four. The purpose of the round four sampling was to evaluate the effectiveness of the mitigation at Building 326 already performed (i.e., ducting decommissioning and re-routing) and to further examine the necessity for the previously proposed mitigation at Building 532. The VI Work Plan Draft Addendum was submitted to Ecology on April 8, 2015 and follow up telephone communications completed between GHD and Ecology to schedule the sampling for late May 2015 not identify any additional data needs for the round four event as presented in the addendum. The round four sampling was performed over the period of May 26 to June 2, 2015.

In 2015, Ecology began a review of the VI investigation data. The round four data along with the previously reported data were provided to Ecology in electronic database format on August 5, 2015 to aid in Ecologies review. Ecology provided a memorandum dated November 13, 2015 that presented Ecology's detail review and analysis of the VI data. A copy of the memorandum is included in Appendix E.

Rounds One, Two, Three, and Four Sampling

Summa canister samples were analyzed using USEPA Method TO-15 and TO-15 SIM per the Work Plan. The analytes included 24 parameters, 19 of which are Site-related chemicals of concern (COC), and five additional compounds found in previous IA samples and in either soil or groundwater samples. The 7-day passive sampling was conducted using Radiello tubes and these samples were analyzed using USEPA Method TO-17. The Radiello tubes were selected to provide greatest number of target analytes with particular interest in the analysis of trichloroethene (TCE).

Washington State Ecology recommends in its 2009 VI Guidance document that decisions regarding the number of sampling rounds necessary to determine the VI contributions from the sub-surface should be site and building dependent.

"*In deciding how many events are merited, investigators will need to consider: a) the degree of soil gas contamination (higher concentrations suggesting the need for more than one event); b) the indoor air results (concentrations approaching acceptable levels suggesting the need for more than one event); and, c) the building and meteorological conditions encountered at the time of sampling (sampling during a season other than the "heating season," for example, usually suggests the need for at least an additional event during a colder period).*" (Page 3-22, Ecology, 2009).

The round one and round two sampling events were conducted approximately 2 months apart (April and June/July of 2013) to capture potential variability of sub-slab vapor (i.e., soil gas), and indoor and outdoor air VOC concentrations over time. The month of April is a colder period than June/July; however, the USEPA team requested an additional sampling event be completed during the heating season (cold weather) so a third round of sampling was completed in early March 2014. The round one sampling event included the use of Summa canisters. Summa canisters were used to collect 2-hour SS vapor samples, and concurrent 24-hour IA and OA samples. The round two event included the use of multiple sample collection methods. Both Summa canisters and passive sampling using Radiello tubes were deployed. Summa canisters were used to collect 2-hour SS vapor samples consistent with round one. IA and OA samples were collected concurrently with the passive samplers deployed over a period of 7 days, at the request of USEPA. The different collection method was implemented to capture potential variability of VOC concentrations over a longer sample collection time (i.e., 7 days compared to 24 hours) and for comparison of the analytical results from the round one Summa canister collection method. The round three event included Summa canisters at all locations and Radiello tubes (passive sampling) at one IA and one OA location at each building at the request of USEPA. The IA passive sampling locations were selected by USEPA. Summa canisters were used to collect 2-hour SS vapor samples, and 24-hour IA and OA samples consistent with round one sampling. Passive samplers were deployed consistent with round two sampling. The round four event was conducted in May/June 2015 and included Summa canister samples at selected locations and Radiello tube samples (passive sampling) at the selected IA and OA locations. Summa canisters were used to collect 2-hour SS vapor samples, and 24-hour IA and OA samples consistent with round one sampling. Passive samplers were deployed consistent with round two sampling.

The building-specific conditions (e.g., HVAC operations, window and door openings, etc.) were similar during the sampling rounds in that they represented typical operating conditions within the buildings. One significant difference was the efforts made to remove or identify potential indoor

sources for rounds two, three, and four that could potentially contribute to indoor air quality unrelated to sub-slab vapor.

Review and analysis of the analytical results for round two did not alter the initial conclusions developed from review of the round one results.

Review and analysis of analytical results for the five buildings included in round three altered the initial conclusions developed from review of the round one results. These included; no further action by GSH for POT Buildings 407 and 592, and continued monitoring by GSH for POT Building 595.

Review and analysis of analytical results for the two buildings included in round four altered the conclusions developed from review of the round one and round two results. These include no further action by GSH for POT Building 326 and 532. The reasons for the changes are a result of modifications to the HVAC system in Building 326 and updating the screening levels based on current Ecology draft guidance and new USEPA final guidance published in June 2015. The updated screening levels also resulted in review of previous data from rounds one and two. The results of this review indicate no exceedances of SS vapor screening levels for both buildings, which is consistent with the round four data. The IA exceedances in Building 532 previously reported and attributed to SS vapors do not exceed the updated IA screening levels. The IA exceedances in Building 326 previously reported and attributed to SS vapors have been mitigated by the modifications to the HVAC system as evidenced by the orders of magnitude decreases in IA concentrations in round four.

The recommendations at the end of the report, which are based on review of all the data with respect to the updated screening levels and in consideration of the changes to the HVAC system at Building 326, may be summarized as follows:

- No further action be GSH at Army Reserve Facility (ARF), Buildings 326, 407, 532, 592, and 596, and the Guard Shack
- Continued monitoring at Building 595
- Manage occupancy at OCC Office Building

Active mitigation systems are not needed at Building 595 and the OCC Office Building at this time because there are currently no exceedances of screening criteria for IA samples at Building 595 and the OCC office Building will be occupied only occasionally (e.g., a few hours) and during these times windows and doors will be left open to ventilate the space. These recommendations are supported by Ecology's memorandum dated November 13, 2015 (Appendix E), which provides additional analysis of the data.

This Report is organized as follows:

- Section 1.0 - Introduction
- Section 2.0 - Conceptual Site Model
- Section 3.0 - Buildings Investigated and Results
- Section 4.0 - Summary of Conclusions and Recommendations
- Section 5.0 - References

2. Conceptual Site Model

The purpose of the conceptual site model is to provide a conceptual understanding of the potential for indoor exposures to contaminants based on the sources of contamination, the transport media, and potential intrusion routes. Section 2.1 presents the Site characteristics and contaminants. Section 2.2 presents significant factors that can influence vapor intrusion.

2.1 Site Characteristics and Contaminants

The Site is located on a peninsula surrounded on three sides by saltwater bodies. Groundwater flow is influenced by heterogeneous geology, salt water presence from the surface water bodies, tidal fluctuations in the surface water bodies, and past releases at the Site of high density fluids.

In general, the Site stratigraphy consists of (from ground surface downward):

- A variable thickness layer of fill mainly consisting of silty sand deposits derived from sediments dredged to create the waterways in the Tacoma Tideflats and placed to create the peninsulas located between the waterways
- Puyallup River deltaic deposits that contain a heterogeneous mixture of sands, silts, and clays
- Predominantly low permeability glacial material underlying the deltaic deposits. Some discontinuous portions of the glacial material contain more permeable outwash deposits

Variable groundwater flow direction below the Site is generally towards the waterways. Groundwater at and near the Site averages approximately 12 feet below ground surface (ft bgs).

Site COC in relation to the vapor intrusion pathway are VOCs including primarily tetrachloroethene (PCE), TCE, cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) in groundwater that are related to OCC solvent plant operations conducted between 1947 and 1973. As these VOCs migrate in shallow groundwater toward and potentially beneath buildings, they can subsequently partition from the groundwater to vapor in the vadose zone and present a source for vapor contamination into overlying buildings. The presence of higher permeability soils such as sand and gravel, either naturally occurring or as utility bedding materials, can act as preferential pathways for vapor migration. The approximate extent of the groundwater total chlorinated VOC (TCVOCs = 1,000 µg/L) plume in relation to the buildings is presented on Figure 1.

Concentrations of VOCs in the vadose zone soils can also partition to vapor and potentially migrate laterally underneath nearby buildings, presenting another potential source for vapor contamination into buildings. The concentrations of the most recent, shallowest, and nearby groundwater and soil samples to each of the buildings investigated, where data are available, are illustrated in cross-sections on figures presented in Appendix B. Air data from the four rounds of sampling are also illustrated on the figures referenced in Section 3.0. These data are discussed in Section 3.0 and are presented in tables referenced in Section 3.0.

2.2 Factors that can Influence Vapor Intrusion

There are a number of factors that influence SS vapors intrusion into and retention in a building. The presence of a building floor slab, forced air heating systems, or over insulated and waterproofed buildings are three such factors, among others, that may influence vapor intrusion or retention and are further discussed below.

Primary among them is a building floor slab that can act as either a barrier to or a pathway for vapor intrusion. A slab that is in poor condition, is constructed of permeable material, has cracks, unsealed penetrations, and un-caulked floor/wall or expansion joints will permit more vapor intrusion. An effectively sealed or well-constructed slab in good condition will better inhibit upward flow of SS vapors. The presence of a barrier such as a vapor barrier beneath the slab, or in the form of a coating applied to the surface of the floor slab, will also inhibit vapor migration to some degree, which will in turn slow VOC migration into a building. Vapor barriers or coatings enhance the ability of the floor slab to inhibit vapor intrusion. Vapor barriers are designed to inhibit moisture (water vapor) from entering buildings and may also inhibit some vapor intrusion, whereas vapor intrusion barriers (e.g., coatings) are specifically designed to inhibit vapor intrusion of volatile chemicals from the subsurface. Paved areas around buildings may also inhibit vapors from migrating to outdoor ambient air.

Another causative factor is a forced air heating system that draws cold air from within a building to be heated and returned to the indoor environment. This type of heating system can cause a negative pressure within the occupied space when in operation, causing SS vapors to enter the heated space more readily. This is especially true if cold air returns are blocked or not adequately sized for the blower fan.

Over insulating and effectively weatherproofing a building can contribute to less ventilation of the indoor area, and lead to the accumulation of contaminants in the indoor space. Conversely, an indoor space that is not heated, that has exterior walls that are not well sealed, that has roof top air exchange vents, and/or a number of large doors which are in use (such as a warehouse or older industrial space) can lead to the additional exchange of indoor air with air from outside of the building, which can inhibit subsurface vapors from accumulating within a building.

3. Buildings Investigated and Results

Figure 1 identifies the nine buildings investigated, including the ARF, Buildings 326, 407, 532, 592, 595, and 596, and the Guard Shack located on properties owned and/or controlled by the POT, and the OCC Office Building. These buildings were selected based on their proximity to the groundwater VOC plume, which is either below (regardless of depth) or within 100 ft laterally of the buildings, and a component of groundwater flow towards Commencement Bay further to the north of the Properties. The VI pathway may be complete at buildings that are not within groundwater VOC plume area shown on Figure 1 and buildings outside this area within 100 ft laterally are investigated and considered for mitigation measures on an individual basis by GSH. Currently, there are no other buildings to be assessed. Table 1 provides a summary of available information for each of the nine buildings investigated (e.g., tenant name, use, dimensions, depth to groundwater, description of heating, ventilation, and air conditioning/HVAC, etc.), which is up-to-date as of May 2015.

The building investigations include four sampling events, round one, round two, round three, and round four. Round one was completed in early spring (April), round two was completed in the summer (June/July), round three was completed during the winter (March; heating season), and round four was completed in late spring (May/June). The general sample locations for the investigated buildings are presented on Figure 1.

Round One

SS vapor and IA quality was investigated through the installation and sampling of SS vapor probes at 17 locations inside the nine buildings and concurrent collection of IA and OA samples. Although the Work Plan originally proposed the installation of 19 SS vapor probes, complications with utility clearance reduced the number to 18, as a suitable probe location was not identified for the Guard Shack. The deletion of the proposed SS vapor probe at the Guard Shack was originally conveyed to the USEPA in an April 4, 2013 email from GSH's Clint Babcock to the USEPA's Jonathan Williams and was again discussed and its deletion approved on a June 11, 2013 teleconference between GSH, USEPA, and POT.

Prior to the installation of any SS vapor probes, a borehole clearance was completed at each drilling location with the assistance of a private utility locator. The utility locator identified any potential buried utilities near the planned sampling locations. When anomalies were located within the clearance area, the probe location was moved as necessary. Following successful borehole clearance, drilling and installation of the SS vapor probes were completed. As referenced previously in this report, in the case of the Guard Shack, the size of the building prevented the completion of an accurate utility clearance; therefore, no SS vapor probe could be installed at that building.

Prior to sample collection, the building indoor environments were surveyed to identify and account for potential VOC emitters (especially those that may emit the same VOCs potentially present in the sub-slab vapor). Where practical, the building tenants were asked to remove, isolate, or control the potential emitters (e.g., cleaners, solvents, paints, adhesives, etc.) prior to and during the sampling. Where it was determined not feasible to remove or isolate potential general indoor contaminant sources, an IA monitoring location was added to account for the potential contribution from these background sources. Summaries of the indoor environment surveys are provided in the following sections.

Round one sampling was initiated on April 17 and completed on April 26, 2013. Weekend sampling was necessary for locations within Buildings 592, 595, and 596 in order to meet tenant requests. Operations of the heating and cooling systems during the sampling event were confirmed with building tenants to remain consistent with weekday activities, to reflect normal occupied conditions. IA sample locations were selected adjacent to the SS vapor probes where practical. Two additional IA samples were collected in areas identified as having potential indoor sources of VOCs.
OA samples were collected each day of SS vapor and IA sampling. OA sample locations were selected to represent background ambient air conditions on the upwind exterior of the buildings based on wind direction observations made at the start of each sampling day.

The IA and OA samples at each building were collected concurrently over a 24-hour period. Each SS vapor sample was collected over a 2-hour period during the 24-hour period for the associated IA and OA sampling activities. Weather conditions were recorded at the start of each sampling day. Precipitation observations were made with an on Site rain gauge. SS vapor probe installation, and SS vapor, IA, and OA sampling followed the procedures detailed in Appendix A of the Work Plan.

Round Two

SS vapor and IA quality was investigated through re-sampling SS vapor and IA locations from round one in five of the nine buildings, including Buildings 326, 532, 592, 595, and 596.

As noted in Section 2.1, a second building survey was conducted to determine the potential presence of indoor sources that may contribute to indoor air quality prior to the round two sampling. Summaries of the indoor environment surveys are provided in the following sections.

Round two sampling was initiated on June 24 and completed on July 9, 2013. As was done in round one, normal building conditions were maintained during the sample period. OA sample locations were selected to represent background ambient air conditions on the upwind exterior of the buildings based on wind direction observations made at the start of each sampling day.

In addition to the re-sampling locations, six additional IA samples were collected in areas identified as having potential indoor sources of VOCs and in centrally located areas to represent potential worst-case (upper bound) vapor intrusion points.

SS vapor samples were collected over a 2-hour period. The IA and OA passive samples were collected concurrently over a 7-day period beginning on the day the corresponding building SS vapor samples were collected. Passive samplers set out of doors (OA samples) were protected from the weather with a small metal shroud. The shroud allowed adequate air circulation but sheltered the cartridge from precipitation.

Weather conditions were recorded at the start of each sampling day. Precipitation observations were made with an on Site rain gauge with supplemental information gathered from a local Tacoma weather station. SS vapor, IA, and OA sampling followed the procedures detailed in the Work Plan and associated addenda.

Round Three

SS vapor and IA quality was investigated through re-sampling SS vapor and IA locations from round one and round two in five of the nine buildings, including Buildings 407, 592, 595, 596, and the ARF. At the request of USEPA, 7 new SS vapor probes were installed prior to the round three sampling event. New SS vapor probe locations are shown on Figure 1. In addition to the new SS vapor locations, 12 IA sampling locations were added. These locations were selected with input from USEPA to identify new potential source areas, to represent potential worst-case (upper bound) vapor intrusion points (i.e., centrally located) and to address specific small office and occupied spaces previously excluded from sampling priorities.

Prior to the installation of any new SS vapor probes, a borehole clearance was completed at each drilling location with the assistance of a private utility locator. The utility locator identified any potential buried utilities near the planned sampling locations. When anomalies were located within the clearance area, the probe location was moved as necessary. Numerous anomalies were identified in the center of the ARF maintenance area; therefore, the SS vapor probe was shifted a few feet west of center. This location however, is still closer to the center of the slab then the edge. Following successful borehole clearance, drilling and installation of the SS vapor probes were completed.

As with round two, building surveys were conducted to determine the potential presence of indoor sources that may contribute to indoor air quality prior to the round three sampling. Summaries of the indoor environment surveys are provided in the following sections.

Round three sampling was initiated on March 11 and completed on March 21, 2014. Partial weekend sampling was necessary for locations within Buildings 596 and ARF in order to meet schedule demands and tenant requests. Sampling within the ARF maintenance area and Building

596 were initiated on Friday, March 14 and completed on Saturday March 15. Both buildings were occupied as each facility had shifts working through the weekend. As with previous rounds, the operations of the heating systems during the sampling event were confirmed with building tenants to remain consistent with weekday activities, to reflect normal occupied conditions.

IA sample locations were selected adjacent to the SS vapor probes where practical. Two additional IA samples were collected in areas identified as having potential indoor sources of VOCs. OA samples were collected concurrent with IA sampling. OA sample locations were selected to represent background ambient air conditions on the upwind exterior of the buildings based on wind direction observations made at the time of deployment of the sampling equipment.

The IA and OA Summa canister samples at each building were collected concurrently over a 24-hour period. Each SS vapor sample was collected over a 2-hour period during the 24-hour period for the associated IA and OA sampling activities. Passive Radiello sampling badges, where deployed, were exposed for a 7-day sampling duration. Passive samplers set out of doors (OA samples) were protected from the weather with a small metal shroud. The shroud allowed adequate air circulation but sheltered the cartridge from precipitation.

Weather conditions were recorded at the start of each sampling day. Precipitation observations were made with an on Site rain gauge with supplemental information gathered from a local Tacoma weather station. SS vapor probe installation, and SS vapor, IA, and OA sampling followed the procedures detailed in the Work Plan and associated addenda.

Round Four

SS vapor and IA quality was investigated through re-sampling of selected SS vapor and IA locations in two of the nine buildings, including Buildings 326 and 532.

As with previous sampling rounds, building surveys were conducted to determine the potential presence of indoor sources that may contribute to indoor air quality prior to the round four sampling. Summaries of the indoor environment surveys are provided in the following sections.

Round four sampling was initiated on May 26 and completed on June 2, 2013. As was done in previous sampling rounds, normal building conditions were maintained during the sample period.

IA sample locations were selected adjacent to the SS vapor probes. Two additional IA samples were collected in areas identified as having potential indoor sources of VOCs. OA samples were collected concurrent with IA sampling activities. OA sample locations were selected to represent background ambient air conditions on the upwind exterior of the buildings based on wind direction observations made at the time of deployment of the sampling equipment.

The IA and OA Summa canister samples at each building were collected concurrently over a 24-hour period. Each SS vapor sample was collected over a 2-hour period during the 24-hour period for the associated IA and OA sampling activities. Passive Radiello sampling badges, where deployed, were exposed for a 7-day sampling duration. Passive samplers set out of doors (OA samples) were protected from the weather with a small metal shroud. The shroud allowed adequate air circulation but sheltered the cartridge from precipitation.

Weather conditions were recorded at the start of each sampling day. Precipitation observations were made with an on Site rain gauge with supplemental information gathered from a local Tacoma

weather station. SS vapor, IA, and OA sampling followed the procedures detailed in the Work Plan and associated addenda.

Rounds One to Four

All Summa canister samples submitted to the laboratory (ALS Environmental in Simi Valley, CA – a Washington State certified laboratory) were analyzed using USEPA Method TO-15 and TO-15 SIM for selected target analytes. All passive samples were analyzed using USEPA Method TO-17. The Data Quality Assessment and Validation memoranda are presented in Appendix C and the laboratory reports are provided in Appendix D. The IA analytical results were compared to current Model Toxics Control Act (MTCA) Method C screening levels originally presented in Ecology's Draft VI Guidance (Ecology, 2009; Table B-1) and the IA short-term screening level for TCE (8.4 micrograms per cubic meter [µg/m^3]). The SS vapor analytical results were compared to sub-slab screening levels derived from the above MTCA Method C screening levels multiplied by an attenuation factor of 0.03 recommended by USEPA (USEPA, 2015). The list of target analytes and applicable screening levels along with method reporting limits are presented in Table 2.

Discussion of reporting limits (RLs) and detection limits (DLs)

Discussions of reporting limits (RLs) and detection limits (DLs) for each sampling round are present below.

Round One

While the RLs for all of the laboratory blanks met the values indicated in Table 2, each sample canister had a dilution factor applied based on the beginning and ending pressures, which affected the DLs and RLs for the sample. Additionally, some of the sample canisters required additional dilution due to elevated analyte concentrations. The RLs for all not detected parameters in all IA and SS vapor samples were equal to or less than the applicable IA or SS vapor screening levels with the following exceptions:

- For OCC Office Building, naphthalene SS vapor screening level 25 µg/m^3 was marginally exceeded by the RL in SS vapor sample SS-15 (33 U µg/m^3) because of dilution as a result of elevated concentrations of other analytes within the sample.

This occurrence is identified in Table 11 of this report and is isolated and marginal. Additionally, if a positive detection was observed for any compound below the RL in a sample, then the laboratory was instructed to report the result. Therefore, the results are considered sufficiently accurate for the purpose of the investigation.

Round Two

The round two sampling event used SS vapor sampling procedures and equipment identical to the round one event, and 7-day passive sampling procedures and equipment for IA sample collection. The RLs for all of the laboratory blanks met the values indicated in Table 2. Similar to round one, each SS canister vapor sample collected during round two had a dilution factor applied based on the beginning and ending pressures, which affected the DLs and RLs for the samples. Additionally, some of the sample canisters required additional dilution due to elevated analyte concentrations. However, the round two RLs for all not detected parameters in all SS vapor samples were equal to or less than the applicable SS vapor screening levels with no exceptions. The RLs for all not detected parameters in all IA samples were equal to or less than the applicable IA screening levels

with no exceptions. Therefore, the results are considered accurate for the purpose of the investigation.

Round Three

The round three sampling event used SS vapor and IA Summa canister sampling and analysis procedures and equipment identical to the round one event, and IA 7-day passive sampling and analysis procedures and equipment identical to those used in round two. The RLs for all not detected parameters in all IA and SS vapor samples were equal to or less than the applicable IA or SS vapor screening levels with the following exception:

- For Building 407, the IA screening level 0.20 $\mu g/m^3$ for 1,1,2-trichloroethane (1,1,2-TCA) was marginally exceeded by the RL in IA sample IA-38 (0.57 U $\mu g/m^3$)

This occurrence is identified in Table 5 of this report and is isolated and marginal. Additionally, if a positive detection was observed for any compound below the RL in a sample, then the laboratory was instructed to report the result. Therefore, the results are considered sufficiently accurate for the purpose of the investigation.

Round Four

The round four sampling event used SS vapor and IA Summa canister sampling and analysis procedures and equipment identical to the round one event, and IA 7-day passive sampling and analysis procedures and equipment identical to those used in round two. The RLs for all not detected parameters in all IA and SS vapor samples were equal to or less than the applicable IA or SS vapor screening levels with no exceptions. Therefore, the results are considered accurate for the purpose of the investigation.

Background Concentrations Consideration

The IA analytical results were assessed with respect to the background concentrations detected in the OA samples and potential indoor VOC emitters. Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State (Ecology, 2009) was consulted regarding whether additional characterization activities or mitigation by GSH is warranted for each building, based on detected concentrations of SS vapor analytes relative to IA sample concentrations.

As stated in Ecology's Draft VI Guidance (Ecology 2009; Section 3.2.3) "*The vapor intrusion assessment focus is not on general indoor air contamination, but on the subsurface contribution to indoor air contamination. It is expected that most measurements of indoor air VOCs will be affected by "background" sources, and Ecology recommends that measured indoor air concentrations be corrected for this contribution if it can be done conservatively. Failing to accurately account for background VOC contributions can lead to exaggerating the perceived degree of vapor intrusion and installing unneeded mitigation systems.*" The section further explains: "*There are numerous methods for estimating background indoor VOC concentrations…Indoor air measurements may be adjusted (that is, corrected) by subtracting these estimates when the estimates are based on OA measurements concurrently taken upwind of the building(s) in which indoor air samples are being obtained.*"

For each building, the sections below discuss:

- Building properties and usage
- Sampling location rationale and pre-sampling survey results
- Sampling results including the effect of background concentrations
- Recommendations for future actions by GSH

3.1 Army Reserve Facility

Figure 2 shows the sample locations and layout of the ARF.

Building Properties and Usage

The ARF is a 3-story building with offices, a small armory, and various workshops. The armory and workshops are on the first floor, and offices and common rooms are present on all three floors. Ceilings are 9-ft drop ceilings, except for the front entry (45-ft) and storage area (~25-ft). There is little detailed information available on construction of this building. Construction is brick on a concrete slab. The observed slab thickness is between 5.5 and 6 inches and appears in good condition. The location of load bearing foundations or footers, column construction, office framing, internal sub-floor utilities, etc., is unknown. Building additions protruding from the north end house a large maintenance area. There are a large number of offices on the first floor that are framed above the slab. Vapors could potentially intrude into this building through cracks in the floor slab, unsealed utility penetrations, and un-caulked floor/wall or expansion joints.

The large maintenance area is located at the very north end of the building. Three chemical storage lockers and parts cleaning stations are located within this area. Several pieces of large metal working equipment are located in this area including a large drill press, metal lath, and numerous smaller table-mounted tools. This area is used for the maintenance of the facilities vehicles and vessels. The concrete slab in the maintenance area is approximately 9 inches thick and in good condition.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

Three SS vapor probes were installed where paired SS vapor and IA samples were collected, as discussed below.

Sample pair SS/IA-17 was located within a large mixed-use area referred to by Army Reserve personnel as "Unit Storage". This area is used primarily for storage of equipment but also has areas for small office cubicles. A small quantity of hand cleaning products was observed in a storage cage adjacent to the sampling area. The material observed did not appear to contain potential VOC emitters. All materials were stored within locked cages, and therefore contents of each individual cage could not be reviewed.

Sample pair SS/IA-18 was located within an office space (Office 102) located near the southwestern corner of the building. This office was selected based on its location relative to the groundwater plume with respect to the rest of the building and the office space was vacant at the time of sampling, thereby limiting interference with tenant activities. No obvious potential VOC emitters were observed at this location. The initial IA canister deployed at sample location IA-18 was

observed to be filling at a rate faster than designed (i.e., approximately 24 hours). It was determined that a second canister should be deployed to ensure collection of a 24-hour sample (IA-22). The initial canister (IA-18) was allowed to continue to fill until it reached an internal pressure of less than 10 inches of mercury and was then closed after approximately 9 hours of sampling. Sample IA-22 was allowed to fill for approximately 24 hours.

Sample pair SS/IA-19 was located in the northern portion of the building to provide representative coverage of the building footprint. Initially, an office location was chosen further to the north but buried utilities necessitated the location be shifted across the hall to the south to a small break room. No obvious potential VOC emitters were observed at this location.

Sampling within the ARF was initiated on April 19, 2013 with the 24-hour samples completed the following day. The associated OA sample for this building (OA-18) was collected outside of the building approximately midway along the western wall concurrently with the IA samples. Weather conditions were calm, with mild winds out of the west. No precipitation was noted.

Round Two

Discussions with the USEPA and POT during the June 11, 2013 conference call resulted in the decision to exclude the ARF from the round two sampling event.

Round Three

Comments received from the USEPA regarding the sampling results of rounds one and two resulted in the decision to include the ARF in the round three sampling event. In addition to including the ARF building in round three, USEPA requested that the maintenance area to the north that was previously excluded from the sampling be added. A total of 13 Summa canister samples were collected during round three including at five SS vapor locations paired with five IA locations (two new and three existing pairs), one IA location near a potential source area, and one OA location (two samples collected at the same location but starting on separate dates). Additionally, two passive samples were collected, one from IA location 19 (IA-19P) and one from OA location 18 (OA-18P), as specified by USEPA. A review of mechanical rooms conducted on February 10, 2014 in this building did not reveal any preferential pathways for vapor migration, with the exception of the fire sprinkler room. The watermain entering this room penetrated the slab and the void space surrounding the pipe was not sealed. The mechanical room; however, has a vented door to the outside with no access to the interior building space. No samples were collected from the mechanical rooms associated with the ARF building.

Sample pair SS/IA-17 was unchanged from round one. Consistent with the round one sampling event the materials observed in this area did not appear to contain potential VOC emitters. All materials were stored within locked cages, and therefore contents of each individual cage could not be reviewed.

Sample pair SS/IA-18 was unchanged from round one. No obvious potential VOC emitters were observed at this location and the office is currently vacant.

Sample pair SS/IA-19 was unchanged from round one. No obvious potential VOC emitters were observed at this location.

Sample pair SS/IA-29 was centrally located within the "Unit Storage" area to represent a potential worst-case (upper bound) vapor intrusion point. Consistent with the round one sampling event the

material observed in this area did not appear to contain potential VOC emitters. All materials were stored within locked cages, and therefore contents of each individual cage could not be reviewed.

Sample pair SS/IA-30 was added to assess the center of the maintenance area to represent a potential worst-case (upper bound) vapor intrusion point in this area. A review of the maintenance area identified a location in the southeast portion used for the cleaning of parts and the storage of chemicals in a number of chemical storage lockers. A review of the chemical lockers in this area revealed 56 different products stored. A review of the MSDSs for these products has identified methylene chloride (MC), chloride, PCE, TCE, naphthenic compounds, and petroleum distillates. These chemicals are analytes with the potential to be present in the indoor air environment due to the storage and use in this area. A list of the chemicals by MSDS number is provided in Appendix A along with all the MSDSs maintained by the ARF staff for chemicals potentially stored and used on site.

The sample IA-31 was collected in close proximity to the parts washing area and chemical storage lockers in the maintenance area to assess the contributions of potential VOC emitters in this area.

The indoor and ambient air sampling was initiated on March 11, 2014 using passive sampling equipment at IA-19P and OA-18P. The samplers were retrieved 7 days later. Summa canister samples within the ARF were collected over a 3-day period. Sampling at locations 17, 18, 19, and 29 was initiated on March 13, 2014, with the 24-hour samples completed the following day. The associated OA sample for this building (OA-18) was collected outside of the building approximately midway along the western wall concurrent with locations 17, 18, 19, and 29. Weather conditions were calm, with winds out of the west. No precipitation was noted. Sample locations 30 and 31 were sampled on March 14, with 24-hour samples completed the following day. A second OA sample (OA-30) was collected concurrent with IA-30 and IA-31. Weather conditions were calm, with winds out of the west. Trace precipitation was noted on March 14 and 15.

Round Four

The ARF was excluded from the round four sampling event as sufficient data had been collected for the purpose of this report.

Sampling Results

Round One

Analytical results are presented in Table 3 and detected parameters are summarized on Figure 2.

The IA and SS concentrations were not detected or detected at concentrations below the screening levels.

Round Three

Analytical results are presented in Table 3 and detected parameters are summarized on Figure 2.

IA concentrations of naphthalene and TCE exceeded MTCA IA screening levels.

IA concentration of naphthalene at IA-30 (0.90 $\mu g/m^3$), located in the maintenance area, exceeded the IA MTCA screening level (0.74 $\mu g/m^3$). Naphthalene was detected in the paired SS-30 sample but at a lower estimated concentration of 0.12 J $\mu g/m^3$, which is below the SS vapor and IA screening levels. Naphthalene was detected in the associated OA sample at 0.14 J $\mu g/m^3$, less

than the IA concentration. Naphthalene was detected in the other IA samples below the screening levels. Naphthalene was detected in the other four SS vapor samples at concentrations below the screening levels and below the paired IA samples concentrations for all but one sample where the IA and SS vapor concentrations were similar. Naphthalene is a ubiquitous contaminant associated with hydrocarbon combustion, pesticides, and deodorants. Specifically within the maintenance area, vehicles and equipment are periodically operated, and vehicle exhausts may be concentrated in this area. During sampling procedures, the temporary operation of a forklift was noted, along with the opening of a large garage door. After the vehicle was removed, the door was closed. It is therefore concluded that the IA MTCA screening level exceedance for naphthalene is likely attributable to an indoor source.

IA concentrations of TCE at IA-30 and IA-31, located in the maintenance area, are 2.6 $\mu g/m^3$ and 2.9 $\mu g/m^3$, respectively, and similar. IA-31 is located adjacent to a potential VOC emitter. Both of these detections exceeded an IA MTCA screening level (2.0 $\mu g/m^3$). TCE was detected in the associated OA sample at 0.17 $\mu g/m^3$, less than the IA concentrations. TCE was detected in the SS vapor sample for the sampling pair SS/IA-30 at a concentration of 100 $\mu g/m^3$, above the SS vapor non-carcinogenic screening level. The concentrations in the four other paired IA and SS vapor samples were below the screening levels. These four locations are between the OCC source area and location SS-30. As detailed above during the pre-sampling inventory of the chemical storage lockers in the maintenance area, a potential source of TCE was identified in a product named "Safety Solvent" (MSDS #167 in attached ARF MSDS Appendix). Considering the use of TCE at this location and the presence of floor drains and an oil water separator, there is a potential for the TCE detection in the SS vapor sample to be related to local site conditions and is not associated with the identified OCC plume. Additionally, considering the storage of cleaning products containing TCE and their potential use in this area and that the concentration at IA-31 (potential VOC source) is slightly greater than the concentration at IA-30, it is concluded that IA MTCA screening level exceedances for TCE are likely attributable to an indoor source and potentially subsurface source unrelated to OCC. The IA TCE concentrations (up to 2.9 $\mu g/m^3$) are below the short-term criterion of 8.4 $\mu g/m^3$.

The analytical results for the passive samples were similar to the Summa canisters collected at the same location for both IA and OA.

The following table presents the difference between measured IA concentrations and measured OA concentrations (adjusted IA). Not detected results for OA samples were assumed as zero.

Detected		IA-17	IA-18	IA-19	IA-29	IA-30	IA-31
Volatile Organic Compounds		- OA-18	- OA-18	- OA-18	- OA-18	- OA-30	- OA-30
1,1,1-Trichloroethane	$\mu g/m^3$	0.043	0.007	0.046	0.26	0.036	0.058
1,1-Dichloroethene	$\mu g/m^3$	-	-	-	-	-	-
1,2,4-Trichlorobenzene	$\mu g/m^3$	-	0.067	-	0.020	-	-
1,2,4-Trimethylbenzene	$\mu g/m^3$	0.88	0.50	0.29	0.60	0.73	0.71
1,3,5-Trimethylbenzene	$\mu g/m^3$	0.288	0.148	0.078	0.188	0.193	0.183
1,4-Dichlorobenzene	$\mu g/m^3$	0.038	0.036	0.066	0.031	0.001	0.002
Benzene	$\mu g/m^3$	0.48	0.25	0.18	0.34	0.58	0.48
Carbon tetrachloride	$\mu g/m^3$	-0.010	-0.050	0.00	-0.010	-0.030	-0.020

Detected		IA-17	IA-18	IA-19	IA-29	IA-30	IA-31
Volatile Organic Compounds		- OA-18	- OA-18	- OA-18	- OA-18	- OA-30	- OA-30
Chloroform (Trichloromethane)	µg/m^3	0.018	0.018	0.012	0.016	0.011	0.015
cis-1,2-Dichloroethene	µg/m^3	0.006	0.013	0.013	0.003	-0.019	-0.018
Ethylbenzene	µg/m^3	0.46	0.26	0.08	0.36	0.20	0.20
m&p-Xylenes	µg/m^3	1.5	1.1	0.2	1.3	0.9	0.2
Methylene chloride	µg/m^3	0.10	0.01	-0.04	0.20	0.01	0.29
Naphthalene	µg/m^3	0.25	0.18	0.07	0.22	**0.76**[b]	0.15
o-Xylene	µg/m^3	0.57	0.37	0.07	0.47	0.30	0.20
Styrene	µg/m^3	0.30	0.23	0.07	0.22	0.06	0.14
Tetrachloroethene	µg/m^3	0.01	0.11	0.02	0.37	0.03	0.19
Toluene	µg/m^3	1.7	-0.20	-0.6	1.0	2.1	2.3
trans-1,2-Dichloroethene	µg/m^3	-	-	0.011	-	-0.001	0.001
Trichloroethene	µg/m^3	0.003	0.026	0.057	0.227	**2.43**[c]	**2.73**[c]
Vinyl chloride	µg/m^3	0.037	0.014	0.026	0.030	-0.004	-0.002

As shown in the above table, there are adjusted IA exceedances of naphthalene at location IA-30, and of TCE at locations IA-30 and IA-31. As noted previously, naphthalene was not detected above screening levels in SS vapor samples and the SS vapor concentrations are generally less than IA concentrations, and therefore it may be concluded that the naphthalene IA screening level exceedance is not attributable to sub-slab vapor. The TCE exceedances are associated with the maintenance area and as noted previously are likely attributable to an indoor source and potentially subsurface source unrelated to OCC.

In summary, it is concluded that IA screening level exceedance for naphthalene is likely attributable to an indoor source. Potential indoor sources include the operation of vehicles in the maintenance area. IA detections of TCE are attributed to a potential indoor air source and potentially an isolated source beneath the maintenance area unrelated to the OCC plume.

Round One and Round Three Data Comparison

The following table presents a side-by-side comparison of the round one and round three sub-slab vapor data.

		Round One	Round Three	Round One	Round Three	Round One	Round Three
Volatile Organic Compounds		SS-17	SS-17	SS-18	SS-18	SS-19	SS-19
1,1,1-Trichloroethane	µg/m^3	1.6	1.0	0.19 J	0.16	1.2	0.91
1,1,2,2-Tetrachloroethane	µg/m^3	0.24 U	0.20 U	0.20 U	0.037 U	0.038 U	0.19 U
1,1,2-Trichloroethane	µg/m^3	0.94 U	0.79 U	0.81 U	0.15 U	0.15 U	0.78 U
1,1-Dichloroethene	µg/m^3	0.24 U	0.20 U	0.20 U	0.037 U	0.038 U	0.19 U
1,2,4-Trichlorobenzene	µg/m^3	0.24 U	0.20 U	0.20 U	0.037 U	0.038 U	0.19 U

		Round One	Round Three	Round One	Round Three	Round One	Round Three
Volatile Organic Compounds		SS-17	SS-17	SS-18	SS-18	SS-19	SS-19
1,2,4-Trimethylbenzene	µg/m^3	4.7 U	0.084 J	4.0 U	0.029 J	0.76 U	0.78 U
1,3,5-Trimethylbenzene	µg/m^3	4.7 U	0.79 U	4.0 U	0.15 U	0.76 U	0.78 U
1,4-Dichlorobenzene	µg/m^3	0.24 U	0.20 U	0.20 U	0.014 J	0.038 U	0.19 U
Benzene	µg/m^3	0.71 U	0.59 U	0.60 U	0.11 U	0.11 U	0.58 U
Carbon tetrachloride	µg/m^3	1.6	1.2	1.9	1.8	6.5	2.3
Chloroform	µg/m^3	0.25 J	0.18 J	0.54 J	0.49	0.79	0.35 J
cis-1,2-Dichloroethene	µg/m^3	0.24 U	0.20 U	0.20 U	0.037 U	0.038 U	0.19 U
Ethylbenzene	µg/m^3	0.045 J	0.081 J	0.047 J	0.039 J	0.049 J	0.78 U
Hexachlorobutadiene	µg/m^3	0.24 U	0.20 U	0.20 U	0.037 U	0.038 U	0.19 U
m&p-Xylenes	µg/m^3	0.15 J	0.23 J	0.15 J	0.13 J	0.20	0.15 J
Methylene chloride	µg/m^3	4.7 UJ	0.79 U	4.0 UJ	0.15 U	0.76 UJ	0.78 U
Naphthalene	µg/m^3	0.94 U	0.14 J	0.81 U	0.087 J	0.057 J	0.19 J
o-Xylene	µg/m^3	0.050 J	0.098 J	0.056 J	0.047 J	0.065 J	0.072 J
Styrene	µg/m^3	4.7 U	0.79 U	4.0 U	0.15 U	0.76 U	0.78 U
Tetrachloroethene	µg/m^3	0.70	1.0	5.0	4.5	5.4	5.1
Toluene	µg/m^3	0.94 U	1.1	0.81 U	1.5	0.27 J	2.6
trans-1,2-Dichloroethene	µg/m^3	0.24 U	0.20 U	0.20 U	0.012 J	0.038 U	0.19 U
Trichloroethene	µg/m^3	0.084 J	0.42	1.3	1.6	0.23	0.45
Vinyl chloride	µg/m^3	0.24 U	0.20 U	0.20 U	0.037 U	0.038 U	0.19 U

The reported concentrations for the round three samples are similar to the reported concentrations for the round one samples, with the notable exception of CT at SS-19. The round three CT concentration is lower than round one and similar to CT concentrations at other SS vapor probes including the two new SS vapor locations. Variability for the parameters detected above 1 µg/m^3 includes: slight decreases in concentrations in round three for 1,1,1-trichloroethane (1,1,1-TCA), CT, and PCE; a slight increase for TCE; and an increase for toluene. These data suggest limited variability in concentrations over time and limited temporal effects. The parameters that were not detected in both rounds of sampling include 1,1,2,2-tetrachloroethane (1,1,2,2-PCA), 1,1,2-TCA, 1,1-dichloroethene (1,1-DCE), 1,2,4-trichlorobenzene (1,2,4-TCB) , 1,3,5-trimethylbenzene (1,3,5-TMB), benzene (BZ), cis-1,2-DCE, hexachlorobutadiene (HCBD), methylene chloride, styrene, and VC.

The following table presents a side-by-side comparison of the round one and round three indoor air data.

		Round One	Round Three	Round One	Round Three	Round One	Round Three
Volatile Organic Compounds		IA-17	IA-17	IA-18	IA-18	IA-19	IA-19
1,1,1-Trichloroethane	µg/m^3	0.089	0.064	0.049	0.028 J	0.11	0.067

		Round One	Round Three	Round One	Round Three	Round One	Round Three
Volatile Organic Compounds		IA-17	IA-17	IA-18	IA-18	IA-19	IA-19
1,1,2,2-Tetrachloroethane	µg/m^3	0.038 U	0.035 U	0.041 U	0.036 U	0.039 U	0.038 U
1,1,2-Trichloroethane	µg/m^3	0.15 U	0.14 U	0.16 U	0.15 U	0.15 U	0.15 U
1,1-Dichloroethene	µg/m^3	0.010 J	0.035 U	0.041 U	0.036 U	0.039 U	0.038 U
1,2,4-Trichlorobenzene	µg/m^3	0.038 U	0.035 U	0.041 U	0.067	0.039 U	0.038 U
1,2,4-Trimethylbenzene	µg/m^3	1.3	1.1	0.82	0.72	0.80	0.51
1,3,5-Trimethylbenzene	µg/m^3	0.40 J	0.35	0.30 J	0.21	0.27 J	0.14 J
1,4-Dichlorobenzene	µg/m^3	0.054	0.061	0.14 J	0.059	0.16	0.089
Benzene	µg/m^3	0.69	1.1	0.43	0.87	0.67	0.80
Carbon tetrachloride	µg/m^3	0.51	0.47	0.31	0.43	0.46	0.48
Chloroform	µg/m^3	0.11 J	0.10 J	0.13 J	0.10 J	0.18	0.094 J
cis-1,2-Dichloroethene	µg/m^3	0.038 U	0.033 J	0.041 U	0.040	0.039 U	0.040
Ethylbenzene	µg/m^3	1.4	1.2	1.4	1.0	1.1	0.82
Hexachlorobutadiene	µg/m^3	0.038 U	0.035 U	0.041 U	0.036 U	0.039 U	0.038 U
m&p-Xylenes	µg/m^3	4.9	4.3	5.3	3.9	3.9	3.0
Methylene chloride	µg/m^3	0.91 U	0.50	0.82 U	0.41	0.77 U	0.36
Naphthalene	µg/m^3	0.62	0.35	0.081 J	0.28	0.095 J	0.17
o-Xylene	µg/m^3	1.7	1.5	1.6	1.3	1.3	1.0
Styrene	µg/m^3	0.40 J	0.47	0.82 U	0.40	0.23 J	0.24
Tetrachloroethene	µg/m^3	0.21	0.19	0.23	0.29	0.60	0.20
Toluene	µg/m^3	4.9	4.8	1.2	2.9	2.5	2.5
trans-1,2-Dichloroethene	µg/m^3	0.050	0.035 U	0.041 U	0.036 U	0.017 J	0.011 J
Trichloroethene	µg/m^3	0.074	0.076	0.054	0.099	0.045	0.13
Vinyl chloride	µg/m^3	0.095	0.049	0.072	0.026 J	0.11	0.038

The reported concentrations for the round three samples are similar to the reported concentrations for the round one samples. Variability for the parameters detected above 1 µg/m^3 includes: slight decreases in concentrations in round three for 1,2,4-trimethylbenzene (1,2,4-TMB), ethylbenzene (EB), m&p-xylenes, and o-xylene; and a slight decrease (SS-17)/increase (SS-18) for toluene. These data suggest limited variability in concentrations over time and limited temporal effects. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,1,2-TCA, and HCBD.

Additional Analysis of the Data

Sub-slab Vapor Data

The sub-slab vapor concentrations may be contributing to indoor air concentrations via the vapor intrusion pathway. However, the contributions would not be significant for the parameters that were detected in sub-slab vapor samples at concentrations below the cancer screening levels and below

HQ screening levels, and in some cases below indoor air concentrations. This is the case for all parameters during round one sampling. During round three sampling the only exception was a TCE concentration at sub-slab vapor probe location SS-30. As noted above, location SS-30 is the northernmost probe furthest from the OCC groundwater plume and no exceedances were measured in the SS vapor probes closer to the OCC groundwater plume.

Groundwater Data

The following is a discussion of the most recent, shallowest, and nearby groundwater data presented in Table 3 with respect to SS vapor analytical results. Detected parameters in a groundwater sample collected from location 77C-25 include cis-1,2-DCE, m&p-xylenes, PCE, toluene, trans-1,2-dichloroethene (trans-1,2-DCE), TCE, and VC as shown in Table 3. Parameters that were detected in sub-slab vapor samples but were not detected in groundwater include CT, chloroform, EB, and o-xylene. The remaining detected parameters in sub-slab vapor samples were not reported for the groundwater sample.

Potential Non-Cancer Cumulative Effects (HQ=0.1)

The following discusses a comparison of the round one analytical results to non-cancer screening levels for chronic exposures at values that represent a hazard quotient of 0.1 (adjusted HQ) except for TCE for purposes of evaluating short-term exposures to women of reproductive age.

RLs for 1,1,2-TCA are above the MTCA adjusted HQ screening levels for indoor air and adjusted HQ screening levels for sub-slab vapor. It is noted that if a positive detection was observed for any compound below a RL in a sample, then the laboratory was instructed to report the result. Therefore the RLs for 1,1,2-TCA would not contribute to a cumulative hazard index (HI) since the results are non-detect.

Concentrations exceed the MTCA adjusted HQs screening levels for indoor air for 1,2,4-TMB and naphthalene. These two parameters have different primary target organs (blood system and body weight). The exceedances are less than 30 percent of the MTCA HQs screening levels and would not contribute to cumulative primary target organ HIs greater than 1. Additionally, The concentrations of 1,2,4-TMB and naphthalene in indoor air are likely attributable to indoor and/or outdoor sources since they were not detected in sub-slab vapor with one exception for naphthalene that does not exceed the adjusted HQ screening level for sub-slab vapor based on MTCA indoor air value and is less than the indoor air concentrations. RLs are below the adjusted HQ sub-slab vapor screening level for 1,2,4-TMB and would not contribute to a cumulative HI since the results are non-detect.

It is noted that a TCE concentration at the center of the Unit Storage was above the MTCA adjusted HQ screening level for indoor air. This parameter has a different primary target organ (development effects) than the other parameters discussed above and the TCE concentration is 15 percent of the MTCA HQ screening level and would not contribute to a cumulative primary target organ HI greater than 1. Additionally, the paired SS vapor concentration is less than the adjusted HQ sub-slab vapor screening level. Concentrations of TCE associated with the maintenance area are presented above.

Recommendation

No further action by GSH is proposed for this building, due to the apparent indoor source and potential localized subsurface source unrelated to the OCC Site based on the data presented herein.

3.2 Building 326

Figure 3 shows the sample locations and layout of Building 326.

Building Properties and Usage

Building 326 is a 1-story office building of wood frame and metal siding construction on a concrete slab on grade foundation. Where visible, the condition of the concrete slab is good. During probe installation, the slab thickness was measured at two locations as 5.75 and 5 inches. There are two independent occupied office spaces (Nano Silicates and SafeBoats) within the building comprising approximately 11,000 square ft in total. The majority of the building has 8-ft drop ceilings. There is an open-air atrium/garden in the central part of this building. The HVAC system is rooftop forced air with ductwork installed on the rooftop, within the ceiling, and formerly below the building. There was a set of cold air return ducts below the building slab that were decommissioned and re-routed in February 2015 because of a potential for vapor migration into the building via the ducts. Sampling rounds one, two, and three were conducted prior to the decommissioning and re-routing work, and sampling round four was conducted after. Presently, vapors could potentially intrude into this building through cracks in the floor slab, unsealed utility penetrations, and un-caulked floor/wall or expansion joints.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

The sampling locations were selected considering tenant usage and VOC plume location relative to occupied office areas. SafeBoats occupies the eastern half of the building and Nano Silicates occupies the western half. These office spaces, which are located on opposite ends of the building, have separate entrances and exits.

Two SS vapor probes were installed where SS vapor and IA samples were to be collected, as discussed below. However, complications, described below, prevented the collection of a SS vapor sample at one location, and therefore only one SS/IA sample pair was collected within this building at location 7.

Nano Silicates occupies the western half of the building. According to the tenant, this portion of the building was renovated within the last 2 years. Tenant improvements included painting, carpeting, and new ceramic tile floors. The tenant requested that the sample pair (SS/IA-7) be located in a vacant office space at the southwest corner of the building. This office has its own exterior door. This location was determined representative of the western half of the building and suitable to meet the needs of the investigation. During the pre-sampling survey, the unoccupied office was identified as being used for the storage of furniture, computer components, latex paint, construction adhesive, and other building materials. The tenant was asked to remove these materials from the office prior to the sampling event. The tenant complied with this request and the office was cleared of stored materials. The office is adjacent to a small lab space operated by Nano Silicates. A brief review of this room and interview with a Nano Silicates representative did not suggest the storage of any potential VOC emitters within the office building; however, the representative indicated that their neighboring shop space within Building 407 contained chemical storage lockers (this information was confirmed during the Building 407 pre-sampling survey discussed below in Section 3.3).

One IA sample (IA-8) was collected from within the eastern portion of the building occupied by SafeBoats. The space is used exclusively as office and meeting space. Complications with utility

clearance prevented a SS vapor probe from being installed in any of the smaller offices along the eastern wall of the building. Therefore, the sampling location was moved out of the office space to a hallway connecting the offices and larger cubical area. No obvious potential VOC emitters were identified in the office space to be sampled or adjacent offices. Some janitorial cleaning supplies were observed in the kitchen area. Cleaning materials were not removed from this location. During the helium tracer test (designed to assess the integrity of the SS vapor probe seal), a detection of helium above threshold criteria suggested that the seal had been compromised. As a result, sampling of SS vapors at this location was suspended.

Sampling within Building 326 was initiated on April 23, 2013 with the 24-hour samples completed the following day. An associated OA sample for this building (OA-7) was collected outside of the building near the main entrance along the southern wall of the building concurrently with the IA samples. Weather conditions were partly cloudy and calm, with winds from the south, and no precipitation was observed.

Round Two

Indoor air and sub-slab vapor samples were collected at the same IA and SS vapor sample locations as the round one event. An additional IA sample (IA-28) was collected from a small closet/IT room centrally located within the building in accordance with USEPA request. Prior to conducting the round two sampling event, a detailed survey was completed for Building 326, at which time the tenant was asked to fill out a questionnaire and provide MSDSs for all chemicals used or stored within the building. Copies of the submitted MSDSs are included in Appendix A. The survey did not identify the obvious presence of potential VOC emitters in either the Nano Silicates or SafeBoats offices.

The indoor and ambient air sampling was initiated on June 24, 2013 using passive sampling equipment. The samples were completed 7 days later. Sub-slab vapor sampling was initiated on June 25, 2013 using a Summa canister with the 2-hour sample completed the same day. An associated OA sample (ambient air) for this building (OA-7) was collected outside of the building near the main entrance along the southern wall of the building concurrently with the IA Summa canister samples. Weather conditions were partly cloudy and calm, mild wind from the southwest, periodic rain showers with less than 0.3-inches total accumulation.

Round Three

At the time of the round three sampling event, Building 326 was considered for potential mitigation and was excluded from the round three sampling event.

Round Four

Following retrofitting of the HVAC system described previously, the round four sampling event was scheduled to assess the potential effect of decommissioning of below-slab cold air duct returns. Indoor air and sub-slab vapor Summa canister samples were collected at the same IA and SS vapor sample locations as the round two event. Additionally, passive samples were collected at all IA and OA locations as specified by USEPA. Prior to conducting the round four sampling event, a detailed survey was completed for Building 326. The survey did not identify the obvious presence of potential VOC emitters in either the Nano Silicates or SafeBoats offices.

The indoor and ambient air sampling was initiated on May 24, 2015 using passive sampling equipment. These samples were completed 7 days later. IA Summa canister sampling was initialed

on May 27, 2015 with the 24-hour samples completed the following day. Sub-slab vapor sampling was initiated on May 27, 2015 using a Summa canister with the 2-hour samples completed the same day. An associated OA Summa canister sample (ambient air) for this building (OA-7) was collected outside of the building near the main entrance along the southern wall of the building concurrently with the IA Summa canister samples. Weather conditions were sunny and calm, with winds from the southwest, and no precipitation was observed.

Sampling Results

Round One

Analytical results are presented in Table 4 and detected parameters are summarized on Figure 3.

The IA concentration of TCE at IA-7 (3.9 μg/m^3) exceeded an IA MTCA screening level (2.0 μg/m^3). The SS-7 concentration (10 μg/m^3) was 2.5 times higher than the IA-7 concentration, but did not exceed SS vapor screening levels based on MTCA indoor air values. TCE was detected in the OA sample at a lower concentration (0.024 J μg/m^3) than the IA and SS vapor samples. It is therefore concluded that IA MTCA screening level exceedance for TCE is potentially attributable to an indoor and/or a sub-slab source. The IA-7 TCE concentration (3.9 μg/m^3) was below the short-term criterion of 8.4 μg/m^3.

In summary, it is concluded that the IA screening level exceedance for TCE (3.9 μg/m^3) is potentially attributable to an indoor source and/or a sub-slab source and the concentration was below the short-term criterion of 8.4 μg/m^3. No specific obvious indoor sources were noted in the building; however, painting, carpeting, and new ceramic tile floors were installed in the last 2 years. There are no exceedances of SS vapor screening levels.

Round Two

Analytical results are presented in Table 4 and detected parameters are summarized on Figure 3.

IA concentrations of 1,2,4-TMB, 1,4-dichlorobenzene (1,4-DCB), and TCE exceeded MTCA IA screening levels.

The IA concentration of 1,2,4-TMB at IA-7 (16 μg/m^3) and IA-28 (10 μg/m^3) exceeded an IA MTCA screening level (7.0 μg/m^3). 1,2,4-TMB was detected in the OA sample at a lower concentration (0.71 μg/m^3), and was not detected in the SS vapor sample. It is therefore concluded that the IA MTCA screening level exceedances for 1,2,4-TMB are likely attributable to an indoor source.

The concentration of 1,4-DCB at IA-8(58 μg/m^3), exceeded a MTCA screening level (2.3 μg/L). 1,4-DCB was detected at lower concentrations in the SS vapor sample (0.063 μg/m^3) and the OA sample (0.61 μg/m^3), which were both less than the IA concentrations. It is therefore concluded that the screening level exceedance for 1,4-DCB is likely attributable to an indoor source.

The IA concentration of TCE at IA-7 (3.1 μg/m^3) exceeded an IA MTCA screening level (2.0 μg/m^3). The SS-7 concentration (14 μg/m^3) was 4.5 times higher than the IA-7 concentration, but did not exceed the SS vapor screening levels based on MTCA indoor air values. TCE was not detected in the OA. It is therefore concluded that the MTCA screening level exceedance for TCE is potentially attributable to a sub-slab source as was determined by the round one results. The IA-7 TCE concentration (3.1 μg/m^3) was below the short-term criterion of 8.4 μg/m^3.

In summary, the round two sampling is consistent with the round one conclusion discussed above for TCE. The 1,2,4-TMB and 1,4-DCB concentrations are likely attributable to an indoor source, which may be attributable to the recent construction activities. The IA screening level exceedance for TCE (3.1 μg/m^3) is potentially attributable to a sub-slab source and the concentration was below the short-term criterion of 8.4 μg/m^3 as was determined by the round one results. There are no exceedances of SS vapor screening levels consistent with the round one results.

Round Four

Analytical results are presented in Table 4 and detected parameters are summarized on Figure 3. As noted previously, round four was conducted after decommissioning of below-slab cold air duct returns.

The IA and SS concentrations were not detected or detected at concentrations below the screening levels.

The analytical results for the passive samples were similar to the Summa canisters collected at the same location for both IA and OA.

It is noted that the IA screening level exceedance noted for TCE in both round one and round two that was potentially attributable to a sub-slab source was not present in round four, a sampling round that followed decommissioning of below-slab cold air duct returns, even as the sub-slab concentration of TCE was similar.

In Summary, the decommissioning of below-slab cold air duct returns has mitigated the previous IA exceedances for TCE. There are no exceedances of SS vapor screening levels consistent with the other rounds of sampling.

Round One and Round Two Comparison

The following table presents a side-by-side comparison of the round one and round two sub-slab vapor data.

		Round One	Round Two
Volatile Organic Compounds		SS-7	SS-7
1,1,1-Trichloroethane	μg/m^3	1.2	1.6
1,1,2,2-Tetrachloroethane	μg/m^3	0.039 U	0.037 J
1,1,2-Trichloroethane	μg/m^3	0.16 U	0.15 U
1,1-Dichloroethene	μg/m^3	0.012 J	0.019 J
1,2,4-Trichlorobenzene	μg/m^3	0.039 U	0.039 U
1,2,4-Trimethylbenzene	μg/m^3	0.78 U	0.77 U
1,3,5-Trimethylbenzene	μg/m^3	0.78 U	0.77 U
1,4-Dichlorobenzene	μg/m^3	0.035 J	0.063
Benzene	μg/m^3	0.12 U	0.16
Carbon tetrachloride	μg/m^3	0.14	0.14
Chloroform (Trichloromethane)	μg/m^3	0.15 J	0.37

		Round One	Round Two
Volatile Organic Compounds		SS-7	SS-7
cis-1,2-Dichloroethene	µg/m^3	0.039 U	0.039 U
Ethylbenzene	µg/m^3	0.043 J	0.12 J
Hexachlorobutadiene	µg/m^3	0.026 J	0.039 U
m&p-Xylenes	µg/m^3	0.13 J	0.34
Methylene chloride	µg/m^3	0.78 U	0.37
Naphthalene	µg/m^3	0.087 J	0.33
o-Xylene	µg/m^3	0.035 J	0.17
Styrene	µg/m^3	0.78 U	0.30 J
Tetrachloroethene	µg/m^3	12	15
Toluene	µg/m^3	0.26 J	0.34
trans-1,2-Dichloroethene	µg/m^3	0.039 U	0.020 J
Trichloroethene	µg/m^3	10	14
Vinyl chloride	µg/m^3	0.039 U	0.0051 J

At SS-7, the reported concentrations for the round two sample are similar to the reported concentrations for the round one sample. Variability for the parameters detected above 1 µg/m^3 includes slight increases in concentrations in round two for 1,1,1-TCA, PCE, and TCE. These data suggest limited variability of concentrations over time. The parameters that were not detected in both rounds of sampling include 1,1,2-TCA, 1,2,4-TCB, 1,2,4-TMB, 1,3,5-TMB, and cis-1,2-DCE.

The following table presents a side-by-side comparison of the round one (Summa canister) and round two (passive sampler) indoor air data.

		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		IA-7	IA-7		IA-8	IA-8
1,1,1-Trichloroethane	µg/m^3	0.032 J	0.050 U		0.030 J	0.050 U
1,2,4-Trimethylbenzene	µg/m^3	4.7	16		1	1.8
1,4-Dichlorobenzene	µg/m^3	0.14 J	1.3		2	58 J
Benzene	µg/m^3	0.71	0.65		0.76	0.64
Ethylbenzene	µg/m^3	1.0	4.1		1.4	6.9
m&p-Xylenes	µg/m^3	2.9	16		4.3	29
o-Xylene	µg/m^3	1.1	5.6		1.8	9.5
Styrene	µg/m^3	0.35 J	1.9		0.51 J	1.2
Tetrachloroethene	µg/m^3	4.1	6.9		0.66	0.79
Toluene	µg/m^3	2.6	3.9		3.9	3.1
Trichloroethene	µg/m^3	3.9	3.1		0.45	0.30

At IA-7, the reported concentrations for the round two sample are similar to or greater than the reported concentrations for the round one sample. This is also the case for the samples collected at IA-8. The Summa canisters were deployed over a 24-hour period and the passive samplers were deployed over a 7-day period on a different date. These data suggest some variability of concentrations over time. This is inconsistent with the comparison of SS vapor samples that indicate limited variability. The greater variability in the IA samples may be a result of variations in emissions from other potential sources unrelated to the OCC site.

Round One and Round Four Comparison

The following table presents a side-by-side comparison of the round one and round two sub-slab vapor data.

		Round One	Round Four
Volatile Organic Compounds		SS-7	SS-7
1,1,1-Trichloroethane	µg/m^3	1.2	1.1
1,1,2,2-Tetrachloroethane	µg/m^3	0.039 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	0.16 U	0.15 U
1,1-Dichloroethene	µg/m^3	0.012 J	0.037 U
1,2,4-Trichlorobenzene	µg/m^3	0.039 U	0.037 U
1,2,4-Trimethylbenzene	µg/m^3	0.78 U	0.16
1,3,5-Trimethylbenzene	µg/m^3	0.78 U	0.039 J
1,4-Dichlorobenzene	µg/m^3	0.035 J	0.061
Benzene	µg/m^3	0.12 U	0.081 J
Carbon tetrachloride	µg/m^3	0.14	0.15
Chloroform (Trichloromethane)	µg/m^3	0.15 J	0.15 U
cis-1,2-Dichloroethene	µg/m^3	0.039 U	0.073
Ethylbenzene	µg/m^3	0.043 J	0.047 J
Hexachlorobutadiene	µg/m^3	0.026 J	0.15 U
m&p-Xylenes	µg/m^3	0.13 J	0.19
Methylene chloride	µg/m^3	0.78 U	0.11 J
Naphthalene	µg/m^3	0.087 J	0.36
o-Xylene	µg/m^3	0.035 J	0.083 J
Styrene	µg/m^3	0.78 U	0.074 J
Tetrachloroethene	µg/m^3	12	14
Toluene	µg/m^3	0.26 J	0.21
trans-1,2-Dichloroethene	µg/m^3	0.039 U	0.037 U
Trichloroethene	µg/m^3	10	9.6
Vinyl chloride	µg/m^3	0.039 U	0.037 U

At SS-7, the reported concentrations for the round four sample are similar to the reported concentrations for the round one sample. Variability for the parameters detected above 1 µg/m^3 includes a slight increase in concentration in round four for PCE and slight decreases in concentrations for 1,1,1-TCA and TCE. These data suggest limited variability of concentrations over time. The parameters that were not detected in both rounds of sampling include 1,1,2,2 TCA, 1,1,2-TCA, 1,2,4-TCB, trans-1,2-DCE and VC.

The following table presents a side-by-side comparison of the round one (Summa canister) and round four (Summa canister) indoor air data.

		Round One	Round Four	Round One	Round Four
Volatile Organic Compounds		IA-7	IA-7	IA-8	IA-8
1,1,1-Trichloroethane	µg/m^3	0.032 J	0.022 J	0.030 J	0.022 J
1,1,2,2-Tetrachloroethane	µg/m^3	0.039 U	0.038 U	0.035 U	0.040 U
1,1,2-Trichloroethane	µg/m^3	0.16 U	0.15 U	0.14 U	0.16 U
1,1-Dichloroethene	µg/m^3	0.022 J	0.015 J	0.042	0.018 J
1,2,4-Trichlorobenzene	µg/m^3	0.039 U	0.038 U	0.035 U	0.087
1,2,4-Trimethylbenzene	µg/m^3	4.7	0.72	1.0	0.97
1,3,5-Trimethylbenzene	µg/m^3	1.5	0.24	0.32 J	0.53
1,4-Dichlorobenzene	µg/m^3	0.14 J	0.30	2.0	0.94
Benzene	µg/m^3	0.71	0.34	0.76	0.71
Carbon tetrachloride	µg/m^3	0.45	0.51	0.48	0.50
Chloroform (Trichloromethane)	µg/m^3	0.19	0.19	0.26	0.21
cis-1,2-Dichloroethene	µg/m^3	0.039 U	0.038 U	0.035 U	0.026 J
Ethylbenzene	µg/m^3	1.0	0.29	1.4	0.51
Hexachlorobutadiene	µg/m^3	0.039 U	0.15 U	0.035 U	0.049 J
m&p-Xylenes	µg/m^3	2.9	0.78	4.3	1.0
Methylene chloride	µg/m^3	0.78 U	0.33	0.69 U	0.53
Naphthalene	µg/m^3	0.16	0.33	0.23	0.21
o-Xylene	µg/m^3	1.1	0.34	1.8	0.45
Styrene	µg/m^3	0.35 J	1.5	0.51 J	1.5
Tetrachloroethene	µg/m^3	4.1	0.26	0.66	0.28
Toluene	µg/m^3	2.6	1.3	3.9	2.2
trans-1,2-Dichloroethene	µg/m^3	0.039 U	0.038 U	0.051	0.040 U
Trichloroethene	µg/m^3	3.9	0.17	0.45	0.17
Vinyl chloride	µg/m^3	0.0042 J	0.038 U	0.0060 J	0.012 J

At IA-7, the reported concentrations for the round four sample are similar to or less than the reported concentrations for the round one sample with few exceptions. This is also the case for the samples collected at IA-8. Among the largest decreases in concentrations were for PCE and TCE,

which have been detected in SS samples at similar concentrations for both sampling rounds. These decreased IA concentrations appear to be a direct result of decommissioning of below-slab cold air duct returns.

Round Two and Round Four Comparison

As noted previously, the round one SS data are similar to the round two and round four SS data and therefore the round two and round four SS data are similar with limited variability of concentrations over time.

The following table presents a side-by-side comparison of the round two (passive sampler) and round four (passive sampler) indoor air data.

Volatile Organic Compounds		Round Two	Round Four		Round Two	Round Four		Round Two	Round Four
		IA-7	IA-7		IA-8	IA-8		IA-28	IA-28
1,1,1-Trichloroethane	µg/m^3	0.050 U	0.051 U		0.030 J	0.022 J		0.050 U	0.051 U
1,2,4-Trimethylbenzene	µg/m^3	16	0.88		1.8	1.4		10	0.92
1,4-Dichlorobenzene	µg/m^3	1.3	0.31		58 J	1.2		2.2	0.39
Benzene	µg/m^3	0.65	0.88		0.64	0.80		0.64	0.75
Ethylbenzene	µg/m^3	4.1	0.35		6.9	0.52		4.0	0.38
m&p-Xylenes	µg/m^3	16	0.94		29	1.2		15	0.98
o-Xylene	µg/m^3	5.6	0.40		9.5	0.48		5.0	0.42
Styrene	µg/m^3	1.9	1.1		1.2	1.2		2.1	1.0
Tetrachloroethene	µg/m^3	6.9	0.15		0.79	0.13		4.9	0.13
Toluene	µg/m^3	3.9	1.4		3.1	2.2		4.0	1.5
Trichloroethene	µg/m^3	3.1	0.12		0.30	0.049		2.0	0.091

At IA-7, IA-8 and IA-28, the reported concentrations for the round four samples are less than the reported concentrations for the round two samples with a few exceptions. This is consistent with concentrations of some parameters in the OA samples between rounds, which contribute to the IA concentrations. These data suggest some variability of concentrations over time for IA. However, a contributing factor to the decrease in concentrations is a direct result of decommissioning of below-slab cold air duct returns. Another contributing factor may be a result of variations in emissions from other potential sources unrelated to the OCC site. The variability is inconsistent with the comparison of SS vapor samples that indicate limited variability.

Additional Analysis of the Data

Sub-slab Vapor Data

The sub-slab vapor concentrations may be contributing to indoor air concentrations via the vapor intrusion pathway. However, the contributions would not be significant for the parameters that were detected in sub-slab vapor samples at concentrations below the cancer screening levels and below adjusted HQ screening levels, and in some cases below indoor air concentrations. This is the case for all parameters.

Groundwater Data

The following is a discussion of the most recent, shallowest, and nearby groundwater data presented in Table 4 with respect to SS vapor analytical results. TCE was not detected in a recent (2012) shallow groundwater sample collected from location 34-25R, representing the most recent, shallowest, and nearby groundwater data. Other parameters that were detected in sub-slab vapor samples but were not detected in groundwater include 1,1,2,2-PCA, BZ, CT, chloroform, EB, m&p-xylenes, o-xylene, PCE, and toluene. Parameters detected in the sub-slab vapor samples and groundwater sample include 1,1-DCE, MC, trans-1,2-DCE, and VC. The remaining detected parameters in sub-slab vapor samples were not detected or not reported for the groundwater sample.

Recommendation

No further action by GSH is proposed for this building due to no exceedances of screening levels following decommissioning of below-slab cold air duct returns.

3.3 Building 407

Figure 4 shows the sample locations and layout of Building 407.

Building Properties and Usage

Building 407 consists of a large metal sided and metal frame warehouse approximately 450 ft by 240 ft in size, with an attached wing to the south that is 150 ft by 100 ft in size. The warehouse areas have an asphalt floor. The asphalt thickness was measured at two locations and ranged from 6.6 to 8.7 inches. Although the asphalt condition varied across the property, in general it appeared to be in fair condition. During the rounds of sampling, Building 407 was occupied by four tenants including GR Silicates, Trident Seafoods, Citadel Marine, and TOTE Truck Wash.

There is a second structure attached to the east side of Building 407. The structure is approximately 60 ft by 50 ft and is a metal sided and metal frame building. This portion of the building is constructed on a concrete slab. The southeastern part of this 60-ft by 50-ft east wing is a 14-ft by 15-ft office area, and 18-ft by 20-ft break area. Ceilings are 8-ft length plywood sheathing. The concrete slab in the office area is in good condition and the thickness was measured during probe installation at 5.75 inches thick. Heat is provided by electric baseboard. Vapors could potentially intrude into this building through cracks in the floor slab, unsealed utility penetrations, and un-caulked floor/wall or expansion joints.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

Three SS vapor probes were installed where SS vapor and IA samples were collected, as discussed below. One IA sample was collected to assess potential indoor sources of VOCs.

Sample pair SS/IA-6 was located in the southwestern corner of the building within the space occupied by Trident. This space is used for the dry storage of fishing vessel machinery. No small office spaces were observed in this section of the building. In general, activities in this area are limited to the moving in and out of stored supplies as needed by the fishing fleet. The SS vapor probe was installed through the asphalt floor in a location easily accessible, but outside most

equipment traffic. Materials observed in storage included fishing vessel equipment, a diesel generator, electric forklifts, and pallet jacks. No obvious chemical storage was observed during the pre-sampling survey. According to Trident representatives, the area is generally used for storage of out of service machinery, and activities are generally limited to moving machinery in and out of the building. Heavy equipment including flatbed trucks and forklifts are occasionally operated in the building. Repairs and maintenance are completed at another facility. Based on these observations and input from Trident representatives, no obvious potential VOC emitters were identified in this area other than vehicles noted above.

Sample pair SS/IA-9 was situated in a centrally located area within a vacant section of Building 407. This area is open to the area occupied by Trident to the east separated by a chain link fence. The SS vapor probe was installed in the middle of the vacant space in the asphalt floor. The IA sample was collected at this same location. No obvious potential VOC emitters were observed in this area.

Sample pair SS/IA-10 was located within a vacant office structure on the east end of Building 407. During the pre-sampling survey, the vacant office appeared to be used for the storage of office furniture. A small bottle of cleaner was identified and moved outside of the building. The vacant office space shares a wall and open doorway with a shop and storage area to the west operated by Nano Silicates. This shop and storage area was identified to be a potential source of VOC emissions as described in the next paragraph.

IA-20 was added to the investigation within the Nano Silicates shop area to assess potential indoor sources of VOCs from chemical storage and use at this location. This area shares a wall with sample location SS/IA-9 and an open corridor and doorway with sample location SS/IA-10. During the pre-sampling survey, miscellaneous power and hand tools, parts washing tubs, chemical storage tanks, three flammable material storage lockers, paint cans, cleaning products, and miscellaneous building materials were observed. It was determined these materials could not be isolated or removed from the building so IA-20 was located in this area to characterize potential VOC contributions from this area and potential impact on sampling locations SS/IA-9 and SS/IA-10.

Sampling in Building 407 was initiated on April 18, 2013 with the 24-hour samples completed the following day. An associated OA sample for this building (OA-9) was collected outside of the building near the southwestern corner concurrently with the IA samples. Weather conditions were a mix of sun and rain, with winds from the south. Precipitation measured during the previous 24-hour period was less than 0.42 inches.

Round Two

Discussions with the USEPA and POT during the June 11, 2013 conference call resulted in the decision to exclude Building 407 from the round two sampling event.

Round Three

Comments received from USEPA regarding the sampling results of rounds one and two resulted in the decision to include Building 407 in the round three sampling event. Three new sampling locations were added to Building 407 as requested by USEPA. A total of 12 Summa canister samples were collected during round three including four SS vapor locations paired with four IA locations (one new SS vapor probe at an existing IA location and three existing pairs), three IA locations (one existing but adjusted location and two new), and one OA location. Additionally, two

passive samples were collected, one from IA location 6 (IA-6P) and one from OA location 6 (OA-6P), as specified by USEPA.

Sample pair SS/IA-37 was added to the west of the Trident facility in an empty warehouse space rented by Citadel Marine. This area was previously considered outside the study area; however, at the request of USEPA a sampling pair was added to measure potential contributions from neighboring site activities as well as provide a greater representation of sub-slab vapor conditions. No obvious potential VOC emitters were observed in this area; however, adjacent to this space to the west, separated by a wall, Citadel Marine operates a painting bay.

Sample IA-38 was added to identify potential VOC sources associated with boat painting activities in the Citadel Marine painting bay. During the round three sampling of Building 407, painting was noted in this space. During the building inventory and survey, the following target analytes were identified: xylene, 1,2,4-TMB, toluene, EB, naphthalene, BZ, PCE, and TCE. Miscellaneous chemical storage within the small maintenance area south of sample location IA-38 was observed.

During the round three building survey, five sprinkler closets were identified and investigated. The five closets are generally small enclosed areas of wood construction. Each closet houses the watermain and control valves for the building's fire suppression system. One of the five closets was observed to have an unsealed void surrounding the watermain where it penetrated the floor. This closet was located in the GR Silicates portion of the building (Figure 4). Sample IA-39 was added to this closet to assess this potential preferential pathway for the migration of sub-slab VOC to enter the building.

Sample pair SS/IA-6 was unchanged from round one. No changes to the building space or types of material stored were observed between the round one and round three sampling.

Sample pair SS/IA-9 was unchanged from round one. No obvious potential VOC emitters were observed in this area. The space shares a wall with the truck washing facility to the north.

Sample pair SS/IA-10 was unchanged from round one. During the pre-sampling survey, the vacant office was cleared of all previously stored office furniture. Previously this space shared an open doorway with a shop and storage area to the west. The doorway has been boarded up. This shop and storage area was previously identified to be a potential source of VOC emissions as described in the next paragraph.

IA-20 was previously added to the investigation within the GR Silicates (formerly Nano Silicates) shop area to assess potential indoor sources of VOCs from chemical storage and use at this location. This area shares a wall with sample location SS/IA-9 and an open corridor and doorway with sample location SS/IA-10. During the pre-sampling survey for round three, the small storage space was cleared out and vacant, and all of the materials appear to have been relocated to the main warehouse shop space occupied by then Nano Silicates now GR Silicates. The materials stored in the shop space are miscellaneous power and hand tools, three flammable material storage lockers, cleaning products, and miscellaneous building materials. It was determined these materials could not be isolated or removed from the building so IA-20 was located in this larger shop area to characterize potential VOC contributions from this area and potential impact on sampling locations SS/IA-9 and SS/IA-10. During the building inventory and survey, the following target analytes were identified: xylene, 1,2,4-TMB, toluene, EB, naphthalene, BZ, PCE, and TCE. Miscellaneous chemical storage within the small maintenance area south of sample location IA-20 was observed.

The indoor and ambient air sampling was initiated on March 12, 2014 using passive sampling equipment at IA-6P and OA-6P. The samples were retrieved 7 days later. Summa canister SS vapor and IA sampling in Building 407 was initiated on March 18, 2014, with the 2-hour samples completed the same day and 24-hour samples completed the following day. An associated OA Summa canister sample for this building (OA-6) was collected outside of the building near the southwestern corner concurrently with the IA Summa canister samples. Weather conditions were a mix of sun and rain, with winds from the west. No precipitation was measured on March 18 with 0.07 inches measured the following day.

Sampling Results

Round One

Analytical results are presented in Table 5 and detected parameters are summarized on Figure 4.

IA concentrations of 1,2,4-TMB (up to 56 $\mu g/m^3$) exceeded an IA MTCA screening level (7.0 $\mu g/m^3$), and were significantly higher than SS vapor (up to 0.68 J $\mu g/m^3$) and OA (0.65 J $\mu g/m^3$) concentrations. It is therefore concluded that the IA MTCA screening level exceedances for 1,2,4-TMB are likely attributable to an indoor source.

In summary, it is concluded that IA screening level exceedances for 1,2,4-TMB are likely attributable to an indoor source (miscellaneous power and hand tools, parts washing tubs, chemical storage tanks, three flammable material storage lockers, paint cans, cleaning products, miscellaneous building materials, and vehicles operation were observed).There are no exceedances of SS vapor screening levels.

Round three

Analytical results are presented in Table 5 and detected parameters are summarized on Figure 4.

IA concentrations of 1,2,4-TMB, naphthalene, m&p-xylenes, and styrene exceeded IA MTCA screening levels.

IA concentrations of 1,2,4-TMB (up to 730 $\mu g/m^3$) exceeded an IA MTCA screening level (7.0 $\mu g/m^3$) in seven of the eight samples collected. The 1,2,4-TMB concentrations at SS-6, SS-9, and SS-10 were all below 1.0 $\mu g/m^3$ and the screening level. The concentration detected at SS-37 was 32 $\mu g/m^3$, below the SS vapor screening level and an order of magnitude less than the paired IA concentration. OA concentrations up to 6.0 $\mu g/m^3$ were similar to the IA-6, IA-10, and IA-39 concentrations that are less than 10 $\mu g/m^3$. A potential indoor source for 1,2,4-TMB was identified in the Citadel Marine paint bay on the west side of the building. A separate IA sample (IA-38) was collected from within in the paint bay. On the day sampling was to be completed, the tenant was conducting painting operations. A pervasive odor was detectable throughout Building 407. Concentrations of 1,2,4-TMB are greatest in IA-38 and decrease in concentration at each sample the more distant the location from IA-38. It is therefore concluded that IA MTCA screening level exceedances for 1,2,4-TMB are likely attributable to an indoor source related to the painting in the Citadel Marine paint bay.

IA concentrations of naphthalene (up to 19 $\mu g/m^3$) exceeded a MTCA screening level (0.74 $\mu g/m^3$) in four samples and a MTCA screening level (3.0 $\mu g/m^3$) in 2 samples collected. The concentration of naphthalene measured in an OA sample was 0.19 $\mu g/m^3$. SS vapor concentrations of naphthalene ranged from 0.066 to 2.4 $\mu g/m^3$ and are less than the screening levels. Concentrations

of naphthalene are greatest in IA-38 (Citadel Marine paint bay) and decrease in concentration at each sample the more distant the location from IA-38. It is therefore concluded that the IA MTCA screening levels exceedances for naphthalene are likely attributable to an indoor source related to the painting in the Citadel Marine paint bay.

IA concentrations of m&p-xylenes (150 μg/m^3) and styrene (1,400 μg/m^3) exceeded IA MTCA screening levels (100 μg/m^3 for xylenes and 1,000 μg/m^3 for styrene) at IA-38 (Citadel Marine paint bay). Concentrations of m&p-xylenes and styrene measured in the OA samples were 3.5-4.1 μg/m^3 and 1.7-2.7 μg/m^3, respectively. There were no exceedances of screening levels in the SS vapor samples having concentrations less than 10 μg/m^3. It is therefore concluded that the IA MTCA screening levels exceedances for m&p-xylenes and styrene are likely attributable to an indoor source related to the painting in the Citadel Marine paint bay.

The analytical results for the passive samples were similar to the Summa canisters collected at the same location for both IA and OA with the exception of 1,2,4-TMB. The concentrations measured in the passive samples were one order of magnitude lower than the Summa canister samples.

The following table presents the difference between measured IA concentrations and measured OA concentrations (adjusted IA). Not detected results for OA sample were assumed as zero.

Detected		IA-6	IA-9	IA-10	IA-20	IA-37	IA-38	IA-39
Volatile Organic Compounds		- OA-9	- OA-9	- OA-9	- OA-9	- OA-9	- OA-9	- OA-9
1,1,1-Trichloroethane	μg/m^3	0.00	0.00	0.00	0.00	0.00	0.12	0.00
1,1,2,2-Tetrachloroethane	μg/m^3	0.00	0.00	0.00	0.00	0.00	0.10	0.00
1,1,2-Trichloroethane	μg/m^3	-0.03	-0.03	-0.02	-0.01	-0.02	0.40	-0.01
1,1-Dichloroethene	μg/m^3	-0.01	-0.01	0.00	0.00	0.00	0.10	0.00
1,2,4-Trichlorobenzene	μg/m^3	-0.01	-0.01	0.00	0.00	0.00	0.10	0.00
1,2,4-Trimethylbenzene	μg/m^3	**80.90**[c]	**64.90**[c]	4.30	6.90	**334.90**[c]	**724.90**[c]	1.90
1,3,5-Trimethylbenzene	μg/m^3	26.30	18.30	0.80	1.70	118.30	338.30	0.70
1,4-Dichlorobenzene	μg/m^3	-0.01	-0.01	0.01	0.01	-0.01	0.11	-0.02
Benzene	μg/m^3	0.34	0.44	0.64	0.64	0.54	0.64	0.29
Carbon tetrachloride	μg/m^3	-0.01	0.00	-0.01	0.00	-0.01	-0.30	-0.08
Chloroform (Trichloromethane)	μg/m^3	-0.04	-0.04	-0.04	-0.03	-0.04	-0.04	-0.04
cis-1,2-Dichloroethene	μg/m^3	-0.05	-0.05	-0.04	-0.02	-0.05	0.08	-0.04
Ethylbenzene	μg/m^3	5.10	11.00	4.30	2.00	20.00	35.00	1.90
Hexachlorobutadiene	μg/m^3	-0.01	-0.01	0.00	0.00	0.00	0.10	0.00
m&p-Xylenes	μg/m^3	15.50	37.50	14.50	6.30	67.50	**146.50**[c]	7.50
Methylene chloride	μg/m^3	-0.05	0.04	0.11	-0.04	0.01	0.19	0.01
Naphthalene	μg/m^3	0.43	**0.81**[b]	0.21	**1.57**[b]	**3.67**[b]	**18.87**[b]	0.11
o-Xylene	μg/m^3	8.20	18.70	4.20	2.40	42.70	88.70	2.20
Styrene	μg/m^3	18.30	29.30	-0.10	1.50	218.30	**1398.30**[c]	-0.10
Tetrachloroethene	μg/m^3	-0.18	-0.24	-0.10	-0.10	-0.23	-0.07	-0.22
Toluene	μg/m^3	1.40	1.50	2.80	2.60	4.50	14.10	1.50

Detected		IA-6	IA-9	IA-10	IA-20	IA-37	IA-38	IA-39
Volatile Organic Compounds		- OA-9	- OA-9	- OA-9	- OA-9	- OA-9	- OA-9	- OA-9
trans-1,2-Dichloroethene	µg/m^3	-0.01	-0.01	0.00	0.00	0.00	0.10	0.00
Trichloroethene	µg/m^3	-0.71	-0.73	-0.66	-0.66	-0.74	-0.72	-0.73
Vinyl chloride	µg/m^3	-0.03	-0.01	0.01	-0.03	-0.03	0.10	-0.02

There are no exceedances at IA-39 that was located in a utility closet with an unsealed penetration to assess a potential preferential pathway for the migration of sub-slab VOC to enter the building. The adjusted exceedances include 1,2,4-TMB, naphthalene, m&p-xylenes, and styrene. As noted previously, the measured concentrations were attributed to the Citadel Marine paint bay operations (sample location IA-38).

In summary, it is concluded that IA screening levels exceedances for 1,2,4-TMB, naphthalene, m&p-xylenes, and styrene are attributable to an indoor source associated with activities in the Citadel Marine paint bay. There are no exceedances of SS vapor screening levels consistent with the round one results.

Round One and Round Three Comparison

The following table presents a side-by-side comparison of the round one and round three sub-slab vapor data.

		Round One	Round Three		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		SS-6	SS-6		SS-9	SS-9		SS-10	SS-10
1,1,1-Trichloroethane	µg/m^3	0.35	0.32		0.88	0.79		0.030 J	0.030 J
1,1,2,2-Tetrachloroethane	µg/m^3	0.036 U	0.034 U		0.036 U	0.037 U		0.037 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	0.14 U	0.14 U		0.14 U	0.15 U		0.15 U	0.16 U
1,1-Dichloroethene	µg/m^3	0.0067 J	0.034 U		0.0074 J	0.037 U		0.037 U	0.039 U
1,2,4-Trichlorobenzene	µg/m^3	0.036 U	0.034 U		0.036 U	0.037 U		0.037 U	0.039 U
1,2,4-Trimethylbenzene	µg/m^3	0.31 J	0.64		0.68 J	0.33		0.74 U	0.049 J
1,3,5-Trimethylbenzene	µg/m^3	0.71 U	0.20		0.71 U	0.12 J		0.74 U	0.016 J
1,4-Dichlorobenzene	µg/m^3	0.036 U	0.013 J		0.018 J	0.033 J		0.037 U	0.024 J
Benzene	µg/m^3	0.11 U	0.11		0.11 U	0.32		0.11 U	0.11 J
Carbon tetrachloride	µg/m^3	0.14 J	0.15		0.25	0.27		0.34	0.32
Chloroform (Trichloromethane)	µg/m^3	0.011 J	0.0095 J		0.028 J	0.034 J		0.11 J	0.047 J
cis-1,2-Dichloroethene	µg/m^3	0.036 U	0.034 U		0.036 U	0.037 U		0.037 U	0.039 U
Ethylbenzene	µg/m^3	0.044 J	0.080 J		0.057 J	0.068 J		0.043 J	0.081 J
Hexachlorobutadiene	µg/m^3	0.34	0.034 U		1.7	0.037 U		0.26	0.039 U
m&p-Xylenes	µg/m^3	0.15	0.16		0.21	0.25		0.14 J	0.23
Methylene chloride	µg/m^3	0.71 U	0.14 U		0.71 U	0.15 U		0.74 U	0.24
Naphthalene	µg/m^3	0.077 J	0.11 J		1.2	0.26		0.059 J	0.066 J

		Round One	Round Three		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		SS-6	SS-6		SS-9	SS-9		SS-10	SS-10
o-Xylene	µg/m^3	0.068 J	0.084 J		0.097 J	0.11 J		0.079 J	0.093 J
Styrene	µg/m^3	1.0	0.13 J		0.62 J	0.53		0.74 U	0.078 J
Tetrachloroethene	µg/m^3	63	57		2.8	0.69		0.53	0.49
Toluene	µg/m^3	0.44 J	0.14 U		0.33 J	0.19		0.20	0.42
trans-1,2-Dichloroethene	µg/m^3	0.036 U	0.034 U		0.036 U	0.037 U		0.037 U	0.039 U
Trichloroethene	µg/m^3	0.31	0.10		0.15	0.022 J		0.14	0.080
Vinyl chloride	µg/m^3	0.036 U	0.034 U		0.036 U	0.037 U		0.037 U	0.039 U

The reported concentrations for the round three samples are similar to the reported concentrations for the round one samples, with the notable exceptions of HCBD, naphthalene, and PCE at SS-9. The round three concentrations of these parameters are an order of magnitude lower for naphthalene and PCE, and not detected for HCBD. Variability for other parameters detected above 1 µg/m^3 includes slight decreases in concentrations in round three for PCE at SS-6. These data suggest limited variability in concentrations over time and limited temporal effects with a few exceptions. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,1,2-TCA, 1,2,4-TCB, cis-1,2-DCE, trans-1,2-DCE, and VC.

The following table presents a side-by-side comparison of the round one and round three indoor air summa canister data.

		Round One	Round Three	Round One	Round Three	Round One	Round Three	Round One	Round Three
Volatile Organic Compounds		IA-6	IA-6	IA-9	IA-9	IA-10	IA-10	IA-20	IA-20A
1,1,1-Trichloroethane	µg/m^3	0.025 J	0.023 J	0.027 J	0.022 J	0.027 J	0.021 J	0.026 J	0.021 J
1,1,2,2-Tetrachloroethane	µg/m^3	0.036 U	0.035 U	0.037 U	0.035 U	0.042 U	0.037 U	0.035 U	0.041 U
1,1,2-Trichloroethane	µg/m^3	0.15 U	0.14 U	0.15 U	0.14 U	0.17 U	0.15 U	0.011 J	0.16 U
1,1-Dichloroethene	µg/m^3	0.036 U	0.035 U	0.037 U	0.035 U	0.042 U	0.037 U	0.0049 J	0.041 U
1,2,4-Trichlorobenzene	µg/m^3	0.036 U	0.035 U	0.037 U	0.035 U	0.042 U	0.037 U	0.035 U	0.041 U
1,2,4-Trimethylbenzene	µg/m^3	53	86	56	70	6.0	9.4	16	12
1,3,5-Trimethylbenzene	µg/m^3	17	28	17	20	1.9	2.5	4.7	3.4
1,4-Dichlorobenzene	µg/m^3	0.036 U	0.026 J	0.022 J	0.021 J	0.026 J	0.047	0.032 J	0.046
Benzene	µg/m^3	0.60	1.0	0.95	1.1	0.82	1.3	0.99	1.3
Carbon tetrachloride	µg/m^3	0.35	0.46	0.46	0.47	0.46	0.46	0.45	0.47
Chloroform (Trichloromethane)	µg/m^3	0.11 J	0.085 J	0.15 U	0.082 J	0.12 J	0.082 J	0.11 J	0.090 J
cis-1,2-Dichloroethene	µg/m^3	0.036 U	0.012 J	0.037 U	0.010 J	0.042 U	0.022 J	0.016 J	0.040 J
Ethylbenzene	µg/m^3	3.0	6.1	3.4	12	1.3	5.3	4.3	3.0
Hexachlorobutadiene	µg/m^3	0.036 U	0.035 U	0.037 U	0.035 U	0.042 U	0.037 U	0.035 U	0.041 U

		Round One	Round Three	Round One	Round Three	Round One	Round Three	Round One	Round Three
Volatile Organic Compounds		IA-6	IA-6	IA-9	IA-9	IA-10	IA-10	IA-20	IA-20A
m&p-Xylenes	µg/m^3	13	19	15	41	5.4	18	18	9.8
Methylene chloride	µg/m^3	0.73 U	0.33	0.74 U	0.42	0.84 U	0.49	0.71 UJ	0.34
Naphthalene	µg/m^3	0.17	0.56	0.24	0.94	0.54	0.34	0.31	1.7
o-Xylene	µg/m^3	7.6	9.5	7.8	20	2.0	5.5	6.1	3.7
Styrene	µg/m^3	88	20	83	31	6.1	1.6	18	3.2
Tetrachloroethene	µg/m^3	0.062	0.24	0.24	0.18	0.12	0.32	0.15	0.32
Toluene	µg/m^3	8.3	3.3	8.2	3.4	6.3	4.7	13	4.5
trans-1,2-Dichloroethene	µg/m^3	0.036 U	0.035 U	0.037 U	0.035 U	0.042 U	0.037 U	0.024 J	0.041 U
Trichloroethene	µg/m^3	0.040	0.087	0.052	0.066	0.047	0.14	0.085	0.14
Vinyl chloride	µg/m^3	0.036 U	0.011 J	0.037 U	0.035 U	0.042 U	0.049	0.0036 J	0.012 J

There is significant variability for parameters detected above 1 µg/m^3 including increases in concentrations for a majority of parameters and a few decreases in concentrations for the round three data. There is similar variability between the OA samples. This variability is inconsistent with the generally consistent results for SS vapor samples between sampling rounds. The observed variability of the IA and OA results is indicative of variable sources. As discussed previously, indoor sources have been identified and outdoor VOC concentrations have been measured at all OA sample locations.

Additional Analysis of the Data

Sub-slab Vapor Data

The sub-slab vapor concentrations may be contributing to indoor air concentrations via the vapor intrusion pathway. However, the contributions would not be significant for the parameters that were detected in sub-slab vapor samples at concentrations below the cancer screening levels and below HQ screening levels (See Response to General Comment 6 regarding Building 407) and in some cases below indoor air concentrations. This is the case for all the parameters.

Groundwater Data

The following is a discussion of the most recent, shallowest, and nearby groundwater data presented in Table 5 with respect to SS vapor analytical results. Parameters that were detected in sub-slab vapor samples but were not detected in groundwater include 1,1-DCE, BZ, CT, MC, PCE, trans-1,2-DCE, and TCE. Parameters detected in the sub-slab vapor samples and groundwater sample include chloroform, cis-1,2-DCE, EB, m&p-xylenes, o-xylene, and toluene. The remaining detected parameters in sub-slab vapor samples were not reported for the groundwater sample.

Potential Non-Cancer Cumulative Effects (HQ=0.1)

The following discusses a comparison of the analytical results to non-cancer screening levels for chronic exposures at values that represent a hazard quotient of 0.1 (adjusted HQ) except for TCE for purposes of evaluating short-term exposures to women of reproductive age.

RLs are above the MTCA adjusted HQ screening levels for 1,1,2-TCA for indoor air. It is noted that if a positive detection was observed for any compound below a RL in a sample, then the laboratory was instructed to report the result. Therefore the RLs for 1,1,2-TCA would not contribute to a cumulative HI since the results are non-detect.

Concentrations exceed the MTCA adjusted HQ screening level for 1,2,4-TMB for indoor air. The exceedances for 1,2,4-TMB have been concluded to be attributed to an indoor source since the sub-slab vapor concentrations are lower and do not exceed the adjusted HQ screening levels based on the indoor air screening level with one exception that is less than 15 percent of the SS vapor screening level. This parameter has a primary target organ of blood system. There are no other exceedances of the adjusted HQ screening levels for sub-slab vapor based on the MTCA indoor air screening levels. Since detected concentrations are below the SS vapor MTCA adjusted HQ screening levels with one exception noted above, cumulative non-cancer health effects would be less than a HI of 1.

Concentrations exceed the MTCA adjusted HQs for m&p-xylenes, naphthalene, o-xylene, and styrene for indoor air. The exceedances are likely attributable to an indoor source since the sub-slab vapor concentrations are lower and do not exceed the SS vapor adjusted HQ screening levels.

The parameters 1,2,4-TMB and styrene have a different primary target organ (blood system) than naphthalene and xylenes (body weight).

Recommendation

No further action by GSH is proposed for this building due to the identified indoor sources unrelated to the OCC Site based on the data presented herein.

3.4 Building 532

Figure 5 shows the sample locations and layout of Building 532.

Building Properties and Usage

Building 532 consists of multi-tenant workshop/work areas of approximately 400 ft by 150 ft in size. The interior space is configured for use by four tenants. The current occupying tenants include WIC, SafeBoats, and POT.

The northwestern section of the building is occupied by WIC and is used as a covered workshop with large hanger style doors open to adjacent tents where sand blasting and painting activities are conducted. WIC has two small office areas, with one used as a break room. Office space for the WIC operation is set up in adjacent job trailers to the north of the main building. The eastern section of the building is occupied by SafeBoats. This section of the building includes a small office located in the northeastern corner of the building, a centrally located break room, and three small offices along the inside (northern) wall. The SafeBoats offices are occupied for a full 8-hour shift. The POT maintains a lunchroom in the extreme southwestern area of the building. All of these offices and lunchrooms are of concrete block construction. Ceilings are typically 8 ft in height.

The SafeBoats facility has radiant heaters and fans in the shop areas and electric wall heaters in the office spaces. Electric baseboards are used to heat the POT lunchroom and vacant offices.

Vapors could potentially intrude into this building through cracks in the floor slab, unsealed utility penetrations, and un-caulked floor/wall or expansion joints.

The concrete slab ranged in thickness from 5.25 to 6 inches during probe installation within the northeast office area, and the centrally located break room. Drilling was advanced to a depth of approximately 12 inches to confirm the absence of asphalt below the concrete. The third vapor probe was drilled through the asphalt shop floor in the southwest corner of the SafeBoats facility. Probe installation in the asphalt shop floor in the southwest corner of the building determined an asphalt thickness of approximately 10.5 inches.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

Three SS vapor probes were installed within the SafeBoats occupied eastern half of this building where SS vapor and IA samples were collected, as discussed below.

Sample pair SS/IA-11 was located in the northeast corner of the building within a small enclosed office space. The floor of the office is a concrete slab. The slab appeared to be set within and not on top of the surrounding asphalt floor. The office area is segregated from a small storage area with a work bench and an office area with a single desk. A door separates these areas but is generally left open. The SS vapor probe was installed in the storage area to limit interruptions to tenant activities during sampling. The IA sample was collected in this area as well, and adjacent to the desk in the office area. During the pre-sampling survey, the small storage room and work bench adjacent to the office was observed to contain some aerosol paint cans and lubricants. It was requested of SafeBoats staff that these materials be removed to a location outside of the office. These materials were removed prior to the sampling event, and the room was cleared of these potential VOC emitters.

Sample pair SS/IA-12 was placed in a centrally located area within the SafeBoats facility in a small enclosed break room. The break room has a concrete floor set into the asphalt floor surrounding it. The break room opens onto the manufacturing floor from two doors on either side of the room. During the pre-sampling survey, the break room was not observed to contain any potential VOC emitters. During sampling activities, the doors were allowed to be opened and closed as normal to represent normal use and conditions.

Sample pair SS/IA-13 was located in the southwest corner of the SafeBoats facility within the main manufacturing area. Initially, the probe was planned to be advanced along the eastern wall but complications with utility clearance and tenant activities required the sample be moved approximately 20 ft west of the eastern wall. The sample location is directly adjacent to a small workstation. This workstation is generally used during an 8-hour shift, 5 days per week. The entire shop area is interconnected and large hanger style doors are located on three sides. Aerosol cans containing chemical cleaners, lubricants, and paints were observed at various work stations in the manufacturing area. Pallets of diesel fuel stored in 55-gallon drums were stored along the eastern wall. The diesel fuel is used in portable heaters. During the building walk-through, the heaters were not in operation. On the day of the pre-sampling survey, workers were completing interior painting on a boat stored in the shop area. A strong paint odor was detected at the south end of the building. It was noted that a series of air ducts and fans were venting air from the boat and exhausting out of the building through a door at the south end of the building.

Activities within the manufacturing area included aluminum welding, grinding, small painting projects, electrical wiring, and upholstery work. Isolation or removal of these activities was not practical; however, the sampling event was scheduled around activities to minimize potential indoor VOC emission sources. Information provided by SafeBoats indicated that two of the most actively maintained and renovated boats would be moved out of the facility within a week and prior to sampling. At that time, activity within the manufacturing area would be greatly reduced with the majority of operations taking place on the north side of the building, or on the opposite end of the building from sample location SS/IA-13. During sample collection, activity levels within the building were minimal, and no painting projects were observed.

The SafeBoats facility shares a large portion of its western wall with WIC. The WIC facility completes large scale sand blasting and painting activities. All of the sand blasting and painting are conducted within tents each supplied with fresh air circulated through large truck mounted filter packs. Untreated air is not permitted from escaping the tented area. A discussion with a WIC representative confirmed that, during the scheduled sampling on April 19, 2013, no painting operations were scheduled.

Sampling in Building 532 was initiated on April 19, 2013 with the 24-hour samples completed the following day. An associated OA sample (OA-11 and field duplicate sample FD-11) were collected at a location immediately south of Building 532 concurrent with the IA samples. Weather conditions during the sampling event were a mix of rain and sun, with winds from the southwest. Precipitation noted during the preceding 24-hour period was less than 0.15 inches.

On April 20, 2013, the IA sample canister set up at location SS/IA-11 experienced an equipment malfunction that prevented collection of a complete IA sample. This required the location to be re-sampled. Location SS/IA-11 was re-sampled on April 25, 2013. Weather conditions on April 25, 2013 were partly cloudy, with winds from the east, and no precipitation was observed. An associated OA sample (OA-11) was collected along the eastern wall of Building 532 near the northeastern corner concurrent with the IA sample.

Round Two

Indoor air and sub-slab vapor samples were collected at the same IA and SS vapor sample locations as the round one event. Two additional IA samples (IA-23 and IS-27) were collected from within a break room adjacent to the west of the main SafeBoats manufacturing floor and a centrally located office space within the building in accordance with USEPA request, respectively. Prior to conducting the round two sampling event, a detailed survey was completed for Building 532, at which time the tenant was asked to fill out a questionnaire and provide MSDSs for all chemicals used or stored within the building. During the building inventory and survey, the following target analytes were identified: xylene, 1,2,4-TMB, toluene, EB, naphthalene, BZ, styrene, and TCE. Copies of the submitted building survey questionnaire and MSDSs are included in Appendix A.

The indoor and ambient air sampling was initiated on June 24, 2013 using passive sampling equipment. The samples were completed 7 days later. Sub-slab vapor sampling was conducted on June 25 and 26, 2013 with the 2-hour samples completed the same day. An associated OA sample for this building (OA-11) was collected outside of the building concurrent with the IA samples.

Round Three

At the time of the round three sampling event, Building 532 was considered for potential mitigation and was excluded from the round three sampling event.

Round Four

The purpose of including this building in the round four sampling was to collect additional IA data at location IA-13 where an exceedance of a screening level was identified in round one but not in round two based on the screening levels used for comparison at that time.

Indoor air and sub-slab vapor Summa canister samples were collected at sample pair SS/IA-13. Additionally, passive samples were collected at IA and OA locations as specified by USEPA. Prior to conducting the round four sampling event, a detailed survey and building inspection were completed for Building 532. During the building inventory and survey, the following target analytes were identified in products used: xylene, 1,2,4-TMB, toluene, EB, naphthalene, BZ, styrene, and TCE. There are several chemical storage lockers set up within the Building 532 work space. Lockers were reviewed for content and condition. The materials observed were stored in proper containers with visible labels.

The indoor and ambient air sampling was initiated on May 26, 2015 using passive sampling equipment. These samples were completed 7 days later. IA Summa canister sampling was initialed on May 27, 2015 with the 24-hour samples completed the following day. Sub-slab vapor sampling was initiated on May 27, 2015 using a Summa canister with the 2-hour samples completed the same day. An associated OA Summa canister sample (ambient air) for this building (OA-13) was collected from a location centrally located along the southern building perimeter in close proximity to IA-13 location concurrently with the IA Summa canister samples. Weather conditions were partly sunny, no precipitation with winds from the southwest.

Sampling Results

Round One

Analytical results are presented in Table 6 and detected parameters are summarized on Figure 5.

An IA concentration of 1,4-DCB at IA-12 (5.4 $\mu g/m^3$) exceeded an IA MTCA screening level (2.3 $\mu g/m^3$), and was higher than SS vapor (up to 0.13 J $\mu g/m^3$) or OA (up to 0.15 J $\mu g/m^3$) concentrations. It is therefore concluded that screening level exceedance for 1,4-DCB is likely attributable to an indoor source.

In summary, it is concluded that IA screening level exceedance for 1,4-DCB is likely attributable to an indoor source (aerosol cans containing chemical cleaners, lubricants, paints, and diesel fuel were observed). There are no exceedances of SS screening levels.

Round Two

Analytical results are presented in Table 6 and detected parameters are summarized on Figure 5.

IA concentrations of 1,4-DCB was detected at IA-23 (87 $\mu g/m^3$), and IA-27 (26 $\mu g/m^3$) exceeded an IA MTCA screening level (2.3 $\mu g/m^3$), and were higher than SS vapor (up to 0.12 J $\mu g/m^3$) or OA (up to 0.05 J $\mu g/m^3$) concentrations. It is therefore concluded that screening level exceedances for 1,4-DCB are likely attributable to an indoor source.

In summary, it is concluded that the IA screening level exceedances for 1,4-DCB are likely attributable to an indoor source (aerosol cans containing chemical cleaners, lubricants, paints, and diesel fuel were observed). There are no exceedances of SS screening levels consistent with the round one results.

Round Four

Analytical results are presented in Table 6 and detected parameters are summarized on Figure 5.

IA concentrations of 1,2,4-TMB in passive samples at IA-13 (12 to 13 μg/m^3) exceeded an IA MTCA screening level (7.0 μg/m^3), and were higher than SS vapor (0.090 J μg/m^3) and OA passive sample (0.46 J μg/m^3) concentrations. It is therefore concluded that screening levels exceedances for 1,2,4-TMB are likely attributable to an indoor source.

In summary, it is concluded that IA screening level exceedances for 1,2,4-TMB are likely attributable to an indoor source (aerosol cans containing chemical cleaners, lubricants, paints, and diesel fuel were observed). The parameter 1,2,4-TMB was identified on MSDSs provided by a tenant. There are no exceedances of SS screening levels consistent with the other rounds of sampling.

Round One and Round Two Comparison

The following table presents a side-by-side comparison of the round one and round two sub-slab vapor data.

		Round One	Round Two		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		SS-11	SS-11		SS-12	SS-12		SS-13	SS-13
1,1,1-Trichloroethane	μg/m^3	0.50	0.66		4.2	4.3		24	23
1,1,2,2-Tetrachloroethane	μg/m^3	0.039 U	0.038 U		0.041 U	0.035 U		0.043 U	0.036 U
1,1,2-Trichloroethane	μg/m^3	0.15 U	0.15 U		0.16 U	0.14 U		0.17 U	0.15 U
1,1-Dichloroethene	μg/m^3	0.039 U	0.028 J		0.058	0.057		0.31	0.29
1,2,4-Trichlorobenzene	μg/m^3	0.039 U	0.058		0.041 U	0.062		0.043 U	0.036 U
1,2,4-Trimethylbenzene	μg/m^3	0.77 U	0.76 U		0.82 U	0.69 U		0.86 U	0.73 U
1,3,5-Trimethylbenzene	μg/m^3	0.77 U	0.76 U		0.82 U	0.69 U		0.86 U	0.73 U
1,4-Dichlorobenzene	μg/m^3	0.039 U	0.10		0.13 J	0.12		0.046	0.066
Benzene	μg/m^3	0.12 U	0.13		0.12	0.10 J		0.13 U	0.10 J
Carbon tetrachloride	μg/m^3	0.66	0.79		0.16	0.10		0.064	0.062
Chloroform (Trichloromethane)	μg/m^3	0.049 J	0.15 J		0.070 J	0.12 J		0.045 J	0.059 J
cis-1,2-Dichloroethene	μg/m^3	0.039 U	0.060		0.041 U	0.051		0.043 U	0.036 U
Ethylbenzene	μg/m^3	0.027 J	0.13 J		0.34 J	0.12 J		0.078 J	0.11 J
Hexachlorobutadiene	μg/m^3	0.039 U	0.038 U		0.89	0.020 J		0.022 J	0.036 U
m&p-Xylenes	μg/m^3	0.087 J	0.42		1.4	0.33		0.33	0.43
Methylene chloride	μg/m^3	0.77 U	0.13 J		0.82 U	0.17		0.86 UJ	0.035 J

		Round One	Round Two		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		SS-11	SS-11		SS-12	SS-12		SS-13	SS-13
Naphthalene	µg/m^3	0.15 U	0.31		0.092 J	0.18		0.85	0.30
o-Xylene	µg/m^3	0.030 J	0.25		0.40 J	0.18		0.087 J	0.28
Styrene	µg/m^3	0.77 U	0.43 J		0.82 U	0.69 U		0.86 U	0.73 U
Tetrachloroethene	µg/m^3	3.2	5.0		27	30		20	27
Toluene	µg/m^3	1.2	0.33		5.0	0.17		1.2	0.17
trans-1,2-Dichloroethene	µg/m^3	0.039 U	0.063		0.041 U	0.053		0.043 U	0.036 U
Trichloroethene	µg/m^3	0.27	0.45		0.37	0.30		24	27
Vinyl chloride	µg/m^3	0.039 U	0.018 J		0.041 U	0.017 J		0.043 U	0.036 U

At SS-11, SS-12, and SS-13, the reported concentrations for the round two samples are similar to the reported concentrations for the round one samples. Variability for the parameters detected above 1 µg/m^3 includes slight increases in concentrations in round two for PCE and TCE, and decreases in round two for toluene. These data suggest limited variability of concentrations over time. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,1,2-TCA, 1,2,4-TMB, and 1,3,5-TMB.

The following table presents a side-by-side comparison of the round one (Summa canister) and round two (passive sampler) indoor air data.

		Round One	Round Two		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		IA-11	IA-11		IA-12	IA-12		IA-13	IA-13
1,1,1-Trichloroethane	µg/m^3	0.024 J	0.050 U		0.032 J	0.050 U		0.034 J	0.050 U
1,2,4-Trimethylbenzene	µg/m^3	0.60 J	1.9		1.3	1.6		1.1	1.6
1,4-Dichlorobenzene	µg/m^3	0.13 J	0.69		5.4	2.2		1.6	2.2
Benzene	µg/m^3	0.63	0.64		0.71	0.61		0.74	0.86
Ethylbenzene	µg/m^3	1.7	14		4.7	22 J		5.1	27 J
m&p-Xylenes	µg/m^3	6.9	61 J		20	89 J		22	100 J
o-Xylene	µg/m^3	2.3	21 J		5.0	32 J		5.6	40 J
Styrene	µg/m^3	0.34 J	2.0		0.32 J	0.93		0.28 J	1.2
Tetrachloroethene	µg/m^3	0.18	0.37		1.5	0.24		1.8	0.19
Toluene	µg/m^3	21	28 J		55	8.4		59	19 J
Trichloroethene	µg/m^3	0.10	0.12		0.34	0.049		0.86	0.076

At IA-11, the reported concentrations for the round two sample are greater than the reported concentrations for the round one sample with some exceptions that have similar concentrations (i.e., 1,1,1-TCA, 1,2,4-TMB, 1,4-DCB, BZ, PCE, TCE). At IA-12 and IA-13, the reported concentrations for the round two samples are similar for 1,1,1-TCA, 1,2,4-TMB, 1,4-DCB, BZ, and styrene, greater than for EB and xylenes, and less than for PCE, toluene, and TCE with respect to

the reported concentrations for the round one samples. The Summa canisters were deployed over a 24-hour period and the passive samplers were deployed over a 7-day period on a different date. These data suggest some variability of concentrations over time. This is inconsistent with the comparison of SS vapor samples that indicate limited variability. The greater variability in the IA samples may be a result of variations in emissions from other potential sources unrelated to the OCC site.

Round One and Round Four Comparison

The following table presents a side-by-side comparison of the round one and round four sub-slab vapor data.

		Round One	Round Four
Volatile Organic Compounds		SS-13	SS-13
1,1,1-Trichloroethane	µg/m^3	24	25
1,1,2,2-Tetrachloroethane	µg/m^3	0.043 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	0.17 U	0.16 U
1,1-Dichloroethene	µg/m^3	0.31	0.059
1,2,4-Trichlorobenzene	µg/m^3	0.043 U	0.039 U
1,2,4-Trimethylbenzene	µg/m^3	0.86 U	0.090 J
1,3,5-Trimethylbenzene	µg/m^3	0.86 U	0.040 J
1,4-Dichlorobenzene	µg/m^3	0.046	0.058
Benzene	µg/m^3	0.13 U	0.12 J
Carbon tetrachloride	µg/m^3	0.064	0.067
Chloroform (Trichloromethane)	µg/m^3	0.045 J	0.16 U
cis-1,2-Dichloroethene	µg/m^3	0.043 U	0.016 J
Ethylbenzene	µg/m^3	0.078 J	0.051 J
Hexachlorobutadiene	µg/m^3	0.022 J	0.16 U
m&p-Xylenes	µg/m^3	0.33	0.19
Methylene chloride	µg/m^3	0.86 UJ	0.11 J
Naphthalene	µg/m^3	0.85	0.46
o-Xylene	µg/m^3	0.087 J	0.10 J
Styrene	µg/m^3	0.86 U	0.10 J
Tetrachloroethene	µg/m^3	20	29
Toluene	µg/m^3	1.2	0.40
trans-1,2-Dichloroethene	µg/m^3	0.043 U	0.039 U
Trichloroethene	µg/m^3	24	21
Vinyl chloride	µg/m^3	0.043 U	0.039 U

At SS-13, the reported concentrations for the round four sample are similar to the reported concentrations for the round one sample. Variability for the parameters detected above 1 µg/m^3

includes an increase in concentration in round four for PCE and slight decreases in concentrations for toluene and TCE. These data suggest limited variability of concentrations over time. The parameters that were not detected in both rounds of sampling include 1,1,2,2 TCA, 1,1,2-TCA, 1,2,4-TCB, trans-1,2-DCE and VC.

The following table presents a side-by-side comparison of the round one (Summa canister) and round four (Summa canister) indoor air data.

		Round One	Round Four
Volatile Organic Compounds		IA-13	IA-13
1,1,1-Trichloroethane	µg/m^3	0.034 J	0.022 J
1,1,2,2-Tetrachloroethane	µg/m^3	0.039 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	0.16 U	0.15 U
1,1-Dichloroethene	µg/m^3	0.039 U	0.039 U
1,2,4-Trichlorobenzene	µg/m^3	0.039 U	0.039 U
1,2,4-Trimethylbenzene	µg/m^3	1.1	1.0
1,3,5-Trimethylbenzene	µg/m^3	0.36 J	0.41
1,4-Dichlorobenzene	µg/m^3	1.6	0.019 J
Benzene	µg/m^3	0.74	0.28
Carbon tetrachloride	µg/m^3	0.45	0.62
Chloroform (Trichloromethane)	µg/m^3	0.078 J	0.20
cis-1,2-Dichloroethene	µg/m^3	0.039 U	0.039 U
Ethylbenzene	µg/m^3	5.1	2.7
Hexachlorobutadiene	µg/m^3	0.039 U	0.15 U
m&p-Xylenes	µg/m^3	22	10
Methylene chloride	µg/m^3	0.78 UJ	0.49
Naphthalene	µg/m^3	0.20	0.26
o-Xylene	µg/m^3	5.6	3.3
Styrene	µg/m^3	0.28 J	1.9
Tetrachloroethene	µg/m^3	1.8	0.14
Toluene	µg/m^3	59	7.8
trans-1,2-Dichloroethene	µg/m^3	0.039 U	0.039 U
Trichloroethene	µg/m^3	0.86	0.042
Vinyl chloride	µg/m^3	0.039 U	0.039 U

At IA-13, the reported concentrations for the round four sample are similar to or less than the reported concentrations for the round one sample with few exceptions. Among the largest decreases in concentrations were for toluene and m&p-xylenes. Toluene and m&p-xylenes were detected in the SS sample at similar concentrations for both sampling rounds. These data suggest some variability of IA concentrations over time. This is inconsistent with the comparison of SS vapor

samples that indicate limited variability. The greater variability in the IA samples may be a result of variations in emissions from other potential sources unrelated to the OCC site.

Round Two and Round Four Comparison

As noted previously, the round one SS data are similar to the round two and round four SS data and therefore the round two and round four SS data are similar with limited variability of concentrations over time.

The following table presents a side-by-side comparison of the round two (passive sampler) and round four (passive sampler) indoor air data.

Volatile Organic Compounds		Round Two	Round Four
		IA-13	IA-13
1,1,1-Trichloroethane	µg/m^3	0.050 U	0.051 U
1,2,4-Trimethylbenzene	µg/m^3	1.6	13
1,4-Dichlorobenzene	µg/m^3	2.2	0.046 U
Benzene	µg/m^3	0.86	0.61 J
Ethylbenzene	µg/m^3	27 J	8.7
m&p-Xylenes	µg/m^3	100 J	36 J
o-Xylene	µg/m^3	40 J	12
Styrene	µg/m^3	1.2	1.3
Tetrachloroethene	µg/m^3	0.19	0.19
Toluene	µg/m^3	19 J	22 J
Trichloroethene	µg/m^3	0.076	0.070

At IA-13, the reported concentrations for the round four samples are less than the reported concentrations for the round two samples with a few exceptions. This is consistent with concentrations of some parameters in the OA samples between rounds, which contribute to the IA concentrations. These data suggest some variability of concentrations over time for IA. This is inconsistent with the comparison of SS vapor samples that indicate limited variability. The greater variability in the IA samples may be a result of variations in emissions from other potential sources unrelated to the OCC site.

Additional Analysis of the Data

Sub-slab Vapor Data

The sub-slab vapor concentrations may be contributing to indoor air concentrations via the vapor intrusion pathway. However, the contributions would not be significant for the parameters that were detected in sub-slab vapor samples at concentrations below the cancer screening levels and below HQ screening levels, and in some cases below indoor air concentrations. This is the case for all parameters. The highest concentrations in the sub-slab are for 1,1,1-TCA, PCE, and TCE, which are all below the screening levels. These concentrations are being adequately attenuated as evidence of the low concentrations (not detected to 1.8 µg/m^3) in indoor air that are also below screening levels.

Groundwater Data

The following is a discussion of the most recent, shallowest, and nearby groundwater data presented in Table 6 with respect to SS vapor analytical results. TCE was detected in a recent (2012) shallow groundwater sample collected from location 61C-25, representing the most recent, shallowest, and nearby groundwater data. CT was detected in sub-slab vapor samples but was not detected in groundwater. Other parameters detected in the sub-slab vapor samples and groundwater sample include 1,1-DCE, BZ, chloroform, cis-1,2-DCE, EB, m&p-xylenes, MC, o-xylene, PCE, toluene, trans-1,2-DCE, and VC. The remaining detected parameters in sub-slab vapor samples were not reported for the groundwater sample. Concentrations in the SS vapor of the parameters detected in groundwater are below screening levels.

Recommendation

No further action by GSH is proposed for this building, due to an indoor source unrelated to the OCC Site based on the data presented herein.

3.5 Building 592

Figure 6 shows the sample locations and layout of Building 592.

Building Properties and Usage

Building 592 houses Trident's offices and warehouse. Construction is steel siding over wood frame construction on concrete slab. The concrete slab is in good condition. This 260-ft by 150-ft building has two separate office areas along the east wall of the first floor, with the majority of the first floor used as warehouse space. The interior walls of the offices are wood framed. There are offices on the partial second floor, which covers about two thirds of the building footprint. The two main floor office areas occupy an area about 220 ft by 45 ft along the east wall, with the northernmost office estimated to be 60 ft by 45 ft with 8-ft drop ceilings. The southernmost office is approximately 160 ft by 45 ft in size with an 8-ft high drywall ceiling. There is a 40-ft space between the offices. Vapors could potentially intrude into this building through cracks in the floor slab, unsealed utility penetrations, and un-caulked floor/wall or expansion joints. The slab thickness encountered during the probe installation was between 6 and 6.5 inches. Where visible, the slab appeared to be in good condition.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

Two SS vapor probes were installed where SS vapor and IA samples were collected, as discussed below.

Sample pair SS/IA-1 was located in a small office space in the northeast corner of the building. Specifically, the sample probe was installed just outside the main office space in a cubicle area to limit impacts to tenant operations. A second office space extends to the west of this sample location and is separated by a door. Adjacent to the south of the office is a small storage area that opens to a larger warehouse area to the west. Further to the south is another office space. No obvious chemical storage was observed in this area. A warehouse space is located within this same building; however, the contents of the warehouse were not directly inspected.

Sample pair SS/IA-2 was located in an office space approximately 40 ft south of sample location SS/IA-1. The two offices are separated by a storage area opened to the adjacent warehouse and shop space to the west. South of this sample location is a shop and warehouse space separated by a door. This office has its own exterior door. During the pre-sampling survey, three plastic gasoline cans were observed. The cans were empty and it was not clear whether these cans were used. The cans were moved out of the office area to a nearby shop space for storage. During the sampling event, the cans were not observed to be in the area. No additional obvious VOC emitters were identified in this area. This office and break room space shares a wall with a storage area and warehouse space. The warehouse space was not directly inspected.

Sampling in Building 592 was initiated on April 21, 2013 with the 24-hour samples completed the following day. An associated OA sample (OA-1) was collected at a location just to the west of Building 592 concurrent with the IA samples. Weather conditions during the sampling event were partly cloudy and calm, with winds from the west southwest. No precipitation was observed.

Round Two

Indoor air and sub-slab vapor samples were collected at the same IA and SS vapor sample locations as the round one event. Two additional IA samples (IA-24 and IS-25) were collected from a centrally located position within the building in accordance with USEPA request and at the far south end of the building in an area used as a machine shop with several large lathes and other metal working tools, respectively. Prior to conducting the round two sampling event, a detailed survey was completed for Building 592, at which time the tenant was asked to fill out a questionnaire and provide MSDSs for all chemicals used or stored within the building. During the building inventory and survey, the following target analytes were identified: xylene, 1,2,4-TMB, toluene, EB, naphthalene, BZ, PCE, and TCE. Miscellaneous chemical storage within the small maintenance area south of sample location 2 was observed. Numerous gas cans were observed and the operation of a forklift and golf carts within the warehouse were noted. Various cutting oils and lubricants were observed in the machine shop area as well as bins of waste metal shaving. Copies of the submitted building survey questionnaire and MSDSs are included in Appendix A.

The indoor and ambient air sampling was initiated on June 24, 2013 using passive sampling equipment. The samples were completed 7 days later. Sub-slab vapor sampling was conducted on June 27 and 29, 2013 with the 2-hour samples completed the same day. An associated OA sample for this building (OA-1) was collected outside of the building concurrently with the IA samples.

Round Three

A total of 13 Summa canister samples were collected during round three including at four SS vapor locations paired with four IA locations (one new SS vapor probe at an existing IA location and three existing pairs), four IA locations (one existing near a potential source area and three new), and one OA location. Additionally, two passive samples were collected, one from IA location 2 (IA-2P) and one from OA location 1 (OA-1P), as specified by USEPA.

Sample location IA-24 was previously sampled in round two to represent the center of the building space. A new SS vapor probe (SS-24) was paired with it for round three.

A preliminary building and sampling survey was conducted on February 7, 2014 to investigate potential preferential pathways specifically targeting utility penetrations. Mechanical, electrical, and plumbing are routed through numerous locations in the warehouse. The observed floor penetrations

all appeared sealed and in good condition. Numerous cracks in the floor were observed throughout the building. Some of the larger cracks have been sealed. The date of the floor sealing is unknown. Four sprinkler closets were observed in the building. The closets are wood construction and surround the watermain and control valves associated with the building's fire suppression system. A cut surrounding the watermain entering the floor was observed to be unsealed with the existing floor. During a pre-sampling site walk with USEPA representatives conducted on March 10, 2014 these sprinkler closets were investigated and two closets were selected as additional indoor air sampling points (IA-33 and IA-34).

The SS/IA-32 location was added to a small shop area near the southeastern corner of the building. This area is used for the maintenance of fish processing equipment. A parts washing tub, sand blasting station, and welding station are all housed in this area. During the pre-sampling survey, no obvious VOC emitters were observed in this space; however, previous work activities likely exposed this area to chemicals noted in the MSDSs review. Consistent with round two during the building inventory and survey, the following target analytes were identified in MSDSs as being used in the building: xylene, 1,2,4-TMB, toluene, EB, naphthalene, BZ, PCE, and TCE.

During the pre-sampling site walk on March 10, 2014, USEPA representatives requested an additional indoor air sample be collected within a small office space located along the eastern wall of the building, just north and outside of a shop area. The office space was previously excluded from the sampling program since it is built on a raised wooden floor. IA-40B was added to this location. The first summa canister (IA-40) deployed at this location began filling at a rate greater than designed and was closed, a second canister, IA-40B, was deployed. No obvious VOC emitters were observed in this area.

Sample pair SS/IA-1 is unchanged from round one. No obvious potential VOC emitters were observed in this area.

Sample pair SS/IA-2 is unchanged from round one. No obvious potential VOC emitters were observed in this area. The space shares a wall with the warehouse and maintenance area to the south.

The indoor and ambient air sampling was initiated on March 11, 2014 using passive sampling equipment at IA-2P and OA-1P. The samples were retrieved 7 days later. Summa canister SS vapor and IA sampling was initiated on March 17 with the 2-hour samples completed the same day and 24-hour samples were completed the following day. An associated Summa canister OA sample for this building (OA-1) was collected outside of the building on the west side concurrent with the IA Summa canister samples.

Sampling Results

Round One

Analytical results are presented in Table 7 and detected parameters are summarized on Figure 6.

The IA concentrations of TCE at IA-1 (7.3 $\mu g/m^3$) and IA-2 (13 $\mu g/m^3$) exceeded IA MTCA screening levels (6.3 and 2.0 $\mu g/m^3$), and were higher than in the SS vapor samples (up to 4.5 $\mu g/m^3$) and the OA sample (0.38 $\mu g/m^3$). SS vapor concentrations of TCE are below the SS vapor screening levels. It is therefore concluded that the IA MTCA screening levels exceedances for TCE at IA-1 and IA-2 are likely attributable to an indoor source. The TCE concentration at IA-2 (13 $\mu g/m^3$) exceeded the short-term criterion of 8.4 $\mu g/m^3$.

The following table presents the difference between measured IA concentrations and measured OA concentrations (adjusted IA). Not detected results for OA sample were assumed as zero.

Detected		IA-1	IA-2
Volatile Organic Compounds		- OA-1	- OA-1
1,1,1-Trichloroethane	µg/m^3	0.084	0.074
1,1-Dichloroethene	µg/m^3	0.007	
1,2,4-Trimethylbenzene	µg/m^3	1.82	1.02
1,3,5-Trimethylbenzene	µg/m^3	0.59	0.48
1,4-Dichlorobenzene	µg/m^3	0.028	-0.005
Benzene	µg/m^3	0.54	1.04
Carbon tetrachloride	µg/m^3	-0.03	-0.03
Chloroform (Trichloromethane)	µg/m^3	0.023	0.022
Ethylbenzene	µg/m^3	2.25	2.45
m&p-Xylenes	µg/m^3	8.33	8.63
Methylene chloride	µg/m^3	1.6	-
Naphthalene	µg/m^3	0.42	-0.043
o-Xylene	µg/m^3	2.69	2.69
Styrene	µg/m^3	0.36	0.26
Tetrachloroethene	µg/m^3	0.97	0.82
Toluene	µg/m^3	14.5	20.5
Trichloroethene	µg/m^3	6.92^{bc}	12.62^{abc}

As shown in the above table, the adjusted IA exceedances include TCE at two locations. As noted previously, TCE was detected in the two sub-slab vapor samples at concentrations less than screening levels and additionally less than adjusted IA concentrations by up to an order of magnitude. TCE was not detected in the nearby groundwater sample. Therefore it may be concluded that the exceedances of TCE in IA are unlikely attributable to sub-slab vapor. As noted previously, TCE was identified on MSDSs provided by the operator confirming the presence of this chemical within the building.

In summary, it is concluded that IA screening levels exceedances for TCE are likely attributable to an indoor source (no specific obvious indoor sources were noted in the building; however, warehouse space was not directly inspected). The TCE concentration at IA-2 (13 µg/m^3) exceeded the short-term criterion of 8.4 µg/m^3. Note that the building survey conducted in round two identified TCE in degreasers used in maintenance areas in Building 592.

Round Two

Analytical results are presented in Table 7 and detected parameters are summarized on Figure 6.

The IA and SS concentrations were not detected or detected at concentrations below the screening levels.

Round Three

Analytical results are presented in Table 7 and detected parameters are summarized on Figure 6.

IA concentrations of naphthalene, PCE, and TCE exceeded IA screening levels.

An IA concentration of naphthalene at IA-25 (0.76 μg/m^3) marginally exceeded an IA MTCA screening level (0.74 μg/m^3) and was higher than the OA concentration (0.081 J μg/m^3) and the SS vapor concentrations (up to 0.21 μg/m^3), which are below screening levels. It is therefore concluded that IA screening level exceedance for naphthalene is likely attributable to an indoor source.

IA concentration of PCE (up to 55 μg/m^3) exceeded an IA MTCA screening level (40 μg/m^3) in samples from two of eight locations. The concentration of PCE measured in the OA sample was 0.41 μg/m^3. Three of the four SS vapor concentrations of PCE ranged from 6.9 to 23 μg/m^3 and are less than the SS vapor screening levels. The fourth SS vapor concentration associated with new location SS-32 in a small shop area at the south-east corner of the building was measured at 2,000 μg/m^3 and exceeded the non-carcinogen screening level. The concentration of PCE in the paired IA sample was 17 μg/m^3, the lowest measured IA concentration. The highest IA concentrations were at locations IA-2 (office to the north-east) and IA-25 (near potential source). IA-2 was paired with SS-2 having a concentration of 23 μg/m^3 that is less than the IA concentration and below the SS vapor screening levels. The previous sampling rounds had no exceedances for PCE in SS vapor, IA, and OA samples; however, the highest measured concentration was at location IA-25 (near potential source). The concentrations at the previously installed and sampled SS vapor probe locations are generally consistent over the three rounds, which is inconsistent with the IA data. Therefore, It appears that screening level exceedances for PCE are likely attributable to an indoor source. Additionally, the data indicate that a potential isolated source exists beneath the shop area, unrelated to the OCC Site. The potential contribution to IA concentrations from location SS-32 is unclear.

IA concentrations of TCE (up to 8.3 μg/m^3) exceeded an IA MTCA screening level (2.0. μg/m^3) in samples from two of the eight locations. Another IA MTCA screening level (6.3 μg/m^3) was exceeded at one location. The IA concentrations were higher than TCE concentrations measured in the OA sample (0.25 μg/m^3) and in the four SS vapor samples (up to 2.4 μg/m^3), which are below screening levels. It is therefore concluded that the IA MTCA screening levels exceedances for TCE are likely attributable to an indoor source. The TCE concentrations did not exceed the short-term criterion of 8.4 μg/m^3. Note that the building survey conducted in round two identified TCE in degreasers used in maintenance areas in Building 592.

The concentrations for the passive samples were generally lower than the Summa canister collected at the same location for IA and generally similar or greater than the Summa canister collected at the same location for OA.

The following table presents the difference between measured IA concentrations and measured OA concentrations (adjusted IA). Not detected results for OA sample were assumed as zero.

Detected		IA-1	IA-2	IA-24	IA-25	IA-32	IA-33	IA-34	IA-40B
Volatile Organic Compounds		- OA-1	- OA-1	- OA-1	- OA-1	- OA-1	- OA-1	- OA-1	- OA-1
1,1,1-Trichloroethane	μg/m^3	0.049	0.037	0.014	0.037	0.003	0.009	0.024	0.010

Detected		IA-1	IA-2	IA-24	IA-25	IA-32	IA-33	IA-34	IA-40B
Volatile Organic Compounds		- OA-1	- OA-1	- OA-1	- OA-1	- OA-1	- OA-1	- OA-1	- OA-1
1,1,2,2-Tetrachloroethane	µg/m^3	0.001U	0.00U	-0.004U	-0.001U	0.00U	0.002	-0.005U	-0.002U
1,1,2-Trichloroethane	µg/m^3	0.00U	-0.01U	-0.02U	-0.01U	-0.01U	-0.01U	-0.03U	-0.01U
1,1-Dichloroethene	µg/m^3	0.001U	0.00U	-0.004U	-0.001U	0.00U	-0.002U	-0.005U	-0.002U
1,2,4-Trichlorobenzene	µg/m^3	0.001U	0.00U	-0.024	-0.001U	0.00U	-0.002U	-0.005U	-0.002U
1,2,4-Trimethylbenzene	µg/m^3	1.31	2.01	0.91	0.61	0.64	0.81	1.01	1.21
1,3,5-Trimethylbenzene	µg/m^3	0.455	0.675	0.305	0.225	0.235	0.295	0.335	0.425
1,4-Dichlorobenzene	µg/m^3	0.079	0.016	0.014	0.012	0.014	0.006	0.006	0.017
Benzene	µg/m^3	0.20	0.45	0.15	0.15	0.05	0.15	0.45	0.15
Carbon tetrachloride	µg/m^3	-0.13	-0.01	-0.04	0.01	-0.06	-0.02	-0.03	-0.06
Chloroform (Trichloromethane)	µg/m^3	0.03	0.14	0.05	0.03	0.00	0.01	0.03	0.03
cis-1,2-Dichloroethene	µg/m^3	-0.06	-0.07	-0.05	0.00	-0.04	-0.04	0.00	-0.11
Ethylbenzene	µg/m^3	1.91	2.61	1.81	1.21	4.71	1.41	1.31	6.01
Hexachlorobutadiene	µg/m^3	0.001U	0.00U	-0.004U	-0.001U	0.00U	-0.002U	-0.005	-0.002U
m&p-Xylenes	µg/m^3	6.7	9.2	6.3	4.2	20.2	4.6	4.9	24.2
Methylene chloride	µg/m^3	0.34	0.37	0.33	1.76	0.09	0.37	0.56	0.33
Naphthalene	µg/m^3	0.309	0.399	0.229	0.679	0.199	0.309	0.159	0.229
o-Xylene	µg/m^3	2.11	3.01	1.91	1.41	5.71	1.41	1.61	7.11
Styrene	µg/m^3	0.258	0.168	0.168	0.278	0.898	0.148	0.128	0.408
Tetrachloroethene	µg/m^3	25.59	**54.59**[c]	26.59	**54.59**[c]	16.59	22.59	37.59	24.59
Toluene	µg/m^3	6.1	9.3	4.9	4.9	2.9	6.0	4.9	7.5
trans-1,2-Dichloroethene	µg/m^3	0.008	0.015	0.024	0.010	-0.001	0.009	0.012	0.002
Trichloroethene	µg/m^3	**3.45**[c]	**8.05**[bc]	0.31	1.55	0.13	0.63	0.60	0.53
Vinyl chloride	µg/m^3	-0.11	-0.13	-0.09	-0.04	-0.13	-0.09	-0.02	-0.17

As shown in the above table, the exceedances for adjusted IA concentrations include PCE and TCE at various locations. PCE was detected in all four SS vapor samples at concentrations less than screening levels except at SS-32. As shown above, the lowest IA concentration is at the location paired with SS-32 and below the screening levels. As noted previously, PCE was not detected above screening levels in IA samples collected in rounds one and two, and the SS vapor concentrations are consistent with the round three SS vapor concentrations. PCE was not detected in the nearby groundwater sample. Therefore it may be concluded that the exceedances of PCE in IA is unlikely attributable to sub-slab vapor, except potentially partially from location SS-32. TCE was detected at all four sub-slab vapor samples at concentrations less than screening levels and additionally less than adjusted IA concentrations. TCE was not detected in the nearby groundwater sample. Therefore it may be concluded that the exceedances of TCE in IA are unlikely attributable to sub-slab vapor. As noted previously, all the above chemicals were identified on MSDSs provided by the operator confirming the presence of these chemicals within the building.

In summary, it is concluded that IA screening level exceedances for naphthalene, PCE, and TCE are likely attributable to an indoor source. Additionally, the data indicate that a potential isolated

PCE source exists beneath the shop area, unrelated to the OCC Site. The potential contribution to IA PCE concentrations from location SS-32 is unclear since the IA concentration at that location was below the IA MTCA screening levels.

Round One and Round Two Comparison

The following table presents a side-by-side comparison of the round one and round two sub-slab vapor data.

		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		SS-1	SS-1		SS-2	SS-2
1,1,1-Trichloroethane	µg/m^3	21	20		0.59	0.35
1,1,2,2-Tetrachloroethane	µg/m^3	0.038 U	0.038 U		0.037 U	0.040 U
1,1,2-Trichloroethane	µg/m^3	0.15 U	0.15 U		0.0075 J	0.16 U
1,1-Dichloroethene	µg/m^3	0.31	0.33		0.0068 J	0.0078 J
1,2,4-Trichlorobenzene	µg/m^3	0.038 U	0.038 U		0.037 U	0.040 U
1,2,4-Trimethylbenzene	µg/m^3	0.76 U	0.38 J		0.73 U	0.79 U
1,3,5-Trimethylbenzene	µg/m^3	0.76 U	0.76 U		0.73 U	0.79 U
1,4-Dichlorobenzene	µg/m^3	0.038 U	0.13		0.033 J	0.040 U
Benzene	µg/m^3	0.20	0.33		0.11 U	0.069 J
Carbon tetrachloride	µg/m^3	0.25	0.29		0.36	0.31
Chloroform (Trichloromethane)	µg/m^3	0.52	0.43		0.046 J	0.070 J
cis-1,2-Dichloroethene	µg/m^3	0.038 U	0.018 J		0.018 J	0.040 U
Ethylbenzene	µg/m^3	0.11 J	0.22		0.060 J	0.37
Hexachlorobutadiene	µg/m^3	0.038 U	0.038 U		0.026 J	0.040 U
m&p-Xylenes	µg/m^3	0.38	0.91		0.20	1.5
Methylene chloride	µg/m^3	0.76 UJ	0.082 J		0.73 UJ	0.034 J
Naphthalene	µg/m^3	0.031 J	0.43		0.077 J	0.32
o-Xylene	µg/m^3	0.12 J	0.45		0.066 J	0.51
Styrene	µg/m^3	0.76 U	0.32 J		0.73 U	0.79 U
Tetrachloroethene	µg/m^3	18	24		19	25
Toluene	µg/m^3	0.62 J	0.69		0.39 J	0.40
trans-1,2-Dichloroethene	µg/m^3	0.038 U	0.038 U		0.037 U	0.040 U
Trichloroethene	µg/m^3	0.48	0.13		4.5	0.40
Vinyl chloride	µg/m^3	0.038 U	0.038 U		0.037 U	0.040 U

At SS-1 and SS-2, the reported concentrations for the round two samples are similar to the reported concentrations for the round one samples. Variability for the parameters detected above 1 µg/m^3 includes slight increases in concentrations in round two for m&p-xylenes and PCE, and decrease in concentration in round two for TCE. These data suggest limited variability of concentrations over

time. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,2,4-TCB, 1,3,5-TMB, trans-1,2-DCE, and VC.

The following table presents a side-by-side comparison of the round one (Summa canister) and round two (passive sampler) indoor air data.

		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		IA-1	IA-1		IA-2	IA-2
1,1,1-Trichloroethane	µg/m^3	0.11	0.053		0.10	0.068
1,2,4-Trimethylbenzene	µg/m^3	2.1	3.3		1.3	5.3
1,4-Dichlorobenzene	µg/m^3	0.055	0.045 U		0.022 J	0.086
Benzene	µg/m^3	1	1.6		1.5	1.7
Ethylbenzene	µg/m^3	2.5	4.5		2.7	6.8
m&p-Xylenes	µg/m^3	9.2	16		9.5	25
o-Xylene	µg/m^3	3	5.5		3.0	8.7
Styrene	µg/m^3	0.36 J	1.2		0.26 J	1.1
Tetrachloroethene	µg/m^3	1.1	1.1		0.95	1.4
Toluene	µg/m^3	16	21 J		22	29 J
Trichloroethene	µg/m^3	7.3	1.5		13	1.9

At IA-1 and IA-2, the reported concentrations for the round two samples are similar for 1,4-DCB, BZ, and PCE, greater than for 1,2,4-TMB, EB, xylenes, styrene and toluene, and less than for 1,1,1-TCA, and TCE with respect to the reported concentrations for the round one samples. The Summa canisters were deployed over a 24-hour period and the passive samplers were deployed over a 7-day period on a different date. These data suggest some variability of concentrations over time. This is inconsistent with the comparison of SS vapor samples that indicate limited variability. The greater variability in the IA samples may be a result of variations in emissions from other potential sources unrelated to the OCC site.

Round One and Round Three Comparison

The following table presents a side-by-side comparison of the round one and round two sub-slab vapor data.

		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		SS-1	SS-1		SS-2	SS-2
1,1,1-Trichloroethane	µg/m^3	21	16		0.59	0.37
1,1,2,2-Tetrachloroethane	µg/m^3	0.038 U	0.037 U		0.037 U	0.043 U
1,1,2-Trichloroethane	µg/m^3	0.15 U	0.15 U		0.0075 J	0.17 U
1,1-Dichloroethene	µg/m^3	0.31	0.17		0.0068 J	0.043 U
1,2,4-Trichlorobenzene	µg/m^3	0.038 U	0.037 U		0.037 U	0.043 U

		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		SS-1	SS-1		SS-2	SS-2
1,2,4-Trimethylbenzene	µg/m^3	0.76 U	0.081 J		0.73 U	0.12 J
1,3,5-Trimethylbenzene	µg/m^3	0.76 U	0.025 J		0.73 U	0.036 J
1,4-Dichlorobenzene	µg/m^3	0.038 U	0.029 J		0.033 J	0.040 J
Benzene	µg/m^3	0.20	0.16		0.11 U	0.059 J
Carbon tetrachloride	µg/m^3	0.25	0.25		0.36	0.36
Chloroform (Trichloromethane)	µg/m^3	0.52	0.39		0.046 J	0.062 J
cis-1,2-Dichloroethene	µg/m^3	0.038 U	0.037 U		0.018 J	0.043 U
Ethylbenzene	µg/m^3	0.11 J	0.11 J		0.060 J	0.086 J
Hexachlorobutadiene	µg/m^3	0.038 U	0.037 U		0.026 J	0.043 U
m&p-Xylenes	µg/m^3	0.38	0.34		0.20	0.30
Methylene chloride	µg/m^3	0.76 UJ	0.15 U		0.73 UJ	0.17 U
Naphthalene	µg/m^3	0.031 J	0.17		0.077 J	0.21
o-Xylene	µg/m^3	0.12 J	0.11 J		0.066 J	0.11 J
Styrene	µg/m^3	0.76 U	0.14 J		0.73 U	0.10 J
Tetrachloroethene	µg/m^3	18	18		19	23
Toluene	µg/m^3	0.62 J	0.37		0.39 J	0.24
trans-1,2-Dichloroethene	µg/m^3	0.038 U	0.037 U		0.037 U	0.043 U
Trichloroethene	µg/m^3	0.48	0.064		4.5	0.30
Vinyl chloride	µg/m^3	0.038 U	0.037 U		0.037 U	0.043 U

At SS-1 and SS-2, the reported concentrations for the round three samples are similar to the reported concentrations for the round one samples with the exception of TCE that is an order of magnitude lower in round three. Variability for the parameters detected above 1 µg/m^3 includes a slight increase in concentration in round three for PCE, and decrease in round three for 1,1,1-TCA. These data suggest limited variability of concentrations over time and limited temporal effects with the possible exception of TCE. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,2,4-TMB, MC, trans-1,2-DCE, and VC.

The following table presents a side-by-side comparison of the round one and round three indoor air summa canister data.

		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		IA-1	IA-1		IA-2	IA-2
1,1,1-Trichloroethane	µg/m^3	0.11	0.070		0.10	0.058
1,1,2,2-Tetrachloroethane	µg/m^3	0.038 U	0.040 U		0.040 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	0.15 U	0.16 U		0.16 U	0.15 U

		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		IA-1	IA-1		IA-2	IA-2
1,1-Dichloroethene	µg/m^3	0.0070 J	0.040 U		0.040 U	0.039 U
1,2,4-Trichlorobenzene	µg/m^3	0.038 U	0.040 U		0.040 U	0.039 U
1,2,4-Trimethylbenzene	µg/m^3	2.0	1.6		1.3	2.3
1,3,5-Trimethylbenzene	µg/m^3	0.56 J	0.54 J		0.48 J	0.76
1,4-Dichlorobenzene	µg/m^3	0.055	0.093		0.022 J	0.030 J
Benzene	µg/m^3	1.0	0.85		1.5	1.1
Carbon tetrachloride	µg/m^3	0.46	0.33 J		0.47	0.45
Chloroform (Trichloromethane)	µg/m^3	0.10 J	0.11 J		0.099 J	0.22
cis-1,2-Dichloroethene	µg/m^3	0.038 U	0.15		0.040 U	0.14
Ethylbenzene	µg/m^3	2.5	2.4		2.7	3.1
Hexachlorobutadiene	µg/m^3	0.038 U	0.040 U		0.040 U	0.039 U
m&p-Xylenes	µg/m^3	9.2	8.5		9.5	11
Methylene chloride	µg/m^3	1.6 J	0.78		1.3 UJ	0.81
Naphthalene	µg/m^3	0.41	0.39 J		0.067 J	0.48
o-Xylene	µg/m^3	3.0	2.7		3.0	3.6
Styrene	µg/m^3	0.34 J	0.35		0.26 J	0.26
Tetrachloroethene	µg/m^3	1.1	26		0.95	55
Toluene	µg/m^3	16	7.8		22	11
trans-1,2-Dichloroethene	µg/m^3	0.038 U	0.027 J		0.040 U	0.034 J
Trichloroethene	µg/m^3	7.3	3.7		13	8.3
Vinyl chloride	µg/m^3	0.038 U	0.18		0.040 U	0.16

The reported concentrations for the round three samples are similar to the reported concentrations for the round one samples with the exception of PCE that is one to two orders of magnitude higher in round three. Variability for the other parameters detected above 1 µg/m^3 includes: slight decreases in concentrations in round three for 1,2,4-TMB (AI-1), BZ (AI-1 and AI-2), EB (AI-1), m&p-xylenes (AI-1), MC (AI-1 and AI-2), and o-xylene (AI-1); decreases for toluene (AI-1 and AI-2), and TCE (AI-1 and AI-2); slight increases for 1,2,4-TMB (AI-2), EB (AI-2), m&p-xylenes (AI-2), o-xylene (AI-2). These data suggest limited variability in concentrations over time and limited temporal effects with the exception of PCE. The variability of PCE is inconsistent with the generally consistent results for SS vapor and OA samples between sampling rounds. The observed variability of the PCE IA results is indicative of variable emissions from another potential source unrelated to the OCC site. As discussed previously, PCE has been identified in materials stored and/or used in the building. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,1,2-TCA, 1,2,4-TCB, and HCBD.

Additional Analysis of the Data

Sub-slab Vapor Data

The sub-slab vapor concentrations may be contributing to indoor air concentrations via the vapor intrusion pathway. However, the contributions would not be significant for the parameters that were detected in sub-slab vapor samples at concentrations below the cancer screening levels and below HQ screening levels, and in some cases below indoor air concentrations.

The sub-slab TCE concentration measured at sub-slab probe 2 of 4.5 $\mu g/m^3$ was not confirmed in the round two or round three sampling. Concentration of 0.40 and 0.30 $\mu g/m^3$ were measured in the round two and three samples, respectively, that are an order of magnitude lower than the round one result. The concentrations of the other target parameters in the round two and three samples were similar to or greater than the concentrations in the round one sample. The rounds two and three concentrations of TCE at sub-slab probe 2 are consistent with the round one, two, and three concentrations measured at the other sub-slab probes with the exception of SS-32. It was identified during the building survey conducted prior to the rounds two and three sampling that a TCE potential source exists inside the building.

The sub-slab PCE concentration measured at SS probe 32 of 2,000 µg/m3 is inconsistent with the other sub-slab PCE concentrations measured, which are two orders of magnitude less. These data indicate that a potential isolated source exists beneath the shop area (SS-32). The potential contribution to IA concentrations from location SS-32 is unclear.

Groundwater Data

The following is a discussion of the most recent, shallowest, and nearby groundwater data presented in Table 7 with respect to SS vapor analytical results. TCE was not detected in a recent (2012) shallow groundwater sample collected from location 41C-25, representing the most recent, shallowest, and nearby groundwater data. Other parameters that were detected in sub-slab vapor samples but were not detected in groundwater include 1,1-DCE, BZ, CT, chloroform, EB, m&p-xylenes, MC, o-xylene, and PCE. Parameters detected in the sub-slab vapor samples and groundwater sample include cis-1,2-DCE and toluene. The remaining detected parameters in sub-slab vapor samples were not reported for the groundwater sample.

Potential Non-Cancer Cumulative Effects (HQ=0.1)

The following discusses a comparison of the analytical results to non-cancer screening levels for chronic exposures at values that represent a hazard quotient of 0.1 (adjusted HQ) except for TCE for purposes of evaluating short-term exposures to women of reproductive age and PCE since the data indicate that a potential isolated source exists beneath the shop area (SS-32).

RLs for 1,1,2-TCA are above the MTCA adjusted HQ screening level for indoor air and adjusted HQ screening level for sub-slab vapor based on MTCA indoor air value. It is noted that if a positive detection was observed for any compound below a RL in a sample, then the laboratory was instructed to report the result. Therefore the RLs for 1,1,2-TCA would not contribute to a cumulative HI since the results are non-detect.

Concentrations exceed the MTCA adjusted HQ screening levels for 1,2,4-TMB, m&p-xylenes, and naphthalene for indoor air. The exceedances for 1,2,4-TMB, naphthalene, m&p-xylenes are likely attributable to an indoor/outdoor source since the sub-slab vapor concentrations are lower and do

not exceed the adjusted HQ screening levels for sub-slab vapor based on MTCA indoor air values. The parameters have a different primary target organs; 1,2,4-TMB (blood system) and naphthalene and m&p-xylenes (body weight).

Recommendation

No further action by GSH is proposed for this building, due to the apparent indoor source and potential localized subsurface source unrelated to the OCC Site based on the data presented herein.

3.6 Building 595

Figure 7 shows the sample locations and layout of Building 595.

Building Properties and Usage

Building 595 is Trident's warehouse to support its fishing fleet, which includes forklift operation and truck loading. The 200-ft by 150-ft building is 24 ft high and steel sided over steel frame built on concrete slab on grade. Available building construction drawings show a 6-mil vapor barrier is installed within a 6-inch sand layer located 2 inches beneath the concrete slab; however, no evidence of the vapor barrier was encountered during the drilling and installation of the SS vapor probes. The drill bit was advanced 6 inches below the bottom of the slab. Slab thickness measured during the probe installation was 6.25 inches. Where visible, the concrete slab is in good condition. There is a small (one-desk) office along the west wall of this building that is frequently occupied on a seasonal basis. There are no other offices or continually occupied spaces within the building. There is no HVAC system in the warehouse area. The building has a number of large overhead doors. Vapors could potentially intrude into this building through cracks in the floor slab, unsealed utility penetrations, and un-caulked floor/wall or expansion joints.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

Two SS vapor probes were installed where SS vapor and IA samples were collected, as discussed below.

Sample pair SS/IA-4 was located near the southeastern corner of Building 595. During the pre-sampling survey, the area was observed to contain pallets of cardboard boxes. A single large cardboard tote was located near the southeastern corner of the building. The tote contained miscellaneous fishing material and a 5-gallon pail of chlorine pellets. It was requested of Tyson personnel that the tote be removed prior to sampling. The tote was not observed during the sampling event.

Sample pair SS/IA-5 was located in the only enclosed office structure within Building 595. Staffs occupy this office seasonally when fishing vessels are in operation and delivering cargo to the building. The office shares a wall with the electrical, fire control, and mechanical room. The small size of the office prevented an accurate utility clearance from being completed; therefore, the SS vapor sample was moved to the east into the warehouse area. The IA sample was collected from within the enclosed office space. No chemical storage or other obvious potential VOC emitters were observed in this office space. SS-5 was located approximately 25 ft east outside of the office in the warehouse area.

Sampling in Building 595 was initiated on April 20, 2013 with the 24-hour samples completed the following day. An associated OA sample (OA-4) was collected at a location just to the south of Building 595 concurrent with the IA samples. Weather conditions during sampling were partly cloudy and calm, with winds from the south, and no precipitation was observed.

Round Two

Indoor air and sub-slab vapor samples were collected at the same IA and SS vapor sample locations as the round one event. One additional IA sample (IA-26) was collected from a centrally located position within the building in accordance with USEPA request. Prior to conducting the round two sampling event, a detailed survey was completed for Building 595, at which time the tenant was asked to fill out a questionnaire and provide MSDSs for all chemicals used or stored within the building. During the building inventory and survey, no target analytes were identified. Copies of the submitted building survey questionnaire and MSDSs are included in Appendix A.

The indoor and ambient air sampling was initiated on June 24, 2013 using passive sampling equipment. The samples were completed 7 days later. Sub-slab vapor sampling was conducted on June 28, 2013 with the 2-hour samples completed the same day. An associated OA passive sample for this building (OA-4) was collected outside of the building concurrent with the IA samples.

Round Three

Eight Summa canister samples were collected during round three including at three SS vapor locations paired with three IA locations (one new SS vapor probe at an existing IA location and two existing pairs), one new IA location, and one OA location. Additionally, two passive samples were collected, one from IA location 5 (IA-5P) and one from new OA location 5 (OA-5P), as specified by USEPA.

Sample location IA-26 was previously sampled in round two to represent the center of the building space. A new SS vapor probe (SS-26) was paired with it for round three.

A site walk was conducted on February 7, 2014 to investigate potential preferential pathways specifically targeting utility penetrations. During this building inspection, the mechanical room at the very northwest corner of the building was investigated, a large diameter cut in the concrete floor was observed. The cut is to allow access to the watermain for the fire suppression system. An IA sample (IA-36) was added to this room.

Sample pairs SS/IA-4 and SS/IA-5 were unchanged from round one.

Prior to conducting the round three sampling event, a detailed survey was completed for Building 595, at which time the tenant was asked to fill out a questionnaire and provide MSDSs for all chemicals used or stored within the building. Consistent with round two, the building inventory and survey did not reveal any target analytes stored or in use in the building. Operation of propane and diesel-powered vehicles (forklift and trucks) was noted at the building. Copies of the submitted building survey questionnaire and MSDSs are included in Appendix A.

The indoor and ambient air sampling was initiated on March 11, 2014 using passive sampling equipment at IA-5P and OA-5P. The samples were retrieved 7 days later. Summa canister SS vapor and IA sampling was initiated on March 12, 2014 with the 2-hour samples completed the same day and the 24-hour samples were completed the following day. An associated Summa

canister OA sample for this building (OA-4) was collected outside of the building on the south side concurrent with the IA Summa canister samples.

Sampling Results

Round One

Analytical results are presented in Table 8 and detected parameters are summarized on Figure 7.

No IA concentrations exceeded IA screening levels.

The SS vapor concentrations of PCE at SS-4 (3,800 μg/m^3) and SS-5 (3,600 μg/m^3) exceeded the SS vapor screening levels (1,300 and 3,200 μg/m^3) based on MTCA indoor air values and were higher than the IA concentrations at IA-4 (0.34 μg/m^3) and IA-5 (1.4 μg/m^3) that were below the IA MTCA screening levels (40 and 96 μg/m^3). It is therefore concluded that SS vapor concentrations of PCE in exceedance of the SS vapor screening levels are being adequately attenuated.

The SS vapor concentrations of TCE at SS-4 (1,600 μg/m^3) and SS-5 (1,500 μg/m^3) exceeded the SS vapor screening levels (67 and 210 μg/m^3) and were higher than the IA concentrations at IA-4 (0.089 μg/m^3) and IA-5 (0.24 μg/m^3) which were below the IA MTCA screening levels (2.0 and 6.3 μg/m^3). It is therefore concluded that SS vapor concentrations of TCE in exceedance of the SS vapor screening levels are being adequately attenuated.

In summary, it is concluded that SS vapor concentrations of PCE and TCE in exceedance of the SS vapor screening levels are being adequately attenuated.

Round Two

Analytical results are presented in Table 8 and detected parameters are summarized on Figure 7.

No IA concentrations exceeded IA screening levels.

The SS concentrations of PCE at SS-4 (7,400 μg/m^3) and SS-5 (5,400 μg/m^3) exceeded the SS vapor screening levels (1,300 and 3,200 μg/m^3) based on MTCA indoor air values and were higher than the IA concentrations at IA-4 (0.64 J μg/m^3) and IA-5 (1 μg/m^3) which were below the IA MTCA screening levels (40 and 96 μg/m^3 and higher). It is therefore concluded that SS concentrations of PCE in exceedance of the SS vapor screening levels are being adequately attenuated.

The SS vapor concentrations of TCE at SS-4 (2,500 μg/m^3) and SS-5 (1,800 μg/m^3) exceeded the SS vapor screening levels (67 and 210 μg/m^3) and were higher than the IA concentrations at IA-4 (0.27 J μg/m^3) and IA-5 (0.4 μg/m^3) which were below the IA MTCA screening levels (2.0 and 6.3 μg/m^3). It is therefore concluded that SS vapor concentrations of TCE in exceedance of the SS vapor screening levels are being adequately attenuated.

In summary, it is concluded that SS vapor concentrations of PCE and TCE in exceedance of the SS vapor screening levels are being adequately attenuated.

Round Three

Analytical results are presented in Table 8 and detected parameters are summarized on Figure 7.

No IA concentrations exceeded an IA MTCA screening levels.

The SS vapor concentrations of PCE at SS-4 (3,000 μg/m^3), SS-5 (1,400 μg/m^3), and SS-26 (2,900 μg/m^3) exceeded a SS vapor screening level (1,300 μg/m^3) based on a MTCA indoor air value and were higher than the IA concentrations at IA-4 (0.57 μg/m^3), IA-5 (1.1 μg/m^3), and IA-26 (0.65 μg/m^3) which were below the IA MTCA screening levels (40 and 96 μg/m^3). It is therefore concluded that SS vapor concentrations of PCE in exceedance of a SS vapor screening level are being adequately attenuated.

The SS vapor concentrations of TCE at SS-4 (2,500 μg/m^3), SS-5 (1,800 μg/m^3), and SS-26 (940 μg/m^3) exceeded the SS vapor screening levels (67 and 210 μg/m^3) and were higher than the IA concentrations at IA-4 (0.27 J μg/m^3), IA-5 (0.4 μg/m^3), and IA-26 (0.036 U) which were below the IA MTCA screening levels (2.0 and 6.3 μg/m^3). It is therefore concluded that SS vapor concentrations of TCE in exceedance of the SS vapor screening levels are being adequately attenuated.

The analytical results for the passive samples were generally similar to the Summa canister collected at the same location for IA and OA.

The following table presents the difference between measured IA concentrations and measured OA concentrations (adjusted IA). Not detected results for OA sample were assumed as zero.

Detected		IA-4	IA-5	IA-26	IA-36
Volatile Organic Compounds		- OA-4	- OA-4	- OA-4	- OA-4
1,1,1-Trichloroethane	μg/m^3	-0.005	-0.002	-0.002	-0.002
1,1,2,2-Tetrachloroethane	μg/m^3	-0.008U	-0.002U	-0.002U	-0.003U
1,1,2-Trichloroethane	μg/m^3	-0.03U	0.00U	-0.01U	-0.01U
1,1-Dichloroethene	μg/m^3	-0.008U	-0.002U	-0.002U	-0.003U
1,2,4-Trichlorobenzene	μg/m^3	-0.008U	-0.002U	-0.002U	-0.003U
1,2,4-Trimethylbenzene	μg/m^3	0.40	0.53	0.77	0.57
1,3,5-Trimethylbenzene	μg/m^3	0.11	0.15	0.28	0.19
1,4-Dichlorobenzene	μg/m^3	-1.166	-1.169	-1.080	-1.162
Benzene	μg/m^3	-0.20	0.00	0.10	-0.20
Carbon tetrachloride	μg/m^3	0.06	0.11	0.10	0.11
Chloroform (Trichloromethane)	μg/m^3	0.006	0.016	0.026	0.016
cis-1,2-Dichloroethene	μg/m^3	-0.015	-0.001	-0.003	-0.002
Ethylbenzene	μg/m^3	0.19	0.59	0.59	0.59
Hexachlorobutadiene	μg/m^3	0.010U	0.016U	0.016U	0.015U
m&p-Xylenes	μg/m^3	0.9	1.8	2.4	2.1
Methylene chloride	μg/m^3	1.54	0.01	-0.05	-0.10
Naphthalene	μg/m^3	0.22	-0.08	0.00	0.00
o-Xylene	μg/m^3	0.5	0.8	0.9	0.8
Styrene	μg/m^3	0.05	0.10	0.32	0.29
Tetrachloroethene	μg/m^3	-1.43	-0.90	-1.35	0.60
Toluene	μg/m^3	3.4	3.7	3.4	3.4

Detected		IA-4	IA-5	IA-26	IA-36
Volatile Organic Compounds		- OA-4	- OA-4	- OA-4	- OA-4
trans-1,2-Dichloroethene	µg/m^3	0.021U	0.00	0.027U	0.00
Trichloroethene	µg/m^3	-0.12	-0.06	-0.09	0.22
Vinyl chloride	µg/m^3	-0.007	0.002	-0.003	0.00

As shown in the above table, none of the adjusted IA concentrations are above the screening levels.

In summary, it is concluded that SS vapor concentrations of PCE and TCE in exceedance of the SS vapor screening levels are being adequately attenuated.

Round One and Round Two Comparison

The following table presents a side-by-side comparison of the round one and round two sub-slab vapor data.

		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		SS-4	SS-4		SS-5	SS-5
1,1,1-Trichloroethane	µg/m^3	8.0	9.8		1.8	2.2 J
1,1,2,2-Tetrachloroethane	µg/m^3	1.2 U	0.81 U		1.3 U	0.75 U
1,1,2-Trichloroethane	µg/m^3	4.9 U	0.59 U		5.1 U	0.54 U
1,1-Dichloroethene	µg/m^3	1.2 U	0.53 U		1.3 U	0.49 U
1,2,4-Trichlorobenzene	µg/m^3	1.2 U	3.3 U		1.3 U	3.0 U
1,2,4-Trimethylbenzene	µg/m^3	25 U	4.7 U		22 U	4.3 U
1,3,5-Trimethylbenzene	µg/m^3	25 U	4.7 U		22 U	4.3 U
1,4-Dichlorobenzene	µg/m^3	1.2 U	2.1 U		1.3 U	1.9 U
Benzene	µg/m^3	3.7 U	6.9 J		3.9 U	5.1 J
Carbon tetrachloride	µg/m^3	0.15 J	0.50 U		1.3 U	0.46 U
Chloroform (Trichloromethane)	µg/m^3	2.2 J	3.2 J		1.4 J	1.9 J
cis-1,2-Dichloroethene	µg/m^3	0.97 J	1.7 U		0.51 J	1.6 U
Ethylbenzene	µg/m^3	4.9 U	0.79 U		5.1 U	0.73 U
Hexachlorobutadiene	µg/m^3	1.2 U	1.6 U		1.3 U	1.5 U
m&p-Xylenes	µg/m^3	4.9 U	1.7 U		5.1 U	1.5 U
Methylene chloride	µg/m^3	25 UJ	1.6 U		22 UJ	1.5 U
Naphthalene	µg/m^3	4.9 U	3.1 U		5.1 U	2.9 U
o-Xylene	µg/m^3	4.9 U	0.76 U		5.1 U	0.70 U
Styrene	µg/m^3	25 U	4.7 U		22 U	4.3 U
Tetrachloroethene	µg/m^3	3800	7400		3600	5400
Toluene	µg/m^3	4.9 U	2.6 J		5.1 U	2.5 J

		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		SS-4	SS-4		SS-5	SS-5
trans-1,2-Dichloroethene	µg/m^3	1.2 U	1.9 U		1.3 U	1.7 U
Trichloroethene	µg/m^3	1600	2500		1500	1800
Vinyl chloride	µg/m^3	1.2 U	0.43 U		1.3 U	0.40 U

At SS-4 and SS-5, the reported concentrations for the round two samples are similar to or greater than the reported concentrations for the round one samples. Variability for the parameters detected above 1 µg/m^3 includes slight increases in concentrations in round two for 1,1,1-TCA, BZ, and chloroform, and increases in concentrations in round two for PCE and TCE. These data suggest some variability of concentrations over time. Most of the parameters were not detected in both rounds of sampling; however, the reporting limits were elevated because of sample dilution necessary to quantify elevated concentrations of PCE and TCE.

The following table presents a side-by-side comparison of the round one (Summa canister) and round two (passive sampler) indoor air data.

		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		IA-4	IA-4		IA-5	IA-5
1,1,1-Trichloroethane	µg/m^3	0.024 J	0.050 UJ		0.028 J	0.050 U
1,2,4-Trimethylbenzene	µg/m^3	1.0	0.72 J		1.2	1.8
1,4-Dichlorobenzene	µg/m^3	0.022 J	0.052 J		0.037 U	0.062
Benzene	µg/m^3	0.82	0.55 J		0.75	0.56
Ethylbenzene	µg/m^3	0.92	1.6 J		0.92	2.1
m&p-Xylenes	µg/m^3	3.3	5.6 J		3.1	7.0
o-Xylene	µg/m^3	1.2	2.2 J		1.1	2.7
Styrene	µg/m^3	0.35 J	1.7 J		0.28 J	1.8
Tetrachloroethene	µg/m^3	0.34	0.64 J		1.4	1.0
Toluene	µg/m^3	3.8	3.5 J		3.5	5.2
Trichloroethene	µg/m^3	0.089	0.27 J		0.24	0.40

At IA-1 and IA-2, the reported concentrations for the round two samples are similar with respect to the reported concentrations for the round one samples. The Summa canisters were deployed over a 24-hour period and the passive samplers were deployed over a 7-day period on a different date. These data suggest limited variability of concentrations over time. This is inconsistent with the comparison of SS vapor samples that indicate some variability. The greater variability in the SS vapor samples may be a result of limited vapor migration to indoor air and/or high attenuation in Building 595.

Round One and Round Three Comparison

The following table presents a side-by-side comparison of the round one and round three Summa canister sub-slab vapor data.

		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		SS-4	SS-4		SS-5	SS-5
1,1,1-Trichloroethane	µg/m^3	8.0	6.2		1.8	1.9
1,1,2,2-Tetrachloroethane	µg/m^3	1.2 U	0.86 U		1.3 U	0.43 U
1,1,2-Trichloroethane	µg/m^3	4.9 U	3.4 U		5.1 U	1.7 U
1,1-Dichloroethene	µg/m^3	1.2 U	0.86 U		1.3 U	0.43 U
1,2,4-Trichlorobenzene	µg/m^3	1.2 U	0.86 U		1.3 U	0.43 U
1,2,4-Trimethylbenzene	µg/m^3	25 U	3.4 U		22 U	1.7 U
1,3,5-Trimethylbenzene	µg/m^3	25 U	3.4 U		22 U	1.7 U
1,4-Dichlorobenzene	µg/m^3	1.2 U	0.86 U		1.3 U	0.43 U
Benzene	µg/m^3	3.7 U	1.2 J		3.9 U	1.3
Carbon tetrachloride	µg/m^3	0.15 J	0.86 U		1.3 U	1.4
Chloroform (Trichloromethane)	µg/m^3	2.2 J	1.8 J		1.4 J	5.4
cis-1,2-Dichloroethene	µg/m^3	0.97 J	0.71 J		0.51 J	2.1
Ethylbenzene	µg/m^3	4.9 U	3.4 U		5.1 U	1.7 U
Hexachlorobutadiene	µg/m^3	1.2 U	0.86 U		1.3 U	0.43 U
m&p-Xylenes	µg/m^3	4.9 U	3.4 U		5.1 U	0.38 J
Methylene chloride	µg/m^3	25 UJ	3.4 U		22 UJ	1.7 U
Naphthalene	µg/m^3	4.9 U	3.4 U		5.1 U	0.17 J
o-Xylene	µg/m^3	4.9 U	3.4 U		5.1 U	0.30 J
Styrene	µg/m^3	25 U	3.4 U		22 U	1.7 U
Tetrachloroethene	µg/m^3	3800	3000		3600	1400
Toluene	µg/m^3	4.9 U	0.59 J		5.1 U	0.86 J
trans-1,2-Dichloroethene	µg/m^3	1.2 U	0.23 J		1.3 U	1.2
Trichloroethene	µg/m^3	1600	1400		1500	940
Vinyl chloride	µg/m^3	1.2 U	0.86 U		1.3 U	0.43 U

At SS-4 and SS-5, the reported concentrations for the round three samples are similar to or less than (with few exceptions) the reported concentrations for the round one samples. Variability for the parameters detected above 1 µg/m^3 includes: slight decreases in concentrations in round three for 1,1,1-TCA and chloroform; decreases in concentrations in round three for PCE and TCE; and increases for chloroform and cis-1,2-DCE. These data suggest some variability in concentrations over time. Most of the parameters were not detected in round one of sampling; however, the reporting limits were elevated because of sample dilution necessary to quantify elevated concentrations of PCE and TCE. In round three, the parameters not detected include 1,1,2,2-PCA,

1,1,2-TCA, 1,1-DCE, 1,2,4-TCB, 1,2,4-TMB, 1,3,5-TMB, 1,4-DCB, EB, HCBD, MC, styrene, and VC.

The following table presents a side-by-side comparison of the round one and round three Summa canister indoor air data.

		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		IA-4	IA-4		IA-5	IA-5
1,1,1-Trichloroethane	µg/m^3	0.024 J	0.023 J		0.028 J	0.026 J
1,1,2,2-Tetrachloroethane	µg/m^3	0.038 U	0.030 U		0.037 U	0.036 U
1,1,2-Trichloroethane	µg/m^3	0.15 U	0.12 U		0.0051 J	0.15 U
1,1-Dichloroethene	µg/m^3	0.038 U	0.030 U		0.037 U	0.036 U
1,2,4-Trichlorobenzene	µg/m^3	0.038 U	0.030 U		0.037 U	0.036 U
1,2,4-Trimethylbenzene	µg/m^3	1.0	0.83		1.2	0.96
1,3,5-Trimethylbenzene	µg/m^3	0.28 J	0.24		0.33 J	0.28
1,4-Dichlorobenzene	µg/m^3	0.022 J	0.034		0.037 U	0.031 J
Benzene	µg/m^3	0.82	1.0		0.75	1.2
Carbon tetrachloride	µg/m^3	0.44	0.42		0.47	0.47
Chloroform (Trichloromethane)	µg/m^3	0.083 J	0.10 J		0.078 J	0.11 J
cis-1,2-Dichloroethene	µg/m^3	0.023 J	0.042		0.037 U	0.056
Ethylbenzene	µg/m^3	0.92	1.1		0.92	1.5
Hexachlorobutadiene	µg/m^3	0.038 U	0.030 U		0.037 U	0.036 U
m&p-Xylenes	µg/m^3	3.3	4.0		3.1	4.9
Methylene chloride	µg/m^3	0.26	2.1		0.74 UJ	0.57
Naphthalene	µg/m^3	0.23	0.41		0.20	0.11 J
o-Xylene	µg/m^3	1.2	1.4		1.1	1.7
Styrene	µg/m^3	0.35 J	0.38		0.28 J	0.43
Tetrachloroethene	µg/m^3	0.34	0.57		1.4	1.1
Toluene	µg/m^3	3.8	6.3		3.5	6.6
trans-1,2-Dichloroethene	µg/m^3	0.038 U	0.030 U		0.037 U	0.0093 J
Trichloroethene	µg/m^3	0.089	0.18		0.24	0.24
Vinyl chloride	µg/m^3	0.0040 J	0.017 J		0.037 U	0.026 J

The reported concentrations for the round three samples are similar to the reported concentrations for the round one samples with the exception of BZ, EB, MC, xylenes, and toluene. Variability for the parameters detected above 1 µg/m^3 includes: slight decreases in concentrations in round three for 1,2,4-TMB and PCE (IA-5); and increases for BZ, EB, MC, m&p-xylenes, o-xylene, and toluene. These data suggest limited variability in concentrations over time and limited temporal effects with the possible exceptions noted. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,1-DCE, 1,2,4-TCB, and HCBD.

Additional Analysis of the Data

Sub-slab Vapor Data

The sub-slab vapor concentrations may be contributing to indoor air concentrations via the vapor intrusion pathway. However, the concentrations appear to be adequately attenuated.

Groundwater and Soil Data

The following is a discussion of the most recent, shallowest, and nearby groundwater and soil data presented in Table 8 with respect to SS vapor analytical results. TCE and PCE were detected in a recent (2012) shallow groundwater sample collected from location 10-24 and shallow soil samples from locations WMUR-03, WMUR-04, and WMUR-10, representing the most recent, shallowest, and nearby data. BZ was detected in sub-slab vapor samples but was not detected in groundwater or soil. Other parameters detected in the sub-slab vapor samples and groundwater or soil samples include CT, chloroform, cis-1,2-DCE, and toluene. The remaining detected parameters in sub-slab vapor samples were not detected or not reported for groundwater and soil samples.

Potential Non-Cancer Cumulative Effects (HQ=0.1)

The following discusses a comparison of the analytical results to non-cancer screening levels for chronic exposures at values that represent a hazard quotient of 0.1 (adjusted HQ) except for TCE for purposes of evaluating short-term exposures to women of reproductive age.

RLs are above the MTCA adjusted HQ screening levels for 1,1,2-TCA for indoor air and adjusted HQ screening levels for sub-slab vapor. It is noted that if a positive detection was observed for any compound below an RL in a sample, then the laboratory was instructed to report the result. Therefore the RLs for 1,1,2-TCA would not contribute to a cumulative HI since the results are non-detect.

Concentrations exceed MTCA adjusted HQ screening levels for 1,2,4-TMB, naphthalene, and TCE for indoor air. The parameters have a different primary target organs; 1,2,4-TMB (blood system), naphthalene (body weight), and TCE (developmental effects). The exceedances for 1,2,4-TMB, naphthalene, and TCE are less than 30, 15, and 30 percent of the MTCA HQ screening levels, respectively, and would not contribute to cumulative primary target organ HIs greater than 1.

A RL is above the adjusted HQ screening level for 1,2,4-TMB for sub-slab vapor based on MTCA screening level for indoor air. It should be noted that the RL was elevated because of necessary dilution of the sample to quantify other target parameters. The RL for 1,2,4-TMB are less than 15 percent of the HQ screening level and would not contribute to cumulative primary target organ HIs since the results are non-detect.

Concentrations exceeded adjusted and non-adjusted HQ screening levels for PCE and TCE for sub-slab vapor based on MTCA screening levels for indoor air. As noted above, these parameters are adequately attenuated based on review of the indoor air data.

Recommendation

Continued monitoring by GSH is proposed for this building to show that PCE and TCE concentrations above screening levels in sub-slab vapor continue to be adequately attenuated.

3.7 Building 596

Figure 8 shows the sample locations and layout of Building 596.

Building Properties and Usage

Building 596 is Tyson's maintenance and fabrication shop. Operations include storage, fabrication, and welding shops, as well as three office areas along the east wall. The main building is approximately 112 ft by 50 ft in size, with a small addition for washrooms on the south wall. There is also a large, covered, and partially enclosed work area along the south wall. This area is approximately 60 ft by 60 ft in size. The building is metal siding over steel frame and the floor is concrete slab on grade. The slab thickness measured during probe installation was 6.25 inches and, where visible, is in good condition. There is a lunchroom on the second floor in the northeast corner of the building. The lunchroom and offices have electric baseboard heating. The offices also have operable windows, and no air conditioning (AC) units are present. Ceilings are 10 ft in height, with the shop areas open to a ceiling height of 24 ft. A wall midway through the building separates the fabrication and welding shops from the storage area and offices, and a second interior wall separates the welding and fabrication shops. The welding shop has fume ventilation hoses. The offices are occupied for one 8-hour shift each day. Workers are normally present in the shop areas throughout the daytime 8-hour shift and for longer periods as required when fishing boats arrive. Vapors could potentially intrude into this building through cracks in the floor slab, unsealed utility penetrations, and un-caulked floor/wall or expansion joints.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

One SS vapor probe was installed where SS vapor and IA samples were collected, as discussed below. One IA sample was collected to assess potential indoor sources of VOCs.

Sample pair SS/IA-3 was located within an occupied office space along the east side of the building. The office space shares a wall and doorway with a large storage and shop area to the west. The SS vapor probe was installed along the southern interior wall within the office at the northeastern corner of the building. Windows in this office were closed during the sampling event. During the pre-sampling survey, no obvious chemical storage was observed in this office. On the day of the sampling event, a can of carburetor cleaner fluid was observed on a shelf within the office space. The can was removed from the office during the sampling event and placed in the adjacent open-air shop area.

IA-21 was located within the storage/shop area. This sample was added to the investigation to identify and characterize the potential VOC contributions from the storage and use of chemicals in this area. The area contained numerous flammable storage lockers and stored chemicals including cleaners, and cutting oils on shelves near work stations. It was determined not feasible to move or isolate the chemicals and materials stored in this area and that this area may contribute to general IA VOC concentrations within the adjacent offices. Therefore, IA-21 was located in this area.

Sampling in Building 596 was initiated on April 21, 2013 with the 24-hour samples completed the following day. An OA sample was collected at adjacent Building 592 concurrent with both Building 592 and Building 596 sampling activities, and therefore the OA sample was used to represent OA conditions at both buildings. Weather conditions during sampling event were partly cloudy and calm, with winds from the west southwest, and no precipitation was observed.

Round Two

Indoor air and sub-slab vapor samples were collected at the same IA and SS vapor sample locations as the round one event. One of the existing sample locations (IA-21) was in a centrally located position within the building in accordance with USEPA request. Prior to conducting the round two sampling event, a detailed survey was completed for Building 596, at which time the tenant was asked to fill out a questionnaire and provide MSDSs for all chemicals used or stored within the building. During the building inventory and survey, the following target analytes were identified: xylenes, 1,2,4-TMB, toluene, EB, naphthalene, BZ, PCE, and TCE. Adjacent to and south of the offices associated with sample location AI-3 is a tool and chemical storage and maintenance area. Copies of the submitted building survey questionnaire and MSDSs are included in Appendix A.

The indoor and ambient air sampling was initiated on June 24, 2013 using passive sampling equipment. The samples were completed 7 days later. Sub-slab vapor sampling was conducted on June 27, 2013 with the 2-hour sample completed the same day. An associated OA passive sample for Building 592 (OA-1) was considered representative for this building as well and was collected concurrently.

Round Three

Indoor air and sub-slab vapor samples were collected at the same IA and SS vapor sample locations as the round one and two events, with the addition of one new sampling pair at location (SS/IA-35).

A site walk was conducted on February 7, 2014 to investigate potential preferential pathways specifically targeting utility penetrations. Mechanical, electrical, and plumbing are routed through numerous locations in this space, the observed floor penetrations all appeared sealed and in good condition. A separate sprinkler closet similar to those observed in Building 592 is located near the center of the building. An inspection of the utility penetrations in this closet revealed cuts in the floor have been sealed. No sampling was conducted in this closet space. Numerous cracks in the floor were observed throughout the building. Some of the cracks appear to have been sealed; however, the date of the floor sealing is unknown.

The SS/IA-32 was added to a small shop area near the southeastern corner of the building. This area is used for the maintenance and manufacture of fish processing equipment. Metal bending, shaping, cutting, welding, and grinding activities were noted in this area. Consistent with round one, during the building inventory and survey the following target analytes were identified: xylenes, 1,2,4-TMB, toluene, EB, naphthalene, BZ, PCE, and TCE.

Sample pair SS/IA-3 is unchanged from round one. No obvious potential VOC emitters were observed in this area.

As with round one and two, an indoor air sample (IA-21) was collected from the tool and chemical storage room west of the office spaces in Building 596. The space appears unchanged from round two.

The indoor and ambient air sampling was initiated on March 11, 2014 using passive sampling equipment at OA-3P. However, an indoor sample at IA-21 was erroneously not deployed at this time. Prior to deploying the Summa canisters for the 24-hour sample collection, the error was detected and a passive sampler was deployed at IA-21P on March 14, a matched outdoor sampling

badge was deployed on the west side of the building (OA-3AP). Sample OA-3P was retrieved on March 18, with the sampling pair IA-21p/OA-3AP retrieved on March 21, each 7 days after initial deployment. Sub-slab vapor sampling was conducted on March 14 with the 2-hour samples completed the same day, 24-hour samples were completed the following day. An associated OA Summa canister sample for this building (OA-3) was collected outside of the building concurrent with the IA Summa canister samples.

Sampling Results

Round One

Analytical results are presented in Table 9 and detected parameters are summarized on Figure 8.

IA concentrations of 1,4-DCB and TCE exceeded IA MTCA screening levels.

The concentration of 1,4-DCB in indoor source characterization sample IA-21 (2.7 $\mu g/m^3$) exceeded an IA MTCA screening level (2.3 $\mu g/m^3$) while the concentration at IA-3 (0.18 $\mu g/m^3$) did not exceed. The SS vapor and OA concentrations (0.027 J $\mu g/m^3$ for both) were lower than IA concentrations. It is therefore concluded that the IA MTCA screening level exceedance for 1,4-DCB is likely attributable to the indoor source.

The IA concentrations of TCE at IA-3 (6.6 $\mu g/m^3$) and IA-21 (19 $\mu g/m^3$) exceeded the IA MTCA screening levels (2.0 and 6.3 $\mu g/m^3$), and were higher than in the paired SS-3 sample concentration (0.26 $\mu g/m^3$) and the OA concentration (0.38 $\mu g/m^3$). The TCE concentration observed in the potential source area at IA-21 was higher than the TCE concentration measured at IA-3. These results suggest the shop area and potential VOC emitters stored and used therein are likely contributing to the indoor exceedance observed in sample IA-3. It is therefore concluded that the IA MTCA screening levels exceedances for TCE are likely attributable to the indoor source. The TCE concentration at IA-21 (19 $\mu g/m^3$) exceeded the short-term criterion of 8.4 $\mu g/m^3$ and the concentration at IA-3 (6.6 $\mu g/m^3$) did not.

The following table presents the difference between measured IA concentrations and measured OA concentrations (adjusted IA). Not detected results for OA sample were assumed as zero.

Detected		IA-3	IA-21
Volatile Organic Compounds		- OA-1	- OA-1
1,1,1-Trichloroethane	$\mu g/m^3$	0.314	2.774
1,1-Dichloroethene	$\mu g/m^3$	-	0.017
1,2,4-Trimethylbenzene	$\mu g/m^3$	0.72	1.62
1,3,5-Trimethylbenzene	$\mu g/m^3$	0.3	0.52
1,4-Dichlorobenzene	$\mu g/m^3$	0.153	**2.67**[b]
Benzene	$\mu g/m^3$	0.39	0.64
Carbon tetrachloride	$\mu g/m^3$	-0.02	-0.02
Chloroform (Trichloromethane)	$\mu g/m^3$	0.19	0.011
cis-1,2-Dichloroethene	$\mu g/m^3$	0.011	0.014
Ethylbenzene	$\mu g/m^3$	2.35	1.95
m&p-Xylenes	$\mu g/m^3$	8.93	7.63

Detected		IA-3	IA-21
Volatile Organic Compounds		- OA-1	- OA-1
Methylene chloride	µg/m^3	5.5	75
Naphthalene	µg/m^3	0.26	0.35
o-Xylene	µg/m^3	2.99	2.19
Styrene	µg/m^3	0.29	0.46
Tetrachloroethene	µg/m^3	2.77	11.87
Toluene	µg/m^3	9.5	23.5
trans-1,2-Dichloroethene	µg/m^3	0.025	0.14
Trichloroethene	µg/m^3	**6.22**[c]	**18.62**[abc]
Vinyl chloride	µg/m^3	0.0044	0.0048

As shown in the above table, the adjusted IA exceedances include 1,4-DCB and TCE. As noted previously, 1,4-DCB was detected in the one sub-slab vapor sample at a concentration less than screening levels and additionally less than adjusted IA concentrations by up to two orders of magnitude. The concentration in the adjusted IA (and unadjusted) sample associated with the sub-slab vapor sample was below screening levels. The IA exceedance is from a location near a suspected VOC source. Therefore, it may be concluded that the exceedances of 1,4-DCB in IA are unlikely attributable to sub-slab vapor. TCE was detected in the one sub-slab vapor sample at a concentration less than screening levels and additionally less than adjusted IA concentrations by more than an order of magnitude. The IA concentration of TCE near a suspected VOC source was greater than the measured concentration at the location further away. TCE was not detected in the nearby groundwater sample. Therefore it may be concluded that the exceedances of TCE in IA are unlikely attributable to sub-slab vapor. As noted previously TCE was identified on MSDSs provided by the operator confirming the presence of this chemical within the building.

In summary, it is concluded that IA screening levels exceedances for 1,4-DCB and TCE are likely attributable to an indoor source (numerous flammable storage lockers and stored chemicals including cleaners, and cutting oils were observed). The TCE concentration at IA-21 (19 µg/m^3) exceeded the short-term criterion of 8.4 µg/m^3 and the concentration at IA-3 (6.6 µg/m^3) did not. There are no exceedances of SS screening levels.

Round Two

Analytical results are presented in Table 9 and detected parameters are summarized on Figure 8.

IA concentrations of 1,4-DCB and TCE exceeded IA screening levels.

The concentration of 1,4-DCB in indoor source characterization sample IA-21 (6.5 µg/m^3) exceeded an IA MTCA screening level (2.3 µg/m^3) while the concentration at IA-3 (1.1 µg/m^3) did not exceed. The SS vapor concentration (0.046 µg/m^3) was lower than IA concentrations and 1,4-DCB was not detected in OA. It is therefore concluded that the screening level exceedance for 1,4-DCB is likely attributable to the indoor source.

The IA concentrations of TCE at IA-3 (2.9 µg/m^3) and IA-21 (15 J µg/m^3) exceeded one or more of the IA MTCA screening levels (2.0 and 6.3 µg/m^3), and were higher than in the paired SS-3 sample concertation (0.15 µg/m^3) and the OA concentration (0.48 µg/m^3). The TCE concentration observed

in the potential source area at IA-21 was higher than the TCE concentration measured at IA-3. These results suggest the shop area and potential VOC emitters stored and used therein are likely contributing to the indoor exceedance observed in sample IA-3. It is therefore concluded that the IA MTCA screening levels exceedances for TCE are likely attributable to the indoor source. The TCE concentration at IA-21 (15 µg/m^3) exceeded the short-term criterion of 8.4 µg/m^3 and the concentration at IA-3 (2.9 µg/m^3) did not.

The following table presents the difference between measured IA concentrations and measured OA concentrations (adjusted IA). Not detected results for OA sample were assumed as zero.

Detected		IA-3	IA-21
Volatile Organic Compounds		- OA-1	- OA-1
1,1,1-Trichloroethane	µg/m^3	0.34	0.65
1,2,4-Trimethylbenzene	µg/m^3	1.85	4.05
1,4-Dichlorobenzene	µg/m^3	1.1	6.5[b]
Benzene	µg/m^3	0.7	0.22
Ethylbenzene	µg/m^3	7.9	9.4
m&p-Xylenes	µg/m^3	30.2	35.2
o-Xylene	µg/m^3	11.34	12.34
Styrene	µg/m^3	1.37	1.77
Tetrachloroethene	µg/m^3	2.93	12.93
Toluene	µg/m^3	18.6	35.6
Trichloroethene	µg/m^3	2.42[c]	14.52[abc]

As shown in the above table, the adjusted IA exceedances include 1,4-DCB, and TCE. As noted previously, 1,4-DCB was detected in the one sub-slab vapor sample at a concentration less than screening levels and additionally less than adjusted IA concentrations by up to two orders of magnitude. The concentration in the adjusted IA (and unadjusted) sample associated with the sub-slab vapor sample was below screening levels. The IA exceedance is from a location near a suspected VOC source. Therefore, it may be concluded that the exceedance of 1,4-DCB in IA is unlikely attributable to sub-slab vapor TCE was detected in the one sub-slab vapor sample at a concentration less than screening levels and additionally less than adjusted IA concentrations by more than an order of magnitude. The IA concentration of TCE near a suspected VOC source was greater than at the location further away. TCE was not detected in the nearby groundwater sample. Therefore it may be concluded that the exceedances of TCE in IA are unlikely attributable to sub-slab vapor. As noted previously TCE was identified on MSDSs provided by the operator confirming the presence of these chemicals within the building.

In summary, it is concluded that IA screening levels exceedances for 1,4-DCB and TCE are likely attributable to an indoor source (numerous flammable storage lockers and stored chemicals including cleaners, and cutting oils were observed). The TCE concentration at IA-21 (15 µg/m^3) exceeded the short-term criterion of 8.4 µg/m^3 and the concentration at IA-3 (2.9 µg/m^3) did not. There are no exceedances of SS screening levels consistent with the round one results.

Round Three

Analytical results are presented in Table 9 and detected parameters are summarized on Figure 8.

IA concentrations of TCE exceeded IA screening levels in round three.

The concentrations of TCE in indoor source characterization samples IA-21/21P (Summa canister, 7.1 μg/m^3 and passive sample, 4.8 J μg/m^3) were the highest measured and exceeded one or both of the IA MTCA screening levels (2.0 and 6.3 μg/m^3). The other IA concentrations (up to 2.8 μg/ m^3) exceeded an IA MTCA screening level and were higher than the OA concentration (0.20 μg/m^3). The two SS vapor concentrations (up to 0.13 J μg/m^3) were one to two orders of magnitude lower than IA concentrations. These results suggest the chemical storage area and potential VOC emitters stored and used therein are likely contributing to the concentrations observed in sample IA-21 and elsewhere. It is therefore concluded that the MTCA screening levels exceedances for TCE are likely attributable to the indoor source. The TCE concentrations in IA did not exceed the short-term criterion of 8.4 μg/m^3.

The analytical results for the IA passive samples were generally similar to the Summa canister collected at the same location for IA and OA.

The following table presents the difference between measured IA concentrations and measured OA concentrations (adjusted IA) for the summa canisters and passive sampler. Not detected results for OA sample were assumed as zero.

Detected		IA-3	IA-21	IA-35	IA-21p
Volatile Organic Compounds		- OA-3	- OA-3	- OA-3	- OA-3Ap
1,1,1-Trichloroethane	μg/m^3	0.629	0.769	0.076	0.974
1,1,2,2-Tetrachloroethane	μg/m^3	0.00	-0.001	0.001	-
1,1,2-Trichloroethane	μg/m^3	0.00	0.00	0.01	-
1,1-Dichloroethene	μg/m^3	0.00	-0.028	0.001	-
1,2,4-Trichlorobenzene	μg/m^3	0.00	-0.001	0.001	-
1,2,4-Trimethylbenzene	μg/m^3	0.88	0.88	0.15	0.95
1,3,5-Trimethylbenzene	μg/m^3	0.27	0.25	0.03	-
1,4-Dichlorobenzene	μg/m^3	0.314	0.704	0.026	1.356
Benzene	μg/m^3	0.73	0.63	0.13	0.34
Carbon tetrachloride	μg/m^3	0.04	0.03	0.03	-
Chloroform (Trichloromethane)	μg/m^3	0.044	-0.001	-0.003	-
cis-1,2-Dichloroethene	μg/m^3	-0.004	-0.009	-0.013	
Ethylbenzene	μg/m^3	0.6	0.7	1.3	3.6
Hexachlorobutadiene	μg/m^3	0.00	-0.001	0.001	-
m&p-Xylenes	μg/m^3	1.0	2.0	4.0	6.5
Methylene chloride	μg/m^3	10.61	25.61	2.21	-
Naphthalene	μg/m^3	0.55	0.56	0.09	-

Detected		IA-3	IA-21	IA-35	IA-21p
Volatile Organic Compounds		- OA-3	- OA-3	- OA-3	- OA-3Ap
o-Xylene	µg/m^3	0.7	0.5	1.2	5.1
Styrene	µg/m^3	0.32	0.25	-0.06	0.17
Tetrachloroethene	µg/m^3	1.02	2.42	0.37	1.88
Toluene	µg/m^3	7.5	11.0	1.4	7.0
trans-1,2-Dichloroethene	µg/m^3	0.015	0.092	-0.009	-
Trichloroethene	µg/m^3	2.6[c]	6.9[bc]	1.3	4.7[c]
Vinyl chloride	µg/m^3	-0.004	-0.007	-0.006	-

As shown in the above table, the adjusted IA exceedances include TCE at various locations. TCE was detected in both sub-slab vapor samples at concentrations less than screening levels and additionally less than adjusted IA concentrations by more than an order of magnitude. The IA concentration of TCE near a suspected VOC source was greater than at the locations further away. TCE was not detected in the nearby groundwater sample. Therefore it may be concluded that the exceedances of TCE in IA are unlikely attributable to sub-slab vapor. As noted previously TCE was identified on MSDSs provided by the operator confirming the presence of these chemicals within the building.

In summary, it is concluded that IA screening levels exceedances for TCE are likely attributable to an indoor source (numerous flammable storage lockers and stored chemicals including cleaners, and cutting oils were observed The TCE concentrations at IA-21 (7.1 µg/m^3), IA-3 (2.8 µg/m^3), and IA-35 (1.5 µg/m^3) are below the short-term criterion of 8.4 µg/m^3. There are no exceedances of SS screening levels consistent with the other rounds of sampling.

Round One and Round Two Comparison

The following table presents a side-by-side comparison of the round one and round two sub-slab vapor data.

		Round One	Round Two
Volatile Organic Compounds		SS-3	SS-3
1,1,1-Trichloroethane	µg/m^3	0.70	0.74
1,1,2,2-Tetrachloroethane	µg/m^3	0.039 U	0.038 U
1,1,2-Trichloroethane	µg/m^3	0.0060 J	0.15 U
1,1-Dichloroethene	µg/m^3	0.039 U	0.015 J
1,2,4-Trichlorobenzene	µg/m^3	0.039 U	0.038 U
1,2,4-Trimethylbenzene	µg/m^3	0.78 U	0.76 U
1,3,5-Trimethylbenzene	µg/m^3	0.78 U	0.76 U
1,4-Dichlorobenzene	µg/m^3	0.027 J	0.046
Benzene	µg/m^3	0.18	0.54
Carbon tetrachloride	µg/m^3	0.32	0.31
Chloroform	µg/m^3	0.041 J	0.079 J

		Round One	Round Two
Volatile Organic Compounds		SS-3	SS-3
(Trichloromethane)			
cis-1,2-Dichloroethene	µg/m^3	0.039 U	0.038 U
Ethylbenzene	µg/m^3	0.081 J	0.53
Hexachlorobutadiene	µg/m^3	0.097	0.038 U
m&p-Xylenes	µg/m^3	0.31	1.8
Methylene chloride	µg/m^3	0.78 UJ	0.59
Naphthalene	µg/m^3	0.079 J	0.32
o-Xylene	µg/m^3	0.12 J	0.70
Styrene	µg/m^3	0.78 U	0.55 J
Tetrachloroethene	µg/m^3	26	35
Toluene	µg/m^3	0.34 J	2.5
trans-1,2-Dichloroethene	µg/m^3	0.039 U	0.038 U
Trichloroethene	µg/m^3	0.26	0.15
Vinyl chloride	µg/m^3	0.039 U	0.038 U

At SS-3, the reported concentrations for the round two sample are similar to the reported concentrations for the round one sample. Variability for the parameters detected above 1 µg/m^3 includes slight increases in concentrations in round two for m&p-xylenes and toluene, and increase in concentration in round two for PCE. These data suggest limited variability of concentrations over time. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,2,4-TCB, 1,2,4-TMB, 1,3,5-TMB, cis-1,2-DCE, trans-1,2-DCE, and VC.

The following table presents a side-by-side comparison of the round one (Summa canister) and round two (passive sampler) indoor air data.

		Round One	Round Two		Round One	Round Two
Volatile Organic Compounds		IA-3	IA-3		IA-21	IA-21
1,1,1-Trichloroethane	µg/m^3	0.34	0.34		2.8	0.65
1,2,4-Trimethylbenzene	µg/m^3	1.0	2.2		1.9	4.4
1,4-Dichlorobenzene	µg/m^3	0.18	1.1		2.7	6.5
Benzene	µg/m^3	0.85	1.3		1.1	0.82
Ethylbenzene	µg/m^3	2.6	8.4		2.2	9.9
m&p-Xylenes	µg/m^3	9.8	32 J		8.5	37 J
o-Xylene	µg/m^3	3.3	12		2.5	13
Styrene	µg/m^3	0.29 J	1.8		0.46 J	2.2
Tetrachloroethene	µg/m^3	2.9	3.0		12	13
Toluene	µg/m^3	11	20 J		25	37 J
Trichloroethene	µg/m^3	6.6	2.9		19	15 J

At IA-3, the reported concentrations for the round two sample are similar for 1,1,1-TCA, 1,2,4-TMB, 1,4-DCB, BZ, and PCE, greater than for EB, xylenes, styrene, and toluene, and less than for TCE with respect to the reported concentrations for the round one sample. At IA-21, the reported concentrations for the round two sample are similar for BZ and PCE, greater than for 1,2,4-TMB, 1,4-DCB, EB, xylenes, styrene, and toluene, and less than for 1,1,1-TCA and TCE with respect to the reported concentrations for the round one sample. The Summa canisters were deployed over a 24-hour period and the passive samplers were deployed over a 7-day period on a different date. These data suggest some variability of concentrations over time. This is inconsistent with the comparison of SS vapor samples that indicate limited variability. The greater variability in the IA samples may be a result of variations in emissions from other potential sources unrelated to the OCC site.

Rounds One and Round Three Comparison

The following table presents a side-by-side comparison of the round one and round three sub-slab vapor data.

		Round One	Round Three
Volatile Organic Compounds		SS-3	SS-3
1,1,1-Trichloroethane	µg/m^3	0.70	0.45
1,1,2,2-Tetrachloroethane	µg/m^3	0.039 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	0.0060 J	0.16 U
1,1-Dichloroethene	µg/m^3	0.039 U	0.039 U
1,2,4-Trichlorobenzene	µg/m^3	0.039 U	0.039 U
1,2,4-Trimethylbenzene	µg/m^3	0.78 U	0.069 J
1,3,5-Trimethylbenzene	µg/m^3	0.78 U	0.023 J
1,4-Dichlorobenzene	µg/m^3	0.027 J	0.032 J
Benzene	µg/m^3	0.18	0.12 U
Carbon tetrachloride	µg/m^3	0.32	0.29
Chloroform (Trichloromethane)	µg/m^3	0.041 J	0.046 J
cis-1,2-Dichloroethene	µg/m^3	0.039 U	0.028 J
Ethylbenzene	µg/m^3	0.081 J	0.037 J
Hexachlorobutadiene	µg/m^3	0.097	0.039 U
m&p-Xylenes	µg/m^3	0.31	0.15 J
Methylene chloride	µg/m^3	0.78 UJ	0.16 U
Naphthalene	µg/m^3	0.079 J	0.16
o-Xylene	µg/m^3	0.12 J	0.054 J
Styrene	µg/m^3	0.78 U	0.073 J
Tetrachloroethene	µg/m^3	26	28
Toluene	µg/m^3	0.34 J	0.098 J

		Round One	Round Three
Volatile Organic Compounds		SS-3	SS-3
trans-1,2-Dichloroethene	µg/m^3	0.039 U	0.039 U
Trichloroethene	µg/m^3	0.26	0.077
Vinyl chloride	µg/m^3	0.039 U	0.039 U

At SS-3, the reported concentrations for the round three sample are similar to the reported concentrations for the round one sample. Variability for the parameters detected above 1 µg/m^3 includes a slight increase in concentration in round three for PCE. These data suggest limited variability of concentrations over time and temporal effects. The parameters that were not detected in both rounds of sampling include 1,1,2,2-PCA, 1,1-DCE, 1,2,4-TCB, MC, trans-1,2-DCE, and VC.

The following table presents a side-by-side comparison of the round one and round three Summa canister indoor air data.

		Round One	Round Three		Round One	Round Three
Volatile Organic Compounds		IA-3	IA-3		IA-21	IA-21
1,1,1-Trichloroethane	µg/m^3	0.34	0.65		0.038 U	0.79
1,1,2,2-Tetrachloroethane	µg/m^3	0.041 U	0.038 U		0.15 U	0.037 U
1,1,2-Trichloroethane	µg/m^3	0.17 U	0.15 U		0.017 J	0.15 U
1,1-Dichloroethene	µg/m^3	0.041 U	0.038 U		0.038 U	0.010 J
1,2,4-Trichlorobenzene	µg/m^3	0.041 U	0.038 U		1.9	0.037 U
1,2,4-Trimethylbenzene	µg/m^3	1.0	1.2		0.52 J	1.2
1,3,5-Trimethylbenzene	µg/m^3	0.30 J	0.37		2.7	0.35
1,4-Dichlorobenzene	µg/m^3	0.18	0.34		1.1	0.73
Benzene	µg/m^3	0.85	1.4		0.48	1.3
Carbon tetrachloride	µg/m^3	0.48	0.47		0.088 J	0.46
Chloroform (Trichloromethane)	µg/m^3	0.27	0.13 J		0.035 J	0.085 J
cis-1,2-Dichloroethene	µg/m^3	0.032 J	0.051		2.2	0.046
Ethylbenzene	µg/m^3	2.6	4.8		0.038 U	4.9
Hexachlorobutadiene	µg/m^3	0.041 U	0.038 U		8.5	0.037 U
m&p-Xylenes	µg/m^3	9.8	18		75 J	19
Methylene chloride	µg/m^3	5.5 J	11		0.46	26
Naphthalene	µg/m^3	0.37	0.70		2.5	0.71
o-Xylene	µg/m^3	3.3	5.6		0.46 J	5.4
Styrene	µg/m^3	0.29 J	0.55		12	0.48
Tetrachloroethene	µg/m^3	2.9	1.2		25	2.6
Toluene	µg/m^3	11	9.5		0.038 U	13
trans-1,2-Dichloroethene	µg/m^3	0.025 J	0.053		0.14 J	0.13

			Round One	Round Three		Round One	Round Three
Volatile Organic Compounds			IA-3	IA-3		IA-21	IA-21
Trichloroethene		µg/m^3	6.6	2.8		19	7.1
Vinyl chloride		µg/m^3	0.0044 J	0.021 J		0.0048 J	0.018 J

At IA-3, the reported concentrations for the round three samples are generally greater than or similar to the reported concentrations for the round one samples with a few exceptions. Variability for the parameters detected above 1 µg/m^3 includes: decreases in concentrations in round three for PCE, toluene, and TCE; and increases for 1,2,4-TMB, BZ, EB, m&p-xylenes, MC, and o-xylene. At IA-21, the reported concentrations for the round three samples are variable compared to the reported concentrations for the round one samples. Variability for the parameters detected above 1 µg/m^3 includes: decreases in concentrations in round three for 1,2,4-TCB, 1,3,5-TMB, 1,4-DCB, cis-1,2-DCE, HCBD, m&p-xylenes, naphthalene, styrene, PCE, and TCE; and increases for 1,2,4-TMB, BZ, EB, MC, o-xylene, and toluene. The OA concentrations for the round three samples are generally less than or similar to the reported concentrations for the round one samples. The parameter 1,1,2,2-PCA was not detected in both rounds of sampling.

The variability of the IA data is inconsistent with the generally consistent results for SS vapor and results for OA between sampling rounds. The observed variability is indicative of variable emissions likely from an indoor source unrelated to the OCC site.

Additional Analysis of the Data

Sub-slab Vapor Data

The sub-slab vapor concentrations may be contributing to indoor air concentrations via the vapor intrusion pathway. However, the contributions would not be significant for the parameters that were detected in sub-slab vapor samples at concentrations below the cancer screening levels and below HQ screening levels, and in some cases below indoor air concentrations.

Groundwater Data

The following is a discussion of the most recent, shallowest, and nearby groundwater data presented in Table 9 with respect to SS vapor analytical results. PCE and TCE were not detected in a recent (2012) shallow groundwater sample collected from location 71-25, representing the most recent, shallowest, and nearby groundwater data. Other parameters that were detected in sub-slab vapor samples but were not detected in groundwater include 1,1-DCE, BZ, CT, chloroform, MC, o-xylene, toluene, and TCE. Parameters detected in the sub-slab vapor and groundwater samples include EB and m&p-xylenes. The remaining detected parameters in sub-slab vapor samples were not reported for the groundwater sample.

Potential Non-Cancer Cumulative Effects (HQ=0.1)

The following discusses a comparison of the analytical results to non-cancer screening levels for chronic exposures at values that represent a hazard quotient of 0.1 (adjusted HQ) except for TCE for purposes of evaluating short-term exposures to women of reproductive age.

No concentrations exceed the adjusted HQ screening levels for sub-slab vapor and therefore potential cumulative no-cancer health effects would be less than a HI of 1.

RLs are above the MTCA adjusted HQ screening level for 1,1,2-TCA for indoor air. It is noted that if a positive detection was observed for any compound below an RL in a sample, the laboratory was instructed to report the result. The RLs for 1,1,2-TCA would not contribute to a cumulative HI since the results are non-detect.

Concentrations exceed the MTCA adjusted HQ screening level for 1,2,4-TMB for indoor air. The exceedances for 1,2,4-TMB have been concluded to be attributed to an indoor source since the sub-slab vapor concentrations are lower and do not exceed the adjusted HQ screening level and 1,2,4-TMB was identified in MSDSs for the building. 1,2,4-TMB has a primary target organ of blood system.

Concentrations exceed MTCA adjusted HQ screening levels for m&p-xylenes, MC, naphthalene, o-xylene, and PCE for indoor air. The concentrations of m&p-xylenes, MC, naphthalene, o-xylene, and PCE have been concluded to be attributable to indoor sources since the sub-slab vapor concentrations are lower and do not exceed the adjusted HQ screening levels and xylenes, naphthalene, and PCE were identified in MSDSs for the building. The parameters have a different primary target organs; MC (liver), naphthalene and xylenes (body weight), and PCE (central nervous system). The exceedances are generally less than 50 percent of the HQ screening levels and would not contribute to a cumulative primary target organ HI greater than 1.

Recommendation

No further action by GSH is proposed for this building due to the identified indoor sources unrelated to the OCC Site based on the data presented herein.

3.8 Guard Shack

Figure 9 shows the sample location and layout of the Guard Shack.

Building Properties and Usage

The Guard Shack is occupied full time. The building covers approximately 100 square ft and houses a small office space for security operation and a small bathroom. The building is steel siding over wood frame construction on a concrete slab. The concrete slab was not visible during the inspection or sampling event; however, the relatively new age of the building suggests it should be in good condition. No SS vapor probe was advanced at this location so slab thickness was not determined.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

IA-14 was located within the office occupied by TOTE security personnel. The number of potential utility conflicts prevented an accurate utility clearance from being completed. Therefore it was determined that a SS vapor probe could not be safely advanced within this building. Consultation with POT and USEPA representatives concluded that the SS vapor sample could be removed from the sampling plan. No obvious potential VOC emitters were observed at this location.

Sampling in the Guard Shack was initiated on April 23, 2013 with the 24-hour samples completed the following day. Weather conditions during the sampling event were partly cloudy and calm, with

winds from the south, and no precipitation was observed. The associated OA sample (OA-14) was collected near the southeast corner of the Guard Shack concurrent with the IA sample.

Round Two

Discussions with the USEPA and POT during the June 11, 2013 conference call resulted in the decision to exclude the Guard Shack from the round two sampling event. A consensus among the investigation team that additional investigation was not warranted based on the round one data, the location of the Guard Shack relative to the main plume, and the nature of the day-to-day operations at this location.

Rounds Three and Four

The Guard shack was not included in the rounds three and four sampling events for the reasons stated above.

Sampling Results

Round One

Analytical results are presented in Table 10 and detected parameters are summarized on Figure 9.

There are no exceedances of IA MTCA screening levels and IA concentrations were similar to OA concentrations.

Additional Analysis of the Data

Potential Non-Cancer Cumulative Effects (HQ=0.1)

The following discusses a comparison of the analytical results to non-cancer screening levels for chronic exposures at values that represent a hazard quotient of 0.1 (adjusted HQ).

A RL is above the MTCA adjusted HQ screening level for 1,1,2-TCA for indoor air. It is noted that if a positive detection was observed for any compound below an RL in a sample, the laboratory was instructed to report the result. The RL for 1,1,2-TCA would not contribute to a cumulative HI since the result is non-detect.

A concentration exceeded the MTCA adjusted HQ screening level for 1,2,4-TMB for indoor air. The parameter 1,2,4-TMB has a primary target organ (blood system). The concentrations are less than 15 percent of the MTCA HQ screening level and would not contribute to a cumulative primary target organ HI greater than 1.

Recommendation

No further action by GSH is proposed for this building because of the location of the Guard Shack relative to the main plume and the nature of the day-to-day operations at this location, and there were no IA exceedances.

3.9 OCC Office Building

Figure 10 shows the sample locations and layout of the OCC Office Building.

Building Properties and Usage

The OCC Office Building is used for occasional office work and meetings, and full time for records retention, and is built on a concrete slab foundation. The building is separated into several areas including an office area, conference room, shower room, file room, bathroom, hallways, and kitchen area. The office space is used very infrequently and when used it is occupied for shifts shorter than 8 hours. The shower facilities are used periodically throughout the week. The building layout consists of a 30-ft by 40-ft wing housing the office, copier room, conference room, and kitchen area that is joined to an older 24-ft by 80-ft block building that contains a climate controlled document storage area (file room) in the southern half of the building. The building has a HVAC system. The concrete slab was measured to be 8 inches thick in the office area and 6.5 inches thick in the file room area.

Sampling Location Rationale and Pre-Sampling Survey Results

Round One

Two SS vapor probes were installed where SS vapor and IA samples were collected, as discussed below.

Sample pair SS/IA-15 was located within the office area, which consists of a conference room, large office, cubicle area, bathroom, kitchen, and mechanical closet. The SS vapor probe was installed in the entryway between the larger office and cubicle space. During the pre-sampling survey, a small number of cleaning products were observed in the kitchen area. The products were removed prior to sampling. During sampling, no obvious potential VOC emitters were observed in this area.

Sample pair SS/IA-16 was located within the shower and file room areas. The SS vapor probe was installed just south of the doorway between the shower room and file area. The IA sample was collected at this same location within the file room. During the pre-sampling survey, a small number of cleaning products were observed in the shower room area. The products were removed and stored off Site prior to sampling. During sampling, no obvious potential VOC emitters were observed in these areas.

Sampling in the OCC Office Building was initiated on April 17, 2013 with the 24-hour samples completed the following day. The associated OA sample (OA-15) was collected along the western wall of the office building approximately 5 ft north of the southwestern corner concurrent with the IA samples. Weather conditions during the sampling event were partly cloudy and calm, with winds from the southwest, and no precipitation was observed.

Round Two

The OCC Office Building was not included in the round two sampling event based on the assessment of the round one sampling results described below and an understanding the office space is very rarely occupied and additional ventilation measures would be conducted prior to any prolonged occupation by sensitive personnel.

Round Three and Four

At the time of the round three and four sampling events, the OCC Office Building was considered for potential mitigation and was excluded from the round three and four sampling events.

Sampling Results

Round One

Analytical results are presented in Table 11 and detected parameters are summarized on Figure 10.

IA concentrations of 1,4-DCB and TCE exceeded IA MTCA screening levels.

The IA concentration of 1,4-DCB at IA-16 (2.9 μg/m^3) exceeded an IA MTCA screening level (2.3 μg/m^3). 1,4-DCB was not detected in OA (RL of 0.039 μg/m^3), and was not detected in SS vapor samples. The RLs for 1,4-DCB in SS vapor samples were elevated (5.6 to 8.2 μg/m^3); however, the RLs were below the SS vapor screening levels. It is noted that if a positive detection was observed for any compound below an RL in a sample, the laboratory was instructed to report the result. It is therefore concluded that IA screening level exceedance for 1,4-DCB is likely attributable to an indoor source.

The IA concentration of TCE at IA-15 (5.0 μg/m^3) exceeded an IA MTCA screening level (2.0 μg/m^3). SS vapor concentrations (up to 18,000 μg/m^3) were three orders of magnitude higher than IA concentration and exceeded SS vapor screening levels based on MTCA IA screening levels. TCE was detected in the OA sample at a lower concentration (0.046 μg/m^3) than the IA and SS vapor samples. It is therefore concluded that IA MTCA screening level exceedance for TCE is likely attributable to a sub-slab source. IA TCE concentrations (up to 5.0 μg/m^3) were below the short-term criterion of 8.4 μg/m^3.

The SS vapor concentrations of 1,1,2,2-PCA, 1,1,2-TCA, chloroform, HCBD, and PCE at one or both of SS-15 and SS-16 exceeded SS vapor screening levels based on MTCA IA screening levels and were significantly higher than the paired IA concentrations. No IA screening level exceedances were noted for these parameters. It is therefore concluded that SS vapor concentrations of 1,1,2,2-PCA, 1,1,2-TCA, chloroform, HCBD, and PCE in exceedance of the SS vapor screening levels are being adequately attenuated.

In summary, it is concluded that the IA screening level exceedance for 1,4-DCB is likely attributable to an indoor source. No specific obvious indoor sources were noted in the building. IA screening levels exceedances for TCE is likely attributable to a sub-slab source. IA TCE concentrations (up to 5.3 μg/m^3) were below the short-term criterion of 8.4 μg/m^3. SS vapor concentrations of 1,1,2,2-PCA, 1,1,2-TCA, chloroform, HCBD, and PCE in exceedance of the SS vapor screening levels are being adequately attenuated.

Recommendation

Mitigation by GSH in response to concentrations of TCE in IA would be appropriate if the building is occupied; however, given the very limited usage of the building, the need for mitigation is not required. Building ventilation will be employed immediately prior to and during periods of occupation by opening windows and propping doors open. If the building usage plans change in the future (e.g., higher usage), then additional sampling and/or mitigation will be considered prior to the change.

4. Summary of Conclusions and Recommendations

Conclusions and recommendations for each building are summarized below.

Army Reserve Facility

IA MTCA screening level exceedance for naphthalene is likely attributable to an indoor source. Potential indoor sources of naphthalene include the operation of vehicles in the maintenance area. IA detections of TCE are attributed to a potential indoor air source and potentially an isolated source beneath the maintenance area unrelated to the OCC plume.

No further action by GSH is proposed for this building, due to the apparent indoor source and potentially subsurface source unrelated to the OCC Site based on the data presented herein.

Building 326

The following summary is based on the round four data that was collected after decommissioning of below-slab cold air duct returns, which resulted in mitigation of some IA exceedances noted for rounds one and two. The IA concentrations were not detected or detected at concentrations below the IA MTCA screening levels. There are no exceedances of SS vapor screening levels, which is consistent with rounds one and two.

No further action by GSH is proposed for this building, due to no exceedances of screening levels following decommissioning of below-slab cold air duct returns.

Building 407

IA MTCA screening levels exceedances for 1,2,4-TMB,, naphthalene (round three), m&p-xylenes (round three), and styrene (round three) are likely attributable to indoor sources (Citadel Marine paint bay operations, miscellaneous power and hand tools, parts washing tubs, chemical storage tanks, three flammable material storage lockers, paint cans, cleaning products, and miscellaneous building materials). There are no exceedances of SS vapor screening levels in all rounds of sampling.

No further action by GSH is proposed for this building due to the identified indoor source unrelated to the OCC Site based on the data presented herein.

Building 532

IA screening levels exceedances for 1,2,4-TMB, and 1,4-DCB are likely attributable to an indoor source (aerosol cans containing chemical cleaners, lubricants, paints, and diesel fuel were observed). There are no exceedances of SS vapor screening levels in all rounds of sampling.

No further action by GSH is proposed for this building, due to an indoor source unrelated to the OCC Site based on the data presented herein.

Building 592

IA MTCA screening level exceedance for naphthalene (round three) is likely attributable to an indoor source and possibly outdoor source. The adjusted IA concentration for naphthalene (i.e., IA concentration minus OA concentration / background) is below the IA MTCA screening levels.

IA screening level exceedances for TCE are likely attributable to an indoor source. The building survey identified TCE in degreasers used in maintenance areas in Building 592. The TCE concentration at IA-2 (13 μg/m^3) in round one exceeded the short-term criterion of 8.4 μg/m^3. The rounds two and three maximum concentrations were 1.9 μg/m^3 and 8.3 μg/m^3, respectively, below the short-term criterion. There were no exceedances for naphthalene and TCE in SS vapor samples in all rounds of sampling. IA screening level exceedances for PCE in round three are likely attributable to an indoor source. The data indicates that a potential isolated source exists beneath the shop area unrelated to the OCC Site. The potential contribution to IA concentrations from location SS-32 is unclear since the IA concentration at that location was below the IA MTCA screening levels. There were no exceedances for PCE in IA and SS vapor samples in rounds one and two.

No further action by GSH is proposed for this building, due to the apparent indoor source and potential localized subsurface source unrelated to the OCC Site based on the data presented herein.

Building 595

No IA concentrations exceeded IA MTCA screening levels in all sampling rounds. SS vapor concentrations of PCE and TCE in exceedance of the SS vapor screening levels are being adequately attenuated.

Continued monitoring by GSH is proposed for this building to show that PCE and TCE concentrations above screening levels in sub-slab vapor continue to be adequately attenuated.

Building 596

IA screening levels exceedances for 1,4-DCB (rounds one and two) and TCE are likely attributable to an indoor source (numerous flammable storage lockers and stored chemicals including cleaners, and cutting oils were observed). The TCE concentrations for both rounds one and two at IA-21 (19 and 15 μg/m^3, respectively) exceeded the short-term criterion of 8.4 μg/m^3 and the concentrations at IA-3 (6.6 and 2.9 μg/m^3) did not. The TCE concentrations for round three at IA-21 (7.1 μg/m^3), IA-3 (2.8 μg/m^3), and IA-35 (1.5 μg/m^3) are below the short-term criterion of 8.4 μg/m^3. There are no exceedances of SS vapor screening levels in all rounds of sampling.

No further action by GSH is proposed for this building due to the identified indoor sources unrelated to the OCC Site based on the data presented herein.

Guard Shack

There are no exceedances of IA MTCA screening levels and IA concentrations were similar to OA concentrations.

No further action by GSH is proposed for this building because of the location of the Guard Shack relative to the main plume and the nature of the day-to-day operations at this location, and there were no IA exceedances.

OCC Office Building

An IA screening level exceedance for 1,4-DCB are likely attributable to an indoor source. No specific obvious indoor sources were noted in the building. IA screening levels exceedances for

TCE is likely attributable to a sub-slab source. IA TCE concentrations (up to 5.3 μg/m^3) were below the short-term criterion of 8.4 μg/m^3. SS vapor concentrations of 1,1,2,2-PCA, 1,1,2-TCA, chloroform, HCBD, and PCE in exceedance of the SS vapor screening levels are being adequately attenuated.

Mitigation by GSH in response to concentrations of TCE in IA would be appropriate if the building is occupied; however, given the very limited usage of the building, the need for mitigation is not required. Building ventilation will be employed immediately prior to and during periods of occupation by opening windows and propping doors open. If the building usage plans change in the future (e.g., higher usage), then additional sampling and/or mitigation will be considered prior to the change.

Table 12 presents a summary of indoor sources, IA screening levels exceedances and likely sources, and recommendations for future actions by GSH. The attributed sources for IA screening levels exceedances were as follows:

- Indoor sources: 1,2,4-TMB, 1,4-DCB, BZ, EB, naphthalene, m&p-xylenes, styrene, PCE, and TCE
- Outdoor sources: BZ, EB, and naphthalene
- Sub-slab source: chloroform, PCE, and TCE

In summary, the recommendations for future actions by GSH at the nine buildings are as follows (see Figure 11):

- Manage occupancy by GSH (1): OCC Office
- Continued monitoring by GSH (1): 595
- No Further Action by GSH (7): ARF, 326, 407, 532, 592, 596, Guard Shack

These recommendations are supported by Ecology's memorandum dated November 13, 2015 (Appendix E), which provides additional analysis of the data.

The purpose for conducting the vapor intrusion investigation was to evaluate vapor intrusion pathway.

Guidance permits evaluation of sub-slab vapor, indoor air, and ambient (outdoor) air as follows:

If measured concentrations [sub-slab] *are below levels that could lead to unacceptable indoor air concentrations, it is reasonable to conclude during Tier I that no further VI assessment is needed.*" (Page 3-9, Ecology, 2009).

"Ecology therefore suggests that investigators use building-specific upwind ambient air measurement data as follows:

- *When the measured building-specific upwind ambient air VOC level is the same or higher than the measured maximum indoor concentration for that VOC, assume that VI is unlikely to be significantly impacting indoor air quality. In this situation the ambient contribution to the indoor air concentration is probably close to 100 percent.*
- *When the measured indoor air concentration of a particular site-related VOC exceeds the measured ambient concentration of that VOC, assume that the contribution from ambient sources to the indoor air measurement is close to the*

measured ambient concentration. The VI contribution, which should be compared to acceptable indoor air levels, is the difference between the indoor measurement and the ambient measurement." (Page 3-21, Ecology, 2009).

The data were evaluated in accordance with guidance that specifically permits evaluating the sub-slab vapor concentrations with respect to indoor air concentrations and contributions from indoor and outdoor air sources. If the sub-slab vapor concentrations are below the screening levels, then it is reasonable to conclude additional action by GSH is unnecessary. If the indoor air concentrations are below the screening levels or above screening levels but without corresponding exceedances of sub-slab vapor screening levels and thus attributable to indoor and/or outdoor air sources, then it is reasonable to conclude that additional action by GSH is unnecessary. If indoor air concentrations are similar to outdoor concentrations, then it is reasonable to conclude that the indoor concentrations can be attributed to ambient conditions.

Analysis of round four data in combination with analysis of previous rounds of data using updated screening levels determined that no further action is needed at Building 326 after the decommissioning of the below-grade cold air duct returns, and at the ARF, Buildings 407, 532, 592, and 596, and the Guard Shack. In Building 595, it is proposed that monitoring by GSH be continued to show that PCE and TCE concentrations above screening levels in sub-slab vapor continue to be adequately attenuated. In the OCC Office, mitigation was considered but given the low usage of the building, the need for mitigation was determined to not be required.

Ecology guidance further states:

"*Failing to accurately account for background VOC contributions can lead to exaggerating the perceived degree of vapor intrusion and installing unneeded mitigation systems. Not only does unneeded mitigation entail unnecessary cost, but the installed system will not be effective (that is, it will be unable to reduce indoor air VOC concentrations to target levels.).*" (Pages 3-20 and 3-21, Ecology, 2009).

Based on the four rounds of investigation, the exceedances of the TCE short-term criterion for women of reproductive age appear to be related to activities in those specific buildings and not to potential OCC subsurface impacts. Specifically, sub-slab vapor concentrations were found to be lower than indoor air concentrations and probable TCE sources inside the buildings were identified. Ecology guidance indicates that indoor air concentrations would be expected to be ten times lower than sub-slab vapor concentrations (Page 3-11 and Appendix-7, Ecology, 2009). This should lead to conservative decision making at most sites (Page 3-11, Ecology, 2009).

POT was advised to instruct tenants to implement additional ventilation in areas of identified exceedances based on the round one data. During periodic site visits to these locations, GSH representatives observed these building as having open windows and propped doors.

5. References

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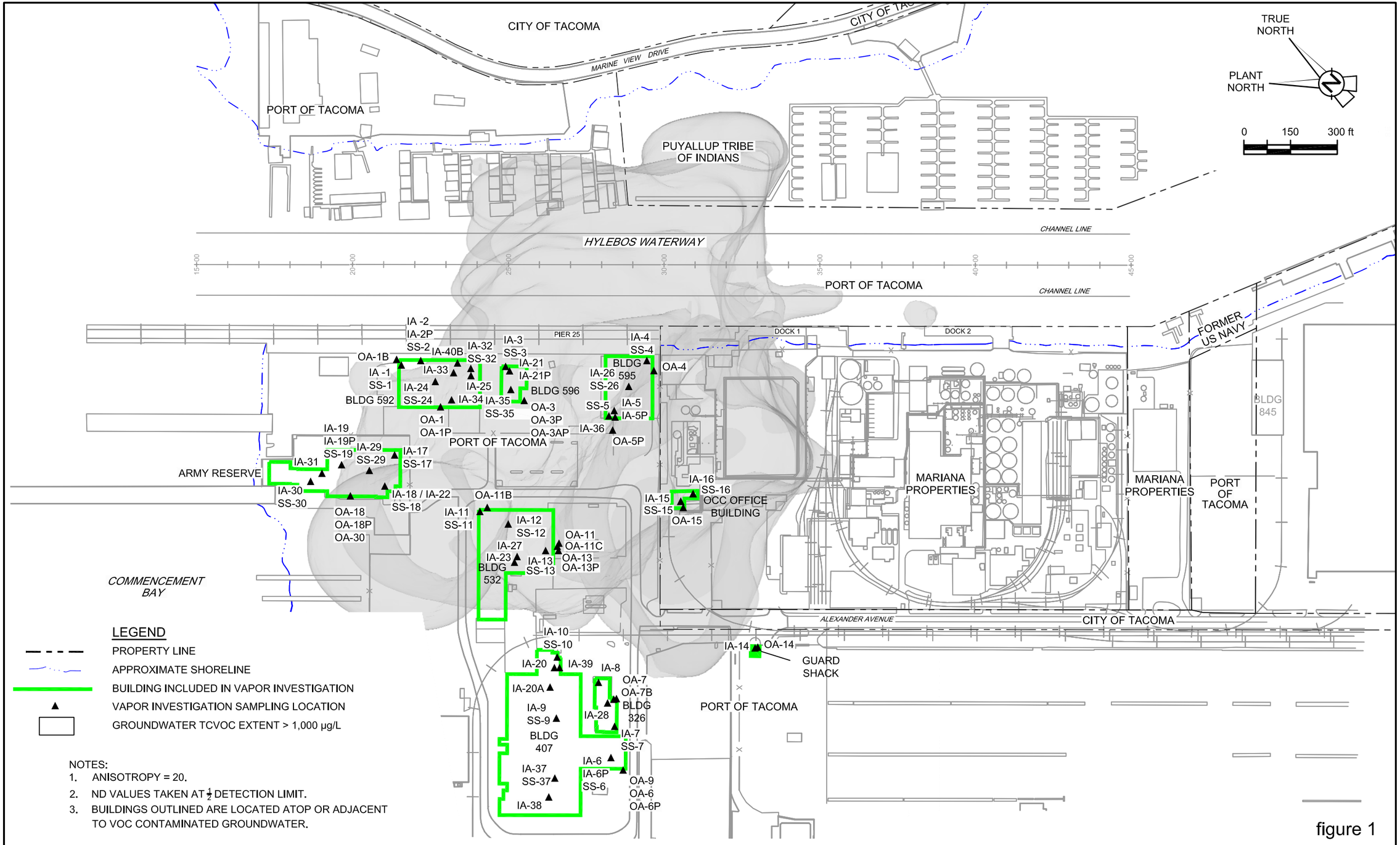


figure 1

GENERAL LOCATIONS FOR VAPOR INVESTIGATION SAMPLES
VAPOR INVESTIGATION
Occidental Chemical Corporation, Tacoma, Washington

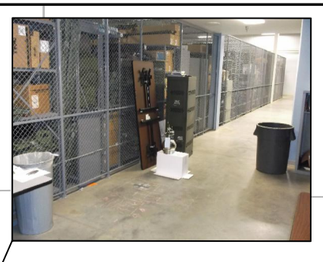
07843-M9(129)GN-WA010 SEP 3, 2015

Indoor Air-31	3/15/2014
	-
1,1,1-Trichloroethane	0.080
1,2,4-Trimethylbenzene	0.98
1,3,5-Trimethylbenzene	0.27
1,4-Dichlorobenzene	0.025 J
Benzene	1.1
Carbon tetrachloride	0.43
Chloroform (Trichloromethane)	0.10 J
cis-1,2-Dichloroethene	0.080
Ethylbenzene	1.8
m&p-Xylenes	6.7
Methylene chloride	0.60
Naphthalene	0.29
o-Xylene	2.0
Styrene	0.30
Tetrachloroethene	0.32
Toluene	4.4
trans-1,2-Dichloroethene	0.013 J
Trichloroethene	2.9(c)
Vinyl chloride	0.042

Indoor Air-19P	3/18/2014
	-
1,1,1-Trichloroethane	0,049
1,2,4-Trimethylbenzene	0,27
1,4-Dichlorobenzene	0.093
Benzene	0,64
Ethylbenzene	1,0
m&p-Xylenes	3,8
o-Xylene	1,2
Styrene	0,15
Tetrachloroethene	0,16
Toluene	2,2
Trichloroethene	0,095

Sub-Slab Probe-19	4/22/2013	3/13/2014
	-	-
1,1,1-Trichloroethane	1.2	0,91
Carbon tetrachloride	6.5	2.3
Chloroform (Trichloromethane)	0.79	0,35 J
Ethylbenzene	0.049 J	0.78 U
m&p-Xylenes	0.20	0,15 J
Naphthalene	0.057 J	0,19 J
o-Xylene	0.065 J	0.072 J
Tetrachloroethene	5.4	5,1
Toluene	0.27 J	2.6
Trichloroethene	0,23	0.45

Indoor Air-29	3/14/2014
	-
1,1,1-Trichloroethane	0.047
1,2,4-Trichlorobenzene	0.020 J
1,2,4-Trimethylbenzene	0.82
1,3,5-Trimethylbenzene	0.25
1,4-Dichlorobenzene	0.054
Benzene	0.96
Carbon tetrachloride	0.47
Chloroform (Trichloromethane)	0.098 J
cis-1,2-Dichloroethene	0.030 J
Ethylbenzene	1.1
m&p-Xylenes	4.1
Methylene chloride	0.60
Naphthalene	0.32
o-Xylene	1.4
Styrene	0.39
Tetrachloroethene	0.55
Toluene	4.1
Trichloroethene	0.30
Vinyl chloride	0.042



Indoor Air-17	4/23/2013	3/14/2014
	-	-
1,1,1-Trichloroethane	0.089	0.064
1,1-Dichloroethene	0,010 J	0.035 U
1,2,4-Trimethylbenzene	1,3	1.1
1,3,5-Trimethylbenzene	0.40 J	0.35
1,4-Dichlorobenzene	0,054	0.061
Benzene	0,69	1.1
Carbon tetrachloride	0,51	0.47
Chloroform (Trichloromethane)	0.11 J	0.10 J
cis-1,2-Dichloroethene	0,038 U	0.033 J
Ethylbenzene	1,4	1,2
m&p-Xylenes	4,9	4,3
Methylene chloride	0,91 U	0.50
Naphthalene	0,62	0.35
o-Xylene	1,7	1.5
Styrene	0,40 J	0.47
Tetrachloroethene	0,21	0.19
Toluene	4,9	4.8
trans-1,2-Dichloroethene	0,050	0,035 U
Trichloroethene	0,074	0.076
Vinyl chloride	0,095	0.049

Sub-Slab Probe-17	4/22/2013	3/13/2014
	-	-
1,1,1-Trichloroethane	1.6	1.0
1,2,4-Trimethylbenzene	4,7 U	0.084 J
Carbon tetrachloride	1.6	1.2
Chloroform (Trichloromethane)	0.25 J	0.18 J
Ethylbenzene	0.045 J	0.081 J
m&p-Xylenes	0.15 J	0.23 J
Naphthalene	0.94 U	0.14 J
o-Xylene	0.050 J	0.098 J
Tetrachloroethene	0.70	1.0
Toluene	0.94 U	1.1
Trichloroethene	0,084 J	0.42

Sub-Slab Probe-30	3/14/2014
	-
1,1,1-Trichloroethane	1,8
1,1-Dichloroethene	0.021 J
1,2,4-Trimethylbenzene	0,061 J
1,3,5-Trimethylbenzene	0,017 J
1,4-Dichlorobenzene	0,018 J
Benzene	0,20
Carbon tetrachloride	1,6
Chloroform (Trichloromethane)	2.1
cis-1,2-Dichloroethene	0,0089 J
Ethylbenzene	0,067 J
m&p-Xylenes	0,27
Naphthalene	0,12 J
o-Xylene	0,11 J
Styrene	0,059 J
Tetrachloroethene	30
Toluene	0,12 J
Trichloroethene	100(e)

Indoor Air-30	3/15/2014
	-
1,1,1-Trichloroethane	0.058
1,2,4-Trimethylbenzene	1.0
1,3,5-Trimethylbenzene	0.28
1,4-Dichlorobenzene	0.024 J
Benzene	1.2
Carbon tetrachloride	0,42
Chloroform (Trichloromethane)	0,096 J
cis-1,2-Dichloroethene	0.079
Ethylbenzene	1,8
m&p-Xylenes	7.4
Methylene chloride	0.32
Naphthalene	0.90(b)
o-Xylene	2.1
Styrene	0,22
Tetrachloroethene	0,16
Toluene	4,2
trans-1,2-Dichloroethene	0.011 J
Trichloroethene	2.6(c)
Vinyl chloride	0,040

EXTERIOR VIEW - MAIN ENTRANCE

Indoor Air-18	4/22/2013	3/14/2014
	-	-
1,1,1-Trichloroethane	0.049	0,028 J
1,2,4-Trichlorobenzene	0.041 U	0,067
1,2,4-Trimethylbenzene	0,82	0.72
1,3,5-Trimethylbenzene	0.30 J	0.21
1,4-Dichlorobenzene	0.14 J	0.059
Benzene	0.43	0.87
Carbon tetrachloride	0,31	0.43
Chloroform (Trichloromethane)	0.13 J	0.10 J
cis-1,2-Dichloroethene	0.041 U	0.040
Ethylbenzene	1,4	1.0
m&p-Xylenes	5,3	3.9
Methylene chloride	0.82 U	0.41
Naphthalene	0.081 J	0.28
o-Xylene	1,6	1.3
Styrene	0,82 U	0.40
Tetrachloroethene	0,23	0.29
Toluene	1.2	2.9
Trichloroethene	0.054	0.099
Vinyl chloride	0.072	0,026 J

Indoor Air-19	4/23/2013	3/14/2014
	-	-
1,1,1-Trichloroethane	0,11	0.067
1,2,4-Trimethylbenzene	0,80	0,51
1,3,5-Trimethylbenzene	0,27 J	0,14 J
1,4-Dichlorobenzene	0,16	0.089
Benzene	0,67	0.80
Carbon tetrachloride	0.46	0.48
Chloroform (Trichloromethane)	0,18	0.094 J
cis-1,2-Dichloroethene	0.039 U	0,040
Ethylbenzene	1,1	0.82
m&p-Xylenes	3,9	3.9
Methylene chloride	0,77 U	0.36
Naphthalene	0.095 J	0.17
o-Xylene	1,3	1.0
Styrene	0,23 J	0.24
Tetrachloroethene	0,60	0.20
Toluene	2,5	2,5
trans-1,2-Dichloroethene	0,017 J	0,011 J
Trichloroethene	0,045	0.13
Vinyl chloride	0,11	0,038

Outside Air-30	3/15/2014
	-
1,1,1-Trichloroethane	0.022 J
1,2,4-Trimethylbenzene	0.27
1,3,5-Trimethylbenzene	0.087 J
1,4-Dichlorobenzene	0.023 J
Benzene	0.62
Carbon tetrachloride	0,45
Chloroform (Trichloromethane)	0.085 J
cis-1,2-Dichloroethene	0.098
Ethylbenzene	1,6
m&p-Xylenes	6.5
Methylene chloride	0.31
Naphthalene	0.14 J
o-Xylene	1.8
Styrene	0,16
Tetrachloroethene	0,13
Toluene	2.1
trans-1,2-Dichloroethene	0,012 J
Trichloroethene	0.17
Vinyl chloride	0.044

Outside Air-18P	3/18/2014
	-
1,1,1-Trichloroethane	0.027
1,2,4-Trimethylbenzene	0.16
1,4-Dichlorobenzene	0.030
Benzene	0.75
Ethylbenzene	1.1
m&p-Xylenes	4.0
o-Xylene	1.2
Styrene	0.13
Tetrachloroethene	0.16
Toluene	1.8
Trichloroethene	0.076

Outside Air-18	4/24/2013	3/14/2014
	-	-
1,1,1-Trichloroethane	0.032 J	0,021 J
1,2,4-Trimethylbenzene	0.81 J	0.22
1,3,5-Trimethylbenzene	0.83 U	0,062 J
1,4-Dichlorobenzene	0.022 J	0,023 J
Benzene	0.72	0,62
Carbon tetrachloride	0.48	0.48
Chloroform (Trichloromethane)	0.089 J	0.082 J
cis-1,2-Dichloroethene	0.042 U	0,027 J
Ethylbenzene	1.1	0,74
m&p-Xylenes	3.8	2,8
Methylene chloride	0.83 U	0,40
Naphthalene	0.077 J	0,10 J
o-Xylene	1.3	0.93
Styrene	0,83 U	0,17
Tetrachloroethene	0.14 J	0,18
Toluene	2,1	3.1
Trichloroethene	0.033 J	0,073
Vinyl chloride	0.042 U	0,012 J

Sub-Slab Probe-29	3/13/2014
	-
1,1,1-Trichloroethane	0,60
1,1-Dichloroethene	0,010 J
1,2,4-Trimethylbenzene	0,097 J
1,3,5-Trimethylbenzene	0,035 J
1,4-Dichlorobenzene	0,036 J
Benzene	0,65
Carbon tetrachloride	2,0
Chloroform (Trichloromethane)	0,48
cis-1,2-Dichloroethene	0,033 J
Ethylbenzene	0,087 J
m&p-Xylenes	0,31
Methylene chloride	0,33
Naphthalene	0,096 J
o-Xylene	0,15 J
Styrene	0,093 J
Tetrachloroethene	3,4
Toluene	0,40
trans-1,2-Dichloroethene	0,016 J
Trichloroethene	0,37

Sub-Slab Probe-18	4/22/2013	3/13/2014
	-	-
1,1,1-Trichloroethane	0.19 J	0.16
1,2,4-Trimethylbenzene	4.0 U	0,029 J
1,4-Dichlorobenzene	0.20 U	0,014 J
Carbon tetrachloride	1.9	1.8
Chloroform (Trichloromethane)	0.54 J	0.49
Ethylbenzene	0.047 J	0,039 J
m&p-Xylenes	0.15 J	0,13 J
Naphthalene	0.81 U	0,087 J
o-Xylene	0.056 J	0,047 J
Tetrachloroethene	5.0	4,5
Toluene	0.81 U	1.5
trans-1,2-Dichloroethene	0.20 U	0,012 J
Trichloroethene	1.3	1.6

Indoor Air-22	4/23/2013
	-
1,1,1-Trichloroethane	0,072
1,2,4-Trimethylbenzene	0,86
1,3,5-Trimethylbenzene	0,30 J
1,4-Dichlorobenzene	0,15 J
Benzene	0,67
Carbon tetrachloride	0,46
Chloroform (Trichloromethane)	0,14 J
Ethylbenzene	0,94
m&p-Xylenes	3,2
Naphthalene	0,17
o-Xylene	1,2
Tetrachloroethene	0,36
Toluene	2,2
Trichloroethene	0,033 J
Vinyl chloride	0,066

TRUE NORTH

PLANT NORTH

0 15 30ft

LEGEND

BUILDING OUTLINE

▲ VAPOR INVESTIGATION SAMPLING LOCATION

SAMPLE LOCATION

Sub-Slab Probe-17	4/18/2013
1,1,1-Trichloroethane	1.6
Carbon tetrachloride	1.6

SAMPLE DATE

RESULT (ug/m³)

PARAMETER

(a) EXCEEDS SCREENING LEVEL(S) IDENTIFIED IN PARENTHESIS

SCREENING LEVELS (µg/m³) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane			5000		170000
1,1,2,2-Tetrachloroethane		0.43	-	14	-
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-	-	-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-	-	-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1		38	-
m,p-Xylenes			100		3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

OCCIDENTAL CHEMICAL CORPORATION TACOMA, WASHINGTON

VAPOR INVESTIGATION

DETECTED PARAMETERS ARMY RESERVE FACILITY

GHD

Source Reference:

Project Manager:	Reviewed By:	Date: JULY 2015	
Scale: 1:30	Project №: 07843-M9	Report №: 129	Drawing №: figure 2

07843-M9(129)GN-WA023 FEB 17, 2016

EXTERIOR VIEW - NORTHEAST CORNER

SCREENING LEVELS (µg/m³) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane		-	5000	-	170000
1,1,2,2-Tetrachloroethane		0.43		14	-
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-	-	-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-	-	-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1		38	-
m,p-Xylenes		-	100		3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

IA-8

Indoor Air-8	4/24/2013	7/1/2013	5/27/2015
1,1,1-Trichloroethane	0.030 J/0.029 J	0.050 U	0.022 J
1,1-Dichloroethene	0.040/0.042	-	0.018 J
1,2,4-Trichlorobenzene	0.035 U/0.036 U	-	0.087
1,2,4-Trimethylbenzene	1.0/0.98	1.8	0.97
1,3,5-Trimethylbenzene	0.31 J/0.32 J	-	0.53
1,4-Dichlorobenzene	2.0/1.9	58 J(b)	0.94
Benzene	0.68/0.76	0.64	0.71
Carbon tetrachloride	0.48/0.44	-	0.50
Chloroform (Trichloromethane)	0.26/0.26	-	0.21
cis-1,2-Dichloroethene	0.035 U/0.036 U	-	0.026 J
Ethylbenzene	1.4/1.2	6.9	0.51
Hexachlorobutadiene	0.035 U/0.036 U	-	0.049 J
m&p-Xylenes	4.3/3.7	29	1.0
Methylene chloride	0.69 U/0.72 U	-	0.53
Naphthalene	0.21/0.23	-	0.21
o-Xylene	1.8/1.3	9.5	0.45
Styrene	0.45 J/0.51 J	1.2	1.5
Tetrachloroethene	0.66/0.63	0.79	0.28
Toluene	3.2/3.9	3.1	2.2
trans-1,2-Dichloroethene	0.035 U/0.051	-	0.040 U
Trichloroethene	0.45/0.44	0.30	0.17
Vinyl chloride	0.0060 J/0.0057 J	-	0.012 J

Indoor Air-8P	6/2/2015
1,2,4-Trimethylbenzene	1.4
1,4-Dichlorobenzene	1.2
Benzene	0.80
Ethylbenzene	0.52
m&p-Xylenes	1.2
o-Xylene	0.48
Styrene	1.2
Tetrachloroethene	0.13
Toluene	2.2
Trichloroethene	0.049

Outside Air-7B	7/1/2013
1,2,4-Trimethylbenzene	0.71
1,4-Dichlorobenzene	0.61
Benzene	0.48
Ethylbenzene	4.8
m&p-Xylenes	21
o-Xylene	6.8
Styrene	0.52
Tetrachloroethene	0.082
Toluene	1.7

OA-7B

OA-7

Outside Air-7	4/24/2013	5/27/2015
1,1,1-Trichloroethane	0.028 J	0.018 J
1,2,4-Trimethylbenzene	1.2	0.23
1,3,5-Trimethylbenzene	0.38 J	0.063 J
1,4-Dichlorobenzene	0.038 J	0.043
Benzene	0.76	0.58
Carbon tetrachloride	0.47	0.50
Chloroform (Trichloromethane)	0.095 J	0.17 U
Ethylbenzene	0.77 J	0.14 J
m&p-Xylenes	2.3	0.47
Methylene chloride	0.79 U	0.27
Naphthalene	0.15 J	0.16 J
o-Xylene	0.89	0.18
Styrene	0.79 U	0.95
Tetrachloroethene	0.13 J	0.23
Toluene	2.6	0.62
Trichloroethene	0.024 J	0.17

Outside Air-7P	6/2/2015
1,2,4-Trimethylbenzene	0.28
Benzene	1.1
Ethylbenzene	0.19
m&p-Xylenes	0.55
o-Xylene	0.23
Styrene	0.73
Tetrachloroethene	0.057
Toluene	0.84

TRUE NORTH

PLANT NORTH

N

0 10 20 ft

Sub-Slab Probe-7	4/24/2013	6/25/2013	5/27/2015
1,1,1-Trichloroethane	1.2	1.6	1.1
1,1,2,2-Tetrachloroethane	0.039 U	0.037 J	0.037 U
1,1-Dichloroethene	0.012 J	0.019 J	0.037 U
1,2,4-Trimethylbenzene	0.78 U	0.77 U	0.16
1,3,5-Trimethylbenzene	0.78 U	0.77 U	0.039 J
1,4-Dichlorobenzene	0.035 J	0.063	0.061
Benzene	0.12 U	0.16	0.081 J
Carbon tetrachloride	0.14	0.14	0.15
Chloroform (Trichloromethane)	0.15 J	0.37	0.15 U
cis-1,2-Dichloroethene	0.039 U	0.039 U	0.073
Ethylbenzene	0.043 J	0.12 J	0.047 J
Hexachlorobutadiene	0.026 J	0.039 U	0.15 U
m&p-Xylenes	0.13 J	0.34	0.19
Methylene chloride	0.78 U	0.37	0.11 J
Naphthalene	0.087 J	0.33	0.36
o-Xylene	0.035 J	0.17	0.083 J
Styrene	0.78 U	0.30 J	0.074 J
Tetrachloroethene	12	15	14
Toluene	0.26 J	0.34	0.21
trans-1,2-Dichloroethene	0.039 U	0.020 J	0.037 U
Trichloroethene	10	14	9.6
Vinyl chloride	0.039 U	0.0051 J	0.037 U

IA-28

Indoor Air-28	7/1/2013	5/27/2015
1,1,1-Trichloroethane	0.050 U	0.022 J
1,1-Dichloroethene	-	0.016 J
1,2,4-Trimethylbenzene	10(c)	0.85
1,3,5-Trimethylbenzene	-	0.27
1,4-Dichlorobenzene	2.2	0.19
Benzene	0.64	0.35
Carbon tetrachloride	-	0.54
Chloroform (Trichloromethane)	-	0.28
Ethylbenzene	4.0	0.40
m&p-Xylenes	15	1.1
Methylene chloride	-	0.36
Naphthalene	-	0.27
o-Xylene	5.0	0.43
Styrene	2.1	1.2
Tetrachloroethene	4.9	0.19
Toluene	4.0	1.5
Trichloroethene	2.0	0.13
Vinyl chloride	-	0.012 J

Indoor Air-28P	6/2/2015
1,2,4-Trimethylbenzene	0.92
1,4-Dichlorobenzene	0.39
Benzene	0.75
Ethylbenzene	0.38
m&p-Xylenes	0.98
o-Xylene	0.42
Styrene	1.0
Tetrachloroethene	0.13
Toluene	1.5
Trichloroethene	0.091

IA-7
SS-7

Indoor Air-7	4/24/2013	7/1/2013	5/27/2015
1,1,1-Trichloroethane	0.032 J	0.050 U	0.022 J
1,1-Dichloroethene	0.022 J	-	0.015 J
1,2,4-Trimethylbenzene	4.7	16(c)	0.72
1,3,5-Trimethylbenzene	1.5	-	0.24
1,4-Dichlorobenzene	0.14 J	1.3	0.30
Benzene	0.71	0.65	0.34
Carbon tetrachloride	0.45	-	0.51
Chloroform (Trichloromethane)	0.19	-	0.19
Ethylbenzene	1.0	4.1	0.29
m&p-Xylenes	2.9	16	0.78
Methylene chloride	0.78 U	-	0.33
Naphthalene	0.16	-	0.33
o-Xylene	1.1	5.6	0.34
Styrene	0.35 J	1.9	1.5
Tetrachloroethene	4.1	6.9	0.26
Toluene	2.6	3.9	1.3
Trichloroethene	3.9(c)	3.1(c)	0.17
Vinyl chloride	0.0042 J	-	0.038 U

Indoor Air-7P	6/2/2015
1,2,4-Trimethylbenzene	0.88
1,4-Dichlorobenzene	0.31
Benzene	0.88
Ethylbenzene	0.35
m&p-Xylenes	0.94
o-Xylene	0.40
Styrene	1.1
Tetrachloroethene	0.15
Toluene	1.4
Trichloroethene	0.12

LEGEND

BUILDING OUTLINE

▲ VAPOR INVESTIGATION SAMPLING LOCATION

SAMPLE LOCATION

Sub-Slab Probe-7	4/24/2013
1,1,1-Trichloroethane	1.2
Chloroform (Trichloromethane)	0.15 J

SAMPLE DATE

RESULT (ug/m³)

PARAMETER

(a) EXCEEDS SCREENING LEVEL(S) IDENTIFIED IN PARENTHESIS

figure 3

DETECTED PARAMETERS - BUILDING 326
VAPOR INVESTIGATION

Occidental Chemical Corporation, Tacoma, Washington

Indoor Air-9	4/19/2013	3/19/2014
	-	-
1,1,1-Trichloroethane	0.027 J	0.022 J
1,2,4-Trimethylbenzene	56(c)	70(c)
1,3,5-Trimethylbenzene	17	20
1,4-Dichlorobenzene	0.022 J	0.021 J
Benzene	0.95	1.1
Carbon tetrachloride	0.46	0.47
Chloroform (Trichloromethane)	0.15 U	0.082 J
cis-1,2-Dichloroethene	0.037 U	0.010 J
Ethylbenzene	3.4	12
m&p-Xylenes	15	41
Methylene chloride	0.74 U	0.42
Naphthalene	0.24	0.94(b)
o-Xylene	7.8	20
Styrene	83	31
Tetrachloroethene	0.24	0.18
Toluene	8.2	3.4
Trichloroethene	0.052	0.066

Indoor Air-20A	3/19/2014
	-
1,1,1-Trichloroethane	0.021 J
1,2,4-Trimethylbenzene	12(c)
1,3,5-Trimethylbenzene	3.4
1,4-Dichlorobenzene	0.046
Benzene	1.3
Carbon tetrachloride	0.47
Chloroform (Trichloromethane)	0.090 J
cis-1,2-Dichloroethene	0.040 J
Ethylbenzene	3.0
m&p-Xylenes	9.8
Methylene chloride	0.34
Naphthalene	1.7(b)
o-Xylene	3.7
Styrene	3.2
Tetrachloroethene	0.32
Toluene	4.5
Trichloroethene	0.14
Vinyl chloride	0.012 J

Indoor Air-20	4/19/2013
	-
1,1,1-Trichloroethane	0.026 J
1,1,2-Trichloroethane	0.011 J
1,1-Dichloroethene	0.0049 J
1,2,4-Trimethylbenzene	16(c)
1,3,5-Trimethylbenzene	4.7
1,4-Dichlorobenzene	0.032 J
Benzene	0.99
Carbon tetrachloride	0.45
Chloroform (Trichloromethane)	0.11 J
cis-1,2-Dichloroethene	0.016 J
Ethylbenzene	4.3
m&p-Xylenes	18
Naphthalene	0.31
o-Xylene	6.1
Styrene	18
Tetrachloroethene	0.15
Toluene	13
trans-1,2-Dichloroethene	0.024 J
Trichloroethene	0.085
Vinyl chloride	0.0036 J

Sub-Slab Probe-10	4/18/2013	3/18/2014
	-	-
1,1,1-Trichloroethane	0.030 J	0.030 J
1,2,4-Trimethylbenzene	0.74 U	0.049 J
1,3,5-Trimethylbenzene	0.74 U	0.016 J
1,4-Dichlorobenzene	0.037 U	0.024 J
Benzene	0.11 U	0.11 J
Carbon tetrachloride	0.34	0.32
Chloroform (Trichloromethane)	0.11 J	0.047 J
Ethylbenzene	0.043 J	0.081 J
Hexachlorobutadiene	0.26	0.039 U
m&p-Xylenes	0.14 J	0.23
Methylene chloride	0.74 U	0.24
Naphthalene	0.059 J	0.066 J
o-Xylene	0.079 J	0.093 J
Styrene	0.74 U	0.078 J
Tetrachloroethene	0.53	0.49
Toluene	0.20	0.42
Trichloroethene	0.14	0.080

Indoor Air-10	4/19/2013	3/19/2014
	-	-
1,1,1-Trichloroethane	0.027 J	0.021 J
1,2,4-Trimethylbenzene	6.0	9.4(c)
1,3,5-Trimethylbenzene	1.9	2.5
1,4-Dichlorobenzene	0.026 J	0.047
Benzene	0.82	1.3
Carbon tetrachloride	0.46	0.46
Chloroform (Trichloromethane)	0.12 J	0.082 J
cis-1,2-Dichloroethene	0.042 U	0.022 J
Ethylbenzene	1.3	5.3
m&p-Xylenes	5.4	18
Methylene chloride	0.84 U	0.49
Naphthalene	0.54	0.34
o-Xylene	2.0	5.5
Styrene	6.1	1.6
Tetrachloroethene	0.12	0.32
Toluene	6.3	4.7
Trichloroethene	0.047	0.14
Vinyl chloride	0.042 U	0.049

Indoor Air-39	3/19/2014
	-
1,1,1-Trichloroethane	0.021 J
1,2,4-Trimethylbenzene	7.0
1,3,5-Trimethylbenzene	2.4
1,4-Dichlorobenzene	0.017 J
Benzene	0.95
Carbon tetrachloride	0.39
Chloroform (Trichloromethane)	0.081 J
cis-1,2-Dichloroethene	0.017 J
Ethylbenzene	2.9
m&p-Xylenes	11
Methylene chloride	0.39
Naphthalene	0.24
o-Xylene	3.5
Styrene	1.6
Tetrachloroethene	0.20
Toluene	3.4
Trichloroethene	0.074
Vinyl chloride	0.019 J

Sub-Slab Probe-9	4/18/2013	3/18/2014
	-	-
1,1,1-Trichloroethane	0.88	0.79
1,1-Dichloroethene	0.0074 J	0.037 U
1,2,4-Trimethylbenzene	0.68 J	0.33
1,3,5-Trimethylbenzene	0,71 U	0,12 J
1,4-Dichlorobenzene	0.018 J	0.033 J
Benzene	0,11 U	0.32
Carbon tetrachloride	0.25	0.27
Chloroform (Trichloromethane)	0.028 J	0.034 J
Ethylbenzene	0.057 J	0.068 J
Hexachlorobutadiene	1.7	0.037 U
m&p-Xylenes	0.21	0.25
Naphthalene	1.2	0.26
o-Xylene	0.097 J	0,11 J
Styrene	0.62 J	0.53
Tetrachloroethene	2.8	0.69
Toluene	0.33 J	0.19
Trichloroethene	0.15	0.022 J

EXTERIOR VIEW - SOUTH SIDE

Indoor Air-37	3/19/2014
	-
1,1,1-Trichloroethane	0.021 J
1,2,4-Trimethylbenzene	340(c)
1,3,5-Trimethylbenzene	120
1,4-Dichlorobenzene	0.026 J
Benzene	1.2
Carbon tetrachloride	0.46
Chloroform (Trichloromethane)	0.085 J
cis-1,2-Dichloroethene	0.011 J
Ethylbenzene	21
m&p-Xylenes	71
Methylene chloride	0.39
Naphthalene	3.8(b,c)
o-Xylene	44
Styrene	220
Tetrachloroethene	0.19
Toluene	6.4
Trichloroethene	0.059
Vinyl chloride	0.011 J

Sub-Slab Probe-37	3/18/2014
	-
1,1,1-Trichloroethane	4.1
1,1-Dichloroethene	0.060
1,2,4-Trimethylbenzene	32
1,3,5-Trimethylbenzene	8.6
1,4-Dichlorobenzene	0.19
Benzene	0.43
Carbon tetrachloride	0.16
Chloroform (Trichloromethane)	0.042 J
cis-1,2-Dichloroethene	0.0084 J
Ethylbenzene	1.3
m&p-Xylenes	3.3
Methylene chloride	2.9
Naphthalene	2.4
o-Xylene	1.6
Styrene	8.9
Tetrachloroethene	7.1
Toluene	6.1
trans-1,2-Dichloroethene	0.013 J
Trichloroethene	0.40

Indoor Air-38	3/19/2014
	-
1,2,4-Trimethylbenzene	730(c)
1,3,5-Trimethylbenzene	340
Benzene	1,3
Carbon tetrachloride	0,17
Chloroform (Trichloromethane)	0,083 J
Ethylbenzene	36
m&p-Xylenes	150(c)
Naphthalene	19(b,c)
o-Xylene	90
Styrene	1400(c)
Tetrachloroethene	0,35
Toluene	16
Trichloroethene	0,077 J

Indoor Air-6	4/19/2013	3/19/2014
	-	-
1,1,1-Trichloroethane	0,025 J	0,023 J
1,2,4-Trimethylbenzene	53(c)	86(c)
1,3,5-Trimethylbenzene	17	28
1,4-Dichlorobenzene	0,036 U	0,026 J
Benzene	0,60	1,0
Carbon tetrachloride	0,35	0,46
Chloroform (Trichloromethane)	0,11 J	0,085 J
cis-1,2-Dichloroethene	0,036 U	0,012 J
Ethylbenzene	3,0	6,1
m&p-Xylenes	13	19
Methylene chloride	0,73 U	0,33
Naphthalene	0,17	0,56
o-Xylene	7,6	9,5
Styrene	88	20
Tetrachloroethene	0,062	0,24
Toluene	8,3	3,3
Trichloroethene	0,040	0,087
Vinyl chloride	0,036 U	0,011 J

Indoor Air-6P	3/19/2014
	-
1,1,1-Trichloroethane	0.020/0.019 J
1,2,4-Trimethylbenzene	8.5 J(c)/8.3 J(c)
1,4-Dichlorobenzene	0.037 J/0.034 J
Benzene	1.0/0.97 J
Ethylbenzene	5.6 J/5.4 J
m&p-Xylenes	14 J/14 J
o-Xylene	6.9 J/6.7 J
Styrene	25 J/24 J
Tetrachloroethene	0.29 J/0.28 J
Toluene	5.2 J/5.0 J
Trichloroethene	0.031/0.030 J

Sub-Slab Probe-6	4/18/2013	3/18/2014
	-	-
1,1,1-Trichloroethane	0,35	0,32
1,1-Dichloroethene	0,0067 J	0,034 U
1,2,4-Trimethylbenzene	0,31 J	0,64
1,3,5-Trimethylbenzene	0,71 U	0,20
1,4-Dichlorobenzene	0,036 U	0,013 J
Benzene	0,11 U	0,11
Carbon tetrachloride	0,14 J	0,15
Chloroform (Trichloromethane)	0,011 J	0,0095 J
Ethylbenzene	0,044 J	0,080 J
Hexachlorobutadiene	0,34	0,034 U
m&p-Xylenes	0,15	0,16
Naphthalene	0,077 J	0,11 J
o-Xylene	0,068 J	0,084 J
Styrene	1,0	0,13 J
Tetrachloroethene	63	57
Toluene	0,44 J	0,14 U
Trichloroethene	0,31	0,10

Outside Air-6	3/19/2014
	-
1,1,1-Trichloroethane	0.020 J/0.021 J
1,1,2,2-Tetrachloroethane	0.039 J/0.039 U
1,2,4-Trimethylbenzene	5.1/6.0
1,3,5-Trimethylbenzene	1.7 J/2.1 J
1,4-Dichlorobenzene	0.034 J/0.025 J
Benzene	0,66/0.68
Carbon tetrachloride	0,47/0.47
Chloroform (Trichloromethane)	0.12 J/0.10 J
cis-1,2-Dichloroethene	0.057/0.037 J
Ethylbenzene	1.0/1.1
m&p-Xylenes	3.5/4.1
Methylene chloride	0.38/0.34
Naphthalene	0.13 J/0.19
o-Xylene	1.3/1.5
Styrene	1.7/1.9
Tetrachloroethene	0.42/0.37
Toluene	1.9/1.8
Trichloroethene	0,80/0.51

Outside Air-9	4/19/2013
	-
1,1,1-Trichloroethane	0,024 J
1,2,4-Trimethylbenzene	0.65 J
Benzene	0.40
Carbon tetrachloride	0.45
Chloroform (Trichloromethane)	0,075 J
Ethylbenzene	0.21
m&p-Xylenes	0.78
Naphthalene	0,047 J
o-Xylene	0.29 J
Styrene	0.64 J
Tetrachloroethene	0.082
Toluene	1.0
Trichloroethene	0,013 J

Outside Air-6P	3/19/2014
	-
1,1,1-Trichloroethane	0,022
1,2,4-Trimethylbenzene	0.44
1,4-Dichlorobenzene	0,038
Benzene	0.62
Ethylbenzene	1.1
m&p-Xylenes	4.1
o-Xylene	1.2
Styrene	2.7
Tetrachloroethene	0.15
Toluene	1.6
Trichloroethene	0,021

TRUE NORTH

PLANT NORTH

0 30 60ft

LEGEND

BUILDING OUTLINE

VAPOR INVESTIGATION SAMPLING LOCATION

SAMPLE LOCATION

Sub-Slab Probe-10	4/18/2013
Carbon tetrachloride	0.34
Hexachlorobutadiene	0.26
Naphthalene	0.059 J

SAMPLE DATE

RESULT (ug/m³)

PARAMETER

(a) EXCEEDS SCREENING LEVEL(S) IDENTIFIED IN PARENTHESIS

SCREENING LEVELS (µg/m³) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane			5000		170000
1,1,2,2-Tetrachloroethane		0.43		14	
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-	-	-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-	-	-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1		38	-
m,p-Xylenes			100		3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

OCCIDENTAL CHEMICAL CORPORATION TACOMA, WASHINGTON

VAPOR INVESTIGATION

DETECTED PARAMETERS BUILDING 407

GHD

Source Reference:

Project Manager:	Reviewed By:	Date: JULY 2015	
Scale: 1:60	Project №: 07843-M9	Report №: 129	Drawing №: figure 4

07843-M9(129)GN-WA024 FEB 17, 2016

Outside Air-11B	4/26/2013
1,1,1-Trichloroethane	0,025 J
1,2,4-Trimethylbenzene	0.42 J
1,4-Dichlorobenzene	0.15 J
Benzene	0,49
Carbon tetrachloride	0.45
Chloroform (Trichloromethane)	0.080 J
cis-1,2-Dichloroethene	0.054
Ethylbenzene	0.96
m&p-Xylenes	3.8
Naphthalene	0.056 J
o-Xylene	1.0
Tetrachloroethene	0,12 J
Toluene	5,9
Trichloroethene	0.068
Vinyl chloride	0.017 J

OA-11B

IA-11
SS-11

Sub-Slab Probe-11	4/25/2013	6/25/2013
1,1,1-Trichloroethane	0,50	0.66
1,1-Dichloroethene	0,039 U	0,028 J
1,2,4-Trichlorobenzene	0,039 U	0,058
1,4-Dichlorobenzene	0,039 U	0,10
Benzene	0,12 U	0,13
Carbon tetrachloride	0,66	0,79
Chloroform (Trichloromethane)	0,049 J	0,15 J
cis-1,2-Dichloroethene	0,039 U	0,060
Ethylbenzene	0,027 J	0,13 J
m&p-Xylenes	0,087 J	0,42
Methylene chloride	0,77 U	0,13 J
Naphthalene	0,15 U	0,31
o-Xylene	0,030 J	0,25
Styrene	0,77 U	0,43 J
Tetrachloroethene	3,2	5,0
Toluene	1,2	0,33
trans-1,2-Dichloroethene	0,039 U	0,063
Trichloroethene	0,27	0,45
Vinyl chloride	0,039 U	0,018 J

Indoor Air-11	4/26/2013	7/1/2013
1,1,1-Trichloroethane	0.024 J	0,050 U
1,2,4-Trimethylbenzene	0,60 J	1,9
1,4-Dichlorobenzene	0.13 J	0,69
Benzene	0.63	0,64
Carbon tetrachloride	0.40	-
Chloroform (Trichloromethane)	0,082 J	-
cis-1,2-Dichloroethene	0,020 J	-
Ethylbenzene	1.7	14
m&p-Xylenes	6.9	61 J
Naphthalene	0.23	-
o-Xylene	2,3	21 J
Styrene	0.34 J	2,0
Tetrachloroethene	0.18	0,37
Toluene	21	28 J
trans-1,2-Dichloroethene	0.034 J	-
Trichloroethene	0,10	0,12
Vinyl chloride	0.011 J	-

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Indoor Air-12	4/20/2013	7/1/2013
1,1,1-Trichloroethane	0.032 J	0,050 U
1,2,4-Trimethylbenzene	1.3	1,8
1,3,5-Trimethylbenzene	0.39 J	-
1,4-Dichlorobenzene	5.4(b)	2.2
Benzene	0.71	0,61
Carbon tetrachloride	0.44	-
Chloroform (Trichloromethane)	0.096 J	-
Ethylbenzene	4.7	22 J
m&p-Xylenes	20	89 J
Naphthalene	0.17 J	-
o-Xylene	5.0	32 J
Styrene	0.32 J	0,93
Tetrachloroethene	1.5	0.24
Toluene	55	8,4
Trichloroethene	0.34	0,049

Sub-Slab Probe-12	4/19/2013	6/26/2013
1,1,1-Trichloroethane	4.2	4,3
1,1-Dichloroethene	0.058	0.057
1,2,4-Trichlorobenzene	0.041 U	0.062
1,4-Dichlorobenzene	0.13 J	0.12
Benzene	0.12	0,10 J
Carbon tetrachloride	0.16	0.10
Chloroform (Trichloromethane)	0.070 J	0.12 J
cis-1,2-Dichloroethene	0.041 U	0.051
Ethylbenzene	0.34 J	0.12 J
Hexachlorobutadiene	0.89	0,020 J
m&p-Xylenes	1.4	0.33
Methylene chloride	0.82 U	0.17
Naphthalene	0,092 J	0.18
o-Xylene	0.40 J	0.18
Tetrachloroethene	27	30
Toluene	5.0	0.17
trans-1,2-Dichloroethene	0.041 U	0.053
Trichloroethene	0.37	0,30
Vinyl chloride	0.041 U	0,017 J

Outside Air-11	4/20/2013
1,1,1-Trichloroethane	0.023 J/0,023 J
1,1,2-Trichloroethane	0.027 J/0,14 U
1,1-Dichloroethene	0.013 J/0,035 U
1,2,4-Trichlorobenzene	0,026 J/0,035 U
1,4-Dichlorobenzene	0.060 J/0,039 J
Benzene	0.29/0,34
Carbon tetrachloride	0.39/0.46
Chloroform (Trichloromethane)	0.083 J/0,071 J
cis-1,2-Dichloroethene	0.046 J/0,035 UJ
Ethylbenzene	0.22 J/0,26 J
m&p-Xylenes	0.86/0,99
Naphthalene	0.073 J/0.070 J
o-Xylene	0.27 J/0,31 J
Tetrachloroethene	0.16 J/0,062 J
Toluene	1,4/1.9
trans-1,2-Dichloroethene	0.043 J/0,035 UJ
Trichloroethene	0.085 J/0,023 J
Vinyl chloride	0.014 J/0,035 U

WIND (4/25)

IA-12
SS-12

OA-11

OA-11C

Outside Air-11C	7/1/2013
1,2,4-Trimethylbenzene	0,49
1,4-Dichlorobenzene	0,050
Benzene	0,58
Ethylbenzene	16 J
m&p-Xylenes	67 J
o-Xylene	23 J
Styrene	0,69
Tetrachloroethene	0.084
Toluene	1,7

IA-13
SS-13

OA-13
OA-13P

Outside Air-13P	6/2/2015
1,2,4-Trimethylbenzene	0.46
Benzene	0.58
Ethylbenzene	0,81
m&p-Xylenes	3.2
o-Xylene	1.2
Styrene	0.63
Tetrachloroethene	0.064
Toluene	1.6

Outside Air-13	5/27/2015
1,1,1-Trichloroethane	0.022 J/0,020 J
1,2,4-Trimethylbenzene	3.3 J/0,92 J
1,3,5-Trimethylbenzene	1.4 J/0.35 J
1,4-Dichlorobenzene	0.024 J/0,019 J
Benzene	0,28/0,36
Carbon tetrachloride	0,51/0.48
Chloroform (Trichloromethane)	0,17/0,16
cis-1,2-Dichloroethene	0.031 J/0,037 U
Ethylbenzene	4.0 J/1,9 J
m&p-Xylenes	16 J/7,5 J
Methylene chloride	0.63 J/0,41 J
Naphthalene	0.34 J/0.81 J
o-Xylene	5,2 J/2,4 J
Styrene	1.3/1.8
Tetrachloroethene	0.83 J/0,14 J
Toluene	20 J/5,0 J
Trichloroethene	0.24 J/0,049 J

IA-27

BUILDING 532

IA-23

Indoor Air-27	7/1/2013
1,2,4-Trimethylbenzene	2,1
1,4-Dichlorobenzene	26 J(b)
Benzene	0.78
Ethylbenzene	26 J
m&p-Xylenes	100 J
o-Xylene	40 J
Styrene	1,3
Tetrachloroethene	0.31
Toluene	11

Indoor Air-23	7/1/2013
1,2,4-Trimethylbenzene	2.9
1,4-Dichlorobenzene	87 J(b)
Benzene	1,2
Ethylbenzene	30 J
m&p-Xylenes	100 J
o-Xylene	43 J
Styrene	1,3
Tetrachloroethene	0.43
Toluene	28 J
Trichloroethene	0.046

Sub-Slab Probe-13	4/19/2013	6/26/2013	5/27/2015
1,1,1-Trichloroethane	24	23	25
1,1-Dichloroethene	0,31	0.29	0,059
1,2,4-Trimethylbenzene	0.86 U	0.73 U	0.090 J
1,3,5-Trimethylbenzene	0.86 U	0.73 U	0.040 J
1,4-Dichlorobenzene	0,046	0.066	0.058
Benzene	0.13 U	0,10 J	0.12 J
Carbon tetrachloride	0.064	0.062	0,067
Chloroform (Trichloromethane)	0,045 J	0.059 J	0,16 U
cis-1,2-Dichloroethene	0,043 U	0.036 U	0.016 J
Ethylbenzene	0,078 J	0.11 J	0.051 J
Hexachlorobutadiene	0,022 J	0.036 U	0,16 U
m&p-Xylenes	0.33	0.43	0,19
Methylene chloride	0,86 UJ	0.035 J	0,11 J
Naphthalene	0,85	0.30	0.46
o-Xylene	0,087 J	0.28	0,10 J
Styrene	0,86 U	0.73 U	0,10 J
Tetrachloroethene	20	27	29
Toluene	1.2	0.17	0,40
Trichloroethene	24	27	21

Indoor Air-13	4/20/2013	7/1/2013	5/27/2015
1,1,1-Trichloroethane	0,034 J	0,050 U	0.022 J
1,2,4-Trimethylbenzene	1,1	1.6	1.0
1,3,5-Trimethylbenzene	0,36 J	-	0,41
1,4-Dichlorobenzene	1,6	2.2	0.019 J
Benzene	0,74	0.86	0.28
Carbon tetrachloride	0,45	-	0.62
Chloroform (Trichloromethane)	0,078 J	-	0.20
Ethylbenzene	5,1	27 J	2.7
m&p-Xylenes	22	100 J	10
Methylene chloride	0,78 UJ	-	0.49
Naphthalene	0,20	-	0.26
o-Xylene	5,6	40 J	3.3
Styrene	0,28 J	1.2	1.9
Tetrachloroethene	1,8	0.19	0.14
Toluene	59	19 J	7.8
Trichloroethene	0,86	0.076	0.042

Indoor Air-13P	6/2/2015
1,2,4-Trimethylbenzene	12(c)/13(c)
Benzene	0,61 J/0.44 J
Ethylbenzene	8,7/8.3
m&p-Xylenes	35 J/36 J
o-Xylene	12/12
Styrene	1.2/1.3
Tetrachloroethene	0.19/0.11
Toluene	22 J/17 J
Trichloroethene	0.070/0.037 U

EXTERIOR VIEW - NORTH SIDE

TRUE NORTH

PLANT NORTH

0 15 30ft

LEGEND

BUILDING OUTLINE

▲ VAPOR INVESTIGATION SAMPLING LOCATION

SAMPLE LOCATION

Sub-Slab Probe-17	4/18/2013
1,1,1-Trichloroethane	1.6
Carbon tetrachloride	1.6

SAMPLE DATE

RESULT (ug/m³)

PARAMETER

(a) EXCEEDS SCREENING LEVEL(S) IDENTIFIED IN PARENTHESIS

SCREENING LEVELS (ug/m³) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane		-	5000	-	170000
1,1,2,2-Tetrachloroethane		0.43		14	
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-		-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-		-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1		38	-
m,p-Xylenes		-	100	-	3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

OCCIDENTAL CHEMICAL CORPORATION
TACOMA, WASHINGTON

VAPOR INVESTIGATION

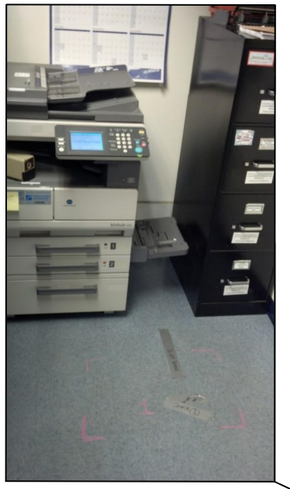
DETECTED PARAMETERS
BUILDING 532

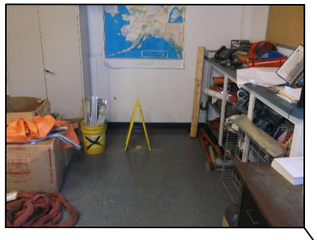
GHD

Source Reference:

Project Manager:	Reviewed By:	Date: JULY 2015	
Scale: 1:30	Project N°: 07843-M9	Report N°: 129	Drawing N°: figure 5

07843-M9(129)GN-WA013 FEB 17, 2016





Outside Air-1B	7/1/2013
	-
1,2,4-Trimethylbenzene	0,35
Benzene	0,60
Ethylbenzene	0,50
m&p-Xylenes	1,8
o-Xylene	0,66
Styrene	0,43
Tetrachloroethene	0,070
Toluene	1,4
Trichloroethene	0,48

Sub-Slab Probe-2	4/21/2013	6/27/2013	3/17/2014
	-	-	-
1,1,1-Trichloroethane	0,59	0,35	0,37
1,1,2-Trichloroethane	0,0075 J	0,16 U	0,17 U
1,1-Dichloroethene	0,0068 J	0,0078 J	0,043 U
1,2,4-Trimethylbenzene	0,73 U	0,79 U	0,12 J
1,3,5-Trimethylbenzene	0,73 U	0,79 U	0,036 J
1,4-Dichlorobenzene	0,033 J	0,040 U	0,040 J
Benzene	0,11 U	0,069 J	0,059 J
Carbon tetrachloride	0,36	0,31	0,36
Chloroform (Trichloromethane)	0,046 J	0,070 J	0,062 J
cis-1,2-Dichloroethene	0,018 J	0,040 U	0,043 U
Ethylbenzene	0,060 J	0,37	0,086 J
Hexachlorobutadiene	0,026 J	0,040 U	0,043 U
m&p-Xylenes	0,20	1,5	0,30
Methylene chloride	0,73 UJ	0,034 J	0,17 U
Naphthalene	0,077 J	0,32	0,21
o-Xylene	0,066 J	0,51	0,11 J
Styrene	0,73 U	0,79 U	0,10 J
Tetrachloroethene	19	25	23
Toluene	0,39 J	0,40	0,24
Trichloroethene	4,5	0,40	0,30

Indoor Air-2P	3/18/2014
	-
1,1,1-Trichloroethane	0.034
1,2,4-Trimethylbenzene	0,97 J
1,4-Dichlorobenzene	0.030 J
Benzene	0,92
Ethylbenzene	2,6 J
m&p-Xylenes	7,8 J
o-Xylene	2,6 J
Styrene	0.23 J
Tetrachloroethene	21 J
Toluene	8,5 J
Trichloroethene	2.2(c)

Indoor Air-2	4/22/2013	7/1/2013	3/18/2014
	-	-	-
1,1,1-Trichloroethane	0.10	0,068	0,058
1,2,4-Trimethylbenzene	1.3	5,3	2,3
1,3,5-Trimethylbenzene	0.48 J	-	0,76
1,4-Dichlorobenzene	0,022 J	0,086	0.030 J
Benzene	1.5	1,7	1.1
Carbon tetrachloride	0.47	-	0,45
Chloroform (Trichloromethane)	0.099 J	-	0,22
cis-1,2-Dichloroethene	0.040 U	-	0,14
Ethylbenzene	2.7	6,8	3,1
m&p-Xylenes	9.5	25	11
Methylene chloride	1.3 UJ	-	0,81
Naphthalene	0.067 J	-	0,48
o-Xylene	3.0	8,7	3,6
Styrene	0.26 J	1,1	0,26
Tetrachloroethene	0.95	1,4	55(c)
Toluene	22	29 J	11
trans-1,2-Dichloroethene	0.040 U	-	0,034 J
Trichloroethene	13(a,b,c)	1.9	8,3(b,c)
Vinyl chloride	0.040 U	-	0,16

Indoor Air-40B	3/18/2014
	-
1,1,1-Trichloroethane	0,031 J
1,2,4-Trimethylbenzene	1.5
1,3,5-Trimethylbenzene	0,51
1,4-Dichlorobenzene	0.031 J
Benzene	0,88
Carbon tetrachloride	0,40
Chloroform (Trichloromethane)	0,11 J
cis-1,2-Dichloroethene	0,10
Ethylbenzene	6,5
m&p-Xylenes	26
Methylene chloride	0,77
Naphthalene	0,31
o-Xylene	7,7
Styrene	0,50
Tetrachloroethene	25
Toluene	9,2
trans-1,2-Dichloroethene	0,021 J
Trichloroethene	0,78
Vinyl chloride	0,12

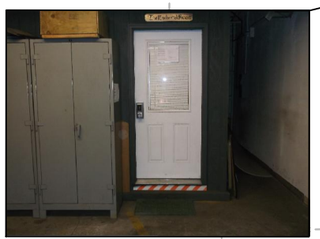
Sub-Slab Probe-32	3/17/2014
	-
1,1,1-Trichloroethane	1,3
Benzene	0.11 J
Carbon tetrachloride	0.21 J
Chloroform (Trichloromethane)	0.095 J
m&p-Xylenes	0.16 J
Naphthalene	0.21 J
Tetrachloroethene	2000(e)
Trichloroethene	2,4

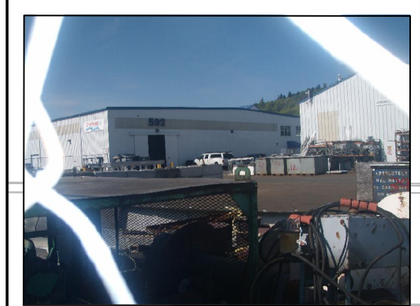
Indoor Air-32	3/18/2014
	-
1,1,1-Trichloroethane	0,024 J
1,2,4-Trimethylbenzene	0,93
1,3,5-Trimethylbenzene	0.32
1,4-Dichlorobenzene	0,028 J
Benzene	0,76
Carbon tetrachloride	0,40
Chloroform (Trichloromethane)	0,082 J
cis-1,2-Dichloroethene	0,17
Ethylbenzene	5,2
m&p-Xylenes	22
Methylene chloride	0,53
Naphthalene	0,28
o-Xylene	6,3
Styrene	0,99
Tetrachloroethene	17
Toluene	4.6
trans-1,2-Dichloroethene	0,018 J
Trichloroethene	0,38
Vinyl chloride	0,16

Sub-Slab Probe-1	4/21/2013	6/29/2013	3/17/2014
	-	-	-
1,1,1-Trichloroethane	21	20	16
1,1-Dichloroethene	0.31	0.33	0.17
1,2,4-Trimethylbenzene	0.76 U	0,38 J	0.081 J
1,3,5-Trimethylbenzene	0.76 U	0,76 U	0,025 J
1,4-Dichlorobenzene	0.038 U	0,13	0,029 J
Benzene	0.20	0,33	0.16
Carbon tetrachloride	0.25	0,29	0,25
Chloroform (Trichloromethane)	0.52	0,43	0,39
cis-1,2-Dichloroethene	0.038 U	0,018 J	0,037 U
Ethylbenzene	0.11 J	0.22	0.11 J
m&p-Xylenes	0.38	0,91	0.34
Methylene chloride	0.76 UJ	0,082 J	0.15 U
Naphthalene	0,031 J	0,43	0.17
o-Xylene	0.12 J	0,45	0.11 J
Styrene	0.76 U	0,32 J	0.14 J
Tetrachloroethene	18	24	18
Toluene	0,62 J	0,69	0.37
Trichloroethene	0.48	0,13	0,064

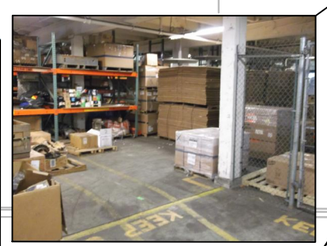
Indoor Air-25	7/1/2013	3/18/2014
	-	-
1,1,1-Trichloroethane	0.050 U	0,058
1,2,4-Trimethylbenzene	4.2	0.90
1,3,5-Trimethylbenzene	-	0.31
1,4-Dichlorobenzene	0.070	0.026 J
Benzene	0.65	0.83
Carbon tetrachloride	-	0.47
Chloroform (Trichloromethane)	-	0.11 J
cis-1,2-Dichloroethene	-	0.21
Ethylbenzene	4.8	1.7
m&p-Xylenes	18	6.0
Methylene chloride	-	2.2
Naphthalene	-	0.76(b)
o-Xylene	6.7	2.0
Styrene	1.0	0.37
Tetrachloroethene	1.9	55(c)
Toluene	29 J	6.6
trans-1,2-Dichloroethene	-	0.029 J
Trichloroethene	1.3	1.8
Vinyl chloride	-	0.25

Indoor Air-1	4/22/2013	7/1/2013	3/18/2014
	-	-	-
1,1,1-Trichloroethane	0.11/0.11	0.053	0.070/0.072
1,1-Dichloroethene	0.0070 J/0.0052 J	-	0.040 U/0.039 U
1,2,4-Trimethylbenzene	2.0/2.1	3.3	1.6/1.4
1,3,5-Trimethylbenzene	0.56 J/0.59 J	-	0.54 J/0.40 J
1,4-Dichlorobenzene	0.055/0.053	0.045 U	0.093/0.093
Benzene	1.0/0.99	1.6	0.85/0.82
Carbon tetrachloride	0.46/0.47	-	0.33 J/0.46 J
Chloroform (Trichloromethane)	0.10 J/0.10 J	-	0.11 J/0.11 J
cis-1,2-Dichloroethene	0.038 U/0.036 U	-	0.15/0.18
Ethylbenzene	2.5/2.4	4.5	2.4/2.2
m&p-Xylenes	9.2/9.0	16	8.5/7.5
Methylene chloride	1.6 J/1.6 J	-	0.78/0.71
Naphthalene	0.41/0.53	-	0.39 J/0.53 J
o-Xylene	3.0/2.7	5.5	2.7/2.4
Styrene	0.34 J/0.36 J	1.2	0.35/0.28
Tetrachloroethene	1.1/1.1	1.1	26/23
Toluene	16/15	21 J	7.8/7.6
trans-1,2-Dichloroethene	0.038 U/0.036 U	-	0.027 J/0.026 J
Trichloroethene	7.3(b,c)/6.6(b,c)	1.5	3.7(c)/3.4(c)
Vinyl chloride	0.038 U/0.036 U	-	0.18/0.17





EXTERIOR VIEW - SOUTHWEST SIDE



Sub-Slab Probe-24	3/17/2014
	-
1,1,1-Trichloroethane	3.8
1,1-Dichloroethene	0.041
1,2,4-Trimethylbenzene	0.035 J
1,4-Dichlorobenzene	0.013 J
Benzene	0,10 J
Carbon tetrachloride	2.2
Chloroform (Trichloromethane)	0.12 J
Ethylbenzene	0.034 J
m&p-Xylenes	0.13 J
Naphthalene	0.080 J
o-Xylene	0.047 J
Styrene	0.034 J
Tetrachloroethene	6,9
Trichloroethene	0,054

Indoor Air-24	7/1/2013	3/18/2014
	-	-
1,1,1-Trichloroethane	0.050 U	0,035
1,2,4-Trichlorobenzene	-	0,015 J
1,2,4-Trimethylbenzene	4.8	1,2
1,3,5-Trimethylbenzene	-	0,39
1,4-Dichlorobenzene	0.074	0,028 J
Benzene	0.67	0.87
Carbon tetrachloride	-	0,42
Chloroform (Trichloromethane)	-	0,13 J
cis-1,2-Dichloroethene	-	0,16
Ethylbenzene	5,0	2,3
m&p-Xylenes	19	8,1
Methylene chloride	-	0,77
Naphthalene	-	0.31
o-Xylene	6,9	2,5
Styrene	1,0	0,28
Tetrachloroethene	1,1	27
Toluene	10	6,6
trans-1,2-Dichloroethene	-	0,043
Trichloroethene	1,2	0.56
Vinyl chloride	-	0.20

Outside Air-1P	3/18/2014
	-
1,2,4-Trimethylbenzene	0.30
1,4-Dichlorobenzene	0,038
Benzene	0,42
Ethylbenzene	1,4
m&p-Xylenes	5,5
o-Xylene	1,7
Styrene	0.17
Tetrachloroethene	0,26
Toluene	2,1
Trichloroethene	0,050

Outside Air-1	4/22/2013	3/18/2014
	-	-
1,1,1-Trichloroethane	0.026 J	0.021 J
1,1,2-Trichloroethane	0.0084 J	0.16 U
1,2,4-Trimethylbenzene	0.28 J	0.29
1,3,5-Trimethylbenzene	0.71 U	0.085 J
1,4-Dichlorobenzene	0,027 J	0,014 J
Benzene	0.46	0.65
Carbon tetrachloride	0.50	0.46
Chloroform (Trichloromethane)	0.077 J	0.080 J
cis-1,2-Dichloroethene	0.021 J	0.21
Ethylbenzene	0.25 J	0.49
m&p-Xylenes	0,87	1.8
Methylene chloride	0.71 UJ	0.44
Naphthalene	0.11 J	0.081 J
o-Xylene	0.31 J	0.59
Styrene	0.71 U	0.092 J
Tetrachloroethene	0.13 J	0.41
Toluene	1.5	1.7
trans-1,2-Dichloroethene	0.035 U	0.019 J
Trichloroethene	0.38	0.25
Vinyl chloride	0.035 U	0.29

Indoor Air-33	3/18/2014
	-
1,1,1-Trichloroethane	0,030 J
1,1,2,2-Tetrachloroethane	0.041
1,2,4-Trimethylbenzene	1.1
1,3,5-Trimethylbenzene	0.38
1,4-Dichlorobenzene	0.020 J
Benzene	0.83
Carbon tetrachloride	0.44
Chloroform (Trichloromethane)	0.093 J
cis-1,2-Dichloroethene	0.17
Ethylbenzene	1,9
m&p-Xylenes	6,4
Methylene chloride	0.81
Naphthalene	0.39
o-Xylene	2,0
Styrene	0.24
Tetrachloroethene	23
Toluene	7.7
trans-1,2-Dichloroethene	0,028 J
Trichloroethene	0.88
Vinyl chloride	0.20

Indoor Air-34	3/18/2014
	-
1,1,1-Trichloroethane	0.045
1,2,4-Trimethylbenzene	1.3
1,3,5-Trimethylbenzene	0.42
1,4-Dichlorobenzene	0.020 J
Benzene	1.1
Carbon tetrachloride	0.43
Chloroform (Trichloromethane)	0.11 J
cis-1,2-Dichloroethene	0.21
Ethylbenzene	1.8
m&p-Xylenes	6.7
Methylene chloride	1.0
Naphthalene	0.24
o-Xylene	2.2
Styrene	0.22
Tetrachloroethene	38
Toluene	6.6
trans-1,2-Dichloroethene	0,031 J
Trichloroethene	0.85
Vinyl chloride	0.27

TRUE NORTH
PLANT NORTH
0 15 30ft

LEGEND
- BUILDING OUTLINE
- ▲ VAPOR INVESTIGATION SAMPLING LOCATION
- SAMPLE LOCATION
- Sub-Slab Probe-1 / 4/21/2013 / 21 / 1,1,1-Trichloroethane / 1,1-Dichloroethene / 0.31 — SAMPLE DATE, RESULT (ug/m³), PARAMETER
- (a) EXCEEDS SCREENING LEVEL(S) IDENTIFIED IN PARENTHESIS

SCREENING LEVELS (µg/m³) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane			5000	-	170000
1,1,2,2-Tetrachloroethane		0.43		14	-
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-	-	-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-	-	-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1		38	
m,p-Xylenes		-	100	-	3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

OCCIDENTAL CHEMICAL CORPORATION
TACOMA, WASHINGTON

VAPOR INVESTIGATION

DETECTED PARAMETERS
BUILDING 592

GHD

Source Reference:

Project Manager:	Reviewed By:	Date: JULY 2015	
Scale: 1:30	Project Nº: 07843-M9	Report Nº: 129	Drawing Nº: figure 6

07843-M9(129)GN-WA025 FEB 17, 2016

Sub-Slab Probe-26	3/12/2014
	-
1,1,1-Trichloroethane	1.5
1,1-Dichloroethene	0.50
1,2,4-Trimethylbenzene	0.18 J
Benzene	0.48 J
Carbon tetrachloride	0.12 J
Chloroform (Trichloromethane)	1.1 J
cis-1,2-Dichloroethene	0.37
Ethylbenzene	0.22 J
m&p-Xylenes	0.57 J
Naphthalene	0.12 J
o-Xylene	0.20 J
Tetrachloroethene	2900(e)
Toluene	2.5
trans-1,2-Dichloroethene	0.14 J
Trichloroethene	940(d,e)

Sub-Slab Probe-4	4/20/2013	6/28/2013	3/12/2014
	-	-	-
1,1,1-Trichloroethane	8.0	9.8	6.2
Benzene	3.7 U	6.9 J	1.2 J
Carbon tetrachloride	0.15 J	0.50 U	0.86 U
Chloroform (Trichloromethane)	2.2 J	3.2 J	1.8 J
cis-1,2-Dichloroethene	0.97 J	1.7 U	0.71 J
Tetrachloroethene	3800(d,e)	7400(d,e)	3000(e)
Toluene	4.9 U	2.6 J	0.59 J
trans-1,2-Dichloroethene	1.2 U	1.9 U	0.23 J
Trichloroethene	1600(d,e)	2500(d,e)	1400(d,e)

Indoor Air-4	4/21/2013	7/1/2013	3/13/2014
	-	-	-
1,1,1-Trichloroethane	0.024 J	0.050 UJ	0.023 J
1,2,4-Trimethylbenzene	1.0	0.72 J	0.83
1,3,5-Trimethylbenzene	0.28 J	-	0.24
1,4-Dichlorobenzene	0.022 J	0.052 J	0.034
Benzene	0.82	0.55 J	1.0
Carbon tetrachloride	0.44	-	0.42
Chloroform (Trichloromethane)	0.083 J	-	0.10 J
cis-1,2-Dichloroethene	0.023 J	-	0.042
Ethylbenzene	0.92	1.6 J	1.1
m&p-Xylenes	3.3	5.6 J	4.0
Methylene chloride	0.26	-	2.1
Naphthalene	0.23	-	0.41
o-Xylene	1.2	2.2 J	1.4
Styrene	0.35 J	1.7 J	0.38
Tetrachloroethene	0.34	0.64 J	0.57
Toluene	3.8	3.5 J	6.3
Trichloroethene	0.089	0.27 J	0.18
Vinyl chloride	0.0040 J	-	0.017 J

Indoor Air-26	7/1/2013	3/13/2014
	-	-
1,1,1-Trichloroethane	0.050 U	0.026 J
1,2,4-Trimethylbenzene	0.73	1.2
1,3,5-Trimethylbenzene	-	0.41
1,4-Dichlorobenzene	0.052	0.12
Benzene	0.55	1.3
Carbon tetrachloride	-	0.46
Chloroform (Trichloromethane)	-	0.12 J
cis-1,2-Dichloroethene	-	0.054
Ethylbenzene	1.5	1.5
m&p-Xylenes	5.1	5.5
Methylene chloride	-	0.51
Naphthalene	-	0.19
o-Xylene	2.0	1.8
Styrene	1.8	0.65
Tetrachloroethene	0.55	0.65
Toluene	16 J	6.3
Trichloroethene	0.30	0.21
Vinyl chloride	-	0.021 J

Outside Air-4	4/21/2013	7/1/2013	3/13/2014
	-	-	-
1,1,1-Trichloroethane	0.023 J	0.050 U	0.028 J
1,2,4-Trimethylbenzene	0.75 U	0.47	0.43
1,3,5-Trimethylbenzene	0.75 U	-	0.13 J
1,4-Dichlorobenzene	0.018 J	0.045 U	1.2
Benzene	0.23	0.70	1.2
Carbon tetrachloride	0.49	-	0.36
Chloroform (Trichloromethane)	0.070 J	-	0.094 J
cis-1,2-Dichloroethene	0.037 U	-	0.057
Ethylbenzene	0.20	1.5	0.91
Hexachlorobutadiene	0.037 U	-	0.020 J
m&p-Xylenes	0.58 J	6.1	3.1
Methylene chloride	0.75 UJ	-	0.56
Naphthalene	0.032 J	-	0.19
o-Xylene	0.18	0.86	0.90
Styrene	0.75 U	0.61	0.33
Tetrachloroethene	0.19	1.0	2.0
Toluene	0.60 J	2.0	2.9
trans-1,2-Dichloroethene	0.037 U	-	0.0097 J
Trichloroethene	0.038	0.24	0.30
Vinyl chloride	0.037 U	-	0.024 J

Indoor Air-5P	3/18/2014
	-
1,1,1-Trichloroethane	0.015
1,2,4-Trimethylbenzene	0.50 J
1,4-Dichlorobenzene	0.036 J
Benzene	0.71
Ethylbenzene	2.4 J
m&p-Xylenes	8.3 J
o-Xylene	2.5 J
Styrene	0.39 J
Tetrachloroethene	1.5 J
Toluene	4.6 J
Trichloroethene	0.27

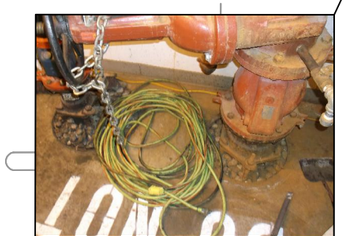
Indoor Air-5	4/21/2013	7/1/2013	3/13/2014
	-	-	-
1,1,1-Trichloroethane	0.028 J	0.050 U	0.026 J
1,1,2-Trichloroethane	0.0051 J	-	0.15 U
1,2,4-Trimethylbenzene	1.2	1.8	0.96
1,3,5-Trimethylbenzene	0.33 J	-	0.28
1,4-Dichlorobenzene	0.037 U	0.062	0.031 J
Benzene	0.75	0.56	1.2
Carbon tetrachloride	0.47	-	0.47
Chloroform (Trichloromethane)	0.078 J	-	0.11 J
cis-1,2-Dichloroethene	0.037 U	-	0.056
Ethylbenzene	0.92	2.1	1.5
m&p-Xylenes	3.1	7.0	4.9
Methylene chloride	0.74 UJ	-	0.57
Naphthalene	0.20	-	0.11 J
o-Xylene	1.1	2.7	1.7
Styrene	0.28 J	1.8	0.43
Tetrachloroethene	1.4	1.0	1.1
Toluene	3.5	5.2	6.6
trans-1,2-Dichloroethene	0.037 U	-	0.0093 J
Trichloroethene	0.24	0.40	0.24
Vinyl chloride	0.037 U	-	0.026 J

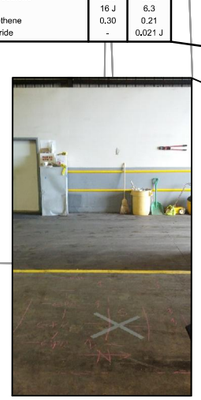
Sub-Slab Probe-5	4/20/2013	6/28/2013	3/12/2014
	-	-	-
1,1,1-Trichloroethane	1.8	2.2 J	1.9
Benzene	3.9 U	5.1 J	1.3
Carbon tetrachloride	1.3 U	0.46 U	1.4
Chloroform (Trichloromethane)	1.4 J	1.9 J	5.4
cis-1,2-Dichloroethene	0.51 J	1.6 U	2.1
m&p-Xylenes	5.1 U	1.5 U	0.38 J
Naphthalene	5.1 U	2.9 U	0.17 J
o-Xylene	5.1 U	0.70 U	0.30 J
Tetrachloroethene	3600(d,e)	5400(d,e)	1400(e)
Toluene	5.1 U	2.5 J	0.86 J
trans-1,2-Dichloroethene	1.3 U	1.7 U	1.2
Trichloroethene	1500(d,e)	1800(d,e)	940(d,e)

Indoor Air-36	3/13/2014
	-
1,1,1-Trichloroethane	0.026 J
1,2,4-Trimethylbenzene	1.0
1,3,5-Trimethylbenzene	0.32
1,4-Dichlorobenzene	0.038
Benzene	1.0
Carbon tetrachloride	0.47
Chloroform (Trichloromethane)	0.11 J
cis-1,2-Dichloroethene	0.055
Ethylbenzene	1.5
m&p-Xylenes	5.2
Methylene chloride	0.46
Naphthalene	0.19
o-Xylene	1.7
Styrene	0.62
Tetrachloroethene	2.6
Toluene	6.3
trans-1,2-Dichloroethene	0.0090 J
Trichloroethene	0.52
Vinyl chloride	0.024 J

Outside Air-5P	3/18/2014
	-
1,1,1-Trichloroethane	0.013
1,2,4-Trimethylbenzene	0.11
1,4-Dichlorobenzene	0.014
Benzene	0.77
Ethylbenzene	1.5
m&p-Xylenes	5.2
o-Xylene	1.4
Styrene	0.14
Tetrachloroethene	0.29
Toluene	1.8
Trichloroethene	0.24

EXTERIOR VIEW - WEST SIDE





PIER 25

BLDG 595

TYSON SEAFOOD
WAREHOUSE
(FORKLIFT OPERATIONS)

MECHANICAL ROOM

OFFICE

IA-4
SS-4

IA-26
SS-26

SS-5

IA-36

IA-5
IA-5P

OA-4

OA-5P

WIND (4/20/13)
(3/12/14)

WIND (3/11/14)

TRUE NORTH

PLANT NORTH

0 15 30ft

LEGEND

BUILDING OUTLINE

▲ VAPOR INVESTIGATION SAMPLING LOCATION

SAMPLE LOCATION

Sub-Slab Probe-5	4/20/2013
Tetrachloroethene	3600
Trichloroethene	1500

SAMPLE DATE

RESULT (ug/m³)

PARAMETER

(a) EXCEEDS SCREENING LEVEL(S) IDENTIFIED IN PARENTHESIS

SCREENING LEVELS (µg/m³) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane			5000	-	170000
1,1,2,2-Tetrachloroethane		0.43		14	-
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-	-	-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-	-	-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1		38	-
m,p-Xylenes		-	100	-	3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

OCCIDENTAL CHEMICAL CORPORATION
TACOMA, WASHINGTON

VAPOR INVESTIGATION

DETECTED PARAMETERS
BUILDING 595

GHD

Source Reference:

Project Manager:	Reviewed By:	Date: JULY 2015	
Scale: 1:30	Project №: 07843-M9	Report №: 129	Drawing №: figure 7

07843-M9(129)GN-WA026 FEB 17, 2016

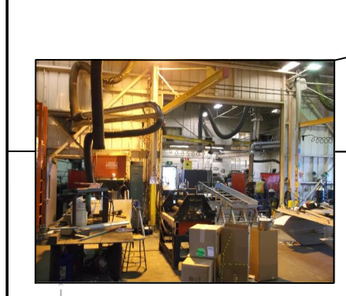
290' ▲ OA-1B
COLLECTED ADJACENT TO BUILDING 592
CONCURRENT WITH BUILDING 596 SAMPLING

Indoor Air-3	4/22/2013	7/1/2013	3/15/2014
	-	-	-
1,1,1-Trichloroethane	0,34	0.34	0.65
1,2,4-Trimethylbenzene	1,0	2.2	1.2
1,3,5-Trimethylbenzene	0.30 J	-	0.37
1,4-Dichlorobenzene	0,18	1.1	0.34
Benzene	0,85	1.3	1.4
Carbon tetrachloride	0.48	-	0.47
Chloroform (Trichloromethane)	0,27	-	0.13 J
cis-1,2-Dichloroethene	0,032 J	-	0.051
Ethylbenzene	2,6	8.4	4.8
m&p-Xylenes	9,8	32 J	18
Methylene chloride	5.5 J	-	11
Naphthalene	0,37	-	0.70
o-Xylene	3.3	12	5.6
Styrene	0,29 J	1.8	0.55
Tetrachloroethene	2,9	3.0	1.2
Toluene	11	20 J	9.5
trans-1,2-Dichloroethene	0.025 J	-	0.053
Trichloroethene	6,6(b,c)	2.9(c)	2.8(c)
Vinyl chloride	0,0044 J	-	0.021 J

Indoor Air-21P	3/21/2014
1,1,1-Trichloroethane	1,0 J
1,2,4-Trimethylbenzene	1,1 J
1,4-Dichlorobenzene	1,4 J
Benzene	0,93 J
Ethylbenzene	5,4 J
m&p-Xylenes	13 J
o-Xylene	7,1 J
Styrene	0,40 J
Tetrachloroethene	2,1 J
Toluene	8,3 J
Trichloroethene	4.8 J(c)

Indoor Air-21	4/22/2013	7/1/2013	3/15/2014
	-	-	-
1,1,1-Trichloroethane	2.8	0.65	0.79
1,1-Dichloroethene	0.017 J	-	0,010 J
1,2,4-Trimethylbenzene	1.9	4.4	1,2
1,3,5-Trimethylbenzene	0.52 J	-	0.35
1,4-Dichlorobenzene	2.7(b)	6.5(b)	0.73
Benzene	1,1	0.82	1,3
Carbon tetrachloride	0.48	-	0,46
Chloroform (Trichloromethane)	0,088 J	-	0,085 J
cis-1,2-Dichloroethene	0.035 J	-	0,046
Ethylbenzene	2.2	9.9	4,9
m&p-Xylenes	8.5	37 J	19
Methylene chloride	75 J	-	26
Naphthalene	0,46	-	0.71
o-Xylene	2.5	13	5,4
Styrene	0.46 J	2.2	0,48
Tetrachloroethene	12	13	2,6
Toluene	25	37 J	13
trans-1,2-Dichloroethene	0.14 J	-	0,13
Trichloroethene	19(a,b,c)	15 J(a,b,c)	7,1(b,c)
Vinyl chloride	0,0048 J	-	0,018 J

Sub-Slab Probe-3	4/21/2013	6/27/2013	3/14/2014
-	-	-	-
1,1,1-Trichloroethane	0,70	0.74	0.45
1,1,2-Trichloroethane	0,0060 J	0.15 U	0.16 U
1,1-Dichloroethene	0,039 U	0.015 J	0.039 U
1,2,4-Trimethylbenzene	0,78 U	0.76 U	0.069 J
1,3,5-Trimethylbenzene	0,78 U	0.76 U	0.023 J
1,4-Dichlorobenzene	0,027 J	0.046	0.032 J
Benzene	0,18	0,54	0.12 U
Carbon tetrachloride	0,32	0,31	0.29
Chloroform (Trichloromethane)	0,041 J	0.079 J	0.046 J
cis-1,2-Dichloroethene	0,039 U	0.038 U	0.028 J
Ethylbenzene	0,081 J	0.53	0.037 J
Hexachlorobutadiene	0,097	0.038 U	0.039 U
m&p-Xylenes	0,31	1.8	0.15 J
Methylene chloride	0.78 UJ	0.59	0.16 U
Naphthalene	0,079 J	0,32	0.16
o-Xylene	0,12 J	0.70	0.054 J
Styrene	0,78 U	0.55 J	0.073 J
Tetrachloroethene	26	35	28
Toluene	0,34 J	2.5	0.098 J
Trichloroethene	0,26	0,15	0,077



120' ▲ OA-1
COLLECTED ADJACENT TO BUILDING 592
CONCURRENT WITH BUILDING 596 SAMPLING

EXTERIOR VIEW - WEST SIDE

Outside Air-1	4/22/2013	3/18/2014
-	-	-
1,1,1-Trichloroethane	0,026 J	0.021 J
1,1,2-Trichloroethane	0,0084 J	0.16 U
1,2,4-Trimethylbenzene	0,28 J	0.29
1,3,5-Trimethylbenzene	0,71 U	0.085 J
1,4-Dichlorobenzene	0,027 J	0.014 J
Benzene	0,46	0,65
Carbon tetrachloride	0,50	0,46
Chloroform (Trichloromethane)	0,077 J	0.080 J
cis-1,2-Dichloroethene	0,021 J	0.21
Ethylbenzene	0,25 J	0.49
m&p-Xylenes	0,87	1.8
Methylene chloride	0,71 UJ	0.44
Naphthalene	0,11 J	0.081 J
o-Xylene	0,31 J	0.59
Styrene	0,71 U	0.092 J
Tetrachloroethene	0,13 J	0.41
Toluene	1.5	1.7
trans-1,2-Dichloroethene	0,035 U	0.019 J
Trichloroethene	0,38	0,25
Vinyl chloride	0,035 U	0,29

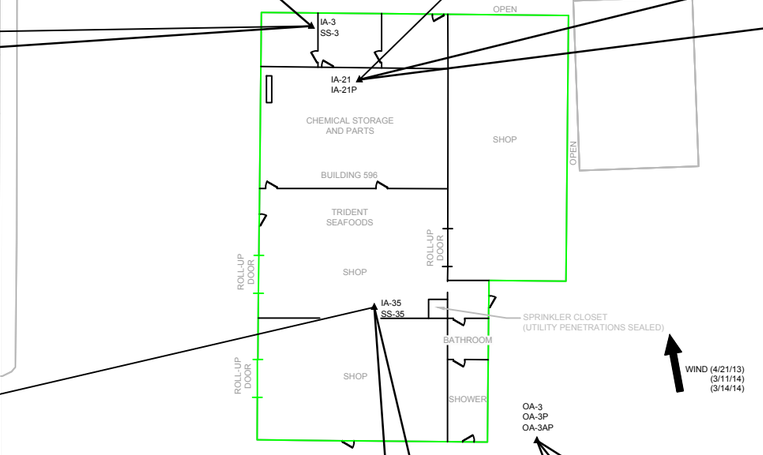
Sub-Slab Probe-35	3/14/2014
-	-
1,1,1-Trichloroethane	3,3
1,1-Dichloroethene	0.036
1,2,4-Trimethylbenzene	0,043 J
1,4-Dichlorobenzene	0,024 J
Carbon tetrachloride	0,25
Chloroform (Trichloromethane)	2,6
Ethylbenzene	0,073 J
m&p-Xylenes	0,26
Methylene chloride	0,18
Naphthalene	0,077 J
o-Xylene	0,084 J
Styrene	0,14
Tetrachloroethene	69
Toluene	0,52
Trichloroethene	0,13

Indoor Air-35	3/15/2014
-	-
1,1,1-Trichloroethane	0,097
1,2,4-Trimethylbenzene	0,47
1,3,5-Trimethylbenzene	0.13 J
1,4-Dichlorobenzene	0,052
Benzene	0,81
Carbon tetrachloride	0,46
Chloroform (Trichloromethane)	0,083 J
cis-1,2-Dichloroethene	0,042
Ethylbenzene	5.5
m&p-Xylenes	21
Methylene chloride	2,6
Naphthalene	0,24
o-Xylene	6,1
Styrene	0.17
Tetrachloroethene	0.55
Toluene	3,4
trans-1,2-Dichloroethene	0,029 J
Trichloroethene	1.5
Vinyl chloride	0,019 J

Outside Air-3P	3/18/2014
-	-
1,1,1-Trichloroethane	0.020
1,2,4-Trimethylbenzene	0,17
1,4-Dichlorobenzene	0,026
Benzene	0,72
Ethylbenzene	1,4
m&p-Xylenes	5,1
o-Xylene	1,6
Styrene	0.19
Tetrachloroethene	0.21
Toluene	1,9
Trichloroethene	0.11

Outside Air-3AP	3/21/2014
-	-
1,1,1-Trichloroethane	0,026
1,2,4-Trimethylbenzene	0.15
1,4-Dichlorobenzene	0,044
Benzene	0.59
Ethylbenzene	1.8
m&p-Xylenes	6.5
o-Xylene	2.0
Styrene	0.23
Tetrachloroethene	0.22
Toluene	1,3
Trichloroethene	0.10

Outside Air-3	3/15/2014
-	-
1,1,1-Trichloroethane	0,021 J
1,2,4-Trimethylbenzene	0,32
1,3,5-Trimethylbenzene	0,10 J
1,4-Dichlorobenzene	0,026 J
Benzene	0,67
Carbon tetrachloride	0,43
Chloroform (Trichloromethane)	0,086 J
cis-1,2-Dichloroethene	0,055
Ethylbenzene	4,2
m&p-Xylenes	17
Methylene chloride	0,39
Naphthalene	0,15 J
o-Xylene	4,9
Styrene	0,23
Tetrachloroethene	0,18
Toluene	2,0
Trichloroethene	0,20
Vinyl chloride	0,025 J



TRUE NORTH
PLANT NORTH
0 10 20ft

LEGEND
- BUILDING OUTLINE
- ▲ VAPOR INVESTIGATION SAMPLING LOCATION
- SAMPLE LOCATION

Sub-Slab Probe-3	4/21/2013
1,1,1-Trichloroethane	0.70
Benzene	0.18

- SAMPLE DATE
- RESULT (ug/m³)
- PARAMETER
- (a) EXCEEDS SCREENING LEVEL(S) IDENTIFIED IN PARENTHESIS

SCREENING LEVELS (µg/m³) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane		-	5000	-	170000
1,1,2,2-Tetrachloroethane		0.43	-	14	-
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-	-	-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-	-	-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1	-	38	-
m,p-Xylenes		-	100	-	3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

OCCIDENTAL CHEMICAL CORPORATION TACOMA, WASHINGTON

VAPOR INVESTIGATION

DETECTED PARAMETERS BUILDING 596

GHD

Source Reference:			
Project Manager:	Reviewed By:	Date: JULY 2015	
Scale: 1:20	Project No.: 07843-M9	Report No.: 129	Drawing No.: figure 8

07843-M9(129)GN-WA027 FEB 17, 2016

Outside Air-14	4/24/2013
1,1,1-Trichloroethane	0.031 J
1,2,4-Trimethylbenzene	0.74 J
1,4-Dichlorobenzene	0.023 J
Benzene	0.75
Carbon tetrachloride	0.43
Chloroform (Trichloromethane)	0.099 J
Ethylbenzene	0.54 J
m&p-Xylenes	1.6
Naphthalene	0.12 J
o-Xylene	0.59 J
Tetrachloroethene	0.14
Toluene	2.3
Trichloroethene	0.029 J

TRUE NORTH

PLANT NORTH

0 5 10 ft

WIND (4/23)

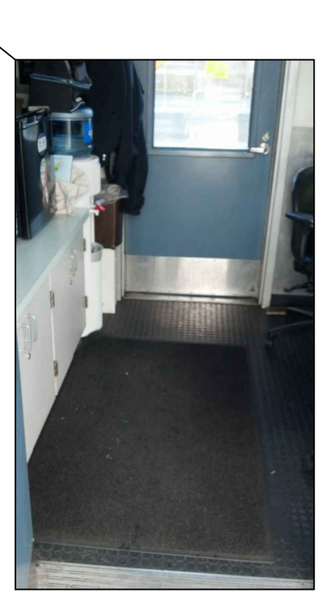
OA-14

Indoor Air-14	4/24/2013
1,1,1-Trichloroethane	0.029 J
1,2,4-Trimethylbenzene	0.80
1,3,5-Trimethylbenzene	0.26 J
1,4-Dichlorobenzene	0.062
Benzene	0.79
Carbon tetrachloride	0.47
Chloroform (Trichloromethane)	0.11 J
Ethylbenzene	0.58 J
m&p-Xylenes	1.7
Naphthalene	0.20
o-Xylene	0.63 J
Styrene	0.23 J
Tetrachloroethene	0.12 J
Toluene	2.2
Trichloroethene	0.025 J

IA-14

GUARD SHACK

TOTE



SCREENING LEVELS (µg/m³) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane		-	5000	-	170000
1,1,2,2-Tetrachloroethane		0.43		14	-
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-	-	-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-	-	-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1		38	-
m,p-Xylenes		-	100		3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

LEGEND

BUILDING OUTLINE

▲ VAPOR INVESTIGATION SAMPLING LOCATION

Indoor Air-14	4/24/2013
1,2,4-Trimethylbenzene	0.80
1,3,5-Trimethylbenzene	0.26 J

SAMPLE LOCATION

SAMPLE DATE

RESULT (ug/m³)

PARAMETER

figure 9

DETECTED PARAMETERS - GUARD SHACK
VAPOR INVESTIGATION

Occidental Chemical Corporation, Tacoma, Washington

Indoor Air-15	4/18/2013
1,1,1-Trichloroethane	0.027 J
1,2,4-Trimethylbenzene	0.59 J
1,4-Dichlorobenzene	0.14
Benzene	0.96
Carbon tetrachloride	0.47
Chloroform (Trichloromethane)	0.24
cis-1,2-Dichloroethene	0.071
Ethylbenzene	0.59 J
Hexachlorobutadiene	0.046
m&p-Xylenes	1.7
Naphthalene	0.36
o-Xylene	0.57 J
Styrene	0.21 J
Tetrachloroethene	8.8
Toluene	3.3
Trichloroethene	5.0(c)

Sub-Slab Probe-15	4/17/2013
1,1,1-Trichloroethane	74
1,1,2,2-Tetrachloroethane	13
1,1,2-Trichloroethane	19 J(e)
1,1-Dichloroethene	5.6 J
Carbon tetrachloride	2.1 J
Chloroform (Trichloromethane)	42(d)
cis-1,2-Dichloroethene	97
Hexachlorobutadiene	29
Tetrachloroethene	30000(d,e)
trans-1,2-Dichloroethene	10
Trichloroethene	18000(d,e)

EXTERIOR VIEW - WEST SIDE

TRUE NORTH

PLANT NORTH

N

0 5 10 ft

OCC OFFICE BUILDING

IA-16
SS-16

Sub-Slab Probe-16	4/17/2013
1,1,1-Trichloroethane	62
1,1,2,2-Tetrachloroethane	4.7 J
1,1,2-Trichloroethane	3.2 J
1,1-Dichloroethene	1.5 J
Carbon tetrachloride	3.1 J
Chloroform (Trichloromethane)	28
cis-1,2-Dichloroethene	9.4
Ethylbenzene	5.2 J
Hexachlorobutadiene	28
m&p-Xylenes	3.8 J
o-Xylene	3.3 J
Tetrachloroethene	21000(d,e)
trans-1,2-Dichloroethene	10
Trichloroethene	6000(d,e)

SCREENING LEVELS (µg/m^3) (from Table 2)					
	Indoor Air	Updated MTCA Method C			
	Short-term	Indoor Air		Soil Gas (below slab)	
Volatile Organic Compounds (VOCs)	NC	C	NC	C	NC
	a	b	c	d	e
1,1,1-Trichloroethane		-	5000	-	170000
1,1,2,2-Tetrachloroethane		0.43		14	-
1,1,2-Trichloroethane		1.6	0.2	52	6.7
1,1-Dichloroethene		-	200	-	6700
1,2,4-Trichlorobenzene		-	2	-	67
1,2,4-Trimethylbenzene		-	7	-	230
1,3,5-Trimethylbenzene		-	-	-	-
1,4-Dichlorobenzene		2.3	800	76	27000
Benzene		3.2	30	110	1000
Carbon Tetrachloride		4.2	100	140	3300
Chloroform		1.1	98	36	3300
cis-1,2-Dichloroethene		-	-	-	-
Ethylbenzene		-	1000	-	33000
Hexachlorobutadiene		1.1		38	-
m,p-Xylenes		-	100		3300
Methylene Chloride		2500	600	83000	20000
Naphthalene		0.74	3	25	100
o-Xylene		-	100	-	3300
Styrene		-	1000	-	33000
Tetrachloroethene		96	40	3200	1300
Toluene		-	5000	-	170000
trans-1,2-Dichloroethene		-	-	-	-
Trichloroethene (TCE)	8.4	6.3	2	210	67
Vinyl Chloride		2.8	100	93	3300

IA-15
SS-15

WIND (4/17)

OA-15

Outside Air-15	4/18/2013
1,1,1-Trichloroethane	0.025 J
Benzene	0.34
Carbon tetrachloride	0.47
Chloroform (Trichloromethane)	0.071 J
cis-1,2-Dichloroethene	0.024 J
Ethylbenzene	0.13 J
m&p-Xylenes	0.44
Naphthalene	0.21
o-Xylene	0.17
Tetrachloroethene	0.27
Toluene	0.81
Trichloroethene	0.046

Indoor Air-16	4/18/2013
1,1,1-Trichloroethane	0.034 J
1,2,4-Trimethylbenzene	0.54 J
1,4-Dichlorobenzene	2.9(b)
Benzene	0.48
Carbon tetrachloride	0.45
Chloroform (Trichloromethane)	0.58
Ethylbenzene	0.23 J
Hexachlorobutadiene	0.021 J
m&p-Xylenes	0.88
Naphthalene	0.085 J
o-Xylene	0.37 J
Styrene	0.89
Tetrachloroethene	0.70
Toluene	1.1
Trichloroethene	0.24

LEGEND

BUILDING OUTLINE

▲ VAPOR INVESTIGATION SAMPLING LOCATION

SAMPLE LOCATION

SAMPLE DATE

RESULT (ug/m³)

PARAMETER

(a) EXCEEDS SCREENING LEVEL(S) IDENTIFIED IN PARENTHESIS

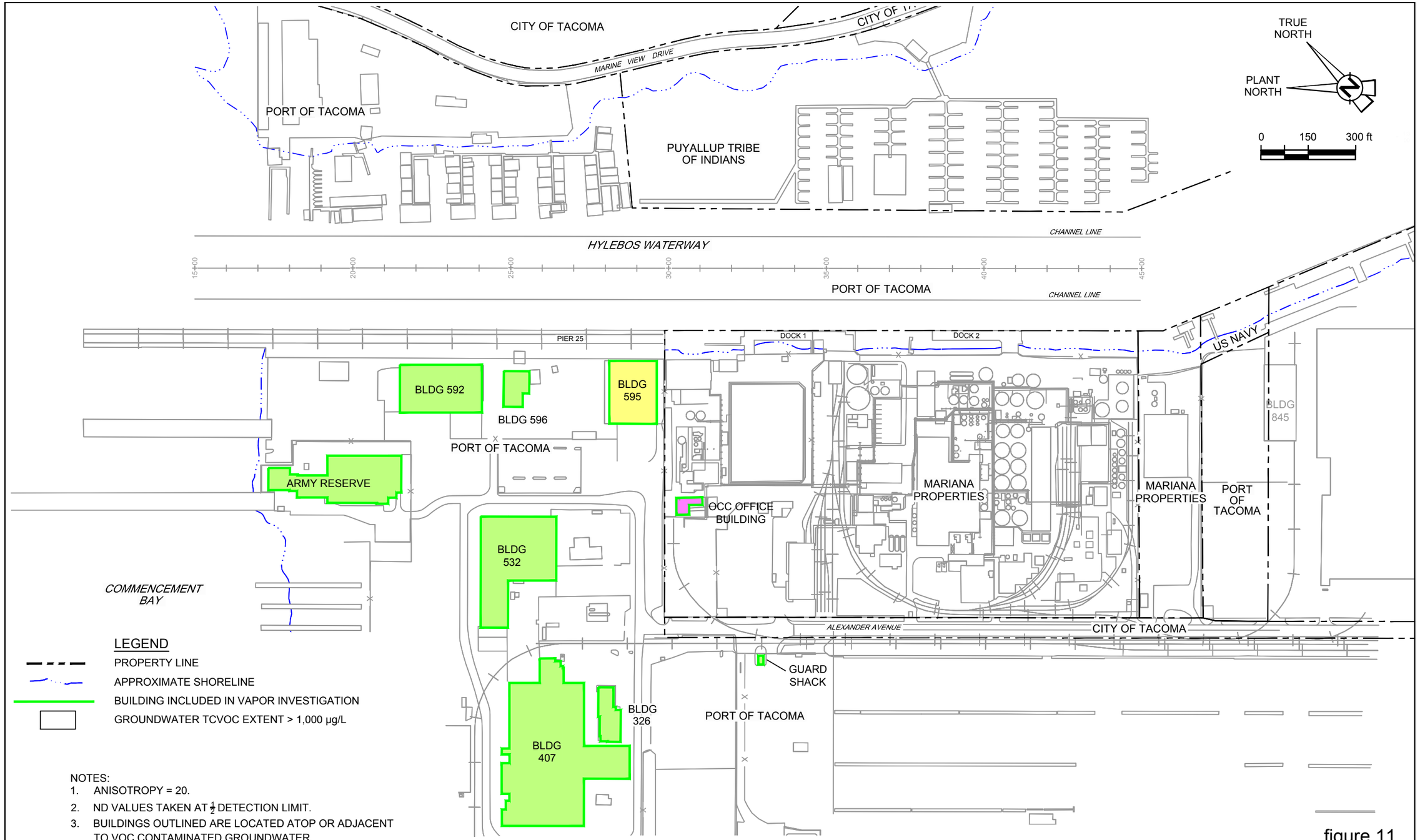
Outside Air-15	4/18/2013
Benzene	0.34
Carbon tetrachloride	0.47

GHD

figure 10

DETECTED PARAMETERS - OCC OFFICE BUILDING
VAPOR INVESTIGATION

Occidental Chemical Corporation, Tacoma, Washington



LEGEND

- PROPERTY LINE
- APPROXIMATE SHORELINE
- BUILDING INCLUDED IN VAPOR INVESTIGATION
- GROUNDWATER TCVOC EXTENT > 1,000 µg/L

NOTES:

1. ANISOTROPY = 20.
2. ND VALUES TAKEN AT ½ DETECTION LIMIT.
3. BUILDINGS OUTLINED ARE LOCATED ATOP OR ADJACENT TO VOC CONTAMINATED GROUNDWATER.

RECOMMENDATIONS FOR ADDITIONAL WORK

- MANAGE OCCUPANCY BY GSH
- CONTINUED MONITORING BY GSH
- NO FURTHER ACTION BY GSH

figure 11

RECOMMENDATIONS FOR FUTURE ACTIONS BY GSH VAPOR INVESTIGATION

Occidental Chemical Corporation, Tacoma, Washington

GHD

07843-M9(129)GN-WA011 MAR 16, 2016

Table 1

Summary of Information for Buildings
Occidental Chemical Corporation
Tacoma, Washington

Port of Tacoma Building		Building Properties						Heat, Ventilation, and Air Conditioning (HVAC) System			
Building Name or Port of Tacoma Building Number	**Tenant**	**Primary Building Use**	**Warehouse Size**	**Office Size**	**Applied Building Size (J&E Model)**	**Average Vapor Flow Rate Into Building, Qsoil (L/min)**	**Depth to Water Table, Lwt (cm)**	**HVAC**	**HVAC Details**	**Seasonal Variability (Yes/No)**	**Comments**
Army Reserve Facility (ARF)	Army Reserve	Office / Shop and Fleet Maintenance / Equipment storage	--	L - 192.35 ft (58.63 m) W - 96.18 ft (29.32 m) H - 10 ft (3.05 m)	L - 192.35 ft (58.63 m) W - 96.18 ft (29.32 m) H - 10 ft (3.05 m)	22	12 feet (3.66 meters) - Average depth to on-Site groundwater	Yes	No	No	Office space only. Floor plans and tour indicate mostly offices with a shop on the north end. Floor Plan only available as of today.
326	SafeBoats International/(formerly) GR Silicate Nano-Fibers & Carbonates	Office	--	L - 50 ft (15.24 m) W - 50 ft (15.24 m) [Average] H - 12 ft (3.66 m) [Minimum] H - 8 ft (2.44 m)	L - 50 ft (15.24 m) W 50 ft (15.24 m) H - 8 ft (2.44 m)	7.6	12 feet (3.66 meters) - Average depth to on-Site groundwater	Yes	Yes	No	Office space only. HVAC Retrofit completed February 2015 to eliminate sub-slab cold air returns and seal floor penetration.
407	GR Silicate Nano-Fibers & Carbonates, Trident Seafoods, and Citadel Marine	Warehouse with a few small shops / Paint bay / offices on the east side	L - 50 ft (15.24 m) W - 30 ft (9.14 m) H - 10 ft (3.05 m)	L - 25 ft (7.62 m) W - 20 ft (6.10 m) H - 10 ft (3.05 m)	L - 25 ft (7.62 m) W -20 ft (6.10 m) H - 10 ft (3.05 m)	5	12 feet (3.66 meters) - Average depth to on-Site groundwater	No	Not Available	Not Available	Added by the Port - Few shops on eastern side of structure are potentially over the plume
532	SafeBoats International/Port of Tacoma (round one only)/Washington Industrial Coatings	Work shops/work areas with a few small offices	L - 400 ft (121.90 m) W - 146 ft (44.50 m) H - 31 ft (9.45 m)	L - 20 ft (6.10 m) W - 10 ft (3.05 m) H - 8 ft (2.44 m)	L - 20 ft (6.10 m) W -10 ft (3.05 m) H - 8 ft (2.44 m)	5	12 feet (3.66 meters) - Average depth to on-Site groundwater	Yes for small offices only	Not Available	No	Mostly open work shops with a few small offices. Some offices have base board heating only. A couple have small units for heating/cooling.
592	Trident Seafoods	Main Office / Warehouse / Machine Shop	L - 150 ft (45.72 m) W -250 ft (76.20 m) H - 25 ft (7.62 m)	L - 45 ft (13.71 m) W - 20 ft (6.10 m) H - 10 ft (3.05 m)	L - 45 ft (13.71 m) W - 20 ft (6.10 m) H - 10 ft (3.05 m)	5	12 feet (3.66 meters) - Average depth to on-Site groundwater	Yes - offices only	No	No	Added by the Port - Combined warehouse with offices on main floor and second floor
595	Trident Seafoods	Warehouse, small office on west wall	L - 200 ft (60.96 m) W -150 ft (45.72 m) H - 24 ft (7.32 m)	TBD (small - 1 desk)	L - 200 ft (60.96 m) W -150 ft (45.72 m) H - 24 ft (7.32 m)	27	12 feet (3.66 meters) - Average depth to on-Site groundwater	Not Available	Not Available	Not Available	
596	Trident Seafoods	Repair and Maintenance Building with a few small offices on east side	L - 73.75 ft (22.48 m) W - 73.75 ft (22.48 m) H - 8 ft (2.44 m)	L - 40 ft (12.19 m) W - 13.3 ft (4.05 m) H - 8 ft (2.44 m)	L - 40 ft (12.19 m) W - 13.3 ft (4.05 m) H - 8 ft (2.44 m)	5	12 feet (3.66 meters) - Average depth to on-Site groundwater	No	Not Available	Yes	Added by the Port - Repair and Maintenance Building - baseboard heating in some offices/lunchrooms. Windows open in the summer. Mostly shop facility.
Northern Guard Shack	TOTE	Office	--	TBD	Not Modeled	Not Modeled	12 feet (3.66 meters) - Average depth to on-Site groundwater	No	No	No	
OCC Service Building	GSH	Office, meeting room and records retention	Records Retention L - 80 ft (12.19 m) W - 24 ft (9.14 m) H - 9 ft (2.44 m)	L - 40 ft (12.19 m) W - 30 ft (9.14 m) H - 9 ft (2.44 m)	Not modeled	Not Modeled	12 feet (3.66 meters) - Average depth to on-Site groundwater	Yes	Not Available	No	

Notes:

All buildings are constructed with an industrial Slab-on-Grade floor.
L Building Floor Length
W Building Floor width
H Building Ceiling Height
Some tenants listed may no longer be present in the building, but were present during one or more sampling rounds.

Table 2

List of Parameters and Screening Levels
Indoor Air and Soil Gas
Occidental Chemical Corporation
Tacoma, Washington

Volatile Organic Compounds (VOCs)	CASRN	Method Reporting Limit (MRL) [1] (µg/m^3)	Updated MTCA Method C Levels [2] Indoor Air C TCR=10^{-6}	Indoor Air NC THQ=1	Soil Gas (below slab) [3] C TCR=10^{-6}	Soil Gas (below slab) [3] NC THQ=1	Indoor Air Short-term [4] NC
1,1,1-Trichloroethane	71-55-6	0.1		5000		170000	
1,1,2,2-Tetrachloroethane	79-34-5	0.025*	0.43		14		
1,1,2-Trichloroethane	79-00-5	0.1	1.6	0.20	52	6.7	
1,1-Dichloroethene	75-35-4	0.1		200		6700	
1,2,4-Trichlorobenzene	120-82-1	0.5		2.0		67	
1,2,4-Trimethylbenzene	95-63-6	0.5		7.0		230	
1,3,5-Trimethylbenzene [5]	108-67-8	0.5	-	-	-	-	
1,4-Dichlorobenzene	106-46-7	0.1	2.3	800	76	27000	
Benzene	71-43-2	0.1	3.2	30	110	1000	
Carbon Tetrachloride	56-23-5	0.1	4.2	100	140	3300	
Chloroform	67-66-3	0.1	1.1	98	36	3300	
cis-1,2-Dichloroethene [5]	156-59-2	0.1	-	-	-	-	
Ethylbenzene	100-41-4	0.5		1000		33000	
Hexachlorobutadiene	87-68-3	0.025*	1.1		38		
m,p-Xylenes [6]	1330-20-7	0.5		100		3300	
Methylene Chloride	75-09-2	0.5	2500	600	83000	20000	
Naphthalene	91-20-3	0.1*	0.74	3.0	25	100	
o-Xylene	95-47-6	0.5		100		3300	
Styrene	100-42-5	0.5		1000		33000	
Tetrachloroethene	127-18-4	0.1	96	40	3200	1300	
Toluene	108-88-3	0.5		5000		170000	
trans-1,2-Dichloroethene [5]	156-60-5	0.1	-	-	-	-	
Trichloroethene (TCE)	79-01-6	0.1	6.3	2.0	210	67	8.4
Vinyl Chloride	75-01-4	0.1	2.8	100	93	3300	

Notes:

µg/m^3 Values in micrograms per cubic meter.
C Refers to toxicity as a carcinogen.
NC Refers to toxicity as a non-carcinogen.
TCR Target Cancer Risk.
THQ Target Hazard Quotient.
(1) Low Level EPA Method TO-15. * Reporting limits for these parameters are for TO-15 Selective Ion Monitoring (SIM) analysis.
(2) MTCA Method C indoor air concentrations (2015 Indoor Air Cleanup Levels Method C: Vapor Intrusion Table update April 6 2015.xlsx).
(3) Indoor air concentration ÷ 0.03 (OSWER Publication 9200.2-154; USEPA, June 2015).
(4) Short-term, non-cancer concentration is 8.4 µg/m^3, USEPA Region 10 Memorandum; OEA Recommendations Regarding Trichloroethylene Toxicity in Human Health Risk Assessments, Office of Environmental Assessment, December 13, 2012.
(5) No toxicity values in CLARC.
(6) Values for xylene;m-.

Table 3

Analytical Results - Army Reserve Facility
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round One							
Sample ID:							Indoor Air-17 IA-042213-RB-17	Indoor Air-18 IA-042213-RB-18	Indoor Air-22 IA-042213-RB-22	Indoor Air-19 IA-042213-RB-19	Outside Air-18 OA-042313-RB-18	Sub-Slab Probe-17 SS-042213-RB-17	Sub-Slab Probe-18 SS-042213-RB-18	Sub-Slab Probe-19 SS-042213-RB-19
Sample Date:							4/23/2013	4/22/2013	4/23/2013 (Re-sample of IA-18)	4/23/2013	4/24/2013	4/22/2013	4/22/2013	4/22/2013
		Screening Levels[1]												
Parameters	Units	Indoor Air Short-Term NC a	MTCA Method C Indoor Air C b	MTCA Method C Indoor Air NC c	Sub-slab Vapor C d	Sub-slab Vapor NC e								
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.089	0.049	0.072	0.11	0.032 J	1.6	0.19 J	1.2
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.038 U	0.041 U	0.040 U	0.039 U	0.042 U	0.24 U	0.20 U	0.038 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	0.16 U	0.16 U	0.15 U	0.17 U	0.94 U	0.81 U	0.15 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.010 J	0.041 U	0.040 U	0.039 U	0.042 U	0.24 U	0.20 U	0.038 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.038 U	0.041 U	0.040 U	0.039 U	0.042 U	0.24 U	0.20 U	0.038 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	1.3	0.82	0.86	0.80	0.81 J	4.7 U	4.0 U	0.76 U
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.40 J	0.30 J	0.30 J	0.27 J	0.83 U	4.7 U	4.0 U	0.76 U
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.054	0.14 J	0.15 J	0.16	0.022 J	0.24 U	0.20 U	0.038 U
Benzene	µg/m^3	-	3.2	30	110	1000	0.69	0.43	0.67	0.67	0.72	0.71 U	0.60 U	0.11 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.51	0.31	0.46	0.46	0.48	1.6	1.9	6.5
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.11 J	0.13 J	0.14 J	0.18	0.089 J	0.25 J	0.54 J	0.79
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.038 U	0.041 U	0.040 U	0.039 U	0.042 U	0.24 U	0.20 U	0.038 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	1.4	1.4	0.94	1.1	1.1	0.045 J	0.047 J	0.049 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.038 U	0.041 U	0.040 U	0.039 U	0.042 U	0.24 U	0.20 U	0.038 U
m&p-Xylenes	µg/m^3	-	-	100	-	3300	4.9	5.3	3.2	3.9	3.8	0.15 J	0.15 J	0.20
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.91 U	0.82 U	0.80 U	0.77 U	0.83 U	4.7 UJ	4.0 UJ	0.76 UJ
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.62	0.081 J	0.17	0.095 J	0.077 J	0.94 U	0.81 U	0.057 J
o-Xylene	µg/m^3	-	-	100	-	3300	1.7	1.6	1.2	1.3	1.3	0.050 J	0.056 J	0.065 J
Styrene	µg/m^3	-	-	1000	-	33000	0.40 J	0.82 U	0.80 U	0.23 J	0.83 U	4.7 U	4.0 U	0.76 U
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.21	0.23	0.36	0.60	0.14 J	0.70	5.0	5.4
Toluene	µg/m^3	-	-	5000	-	170000	4.9	1.2	2.2	2.5	2.1	0.94 U	0.81 U	0.27 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.050	0.041 U	0.040 U	0.017 J	0.042 U	0.24 U	0.20 U	0.038 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.074	0.054	0.033 J	0.045	0.033 J	0.084 J	1.3	0.23
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.095	0.072	0.066	0.11	0.042 U	0.24 U	0.20 U	0.038 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
0.90^b Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 3

Analytical Results - Army Reserve Facility
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Three							
Sample ID:							Indoor Air-17 IA-031314-NH-17	Indoor Air-18 IA-031314-NH-18	Indoor Air-19 IA-031314-MD-19	Indoor Air-19P IA-031814-RB-19p	Indoor Air-29 IA-031314-MD-29	Indoor Air-30 IA-031414-RB-30	Indoor Air-31 IA-031414-RB-31	Outside Air-18 OA-031314-MD-18
Sample Date:							3/14/2014	3/14/2014	3/14/2014	3/18/2014	3/14/2014	3/15/2014	3/15/2014	3/14/2014
		Screening Levels[1]												
Parameters	Units	Indoor Air Short-Term NC a	MTCA Method C Indoor Air C b	MTCA Method C Indoor Air NC c	Sub-slab Vapor C d	Sub-slab Vapor NC e								
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.064	0.028 J	0.067	0.049	0.047	0.058	0.080	0.021 J
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.035 U	0.036 U	0.038 U	-	0.037 U	0.037 U	0.042 U	0.038 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.14 U	0.15 U	0.15 U	-	0.15 U	0.15 U	0.17 U	0.15 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.035 U	0.036 U	0.038 U	-	0.037 U	0.037 U	0.042 U	0.038 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.035 U	0.067	0.038 U	-	0.020 J	0.037 U	0.042 U	0.038 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	1.1	0.72	0.51	0.27	0.82	1.0	0.98	0.22
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.35	0.21	0.14 J	-	0.25	0.28	0.27	0.062 J
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.061	0.059	0.089	0.093	0.054	0.024 J	0.025 J	0.023 J
Benzene	µg/m^3	-	3.2	30	110	1000	1.1	0.87	0.80	0.64	0.96	1.2	1.1	0.62
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.47	0.43	0.48	-	0.47	0.42	0.43	0.48
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.10 J	0.10 J	0.094 J	-	0.098 J	0.096 J	0.10 J	0.082 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.033 J	0.040	0.040	-	0.030 J	0.079	0.080	0.027 J
Ethylbenzene	µg/m^3	-	-	1000	-	33000	1.2	1.0	0.82	1.0	1.1	1.8	1.8	0.74
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.035 U	0.036 U	0.038 U	-	0.037 U	0.037 U	0.042 U	0.038 U
m&p-Xylenes	µg/m^3	-	-	100	-	3300	4.3	3.9	3.0	3.8	4.1	7.4	6.7	2.8
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.50	0.41	0.36	-	0.60	0.32	0.60	0.40
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.35	0.28	0.17	-	0.32	**0.90[b]**	0.29	0.10 J
o-Xylene	µg/m^3	-	-	100	-	3300	1.5	1.3	1.0	1.2	1.4	2.1	2.0	0.93
Styrene	µg/m^3	-	-	1000	-	33000	0.47	0.40	0.24	0.15	0.39	0.22	0.30	0.17
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.19	0.29	0.20	0.16	0.55	0.16	0.32	0.18
Toluene	µg/m^3	-	-	5000	-	170000	4.8	2.9	2.5	2.2	4.1	4.2	4.4	3.1
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.035 U	0.036 U	0.011 J	-	0.037 U	0.011 J	0.013 J	0.038 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.076	0.099	0.13	0.095	0.30	**2.6[c]**	**2.9[c]**	0.073
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.049	0.026 J	0.038	-	0.042	0.040	0.042	0.012 J

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
0.90[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 3

Analytical Results - Army Reserve Facility
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Three							Groundwater Sample[2]
Sample ID:							Outside Air-18P	Outside Air-30	Sub-Slab Probe-17	Sub-Slab Probe-18	Sub-Slab Probe-19	Sub-Slab Probe-29	Sub-Slab Probe-30	77C-25
							OA-031814-RB-18p	OA-031414-RB-30	SS-031314-NH-17	SS-031314-NH-18	SS-031314-MD-19	SS-031314-MD-29	SS-031414-NH-30	WG-071612-DJT-77C-25-126
Sample Date:							3/18/2014	3/15/2014	3/13/2014	3/13/2014	3/13/2014	3/13/2014	3/14/2014	7/16/2012
														25 ft BGS
		Screening Levels[1]												(µg/L)
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor									
		NC a	C b	NC c	C d	NC e								
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.027	0.022 J	1.0	0.16	0.91	0.60	1.8	-
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	-	0.036 U	0.20 U	0.037 U	0.19 U	0.038 U	0.034 U	0.50 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	0.14 U	0.79 U	0.15 U	0.78 U	0.15 U	0.14 U	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	-	0.036 U	0.20 U	0.037 U	0.19 U	0.010 J	0.021 J	0.50 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	0.036 U	0.20 U	0.037 U	0.19 U	0.038 U	0.034 U	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.16	0.27	0.084 J	0.029 J	0.78 U	0.097 J	0.061 J	-
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	0.087 J	0.79 U	0.15 U	0.78 U	0.035 J	0.017 J	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.030	0.023 J	0.20 U	0.014 J	0.19 U	0.036 J	0.018 J	-
Benzene	µg/m^3	-	3.2	30	110	1000	0.75	0.62	0.59 U	0.11 U	0.58 U	0.65	0.20	0.50 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	-	0.45	1.2	1.8	2.3	2.0	1.6	0.50 U
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	-	0.085 J	0.18 J	0.49	0.35 J	0.48	2.1	0.50 U
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	0.098	0.20 U	0.037 U	0.19 U	0.033 J	0.0089 J	3.4
Ethylbenzene	µg/m^3	-	-	1000	-	33000	1.1	1.6	0.081 J	0.039 J	0.78 U	0.087 J	0.067 J	0.50 U
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	0.036 U	0.20 U	0.037 U	0.19 U	0.038 U	0.034 U	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	4.0	6.5	0.23 J	0.13 J	0.15 J	0.31	0.27	0.11 J
Methylene chloride	µg/m^3	-	2500	600	83000	20000	-	0.31	0.79 U	0.15 U	0.78 U	0.33	0.14 U	2.0 U
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	0.14 J	0.14 J	0.087 J	0.19 J	0.096 J	0.12 J	-
o-Xylene	µg/m^3	-	-	100	-	3300	1.2	1.8	0.098 J	0.047 J	0.072 J	0.15 J	0.11 J	0.50 U
Styrene	µg/m^3	-	-	1000	-	33000	0.13	0.16	0.79 U	0.15 U	0.78 U	0.093 J	0.059 J	-
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.16	0.13	1.0	4.5	5.1	3.4	30	0.64
Toluene	µg/m^3	-	-	5000	-	170000	1.8	2.1	1.1	1.5	2.6	0.40	0.12 J	0.090 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	0.012 J	0.20 U	0.012 J	0.19 U	0.016 J	0.034 U	0.26 J
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.076	0.17	0.42	1.6	0.45	0.37	100[e]	2.3
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	-	0.044	0.20 U	0.037 U	0.19 U	0.038 U	0.034 U	0.21 J

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
0.90[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 4

Analytical Results - Building 326
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round One				
Sample ID:							Indoor Air-7 IA-042313-RB-7	Indoor Air-8 IA-042313-RB-8	Indoor Air-8 FD-042313-RB-8	Outside Air-7 OA-042313-RB-7	Sub-Slab Probe-7 SS-042313-RB-7
Sample Date:							4/24/2013	4/24/2013	4/24/2013 Duplicate	4/24/2013	4/24/2013
		Screening Levels[(1)]									
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor						
		NC a	C b	NC c	C d	NC e					
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.032 J	0.030 J	0.029 J	0.028 J	1.2
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.039 U	0.035 U	0.036 U	0.040 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.16 U	0.14 U	0.14 U	0.16 U	0.16 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.022 J	0.040	0.042	0.040 U	0.012 J
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.039 U	0.035 U	0.036 U	0.040 U	0.039 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	4.7	1.0	0.98	1.2	0.78 U
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	1.5	0.31 J	0.32 J	0.38 J	0.78 U
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.14 J	2.0	1.9	0.038 J	0.035 J
Benzene	µg/m^3	-	3.2	30	110	1000	0.71	0.68	0.76	0.76	0.12 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.45	0.48	0.44	0.47	0.14
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.19	0.26	0.26	0.095 J	0.15 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.039 U	0.035 U	0.036 U	0.040 U	0.039 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	1.0	1.4	1.2	0.77 J	0.043 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.039 U	0.035 U	0.036 U	0.040 U	0.026 J
m&p-Xylenes	µg/m^3	-	-	100	-	3300	2.9	4.3	3.7	2.3	0.13 J
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.78 U	0.69 U	0.72 U	0.79 U	0.78 U
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.16	0.21	0.23	0.15 J	0.087 J
o-Xylene	µg/m^3	-	-	100	-	3300	1.1	1.8	1.3	0.89	0.035 J
Styrene	µg/m^3	-	-	1000	-	33000	0.35 J	0.45 J	0.51 J	0.79 U	0.78 U
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	4.1	0.66	0.63	0.13 J	12
Toluene	µg/m^3	-	-	5000	-	170000	2.6	3.2	3.9	2.6	0.26 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.039 U	0.035 U	0.051	0.040 U	0.039 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	**3.9^c**	0.45	0.44	0.024 J	10
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.0042 J	0.0060 J	0.0057 J	0.040 U	0.039 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
3.9^c Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 4

Analytical Results - Building 326
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Two					Round Four		
Sample ID:							Indoor Air-7 IA-070113-JW-7	Indoor Air-8 IA-070113-JW-8	Indoor Air-28 IA-070113-JW-28	Outside Air-7B OA-070113-JW-7	Sub-Slab Probe-7 SS-062513-JW-7	Indoor Air-7 IA-052715-RB-07	Indoor Air-7P IA-052615-RB-07P	Indoor Air-8 IA-052715-RB-08
Sample Date:							7/1/2013	7/1/2013	7/1/2013	7/1/2013	6/25/2013	5/27/2015	6/2/2015	5/27/2015
		Screening Levels[1]												
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor									
		NC a	C b	NC c	C d	NC e								
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.050 U	0.050 U	0.050 U	0.050 U	1.6	0.022 J	0.051 U	0.022 J
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	-	-	-	-	0.037 J	0.038 U	-	0.040 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	-	-	-	0.15 U	0.15 U	-	0.16 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	-	-	-	-	0.019 J	0.015 J	-	0.018 J
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	-	-	-	0.039 U	0.038 U	-	0.087
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	16[c]	1.8	10[c]	0.71	0.77 U	0.72	0.88	0.97
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	-	-	-	0.77 U	0.24	-	0.53
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	1.3	58 J[b]	2.2	0.61	0.063	0.30	0.31	0.94
Benzene	µg/m^3	-	3.2	30	110	1000	0.65	0.64	0.64	0.48	0.16	0.34	0.88	0.71
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	-	-	-	-	0.14	0.51	-	0.50
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	-	-	-	-	0.37	0.19	-	0.21
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	-	-	-	0.039 U	0.038 U	-	0.026 J
Ethylbenzene	µg/m^3	-	-	1000	-	33000	4.1	6.9	4.0	4.8	0.12 J	0.29	0.35	0.51
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	-	-	-	0.039 U	0.15 U	-	0.049 J
m&p-Xylenes	µg/m^3	-	-	100	-	3300	16	29	15	21	0.34	0.78	0.94	1.0
Methylene chloride	µg/m^3	-	2500	600	83000	20000	-	-	-	-	0.37	0.33	-	0.53
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	-	-	-	0.33	0.33	-	0.21
o-Xylene	µg/m^3	-	-	100	-	3300	5.6	9.5	5.0	6.8	0.17	0.34	0.40	0.45
Styrene	µg/m^3	-	-	1000	-	33000	1.9	1.2	2.1	0.52	0.30 J	1.5	1.1	1.5
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	6.9	0.79	4.9	0.082	15	0.26	0.15	0.28
Toluene	µg/m^3	-	-	5000	-	170000	3.9	3.1	4.0	1.7	0.34	1.3	1.4	2.2
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	-	-	-	0.020 J	0.038 U	-	0.040 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	3.1[c]	0.30	2.0	0.037 U	14	0.17	0.12	0.17
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	-	-	-	-	0.0051 J	0.038 U	-	0.012 J

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
3.9[c] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 4

Analytical Results - Building 326
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Four						Groundwater Sample[2]
Sample ID:							Indoor Air-8P	Indoor Air-28	Indoor Air-28P	Outside Air-7	Outside Air-7P	Sub-Slab Probe-7	34-25R
							IA-052615-RB-08P	IA-052715-RB-28	IA-052615-RB-28P	OA-052715-RB-07	OA-052615-RB-07P	SS-052715-RB-07	WG-082012-AMK-34-25R-052
Sample Date:							6/2/2015	5/27/2015	6/2/2015	5/27/2015	6/2/2015	5/27/2015	8/20/2012
													25 ft BGS
		Screening Levels[1]											
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor								(µg/L)
		NC a	C b	NC c	C d	NC e							
Volatile Organic Compounds													
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.051 U	0.022 J	0.051 U	0.018 J	0.051 U	1.1	-
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	-	0.035 U	-	0.043 U	-	0.037 U	25 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	0.14 U	-	0.17 U	-	0.15 U	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	-	0.016 J	-	0.043 U	-	0.037 U	15 J
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	0.035 U	-	0.043 U	-	0.037 U	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	1.4	0.85	0.92	0.23	0.28	0.16	-
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	0.27	-	0.063 J	-	0.039 J	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	1.2	0.19	0.39	0.043	0.047 U	0.061	-
Benzene	µg/m^3	-	3.2	30	110	1000	0.80	0.35	0.75	0.58	1.1	0.081 J	25 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	-	0.54	-	0.50	-	0.15	25 U
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	-	0.28	-	0.17 U	-	0.15 U	25 U
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	0.035 U	-	0.043 U	-	0.073	840
Ethylbenzene	µg/m^3	-	-	1000	-	33000	0.52	0.40	0.38	0.14 J	0.19	0.047 J	25 U
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	0.14 U	-	0.17 U	-	0.15 U	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	1.2	1.1	0.98	0.47	0.55	0.19	25 U
Methylene chloride	µg/m^3	-	2500	600	83000	20000	-	0.36	-	0.27	-	0.11 J	11 J
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	0.27	-	0.16 J	-	0.36	-
o-Xylene	µg/m^3	-	-	100	-	3300	0.48	0.43	0.42	0.18	0.23	0.083 J	25 U
Styrene	µg/m^3	-	-	1000	-	33000	1.2	1.2	1.0	0.95	0.73	0.074 J	-
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.13	0.19	0.13	0.23	0.057	14	25 U
Toluene	µg/m^3	-	-	5000	-	170000	2.2	1.5	1.5	0.62	0.84	0.21	25 U
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	0.035 U	-	0.043 U	-	0.037 U	290
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.049	0.13	0.091	0.17	0.038 U	9.6	25 U
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	-	0.012 J	-	0.043 U	-	0.037 U	56

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
3.9^c Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 5

Analytical Results - Building 407
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round One						
Sample ID:							Indoor Air-6 IA-041813-RB-06	Indoor Air-9 IA-041813-RB-09	Indoor Air-10 IA-041813-RB-10	Indoor Air-20 IA-041813-RB-20	Outside Air-9 OA-041813-RB-09	Sub-Slab Probe-6 SS-041813-SL-6	Sub-Slab Probe-9 SS-041813-SL-9
Sample Date:							4/19/2013	4/19/2013	4/19/2013	4/19/2013	4/19/2013	4/18/2013	4/18/2013
		Screening Levels[1]											
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor								
		NC a	C b	NC c	C d	NC e							
Volatile Organic Compounds													
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.025 J	0.027 J	0.027 J	0.026 J	0.024 J	0.35	0.88
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.036 U	0.037 U	0.042 U	0.035 U	0.037 U	0.036 U	0.036 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	0.15 U	0.17 U	0.011 J	0.15 U	0.14 U	0.14 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.036 U	0.037 U	0.042 U	0.0049 J	0.037 U	0.0067 J	0.0074 J
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.036 U	0.037 U	0.042 U	0.035 U	0.037 U	0.036 U	0.036 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	53[c]	56[c]	6.0	16[c]	0.65 J	0.31 J	0.68 J
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	17	17	1.9	4.7	0.74 U	0.71 U	0.71 U
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.036 U	0.022 J	0.026 J	0.032 J	0.037 U	0.036 U	0.018 J
Benzene	µg/m^3	-	3.2	30	110	1000	0.60	0.95	0.82	0.99	0.40	0.11 U	0.11 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.35	0.46	0.46	0.45	0.45	0.14 J	0.25
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.11 J	0.15 U	0.12 J	0.11 J	0.075 J	0.011 J	0.028 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.036 U	0.037 U	0.042 U	0.016 J	0.037 U	0.036 U	0.036 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	3.0	3.4	1.3	4.3	0.21	0.044 J	0.057 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.036 U	0.037 U	0.042 U	0.035 U	0.037 U	0.34	1.7
m&p-Xylenes	µg/m^3	-	-	100	-	3300	13	15	5.4	18	0.78	0.15	0.21
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.73 U	0.74 U	0.84 U	0.71 UJ	0.74 U	0.71 U	0.71 U
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.17	0.24	0.54	0.31	0.047 J	0.077 J	1.2
o-Xylene	µg/m^3	-	-	100	-	3300	7.6	7.8	2.0	6.1	0.29 J	0.068 J	0.097 J
Styrene	µg/m^3	-	-	1000	-	33000	88	83	6.1	18	0.64 J	1.0	0.62 J
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.062	0.24	0.12	0.15	0.082	63	2.8
Toluene	µg/m^3	-	-	5000	-	170000	8.3	8.2	6.3	13	1.0	0.44 J	0.33 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.036 U	0.037 U	0.042 U	0.024 J	0.037 U	0.036 U	0.036 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.040	0.052	0.047	0.085	0.013 J	0.31	0.15
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.036 U	0.037 U	0.042 U	0.0036 J	0.037 U	0.036 U	0.036 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
53[c] Result exceeds screening level(s) identified in superscript.
0.57 U[c] Reporting limit for non-detect parameter in IA sample exceeds applicable IA screening level.
(2) Most recent, shallowest, and nearby data.

Table 5

Analytical Results - Building 407
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Three								
Sample ID:							Sub-Slab Probe-10	Indoor Air-6	Indoor Air-6P	Indoor Air-6P	Indoor Air-9	Indoor Air-10	Indoor Air-20A	Indoor Air-37	Indoor Air-38	Indoor Air-39
Sample Date:							SS-041813-RB-10	IA-031814-NH-06	IA-031914-RB-06p	IA-031914-RB-FD3p	IA-031814-NH-09	IA-031814-NH-10	IA-031814-NH-20	IA-031814-NH-37	IA-031814-NH-38	IA-031814-NH-39
							4/18/2013	3/19/2014	3/19/2014	3/19/2014	3/19/2014	3/19/2014	3/19/2014	3/19/2014	3/19/2014	3/19/2014
		Screening Levels[1]								Duplicate						
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor											
		NC a	C b	NC c	C d	NC e										
Volatile Organic Compounds																
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.030 J	0.023 J	0.020	0.019 J	0.022 J	0.021 J	0.021 J	0.021 J	0.14 U	0.021 J
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.037 U	0.035 U	-	-	0.035 U	0.037 U	0.041 U	0.038 U	0.14 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	0.14 U	-	-	0.14 U	0.15 U	0.16 U	0.15 U	**0.57 U[c]**	0.16 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.037 U	0.035 U	-	-	0.035 U	0.037 U	0.041 U	0.038 U	0.14 U	0.039 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.037 U	0.035 U	-	-	0.035 U	0.037 U	0.041 U	0.038 U	0.14 U	0.039 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.74 U	**86[c]**	**8.5 J[c]**	**8.3 J[c]**	**70[c]**	**9.4[c]**	**12[c]**	**340[c]**	**730[c]**	7.0
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.74 U	28	-	-	20	2.5	3.4	120	340	2.4
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.037 U	0.026 J	0.037 J	0.034 J	0.021 J	0.047	0.046	0.026 J	0.14 U	0.017 J
Benzene	µg/m^3	-	3.2	30	110	1000	0.11 U	1.0	1.0	0.97 J	1.1	1.3	1.3	1.2	1.3	0.95
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.34	0.46	-	-	0.47	0.46	0.47	0.46	0.17	0.39
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.11 J	0.085 J	-	-	0.082 J	0.082 J	0.090 J	0.085 J	0.083 J	0.081 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.037 U	0.012 J	-	-	0.010 J	0.022 J	0.040 J	0.011 J	0.14 U	0.017 J
Ethylbenzene	µg/m^3	-	-	1000	-	33000	0.043 J	6.1	5.6 J	5.4 J	12	5.3	3.0	21	36	2.9
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.26	0.035 U	-	-	0.035 U	0.037 U	0.041 U	0.038 U	0.14 U	0.039 U
m&p-Xylenes	µg/m^3	-	-	100	-	3300	0.14 J	19	14 J	14 J	41	18	9.8	71	**150[c]**	11
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.74 U	0.33	-	-	0.42	0.49	0.34	0.39	0.57 U	0.39
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.059 J	0.56	-	-	**0.94[b]**	0.34	**1.7[b]**	**3.8[bc]**	**19[bc]**	0.24
o-Xylene	µg/m^3	-	-	100	-	3300	0.079 J	9.5	6.9 J	6.7 J	20	5.5	3.7	44	90	3.5
Styrene	µg/m^3	-	-	1000	-	33000	0.74 U	20	25 J	24 J	31	1.6	3.2	220	**1400[c]**	1.6
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.53	0.24	0.29 J	0.28 J	0.18	0.32	0.32	0.19	0.35	0.20
Toluene	µg/m^3	-	-	5000	-	170000	0.20	3.3	5.2 J	5.0 J	3.4	4.7	4.5	6.4	16	3.4
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.037 U	0.035 U	-	-	0.035 U	0.037 U	0.041 U	0.038 U	0.14 U	0.039 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.14	0.087	0.031	0.030 J	0.066	0.14	0.14	0.059	0.077 J	0.074
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.037 U	0.011 J	-	-	0.035 U	0.049	0.012 J	0.011 J	0.14 U	0.019 J

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
53[c] Result exceeds screening level(s) identified in superscript.
0.57 U[c] Reporting limit for non-detect parameter in IA sample exceeds applicable IA screening level.
(2) Most recent, shallowest, and nearby data.

Table 5

Analytical Results - Building 407
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Three							Groundwater Samples[2]	
Sample ID:							Outside Air-6	Outside Air-6	Outside Air-6P	Sub-Slab Probe-6	Sub-Slab Probe-9	Sub-Slab Probe-10	Sub-Slab Probe-37	85C-25	91C-25
Sample Date:							OA-031814-NH-06	OA-031814-NH-FD2	OA-031914-RB-06p	SS-031814-NH-06	SS-031814-NH-09	SS-031814-MD-10	SS-031814-MD-37	WG-072012-DJT-85C-25-153	WG-071812-BW-91C-25-189
							3/19/2014	3/19/2014	3/19/2014	3/18/2014	3/18/2014	3/18/2014	3/18/2014	7/20/2012	7/18/2012
								Duplicate						25 ft BGS	25 ft BGS
Parameters	Units	Screening Levels[1]												(µg/L)	(µg/L)
		Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor										
		NC a	C b	NC c	C d	NC e									
Volatile Organic Compounds															
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.020 J	0.021 J	0.022	0.32	0.79	0.030 J	4.1	-	-
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.039 J	0.039 U	-	0.034 U	0.037 U	0.039 U	0.033 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.17 U	0.15 U	-	0.14 U	0.15 U	0.16 U	0.13 U	-	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.041 U	0.039 U	-	0.034 U	0.037 U	0.039 U	0.060	0.50 U	0.50 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.041 U	0.039 U	-	0.034 U	0.037 U	0.039 U	0.033 U	-	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	5.1	6.0	0.44	0.64	0.33	0.049 J	32	-	-
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	1.7 J	2.1 J	-	0.20	0.12 J	0.016 J	8.6	-	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.034 J	0.025 J	0.038	0.013 J	0.033 J	0.024 J	0.19	-	-
Benzene	µg/m^3	-	3.2	30	110	1000	0.66	0.68	0.62	0.11	0.32	0.11 J	0.43	0.50 U	0.50 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.47	0.47	-	0.15	0.27	0.32	0.16	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.12 J	0.10 J	-	0.0095 J	0.034 J	0.047 J	0.042 J	0.50 U	0.080 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.057	0.037 J	-	0.034 U	0.037 U	0.039 U	0.0084 J	0.78	0.50 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	1.0	1.1	1.1	0.080 J	0.068 J	0.081 J	1.3	0.50 U	0.080 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.041 U	0.039 U	-	0.034 U	0.037 U	0.039 U	0.033 U	-	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	3.5	4.1	4.1	0.16	0.25	0.23	3.3	0.50 U	0.24 J
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.38	0.34	-	0.14 U	0.15 U	0.24	2.9	2.0 U	2.0 U
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.13 J	0.19	-	0.11 J	0.26	0.066 J	2.4	-	-
o-Xylene	µg/m^3	-	-	100	-	3300	1.3	1.5	1.2	0.084 J	0.11 J	0.093 J	1.6	0.50 U	0.21 J
Styrene	µg/m^3	-	-	1000	-	33000	1.7	1.9	2.7	0.13 J	0.53	0.078 J	8.9	-	-
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.42	0.37	0.15	57	0.69	0.49	7.1	0.50 U	0.50 U
Toluene	µg/m^3	-	-	5000	-	170000	1.9	1.8	1.6	0.14 U	0.19	0.42	6.1	0.50 U	0.17 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.041 U	0.039 U	-	0.034 U	0.037 U	0.039 U	0.013 J	0.50 U	0.50 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.80	0.51	0.021	0.10	0.022 J	0.080	0.40	0.50 U	0.50 U
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.041 U	0.039 U	-	0.034 U	0.037 U	0.039 U	0.033 U	0.50 U	0.40 J

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
53^c Result exceeds screening level(s) identified in superscript.
0.57 U^c Reporting limit for non-detect parameter in IA sample exceeds applicable IA screening level.
(2) Most recent, shallowest, and nearby data.

Table 6

Analytical Results - Building 532
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round One								
Sample ID:							Indoor Air-11	Indoor Air-12	Indoor Air-13	Outside Air-11	Outside Air-11	Outside Air-11B	Sub-Slab Probe-11	Sub-Slab Probe-12	Sub-Slab Probe-13
Sample Date:							IA-042513-RB-11	IA-041913-RB-12	IA-041913-RB-13	OA-041913-RB-11	FD-041913-RB-11	OA-042513-RB-11	SS-042513-RB-11	SS-041913-SL-12	SS-041913-SL-13
							4/26/2013	4/20/2013	4/20/2013	4/20/2013	4/20/2013	4/26/2013	4/25/2013	4/19/2013	4/19/2013
											Duplicate				
		Screening Levels[(1)]													
		Indoor Air	MTCA Method C												
		Short-Term	Indoor Air		Sub-slab Vapor										
Parameters	Units	NC	C	NC	C	NC									
		a	b	c	d	e									
Volatile Organic Compounds															
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.024 J	0.032 J	0.034 J	0.023 J	0.023 J	0.025 J	0.50	4.2	24
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.038 U	0.046 U	0.039 U	0.035 U	0.035 U	0.041 U	0.039 U	0.041 U	0.043 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	0.18 U	0.16 U	0.027 J	0.14 U	0.16 U	0.15 U	0.16 U	0.17 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.038 U	0.046 U	0.039 U	0.013 J	0.035 U	0.041 U	0.039 U	0.058	0.31
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.038 U	0.046 U	0.039 U	0.026 J	0.035 U	0.041 U	0.039 U	0.041 U	0.043 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.60 J	1.3	1.1	0.69 U	0.69 U	0.42 J	0.77 U	0.82 U	0.86 U
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.76 U	0.39 J	0.36 J	0.69 U	0.69 U	0.82 U	0.77 U	0.82 U	0.86 U
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.13 J	**5.4**[b]	1.6	0.060 J	0.039 J	0.15 J	0.039 U	0.13 J	0.046
Benzene	µg/m^3	-	3.2	30	110	1000	0.63	0.71	0.74	0.29	0.34	0.49	0.12 U	0.12	0.13 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.40	0.44	0.45	0.39	0.46	0.45	0.66	0.16	0.064
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.082 J	0.096 J	0.078 J	0.083 J	0.071 J	0.080 J	0.049 J	0.070 J	0.045 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.020 J	0.046 U	0.039 U	0.046 J	0.035 UJ	0.054	0.039 U	0.041 U	0.043 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	1.7	4.7	5.1	0.22 J	0.26 J	0.96	0.027 J	0.34 J	0.078 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.038 U	0.046 U	0.039 U	0.035 U	0.035 U	0.041 U	0.039 U	0.89	0.022 J
m&p-Xylenes	µg/m^3	-	-	100	-	3300	6.9	20	22	0.86	0.99	3.8	0.087 J	1.4	0.33
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.84 U	0.92 UJ	0.78 UJ	0.69 UJ	0.69 UJ	0.82 U	0.77 U	0.82 U	0.86 UJ
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.23	0.17 J	0.20	0.073 J	0.070 J	0.056 J	0.15 U	0.092 J	0.85
o-Xylene	µg/m^3	-	-	100	-	3300	2.3	5.0	5.6	0.27 J	0.31 J	1.0	0.030 J	0.40 J	0.087 J
Styrene	µg/m^3	-	-	1000	-	33000	0.34 J	0.32 J	0.28 J	0.69 U	0.69 U	0.82 U	0.77 U	0.82 U	0.86 U
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.18	1.5	1.8	0.16 J	0.062 J	0.12 J	3.2	27	20
Toluene	µg/m^3	-	-	5000	-	170000	21	55	59	1.4	1.9	5.9	1.2	5.0	1.2
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.034 J	0.046 U	0.039 U	0.043 J	0.035 UJ	0.041 U	0.039 U	0.041 U	0.043 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.10	0.34	0.86	0.085 J	0.023 J	0.068	0.27	0.37	24
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.011 J	0.046 U	0.039 U	0.014 J	0.035 U	0.017 J	0.039 U	0.041 U	0.043 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
5.4[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 6

Analytical Results - Building 532
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Two								
Sample ID:							Indoor Air-11	Indoor Air-12	Indoor Air-13	Indoor Air-23	Indoor Air-27	Outside Air-11C	Sub-Slab Probe-11	Sub-Slab Probe-12	Sub-Slab Probe-13
Sample Date:							IA-070113-JW-11	IA-070113-JW-12	IA-070113-JW-13	IA-070113-JW-23	IA-070113-JW-27	OA-070113-JW-11	SS-062513-JW-11	SS-062613-JW-12	SS-062613-JW-13
							7/1/2013	7/1/2013	7/1/2013	7/1/2013	7/1/2013	7/1/2013	6/25/2013	6/26/2013	6/26/2013
		Screening Levels[(1)]													
		Indoor Air	MTCA Method C Indoor Air		Sub-slab Vapor										
Parameters	Units	Short-Term NC a	C b	NC c	C d	NC e									
Volatile Organic Compounds															
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U	0.66	4.3	23
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	-	-	-	-	-	-	0.038 U	0.035 U	0.036 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	-	-	-	-	-	0.15 U	0.14 U	0.15 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	-	-	-	-	-	-	0.028 J	0.057	0.29
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	-	-	-	-	-	0.058	0.062	0.036 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	1.9	1.6	1.6	2.9	2.1	0.49	0.76 U	0.69 U	0.73 U
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	-	-	-	-	-	0.76 U	0.69 U	0.73 U
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.69	2.2	2.2	**87 J[b]**	**26 J[b]**	0.050	0.10	0.12	0.066
Benzene	µg/m^3	-	3.2	30	110	1000	0.64	0.61	0.86	1.2	0.78	0.58	0.13	0.10 J	0.10 J
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	-	-	-	-	-	-	0.79	0.10	0.062
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	-	-	-	-	-	-	0.15 J	0.12 J	0.059 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	-	-	-	-	-	0.060	0.051	0.036 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	14	22 J	27 J	30 J	26 J	16 J	0.13 J	0.12 J	0.11 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	-	-	-	-	-	0.038 U	0.020 J	0.036 U
m&p-Xylenes	µg/m^3	-	-	100	-	3300	61 J	89 J	100 J	100 J	100 J	67 J	0.42	0.33	0.43
Methylene chloride	µg/m^3	-	2500	600	83000	20000	-	-	-	-	-	-	0.13 J	0.17	0.035 J
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	-	-	-	-	-	0.31	0.18	0.30
o-Xylene	µg/m^3	-	-	100	-	3300	21 J	32 J	40 J	43 J	40 J	23 J	0.25	0.18	0.28
Styrene	µg/m^3	-	-	1000	-	33000	2.0	0.93	1.2	1.3	1.3	0.69	0.43 J	0.69 U	0.73 U
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.37	0.24	0.19	0.43	0.31	0.084	5.0	30	27
Toluene	µg/m^3	-	-	5000	-	170000	28 J	8.4	19 J	28 J	11	1.7	0.33	0.17	0.17
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	-	-	-	-	-	0.063	0.053	0.036 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.12	0.049	0.076	0.046	0.037 U	0.037 U	0.45	0.30	27
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	-	-	-	-	-	-	0.018 J	0.017 J	0.036 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
5.4[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 6

Analytical Results - Building 532
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Four								
							Indoor Air-13	Indoor Air-13P	Indoor Air-13P	Outside Air-13	Outside Air-13	Outside Air-13P	Sub-Slab Probe-13	Groundwater Samples[2]	
Sample ID:							IA-052715-RB-13	IA-052615-RB-13P	IA-052615-RB-DupP	OA-052715-RB-13	OA-052715-RB-DUP	OA-052615-RB-13P	SS-052715-RB-13	78C-25	61C-25
														WG-071912-SP-78C-25-132	WG-071712-BW-61C-25-100
Sample Date:							5/27/2015	6/2/2015	6/2/2015	5/27/2015	5/27/2015	6/2/2015	5/27/2015	7/19/2012	7/17/2012
									Duplicate		Duplicate			25 ft BGS	25 ft BGS
Parameters	Units	Screening Levels[1]												(µg/L)	(µg/L)
		Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor										
		NC a	C b	NC c	C d	NC e									
Volatile Organic Compounds															
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.022 J	0.051 U	0.051 U	0.022 J	0.020 J	0.051 U	25	-	-
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.039 U	-	-	0.039 U	0.037 U	-	0.039 U	0.50 U	0.50 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	-	-	0.15 U	0.15 U	-	0.16 U	-	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.039 U	-	-	0.039 U	0.037 U	-	0.059	0.50 U	0.51
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.039 U	-	-	0.039 U	0.037 U	-	0.039 U	-	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	1.0	12[c]	13[c]	3.3 J	0.92 J	0.46	0.090 J	-	-
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.41	-	-	1.4 J	0.35 J	-	0.040 J	-	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.019 J	0.046 U	0.046 U	0.024 J	0.019 J	0.047 U	0.058	-	-
Benzene	µg/m^3	-	3.2	30	110	1000	0.28	0.61 J	0.44 J	0.28	0.36	0.58	0.12 J	0.50 U	0.070 J
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.62	-	-	0.51	0.48	-	0.067	0.50 U	0.50 U
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.20	-	-	0.17	0.16	-	0.16 U	0.50 U	0.30 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.039 U	-	-	0.031 J	0.037 U	-	0.016 J	1.5	2.3
Ethylbenzene	µg/m^3	-	-	1000	-	33000	2.7	8.7	8.3	4.0 J	1.9 J	0.81	0.051 J	0.070 J	0.070 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.15 U	-	-	0.15 U	0.15 U	-	0.16 U	-	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	10	35 J	36 J	16 J	7.5 J	3.2	0.19	0.12 J	0.31 J
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.49	-	-	0.63 J	0.41 J	-	0.11 J	2.0 U	0.15 J
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.26	-	-	0.34 J	0.81 J	-	0.46	-	-
o-Xylene	µg/m^3	-	-	100	-	3300	3.3	12	12	5.2 J	2.4 J	1.2	0.10 J	0.50 U	0.19 J
Styrene	µg/m^3	-	-	1000	-	33000	1.9	1.2	1.3	1.3	1.8	0.63	0.10 J	-	-
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.14	0.19	0.11	0.83 J	0.14 J	0.064	29	0.50 U	0.56
Toluene	µg/m^3	-	-	5000	-	170000	7.8	22 J	17 J	20 J	5.0 J	1.6	0.40	0.49 J	0.15 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.039 U	-	-	0.039 U	0.037 U	-	0.039 U	0.50 U	0.24 J
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.042	0.070	0.037 U	0.24 J	0.049 J	0.038 U	21	0.50 U	5.9
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.039 U	-	-	0.039 U	0.037 U	-	0.039 U	2.4	1.1

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
5.4[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 7

Analytical Results - Building 592
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round One						
Sample ID:							Indoor Air-1 IA-042113-RB-1	Indoor Air-1 FD-042113-RB-1	Indoor Air-2 IA-042113-RB-2	Outside Air-1 OA-042113-JC-1	Sub-Slab Probe-1 SS-042113-JC-1	Sub-Slab Probe-2 SS-042113-JC-2	Indoor Air-1 IA-070113-JW-1
Sample Date:							4/22/2013	4/22/2013 Duplicate	4/22/2013	4/22/2013	4/21/2013	4/21/2013	7/1/2013
		Screening Levels[(1)]											
Parameters	Units	Indoor Air Short-Term NC a	MTCA Method C Indoor Air C b	MTCA Method C Indoor Air NC c	Sub-slab Vapor C d	Sub-slab Vapor NC e							
Volatile Organic Compounds													
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.11	0.11	0.10	0.026 J	21	0.59	0.053
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.038 U	0.036 U	0.040 U	0.035 U	0.038 U	0.037 U	-
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	0.14 U	0.16 U	0.0084 J	0.15 U	0.0075 J	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.0070 J	0.0052 J	0.040 U	0.035 U	0.31	0.0068 J	-
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.038 U	0.036 U	0.040 U	0.035 U	0.038 U	0.037 U	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	2.0	2.1	1.3	0.28 J	0.76 U	0.73 U	3.3
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.56 J	0.59 J	0.48 J	0.71 U	0.76 U	0.73 U	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.055	0.053	0.022 J	0.027 J	0.038 U	0.033 J	0.045 U
Benzene	µg/m^3	-	3.2	30	110	1000	1.0	0.99	1.5	0.46	0.20	0.11 U	1.6
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.46	0.47	0.47	0.50	0.25	0.36	-
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.10 J	0.10 J	0.099 J	0.077 J	0.52	0.046 J	-
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.038 U	0.036 U	0.040 U	0.021 J	0.038 U	0.018 J	-
Ethylbenzene	µg/m^3	-	-	1000	-	33000	2.5	2.4	2.7	0.25 J	0.11 J	0.060 J	4.5
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.038 U	0.036 U	0.040 U	0.035 U	0.038 U	0.026 J	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	9.2	9.0	9.5	0.87	0.38	0.20	16
Methylene chloride	µg/m^3	-	2500	600	83000	20000	1.6 J	1.6 J	1.3 UJ	0.71 UJ	0.76 UJ	0.73 UJ	-
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.41	0.53	0.067 J	0.11 J	0.031 J	0.077 J	-
o-Xylene	µg/m^3	-	-	100	-	3300	3.0	2.7	3.0	0.31 J	0.12 J	0.066 J	5.5
Styrene	µg/m^3	-	-	1000	-	33000	0.34 J	0.36 J	0.26 J	0.71 U	0.76 U	0.73 U	1.2
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	1.1	1.1	0.95	0.13 J	18	19	1.1
Toluene	µg/m^3	-	-	5000	-	170000	16	15	22	1.5	0.62 J	0.39 J	21 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.038 U	0.036 U	0.040 U	0.035 U	0.038 U	0.037 U	-
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	**7.3^{bc}**	**6.6^{bc}**	**13^{abc}**	0.38	0.48	4.5	1.5
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.038 U	0.036 U	0.040 U	0.035 U	0.038 U	0.037 U	-

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
0.76^{b} Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 7

Analytical Results - Building 592
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Two								
Sample ID:							Indoor Air-2	Indoor Air-24	Indoor Air-25	Outside Air-1B	Sub-Slab Probe-1	Sub-Slab Probe-2	Indoor Air-1	Indoor Air-1	Indoor Air-2
Sample Date:							IA-070113-JW-2	IA-070113-JW-24	IA-070113-JW-25	OA-070113-JW-1	SS-062913-JW-1	SS-062713-JW-2	IA-031714-RB-01	IA-031714-NH-F001	IA-031714-NH-02
							7/1/2013	7/1/2013	7/1/2013	7/1/2013	6/29/2013	6/27/2013	3/18/2014	3/18/2014 Duplicate	3/18/2014
		Screening Levels[(1)]													
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor										
		NC a	C b	NC c	C d	NC e									
Volatile Organic Compounds															
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.068	0.050 U	0.050 U	0.050 U	20	0.35	0.070	0.072	0.058
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	-	-	-	-	0.038 U	0.040 U	0.040 U	0.039 U	0.039 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	-	-	-	0.15 U	0.16 U	0.16 U	0.16 U	0.15 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	-	-	-	-	0.33	0.0078 J	0.040 U	0.039 U	0.039 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	-	-	-	0.038 U	0.040 U	0.040 U	0.039 U	0.039 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	5.3	4.8	4.2	0.35	0.38 J	0.79 U	1.6	1.4	2.3
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	-	-	-	0.76 U	0.79 U	0.54 J	0.40 J	0.76
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.086	0.074	0.070	0.045 U	0.13	0.040 U	0.093	0.093	0.030 J
Benzene	µg/m^3	-	3.2	30	110	1000	1.7	0.67	0.65	0.60	0.33	0.069 J	0.85	0.82	1.1
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	-	-	-	-	0.29	0.31	0.33 J	0.46 J	0.45
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	-	-	-	-	0.43	0.070 J	0.11 J	0.11 J	0.22
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	-	-	-	0.018 J	0.040 U	0.15	0.18	0.14
Ethylbenzene	µg/m^3	-	-	1000	-	33000	6.8	5	4.8	0.50	0.22	0.37	2.4	2.2	3.1
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	-	-	-	0.038 U	0.040 U	0.040 U	0.039 U	0.039 U
m&p-Xylenes	µg/m^3	-	-	100	-	3300	25	19	18	1.8	0.91	1.5	8.5	7.5	11
Methylene chloride	µg/m^3	-	2500	600	83000	20000	-	-	-	-	0.082 J	0.034 J	0.78	0.71	0.81
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	-	-	-	0.43	0.32	0.39 J	0.53 J	0.48
o-Xylene	µg/m^3	-	-	100	-	3300	8.7	6.9	6.7	0.66	0.45	0.51	2.7	2.4	3.6
Styrene	µg/m^3	-	-	1000	-	33000	1.1	1.0	1.0	0.43	0.32 J	0.79 U	0.35	0.28	0.26
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	1.4	1.1	1.9	0.070	24	25	26	23	**55[c]**
Toluene	µg/m^3	-	-	5000	-	170000	29 J	10	29 J	1.4	0.69	0.40	7.8	7.6	11
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	-	-	-	0.038 U	0.040 U	0.027 J	0.026 J	0.034 J
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	1.9	1.2	1.3	0.48	0.13	0.40	**3.7[c]**	**3.4[c]**	**8.3[bc]**
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	-	-	-	-	0.038 U	0.040 U	0.18	0.17	0.16

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
0.76[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 7

Analytical Results - Building 592
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Three								
Sample ID:							Indoor Air-2P	Indoor Air-24	Indoor Air-25	Indoor Air-32	Indoor Air-33	Indoor Air-34	Indoor Air-40B	Outside Air-1	Outside Air-1P
Sample Date:							IA-031814-RB-02p	IA-031714-NH-24	IA-031714-NH-25	IA-031714-NH-32	IA-031714-NH-33	IA-031714-NH-34	IA-031714-RB-40B	OA-031714-RB-01	OA-031814-RB-01p
							3/18/2014	3/18/2014	3/18/2014	3/18/2014	3/18/2014	3/18/2014	3/18/2014	3/18/2014	3/18/2014
		Screening Levels[(1)]													
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor										
		NC a	C b	NC c	C d	NC e									
Volatile Organic Compounds															
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.034	0.035	0.058	0.024 J	0.030 J	0.045	0.031 J	0.021 J	0.0093 U
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	-	0.035 U	0.038 U	0.039 U	0.041	0.034 U	0.037 U	0.039 U	-
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	0.14 U	0.15 U	0.15 U	0.15 U	0.13 U	0.15 U	0.16 U	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	-	0.035 U	0.038 U	0.039 U	0.037 U	0.034 U	0.037 U	0.039 U	-
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	0.015 J	0.038 U	0.039 U	0.037 U	0.034 U	0.037 U	0.039 U	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.97 J	1.2	0.90	0.93	1.1	1.3	1.5	0.29	0.30
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	0.39	0.31	0.32	0.38	0.42	0.51	0.085 J	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.030 J	0.028 J	0.026 J	0.028 J	0.020 J	0.020 J	0.031 J	0.014 J	0.038
Benzene	µg/m^3	-	3.2	30	110	1000	0.92	0.87	0.83	0.76	0.83	1.1	0.88	0.65	0.42
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	-	0.42	0.47	0.40	0.44	0.43	0.40	0.46	-
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	-	0.13 J	0.11 J	0.082 J	0.093 J	0.11 J	0.11 J	0.080 J	-
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	0.16	0.21	0.17	0.17	0.21	0.10	0.21	-
Ethylbenzene	µg/m^3	-	-	1000	-	33000	2.6 J	2.3	1.7	5.2	1.9	1.8	6.5	0.49	1.4
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	0.035 U	0.038 U	0.039 U	0.037 U	0.034 U	0.037 U	0.039 U	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	7.8 J	8.1	6.0	22	6.4	6.7	26	1.8	5.5
Methylene chloride	µg/m^3	-	2500	600	83000	20000	-	0.77	2.2	0.53	0.81	1.0	0.77	0.44	-
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	0.31	**0.76[b]**	0.28	0.39	0.24	0.31	0.081 J	-
o-Xylene	µg/m^3	-	-	100	-	3300	2.6 J	2.5	2.0	6.3	2.0	2.2	7.7	0.59	1.7
Styrene	µg/m^3	-	-	1000	-	33000	0.23 J	0.26	0.37	0.99	0.24	0.22	0.50	0.092 J	0.17
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	21 J	27	**55[c]**	17	23	38	25	0.41	0.26
Toluene	µg/m^3	-	-	5000	-	170000	8.5 J	6.6	6.6	4.6	7.7	6.6	9.2	1.7	2.1
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	0.043	0.029 J	0.018 J	0.028 J	0.031 J	0.021 J	0.019 J	-
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	**2.2[c]**	0.56	1.8	0.38	0.88	0.85	0.78	0.25	0.050
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	-	0.20	0.25	0.16	0.20	0.27	0.12	0.29	-

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
0.76[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 7

Analytical Results - Building 592
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Three				Groundwater Sample[2]
Sample ID:							Sub-Slab Probe-1	Sub-Slab Probe-2	Sub-Slab Probe-24	Sub-Slab Probe-32	41C-25
Sample Date:							SS-031714-NH-01	SS-031714-MD-02	SS-031714-NH-24	SS-031714-MD-32	WG-071612-BW-41C-25-067
							3/17/2014	3/17/2014	3/17/2014	3/17/2014	7/16/2012
		Screening Levels[1]									25 ft BGS
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor						(µg/L)
		NC a	C b	NC c	C d	NC e					
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	16	0.37	3.8	1.3	-
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.037 U	0.043 U	0.036 U	0.22 U	0.50 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	0.17 U	0.14 U	0.89 U	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.17	0.043 U	0.041	0.22 U	0.50 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.037 U	0.043 U	0.036 U	0.22 U	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.081 J	0.12 J	0.035 J	0.89 U	-
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.025 J	0.036 J	0.14 U	0.89 U	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.029 J	0.040 J	0.013 J	0.22 U	-
Benzene	µg/m^3	-	3.2	30	110	1000	0.16	0.059 J	0.10 J	0.11 J	0.50 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.25	0.36	2.2	0.21 J	0.50 U
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.39	0.062 J	0.12 J	0.095 J	0.50 U
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.037 U	0.043 U	0.036 U	0.22 U	0.11 J
Ethylbenzene	µg/m^3	-	-	1000	-	33000	0.11 J	0.086 J	0.034 J	0.89 U	0.50 U
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.037 U	0.043 U	0.036 U	0.22 U	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	0.34	0.30	0.13 J	0.16 J	0.50 U
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.15 U	0.17 U	0.14 U	0.89 U	2.0 U
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.17	0.21	0.080 J	0.21 J	-
o-Xylene	µg/m^3	-	-	100	-	3300	0.11 J	0.11 J	0.047 J	0.89 U	0.50 U
Styrene	µg/m^3	-	-	1000	-	33000	0.14 J	0.10 J	0.034 J	0.89 U	-
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	18	23	6.9	**2000[e]**	0.50 U
Toluene	µg/m^3	-	-	5000	-	170000	0.37	0.24	0.14 U	0.89 U	0.15 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.037 U	0.043 U	0.036 U	0.22 U	0.50 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.064	0.30	0.054	2.4	0.50 U
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.037 U	0.043 U	0.036 U	0.22 U	0.50 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
0.76[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 8

Analytical Results - Building 595
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round One					Round Two		
Sample ID:							Indoor Air-4 IA-042013-JC-4	Indoor Air-5 IA-042013-JC-5	Outside Air-4 OA-042013-RB-4	Sub-Slab Probe-4 SS-042013-JC-4	Sub-Slab Probe-5 SS-042013-JC-5	Indoor Air-4 IA-070113-JW-4	Indoor Air-5 IA-070113-JW-5	Indoor Air-26 IA-070113-JW-26
Sample Date:							4/21/2013	4/21/2013	4/21/2013	4/20/2013	4/20/2013	7/1/2013	7/1/2013	7/1/2013
		Screening Levels[1]												
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor									
		NC a	C b	NC c	C d	NC e								
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.024 J	0.028 J	0.023 J	8.0	1.8	0.050 UJ	0.050 U	0.050 U
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.038 U	0.037 U	0.037 U	1.2 U	1.3 U	-	-	-
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	0.0051 J	0.15 U	4.9 U	5.1 U	-	-	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.038 U	0.037 U	0.037 U	1.2 U	1.3 U	-	-	-
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.038 U	0.037 U	0.037 U	1.2 U	1.3 U	-	-	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	1.0	1.2	0.75 U	25 U	22 U	0.72 J	1.8	0.73
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.28 J	0.33 J	0.75 U	25 U	22 U	-	-	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.022 J	0.037 U	0.018 J	1.2 U	1.3 U	0.052 J	0.062	0.052
Benzene	µg/m^3	-	3.2	30	110	1000	0.82	0.75	0.23	3.7 U	3.9 U	0.55 J	0.56	0.55
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.44	0.47	0.49	0.15 J	1.3 U	-	-	-
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.083 J	0.078 J	0.070 J	2.2 J	1.4 J	-	-	-
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.023 J	0.037 U	0.037 U	0.97 J	0.51 J	-	-	-
Ethylbenzene	µg/m^3	-	-	1000	-	33000	0.92	0.92	0.20	4.9 U	5.1 U	1.6 J	2.1	1.5
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.038 U	0.037 U	0.037 U	1.2 U	1.3 U	-	-	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	3.3	3.1	0.58 J	4.9 U	5.1 U	5.6 J	7.0	5.1
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.26	0.74 UJ	0.75 UJ	25 UJ	22 UJ	-	-	-
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.23	0.20	0.032 J	4.9 U	5.1 U	-	-	-
o-Xylene	µg/m^3	-	-	100	-	3300	1.2	1.1	0.18	4.9 U	5.1 U	2.2 J	2.7	2.0
Styrene	µg/m^3	-	-	1000	-	33000	0.35 J	0.28 J	0.75 U	25 U	22 U	1.7 J	1.8	1.8
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.34	1.4	0.19	**3800de**	**3600de**	0.64 J	1.0	0.55
Toluene	µg/m^3	-	-	5000	-	170000	3.8	3.5	0.60 J	4.9 U	5.1 U	3.5 J	5.2	16 J
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.038 U	0.037 U	0.037 U	1.2 U	1.3 U	-	-	-
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.089	0.24	0.038	**1600de**	**1500de**	0.27 J	0.40	0.30
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.0040 J	0.037 U	0.037 U	1.2 U	1.3 U	-	-	-

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
3800de Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 8

Analytical Results - Building 595
Occidental Chemical Corporation
Tacoma, Washington

							Round Two						
Sample Location:							**Outside Air-4**	**Sub-Slab Probe-4**	**Sub-Slab Probe-5**	**Indoor Air-4**	**Indoor Air-5**	**Indoor Air-5P**	**Indoor Air-26**	**Indoor Air-36**
Sample ID:							**OA-070113-JW-4**	**SS-062813-JW-4**	**SS-062813-JW-5**	**IA-031214-MD-04**	**IA-031214-NH-05**	**IA-031814-RB-05p**	**IA-031214-MD-26**	**IA-031214-MD-36**
Sample Date:							**7/1/2013**	**6/28/2013**	**6/28/2013**	**3/13/2014**	**3/13/2014**	**3/18/2014**	**3/13/2014**	**3/13/2014**
		Screening Levels[(1)]												
Parameters	**Units**	**Indoor Air Short-Term**	**MTCA Method C Indoor Air**		**Sub-slab Vapor**									
		NC a	**C b**	**NC c**	**C d**	**NC e**								
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.050 U	9.8	2.2 J	0.023 J	0.026 J	0.015	0.026 J	0.026 J
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	-	0.81 U	0.75 U	0.030 U	0.036 U	-	0.036 U	0.035 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	0.59 U	0.54 U	0.12 U	0.15 U	-	0.14 U	0.14 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	-	0.53 U	0.49 U	0.030 U	0.036 U	-	0.036 U	0.035 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	3.3 U	3.0 U	0.030 U	0.036 U	-	0.036 U	0.035 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.47	4.7 U	4.3 U	0.83	0.96	0.50 J	1.2	1.0
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	4.7 U	4.3 U	0.24	0.28	-	0.41	0.32
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.045 U	2.1 U	1.9 U	0.034	0.031 J	0.036 J	0.12	0.038
Benzene	µg/m^3	-	3.2	30	110	1000	0.70	6.9 J	5.1 J	1.0	1.2	0.71	1.3	1.0
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	-	0.50 U	0.46 U	0.42	0.47	-	0.46	0.47
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	-	3.2 J	1.9 J	0.10 J	0.11 J	-	0.12 J	0.11 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	1.7 U	1.6 U	0.042	0.056	-	0.054	0.055
Ethylbenzene	µg/m^3	-	-	1000	-	33000	1.5	0.79 U	0.73 U	1.1	1.5	2.4 J	1.5	1.5
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	1.6 U	1.5 U	0.030 U	0.036 U	-	0.036 U	0.035 U
m&p-Xylenes	µg/m^3	-	-	100	-	3300	6.1	1.7 U	1.5 U	4.0	4.9	8.3 J	5.5	5.2
Methylene chloride	µg/m^3	-	2500	600	83000	20000	-	1.6 U	1.5 U	2.1	0.57	-	0.51	0.46
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	3.1 U	2.9 U	0.41	0.11 J	-	0.19	0.19
o-Xylene	µg/m^3	-	-	100	-	3300	0.86	0.76 U	0.70 U	1.4	1.7	2.5 J	1.8	1.7
Styrene	µg/m^3	-	-	1000	-	33000	0.61	4.7 U	4.3 U	0.38	0.43	0.39 J	0.65	0.62
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	1.0	**7400de**	**5400de**	0.57	1.1	1.5 J	0.65	2.6
Toluene	µg/m^3	-	-	5000	-	170000	2.0	2.6 J	2.5 J	6.3	6.6	4.6 J	6.3	6.3
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	1.9 U	1.7 U	0.030 U	0.0093 J	-	0.036 U	0.0090 J
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.24	**2500de**	**1800de**	0.18	0.24	0.27	0.21	0.52
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	-	0.43 U	0.40 U	0.017 J	0.026 J	-	0.021 J	0.024 J

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
3800de Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 8

Analytical Results - Building 595
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Three					Groundwater Sample[2]
Sample ID:							Outside Air-4	Outside Air-5P	Sub-Slab Probe-4	Sub-Slab Probe-5	Sub-Slab Probe-26	10-24
Sample Date:							OA-031214-MD-04	OA-031814-RB-05p	SS-031214-MD-04	SS-031214-MD-26	SS-031214-NH-05	WG-082112-AMK-10-24-503
							3/13/2014	3/18/2014	3/12/2014	3/12/2014	3/12/2014	8/21/2012
		Screening Levels[1]										24 ft BGS
Parameters	Units	Indoor Air	MTCA Method C									(µg/L)
		Short-Term	Indoor Air		Sub-slab Vapor							
		NC a	C b	NC c	C d	NC e						
Volatile Organic Compounds												
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.028 J	0.013	6.2	1.9	1.5	-
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.038 U	-	0.86 U	0.43 U	0.34 U	2500 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	-	3.4 U	1.7 U	1.4 U	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.038 U	-	0.86 U	0.43 U	0.50	2500 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.038 U	-	0.86 U	0.43 U	0.34 U	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.43	0.11	3.4 U	1.7 U	0.18 J	-
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.13 J	-	3.4 U	1.7 U	1.4 U	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	1.2	0.014	0.86 U	0.43 U	0.34 U	-
Benzene	µg/m^3	-	3.2	30	110	1000	1.2	0.77	1.2 J	1.3	0.48 J	2500 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.36	-	0.86 U	1.4	0.12 J	2500 U
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.094 J	-	1.8 J	5.4	1.1 J	2500 U
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.057	-	0.71 J	2.1	0.37	2500 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	0.91	1.5	3.4 U	1.7 U	0.22 J	2500 U
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.020 J	-	0.86 U	0.43 U	0.34 U	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	3.1	5.2	3.4 U	0.38 J	0.57 J	2500 U
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.56	-	3.4 U	1.7 U	1.4 U	2100 J
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.19	-	3.4 U	0.17 J	0.12 J	-
o-Xylene	µg/m^3	-	-	100	-	3300	0.90	1.4	3.4 U	0.30 J	0.20 J	2500 U
Styrene	µg/m^3	-	-	1000	-	33000	0.33	0.14	3.4 U	1.7 U	1.4 U	-
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	2.0	0.29	**3000^{e}**	**1400^{e}**	**2900^{e}**	170000
Toluene	µg/m^3	-	-	5000	-	170000	2.9	1.8	0.59 J	0.86 J	2.5	2500 U
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.0097 J	-	0.23 J	1.2	0.14 J	2500 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.30	0.24	**1400de**	**940de**	**940de**	5600
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.024 J	-	0.86 U	0.43 U	0.34 U	2500 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
3800de Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 8

Analytical Results - Building 595
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Soil Samples[2]		
Sample ID:							WMUR-04	WMUR-10	WMUR-03
Sample Date:							S-061912-KB-WMUR04-001	S-091012-KB-WMUR10-001	S-061712-KB-WMUR03-001
							6/19/2012	9/10/2012	6/17/2012
		Screening Levels[1]					9 to 9 ft BGS	9 to 9 ft BGS	9.5 to 9.5 ft BGS
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor		(µg/kg)	(µg/kg)	(µg/kg)
		NC a	C b	NC c	C d	NC e			
Volatile Organic Compounds									
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	-	-	-
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	1.5 J	1.9 J	660 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	-	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	5.4 U	5.6 U	660 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	-	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	-	-	-
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	-	-	-
Benzene	µg/m^3	-	3.2	30	110	1000	5.4 U	5.6 U	660 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.36 J	5.6 U	660 U
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.35 J	5.6 U	660 U
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.60 J	1.1 J	660 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	5.4 U	5.6 U	660 U
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	-	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	5.4 U	5.6 U	660 U
Methylene chloride	µg/m^3	-	2500	600	83000	20000	11 U	12 U	460 J
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	-	-
o-Xylene	µg/m^3	-	-	100	-	3300	5.4 U	5.6 U	660 U
Styrene	µg/m^3	-	-	1000	-	33000	-	-	-
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	2400	110	42000
Toluene	µg/m^3	-	-	5000	-	170000	0.21 J	1.4 J	660 U
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	5.4 U	5.6 U	660 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	30	12	1000
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.43 J	5.6 U	660 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
3800de Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 9

Analytical Results - Building 596
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round One				Round Two			Round Three	
Sample ID:							Indoor Air-3	Indoor Air-21	Outside Air-1	Sub-Slab Probe-3	Indoor Air-3	Indoor Air-21	Sub-Slab Probe-3	Indoor Air-3	Indoor Air-21
							IA-042213-RB-3	IA-042213-RB-21	OA-042113-JC-1	SS-042113-JC-3	IA-070113-JW-3	IA-070113-JW-21	SS-062713-JW-3	IA-031414-MD-03	IA-031414-NH-21
Sample Date:							4/22/2013	4/22/2013	4/22/2013	4/21/2013	7/1/2013	7/1/2013	6/27/2013	3/15/2014	3/15/2014
		Screening Levels[(1)]													
Parameters	Units	Indoor Air Short-Term NC a	MTCA Method C Indoor Air C b	MTCA Method C Indoor Air NC c	Sub-slab Vapor C d	Sub-slab Vapor NC e									
Volatile Organic Compounds															
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.34	2.8	0.026 J	0.70	0.34	0.65	0.74	0.65	0.79
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.041 U	0.038 U	0.035 U	0.039 U	-	-	0.038 U	0.038 U	0.037 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.17 U	0.15 U	0.0084 J	0.0060 J	-	-	0.15 U	0.15 U	0.15 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.041 U	0.017 J	0.035 U	0.039 U	-	-	0.015 J	0.038 U	0.010 J
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.041 U	0.038 U	0.035 U	0.039 U	-	-	0.038 U	0.038 U	0.037 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	1.0	1.9	0.28 J	0.78 U	2.2	4.4	0.76 U	1.2	1.2
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.30 J	0.52 J	0.71 U	0.78 U	-	-	0.76 U	0.37	0.35
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.18	**2.7[b]**	0.027 J	0.027 J	1.1	**6.5[b]**	0.046	0.34	0.73
Benzene	µg/m^3	-	3.2	30	110	1000	0.85	1.1	0.46	0.18	1.3	0.82	0.54	1.4	1.3
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.48	0.48	0.50	0.32	-	-	0.31	0.47	0.46
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.27	0.088 J	0.077 J	0.041 J	-	-	0.079 J	0.13 J	0.085 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.032 J	0.035 J	0.021 J	0.039 U	-	-	0.038 U	0.051	0.046
Ethylbenzene	µg/m^3	-	-	1000	-	33000	2.6	2.2	0.25 J	0.081 J	8.4	9.9	0.53	4.8	4.9
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.041 U	0.038 U	0.035 U	0.097	-	-	0.038 U	0.038 U	0.037 U
m&p-Xylenes	µg/m^3	-	-	100	-	3300	9.8	8.5	0.87	0.31	32 J	37 J	1.8	18	19
Methylene chloride	µg/m^3	-	2500	600	83000	20000	5.5 J	75 J	0.71 UJ	0.78 UJ	-	-	0.59	11	26
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.37	0.46	0.11 J	0.079 J	-	-	0.32	0.70	0.71
o-Xylene	µg/m^3	-	-	100	-	3300	3.3	2.5	0.31 J	0.12 J	12	13	0.70	5.6	5.4
Styrene	µg/m^3	-	-	1000	-	33000	0.29 J	0.46 J	0.71 U	0.78 U	1.8	2.2	0.55 J	0.55	0.48
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	2.9	12	0.13 J	26	3.0	13	35	1.2	2.6
Toluene	µg/m^3	-	-	5000	-	170000	11	25	1.5	0.34 J	20 J	37 J	2.5	9.5	13
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.025 J	0.14 J	0.035 U	0.039 U	-	-	0.038 U	0.053	0.13
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	**6.6[bc]**	**19[abc]**	0.38	0.26	**2.9[c]**	**15 J[abc]**	0.15	**2.8[c]**	**7.1[bc]**
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.0044 J	0.0048 J	0.035 U	0.039 U	-	-	0.038 U	0.021 J	0.018 J

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
2.7[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 9

Analytical Results - Building 596
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round Three							Groundwater Sample[2]
Sample ID:							Indoor Air-21P	Indoor Air-35	Outside Air-3	Outside Air-3P	Outside Air-3AP	Sub-Slab Probe-3	Sub-Slab Probe-35	71-25
Sample Date:							IA-032114-RB-21p	IA-031414-NH-35	OA-031414-MD-03	OA-031814-RB-03p	OA-032114-RB-03Ap	SS-031414-MD-03	SS-031414-NH-35	WG-072712-AMK-71-25-116
							3/21/2014	3/15/2014	3/15/2014	3/18/2014	3/21/2014	3/14/2014	3/14/2014	7/27/2012
		Screening Levels[1]												25 ft BGS
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor									(µg/L)
		NC a	C b	NC c	C d	NC e								
Volatile Organic Compounds														
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	1.0 J	0.097	0.021 J	0.020	0.026	0.45	3.3	-
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	-	0.039 U	0.038 U	-	-	0.039 U	0.034 U	0.50 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	-	0.16 U	0.15 U	-	-	0.16 U	0.14 U	-
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	-	0.039 U	0.038 U	-	-	0.039 U	0.036	0.50 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	-	0.039 U	0.038 U	-	-	0.039 U	0.034 U	-
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	1.1 J	0.47	0.32	0.17	0.15	0.069 J	0.043 J	-
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	-	0.13 J	0.10 J	-	-	0.023 J	0.14 U	-
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	1.4 J	0.052	0.026 J	0.026	0.044	0.032 J	0.024 J	-
Benzene	µg/m^3	-	3.2	30	110	1000	0.93 J	0.81	0.67	0.72	0.59	0.12 U	0.10 U	0.50 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	-	0.46	0.43	-	-	0.29	0.25	0.50 U
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	-	0.083 J	0.086 J	-	-	0.046 J	2.6	0.50 U
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	0.042	0.055	-	-	0.028 J	0.034 U	0.12 J
Ethylbenzene	µg/m^3	-	-	1000	-	33000	5.4 J	5.5	4.2	1.4	1.8	0.037 J	0.073 J	0.11 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	-	0.039 U	0.038 U	-	-	0.039 U	0.034 U	-
m&p-Xylenes	µg/m^3	-	-	100	-	3300	13 J	21	17	5.1	6.5	0.15 J	0.26	0.12 J
Methylene chloride	µg/m^3	-	2500	600	83000	20000	-	2.6	0.39	-	-	0.16 U	0.18	2.0 U
Naphthalene	µg/m^3	-	0.74	3.0	25	100	-	0.24	0.15 J	-	-	0.16	0.077 J	-
o-Xylene	µg/m^3	-	-	100	-	3300	7.1 J	6.1	4.9	1.6	2.0	0.054 J	0.084 J	0.50 U
Styrene	µg/m^3	-	-	1000	-	33000	0.40 J	0.17	0.23	0.19	0.23	0.073 J	0.14	-
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	2.1 J	0.55	0.18	0.21	0.22	28	69	0.50 U
Toluene	µg/m^3	-	-	5000	-	170000	8.3 J	3.4	2.0	1.9	1.3	0.098 J	0.52	0.50 U
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	-	0.029 J	0.038 U	-	-	0.039 U	0.034 U	0.50 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	**4.8 J[c]**	1.5	0.20	0.11	0.10	0.077	0.13	0.50 U
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	-	0.019 J	0.025 J	-	-	0.039 U	0.034 U	0.50 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
UJ Not detected; associated reporting limit is estimated.
2.7[b] Result exceeds screening level(s) identified in superscript.
(2) Most recent, shallowest, and nearby data.

Table 10

Analytical Results - Guard Shack
Occidental Chemical Corporation
Tacoma, Washington

Parameters	Units	Screening Levels[1] Indoor Air Short-Term NC a	MTCA Method C Indoor Air C b	MTCA Method C Indoor Air NC c	Sub-slab Vapor C d	Sub-slab Vapor NC e	Round One Indoor Air-14 IA-042313-RB-14 4/24/2013	Round One Outside Air-14 OA-042313-RB-14 4/24/2013
Volatile Organic Compounds								
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.029 J	0.031 J
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.038 U	0.040 U
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.15 U	0.16 U
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.038 U	0.040 U
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.038 U	0.040 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.80	0.74 J
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.26 J	0.81 U
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.062	0.023 J
Benzene	µg/m^3	-	3.2	30	110	1000	0.79	0.75
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.47	0.43
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.11 J	0.099 J
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.038 U	0.040 U
Ethylbenzene	µg/m^3	-	-	1000	-	33000	0.58 J	0.54 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.038 U	0.040 U
m&p-Xylenes	µg/m^3	-	-	100	-	3300	1.7	1.6
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.75 U	0.81 U
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.20	0.12 J
o-Xylene	µg/m^3	-	-	100	-	3300	0.63 J	0.59 J
Styrene	µg/m^3	-	-	1000	-	33000	0.23 J	0.81 U
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	0.12 J	0.14
Toluene	µg/m^3	-	-	5000	-	170000	2.2	2.3
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.038 U	0.040 U
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	0.025 J	0.029 J
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.038 U	0.040 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.

Table 11

Analytical Results - OCC Office Building
Occidental Chemical Corporation
Tacoma, Washington

Sample Location:							Round One				
Sample ID:							Indoor Air-15 IA-041813-SL-15	Indoor Air-16 IA-041813-RB-16	Outside Air-15 OA-041813-RB-15	Sub-Slab Probe-15 SS-041713-SL-15	Sub-Slab Probe-16 SS-041713-RB-16
Sample Date:							4/18/2013	4/18/2013	4/18/2013	4/17/2013	4/17/2013
		Screening Levels[1]									
Parameters	Units	Indoor Air Short-Term	MTCA Method C Indoor Air		Sub-slab Vapor						
		NC a	C b	NC c	C d	NC e					
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/m^3	-	-	5000	-	170000	0.027 J	0.034 J	0.025 J	74	62
1,1,2,2-Tetrachloroethane	µg/m^3	-	0.43	-	14	-	0.034 U	0.038 U	0.039 U	13	4.7 J
1,1,2-Trichloroethane	µg/m^3	-	1.6	0.20	52	6.7	0.13 U	0.15 U	0.16 U	19 J[e]	3.2 J
1,1-Dichloroethene	µg/m^3	-	-	200	-	6700	0.034 U	0.038 U	0.039 U	5.6 J	1.5 J
1,2,4-Trichlorobenzene	µg/m^3	-	-	2.0	-	67	0.034 U	0.038 U	0.039 U	8.2 U	5.6 U
1,2,4-Trimethylbenzene	µg/m^3	-	-	7.0	-	230	0.59 J	0.54 J	0.78 U	160 U	110 U
1,3,5-Trimethylbenzene	µg/m^3	-	-	-	-	-	0.67 U	0.76 U	0.78 U	160 U	110 U
1,4-Dichlorobenzene	µg/m^3	-	2.3	800	76	27000	0.14	2.9[b]	0.039 U	8.2 U	5.6 U
Benzene	µg/m^3	-	3.2	30	110	1000	0.96	0.48	0.34	24 U	17 U
Carbon tetrachloride	µg/m^3	-	4.2	100	140	3300	0.47	0.45	0.47	2.1 J	3.1 J
Chloroform (Trichloromethane)	µg/m^3	-	1.1	98	36	3300	0.24	0.58	0.071 J	42[d]	28
cis-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.071	0.038 U	0.024 J	97	9.4
Ethylbenzene	µg/m^3	-	-	1000	-	33000	0.59 J	0.23 J	0.13 J	33 U	5.2 J
Hexachlorobutadiene	µg/m^3	-	1.1	-	38	-	0.046	0.021 J	0.039 U	29	28
m&p-Xylenes	µg/m^3	-	-	100	-	3300	1.7	0.88	0.44	33 U	3.8 J
Methylene chloride	µg/m^3	-	2500	600	83000	20000	0.67 U	0.76 U	0.78 U	160 U	110 U
Naphthalene	µg/m^3	-	0.74	3.0	25	100	0.36	0.085 J	0.21	33 U[d]	23 U
o-Xylene	µg/m^3	-	-	100	-	3300	0.57 J	0.37 J	0.17	33 U	3.3 J
Styrene	µg/m^3	-	-	1000	-	33000	0.21 J	0.89	0.78 U	160 U	110 U
Tetrachloroethene	µg/m^3	-	96	40	3200	1300	8.8	0.70	0.27	30000[de]	21000[de]
Toluene	µg/m^3	-	-	5000	-	170000	3.3	1.1	0.81	33 U	23 U
trans-1,2-Dichloroethene	µg/m^3	-	-	-	-	-	0.034 U	0.038 U	0.039 U	10	10
Trichloroethene	µg/m^3	8.4	6.3	2.0	210	67	5.0[c]	0.24	0.046	18000[de]	6000[de]
Vinyl chloride	µg/m^3	-	2.8	100	93	3300	0.034 U	0.038 U	0.039 U	8.2 U	5.6 U

Notes:

(1) See Table 2 for screening levels.
J Estimated concentration.
U Not detected above the associated reporting limit.
2.9[b] Result exceeds screening level(s) identified in superscript.
33 U[d] Reporting limit for non-detect parameter in SS sample exceeds applicable SS screening level identified in superscript

Table 12

Summary of Indoor Sources, Indoor Air Screening Level Exceedances, and Recommendations for Future Actions by GSH
Occidental Chemical Corporation
Tacoma, Washington

Building	Indoor Sources	IA Screening Level Exceedances							Highest IA TCE Concentration ($\mu g/m^3$)	Recommendation
		1,2,4-TMB	1,4-DCB	Naphthalene	m&p-Xylenes	Styrene	PCE	TCE		
ARF	vehicle operation and chemical storage/use in maintenance area. Individual material storage cages not reviewed			I				I/SS*	2.9	NFA by GSH
326**	no specific indoor sources; however, painting, carpeting, and new ceramic tile floors installed in last 2 years								0.17	NFA by GSH
407	paint bay operations, miscellaneous power and hand tools, parts washing tubs, chemical storage tanks, three flammable material storage lockers, paint cans, cleaning products, miscellaneous building materials, and vehicles operation	I		I	I	I			0.14	NFA by GSH
532	aerosol cans containing chemical cleaners, lubricants, paints, and diesel fuel	I	I						0.86	NFA by GSH
592	parts washing tub, degreasers, chemical storage, gas cans, gasoline-operated equipment (forklifts), bins of metal waste shavings, oil/lubricant products, metal working tools and equipment			I			I/SS***	I	13	NFA by GSH
595****	propane and diesel-powered vehicles (forklift and trucks)								0.52	Continued Monitoring by GSH
596	numerous flammable storage lockers and stored chemicals including cleaners, cutting oils, and metal working tools and equipment		I					I	19	NFA by GSH
Guard Shack	none observed								0.025 J	NFA by GSH
OCC Office	none observed		I					SS	5.0	Manage Occupancy by GSH
	Most Frequent Likely Source	**I**	**I**	**I**	**I**	**I**	**I/SS**	**I**		

Notes:

I	Likely indoor source.
O	Likely outdoor source.
SS	Likely sub-slab source.
NFA by GSH	No further action by GSH.
	IA concentration exceeds short-term criterion (8.4 $\mu g/m^3$).
SS*	Sub-slab source unrelated to OCC site.
326**	Summary based on round four data collected after decommissioning of below-slab cold air duct returns mitigating a potential preferential pathway for vapor intrusion.
SS***	Sub-slab source unrelated to OCC site. The potential contribution to IA concentrations from location SS-32 is unclear.
595****	Sub-slab vapor concentrations are being adequately attenuated.