REVISED DRAFT
2021 Annual Vapor Intrusion Mitigation Status Report

Pacific Food Systems, Inc. North Building
5815 Fourth Avenue South, Seattle, Washington

5900 1st Avenue South, Seattle, Washington

Agreed Order No. DE10402

March 8, 2022

Prepared for

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Vapor Intrusion Mitigation Status Report
Pacific Foods System, Inc and 5900 1st Avenue South
Seattle, Washington

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LIST OF ABBREVIATIONS AND ACRONYMS

Agreed Order	Agreed Order No. DE 5348
Capital	Capital Industries, Inc.
CEF	cancer exceedance factors
CLARC	Cleanup Levels and Risk Calculation
COC	Constituent of concern
Ecology	Washington State Department of Ecology
Farallon	Farallon Consulting, LLC
HVOC	halogenated volatile organic compound
IOW	inches of water
IPIMAL	Inhalation Pathway Interim Measures Action Limit
King County	King County, Washington
Landau	Landau Associates, Inc.
µg/m^3	micrograms per cubic meter
MTCA	Model Toxics Control Act
Natus	Natus Medical Building
NCEF	non-cancer exceedance factor
PCE	tetrachloroethene
PFE	pressure field extension
PFS-N	Pacific Food Systems, Inc. North Building
PSC	Philip Services Corporation
PSCAA	Puget Sound Clean Air Agency
SCFM	standard cubic feet per minute
Site	Capital property
SSDS	sub-slab depressurization system
TCE	trichloroethene
VI	vapor intrusion
VIIMM	Vapor Intrusion, Inspection, Monitoring, and Maintenance
VIRL	vapor intrusion remediation levels
VOC	volatile organic compound
West 4th Group	West of 4th Group

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1.0 INTRODUCTION

Landau Associates, Inc. (Landau) has prepared this 2021 Annual Vapor Intrusion Mitigation Status Report on behalf of Capital Industries, Inc. (Capital) to provide an update on ongoing vapor intrusion (VI) mitigation measures managed by Capital within the West of 4th site. Sub-slab depressurization systems (SSDSs) are currently operating at the Pacific Food Systems, Inc. North Building located at 5815 4th Avenue South in Seattle, Washington (PFS-N) and the former Natus Medical Building located at 5900 1st Avenue South (also formerly known as Olympic Medical Building; 5900 1st Avenue) in Seattle, Washington. The general site location is shown on Figure 1 and the locations of PFS-N and 5900 1st Avenue South relative to the Capital property are shown on Figure 2.

Operation of VI mitigation systems at PFS-N and 5900 1st Avenue South is required by the Washington State Department of Ecology (Ecology) in accordance with Exhibits B and D of Agreed Order No. DE 5348 entered into by Ecology and Capital on January 24, 2008 (Agreed Order) and with the *Revised Vapor Intrusion Assessment, Monitoring, and Mitigation Plan*, prepared by Farallon Consulting, L.L.C. (Farallon 2015a) under Agreed Order No. DE 10402 entered into by Ecology and the West of 4th Group (West 4th Group).

1.1 Purpose of Report

The purpose of this report is to provide a summary of the performance and monitoring results for the VI mitigation measures and details relating to the SSDSs' ongoing operations at the PFS-N and 5900 1st Avenue South buildings in the 2021 period.

1.2 Report Organization

The report is organized as follows:

- **Section 1 Introduction**: Presents the report's purpose
- **Section 2 Site Description and Background**: Provides a description of the Capital Area of Investigation and a summary of the PFS-N and 5900 1st Avenue South buildings' backgrounds
- **Section 3 VI Mitigation Measures**: Provides reference details of the SSDSs' installation and operations
- **Section 4 Inspection, Monitoring, and Maintenance Procedures**: Discusses the procedures used for the SSDSs' inspection, monitoring, and maintenance
- **Section 5 Inspection, Monitoring, and Maintenance Results**: Discusses the results from the SSDSs' inspection, monitoring, and maintenance activities conducted at the PFS-N and 5900 1st Avenue South buildings
- **Section 6 Conclusions**: Presents Landau's conclusions regarding the SSDSs' monitoring and performance air sampling results for the PFS-N and 5900 1st Avenue South buildings
- **Section 7 Planned Work**: Discusses work planned for the 2022
- **Section 8 References**: Provides a list of the documents used in preparation of this report.

2.0 SITE DESCRIPTION AND BACKGROUND

This section provides a description of the Capital Area of Investigation (as shown on Figure 2) within which the PFS-N and 5900 1st Avenue buildings are located and a summary of each building's background, including a discussion of the basis for each VI mitigation plan and the SSDSs' operation.

2.1 Site Description

The Capital property (Site) is located at 5801 Third Avenue South between South Mead Street to the north and South Fidalgo Street to the south, and between 4th Avenue South to the east and 1st Avenue South to the west in Section 39, Township 24 South, Range 4 East in Seattle, King County, Washington (Figure 2). Capital is one of several sources of halogenated volatile organic compounds (HVOCs) within the West of 4th remediation site. Groundwater impacted with trichloroethene (TCE) extends downgradient to the south-southwest from the property. The Capital Area of Investigation is defined as the area south of South Mead Street, east of 1st Avenue South, north of South Front Street, and west of 4th Avenue South, and includes the property on the northwest corner of 4th Avenue South and South Mead Street (Farallon 2009b) (Figure 2). The Capital Area of Investigation is within Seattle city limits in King County, Washington (King County) in an area zoned for industrial light manufacturing. Properties within the Capital Area of Investigation include a mixture of light industrial and commercial properties.

The PFS-N Building is located adjacent to the east end of Capital Plant 4 (Figure 2), and is used by Pacific Food Systems, Inc. for warehouse storage, equipment maintenance, and machining.

The 5900 1st Avenue South building is located within the Capital Area of Investigation, south (downgradient) of Capital Plant 2 (Figure 2) and was previously used by Natus Medical Inc. for the distribution and manufacture of medical equipment. The building has also been historically referred to as the Olympic Medical Building in prior Site documents. Natus Medical Inc., the most recent tenant, vacated the building between October and December 2020. The building is owned by CenterPoint Properties and remained vacant for the entirety of 2021.

2.2 PFS-N Building Background

According to prior Site documents prepared by others, the volatile HVOCs tetrachloroethene (PCE) and TCE were detected in soil gas, at concentrations exceeding the screening levels used to evaluate VI risk at the time (75 micrograms per cubic meter [µg/m^3] and 3.9 µg/m^3, respectively), in two sub-slab soil gas samples collected at the PFS-N Building in April 2011.

The initial sub-slab soil gas sample results from the PFS-N Building exceeded VI screening levels in place at the time and triggered indoor air analysis to further evaluate whether a VI risk was present (Farallon 2017). The results from the assessment of indoor and outdoor ambient air, conducted between 2012 and 2014, showed TCE concentrations in indoor air indicating that HVOCs in the subsurface were potentially contributing to a VI condition at the PFS-N Building.

Tier 4 mitigation measures were implemented in 2015, which consisted of a SSDS. Adjustments were made to optimize and confirm the extent of the negative pressure field exerted by the mitigation system (extension of the discharge stack, and additional differential pressure monitoring points) in 2017 and 2018. Despite implementation and optimization of the mitigation system, TCE results from indoor air sampling events have remained relatively consistent indicating a background TCE source, not VI, is the cause of volatile organic compounds (VOCs) in indoor air at PFS-N.

VI mitigation design specifications for the PFS-N Building were developed in accordance with the *Vapor Intrusion Mitigation Design Plan* (Farallon 2014b). The need for VI mitigation at the PFS-N Building was based on results from Farallon's *Tier 3 Vapor Intrusion Assessment* (Farallon 2014a, b). The as-built plans of the SSDS installed and in operation at the PFS-N Building are contained in Appendix A.

2.3 5900 1st Avenue South (Former Natus Medical and Former Olympic Medical) Building Background

The 5900 1st Ave building is located south of the Capital Plant 1 and Plant 5 buildings.[1] According to prior Site documents prepared by others (Farallon 2009a), Phillips Services Corporation (PSC) initially conducted a Tier 3 VI assessment at the building; subsequently, Capital was identified as the lead business responsible for VI mitigation.

The Tier 3 VI assessment was conducted in 2005 and included sampling indoor air to determine whether commercial indoor air cancer exceedance factors (CEFs) and non-cancer exceedance factors (NCEFs) exceeded their respective ratio benchmarks in place at the time.[2] The warehouse and manufacturing area results exceeded CEFs and NCEFs in the building, and a VI mitigation system was proposed by PSC for those areas based on the concentrations of TCE detected in indoor air (Farallon 2009a). Subsequent additional indoor air sampling by GeoEngineers Inc. in 2006 confirmed exceedances of TCE Inhalation Pathway Interim Measure Action Levels (IPIMALs), which were the screening levels at the time, in indoor air within the warehouse area. In January of 2009, Farallon implemented mitigation in the form of a SSDS within the 5900 1st Ave building (Farallon 2009a). The VI mitigation system was designed according to specifications defined in the *Vapor Intrusion Mitigation Work Plan, Olympic Medical Facility, Seattle, Washington* (Farallon 2008). The as-built plans of the SSDS installed and in operation at the 5900 1st Avenue South building are contained in Appendix A.

Natus Medical Inc., the former tenant, began closing its operation and vacating the building in 2020. Natus Medical Inc. completed closure of its operations in 2021.

[1] There are no known HVOC releases from Capital Plant 1 and Plant 5.

[2] A site-specific VI evaluation method was developed by PSC and Ecology because Washington had no published guidance or VI screening levels at the time.

3.0 VAPOR INTRUSION MITIGATION MEASURES

SSDSs in the PFS-N and 5900 1st Avenue South buildings were designed in accordance with the specifications defined in each facility's VI mitigation work plan or VI mitigation design plan, and ASTM International 2121-13. Installation of the SSDS in the PFS-N Building was completed in March 2015 and installation of the 5900 1st Avenue South building SSDS took place in January 2009. As-built schematics for the SSDSs installed and in operation at both buildings are provided in Appendix A.

The basis for the SSDS design, installation details, inspection, monitoring, and maintenance procedures are discussed in detail for the PFS-N Building in the following:

- *Vapor Intrusion, Inspection, Monitoring, and Maintenance Work Plan*, Pacific Seafoods North Building (Farallon 2015b)
- *Vapor Intrusion Mitigation Measures Status Report*, Pacific Food Systems, Inc. North Building (Farallon 2017).

The basis for the SSDS design, installation details, inspection, monitoring, and maintenance procedures are discussed in detail for the 5900 1st Avenue South building in the following:

- *Vapor Intrusion Mitigation Report*, Olympic Medical Facility, prepared by Farallon, September 10, 2009 (Farallon 2009d)
- *Vapor Intrusion, Inspection, Monitoring, and Maintenance Work Plan*, Olympic Medical, prepared by Farallon, November 2, 2009 (Farallon 2009c).

4.0 INSPECTION, MONITORING, AND MAINTENANCE PROCEDURES

This section presents the inspection and monitoring procedures conducted at the PFS-N and 5900 1st Avenue South buildings during the 2021 period. Inspection and monitoring were conducted in accordance with the Site documents referenced in Section 3.0.

4.1 Inspections and Monitoring

Periodic inspection and monitoring is conducted to confirm that each building's SSDS is operating effectively. Inspection and monitoring of the SSDSs includes the following:

- General system component inspection
- Negative pressure field extension (PFE) monitoring
- Reviewing the onsite SSDS operations documentation maintained by the trained tenant contact (PFS-N only)
- Periodic air quality monitoring.

4.1.1 Tenant Inspections

Inspections by the tenant are to be conducted monthly to ensure that the SSDS is operating properly. During 2021, the 5900 1st Avenue South (former Natus Medical) Building currently owned by CenterPoint was unoccupied by a tenant. Therefore, monthly tenant inspections were not conducted at the 5900 1st Avenue South Building.

The building tenant contacts the designated consultant and/or Capital personnel if the SSDS is not operating properly. 2021 contact information for Pacific Food Systems, Inc., 5900 1st Avenue South (CenterPoint), Capital, and Landau is provided below.

JSI Pacific, Inc. dba Pacific Food Systems, Inc.
Ms. Inna Guryevsky, Operations Manager
5815 Fourth Avenue South
Seattle, Washington 98108
(206) 658-0382

5900 1st Avenue South Building
CenterPoint
Ms. Andrea Hacker, Property Manager
1808 Swift Drive
Oak Brook, Illinois 60623
(206) 970-1780

Capital Industries, Inc.
Mr. Matt Loftis, Facilities and Environmental Manager
5801 Third Avenue South
Seattle, Washington 98108
(206) 762-8585

Landau Associates, Inc.
Mr. David Johnson, Project Engineer, or Ms. Jennifer Wynkoop, Project Manager
2107 South C Street
Tacoma, Washington 98402
(253) 926-2493

4.1.2 Annual Inspections

Annual inspections are conducted to observe and document the condition of each SSDS and to record changes to each building and surrounding area that could affect the performance of each SSDS. The annual inspection consists of observing and documenting the condition of the components for each SSDS, any structural changes or modifications to each building and to adjacent buildings or structures and recording each SSDS's current pressure gauge measurements. Previously documented pressure gauge measurements are used for comparison during the inspections. Photographs are taken during the inspection, as necessary, to document any deterioration of materials (e.g., cracks in piping, mounting damage) or other pertinent changes in the condition of each SSDS, each building structure, or other factors that could impact each system's operation or effectiveness.

4.1.3 Pressure Field Extension Monitoring

PFE monitoring is conducted at each building on a biannual basis (typically in March and September) to measure the pressure differential across each building slab while the SSDS is operating. The results from PFE monitoring are used to confirm that the negative pressure field extends across the designated mitigation area.

Five permanent sub-slab monitoring ports were previously installed in the building slab at the PFS-N Building for PFE monitoring. The sub-slab monitoring ports are flush-mounted to the building slab, and have a tamper-resistant cap. The sub-slab monitoring ports are used for PFE monitoring to verify the negative pressure field extends across the slab under the entire building. Effective depressurization occurs at any measurable vacuum; however, for evaluation purposes, a negative pressure of 0.005 inches of water (IOW) column or more at each of the sub-slab monitoring ports is more than sufficient to demonstrate effective depressurization. The tamper-resistant cap secures the sub-slab monitoring port closed between PFE monitoring events to maintain the integrity of the depressurization applied by the SSDS. The location and details of the PFS-N sub-slab monitoring ports are shown on Sheet Numbers 3 and 4 in Appendix A.

There are seven manometer pressure gauges at the 5900 1st Avenue South building located at each SSDS extraction sump that are currently used for ongoing PFE monitoring. The pressure readings of each extraction sump location should be within a 25 percent reading of the currently applied SSDS overall system vacuum, which has historically been between 5-15 IOW vacuum.

4.1.4 Air Quality Monitoring

Air quality monitoring is performed at the PFS-N and 5900 1st Avenue South buildings to provide air quality data that can be:

- Directly compared with previous VI assessment data to evaluate the reduction in HVOCs due to operation of the SSDSs;
- Used to adjust the SSDS's operation parameters, if needed (Farallon 2015a); and
- Used to evaluate whether further action is necessary to protect human health.

Air quality monitoring is typically conducted semiannually in accordance with the Vapor Intrusion, Inspection, Monitoring, and Maintenance (VIIMM) Work Plan (Farallon 2015b). Air samples collected during this reporting period were collected at the designated sampling locations used during previous investigations/sampling events using 6-liter Summa canisters with flow controllers set to collect a sample over an 8-hour duration (see Figures 3 and 4). The indoor and outdoor air samples were analyzed for PCE, TCE, cDCE, tDCE, 1,1-DCE, and Vinyl Chloride by U.S. Environmental Protection Agency Method TO-15 Selected Ion Monitoring. TCE is the primary constituent of concern because it historically exceeded screening criteria at both PFS-N and 5900 1st Avenue South. All sampling was performed in accordance with the standard operating procedures established during completion of the Tier 3 VI Assessments (Farallon 2013) and the VIAMM Plan (Farallon 2015a).

4.1.4.1 Screening Levels

VI investigation at the West of 4th site began before Washington State issued guidance on vapor intrusion investigation and historically, multiple screening levels were used to evaluate compliance. Previously, IPIMALs[3] and cancer/non-cancer exceedance factors were used to evaluate sample results for groundwater, sub-slab soil gas[4] and indoor air. The screening levels were based on older VI science that has since been updated with guidance at both the federal and state level. Ecology has now published updated draft guidance for evaluating vapor intrusion (Ecology 2018) and published Method B screening levels in the Cleanup Levels and Risk Calculation (CLARC) tables. Use of prior IPIMAL screening levels is no longer warranted.

The Ecology guidance includes procedures for calculating Modified Model Toxics Control Act (MTCA) Method B screening levels for a commercial scenario (i.e., screening levels which reflect exposure of an adult worker). Modified MTCA Method B indoor air and soil gas screening levels the West of 4th site were calculated for a commercial exposure scenario using an exposure frequency of 0.30 per Ecology guidance. Indoor air and sub-slab soil gas results collected as part of the mitigation operation

[3] Discussion of the former IPIMALs is presented in the following documents; Revised Inhalation Pathway Interim Measures Work Plan prepared by Philip Services Corporation (PSC 2002); Draft Interim Vapor Intrusion Plan prepared by Arrow Environmental et al. (Arrow Environmental 2007), which is Exhibit D of the Agreed Order; Updated Air and Groundwater Inhalation Pathway Interim Measures Action Levels (IPIMALs)/Vapor Intrusion Remediation Levels (VIRLs) for Residential and Commercial Scenarios for the Georgetown Site prepared by Pioneer Technologies Corporation (Pioneer 2012).

[4] Sub-slab soil gas IPIMALs were calculated from the indoor air IPIMAL using an attenuation factor 0.1 and later of 0.03, when Ecology issued updated guidance.

and maintenance program are compared to Modified Method B commercial screening levels. Screening levels are presented in Table 1.

4.1.5 Chemical Inventory

When doing indoor air sampling, an inventory may be performed to find sources of indoor air contaminants. Due to persistent low-level detections of TCE at PFS-N, a chemical inventory was completed in conjunction with 2021 semiannual air monitoring in order to determine if a product containing TCE could be identified. A chemical inventory log was completed, noting product names; their locations, size, and condition; chemical ingredients; indications of the magnitude of use; and presence of a safety data sheet for each product. A photograph of each product was also taken. Results of the PFS-N chemical inventory are presented in Section 5.2.2.

4.2 System Evaluation and Optimization

Results from the air quality monitoring, PFE monitoring, groundwater monitoring, and annual inspections are evaluated to determine whether modifications to each SSDS are necessary. The SSDSs are re-evaluated or modified to meet performance standards as warranted based on inspection and monitoring results. The following criteria are used to determine whether re-evaluation of each SSDS is warranted:

- Inspection results indicate a significant structural change in each building (e.g., remodeling that could introduce additional pathways for vapor intrusion);
- Inspection indicates the system is not meeting performance standards;
- Air quality monitoring results indicate an indoor air exceedance; and/or
- Groundwater sampling analytical results indicate a minimum tenfold increase in cumulative VI risk/hazard in the vicinity of each building, as defined in the VIAMM Plan (Farallon 2015a).

4.3 Sub-Slab Depressurization System Maintenance

SSDS maintenance will be performed as needed based on conditions observed during system monitoring and/or optimization visits. Typical target maintenance items are described below.

The SSDS components that may require maintenance include the exhaust blower, the pressure gauge, and piping. The exhaust blower is not amenable to periodic maintenance and is relatively easy to replace. Therefore, the blower will be operated until excessive noise, vibration, or significantly reduced pressure-gauge readings are noted, at which point a blower will be repaired or replaced. An operational failure of the blower would be indicated by the pressure gauge, which is checked during monthly tenant inspections, annual inspections, and/or biannual monitoring. Pressure gauges may fail or become less accurate after prolonged use. The SSDS's pressure measurements collected during annual or biannual inspections and will be compared to the SSDS's pressure gauge readings. The SSDS's pressure gauge will be replaced when a measured reading deviates from the monitored SSDS's pressure by more than 25 percent. If pressure gauge failure is confirmed, a replacement pressure

gauge will be installed and tested. Replacement of cracked or otherwise damaged system piping observed during annual inspections or identified by the building tenant may be required on an as needed basis. Ongoing regular SSDS maintenance will be performed as needed without direct coordination or approval with Ecology. Proposed significant modifications to the SSDSs will be presented to Ecology for approval prior to proceeding with the work.

5.0 ANNUAL INSPECTION, MONITORING, AND MAINETENANCE RESULTS

The PFS-N SSDS startup occurred in April 2015 and the 5900 1st Avenue South SSDS startup occurred in January 2009. During the 2021 operational period, both SSDSs operated continuously with no significant changes from prior year operations. Operation parameters for each SSDS are summarized in Table 2 and Table 3 respectively.

5.1 Inspection, Monitoring, and Maintenance Activities

Periodic inspections to monitor the SSDSs and adjust operations were conducted by Landau on April 26 and September 7, 2021. The work elements cited in Section 4.0, Inspection, Monitoring, and Maintenance Procedures, were monitored and documented during each visit. Air quality monitoring was also conducted by Landau to evaluate whether the SSDSs were reducing HVOCs in indoor air, conducted on the same dates listed above. In addition to the inspections, a chemical inventory was completed at PFS-N on September 7, 2021.

Each sampling event at each building included collecting indoor air samples and an outdoor ambient air sample. The approximate locations of the samples are depicted on Figure 3 and Figure 4. Sampling was conducted in general accordance with the procedures described in the VIIMM Work Plan (Farallon 2015b) and its supporting documents. Air quality monitoring parameters and results are summarized in Table 1. The laboratory analytical reports are provided in Appendix B.

The monitoring conducted in April and September 2021 at PFS-N and 5900 1st Avenue South also included 5-minute grab samples of the combined soil gas influent being extracted by each SSDS prior to discharge to the exhaust stack. The purpose of this sampling was to confirm that the discharge to outdoor ambient air would comply with Puget Sound Clean Air Agency (PSCAA) regulations (less than 1,000 pounds per year total HVOCs), and to evaluate overall trends in soil gas concentrations. Samples were collected using a 1-liter Summa canister at a sampling port located prior to entry to the SSDS blower. Samples were collected while the system was operating. A slight vacuum was maintained in the canister to mitigate potential loss of the sampled influent. Routine maintenance activities included inspection of each building's SSDS components during each 2021 Site visit.

5.2 Inspection, Monitoring, and Maintenance Results

Results from the air quality sampling and the SSDSs' operation monitoring are described below. The air quality monitoring sample locations are depicted on Figure 3 and Figure 4. The sampling parameters, screening levels, and results are summarized on Table 1. Tables 2 and 3 provide summaries of SSDS operation parameters for PFS-N and 5900 1st Avenue respectively. The laboratory analytical reports are provided in Appendix B.

5.2.1 PFS-N Results

Air quality monitoring results from samples collected in 2021 indicated that Constituents of Concern (COCs) persisted in indoor air at concentrations similar to prior rounds of monitoring at PFS-N (Table 1 and Figure 5). However, pressure measurements indicate the SSDS is maintaining a sufficiently negative pressure field across the entire building slab. The consistent detections of COCs in indoor air while the SSDS is properly functioning indicate a background source of COCs in indoor air at PFS-N; a chemical inventory was performed during the September 2021 sampling event and a source of TCE was located (see Section 5.2.2). Detections are summarized below:

- TCE was detected above the laboratory reporting limit in all samples (except one) collected during April and September 2021. Indoor air concentrations ranged from 1.02 µg/m^3 to 1.94 µg/m^3, all below the Modified Method B commercial indoor air screening level (2.1 µg/m^3). TCE was detected at a concentration of 0.411 µg/m^3 in outdoor air collected in April 2021; TCE was not detected above the laboratory reporting limit in outdoor air collected in September 2021. Influent SSDS concentrations, representative of average soil gas concentrations, were 84.7 µg/m^3 (above the Modified Method B commercial soil gas screening level of 69 µg/m^3) and 33.0 µg/m^3 (below screening level).
- PCE was detected above the laboratory reporting limit (but below the Modified Method B commercial indoor air screening level) in all samples collected in April 2021. Detected concentrations in indoor air ranged from 0.357 µg/m^3 to 1.85 µg/m^3. The detected concentration in outdoor air during the April sampling event was 1.66 µg/m^3. Typically, outdoor air concentrations would be subtracted from indoor air concentrations. However, for the purposes of this report, original data is reported. Influent concentrations, representative of average soil gas concentrations, were 41.4 and 21.9 µg/m^3, below the Method B commercial soil gas screening level of 1070 µg/m^3.
- cDCE was detected in one sample above the laboratory reporting limit (2.29 µg/m^3 in the influent sample collected April 2021). There are no screening levels for cDCE due to insufficient toxicity data.
- No other COCs were detected above the laboratory reporting limit.

The SSDS operating parameters were measured in April and September 2021. IOW operating vacuum was measured at 3.8 (April) and 3.3 (September), resulting in a measured negative pressure field extension vacuum range of 0.008 to 0.052 IOW in April and 0.007 to 0.048 IOW in September at sub-slab monitoring ports SSMP-1 through SSMP-5. System flowrate was measured at 19.14 (April) and 29.2 (September) standard cubic feet per minute (SCFM). Table 2 provides a summary of SSDS operation parameters.

The SSDS soil gas influent samples provide a measurement of average soil gas concentrations beneath the slab and are also used to verify that total emissions remain below PSCAA regulations. SSDS influent sample concentrations have been declining since the SSDS startup with a steady-state rate of removal from approximately 2016 to date. Additionally, influent sample concentrations confirm annual discharge remains below PSCAA requirements. Figure 5 shows the TCE concentration trend in influent samples over time.

5.2.2 PFS-N Chemical Inventory

As mentioned above, sampling results at PFS-N (including results of 2021 sampling) indicate the presence of a background TCE source in the building. In September 2021, a chemical inventory completed by Landau identified a product at PFS-N that contains 30 to 50 percent TCE.[5] The product appeared to be used relatively frequently; several spray cans were observed including one sitting on a work bench. The presence of a TCE-containing compound explains the presence of the TCE concentrations in indoor air as well as why concentrations in indoor air remained unchanged following the installation of the SSDS. Additional investigation will be required to confirm that indoor air concentrations of TCE are due to an indoor source; planned work for 2022 is discussed further in Section 7.0.

5.2.3 5900 1st Avenue South Results

Air quality monitoring results for samples collected in 2021 indicated that COCs were below their respective indoor air Modified Method B commercial screening levels (Table 1 and Figure 6) for TCE and PCE at the 5900 1st Avenue South building. Detections are summarized below:

- TCE was not detected in indoor air or outdoor air in 2021. TCE was detected above the analytical reporting limit in the two influent samples, collected in April and September 2021. The detected concentrations were 0.472 and 1.16 µg/m^3, below the Modified Method B commercial soil gas screening level (69 µg/m^3).
- PCE was detected above the laboratory reporting limit in all samples except for the outdoor air sample collected during September 2021. Indoor air concentrations ranged from 0.107 µg/m^3 to 0.343 µg/m^3, below the Modified Method B commercial indoor air screening level (32 µg/m^3). PCE was detected in outdoor air in April at a concentration of 0.107 µg/m^3. Typically, outdoor air concentrations would be subtracted from indoor air concentrations; however, for the purposes of this report, original data is reported. Influent concentrations were 0.764 and 1.55 µg/m^3, below the Modified Method B commercial soil gas screening level (1,070 µg/m^3).
- No other COCs were detected during the August and September 2021 sampling events.

The SSDS system operating parameters were measured in April and September 2021. IOW operating vacuum was measured at 9.2 (April) and 8.7 (September), resulting in a measured negative pressure field extension vacuum range of 8.0 to 9.0 IOW in April and 7.5 to 9.1 IOW in September at extraction sumps 1 through 7. System flowrate was measured at 274 SCFM (April) and 257 SCFM (September). Table 3 provides a summary of SSDS operation parameters.

[5] Zep Inc., material name A07326 ZEP 45 017401_12CS 20N17 lubricant. https://zsds3.zepinc.com/ehswww/zep/result/direct_link.jsp?P_LANGU=E&P_SYS=2&P_SSN=11337&C001=MSDS&C002=US&C003=E&C013=17401&C123=SDS*

SSDS influent sample concentrations have been declining since the SSDS startup. Additionally, influent sample concentrations confirm annual discharge remains below PSCAA requirements. Figure 6 shows the TCE concentration trend in influent samples over time.

The SSDS vacuum blower at 5900 1st Avenue South was fully inspected during the 2021 Site visits and is still operating effectively within normal operating parameter ranges. The current vacuum blower is applying sufficient vacuum beneath the 5900 1st Avenue South building slab resulting in ongoing effective depressurization and VI mitigation.

Inspection of the building revealed a crack between the building slab and the east wall of the building near sump 3. Despite the crack, vacuum appears to be maintained at sumps 3 and 4 based on the vacuum readings.

6.0 CONCLUSIONS

6.1 PFS-N

The PFS-N indoor air quality monitoring results for TCE have fluctuated over time, with continued detections of TCE in indoor air despite ongoing operation of the SSDS (Table 1 and Table 2; Figure 3). PFS-N SSDS vacuum measurements indicate that the SSDS is effectively maintaining a negative pressure field beneath the PFS-N Building slab (Table 2). A chemical inventory in September 2021 identified a background source likely contributing to persistent concentrations of TCE detected in indoor air. For subsequent sampling events, the sampling team will attempt to remove the TCE-containing product from the building during sampling. If removal of the background source reduces indoor air concentrations, SSDS shut-down confirmation sampling may be requested to determine if the system could be turned off. If this request is initiated, an accompanying work plan will be prepared for Ecology review.

6.2 5900 1st Avenue South

At the 5900 1st Avenue South building indoor air quality monitoring results showed no detections of TCE in indoor air in 2021. (Tables 1 and 2; Figure 4). Vacuum measurements indicate that the SSDS is effectively maintaining a negative pressure field beneath the building slab (Table 2). The SSDS influent concentrations, representative of average soil gas concentrations beneath the slab, indicate the sub-slab vapor concentrations are not a risk for vapor intrusion as they are below the Modified Method B commercial soil gas screening levels for all constituents.

Natus Medical, Inc., the former tenant, began closing its operation and vacating the building in 2020, and completed closure of its operations in 2021. Prior to closure of the Natus operation, TCE was consistently detected in indoor air (Figure 6). Since September 2020, after Natus Medical, Inc. shut down its operation, TCE has not been detected in indoor air during three consecutive semi-annual sampling events. The discrepancy between indoor air and sub-slab soil gas results (previously indoor air concentrations were often higher than soil gas results) during active system operation and the absence of TCE in indoor air upon shutdown of the Natus business operations, provides multiple lines of evidence that concentrations of TCE in indoor air were related to a background source of TCE (use of a TCE-containing product) within the building and not to vapor intrusion.

TCE concentrations in sub-slab soil gas also do not indicate the potential for vapor intrusion. The current Method B soil gas screening level for TCE published in CLARC for residential properties is 11 µg/m^3 and the Modified Method B soil gas screening level for commercial properties is 69 µg/m^3, while the soil gas concentrations beneath the 5900 1st Avenue South property hover around 1 µg/m^3 or less.

Evaluation of current and historical TCE data from the 5900 1st Avenue South property indicates that operation of the mitigation system is no longer warranted. Re-evaluation of the VI potential at the 5900 1st Avenue South property with the SSDS off is recommended to verify these conclusions.

The SSDS vacuum blower in operation at 5900 1st Avenue South is beyond its standard operational lifetime period. However, inspection and monitoring activities conducted during 2021 indicate the SSDS vacuum blower is still operating effectively within normal operating parameter ranges. Despite its age, the current vacuum blower is applying sufficient vacuum beneath the 5900 1st Avenue South building slab resulting in ongoing effective depressurization and VI mitigation. If additional work conducted in 2022 determines that ongoing SSDS operations at 5900 1st Avenue South are necessary beyond 2022, the vacuum blower should be replaced with a similar unit once operating parameters indicate a decline in system performance.

7.0 PLANNED WORK FOR 2022

SSDS operations will continue at both PFS-N and 5900 1st Avenue South buildings during the beginning of 2022, pending additional investigation work, including the potential system shutdown and testing recommended above.

SSDS inspections, maintenance, and monitoring, including indoor/outdoor ambient air sampling, is scheduled to be conducted by Landau personnel in March and September 2022 at both PFS-N and 5900 1st Avenue South, unless shutdown and testing occur prior. The results of the inspections, maintenance, and monitoring of the SSDSs will be summarized in the 2022 annual VI mitigation status report.

A crack was noted between the building slab and the east exterior wall of the 5900 1st Ave building during the September 2021 inspection. The sampling team proposes to fill the crack with concrete crack seal prior to the March 2022 sampling event.

Capital proposes to temporarily shut down the SSDS at 5900 1st Avenue South and conduct confirmation sampling to determine if the system can be shut down permanently. A work plan for confirmation sampling will be prepared and submitted to Ecology in early 2022. Results and recommendations will be summarized in a technical memorandum.

During the March sampling event at PFS-N, the sampling team will attempt to remove the TCE background source from inside the building. A work plan will also be prepared to conduct additional sampling and determine if shut-down of the PFS-N system is warranted.

8.0 USE OF THIS REPORT

This report has been prepared for the exclusive use of Capital Industries and applicable regulatory agencies for specific application to the Capital Area of Investigation and Agreed Order No. DE 10402 Site. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau, shall be at the user's sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

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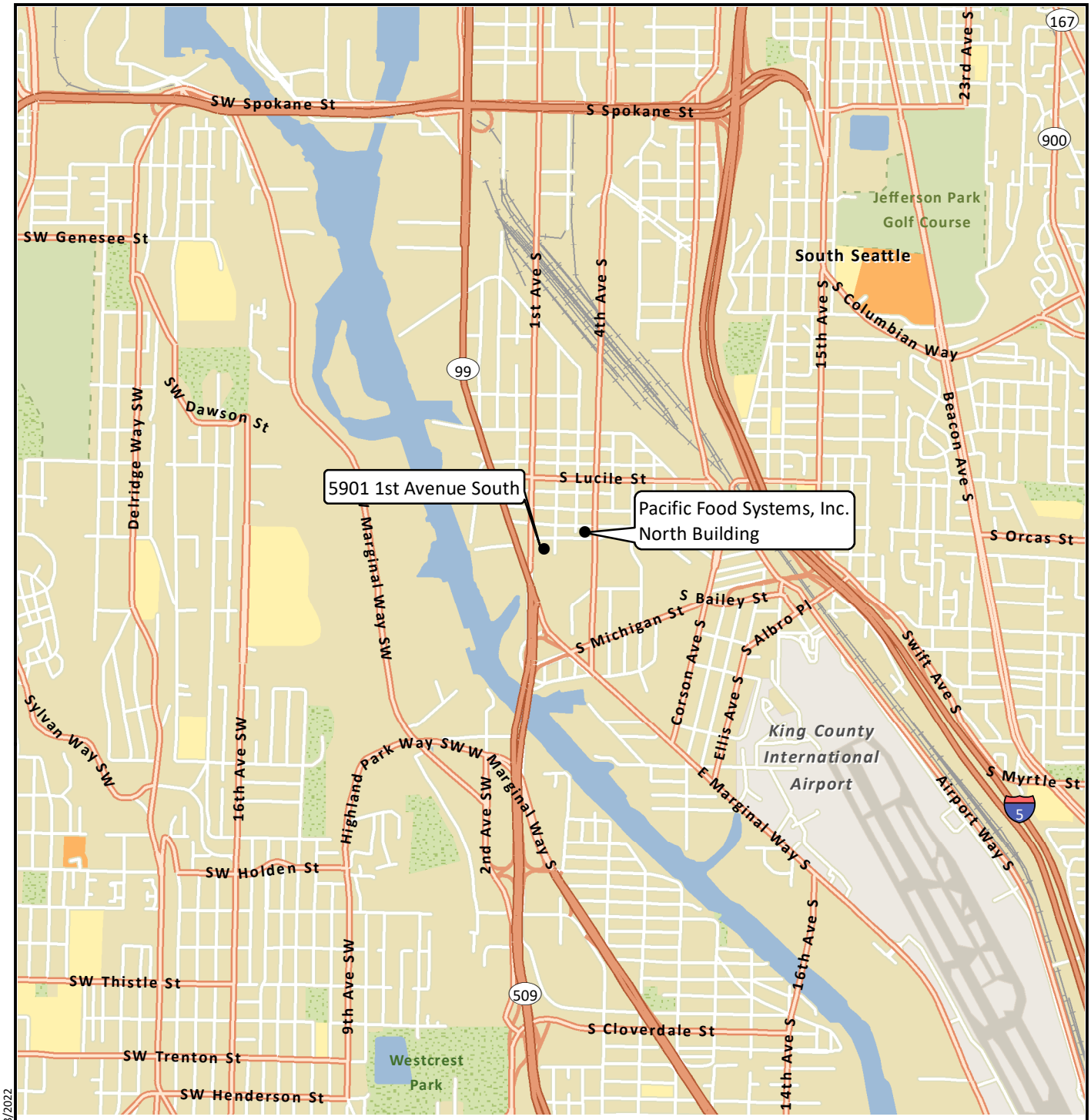

Data Source: Esri 2012

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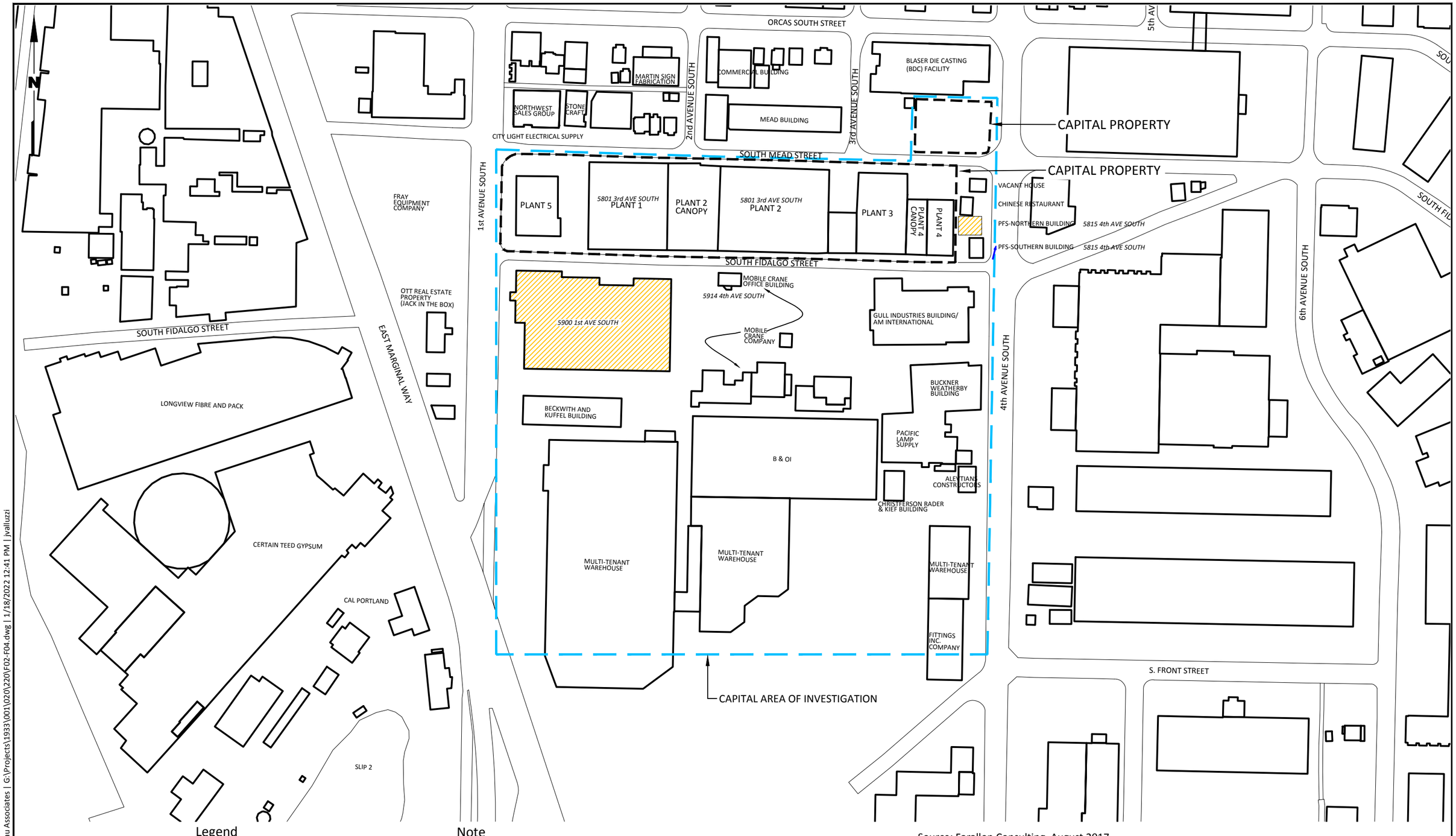
Capital Industries, Inc. Seattle, Washington	**Vicinity Map**	Figure 1



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Legend

Building with Tier 4 Vapor Intrusion Intrusion Mitigation Implemented

Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 200 400

Scale in Feet

Source: Farallon Consulting, August 2017

LANDAU ASSOCIATES

Capital Industries, Inc.
Seattle, Washington

Site Map

Figure 2

N

STORAGE YARD

CAPITAL INDUSTRIES, INC. PROPERTY
5801 3rd AVENUE SOUTH

4th AVENUE SOUTH

CHINESE RESTAURANT

FLOOR DRAIN
SUMP
STOVE HOODS
DINNING AREA
KITCHEN
AQUARIUM
OIL/WATER SEPARATOR
STORAGE
MENS RESTROOM
WOMENS RESTROOM

PACIFIC FOOD SYSTEMS - NORTH BUILDING

5815N-IA1

POWER TOOL WORK AREA
MACHINE WORK AREA
ROLLUP DOOR
PARTS ROOM 2 LEVELS
TOOL BOX
SUMP 1
SUMP 2
WORK BENCHES
PARTS CLEANER
5815N-IA9
OFFICE
OFFICE
RESTROOM
5815N-INFLUENT
5815N-IA8

CAPITAL INDUSTRIES PLANT 4

AIR INLET 2" GATE VALVE AND FILTER

4" DIAMETER VENT STACK EXTENDED 6' ABOVE ROOF

SSDS BLOWER MOUNTED TO OUTSIDE WALL IN COVERED AREA

STORAGE YARD

OFFICE
PACIFIC FOOD SYSTEMS - SOUTH BUILDING
HALLWAY
OFFICE
OFFICE
OFFICE
OFFICE

5815N-OA1

SOUTH FIDALGO STREET

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Legend

- Indoor Air Quality Monitoring Location - 8 Hour Sample
- Outdoor Air Quality Monitoring Location - 8 Hour Sample
- Air Quality Monitoring Location - Grab Sample
- Typical Prevailing Wind Direction at Time of Samping

Note

1. SSDS = Subslab Depressurization System.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 20 40
Scale in Feet

Source: Farallon Consulting, August 2017

LANDAU ASSOCIATES

Capital Industries, Inc.
Seattle, Washington

Pacific Food Systems, Inc.
North Building Monitoring Locations

Figure
3

N

Capital Industries
Plant 5

Capital Industries
Plant 1

Capital Industries
Plant 2

5900-IA1

5900-IA3

5900-INFLUENT

OFFICE AREA

MANUFACTURING AREA

WAREHOUSE AREA

5900-OA2

Beckwith and
Kuffel Building

Wind Direction
out of South

Legend

- Indoor Air Quality Monitoring Location
- Outdoor Air Quality Monitoring Location
- Air Quality Monitoring Location - Grab Sample
- Typical Prevailing Wind Direction at Time of Samping

Note

1. SSDS = Subslab Depressurization System.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 50 100
Scale in Feet

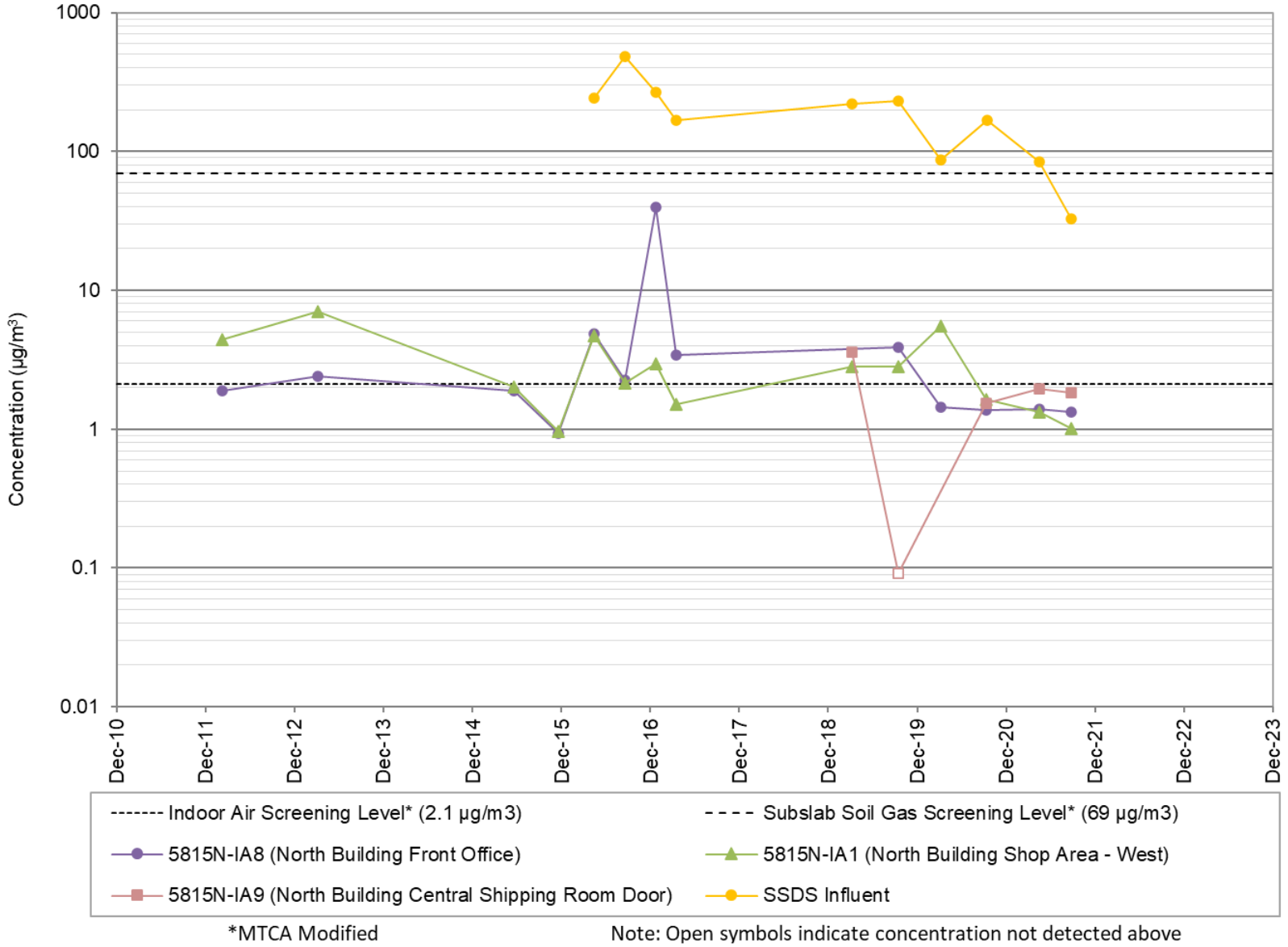
Source: Farallon Consulting, August 2017

LANDAU ASSOCIATES

Capital Industries, Inc.
Seattle, Washington

**5900 1st Avenue South
Monitoring Locations**

Figure
4



*MTCA Modified

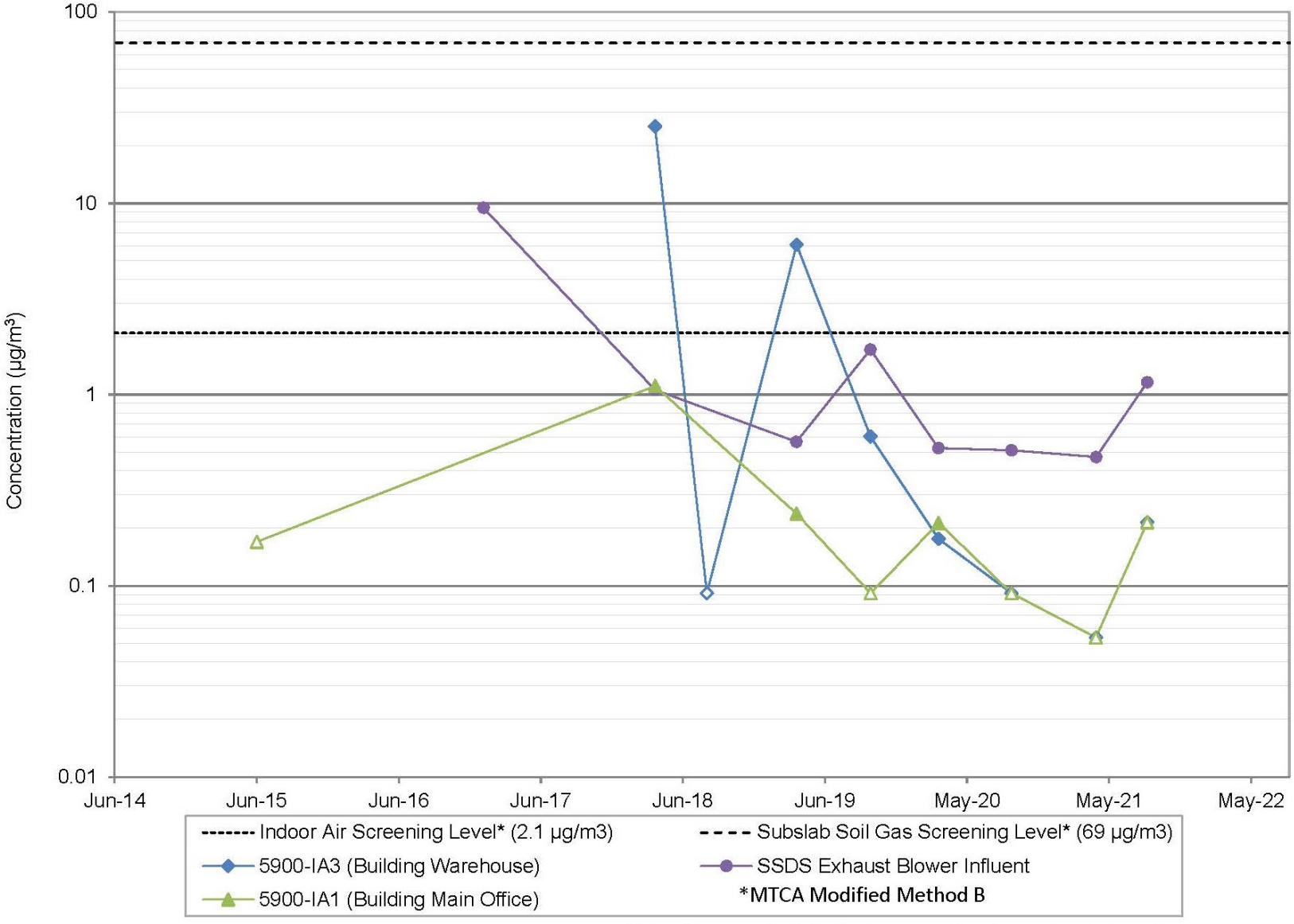
Note: Open symbols indicate concentration not detected above

LANDAU ASSOCIATES

Capital Industries, Inc.
Seattle, Washington

Pacific Food Systems, Inc. North Building TCE Timeseries

Figure
5



Note: Open symbols indicate concentration not detected above

LANDAU ASSOCIATES

Capital Industries, Inc.
Seattle, Washington

5900 1st Avenue South TCE Timeseries

Figure
6

Table 1
Summary of Vapor Intrusion Assessment Analytical Results
Pacific Food Systems, Inc. and 5900 1st Avenue South
Seattle, Washington

Sample Type		Location	Sample Identification	Sample Date	Volatile Organic Compounds (µg/m³; TO-15, TO-15 SIM)					
					PCE	TCE	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1-Dichloroethene	Vinyl Chloride
Commercial Indoor Air MTCA Modified Method B Screening Level (a)					32	2.1	N/A	130	670	0.95
Commerical Sub-slab Soil Gas MTCA Method B Screening Level (b)					1070	69		4300	22300	32
Pacific Food Systems, Inc.	Indoor Air	5815N-IA1	5815N-IA1-20210426	4/26/2021	**0.424**	**1.33**	0.396 U	0.198 U	0.0397 U	0.0256 U
			5815N-IA1-20210907	9/7/2021	0.678 U	**1.02**	3.96 U	1.98 U	0.397 U	0.256 U
		5815N-IA8	5815N-IA8-20210426	4/26/2021	**1.85**	**1.40**	0.396 U	0.198 U	0.0397 U	0.0256 U
			5815N-IA8-20210907	9/7/2021	0.271 U	**1.33**	1.59 U	0.793 U	0.159 U	0.102 U
		5815N-IA9	5815N-IA9-20210426	4/26/2021	**0.357**	**1.94**	0.396 U	0.198 U	0.0397 U	0.0256 U
			5815N-IA4-20210907 (d)	9/7/2021	0.271 U	**1.84**	1.59 U	0.793 U	0.159 U	0.102 U
	Outdoor Air (c)	5815N-OA1	5815N-OA1-20210426	4/26/2021	**1.66**	**0.411**	0.396 U	0.198 U	0.0397 U	0.0256 U
			5815N-OA1-20210907	9/7/2021	0.271 U	0.215 U	1.59 U	0.793 U	0.159 U	0.102 U
	SSDS combined influent (soil gas)	5815N-INFLUENT	5815N-INFLUENT-20210426	4/26/2021	**41.4**	**84.7**	**2.29**	0.793 U	0.159 U	0.102 U
			5815N-INFLUENT-20210907	9/7/2021	**21.9**	**33.0**	3.96 U	1.98 U	0.397 U	0.256 U
5900 1st Avenue South	Indoor Air	5900-IA1	5900-IA1-20210428	4/28/2021	**0.107**	0.0537 U	0.396 U	0.198 U	0.0397 U	0.0256 U
			5900-IA1-20210907	9/7/2021	**0.279**	0.215 U	1.59 U	0.793 U	0.159 U	0.102 U
		5900-IA3	5900-IA3-20210428	4/28/2021	**0.195**	0.0537 U	0.396 U	0.198 U	0.0397 U	0.0256 U
			5900-IA3-20210907	9/7/2021	**0.343**	0.215 U	1.59 U	0.793 U	0.159 U	0.102 U
	Outdoor Air	5900-OA2	5900-OA2-20210428	4/28/2021	**0.107**	0.0537 U	0.396 U	0.198 U	0.0397 U	0.0256 U
			5900-OA2-20210907	9/7/2021	0.271 U	0.215 U	0.159 U	0.793 U	0.159 U	0.102 U
	SSDS combined influent (soil gas)	5900-INFLUENT	5900-INFLUENT-20210428	4/28/2021	**0.764**	**0.472**	1.59 U	0.793 U	0.159 U	0.102 U
			5900-INFLUENT-20210907	9/7/2021	**1.55**	**1.16**	3.96 U	1.98 U	0.397 U	0.256 U

Notes:

Bold text indicates detected analyte

Green shading indicates detected analyte exceeds MTCA Method B screening level.

(a) Indoor air screening levels are compared to indoor air results only.

(b) Sub-slab screening levels are compared to SSDS combined influent results only.

(c) Indoor air concentrations are not normalized to outdoor air concentrations

(d) IA9 was erroneously reported as IA4 in September 2021.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Acronyms/Abbreviations:

-- = not analyzed

N/A = Not Applicable, used where the constituent of concern will not affect the medium of potential concern due to an incomplete pathway or no pertinent standard exists.

µg/m³ = micrograms per cubic meter

MTCA = Model Toxics Control Act

PCE = tetrachloroethene

SIM = selected ion monitoring

SSDS = subslab depressurization system

TCE = trichloroethene

Table 2
Summary of 2021 Pacific Food Systems, Inc. North Building SSDS Operation Parameters
Capital Industries

Date	Individual Pressure Gauge Vacuum Reading (IOW)					Pressure Gauge Vacuum Reading (IOW)	Field-Measured Operating Vacuum (IOW)	SVE System Flow (scfm)	Pressure Gauge/Field-Measured Pressure Differential (percent)	Lab-Measured Influent Concentration (µg/m^3)		Removal Rate [2] (µg/min)		Projected Annual Discharge (lbs/year)	
	SSMP-1	SSMP-2	SSMP-3 [1]	SSMP-4 [1]	SSMP-5 [1]					PCE	TCE	PCE	TCE	PCE	TCE
4/26/2021	0.052	0.021	0.010	0.024	0.008	3.5	3.8	19.14	92%	41.4	84.7	22.4	45.9	0.026	0.053
9/7/2021	0.048	0.021	0.010	0.021	0.007	3.5	3.3	29.2	94%	21.9	33	18.1	27.3	0.021	0.032
SSDS Operations	**>0.005**	**>0.005**	**>0.005**	**>0.005**	**>0.005**	**NA**			**75 - 125 percent**	**NA**				**1,000 lbs/year**	

Notes:

[1] Subslab monitoring ports SSMP-3 through SSMP-5 were installed in April 2018.

[2] Removal Rate = SVE flow * Measured PCE or TCE concentration

Acronyms and Abbreviations:

% = percent
IOW = inches of water
lbs = pounds
µg = micrograms
m^3 = cubic meter
min = minute
NA = not applicable
PCE = tetrachloroethene
scfm = standard cubic feet per minute
SSDS = subslab depressurization system
SSMP = subslab monitoring probe
SVE = soil vapor extraction
TCE = trichloroethene
VIMMWP = Vapor Intrusion, Inspection, Monitoring, and Maintenance Work Plan

Table 3
Summary of 2021 5900 1st Avnue South SSDS Operation Parameters
Capital Industries

Date	Pressure Gauge Vacuum Reading (IOW)							SSDS Vacuum (IOW)	SSSDS Flow (scfm)	Lab-Measured Influent Concentration (µg/m^3)		Removal Rate [1] (µg/min)		Projected Annual Discharge (lbs/year)	
	SSDS Extraction Sump 1	SSDS Extraction Sump 2	SSDS Extraction Sump 3	SSDS Extraction Sump 4	SSDS Extraction Sump 5	SSDS Extraction Sump 6	SSDS Extraction Sump 7			PCE	TCE	PCE	TCE	PCE	TCE
4/28/2021	9.0	8.0	8.0	NM	9.0	9.0	9.0	9.2	274	0.764	0.47	5.1	3.1	0.005	0.004
9/7/2021	8.5	8.0	7.5	NM	9.1	9.0	8.5	8.7	257	1.55	1.16	12.4	9.3	0.014	0.011
VIMMWP SSDS Operations Goals	**Within 25 percent of applied system vacuum at extraction sumps; or >0.005 IOW at any monitoring point beyond extraction sump**							**NA**	**NA**	**NA**				**1,000 lbs/year**	

Notes:
[1] Removal Rate = SVE flow * Measured PCE or TCE concentration

Acronyms and Abbreviations:

IOW = inches of water
lbs = pounds
µg = micrograms
m^3 = cubic meter
min = minute
NA = not applicable
NM = not measured
PCE = tetrachloroethene
scfm = standard cubic feet per minute
SSDS = subslab depressurization system
SSMP = subslab monitoring probe
SVE = soil vapor extraction
TCE = trichloroethene
VIMMWP = Vapor Intrusion, Inspection, Monitoring, and Maintenance Work Plan