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July 31, 2019

Ms. Alana Lee (1 copy + CD)
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Dear Ms. Lee:

SUBJECT: DRAFT 2019 INSTALLATION RESTORATION (IR) SITE 28 AIR SAMPLING AND VAPOR INTRUSION TIER RESPONSE EVALUATION REPORT, FORMER NAVAL AIR STATION (NAS) MOFFETT FIELD, CALIFORNIA

The *Draft 2019 Installation Restoration (IR) Site 28 Air Sampling and Vapor Intrusion Tier Response Evaluation Report, Former Naval Air Station (NAS) Moffett Field, California* is enclosed for your review. This report describes the evaluation of air monitoring results from samples collected in February 2019. Please provide comments, if any, by August 31, 2019.

Should you have questions or need additional information, please contact me at (619) 524-6023.

Sincerely,

CHRISTOPHER YANTOS
BRAC Environmental Coordinator
By direction of the Director

Enclosure: 1. Draft 2019 Installation Restoration (IR) Site 28 Air Sampling and Vapor Intrusion Tier Response Evaluation Report, Former Naval Air Station (NAS) Moffett Field, California

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DRAFT 2019 INSTALLATION RESTORATION (IR) SITE 28 AIR SAMPLING AND VAPOR INTRUSION TIER RESPONSE EVALUATION REPORT

FORMER NAVAL STATION (NAS) MOFFETT FIELD, MOUNTAIN VIEW, CA

JULY 2019

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DCN: NRS-2003-0000-0017

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Naval Facilities Engineering Command Southwest
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DRAFT 2019 INSTALLATION RESTORATION (IR) SITE 28 AIR SAMPLING AND VAPOR INTRUSION TIER RESPONSE EVALUATION REPORT

FORMER NAVAL STATION (NAS) MOFFETT FIELD, MOUNTAIN VIEW, CA

JULY 2019

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DRAFT 2019 INSTALLATION RESTORATION (IR) SITE 28 AIR SAMPLING AND VAPOR INTRUSION TIER RESPONSE EVALUATION REPORT

FORMER NAVAL STATION (NAS) MOFFETT FIELD, MOUNTAIN VIEW, CA

JULY 2019

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EXECUTIVE SUMMARY

This *Draft Installation Restoration Site 28 Air Sampling and Vapor Intrusion Tier Response Evaluation Report* (Report) was prepared as part of implementing the remedy selected in the United States Environmental Protection Agency (EPA) *Record of Decision (ROD) Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View and Moffett Field, California* (EPA 2010). The Navy is responsible for implementing the remedy for volatile organic compound (VOC) vapors originating from potential Navy sources that intrude into buildings within the Navy's vapor intrusion (VI) area of responsibility (AOR) at the former Naval Air Station (NAS) Moffett Field (Moffett Field [Figures 1 and 2]). The property in the Navy AOR is owned by the National Aeronautics and Space Administration (NASA) Ames Research Center. The Navy VI AOR coincides with Installation Restoration (IR) Site 28, where the West-Side Aquifer Treatment System (WATS) is located to remediate groundwater impacted by potential Navy sources.

This Report documents the indoor air sampling events conducted in February 2019 and evaluates the analytical results against historical data. The evaluation leads to recommendations based on the Response Action Tiering System presented in an in accordance with the ROD Amendment pursuant to an agreement between the Navy, the EPA, and the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) for the Navy to implement the VI remedy in the Navy AOR (EPA 2010).

Background

Moffett Field is located at the northern end of the Santa Clara Valley Basin, approximately 1 mile south of San Francisco Bay (Figure 1). Moffett Field is a National Priorities List site (EPA identification CA2170090078). Groundwater at the MEW Superfund Study Area has been impacted by VOCs, primarily trichloroethene (TCE). Under the ROD Amendment, the Navy is responsible for implementing a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) mandated VI remedy within the Navy AOR. As specified in the ROD Amendment (EPA 2010), the VI Study Area is defined as the area where TCE concentrations in shallow groundwater exceed 5 micrograms per liter (µg/L; Figures 2 and 3). A total of 23 buildings in the Navy AOR were identified for the VI study. A list of the buildings sampled is provided in Table 1 and building locations are shown on Figure 3.

The ROD Amendment (EPA 2010) provides a tiering system to determine the appropriate response action for each building/property within the Navy VI AOR. The tiering system for existing buildings is based on indoor air sampling with and without engineering controls (ECs) in place, building surveys, walk-throughs, interviews, inspections, subsurface sampling and other lines of evidence. To determine the appropriate tier and corresponding response action for the occupied and partially occupied industrial/commercial buildings within the Navy AOR (there are no residential buildings present), plans were developed to conduct a VI investigation consisting of

indoor air and outdoor ambient air sampling with analysis for seven chemicals of concern (COCs) by means of EPA Method TO-15 selected ion monitoring (SIM) and EPA Method TO-17. The seven COCs are: TCE; tetrachloroethene (PCE); cis- and trans-1,2-dichloroethene (DCE); 1,1-DCE; 1,1-dichloroethane (DCA); and vinyl chloride (VC). Dissolved concentrations of these COCs have been detected in shallow groundwater, and vapor concentrations have been detected in indoor air samples collected in a number of buildings overlying shallow groundwater, occurring between approximately 4 to 10 feet below ground surface (bgs). According to the ROD Amendment (EPA 2010), once a building has been assigned a tier, the selected response action for the building in that tier is implemented, including ECs and institutional controls (ICs). [Note: Additional lines of evidence may be collected and evaluated at any time to determine whether a move between tiers would be appropriate for any specific building].

Once implemented, the response action is intended to protect the health of building occupants in the VI Study Area from actual or threatened releases of Site-related hazardous substances into the environment via the subsurface VI pathway. EPA has established health-protective indoor air cleanup levels that can be achieved via implementation of the remedy.

The following multiple lines of evidence are used to determine whether VI is or is not a concern for buildings at the Site: (1) the location of the building relative to known source areas and the depths and concentrations of underlying shallow groundwater, (2) sub-slab soil gas concentrations; (3) indoor air concentrations; (4) lateral and vertical distribution of soil gas concentrations and proximity to building; and (5) a building survey documenting chemical use, ventilation system operations, chemical ratios, and other details. Since each building is unique, it is important to recognize that these lines of evidence are guidelines. For this reason, screening criteria and corresponding evaluations, may need to be adjusted on a building-by-building basis as more site-specific data are collected. Where converging lines of evidence indicate that there is no potential for VI exceeding EPA's indoor air cleanup levels, the building will be categorized as Tier 4 (following confirmation and appropriate documentation), and no further action would be required (EPA 2010). The Response Action Tiering System for existing and future commercial and residential building is discussed in detail below, and presented in Table 2.

Response Action Tiering System

Buildings are ranked as Tier 1, Tier 2, Tier 3A, Tier 3B, or Tier 4, based on the tiering descriptions in Tables 6A and 6B of the ROD Amendment (see Table 2 of this Report).

- Tier 1: Buildings are classified as Tier 1 if the indoor air concentrations for any of the seven COCs (listed above) exceed the outdoor ambient air concentrations *and* the EPA's indoor air cleanup levels. Tier 1 buildings require appropriate ECs and ICs.
- Tier 2: Buildings are classified as Tier 2 if indoor air concentrations are below EPA's indoor air cleanup levels with an EC in place or in operation. Long-term monitoring and ICs will be implemented.
- Tiers 3A and B: For buildings without an effective EC in place or in operation, with indoor air concentration that exceed the outdoor air concentrations for any of the seven COCs, but

with indoor air concentrations below the EPA's indoor air cleanup levels for all of the COCs, then the building is classified as Tier 3A. However, if the indoor air concentrations are at or below the approximate outdoor air concentrations or indoor air TCE concentrations are within the typical range of outdoor air concentrations provided in ROD Amendment (EPA 2010), then the building is classified as Tier 3B. Tier 3A and 3B buildings do not require an engineered remedy. Long-term monitoring is required for Tier 3A, but not for Tier 3B. ICs are implemented for both Tier 3A and 3B.

- Tier 4: Buildings are classified as Tier 4 when converging lines of evidence demonstrate that there is no longer the potential for COCs resulting from VI to exceed the EPA's indoor air cleanup levels. For Tier 4 buildings, no action is required after the EPA approves confirmation sampling results and documentation.

Building Surveys

Building surveys were completed before the 2019 air sampling event. Building surveys were conducted to identify 1) each building's structural condition; 2) its basic heating, ventilation, and air conditioning (HVAC) system, layout and use by the building occupants; 3) building occupancy schedule; and 4) types of chemicals used and/or stored on-site. During the building surveys, the field team screened work areas (e.g., office areas, meeting rooms, and high traffic areas such as hallways) for VOCs using a hand-held photoionization detector (PID). Building surveys along with previous indoor air sampling results were used to select potential sampling locations within each building for the February 2019 indoor air sampling activities. Detailed building survey forms, including PID readings for each building, are provided in Appendix A. A summary of noted building conditions are presented in Table A-1 (Appendix A).

Previous Air Sampling Results (2012, 2014, 2016, 2017, and 2018)

To determine the appropriate tier and corresponding response action for the industrial/commercial buildings within the Navy AOR, historical indoor air sampling data was evaluated along with 2019 air sampling data. Appendix B summarizes historical indoor air sampling results at each building for 2012, 2014, 2016, 2017, and 2018. Appendix C presents individual building figures (maps) illustrating sampling locations, along with the associated building summary table of historical and current 2019 air sampling results. Photographs of February 2019 sampling locations are presented in Appendix D.

February 2019 Indoor Air Sampling Activities

On February 15-28, 2019, 189 air samples were collected from 23 industrial/commercial buildings at various locations, including indoor work space areas (such as office areas, meeting rooms, high traffic areas such as hallways), vapor pathways (such as basements, crawlspaces, sumps, drains, trenches and utility corridors), indoor sources (such as groundwater infiltration), outdoor (ambient) air samples, and duplicate samples. A total of 153 indoor air samples (131 with Summa Canisters and 22 with Radiello passive samplers) were collected in work areas (including duplicates and confirmation samples) from 90 locations within the 23 buildings. Sampling locations and number of samples collected for each building were selected using the results of the building surveys and historical indoor air sampling results. In support of the site-wide event, an additional 2 samples

were collected on June 6, 2019 from Building 16 with Radiello passive samplers. Samples were collected from the breathing zone in first-floor and basement work areas (office areas, meeting rooms, and high-traffic areas such as hallways), at potential VI pathways (crawlspaces), and in outdoor ambient air. In buildings with HVAC systems, indoor air samples were collected during normal work hours with the HVAC system operating and over a weekend after the HVAC system had been shut down for 36 hours. The sampling durations for the indoor air samples were 8 or 10 hours, depending on the length of daily occupancy in each building. Indoor and outdoor (ambient) air samples were analyzed using the EPA Method TO-15 SIM or EPA Method TO-17 for the COCs.

Due to the Federal Government shutdown that extended through January 25, 2019, HVAC-off sampling activities were not conducted over the regularly scheduled three-day Martin Luther King Jr. weekend. NASA was furloughed during the Federal Government shut down therefore, NASA Ames Research Center was closed and could not be accessed for sampling. The 2019 HVAC-off sampling activities had to be rescheduled during a 2-day weekend of February 23 and 24, 2019. This event impacted the time limitations of the HVAC-off sampling. Routinely scheduled 24 hour HVAC-off samples had to be converted to a 10-hour sample time interval. Additionally, all 24-hour HVAC-on samples were systematically converted to 10-hour samples to accurately compare the 2019 HVAC-on versus the HVAC-off samples.

Additionally due to the Federal Government shut down and subsequent rescheduling of the 2019 event, the environmental laboratories expressed concerns over not being able to deliver the required quantities of Summa Canisters on time. To try and avoid delays in procurement, buildings without HVAC were sampled with Radiello passive samplers deployed for a 7-day period using EPA Method TO-17. In addition, outdoor ambient samples were collected with Radiello passive samplers over a 7-day period covering both the HVAC-on and HVAC-off sampling events in buildings with HVAC.

Air Sampling Results, Follow-Up Investigation, and Response Action Tiering

Using relevant historical data from 2012, 2014, 2016, 2017, 2018, and current (2019) indoor air sampling results, and Table 2, the 23 buildings were tiered to determine the response action in accordance with the Response Action Tiering System (Table 3). Indoor air quality results for COCs were compared to EPA's indoor air cleanup levels (per the ROD Amendment) and outdoor ambient air concentration ranges, with consideration of whether or not an air quality EC is in place. Table 4 provides the current 2019 tier evaluation building summary. Figure 4 illustrates the location of all indoor air samples, along with annotated 2019 TCE and PCE results that exceeded the EPA's indoor air cleanup levels. Sampling location maps including annotated current 2019 and historical COC results at each location, are provided in Appendix C.

Of the 23 buildings evaluated, Buildings 126, and N239A were classified as Tier 1. Buildings 3 and 10 were classified as Tier 2. The remaining 19 buildings are classified as Tier 3A or Tier 3B. Tier 3A Buildings (14, 15, 16, 45, 555, 567, N210, N239, N243 and N243A) will require continued long-term monitoring per the ROD Amendment (EPA 2010). Tier 3B Buildings (2, 12, 13, 29, 67,

76, 107, 510, and 566) do not require long-term monitoring per the ROD Amendment (EPA 2010). A complete Response Action Tiering System evaluation is presented in Section 7, including a comparison with previous tiering results.

Of the 23 buildings sampled during the February 2019 air sampling event, six buildings (Buildings 3, 16, 126, N210, N239A, and N243) had one or more indoor air, pathway, or indoor source sampling result with detected concentrations of TCE and/or PCE exceeding the EPA's indoor air cleanup level in the ROD Amendment (EPA 2010) guidance document. Two buildings (Buildings 126 and N239A) had one or more indoor air sampling result with detected concentrations of TCE and/or PCE exceeding the EPA's indoor air cleanup levels in the ROD Amendment (EPA 2010). February 2019 air sampling results and results respective building tiering designations are generally consistent with historic (2012 through 2018) air sampling results.

Buildings were tiered to determine the response action required. In accordance with the Response Action Tiering System (ROD Amendment; EPA 2010), the following buildings and their associated tier classification is described below.

Specific details and design of mitigation measures are included in the *Draft Work Plan for Vapor Intrusion Mitigation at Installation Restoration Site 28 (Buildings 10, 16, 126, N210, N239, and N239A)* (CES Work Plan; CES 2017).

Building 3 (Conference Center and Cafeteria): Results collected during the February 2019 air sampling event detected PCE in two samples at concentrations that were at or exceeded the EPA's indoor air cleanup level of 2.0 µg/m^3 (EPA 2010). One pathway sample detected a PCE concentration of 2.0 µg/m$^{3.}$ The second sample that exceeded EPA's indoor air cleanup level for PCE, was collected in Building 3, Room 130 during HVAC off sampling procedures, with a PCE concentration of 5.9 µg/m^3. No other COCs exceeded the indoor air cleanup levels in the sample, and no other air sampling results from Building 3 exceeded the EPA's indoor air cleanup levels during either the HVAC-on or HVAC-off sampling measures. Based on the sampling results, Building 3 was classified Tier 2 and requires HVAC-on as an EC requirement.

Building 10 (Boiler Plant for NASA Research Park): All samples collected had COC concentrations below EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and, 1,1-DCE concentrations in indoor air samples were detected at concentrations exceeding the ambient air concentration range for Building 10. Building 10 is being classified as Tier 2 because no COCs in indoor air samples exceeded the EPA's indoor air cleanup levels during either the 2018 or 2019 monitoring events with the EC (blower) operating. Electron Capture Detector (ECD) and Summa sampling in June 2018 confirmed multiple VI pathways in Building 10 including the tunnel system, electrical conduit, and the drain in Room 103. Therefore, mitigation measures are still recommended for Building 10 and re-evaluating current remedial design (CES 2017) is also recommended. Building 10 was classified as Tier 1 during the 2017 and 2018 sampling events, Tire 2 during the 2012 and 2015 sampling events, and Tier 3A during the 2016 sampling event.

Building 16 (Maintenance Contractor [Jacobs] Office and Shops): TCE was detected at a concentration exceeding the EPA's indoor air cleanup level of 5 µg/m^3 in one pathway sample collected during the February 2019 sampling event. A sample collected in the unoccupied server room (Room 118) during HVAC-on sampling procedures, detected a TCE concentration of 7.0 µg/m^3. On June 6, 2019, two additional samples were collected from Room 118, one from indoor air and one from the crawlspace beneath the floor. Both of the additional samples had a TCE concentration of 1.0 µg/m^3. No other COCs exceeded EPA's indoor air cleanup levels in the sample, and no other air sampling results from Building 16 resulted in concentrations that exceeded the EPA's indoor air cleanup levels during either the HVAC-on or HVAC-off sampling measures.

With the exception of the air sample in Room 118, all indoor air Summa samples collected had COC concentrations that were below EPA's indoor air cleanup levels. Two additional samples collected from Room 118 in June 2019 had concentrations below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples, were detected above the outdoor ambient air concentration range for Building 16. In 2014, TCE exceeded the EPA's indoor air cleanup level in Room 103. Because the indoor air TCE result exceeded the outdoor ambient air concentration range, Building 16 is being classified as Tier 3A. It was proposed not to go forward with the proposed mitigation measures (CES 2017), since only one exceedance was seen in Room 103 and the results could not be reproduced with Summa sampling in 2016, 2017, 2018, 2019, or with ECD sampling. However, due to the TCE exceedance from this current sampling event, continued indoor air monitoring is recommended, as well as investigation into the source/reproducibility of the exceedance in Room 118.

Building 126 (Moffett Historical Society Museum): During the 2019 air sampling event, PCE was detected at concentrations exceeding the EPA's indoor air cleanup level of 2 µg/m^3. With the HVAC-on, PCE concentrations ranged from 0.89 µg/m^3 to 4.2 µg/m^3, exceeding the EPA's indoor air cleanup level in three of four samples. With the HVAC-off, PCE concentrations ranged from 2.0 µg/m^3 to 3.7 µg/m^3, exceeding the EPA's indoor air cleanup level in all four samples.

Monitoring of Building 126 will continue until the proposed VI mitigation measures are implemented (CES 2017). Once mitigation measures are implemented, the sampling rationale will be reevaluated. Building 126 remains classified as Tier 1.

Building N210 (Offices and Storage [former hangar]): During the February 2019 air sampling event, TCE was detected at a concentration exceeding the EPA's indoor air cleanup level of 5 µg/m^3 in one pathway sample with a detected TCE concentration of 55 µg/m^3. The pathway sample was collected in the crawl space under Room 008 during the HVAC-off procedure. An indoor air sample was co-located over the crawlspace sample in Room 008. TCE was also detected in this sample, but with a detected concentration of 2.0 µg/m^3, below the EPA's indoor air cleanup level.

All Summa indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Although, TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; 1,1-DCE; and VC concentrations in indoor air samples were detected at concentrations that exceeded the

outdoor ambient air concentration level for Building N243 (the closest building with outdoor ambient air samples). Due to the resulting datum that no indoor air work area samples exceeded EPA's indoor air cleanup level, but that the indoor air COC results for Building N210 exceeded the outdoor ambient air concentration ranges for the COCs investigated, Building N210 is being classified as Tier 3A. Continued monitoring and re-evaluation of mitigation measures are recommended.

Building N239A (Offices and Centrifuges): During the 2019 air sampling event, PCE was detected at a concentration of 2.9 $\mu g/m^3$, exceeding the EPA's indoor air cleanup level of 2 $\mu g/m^3$ in one sample in Room 102 with the HVAC-on. No other COCs exceeded EPA's indoor air cleanup levels during the HVAC-on or HVAC-off sampling events. Indoor air samples exceeded the EPA's indoor air cleanup level for TCE during the 2013, 2014 and 2017 monitoring events.

Based on 2019 PCE detected concentration in the sample exceeding EPA's indoor air cleanup level, along with historic TCE concentrations above EPA's indoor air cleanup levels during previous monitoring events, Building N239A has been reclassified to Tier 1 (from Tier 2, classified in June 2018). Monitoring will continue until the proposed VI mitigation measures are implemented (CES 2017). Once mitigation measures are implemented, the sampling rationale will be reevaluated.

Building N243 (Flight Guidance and Simulation Laboratory): COCs were not detected exceeding the EPA's indoor air cleanup levels in any indoor air samples with the HVAC-on or -off during the February 2019 air sampling event. TCE was detected at a concentration exceeding the EPA's indoor air cleanup level of 5 $\mu g/m^3$ in one indoor source grab sample at 18 $\mu g/m^3$, collected in Room 054 with the HVAC off. The grab sample was collected above standing water in Room 054, which infiltrated from the water table due to excessive rain that was identified as a possible indoor source of COCs. A time integrated indoor air sample was also collected in Room 054 with the HVAC off, which had a TCE concentration of 0.16 $\mu g/m^3$, below the EPA's indoor air cleanup level. COCs were not detected exceeding the EPA's indoor air cleanup levels in any indoor air samples with the HVAC-on or -off.

With the exception of the indoor source grab sample in Room 054, all indoor air samples collected had COC concentrations below the EPA's indoor air cleanup levels. However, TCE. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected exceeding the ambient air concentration range for Building N243. Because indoor air COC results exceeded the ambient air concentration range, Building N243 is being classified as Tier 3A and continued monitoring is recommended.

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TABLE OF CONTENTS

PAGE

EXECUTIVE SUMMARY 1

TABLE OF CONTENTS i

ACRONYMS AND ABBREVIATIONS viii

1.0 INTRODUCTION 1-1
- 1.1 REPORT ORGANIZATION 1-2
- 1.2 PURPOSE 1-3
- 1.3 GENERAL SCOPE OF WORK 1-3

2.0 SITE DESCRIPTION AND BACKGROUND 2-1
- 2.1 SITE HISTORY 2-1
- 2.2 SITE CONDITIONS 2-5
- 2.3 CONCEPTUAL SITE MODEL FOR VAPOR INTRUSION 2-5
- 2.4 VAPOR INTRUSION ROD AMENDMENT 2-8
- 2.5 BUILDING SURVEYS 2-8
- 2.6 HISTORICAL INVESTIGATIONS AND SAMPLING 2-9

3.0 RESPONSE ACTION TIERING SYSTEM 3-1
- 3.1 TIER 1 3-1
- 3.2 TIER 2 3-1
- 3.3 TIERS 3A AND 3B 3-1
- 3.4 TIER 4 3-2

4.0 AIR SAMPLING METHODOLOGY 4-1
- 4.1 SAMPLING PROGRAM 4-1
- 4.2 INDOOR AIR SAMPLES 4-3
  - 4.2.1 Group 1: Buildings Sampled with Engineering Control (HVAC System) Operating 4-3
  - 4.2.2 Group 2: Buildings Sampled without Engineering Control Systems 4-4
- 4.3 PATHWAY AIR SAMPLES 4-4
- 4.4 INDOOR SOURCE SAMPLES 4-5
- 4.5 OUTDOOR AMBIENT AIR SAMPLES 4-5
- 4.6 ACCESS REQUIREMENTS 4-5
- 4.7 DEVIATIONS FROM THE SAMPLING PLAN 4-6

5.0 AIR SAMPLING RESULTS 5-1
- 5.1 OUTDOOR AMBIENT AIR SAMPLES 5-1
- 5.2 BUILDING 2 (GYMNASIUM) 5-2
  - 5.2.1 Building Condition 5-2
  - 5.2.2 HVAC System 5-2
  - 5.2.3 Existing Mitigation Measures 5-2
  - 5.2.4 Sampling Locations and Results 5-2

TABLE OF CONTENTS
(Continued)

PAGE

5.2.5 Response Action Tier Designation 5-3
5.3 BUILDING 3 (CONFERENCE CENTER AND CAFETERIA) 5-3
5.3.1 Building Condition 5-3
5.3.2 HVAC System 5-4
5.3.3 Existing Mitigation Measures 5-4
5.3.4 Sampling Locations and Results 5-4
5.3.5 Response Action Tier Designation 5-5
5.4 BUILDING 10 (BOILER PLANT FOR NASA RESEARCH PARK) 5-6
5.4.1 Building Condition 5-6
5.4.2 HVAC System 5-6
5.4.3 Existing Mitigation Measures 5-6
5.4.4 Sampling Locations and Results 5-7
5.4.5 Response Action Tier Designation 5-8
5.5 BUILDING 12 (COMMISSARY) 5-8
5.5.1 Building Condition 5-9
5.5.2 HVAC System 5-9
5.5.3 Existing Mitigation Measures 5-9
5.5.4 Sampling Locations and Results 5-9
5.5.5 Response Action Tier Designation 5-10
5.6 BUILDING 13 (COMMISSARY WAREHOUSE) 5-10
5.6.1 Building Condition 5-10
5.6.2 HVAC System 5-11
5.6.3 Existing Mitigation Measures 5-11
5.6.4 Sampling Location and Results 5-11
5.6.5 Response Action Tier Designation 5-11
5.7 BUILDING 14 (OFFICES AND STORAGE) 5-12
5.7.1 Building Condition 5-12
5.7.2 HVAC System 5-12
5.7.3 Existing Mitigation Measures 5-12
5.7.4 Sampling Locations and Results 5-13
5.7.5 Response Action Tier Designation 5-13
5.8 BUILDING 15 (NASA SECURITY) 5-14
5.8.1 Building Condition 5-14
5.8.2 HVAC System 5-14
5.8.3 Existing Mitigation Measures 5-14
5.8.4 Sampling Locations and Results 5-14
5.8.5 Response Action Tier Designation 5-15
5.9 BUILDING 16 (MAINTENANCE CONTRACTOR [JACOBS] OFFICE AND SHOPS) 5-15
5.9.1 Building Condition 5-15
5.9.2 HVAC System 5-16

TABLE OF CONTENTS
(Continued)

PAGE

5.9.3 Sampling Locations and Results 5-16
5.9.4 Response Action Tier Designation 5-17
5.10 BUILDING 29 (BICYCLE SHOP) 5-18
5.10.1 Building Condition 5-18
5.10.2 HVAC System 5-18
5.10.3 Existing Mitigation Measures 5-18
5.10.4 Sampling Locations and Results 5-18
5.10.5 Response Action Tier Designation 5-19
5.11 BUILDING 45 (DRONE TESTING FACILITY) 5-19
5.11.1 Building Condition 5-19
5.11.2 HVAC System 5-19
5.11.3 Existing Mitigation Measures 5-19
5.11.4 Sampling Locations and Results 5-20
5.11.5 Response Action Tier Designation 5-20
5.12 BUILDING 67 (U.S. POST OFFICE) 5-20
5.12.1 Building Construction 5-20
5.12.2 HVAC System 5-21
5.12.3 Existing Mitigation Measures 5-21
5.12.4 Sampling Locations and Results 5-21
5.12.5 Response Action Tier Designation 5-21
5.13 BUILDING 76 (LOCKSMITH SHOP) 5-22
5.13.1 Building Condition 5-22
5.13.2 HVAC System 5-22
5.13.3 Existing Mitigation Measures 5-22
5.13.4 Sampling Locations and Results 5-22
5.13.5 Response Action Tier Designation 5-23
5.14 BUILDING 107 (ROICC OFFICE) 5-23
5.14.1 Building Condition 5-23
5.14.2 HVAC System 5-23
5.14.3 Existing Mitigation Measures 5-23
5.14.4 Sampling Locations and Results 5-24
5.14.5 Response Action Tier Designation 5-24
5.15 BUILDING 126 (MOFFETT HISTORICAL SOCIETY MUSEUM) 5-25
5.15.1 Building Condition 5-25
5.15.2 HVAC System 5-25
5.15.3 Existing Mitigation Measures 5-25
5.15.4 Sampling Locations and Results 5-25
5.15.5 Response Action Tier Designation 5-26
5.16 BUILDING 510 (MAINTENANCE OFFICES) 5-26
5.16.1 Building Condition 5-26
5.16.2 HVAC System 5-27

TABLE OF CONTENTS
(Continued)

PAGE

5.16.3 Existing Mitigation Measures 5-27
5.16.4 Sampling Locations and Results 5-27
5.16.5 Response Action Tier Designation 5-28
5.17 BUILDING 555 (TENANT OFFICES) 5-28
5.17.1 Building Condition 5-28
5.17.2 HVAC System 5-28
5.17.3 Existing Mitigation Measures 5-28
5.17.4 Sampling Locations and Results 5-28
5.17.5 Response Action Tier Designation 5-29
5.18 BUILDING 566 (TENANT OFFICES) 5-29
5.18.1 Building Condition 5-29
5.18.2 HVAC System 5-30
5.18.3 Existing Mitigation Measures 5-30
5.18.4 Sampling Locations and Results 5-30
5.18.5 Response Action Tier Designation 5-31
5.19 BUILDING 567 (WAREHOUSE) 5-31
5.19.1 Building Condition 5-31
5.19.2 HVAC System 5-31
5.19.3 Existing Mitigation Measures 5-31
5.19.4 Sampling Location and Results 5-31
5.19.5 Response Action Tier Designation 5-32
5.20 BUILDING N210 (OFFICES AND STORAGE [FORMER HANGAR]) 5-32
5.20.1 Building Condition 5-32
5.20.2 HVAC System 5-33
5.20.3 Existing Mitigation Measures 5-33
5.20.4 Sampling Locations and Results 5-34
5.20.5 Response Action Tier Designation 5-35
5.21 BUILDING N239 (LIFE SCIENCES BUILDING [OFFICES AND LABORATORIES]) 5-35
5.21.1 Building Condition 5-35
5.21.2 HVAC System 5-36
5.21.3 Existing Mitigation Measures 5-36
5.21.4 Sampling Locations and Results 5-36
5.21.5 Response Action Tier Designation 5-37
5.22 BUILDING N239A (OFFICES AND CENTRIFUGE) 5-37
5.22.1 Building Condition 5-38
5.22.2 HVAC System 5-38
5.22.3 Existing Mitigation Measures 5-38
5.22.4 Sampling Locations and Results 5-38
5.22.5 Response Action Tier Designation 5-39
5.23 BUILDING N243 (FLIGHT GUIDANCE AND SIMULATION

TABLE OF CONTENTS
(Continued)

PAGE

LABORATORY) 5-40
5.23.1 Building Condition 5-40
5.23.2 HVAC System 5-40
5.23.3 Existing Mitigation Measures 5-40
5.23.4 Sampling Locations and Results 5-41
5.23.5 Response Action Tier Designation 5-41
5.24 BUILDING N243A (WELDING AND MACHINE SHOP) 5-42
5.24.1 Building Condition 5-42
5.24.2 HVAC System 5-42
5.24.3 Existing Mitigation Measures 5-42
5.24.4 Sampling Locations and Results 5-42
5.24.5 Response Action Tier Designation 5-43

6.0 QA/QC AND DATA QUALITY ASSESSMENT 6-1
6.1 LABORATORY QUALITY CONTROL ANALYSES 6-1
6.2 DATA VALIDATION 6-2
6.2.1 Chain-of-Custody, Sample Condition, and Technical Holding Times 6-3
6.2.2 Field and Laboratory Duplicates 6-4
6.2.3 Sample Reporting Limits/Compound Identification and Quantitation 6-5
6.2.4 Laboratory QC Analyses 6-5
6.2.5 Data Usability Summary 6-5

7.0 FINDINGS AND CONCLUSIONS 7-1
7.1 RESPONSE ACTION TIERING SYSTEM EVALUATION 7-1
7.1.1 Tier 1 and Tier 2 7-1
7.2 SEASONAL VARIATIONS 7-4
7.2.1 Factors Affecting Seasonal Variations 7-5

8.0 RECOMMENDATIONS 8-1
8.1 VAPOR INTRUSION MONITORING PROGRAM 8-1
8.2 POTENTIAL MITIGATION MEASURES 8-1

9.0 REFERENCES 9-1

TABLES

Table 1 Buildings Sampled During the February 2019 Sampling Events within the Navy AOR of the Vapor Intrusion Study Area, Moffett Field, California

Table 2 Response Action Tiering System for Existing and Future Commercial and Residential Buildings in Vapor Intrusion Study Area (Tables 6A and 6B of the ROD Amendment, EPA 2010)

Table 3 Summary of Tiering System and Response Actions for Existing Commercial Buildings in the Vapor Intrusion Study Area, Moffett Field, California

Table 4 Tier Evaluation Summary for Buildings in the Navy Vapor Intrusion Area of Concern, Moffett Field, California

Table 5 Hydrostratigraphy of MEW and Moffett Field Areas, Moffett Field, California

Table 6 EPA's Indoor Air Cleanup Levels for Chemicals of Concern in the Area of Vapor Intrusion Study Area, Moffett Field, California

Table 7 Number of Air Samples for Individual Buildings Moffett Field, California

Table 8 Planned Indoor Air Sampling Locations in 2016 Work Plan, Moffett Field, California

Table 9 Deviations from Sampling Plan Former Naval Air Station Moffett Field, California

Table 10 2019 Indoor and Outdoor Ambient Air Sampling Results Former Naval Air Station Moffett Field, California

Table 11 Indoor and Outdoor Ambient Air Sampling Results for 2012, 2013, 2014, 2016, 2017, 2018, and 2019 Former Naval Air Station Moffett Field, California

Table 12 February 2019 Ambient Air Concentration Ranges for the Vapor Intrusion Study Area, Moffett Field, California

FIGURES

Figure 1 Former NAS Moffett Field Regional Area Location Map

Figure 2 Extent of TCE Concentrations of the Aquifer A/A1 Zone in the MEW Superfund Study Area

Figure 3 Former NAS Moffett Field Vapor Intrusion Area of Responsibility

Figure 4 Indoor Air Samples with Trichloroethene Exceedances

Figure 5 Distribution of Tetrachloroethene in Soil Gas

Figure 6 Distribution of Trichloroethene in Soil Gas

Figure 7 Distribution of Tetrachloroethene in Shallow Groundwater

Figure 8 Distribution of Trichloroethene in Shallow Groundwater

Figure 9 Vapor Intrusion Pathway – Conceptual Diagram (EPA 2015)

APPENDICES

Appendix A Building Survey Forms and Summary Table (provided on electronic copy only)

Appendix B Historical Investigations and Sampling Results (provided on electronic copy only)

Appendix C Sampling Location Maps (provided on electronic copy only, public version does not include building floor plans due to NASA security requirements)

Appendix D Photographs of Sampling Locations (provided on electronic copy only)

Appendix E Laboratory Analytical Reports and Data Validation Reports (provided on electronic copy only)

ACRONYMS AND ABBREVIATIONS

µg/L	microgram(s) per liter
µg/m^3	microgram(s) per cubic meter
2016 Work Plan	IR Site 28, Vapor Intrusion Air Monitoring Work Plan
A/H	air handler
AC	air conditioning
AOR	area of responsibility
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES Work Plan	Draft Work Plan for Vapor Intrusion Mitigation at Installation Restoration Site 28 (Buildings 10, 16, 126, N210, N239, and N239A)
COC	chemical of concern
DCA	dichloroethane
DCE	dichloroethene
DoD	United States Department of Defense
EC	engineering control
ECD	electron capture detector
ELAP	Environmental Laboratory Accreditation Program
EPA	United States Environmental Protection Agency
FSM	Facility Site Manager
HP	horsepower
HVAC	heating, ventilation, and air conditioning
IC	institutional control
IR	Installation Restoration
J	estimated values
LCS	laboratory control sample
LOQ	limits of quantitation
MEW Site	MEW Superfund Study Area
MEW	Middlefield-Ellis-Whisman
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration

ACRONYMS AND ABBREVIATIONS
(Continued)

Navy	United States Department of the Navy
NELAP	National Environmental Laboratory Accreditation Program
NOREAS	NOREAS, Inc.
PCE	tetrachloroethene
PID	photoionization detector
ppb	parts per billion
QA	quality assurance
QC	quality control
QSM	Quality Systems Manual
Report	Draft Installation Restoration (IR) Site 28 Air Sampling and Vapor Intrusion Tier Response Evaluation Report
ROD Amendment	Record of Decision Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman Superfund Study Area
ROD	record of decision
ROICC	Resident Officer in Charge of Construction
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SF	square feet
SIM	selected ion monitoring
TCE	trichloroethene
USGS	U.S. Geological Survey
VC	vinyl chloride
VI	vapor intrusion
VOC	volatile organic compound
Water Board	California Regional Water Quality Control Board, San Francisco Bay Region
WATS	West-Side Aquifer Treatment System

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1.0 INTRODUCTION

This *Draft Installation Restoration (IR) Site 28 Air Sampling and Vapor Intrusion Tier Response Evaluation Report* (Report) is prepared by NOREAS, Inc. (NOREAS) for Naval Facilities Engineering Command Southwest, under the Naval Facilities Engineering Command Southwest Contract No. N62473-16-C-2003. This Report presents results obtained in 2019 and summarizes previous building surveys, air sampling activities and results, operation and maintenance of vapor intrusion (VI) mitigation measures, and corresponding response action recommendations based on Record of Decision (ROD) Amendment (United States Environmental Protection Agency [EPA] 2010) for the 23 industrial/commercial buildings in the Navy's area of responsibility (AOR) at the former Naval Air Station (NAS) Moffett Field, California (Figure 1).

This Report is prepared as part of implementing United States Environmental Protection Agency (EPA) Record of Decision (ROD) Amendment for the VI Pathway, Middlefield-Ellis-Whisman (MEW) Superfund Study Area (MEW Site), Mountain View, California (ROD Amendment; EPA 2010). The Navy is responsible for implementing a remedy for vapors originating from Navy sources that potentially intrude into 23 commercial/industrial buildings within the Navy's VI AOR at the former NAS Moffett Field (Figure 1). The property within the Navy AOR is owned by the National Aeronautics and Space Administration (NASA) Ames Research Center. The Navy AOR coincides with IR Site 28, where the WATS operates to remediate groundwater affected by possible Navy sources (Figure 2). The indoor air sampling within the Navy IR Site 28 AOR includes 23 industrial/commercial buildings are listed in Table 1, and depicted on Figure 3.

In June 1989, the EPA issued a ROD selecting the soil and groundwater cleanup remedy for the MEW Site (EPA 1989). The groundwater cleanup remedy that has been implemented in the Navy AOR includes extraction and treatment systems to clean up groundwater contamination. The Water Board provides oversight of Navy activities for the State of California at Moffett Field.

In August 2010, the EPA (2010) amended the 1989 ROD to select a remedy for the VI pathway to prevent subsurface contaminants from migrating into indoor air or accumulating in enclosed building spaces at concentrations exceeding indoor air cleanup criteria for long-term exposure (ROD Amendment). As specified in the ROD Amendment, the VI Study Area is defined as the area where trichloroethene (TCE) concentrations in shallow groundwater exceed 5 micrograms per liter (µg/L; EPA 2010). The Navy is responsible for implementing the ROD Amendment within the Navy AOR.

This Report was prepared to document air sampling conducted in February 2019, and to evaluate the buildings using the ROD Amendment Response Action Tiering System, pursuant to an agreement among the Navy, the EPA, and Water Board, for the Navy to implement the VI remedy

in the Navy AOR (EPA 2010). February 2019 air sampling results and results respective building tiering designations are generally consistent with historic (2012 through 2018) air sampling results.

1.1 REPORT ORGANIZATION

The Report is organized as follows:

- **Section 1.0 – Introduction:** Outlines the organization of the Report, project purpose, general scope of work, and project schedule.
- **Section 2.0 – Site Description and Background:** Provides a site description and information about previous investigations for the IR Site 28 VI Indoor Air Monitoring area.
- **Section 3.0 – Response Action Tiering System:** Describes how buildings are classified based on the need for response action according to the detected concentrations of COCs in indoor air.
- **Section 4.0 – Air Sampling Methodology:** Provides the procedures for collection of indoor and outdoor ambient air samples.
- **Section 5.0 – Air Sampling Results:** Provides the description of each building's condition, HVAC system, existing mitigation measures, sampling locations and results, and analysis of the 191 indoor, pathway, and outdoor ambient air samples in regard to the response action tier designation.
- **Section 6.0 – Quality Assurance (QA)/Quality Control (QC) and Data Validation:** Provides the QA/QC protocols applied to this investigation for data evaluation and usability.
- **Section 7.0 – Findings and Conclusions:** Summarizes the results and conclusions from analysis of the 191 total air samples collected to evaluate the occurrence of and pathways for VI in 23 industrial/commercial buildings at Moffett Field.
- **Section 8.0 – Recommendations:** Provides a path forward for the indoor air of all buildings within the IR Site 28 VI Indoor Air Monitoring area to meet EPA's indoor air cleanup levels.
- **Section 9.0 – References:** Presents the cited documents within the figures and text.
- **Appendix A – Building Survey Forms and Summary Table (provided on electronic copy only)**
- **Appendix B – Historical Investigations and Sampling Results (provided on electronic copy only)**
- **Appendix C – Sampling Location Maps (provided on electronic copy only, public version does not include building floor plans due to NASA security requirements)**
- **Appendix D – Photographs of Sampling Locations (provided on electronic copy only)**
- **Appendix E – Laboratory Analytical Reports and Data Validation Reports (provided on electronic copy only)**

1.2 PURPOSE

This Report documents the indoor air sampling events conducted in February 2019 (winter) and evaluates the analytical results against historical data. This February 2019 consecutive winter sampling event, following the May/June 2012 (late spring), February 2014 (winter), January 2016 (winter), January 2017 (winter), January 2018 (winter), and June 2018 electron capture detector (ECD) monitoring (summer) air sampling events, allows for comparison with outdoor ambient air quality and EPA's indoor air cleanup levels (as provided in the 2010 ROD Amendment) and provides details about potential seasonal differences impacting VI. The combined air sampling results from 2012, 2014, 2016, 2017, 2018, and 2019, along with consideration of the soil gas investigation conducted in 2013 and shallow groundwater investigations conducted in 2015 and 2018 (Figures 5 through 8), are used to designate the response action tier classification for each building. The tier classification determines the response action required for each building. Buildings were ranked as Tier 1, Tier 2, Tier 3A, or Tier 3B, based on the tiering descriptions in Tables 6A and 6B of the ROD Amendment (Table 2). The tiering descriptions, response actions, and selected remedies provided in Table 6A and Table 6B of the ROD Amendment, are compiled and presented in Table 3. A detailed description of each tier classification is included in Section 3.

1.3 GENERAL SCOPE OF WORK

The air sampling program was conducted in accordance with the *IR Site 28, Vapor Intrusion Air Monitoring Work Plan* (2016 Work Plan; NOREAS 2016). The 2016 Work Plan provided for collection of a sixth series of indoor and outdoor ambient air samples as a follow-up to samples collected in 2012, 2014, 2016, 2017, and 2018. The air sampling results are used to evaluate seasonal differences in VI and to qualify and evaluate the tier ranking of buildings in accordance with the ROD Amendment VI Tier Response System (EPA 2010).

Indoor air samples were collected from all buildings that were sampled in 2012, 2014, 2016, 2017, and 2018. The indoor air samples were collected at most of the basement and first floor sampling locations identified in 2012, 2014, 2016, 2017, and 2018. For the 2019 sampling event, locations were added or changed based on building surveys and historical data, per the 2016 Work Plan (NOREAS 2016) as well as the availability of sample media due to external factors surrounding the 2019 sampling event. A list of the buildings sampled is provided in Table 1, and building locations are shown on Figure 3.

The scope of work for indoor air sampling within the Navy IR Site 28 AOR industrial/commercial buildings during the 2019 monitoring event consisted of the following elements:

- The WATS has been offline since November 2018 and was not operational during the time of the 2019 sampling event.
- Due to the Federal Government shutdown through January 25, 2019, the originally scheduled 2019 sampling event could not be conducted during the three-day Martin Luther King Jr. weekend. NASA was furloughed during the Federal Government shut down,

therefore the NASA Ames Research Center could not be accessed for sampling. Despite not having a continuing resolution for the Federal Government shut down, the EPA requested the Navy conduct their annual sampling before the end February 2019.

- On February 1, 2019 the EPA made a request to the Navy to sample all 23 buildings during the 2019 event, including the Tier 3B buildings. The request was made because the WATS had been offline since November 2018 and was offline at the time of the 2019 sampling event. In addition, heavy rainfall was forecasted for the month of February during the planned sampling event (National Weather Service 2019), and groundwater levels were anticipated to be higher than average. These two contributing factors are considered a worst-case scenario, and the Navy concurred it would be beneficial to sample all buildings given the conditions.
- As a result of the short notice to re-schedule the 2019 sampling event, logistics and schedules were coordinated through two environmental laboratories. ALS Environmental, located in Simi Valley, California, and Eurofins Air Toxics located in Folsom, California were contracted to ensure timely delivery of the sampling equipment for Moffett Field and receipt and processing of the samples at the laboratories. ALS Environmental and Eurofins Air Toxics are certified by both the United States (U.S.) Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) and National Environmental Laboratory Accreditation Program (NELAP).
- Approximately two weeks prior to the 2019 sampling event, the sampling timeline was confirmed. Pre-field sampling activities were completed, and NASA Ames' building access request and notification were finalized. Requests and notifications were made to the NASA Ames Environmental Management Division and building-specific Facility Site Manager (FSM). Formal notification of the sampling event was submitted to the EPA.
- A mobile office and other equipment and supplies were mobilized to Moffett Field on February 13, 2019.
- Prior to indoor air sampling of the proposed industrial/commercial buildings, the buildings were inspected for any modifications in their layouts and HVAC system operations since the previous, January 2018 sampling event. Collected building survey information, including any modifications noted are summarized in Appendix A, Table A-1.
- Indoor air samples and outdoor ambient air samples were collected from February 15-26, 2019 for the 23 industrial/commercial buildings within the Navy AOR (Buildings 2, 3, 10, 12, 13, 14, 15, 16, 29, 45, 67, 76, 107, 126, N210, N239, N239A, N243, N243A, 510, 555, 566, and 567).
- To reduce the demand for Summa Canisters on the environmental laboratories, air samples from buildings without an HVAC were collected using passive samplers (i.e., Radiellos). As buildings without an HVAC have no time limitations for sampling the building with the HVAC turned off, passive samplers are valid and applicable. Passive samplers were placed in the breathing zone, 36 to 60 inches above the floor.
- In buildings with HVAC systems, air samples were collected using 6-liter Summa Canisters, each equipped with a fixed-rate flow controller and a particulate filter. The sample canisters were placed in the breathing zone, 36 to 60 inches above the floor.

- A total of 155 indoor air samples (including duplicates and confirmation samples) were collected from 90 locations within 23 buildings. A total of 14 outdoor ambient air samples were also collected using passive samplers to provide information on COC concentrations in outdoor ambient air (background) and air near outdoor air ventilation system intakes. A total of 20 pathway samples (including five grab samples) were collected to provide information on potential VI pathways and possible indoor sources of COCs.
  - Buildings without an HVAC system were sampled for 168 hours (7 days) to achieve detection limits consistent with the Summa Canister samples.
  - Buildings with HVAC systems were sampled for 8 or 10 hours, depending on building use and occupancy. Buildings with an HVAC system that supplies outdoor air to a portion or all of the building were sampled twice: once during work hours with the HVAC system operating (i.e. HVAC-on) and once 36 hours after the building ventilation system had been shut down or converted to internal air circulation i.e. HVAC-off)
  - Because of the imposed scheduling limitations/time constraints during the 2019 sampling event, buildings were sampled with the HVAC system shut down over a two-day weekend rather than the originally scheduled three-day Martin Luther King Jr. weekend. This limited the HVAC-off sample collection to a maximum of 10 hours, instead of the regularly scheduled 24 hour sample timeframe. Additionally, in order to accurately compare the data between the HVAC-on and HVAC-off sample, all HVAC-on samples were converted to a 10 hour sampling window instead of the regularly scheduled 24 hour sample collection.
  - Seven-day outdoor ambient air passive samples were collected during the indoor air sampling event. For buildings sampled with passive samples, the outdoor ambient samples were deployed at approximately the same time as the building samples. For buildings sampled with Summa Canisters, passive samplers were deployed to cover both the HVAC-on and HVAC-off sampling events.
- In support of the site-wide event, an additional 2 samples were collected on June 6, 2019 from Building 16.
- The passive samples were analyzed by the EPA Method TO-17 SIM for PCE; TCE; cis- and trans-1,2- DCE; 1,1-DCE; and 1,1-DCA. Vinyl chloride was not reported for samples collected using TO-17 because VC is too volatile on passive samplers (i.e., Radiellos) and reliable data cannot be achieved.
- The Summa Canister samples were analyzed by the EPA Method TO-15 SIM for PCE; TCE; cis- and trans-1,2- DCE; 1,1-DCE; 1,1-DCA; and VC. These are the COCs identified in the ROD Amendment.
- A third-party validation QA review was conducted for the laboratory analytical results by Element Consulting Services, of San Diego, California.
- Analytical results were compared with the industrial/commercial EPA's indoor air cleanup levels of the ROD Amendment (EPA 2010) and with outdoor ambient air concentration ranges (Table 2).

- The indoor air data were evaluated using the Response Action Tiering System criteria presented in Tables 6A and 6B (Table 2 this Report) of the ROD Amendment (EPA 2010). The tiering descriptions, response actions, and selected remedies provided in Tables 6A and 6B of the ROD Amendment are compiled and presented in Table 3. The location of all indoor air samples and exceedances of the indoor air TCE screening levels are shown on Figure 4.
- This Report was prepared to document sampling activities, provide sampling results, conduct the tiering system evaluation, and make recommendations based on the results of the tiering system evaluation and the available information on the HVAC systems for the Tier 1 buildings. This Report includes the following additional information:
  - Building conditions, occupancy and use conditions, and a summary of building/property-specific data, including identification of potential pathways for subsurface VI;
  - Evaluation of current indoor air ventilation system (e.g., HVAC) operations, and building and property surveys provided by NASA;
  - Description of any interim VI mitigation measures taken at the building to date, and a description of the tasks being performed to monitor the ongoing effectiveness of the measures;
  - Description and summary of all lines of evidence and specific data collected to determine response action tier;
  - Maps of building/property layout and actual sampling locations;
  - Photographs of the sampling locations;
  - Sampling and data collection results and summary of data;
  - Laboratory analytical data;
  - Proposed response action tier designation;
  - QA/QC data and activities;
  - Description of access requirements for the work to be performed, existing access conditions, and expected additional tasks necessary and scheduled to obtain access; and
  - Description and schedule if an existing engineered VI control system is to be utilized, and that may not require a Building/Property-Specific Remedial Design.
- Recommendations and proposed follow-up actions

2.0 SITE DESCRIPTION AND BACKGROUND

The Navy AOR is within the VI Study Area on Moffett Field (Figure 3). Moffett Field is a National Priorities List site (EPA ID CA2170090078). The EPA is the lead regulatory agency responsible for directing the cleanup process under and per a Federal Facility Agreement. The Water Board is the State lead agency.

2.1 SITE HISTORY

Moffett Field is located at the northern end of the Santa Clara Valley Basin, approximately 1 mile south of San Francisco Bay (Figure 1). Groundwater at the MEW Site has been contaminated with volatile organic compounds (VOCs), primarily with the solvent TCE (Figure 2). In June 1989, the EPA Region 9 (EPA 1989) issued a ROD under CERCLA selecting the groundwater cleanup remedy for the MEW Site (EPA 1989). The 1989 EPA ROD was adopted for Navy IR Site 28. In August 2010, the EPA (EPA 2010) amended the 1989 ROD to select a remedy for the VI pathway to prevent subsurface contaminants from migrating into indoor air or accumulating in enclosed building spaces at concentrations exceeding their indoor air cleanup criteria for long-term exposure (ROD Amendment). As specified in the ROD Amendment, the VI Study Area is defined as the area where TCE concentrations in shallow groundwater exceed 5 µg/L. The Navy is responsible for implementing the VI remedy in areas that are impacted by Navy sources (Navy AOR). The Navy AOR is shown on Figure 3.

The ROD Amendment provides a tiering system to determine the appropriate response action for each building/property within the VI Study Area. The tiering system for existing buildings is based on indoor air sampling (with and without ECs in place) and other lines of evidence. To determine the appropriate tier and corresponding response action for the industrial/commercial buildings within the Navy AOR (there are no residential buildings present), plans were developed to conduct a VI investigation consisting of indoor air and outdoor ambient air sampling with analysis for the COCs by the EPA Method TO-15 SIM. The COCs are PCE; TCE; cis- and trans-1,2-DCE; 1,1-DCE; 1,1-DCA; and VC. VI investigation activities and reporting for all the buildings in the Navy AOR are presented as follows, in their chronological order:

- In November 2011, April 2012, and May 2013, building surveys were conducted to identify each building's structural condition, ventilation system layout, and use; determine occupancy times; observe operational procedures in laboratory and maintenance areas; and gather information on the use and storage of solvents, chemicals, and cleaners.
- In May and June 2012, 23 industrial/commercial buildings in the Navy AOR were sampled to identify indoor areas that had VOCs in air from VI that exceeded respective cleanup levels for COCs as listed in the ROD Amendment.
- In July 2012, based on the results from the 2012 indoor air sampling, an interim mitigation measure was developed and implemented for Building 10; quarterly indoor air monitoring

was also implemented. The primary source of COC VI into Building 10 was determined to be the influx of VOC laden air from the utility tunnel that connects Building 10 and Hangar 1. The interim measure consisted of installing a cut-off wall in the tunnel approximately 170 feet from Building 10 and installing a blower to remove air within the tunnel near the Building 10 access, with discharge to an elevated, outside exhaust. During the fourth quarter of 2012, TCE concentrations in samples collected in Building 10 increased to levels exceeding the indoor air cleanup goals. The increase was verified during the first quarter 2013 monitoring period. Based on the indoor air exceedances, modifications to the mitigation system were completed in May 2013. Modifications included installation of a cut-off wall at the Building 10 entrance to the tunnel and installation of an additional blower inside the Building 10 floor trench. The blower at the entrance to the tunnel has been operating continuously since it was installed in May 2013. During the November 2015 monitoring event, it was observed that the blower located near the exhaust vent malfunctioned and has been offline since, however observed TCE concentrations indicate that the May 2013 modifications alone are sufficient to prevent VI into Building 10. Additional sampling was conducted in May, June, August, and November 2013, in February, May, and August 2014, in February, May, August, and November 2015, in February, May, August, and November 2016, in January, April, July, and October 2017, and in January 2018 to determine whether TCE and PCE concentrations in work areas inside the Building had decreased and remained below the ROD cleanup goals following the VI system enhancements. The results showed that detected concentrations of TCE in work areas within the Building were below cleanup level of 5 micrograms per cubic meter ($\mu g/m^3$) in all samples collected in May, June, August, and November 2013; February, May, and August 2014; August 2015; February, May, and November 2016; April, July, and October 2017, and January 2018. No other COCs were detected at a concentration that exceeded their respective cleanup levels within work areas of the Building. Quarterly sampling of Building 10 was discontinued following the 2018 Annual Sampling Event (NOREAS 2019).

- The April 2013 Final Air Sampling and VI Tier Response Evaluation Report, Former Naval Air Station Moffett Field, Moffett Field, California (AM8AJV 2013a), presented the results from the May–June 2012 indoor air sampling. The report included tentative tier rankings for the buildings, identified potential indoor air issues, and recommended mitigation measures and tier response data gaps. A revision to the report was issued in January 2014 (AM8AJV 2014a) to correct tables and the Building 3 map for the location of samples collected in Room 130.
- The June 2013 Soil Gas and Groundwater Sampling Work Plan to Support VI Tier Response Evaluation, Former Naval Air Station Moffett Field, Moffett Field, California (AM8AJV 2013b) was prepared to provide information on proposed mitigation measures and data gaps identified in the April 2013 air sampling report (for the May–June 2012 sampling event), to investigate potential VI pathways from dissolved VOCs in the shallow groundwater, both upgradient and in proximity to the buildings, and to assess the feasibility of reclassifying selected buildings that are tentatively ranked as Tier 3B or Tier 4 (no further action).
- On April 22, 2013, an investigation of the vapor and groundwater seepage pathways in the utility tunnel that connects with Building 10 and Hangar 1 was conducted. Seven air and

seven water samples were collected and analyzed for the seven COCs. The investigation was part of an inspection and evaluation of the structural integrity of the tunnel and contaminant pathways to develop options for closure or sealing of the tunnel. The tunnel is a pathway for VI into Building 10 and vapor migration to tunnel accesses in the area of Hangar 1. The results of this investigation are provided in the draft Technical Memorandum – Building 10 Utility Tunnel Closure/Sealing Evaluation, Former Naval Air Station Moffett Field, California (AM8AJV 2015b).

- Between May 17 and July 2, 2013, indoor air samples were collected from Buildings 2, 3, 12, and N239A for a vapor pathway investigation of utility floor conduits; soil gas and groundwater samples were collected from the vicinity of buildings in the Navy AOR, during implementation of the April 2013 Work Plan (indoor air sampling and vapor pathway investigation) and the June 2013 Work Plan (soil gas and groundwater sampling) (AM8AJV 2013b, 2013c). The results of these investigations are presented in the Draft Vapor Pathway, Soil Gas and Groundwater Sampling Report to Support VI Tier Response Evaluation, Former Naval Air Station Moffett Field, California (AM8AJV 2014c).
- In February 2014, the Final 2014 Air Sampling Work Plan for VI Tier Response Evaluation, Former Naval Air Station Moffett Field, California (AM8AJV 2014b) was issued to conduct a winter VI investigation.
- In January 2014, building surveys were conducted to identify each building's structural condition, ventilation system layout, and use; to determine occupancy times; to observe operational procedures in laboratory and maintenance areas; and to gather information on the use and storage of solvents, chemicals, and cleaners.
- In February 2014, a total of 23 industrial/commercial buildings in the Navy AOR were sampled, in the second indoor and outdoor air sampling event. During the previous 2013 event, confirmation air samples were only collected from Buildings 2, 3, 12, and N239A after sealing conduits around utility lines that penetrate foundations and floors in Buildings 2, 3, and 12. The 2014 sampling event is the second event in which all 23 buildings were sampled. Every building from the 2012 event was sampled, but the total number of samples was reduced from 287 to 203.
- The results of the 2014 sampling are presented in the Air Sampling and VI Tier Response Evaluation Report, Former Naval Air Station Moffett Field, Moffett Field, California (AM8AJV 2015a). The report included tentative tier rankings for the buildings, identified potential indoor air issues, and recommended mitigation measures and tier response data gaps.
- In July 2015, building surveys were conducted to identify each building's structural condition; observe the ventilation system layout and use by the building occupants; and gather information about building use schedules. Prior to conducting the surveys, information on basic HVAC systems and chemical use and storage was collected from NASA Facilities Division.
- In January 2016, 23 industrial/commercial buildings in the Navy AOR were sampled in the third indoor and outdoor sampling event per the 2015 Work Plan for Installation Restoration Site 28 VI Indoor Air Monitoring for Former Naval Air Station Moffett Field,

California (MMEC 2015). Every building from the 2012 and 2014 events was sampled but the total number of samples was reduced from 203, in the 2014 event, to 200.

- Between November 28 and December 1, 2016, building surveys were conducted to identify each building's structural condition; observe the ventilation system layout and use by the building occupants; and gather information about building use schedules. Building surveys were conducted per the 2016 Final VI Air Monitoring Work Plan, IR Site 28, Former Naval Air Station Moffett Field, Mountain View, California (NOREAS 2016). While conducting the surveys, information on basic HVAC systems and chemical use and storage was collected from NASA Facilities Division.
- In January 2017, 23 industrial/commercial buildings in the Navy AOR were sampled in the fourth indoor and outdoor sampling event per the 2016 Final VI Air Monitoring Work Plan, IR Site 28, Former Naval Air Station Moffett Field, Mountain View, California (NOREAS 2016). Every building from the 2012, 2014, and 2016 air sampling events was sampled. The total number of samples was updated to reflect recent building surveys and previous sampling results. A total of 211 indoor and outdoor ambient air samples were collected.
- The results of the 2017 sampling are presented in the Air Sampling and VI Tier Response Evaluation Report, Former Naval Air Station Moffett Field, Mountain View, California (NOREAS 2017). The report included tentative tier rankings for the buildings, identified potential indoor air issues, and recommended mitigation measures and tier response data gaps.
- In January 2018, 23 industrial/commercial buildings in the Navy AOR were sampled in the fifth indoor and outdoor sampling event per the 2016 Final VI Air Monitoring Work Plan, IR Site 28, Former Naval Air Station Moffett Field, Mountain View, California (NOREAS 2016). Every building from the 2012, 2014, 2016, and 2017 air sampling events was sampled. Confirmation samples were collected from Buildings 3, 12, 29, N210, and N239 from February 18-21, 2018. The total number of samples were updated to reflect recent building surveys and previous sampling results. A total of 233 indoor and outdoor ambient air samples were collected during the January and February sampling events.
- In June 2018, ECD screening was conducted based on the results of the 2012, 2014, 2016, and 2017 tier response evaluation, and 2018 air sampling results. ECD screening was conducted in Buildings 3, 10, 16, 45, 107, 567, N210, and N243A. ECD was selected as a screening technology as quick turnaround time of the results allow the user to identify and chase potential VI pathways. A total of five Summa samples including one indoor air sample and four pathway samples were collected congruently with the ECD screening.
- The results of the 2018 sampling, follow-up sampling, and ECD screening are presented in the Air Sampling and VI Tier Response Evaluation Report, Former Naval Air Station Moffett Field, Mountain View, California (NOREAS 2019). The report included tier rankings for the buildings, identified potential indoor air issues, and recommended mitigation measures and tier response data gaps.
- In February 2019, 23 industrial/commercial buildings in the Navy AOR were sampled in the sixth indoor and outdoor sampling event per the 2016 Final VI Air Monitoring Work Plan, IR Site 28, Former Naval Air Station Moffett Field, Mountain View, California

(NOREAS 2016). In support of the site-wide event, an additional 2 samples were collected on June 6, 2019 from Building 16. Every building from the 2012, 2014, 2016, 2017, and 2018 air sampling events was sampled. The total number of samples was updated to reflect recent building surveys and previous sampling results. A total of 191 indoor and outdoor ambient air samples were collected. The results of the 2019 sampling event are presented in this Report.

2.2 SITE CONDITIONS

The Navy AOR is within the VI Study Area on Moffett Field. The VI Study Area is generally defined as the area of Navy IR Site 28 where TCE concentrations in shallow groundwater exceed 5 µg/L, or 5 parts per billion (ppb). The estimated extent of TCE in shallow groundwater at the VI Study Area is shown on Figure 2. Shallow groundwater beneath Moffett Field is approximately 5 to 10 feet below ground surface (bgs) and generally flows in a northerly direction (EPA 2010).

Based on groundwater and air sampling results collected between 2002 and 2010 for both commercial and residential areas at the MEW Site (provided in Tables 1 and 2 of the ROD Amendment), TCE is the primary COC for the VI pathway, along with PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCE; 1,1-DCA; and VC.

Groundwater aquifers beneath the VI Study Area consist of shallow and deep aquifer systems, separated by a laterally extensive aquitard approximately 40 feet thick (Table 5). The shallow aquifer system is generally less than 160 feet bgs. Subdivisions within the shallow aquifer are designated as the upper A (also known as A), lower A (also known as B1), B2, and B3 aquifers. The regional aquitard that underlies the B aquifers is designated as the B/C aquitard. The zones below the B/C aquitard are termed the C aquifer and the deep aquifers. Groundwater flow in the shallow aquifer zone is generally to the north, while flows in the C and deep aquifers are generally to the northeast. The shallow and deep aquifer systems in the Moffett Field and MEW Site are not used for drinking water (Haley & Aldrich 2011).

In the Navy AOR, the seasonal variations in water elevations may range from 0.5 to 4.4 feet but more typically range from 0.8 to 1.0 foot, with higher levels in the spring and lower levels in the autumn. The hydraulic gradient is 0.005 to 0.007 foot per foot to the north (ERS Joint Venture and Brown and Caldwell 2011).

2.3 CONCEPTUAL SITE MODEL FOR VAPOR INTRUSION

The VI pathway refers to the migration of volatile chemicals (i.e., chemicals that easily evaporate) from the subsurface soils and groundwater upward as vapors, through conduits and preferential pathways, and into overlying buildings. These vapors can then accumulate inside the buildings and affect indoor air quality (Figure 9). A conceptual site model was developed to help evaluate the VI pathway by identifying the potential sources of VOCs in indoor air, site COCs, and potential pathways and receptors (EPA 2015).

Indoor exposure to VOCs can result from one or more of the following potential sources:

- Volatilization from subsurface shallow soil or groundwater contamination into a building structure (VI).
- Volatilization from standing water that infiltrates into the basements and or sumps of buildings from the groundwater table during cases of extreme rainfall.
- Occupational, household, or consumer product use or storage inside or outside of the building/workplace.
- Contribution from outdoor air moving into a building through opened doors or windows or from air intakes of HVAC systems. This outdoor air can include contributions from offsite background concentrations, nearby industrial emissions, and volatilization from the subsurface to outdoor air near the building.

Pathways: Chemicals may volatilize from the groundwater and soil, migrate upward through voids and cracks in the floors, dry conduits, or subsurface structures (e.g., basements, sumps, or trenches), and then enter buildings. For buildings with basements, VOCs may volatilize from groundwater directly through the basement floor and walls; personnel inside the buildings ("receptors") could inhale these vapors.

Potential Receptors: Potential receptors are persons in current and future buildings in the VI Study Area. While there are no immediate or short-term health or ecological concerns, the response action in the ROD Amendment (EPA 2010) ensures that building occupants are protected from potential long-term inhalation exposure to COCs.

Conceptual Site Model: Volatilization of VOC contamination in shallow groundwater is the primary source of vapors that may migrate into buildings in the Navy AOR. Releases of chlorinated solvents from onsite and offsite sources have impacted the shallow groundwater beneath Moffett Field, primarily with TCE and PCE. The groundwater table beneath Moffett Field is approximately 4 to 10 feet bgs, with shallow groundwater generally flowing from south of the Navy AOR to the north-northeast, primarily through relict sandy stream channel deposits (AM8AJV 2014c; SES-Tech 2008). The COCs dissolved in shallow groundwater volatilize to the vapor phase in the unsaturated soil until they equilibrate with groundwater concentrations. Also, the COCs will attenuate through sorption onto soils resulting in a three-way partition – onto soil, dissolved in groundwater, and in soil vapor. However, the partition across site media is complicated by variations in temperature and the percent moisture in soils, particularly at the capillary fringe, which is the partially saturated contact of the water table with the unsaturated soil.

Studies have shown that the effects of variations in temperature and moisture content have a major impact on how organic compounds partition between soil, groundwater, and soil gas (Washington 1996; Davis et al. 2001). With groundwater occurring at shallow depths of 4 to 10 feet bgs in the Navy AOR, the large paved areas and buried utility conduits (e.g., concrete steam line tunnels) serve as heat conduits for relatively rapid daily temperature variations, and the heterogeneities of soil types (meandering sand channel deposits, silt and clay flood deposits, discontinuous lenticular

sand lenses, bay mud, fill areas for building and utility construction) affect the shallow groundwater and soil gas flow paths and flow rates. These factors make it difficult to predict the partitioning of COCs and therefore complicate the task of valuating the risk of VI into individual buildings based on the concentrations of COCs in shallow groundwater and the integrity of building foundations.

Comparison of soil gas data collected during the 2013 investigation with shallow groundwater data shows limited correlation between high concentrations of TCE in shallow groundwater and concentrations of TCE in soil gas (Figures 6 and 8). TCE in soil vapor is widely spread across the Navy AOR, whereas elevated concentrations in groundwater are more localized (AM8AJV 2014c). This observation likely results from the following:

- Soil gas migrates through porous media because of differences in air pressure, chemical gradients, soil permeability, and soil moisture, with the soil vapors migrating away from or spreading beyond the source area of volatilization, creating a large, spread-out area with vapors in the soil vadose zone.
- Limited COC concentration data for all site media have been collected at specific locations. Ideally all site media (soil, groundwater, soil vapor, and indoor air) would be sampled at each location.

TCE vapors in soil gas are more widely distributed than areas of elevated concentrations of TCE in groundwater, likely due to dispersion and spreading of the soil vapors throughout the soil vadose zone, while contaminated groundwater migrates primarily through sandy stream deposits that are surrounded by finer-grained interchannel sediments (AM8AJV 2014c; SES-Tech 2008). Site data for indoor air, soil gas, and groundwater collected within the Navy AOR show the potential for VI into buildings in areas where elevated concentrations of TCE and/or PCE have been detected in soil gas and/or groundwater. Buildings that currently have or have had COCs detected at concentrations exceeding the ROD Amendment EPA's indoor air cleanup levels frequently have at least a portion of the building over areas with high concentrations of COCs in groundwater.

Factors affecting the VI pathway into and within buildings include vapor pressure differences inside the building and below the foundation (sub slab), the presence of cracks and breaks in the foundation, utility conduits and drain lines that penetrate the foundation, existence of subfloor crawlspaces where vapors can accumulate, negative and positive pressure differences from operation of an HVAC system, fans and powered vents (such as in laboratories, kitchens, break rooms, and restrooms), temperature gradients within the building, and ventilation pathways from open windows, wall cracks, siding separation, and open vertical conduits such as stairwells, elevator and ventilation shafts, and multi-floor utility conduits.

Utility Tunnel Vapor Pathway: In the utility tunnel that connects Building 10 and Hangar 1, elevated concentrations of COCs, including TCE and PCE, were reported in the tunnel air and in

standing water samples. Concentrations of TCE and PCE in the tunnel air exceed the ROD Amendment industrial/commercial EPA's indoor air cleanup levels; however, the utility tunnel is not considered a work area and, therefore, the ROD Amendment EPA's indoor air cleanup levels do not apply. The utility tunnel is a pathway for the migration of VOC laden vapors from soil gas and contaminated groundwater. Groundwater enters the tunnel through cracks and breaks in the tunnel's concrete floor and walls, with the water in the tunnel sumps coming from groundwater seepage. Once inside the tunnel, the COCs volatilize to the vapor phase. Also, soil vapors in the unsaturated soil will enter the tunnel through the cracks and breaks that occur above the water table. The vapors migrate because of vapor pressure gradients into Building 10 and to the area of Hangar 1 (AM8AJV 2015b). Interim mitigation measures have been installed at Building 10. As a result, there is currently no direct exposure pathway from vapors accumulating within the utility tunnel to workers at Building 10 or personnel engaged in periodic VI sampling at and in the vicinity of the building. Potential access to the tunnel in the future would require health and safety measures, including a confined space work permit and implementation of a health and safety plan that requires air monitoring and contingencies for required use of respirators and/or supplied air.

2.4 VAPOR INTRUSION ROD AMENDMENT

In August 2010, the EPA (EPA 2010) amended the MEW Site 1989 ROD to select a remedy for the VI pathway to prevent subsurface volatile contaminants in groundwater from migrating into indoor air or accumulating in enclosed building spaces at levels exceeding indoor air cleanup criteria for long-term exposure for residential and commercial buildings. The ROD Amendment provides a tiering system to determine the appropriate response action for each building/property within the VI Study Area (Table 3). The tiering system for existing buildings is based on indoor air sampling (with or without ECs in place) and other lines of evidence. The corresponding response action may include both ECs and ICs (EPA 2010). A summary of the ROD Amendment tiering descriptions and response actions for existing commercial buildings is provided in Table 2.

2.5 BUILDING SURVEYS

Building surveys were completed before the 2019 air sampling event from February 13-15, 2019. The building surveys were performed to identify each building's structural condition; observe the ventilation system layout and use by the building occupants; make note of building use schedules; gather information on basic HVAC systems; and take account of chemical use and storage. During the building surveys, the field team screened work areas (e.g., office areas, meeting rooms, high traffic areas such as hallways) for VOCs using a hand-held PID. Detailed building survey forms including PID readings for each building are provided in Appendix A. A summary of recorded building conditions is presented in Table A-1 (Appendix A). The building surveys and previous indoor air sampling results were used to select potential sampling locations within each building for the indoor air sampling activities.

2.6 HISTORICAL INVESTIGATIONS AND SAMPLING

A summary of the 2012, 2013, 2014, 2016, 2017, and 2018 indoor air sampling events; 2013 soil gas sampling; 2013 shallow groundwater investigation; 2013 utility tunnel investigation; and 2015 groundwater investigation are included in Appendix B. Summaries of each sampling event and investigation are provided in Section 2.1.

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3.0 RESPONSE ACTION TIERING SYSTEM

The Response Action Tiering System in the ROD Amendment (EPA 2010) classifies buildings by the need for response action according to the detected concentrations of COCs in indoor air, as specified in Tables 6A and 6B of the ROD Amendment (see Table 2 in this Report). Table 6A is for existing commercial and residential buildings with passive or active ECs in place. Table 6B is for existing commercial and residential buildings with no ECs in place. Table 7 of the ROD Amendment provides the EPA's selected VI remedy for existing and future buildings in the VI Study Area. The tiering descriptions, response actions, and selected remedies provided are compiled and presented in Table 3 of this Report. EPA's indoor air cleanup levels for the seven COCs are provided in Table 6.

Using the current 2019 indoor air sampling results and Table 3, the buildings were tiered in accordance with the Response Action Tiering System provided in the ROD Amendment (see Sections 5 and 7). Recommendations for buildings within the Navy AOR were prepared on the basis of the selected VI remedy for existing and future buildings of the ROD Amendment (Table 2, EPA 2010). If the data were inconclusive, then additional lines of evidence were considered and/or additional sampling efforts were recommended (see Section 8).

3.1 TIER 1

Buildings are classified as Tier 1 if the indoor air concentrations for any of the seven COCs exceed the outdoor air concentrations and the EPA's indoor air cleanup levels. Tier 1 buildings need an appropriate EC implemented as a remedy to meet EPA's indoor air cleanup levels. Governmental, proprietary, and informational ICs will be implemented as needed.

3.2 TIER 2

Buildings are classified as Tier 2 if indoor air concentrations are below EPA's indoor air cleanup levels with an EC in place or in operation. For Tier 2, operation and maintenance of active ventilation systems will be continued or other selected engineered remedies will be implemented to meet remedial action objectives. Long-term monitoring and governmental, proprietary, and informational ICs will be implemented. If the remedy is achieved through operation of an active ventilation system, then agreement of the property owner must be contained in a recorded agreement.

3.3 TIERS 3A AND 3B

For a building without an effective EC in place or in operation, if the indoor air concentrations exceed the outdoor air concentrations for any of the seven COCs but are below the EPA's indoor air cleanup levels for all of the COCs, then the building is classified as Tier 3A. If the indoor air concentrations are at or below the approximate outdoor air concentrations or indoor air TCE

concentrations are within the typical range of outdoor air concentrations given in ROD Amendment Tables 6A and 6B (Table 2), then the building is classified as Tier 3B. Tier 3A and 3B buildings do not need an engineered remedy. Long-term monitoring is required for Tier 3A, but not for Tier 3B. Governmental ICs will be implemented for both Tier 3A and 3B.

3.4 TIER 4

Buildings are classified as Tier 4 when converging lines of evidence demonstrate that there is no longer the potential for COCs resulting from VI to exceed the EPA's indoor air cleanup levels. For Tier 4 buildings, no action is required after the EPA approves confirmation sampling results and documentation that no action is necessary.

4.0 AIR SAMPLING METHODOLOGY

Indoor air sampling was conducted in February 2019 at all buildings within the Navy AOR that are currently in use or will be used in the future. Table 1 lists the buildings sampled and presented on Figure 3.

4.1 SAMPLING PROGRAM

To support selection of the appropriate tier and corresponding response action for the industrial/commercial buildings within the Navy AOR, a VI investigation was conducted that consisted of indoor and outdoor ambient air sampling and analysis of COCs by EPA Method TO-15 SIM or EPA Method TO-17. VI sampling provides air quality results for the winter season, which will be used with the late spring 2012, 2013, and 2018 (ECD) and winter 2014, 2016, 2017, 2018 and 2019 sampling results to conduct the tier response evaluation. The 23 industrial/commercial buildings within the Navy AOR, which were originally sampled during May 2012, were resampled during this investigation.

A total of 189 air samples were collected, including indoor, pathway, indoor source, and outdoor ambient air samples. All sampling activities were conducted from February 15–27, 2019. In support of the site-wide event, an additional 2 samples were collected on June 6, 2019 from Building 16. Field sampling activities involved collecting indoor air samples from 23 buildings and outdoor ambient air samples at Moffett Field, per the 2016 Work Plan (NOREAS 2016). Air samples were either collected using 6-liter Summa Canisters and analyzed by EPA method T0-15, or by passive-type Radiello sampling and analyzed by EPA Method TO-17. Each Summa Canister came pre-cleaned and certified from the laboratory and equipped with a fixed-rate flow controller and particulate filter.

Indoor air samples were collected only in the basement and first floor of the 23 buildings, based on the 2012, 2014, 2016, 2017, and 2018 results (Table 7). There were four types of areas sampled: *work areas*, *VI pathways*, *outdoor ambient,* and *indoor source*. Samples were collected in the breathing zone of *work areas* (offices areas, meeting rooms, and high-traffic areas such as hallways), at *VI pathways* (such as basements, crawlspaces, sumps, drains, trenches and utility corridors), *outdoor ambient* (outdoor ambient conditions), and *indoor source* (grab samples over standing water infiltrated from the groundwater table). Grab samples were additionally collected in or near elevator shafts (ventilation pathways between floors) in Buildings N210 and N239. For work area samples, Summa Canisters were placed 36 to 60 inches above the floor in occupied or potentially occupied areas. VI pathway samples were collected in areas where potential conduits (such as penetrations through the slab, drains, utility lines, or vaults) into the building were observed that might provide a direct route for VOC vapor migration into the building. For VI pathway samples, the tubing attached to the Summa Canister was placed within crawlspaces. Grab

samples were collected from within the elevator shaft by feeding a tube down the shaft while the elevator doors were held open. Outdoor ambient air samples were collected to establish background/ outdoor ambient air concentrations. Due to the short lead time for the February 2019 sample event, outdoor ambient air samples were collected using 7-day passive samplers (i.e., Radiellos) rather than the proposed Summa sampling. Outdoor ambient air sample duration spanned over the duration of the HVAC-on and HVAC-off sampling procedures. Indoor source samples were collected as grab samples over standing water possible impacted by VOCs that had infiltrated into buildings due to excessive rain fall in February 2019.

In buildings with HVAC systems, indoor air samples were collected during normal work hours with the HVAC system operating (HVAC-on), and at the end of a weekend after the HVAC system had been shut down for 36 hours (HVAC-off). Depending on the length of a regular work day for the employees in a particular building, sampling durations were either 8 or 10 hours for buildings that operate approximately between 0700 and 1800.

Due to the Federal Government shutdown that extended through January 25, 2019, HVAC-off sampling activities were not conducted over the regularly scheduled three-day Martin Luther King Jr. weekend. NASA was furloughed during the Federal Government shut down, and therefore, NASA Ames Research Center was closed and could not be accessed for sampling. Unfortunately, the 2019 HVAC-off sampling activities had to be rescheduled during a 2-day weekend of February 23 and 24, 2019. This untimely event impacted the sampling time duration for the HVAC-off sampling. The originally proposed scheduled 24-hour HVAC-off samples had to be modified to a 10-hour sample time interval. To accurately compare the 2019 HVAC-on versus the HVAC-off samples, all 24-hour HVAC-on samples were systematically converted to 10-hour samples. Table 8 lists the number of samples collected per building, sample identifications, sample locations (i.e. building number, floor, room number), sample durations (i.e. 8-hr, 10-hr, or grab), sample type (i.e. work area, pathway, outdoor ambient/background, duplicate), and sampling rationale established on the sampling plan from the 2016 Work Plan (NOREAS 2016). Table 9 lists all modifications and/or deviations in sampling from the 2016 Work Plan.

After collection of the air samples, sample canisters and Radiellos were collected, packed, and properly labeled in the field and then submitted to the analytical laboratory under chain of custody in accordance with the 2016 Work Plan. Air samples were analyzed for the select COCs by a DoD ELAP- and NELAP-certified analytical laboratory using the EPA Method TO-15 SIM for Summa Canisters, and EPA Method TO-17 for Radiello; results were reported in $\mu g/m^3$. Samples were analyzed with a standard turnaround time of 10 business days for the initial data report. The Level D report was provided within 21 days of receipt of the samples. A QA/QC evaluation of the data was performed upon receipt of the analytical results (Section 6).

Each sample collected was assigned a unique sample identification number to record and report the results. Each sample was identified on the sample label by the building, sampling location code

(where the sample was collected), a sequential two-digit sample identification code as a reference, and an EC (HVAC) operation code at each location as described below.

A 3-digit building number beginning with a 3 (300 series) was used to indicate a duplicate sample. A floor level of "A" indicates an outdoor ambient air sample. A floor level of "B" indicates a basement sample. The HVAC operation code was identified for each building sample as follows:

- N – EC (HVAC) is on or operation
- F – EC (HVAC) is off or shut down, or
- [none] – the building is without an operational EC (e.g., HVAC system)
- An "R" at the end of the identification number was used to indicate a confirmation sample.

19N210 (Year + Building Number)	1 (Floor Level)	01 (Sampling Location ID)	N (HVAC Operation Code)

4.2 INDOOR AIR SAMPLES

Sampling locations and number of samples collected for each building were selected using the results of the building surveys (such as avoiding areas of solvent use and storage), the 2013 soil gas and ground water sampling results, and the 2012, 2014, 2016, 2017, and 2018 indoor air sampling locations and results. A total of 155 indoor air work area samples (including duplicates and confirmation samples) were collected from 91 locations within the 23 buildings. The number of indoor air samples per building varied from one in Building 76 to 26 in Building N239. The number of samples for individual buildings and planned sampling locations are provided in Table 8. Table 8 lists the deviations in sampling from the 2016 Work Plan (NOREAS 2016). The sampling location maps for each building are provided in Appendix C. Indoor air samples were collected only from the basement (when present) and ground floor of the buildings. The inlet of the indoor air sampling devices was placed within the breathing zone. Duplicate samples were collected at a rate of 10 percent for a total of 18. Photographs taken during sampling activities are provided in Appendix D.

Buildings sampled in the VI Study Area were tiered on the basis of whether the building was sampled with or without an operating EC:

- Group 1: Buildings sampled with an operating EC (e.g., HVAC system)
- Group 2: Buildings sampled without an operating EC or with the EC turned off

4.2.1 Group 1: Buildings Sampled with Engineering Control (HVAC System) Operating

Buildings with an EC (e.g., HVAC system) were sampled while the EC was in operation during normal working hours and at the end of the weekend after the HVAC system was shut down for

36 hours. The exception to this procedure was at Buildings N210 and N243, where it was not possible to turn off the HVAC system because of potential overheating at computer server rooms. This exception is explained further in Section 4.7.

Time-integrated 8- or 10-hour air samples were collected for the ventilation system operation samples to coincide with building-specific, normal workday occupancy. The sampling period for the EC (HVAC) shutdown samples matched the duration of sampling for the EC (HVAC) operation samples. As discussed previously, the buildings were sampled with the HVAC system shut down over a two day weekend instead of the regularly scheduled three-day Martin Luther King Jr. weekend. This limited the HVAC-off samples time duration to a maximum of 10 hours, for HVAC-off sampling. To accurately compare the data between HVAC-on and HVAC-off samples, the HVAC-on samples were also collected over a 10-hour period.

Information regarding EC (HVAC) operations was verified with NASA to provide a basis for proper shutdown and sampling duration criteria. The available shutdown and sampling period was limited to weekend hours. The EC (HVAC) shutdown air samples were collected at the same locations as the EC (HVAC) operating samples. Air samples were collected using 6-liter Summa Canisters to provide consistent data collection methods during both sampling events. Pathway samples from the elevator shafts were collected as grab samples.

4.2.2 Group 2: Buildings Sampled without Engineering Control Systems

To reduce the demand of Summa Canisters on the environmental laboratories, air samples from buildings without an EC (HVAC) were collected using passive samplers (i.e., Radiellos). Since buildings without an HVAC have no time limitations for sampling, the buildings with HVAC turned off, Radiello passive samplers were appropriately and applicably chosen. The passive samplers were placed 36 to 60 inches above the floor.

4.3 PATHWAY AIR SAMPLES

A total of 25 pathway air samples (including duplicates) were collected to provided information on COC concentrations in areas where potential conduits (such as penetrations through the slab, drains, utility lines, or vaults) into observed buildings that might provide a direct route for VOC vapor migration into the building. For pathway air samples in crawl spaces, tubing was attached to the canisters and fed within crawlspaces, or in a few cases, the entire canister was placed in the crawl space. Grab samples were collected from within the elevator shaft by feeding a tube down the shaft while the elevator doors were held open. Maps showing the pathway air sampling locations are provided in Appendix C. Pathway air samples were collected concurrently with the indoor air samples, and with the same sample duration.

Pathway air samples were collected using the same sampling methodology used for the indoor air samples (e.g., a 6-liter Summa Canisters equipped with individually certified, fixed-rate flow controller and a particulate filter or Radiello passive samplers). Pathway air samples were analyzed

and reported in µg/m^3 by a DoD ELAP- and NELAP-certified analytical laboratory using the EPA Method TO-15 SIM or EPA Method TO-17 for the COCs.

4.4 INDOOR SOURCE SAMPLES

A total of 4 indoor source samples (including duplicates) were collected to provide information on COC concentrations from possible indoor air sources identified as standing water that had infiltrated into buildings. Due to extreme rainfall during the 2019 event (National Weather Service 2019), groundwater infiltrated from the water table into the basements of Buildings N239 and N243. Indoor source samples were collected from indoor air just above the standing water. A map showing the indoor source sampling locations is provided in Appendix C.

Indoor source samples were collected using the same sampling methodology used for the indoor air grab samples (e.g., a 6-liter Summa Canisters). Indoor source samples were analyzed and reported in µg/m^3 by a DoD ELAP- and NELAP-certified analytical laboratory using the EPA Method TO-15 SIM.

4.5 OUTDOOR AMBIENT AIR SAMPLES

A total of 14 outdoor ambient air samples were collected to provide information on COC concentrations in outdoor ambient air and air near ventilation system intakes. Outdoor ambient air samples were collected outside the buildings, including near ventilation system air intakes, for comparison with indoor air to evaluate the potential contribution of VOCs from outdoor ambient air to indoor air. A map showing the outdoor ambient air sampling locations is provided in Appendix C. For buildings sampled with passive samples, the outdoor ambient samples were deployed at approximately the same time as the building samples.

Outdoor ambient air samples were collected using 7-day passive samplers (i.e., Radiellos). Outdoor ambient air samples were analyzed and reported in µg/m^3 by a DoD ELAP- and NELAP-certified analytical laboratory using the EPA Method TO-17 for the COCs.

4.6 ACCESS REQUIREMENTS

Access to each of the 23 buildings was arranged through the FSMs of each building prior to finalizing the sampling schedule. Access was required to set up the sampling equipment, check samples following setup, and remove sampling equipment after sampling. The FSMs or tenants of each building provided access to the buildings for collection of samples during standard work hours (buildings with HVAC-on or buildings without HVAC systems). With the exception of Building 126, which required the presence of the FSM for security of artifacts within the building, access during the weekend was provided by NASA security personnel.

Availability of FSMs or tenants and access restrictions such as locked rooms or buildings required changes to the sampling activities. Section 4.7 discusses the deviations in sampling locations and/or schedule.

4.7 DEVIATIONS FROM THE SAMPLING PLAN

This section summarizes the deviations from the sampling activities specified in the 2016 Work Plan. Table 9 presents detailed sampling deviations.

The 2018 Air Sampling and VI Tier Response Evaluation Report, Former Naval Air Station Moffett Field, Mountain View, California (NOREAS 2019) recommended the discontinuation of sampling of buildings classified as Tier 3B as the response action for buildings classified as Tier 3B does not require implementation of long-term monitoring per the ROD Amendment (EPA 2010). Buildings classified as Tier 3B in 2018 that were not schedule to be sampled during the 2019 event include Buildings 13, 29, 67, 76, 107, 510, and 566. On February 1, 2019 the EPA made a request to the Navy to sample all 23 buildings during the 2019 event, including the Tier 3B buildings. The request was made because the WATS had been offline since November 2018 and was offline at the time of the 2019 sampling event. In addition, heavy rainfall was forecasted for the month of February during the planned sampling event (National Weather Service 2019), and groundwater levels were anticipated to be higher than average. These two contributing factors are considered a worst-case scenario, and the Navy concurred it would be beneficial to sample all buildings given the conditions.

Due to the Federal Government shutdown that extended through January 25, 2019, HVAC-off sampling activities were not conducted over the regularly scheduled three-day Martin Luther King Jr. weekend. NASA was furloughed during the Federal Government shut down, and therefore, NASA Ames Research Center was closed and could not be accessed for sampling. The 2019 HVAC-off sampling activities had to be rescheduled during a 2-day weekend of February 23 and 24, 2019. This untimely event impacted the time limitations of the HVAC-off sampling. Routinely scheduled 24 hour HVAC-off samples (in Buildings 12, 15, 510, N239, N239A, N243, and N243A) had to be converted to a 10-hour sample time interval in accordance with FCRF-3028-01. Additionally, all 24-hour HVAC-on samples were systematically converted to 10-hour samples to accurately compare the 2019 HVAC-on versus the HVAC-off samples in accordance with FCRF-3028-01.

Additionally, due to the rescheduling of the 2019 event, the environmental laboratories expressed concerns about the delivery of Summa cans. To try and avoid delays in procurement, buildings without HVAC (Buildings 2, 10, 13, 29, 45, 67, 76, 567) were sampled with Radiello passive samplers using EPA Method TO-17, in accordance with FCRF-3028-01. Passive samplers were deployed for a 7-day period. In addition, outdoor ambient samples were collected with Radiello passive samplers using EPA Method TO-17. Outdoor ambient samples were collected over a 7-day period covering both the HVAC-on and HVAC-off sampling events in buildings with an

HVAC. Note the outdoor ambient samples from Buildings 13, 67, and N210 were lost due to storm conditions at during the 2019 sampling event, measures will be taken to secure lightweight passive samplers as needed during future events.

Due to the limitations in procurement of sample media on short notice, the labs could not provide enough Summa Canisters for the 2019 event. For that reason, sample locations with historically low concentrations were omitted from the 2019 sampling event so samples locations with historically higher concentrations could be prioritized. Samples; 19M003-1-01-F and 19M003-1-08-F from Building 3, 18M014-1-04-F from Building 14, 19M015-1-02-F from Building 15, 19M016-1-01-F and 19M016-1-04-F from Building 16, 19N239-1-07-F and 19N239-1-08-F from Building N239, 19N239A-1-05-F from Building N239A, and 19N243-1-01-F from Building N243 were omitted due to limitations of sample media.

To investigate the attenuation factor between crawlspace pathways and indoor air, indoor air samples were collocated with crawlspace pathway samples. At Building 12 samples 19M012-1-04-F and 19M012-1-04-N were collocated with samples 19M012-C-05-F and 19M012-C-05-N respectively. At Building 14 sample 19M014-1-06-N was collocated with sample 19M014-C-01-N. At Building N210 sample 19N210-1-12-F was collocated with sample 19N210-C-11-F.

On June 6, 2019, two additional samples were collected from Building 16 Room 118, one from indoor air and one from the crawlspace beneath the floor. The samples were collected to see if the exceedance in Room 118 could be re-created. Additional samples include: 19M016-1-07-N-R and 19M016-1-09-N.

At Building 10, sample identification names have been updated to YY-M010-1-XX-YYQZ, where Z is the quarter. A set of samples is collected each quarter and there was no distinguisher between the four quarters of sampling with in each year, so the sample names were not unique. Unique sample IDs are required by NIRIS.

Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event that had not been accounted for at the time of the Sampling and Analysis Plan (SAP; NOREAS 2016). Building 14 was sampled with the HVAC-on and -off scenarios in 2019. Samples were renamed accordingly.

At Building 16, sample 18M416-1-02-N was renamed 18M316-1-02-N to reflect the correct duplicate sample nomenclature. Samples 18M016-1-06-N, 18M016-1-07-N, and 19M016-G-08-N were added to investigate potential for subsurface vapor to get trapped in unventilated rooms built in Building 16.

At Building 126, sample 18M326-1-02-F was collected with the HVAC system in operation, so it was renamed 18M326-1-02-N to reflect the “HVAC-on” sample nomenclature. The “-N” means

that the HVAC system is in operation; the original sample name had an "F" indicating HVAC-off. The sample was taken with the HVAC in operation.

At Building 555, the sample name was updated to 18M355-1-01-N to correspond with the sample it was now proximal to, and given only one "N" to reflect the "HVAC-on" sample nomenclature.

At Building N210, at the request of the FSM, the building was sampled while the HVAC system was in operation. Building N210 has several servers that require continuous cooling to prevent overheating. The FSM requested that the HVAC remain on for the duration of the sampling to prevent any damage to the servers. As an alternative to turning off the HVAC system, the air intake was restricted with plastic sheeting to stop outdoor ambient air from entering the building. The building was sampled with indoor air circulating in the building without the influence of outdoor ambient air. Duplicated sample 19N310-G-03-F was added at the request of the Project Chemist to ensure that the sampling event's requirement of 10 percent duplicate samples was met.

At Building N239, sample 19N339-G-04-F was added at the request of the Project Chemist to ensure that the sampling event's requirement of 10 percent duplicate samples was met. To investigate possible indoor air sources, grab samples 19N239-G-05-F and 19N339-G-05-F were collected from air over standing water which may have infiltrated from the groundwater table due to heavy rainfall.

At Building N243, at the request of the FSM, the building was sampled while the HVAC system was in operation. Building N243 has several servers that require continuous cooling to prevent overheating. The FSM requested that the HVAC remain on for the duration of the sampling to prevent any damage to the servers. As an alternative to turning off the HVAC system, the air intake was restricted with plastic sheeting to stop outdoor ambient air from entering the building. The building was sampled with indoor air circulating in the building without the influence of outdoor ambient air. Additionally, outdoor ambient sample 19N243A-A-02-F was renamed to 19N243-A-02-F to reflect the correct building sampled (N243). To investigate possible indoor air sources, grab samples 19N243-G-01-F and 19N343-G-01-F were collected from air over standing water which may have infiltrated from the groundwater table due to heavy rainfall.

5.0 AIR SAMPLING RESULTS

Indoor and outdoor ambient air samples were analyzed by a DoD ELAP- and NELAP-certified analytical laboratory using the EPA Method TO-15 SIM for the COCs (PCE; TCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCE; 1,1-DCA; and VC) or EPA Method TO-17 for the COCs (PCE; TCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCE; and 1,1-DCA). These methods provide detection limits below the cleanup levels and typical background outdoor ambient air concentrations.

The sampled buildings and the 2019 sampling results are listed in Table 10. The laboratory analytical reports are provided in Appendix E. A QA/QC evaluation and data validation of the analytical data were performed upon receipt of the laboratory results (see Section 6 and Appendix E). Combined analytical sampling results from 2012, 2013, 2014, 2016, 2017, and 2018 historical sampling investigations, along with the current, 2019 sampling event, are provided in Table 11. Sections 5.1 through 5.24 provide detailed building and air sampling results.

5.1 OUTDOOR AMBIENT AIR SAMPLES

A total of one Summa Canister and 15 passive air samplers were deployed to provide information on COC concentrations in outdoor ambient air and air near ventilation system intakes at the time of indoor air sampling during the February 2019 sampling event. Passive samplers are small and lightweight, and two of them could not be found after a storm that occurred during the 168-hour sampling period. Measures will be taken to secure lightweight passive samplers as needed during future events. A tenant in Building 67 reported seeing a sampler blowing away during a storm. The other 13 passive outdoor ambient air samples were collected after being deployed for 168 hours. One outdoor ambient air sample was collected via a 24 hour Summa Canister on February 15, 2019. Outdoor ambient air samples were collected immediately outside the buildings, including near an air ventilation system air intake, for comparison with indoor air values to evaluate the potential contribution of VOCs from outdoor ambient air to indoor air. A map showing the outdoor ambient air sampling locations is provided in Appendix C.

Based on the validated results for outdoor ambient air samples collected from February 15-26, 2019, outdoor ambient concentrations of TCE and PCE ranged from 0.031 to 0.26 $\mu g/m^3$ and 0.028 to 0.54 $\mu g/m^3$, respectively. Results followed by a J qualifier are laboratory estimated values. Table 12 tabulates the 2019 sampling event outdoor ambient air concentration ranges for the seven COCs investigated. For buildings where outdoor ambient air sampling was conducted, indoor air sampling results were compared to outdoor ambient air sampling results. For indoor air samples collected in buildings where outdoor ambient air sampling was not conducted, results were compared to the range of building-specific outdoor ambient air sampling results (Table 12) along with outdoor ambient air samples of adjacent or nearby buildings where outdoor ambient air samples were collected. Indoor and outdoor ambient air sampling location maps are provided in

Appendix C. Additionally, buildings with indoor air concentrations within the range of outdoor outdoor ambient air concentrations were also compared to the TCE range of ND to 0.4 µg/m^3, provided in Tables 6A and 6B of the 2010 ROD (EPA 2010).

5.2 BUILDING 2 (GYMNASIUM)

A walk-through inspection of Building 2 was conducted on February 15, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building survey forms and a summary table with any modifications from later inspections for Building 2 are included in Appendix A. Passive indoor air samplers were placed in Building 2 on February 15, 2019 and collected on February 22, 2019.

5.2.1 Building Condition

Building 2 is an approximately 17,000 square-foot (SF), two-story structure. The building's basketball court, bathrooms, locker rooms, and showers are intermittently used Monday through Friday. Building 2 has a raised wooden floor in the basketball court (main gym floor) and tiled floors in bathrooms and locker rooms. There are no visible breaks in the wooden or tile floors. Electrical conduits penetrating the floor slab are present in the eastern corner of Room 100. Sewer and plumbing conduits penetrating the floor slab are also present in Rooms 103 and 111A. Building 2 was unoccupied during the 2012 and 2014 sampling events, but occupied during the 2015, 2016, 2017, 2018, and 2019 sampling events.

5.2.2 HVAC System

Building 2 does not have a central HVAC system. However, the building does have ventilation systems such as open windows, restroom fans, large industrial fans in Room 100, and an air conditioning (AC) unit in Room 110. A steam heating system is used in the building. Fans are used for cooling and air circulation.

5.2.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 2.

5.2.4 Sampling Locations and Results

5.2.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup level. Building 2 was classified as Tier 3A for the years 2012, 2014, 2016, 2017, and 2018. For 2012 and 2016 the concentrations of TCE were below average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m^3, and as such should have been tiered as 3B. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.2.4.2 Current (2019) Sampling Results

Four indoor air samples were collected in Building 2 on February 22, 2019, one from Room 109, which is an intermittently occupied office used by the building manager; two pathway samples (including one duplicate) in the Boiler Room (Room 104); and one pathway sample from Room 107, which is currently used to store gym equipment. The sampling location details are provided in Table 8. An indoor air sampling location map for Building 2 is provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 29 outdoor ambient air concentration levels, as Building 29 is the closest building with an outdoor ambient air sample. Indoor air concentrations exceeding the outdoor ambient air concentration level at Building 29 included TCE (all four samples) and PCE (three of four samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.056 to 0.16 $\mu g/m^3$ and 0.032 to 0.039 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.2.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air sampling results were compared with Building 29 outdoor ambient air concentration levels, as Building 29 is the closest building with an outdoor ambient air sample. COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration range for Building 29. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$. Building 2 is being classified as Tier 3B, and no further monitoring is recommended.

5.3 BUILDING 3 (CONFERENCE CENTER AND CAFETERIA)

A walk-through inspection of Building 3 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 3 are included in Appendix A. Indoor air samples at Building 3 were collected with the HVAC system shut off on February 24, 2019, and samples were collected again on February 27, 2019, with the HVAC system operating.

5.3.1 Building Condition

Building 3 is an approximately 25,000 SF, one-story structure and is used as a conference center and cafeteria. The cafeteria operates Monday through Friday for breakfast and lunch. The facility intermittently hosts various meetings and functions. The offices operate Monday through Friday 0800 to 1600. There is one occupied floor and an unoccupied partial basement that houses building utilities. The basement consists of a partial crawlspace approximately 3 feet bgs with a raised wooden floor above the crawlspace. The basement walls are constructed of wood and the floor is

constructed of concrete with visible cracks and seams. The crawlspace is present beneath Rooms 105, 127, 124, C110, and 110 to the northeastern end of the building.

Floor drains are present in Rooms 126, 110 (kitchen), restrooms, and janitor closets. Electrical conduits are present in the northeastern corner of Room 110 and in Room 112. Phone line conduits penetrating the floor are present in Room 130 (communication room). Recent renovations include R105D (complete renovation), 104A (new carpet), and 108 (new floor tile in January 2017).

5.3.2 HVAC System

Building 3 has an HVAC system (zoned heating/cooling). Air intakes and all HVAC equipment are mounted on the roof. Exhaust fans in the two kitchen areas are 3 to 5 horsepower (HP); all other fans are 1 HP. The exhaust fans are located in Rooms 102 (one fan), 103 (one fan), 104 (two fans), 105 (one fan), 110 (five fans), 113 (one fan), 116 (two fans), 122 (one fan), 124 (one fan), 127 (two fans), and 128 (two fans). Nine AC units are located on the roof with capacity from 5 to 20 tons. At the time of the 2019 sampling event, the heating units in the kitchen areas were not working.

A building-specific heating system is used in the building. Fans are used for cooling and air circulation.

5.3.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 3.

5.3.4 Sampling Locations and Results

5.3.4.1 Historical Sampling Results

The previous air sampling events in 2014, 2016, and 2017 had samples with COCs that were below the EPA's indoor air cleanup level. In the 2018 event, TCE was detected at concentrations exceeding the EPA's indoor air cleanup level in one work area sample from Room 108 (18M003-1-07-F) and the associated confirmation sample (18M003-1-07-F-R). Building 3 was classified as Tier 3A for the four sampling events in 2012, 2014, 2016, and 2017. Because TCE concentrations in Summa samples collected in 2018 exceeded the EPA's indoor air cleanup levels, Building 3 was reclassified as Tier 2 from 3A at this time. Based on further review of the data, Building 3 should have been classified as Tier 2 during the 2012 sampling event since one sample (M403-1-01-N) had TCE detected exceeding the EPA's indoor air cleanup level. The sampling location details are provided in Table 8. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.3.4.2 Current (2019) Sampling Results

Thirteen indoor air samples were collected at Building 3 with the HVAC system operating (seven samples) and with the HVAC system off (six samples). One outdoor ambient air sample of 7-day duration, was collected on the roof of Building 3 near the air intake. Indoor air samples were collected on February 24, 2019 (six samples) with the HVAC system off and on February 27, 2019 (seven samples) with the HVAC system operating. The sampling location details are provided in Table 8. Indoor and outdoor ambient air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

Thirteen indoor air samples were collected at Building 3 with the HVAC system operating (seven samples) and with the HVAC system off (six samples). One outdoor ambient air sample of 7-day duration was collected on the roof Building 3 near the air intake. Indoor air samples were collected on February 24, 2019 (six samples) with the HVAC system off and on February 27, 2019 (seven samples), with the HVAC system operating. The sampling location details are provided in Table 8. Indoor and outdoor ambient air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

PCE was detected at a concentration exceeding the EPA's indoor air cleanup level in one pathway sample from Room 130 (19M003-1-06-F, at 5.9 µg/m^3). Room 130 is currently used as a communication and server room. Phone line conduits penetrating the floor are present in Room 130, so this is considered a pathway sampling location. Historical concentrations of TCE and PCE in Room 130 collected during the 2012 through 2018 sampling events range from 0.11 to 7.9 µg/m^3 and 0.026 to 0.14 µg/m^3, respectively. All other COC detections for indoor air samples collected at Building 3 were lower than the EPA's indoor air cleanup levels. Indoor air concentrations exceeding outdoor ambient air concentration ranges, included TCE (all 13 samples – six samples with HVAC-off; seven with HVAC-on); PCE (7 of 13 samples – six samples with HVAC system off; one with the HVAC-on); trans-1,2-DCE (5 of 13 samples, all with the HVAC-off); 1,1-DCE (3 of 13 samples, all with the HVAC-off); 1,1-DCA (6 of 13 samples, all with the HVAC-off); and cis-1,2-DCE (7 of 13 – six samples with the HVAC system off; one sample with HVAC-on). TCE and PCE were measured in indoor air at concentrations ranging from 0.23 to 3.3 µg/m^3 and 0.049 to 5.9 µg/m^3, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.3.5 Response Action Tier Designation

PCE concentrations exceeded the EPA's indoor air cleanup level in Room 130 (pathway sample) with the HVAC system turned off. All indoor air Summa samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. However, TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building 3. Because PCE concentrations in Summa samples exceeded the EPA's indoor air cleanup level in one pathway sample, Building

3 is being classified as Tier 2. Based on the results of the 2018 and 2019 indoor air sampling events, as well as the 2018 ECD screening event, mitigation measures are recommended for Building 3.

5.4 BUILDING 10 (BOILER PLANT FOR NASA RESEARCH PARK)

A walk-through inspection of Building 10 was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 10 are included in Appendix A. Passive indoor air samplers were placed in Building 10 on February 15, 2019 and collected on February 22, 2019.

5.4.1 Building Condition

Building 10 is an approximately 12,000 SF, one-story structure that formerly housed the boiler plant for the steam lines at NASA Ames. The boiler was taken out of service by February 2014 and removed during March–April 2014. The facility formerly operated Monday through Friday for 8 hours per day with no weekend use. With removal of the boiler, the occupants of Building 10 were moved to Building 16. Building 10 has one floor with a maintenance shop, the former boiler room, two offices, and a break room. There is a utility corridor tunnel that runs from Building 10 to Hangar 1 that once contained the helium supply lines to the dirigibles in Hangar 1 and steam lines for heating. The helium plant was formerly in Building 10. The steam lines ran through floor trenches into the tunnel and then connected with shallow trenches for distribution of steam to the other buildings at NASA Ames. The tunnel access is via two stairwells to an 8-foot-deep floor trench in the eastern end of Room 101. The tunnel ranges from 7 to 8 feet high and approximately 5 feet wide. The walls and floor of the tunnel are constructed of concrete. The tunnel access and the concrete trenches in the floor of Building 10 are covered by metal plates. Building 10 has a concrete slab floor with some visible cracks and seams.

There is a sump in Room N104 and a sump in the tunnel access trench in Room 101. Floor drains are present in Rooms 101 (three drains), 103, and R106. Electrical conduits penetrating the floor slab are present in Rooms 101, 107 and N104. Toilet conduits penetrating the floor are present in Room R106.

5.4.2 HVAC System

Building 10 does not have an HVAC system. The building does have ventilation systems such as open windows, restroom fans (not in use), and two AC units (not in use).

5.4.3 Existing Mitigation Measures

A cutoff wall was constructed and a blower was installed in the tunnel at a vault access point located approximately 170 feet east of Building 10 from July 11–12, 2012, as part of an interim action to remove vapors from the tunnel and control COC concentrations in Building 10 based on

2012 indoor air sampling results. The blower discharges to an elevated, outside exhaust. Quarterly indoor air monitoring was implemented at Building 10, including in the tunnel access area, to monitor the effectiveness of the interim measure. During the fourth quarter of 2012, TCE concentrations in samples collected in Building 10 increased to levels exceeding the indoor air cleanup goals. The increase was verified during the first quarter 2013 monitoring period. Based on the indoor air exceedances, modifications to the abatement system were completed from May 13–17, 2013. Modifications included installation of a wall at the Building 10 entrance to the tunnel and installation of an additional blower inside the Building 10 floor trench. The blower at the entrance to the tunnel has been operating continuously since it was installed on May 17, 2013. During the November 2015 monitoring event, it was observed that the blower located near the exhaust vent had malfunctioned and had been offline since; however, observed TCE concentrations indicate that the 2013 modifications alone are sufficient to prevent VI into Building 10.

Additional sampling was conducted in May, June, August, and November 2013, in February, May, and August 2014, in February, May, August, and November 2015, in February, May, August, and November 2016, in January, April, July, and October 2017, and January, June, and September 2018 to determine whether TCE and PCE concentrations in work areas inside the building had decreased and remained below the ROD cleanup goals following the VI system enhancements. The results showed that detected concentrations of TCE in work areas within the building were below the ROD Amendment cleanup goal of 5 $\mu g/m^3$ in all samples collected in May, June, August, and November 2013; February, May, and August 2014; August 2015; February, May, and November 2016; April, July, and October 2017; and January, June, and September 2018. No other COC was detected at a concentration that exceeded its respective cleanup goal within work areas of the building. The interim measure is being maintained until a final remedy is implemented for Building 10. Indoor air at Building 10 will be monitored as long as the current interim measure is in place. The 2018 Tier Response Evaluation (NOREAS 2019) recommended reducing the sampling frequency of Building 10 from quarterly to annually. This change has been implemented. This building is currently scheduled for mitigation measures as outlined in CES Work Plan (CES 2017).

5.4.4 Sampling Locations and Results

5.4.4.1 Historical Sampling Results

Indoor air samples had concentrations of TCE exceeding the EPA's indoor air cleanup levels in 2012, 2014, and 2017, and PCE exceeding the EPA's indoor air cleanup levels in 2012. The indoor air samples collected in 2016 and 2018 all had concentrations of COCs that were below the EPA's indoor air cleanup level. Building 10 was classified as Tier 2 in 2012 and 2014, Tier 3A in 2016, and Tier 1 in 2017 and 2018. The historical sampling results are included in Table 11. Additional

information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.4.4.2 Current (2019) Sampling Results

Eight passive indoor air samples of seven-day duration (including two duplicates) were collected from Building 10 on February 22, 2019, from the main work area (duplicate), the boiler room, near the tunnel access area, Room 103 (duplicate), and the Room 102 office. One outdoor air sample at the tunnel exhaust vent was collected. One outdoor ambient air sample was collected immediately outside Building 10, along with the indoor air samples. All samples were collected with the EC (blower) operating. The sampling location details are provided in Table 8. An indoor air sampling location map for Building 10 is provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All sampling results were below EPA's indoor air cleanup levels for all COCs with the EC (blower) operating. Indoor air concentrations exceeding the outdoor ambient air concentration levels included TCE (eight of eight samples); PCE (eight of eight samples); trans-1,2-DCE (four of eight); cis-1,2-DCE (eight of eight samples); 1,1-DCA (three of eight samples); and 1,1-DCE (three of eight samples). The outdoor exhaust sample had concentrations of cis-1,2-DCE; PCE; and TCE exceeding the outdoor ambient air concentration level. TCE and PCE were measured in indoor air at concentrations ranging from 0.44 to 4.8 $\mu g/m^3$ and 0.038 to 0.053 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.4.5 Response Action Tier Designation

All samples collected had COC concentrations below EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and, 1,1-DCE concentrations in indoor air samples were detected at concentrations exceeding the outdoor ambient air concentration range for Building 10. Building 10 is being classified as Tier 2 because no COCs in indoor air samples exceeded the EPA's indoor air cleanup levels during either the 2018 or 2019 monitoring events with the EC (blower) operating. ECD and Summa sampling in June 2018 confirmed multiple VI pathways in Building 10 including the tunnel system, electrical conduit, and the drain in Room 103. Therefore, mitigation measures are still recommended for Building 10 and re-evaluating current remedial design (CES 2017) is also recommended.

5.5 BUILDING 12 (COMMISSARY)

A walk-through inspection of Building 12 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 12 are included in Appendix A. Indoor air samples at Building 12 were collected with the HVAC system shut off on February 25, 2019 and sampled again with the HVAC system running on February 27, 2019.

5.5.1 Building Condition

Building 12 is an approximately 59,000-SF, two-story structure that is used as a military commissary and warehouse. Building 12 is occupied 24 hours per day, except from 2100 Sunday to 0500 Monday. The commissary operates Monday through Saturday generally from 0900 to 1800.

Building 12 has a raised floor throughout and a crawlspace under the raised floor. The floor is carpeted or tiled except in Room 101. Room 101 is used as a warehouse and has a concrete floor. The floor condition of the tiled and carpeted areas is unknown. There are cracks and seams in the concrete floor of Room 101. New tile has been installed within Room 109C and the room has been repainted. Floor drains are present in Rooms 118 and 117 (meat kitchen), 113, and 104C, and 105D (bathrooms). Sumps are present in Rooms 118 (meat kitchen) and 105 (produce). Electrical conduits penetrate the floor slab in Rooms 110 and 117, along with other utility conduits in Room 110. Elevator shafts are present in Rooms 112 and 109A/B.

5.5.2 HVAC System

Building 12 has an HVAC system (zoned heating/cooling). There are nine 3-ton AC units (one or two in use) and a new 10-ton unit mounted on the roof with an air intake. There are six exhaust fans located on the roof. Other ventilation systems in the building include open windows, mechanical fans, and restroom fans. A natural-gas, building-specific heating system is used in the building.

5.5.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 12.

5.5.4 Sampling Locations and Results

5.5.4.1 Historical Sampling Results

Pathway air samples collected in a crawlspace had concentrations of TCE exceeding the EPA's indoor air cleanup levels in 2012, 2014, and 2016. Indoor air samples collected during the previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had COC concentrations that were below the EPA's indoor air cleanup level. Building 12 was classified as Tier 3A for sampling events in 2012, 2014, 2016, 2017, and 2018. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.5.4.2 Current (2019) Sampling Results

Eight indoor air samples were collected from Building 12, with the HVAC system operating (four samples) and off (four samples). Two pathway air samples were collected from the crawlspace beneath the raised floor of Building 12. One passive outdoor ambient air sample (7-day duration)

was collected near Building 12. The outdoor ambient air sample was collected on February 22, 2019. Indoor air and pathway air samples were collected on February 25, 2019 (five samples) with the HVAC system off, and on February 27, 2019 (five samples), with the HVAC system operating. The sampling location details are provided in Table 8. Indoor and outdoor ambient air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE was detected in indoor air at concentrations exceeding the outdoor ambient air concentration in seven of eight samples (three samples with HVAC-off, four samples with HVAC-on). No other COCs were detected in indoor or crawl space air samples. TCE was measured in indoor air at concentrations ranging from 0.072 J to 0.22 $\mu g/m^3$. PCE and TCE were detected in the outdoor ambient air sample at concentrations of 0.03 $\mu g/m^3$ and 0.065 $\mu g/m^3$ respectively. These results are within the range of historical outdoor ambient samples at Building 12. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.5.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration range for Building 12. PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; 1,1-DCE; and VC concentrations in indoor air samples were not detected at their respective method reporting limits. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$. Building 12 is being classified as Tier 3B, and no further monitoring is recommended.

5.6 BUILDING 13 (COMMISSARY WAREHOUSE)

A walk-through inspection of Building 13 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 13 are included in Appendix A. The indoor air samples at Building 13 were collected on February 22, 2019.

5.6.1 Building Condition

Building 13 is an approximately 16,000 SF, one-story structure that is used as a food storage warehouse to support the Building 12 commissary. Building 13 is open 24 hours per day, except from 2100 Sunday to 0500 Monday.

There is a concrete slab floor (with cracks and seams) in Room 103 and a raised floor in Room 102. No floor drains or sumps are present. Electrical conduits penetrate the concrete floor slab in

the northern side of Room 102 and Room 103. A water pipe line penetrates the concrete floor slab in Room 103.

5.6.2 HVAC System

Building 13 does not have an HVAC system. Building 13 has open air ventilation and open windows.

5.6.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 13.

5.6.4 Sampling Location and Results

5.6.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COC concentrations that were below the EPA's indoor air cleanup level. Building 13 was classified as Tier 3A for the years 2012, 2014, and 2016 and Tier 3B for 2017. For 2012 and 2014 the concentrations of TCE were below average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$, and as such should have been tiered as 3B. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.6.4.2 Current (2019) Sampling Results

Two indoor passive air samples (7-day duration) were collected in Building 13. One outdoor ambient air sampler was placed near Building 13 but was lost due to a storm event that took place over the 7-day collection period. Indoor air samples were collected on February 22, 2019. The sampling location details are provided in Table 8. Indoor and outdoor ambient air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

Both samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 12 outdoor ambient air concentration levels, as Building 12 is the closest building with an outdoor ambient air sample collected. Indoor air concentrations exceeding the outdoor ambient air concentration level at Building 12 included TCE (two of two samples) and PCE (two of two samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.082 to 0.25 $\mu g/m^3$ and 0.035 to 0.16 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.6.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COC concentrations in indoor air samples were detected at approximately the outdoor

ambient air sample concentration levels for Building 12 (the closest building with an outdoor ambient air sample collected). Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$; therefore, Building 13 is classified as Tier 3B, and no further monitoring is recommended.

5.7 BUILDING 14 (OFFICES AND STORAGE)

A walk-through inspection of Building 14 was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 14 are included in Appendix A. The indoor air samples at Building 14 were collected on February 24, 2019 and February 28, 2019.

5.7.1 Building Condition

Building 14 is an approximately 15,000 SF, one-story structure. The western portion of the building is occupied by SkyTran, an alternative transportation firm, as a demonstration facility. Two of the company's prototype elevated monorail lines (called "tran lines") are installed in the building. The slab of the floor is approximately 12 inches thick, based on the installation of the tran line. The building is typically operated 5 to 6 hours a month as a demonstration facility. The eastern portion of the building was leased to the U.S. Geological Survey (USGS) in 2018. In February 2019, the USGS was in the process of moving into the eastern portion of the building. The USGS will use the building as offices. Rooms 118 and 119 are an un-occupied storage area.

The concrete floor in the building is covered with carpet or linoleum tile throughout most of the facility. Seams are visible in the uncovered portions of the concrete floor. There is a crawlspace located under most of the building except under the northern storage room. No floor drains/sumps are present. Communications and electrical conduits that penetrate the slab are located in a closet near the demonstration room and the abandoned storage room at the northern end of the building.

5.7.2 HVAC System

An HVAC System was installed in Building 14 between the 2014 and 2016 sampling events. The current HVAC system is a zone heating and cooling system with one zone being for SkyTran portion of the building and the second zone for the USGS portion of the building.

5.7.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 14.

5.7.4 Sampling Locations and Results

5.7.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2017 and 2018 all had samples with COCs that were below the EPA's indoor air cleanup level. In 2016, three pathway samples had concentrations of TCE exceeding the EPA's indoor air cleanup level. Building 14 was classified as Tier 3A for the years 2012, 2014, 2016, 2017, and 2018. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.7.4.2 Current (2019) Sampling Results

Seven indoor air samples (including one duplicate) were collected from Building 14, with the HVAC system operating (five samples) and off (two samples). Four pathway air samples were collected from the crawlspace beneath the raised floor of Building 14. Indoor air samples were collected on February 24, 2019 with the HVAC system on and February 28, 2019 with the HVAC system off. The sampling location details are provided in Table 8. Indoor and pathway air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 12 outdoor ambient air concentration levels, as Building 12 is the closest building with an outdoor ambient air sample. Indoor air and pathway sample concentrations exceeding the outdoor ambient air concentration level at Building 12 included TCE (11 of 11 – four samples with HVAC-off, seven samples with HVAC-on); PCE (4 of 11 – one sample with HVAC-off, three samples with HVAC-on); cis-1,2-DCE (8 of 11 – four samples with HVAC-off, four with HVAC-on); 1,1-DCE (one of four pathway samples, with HVAC-off); and VC (two of four pathway samples – one with HVAC-off, one with HVAC-on). No other COCs were detected at Building 14. TCE and PCE were measured in indoor air at concentrations ranging from 0.11 J to 1.6 $\mu g/m^3$ and 0.070 J to 0.14 J $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.7.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 12 outdoor ambient air concentration levels, as Building 12 is the closest building with an outdoor ambient air sample. TCE; PCE; cis-1,2-DCE; 1,1-DCE; and VC concentrations in indoor air samples collected in Building 14 exceeded the outdoor ambient air concentration level at Building 12. Because indoor air COC results exceeded Building 12 outdoor ambient air concentration levels, Building 14 is remains classified as Tier 3A, and continued monitoring is recommended.

5.8 BUILDING 15 (NASA SECURITY)

A walk-through inspection of Building 15 was conducted on February 15, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 15 are included in Appendix A. The indoor air samples at Building 15 were collected with the HVAC system shut off on February 24, 2019 and were sampled again with the HVAC system running on February 26, 2019.

5.8.1 Building Condition

Building 15 is an approximately 17,000 SF, one-story structure that is used by NASA security. The majority of offices operate 8 hours per day, five days a week, with infrequent weekend use; however, the Lieutenants' office (Room 135D) is staffed 24 hours per day, 7 days per week.

The building has a concrete slab floor (with cracks and seams). Floor drains are present in Rooms 101, R102W, R104M, 146, and 150. Conduits penetrating the floor slab are present in Rooms 117A (janitor closet), R113, R115, R102W, and R104M (pipe conduits).

5.8.2 HVAC System

Building 15 has a chiller in Room 118 and two air handlers (A/H): A/H-1 is in Room 163 in the southwestern corner of the building, and A/H-2 is in Room 108 in the eastern side of the building. The air intake source is outside of the mechanical rooms at approximately 8 feet above ground surface.

The building has five exhaust fans, three in the east wing (one at the northeastern corner, two in the central area of the eastern wing) and two in the western wing (one at the northwestern corner and one at the southwestern corner).

Open windows, fans, and a window-mounted AC unit in Room 111 are used for cooling and air circulation. Heating is provided by a building-specific boiler system that runs on natural gas.

5.8.3 Existing Mitigation Measures

NASA adjusted the HVAC system in 2004 to increase the makeup air supplied into the building after indoor air sampling results ranged from 0.23 to 7.22 $\mu g/m^3$ for TCE (Haley & Aldrich 2009; NASA 2012).

5.8.4 Sampling Locations and Results

5.8.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup level. Building 15 was classified as Tier 3A for the years 2012, 2014, 2016, 2017, and 2018. The historical sampling results are included in Table 11.

Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.8.4.2 Current (2019) Sampling Results

Seven indoor air samples were collected in Building 15 with the HVAC system operating (four samples) and off (three samples). One outdoor ambient air sample (seven-day duration) was collected near Building 15 on February 22, 2019. Indoor air samples were collected on February 24, 2019 with the HVAC system off and February 26, 2019 with the HVAC system on. The sampling location details are provided in Table 8. Indoor and outdoor ambient air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration range included TCE (four of seven – three samples with HVAC-off, one with HVAC-on); PCE (four of seven – three samples with HVAC-off, one with HVAC-on); cis-1,2-DCE (three of seven samples, all with HVAC-off); trans-1,2-DCE (two of seven samples, both with HVAC-off); 1,1-DCA (three of seven samples, all with HVAC-off); and 1,1-DCE (one of seven samples, with HVAC-off). VC was not detected in any samples from Building 15. TCE and PCE were measured in indoor air at concentrations ranging from 0.18 to 1.3 $\mu g/m^3$ and 0.046 to 0.097 J $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.8.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building 15. Because indoor air COC results exceeded the outdoor ambient air concentration range, Building 15 is being classified as Tier 3A, and continued monitoring is recommended.

5.9 BUILDING 16 (MAINTENANCE CONTRACTOR [JACOBS] OFFICE AND SHOPS)

A walk-through inspection of Building 16 was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 16 are included in Appendix A. The indoor air samples at Building 16 were collected with the HVAC system shut off on February 24, 2019, and with the HVAC system running on February 27, 2019.

5.9.1 Building Condition

Building 16 is a single-story building with a second story annex on a slab-on-grade foundation. The building consists of offices, a wood shop, and a machine shop. Building 16 is an approximately

15,000 SF structure that is currently occupied by a maintenance contractor (Jacobs) operating Monday through Friday from 0600 to 1600.

The building has a concrete slab floor with visible cracks and seams. Floor drains are present in Room 111 and Rooms R101 and R102 (bathrooms). Electrical conduits penetrate the concrete floor slab in Room 118. Sink drain and toilet plumbing conduits are present in Rooms R101 and R102. Room 103 has a former steam line utility tunnel entering the room. From October through December 2017, damaged sections of the roof were re-roofed.

Room 118 is a server room. The server room is run by NASA personnel and is not entered by the occupants of the Building 16. The server room is only entered to performed maintenance work on the servers. Lead acid batteries are stored in Room 118 as a backup energy source for the HVAC system. The HVAC system must remain on at all times to protect the servers.

5.9.2 HVAC System

Building 16 has an HVAC system (zoned heating/cooling). It also has an A/H in Room 111 and a small exhaust fan in Room 106. Open windows, restroom fans, and a window-mounted AC unit in Room 110A provide cooling and air circulation. A building-specific boiler heating system that runs on natural gas is used in the building.

Room 118 has a separate HVAC system not connected to the HVAC in the rest of Building 16. The HVAC system in Room 118 must remain on in order to protect the servers that occupy Room 118. The HVAC inlets for Room 118 are located west of the building in a gated area, approximately 3 feet off the ground. HVAC is provided to Room 118 positive pressure forced ventilation. The windows and doors of Room 118 remain closed at all times. Existing Mitigation Measures

NASA adjusted the HVAC system in 2004 to increase the makeup air supplied into the building to maintain positive pressure after indoor air sampling results for TCE ranged from 0.21 to 15.11 $\mu g/m^3$ (NASA 2012). This building is currently scheduled for mitigation measures as outlined in the CES Work Plan (CES 2017).

5.9.3 Sampling Locations and Results

5.9.3.1 Historical Sampling Results

The previous air sampling events in 2012, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup level. In 2014 one work area sample (Room 103) had TCE detected exceeding the EPA's indoor air cleanup level. Building 16 was classified as Tier 3A for the years 2012, 2016, 2017, and 2018. Building 16 was classified as Tier 2 in 2014. The

historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.9.3.2 Current (2019) Sampling Results

Twelve indoor air samples (including one duplicate and two pathway samples) were collected in Building 16, with the HVAC system operating (nine samples) and off (three samples). One outdoor ambient air sample (seven-day duration) was collected near Building 16. Indoor air samples were collected on February 24, 2019 with the HVAC system off and February 27, 2019 and with the HVAC system on. Based on the results of the June 2018 ECD sampling, two pathway samples (19M016-1-07-N and 19M016-G-08-N) were added to the unoccupied server room, Room 118 (NOREAS 2019). The sampling location details are provided in Table 8. Indoor and pathway air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

TCE was detected exceeding the EPA's indoor air cleanup level in pathway sample in the unoccupied server room (Room 118; 19M016-1-07-N), at 7.0 µg/m^3. On June 6, 2019, two additional samples were collected from Room 118, one from indoor air and one from the crawlspace beneath the floor. Both of the additional samples had a TCE concentration of 1.0 µg/m^3. All other samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration range included TCE (12 of 14 – three samples with HVAC-off, nine samples with HVAC-on); PCE (10 of 14 – three samples with HVAC-off, five with HVAC-on); cis-1,2-DCE (seven of 14 – three samples with HVAC-off, four with HVAC-on); trans-1,2-DCE (seven of 14 – three samples with HVAC-off, four with HVAC-on); 1,1-DCA (four of 14 samples, three with HVAC-off, one with the HVAC-on); 1,1-DCE (four of 14 samples, two with HVAC-off, two with the HVAC-on); and VC (one of 14 – one sample with HVAC-off). TCE and PCE were measured in indoor air at concentrations ranging from 0.11 J to 7.0 µg/m^3 and 0.064 to 0.22 µg/m^3, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.9.4 Response Action Tier Designation

One pathway sample collected in Room 118 had a TCE concentration that exceeded the EPA's indoor air cleanup level. Room 118 is an unoccupied server room with an HVAC system that is not connected to Building 16. Two additional samples collected from Room 118 in June 2019 had concentrations below the EPA's indoor air cleanup levels. In addition; TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; 1,1-DCE; and VC concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building 16. Because indoor air COC results exceeded the outdoor ambient air concentration range, Building 16 is being classified as Tier 3A, and continued monitoring is recommended. In addition, investigation into the HVAC system and source of air for Room 118 is recommended to investigate the source of the TCE exceedance of the EPA's indoor air cleanup level in Room 118.

5.10 BUILDING 29 (BICYCLE SHOP)

A walk-through inspection of Building 29 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 29 are included in Appendix A. Passive indoor air samples at Building 29 were collected on February 22, 2019.

5.10.1 Building Condition

Building 29 is an approximately 1,400 SF, one-story structure with a basement that is currently used as bicycle repair shop. Building operating hours are intermittent, but typically the building is occupied 2-4 hours a day.

The building has a half basement under Room 106. The basement is used for storage and utilities. Building 29 has a concrete slab floor (with cracks and seams), tile floor, and raised wood floor in Room 106. Drains are present in the basement below Room 106 and in Room 102 (bathroom). Unknown conduits penetrate the floor slab in the basement and Room 103. Bathroom utilities penetrate the floor in Room 102.

5.10.2 HVAC System

Building 29 does not have an HVAC system. Ventilation systems such as open windows and restroom fans are present.

5.10.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 29.

5.10.4 Sampling Locations and Results

5.10.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup level. Building 29 was classified as Tier 3A for the years 2012 and 2016. Building 29 was classified as Tier 3B for the years 2014, 2017, and 2018. For 2012 and 2016 the concentrations of TCE were below the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$, and as such should have been tiered as 3B. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.10.4.2 Current (2019) Sampling Results

Two indoor air samples (seven-day duration) were collected in Building 29. One outdoor ambient air sample was collected near Building 29. Indoor and outdoor ambient air samples were collected on February 22, 2019. The sampling location details are provided in Table 8. Indoor and outdoor

ambient air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

PCE and TCE were detected at concentrations exceeding the outdoor ambient air concentration range for Building 29. No other COCs were detected. TCE was measured in indoor air at concentrations of 0.04 and 0.14 µg/m^3, and PCE at concentrations of 0.056 and 0.086 µg/m^3. TCE and PCE at were measured in outdoor ambient air at concentrations of 0.04 and 0.033 µg/m^3, respectively. All other COC concentrations were below the method reporting limit for analytical method TO-17. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.10.5 Response Action Tier Designation

Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m^3. COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration levels. Building 29 is being classified as Tier 3B, and no further monitoring is recommended.

5.11 BUILDING 45 (DRONE TESTING FACILITY)

A walk-through inspection of Building 45 was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 45 are included in Appendix A. Passive indoor air samples at Building 45 were collected on February 22, 2019.

5.11.1 Building Condition

Building 45 is an approximately 9,000 SF, one-story structure presently used as a drone testing facility with a paint and welding shop. Building 45 is used several days per month for a short duration of time (two to four hours).

Building 45 has a concrete slab floor with visible cracks and seams. There is a sump approximately 6 feet deep in Room 107A. Electrical conduits and a utility corridor trench are present in Rooms 101S and 101A. The corridor trench traverses the building from east to west at an unknown depth. Building 45 was modified between the 2016 and 2017 air sampling events; the walls separating Rooms 101, 102, and 102A from Room 101A have been removed.

5.11.2 HVAC System

Building 45 does not have an HVAC system. There are several exhaust vents, but the fans may not be operational. Ventilation systems such as open windows and restroom fans are present.

5.11.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 45.

5.11.4 Sampling Locations and Results

5.11.4.1 Historical Sampling Results

Indoor air samples had concentrations of TCE exceeding the EPA's indoor air cleanup levels in 2016, and PCE exceeding the EPA's indoor air cleanup levels in 2016 and 2017. The indoor air samples collected in 2012, 2014 and 2018 all had concentrations of COCs that were below the EPA's indoor air cleanup level. Building 45 was classified as Tier 3A in 2012, and 2014, and Tier 1 in 2016, 2017, and 2018. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events is found in Appendix B.

5.11.4.2 Current (2019) Sampling Results

Two passive indoor air samples were collected from Building 45. One outdoor ambient air sample was collected near Building 45. All samples were collected on February 22, 2019. The sampling location details are provided in Table 8. Indoor air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration ranges included TCE (two of two samples); PCE (one of two samples); and 1,1-DCA (one of two samples). TCE and PCE were measured in indoor air at concentrations of 1.2 and 1.4 $\mu g/m^3$ for TCE, and 0.13 and 0.14 $\mu g/m^3$ for PCE. Outdoor ambient air concentrations for TCE and PCE were 0.22 and 0.25 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.11.5 Response Action Tier Designation

All Summa samples collected in 2019 had COC concentrations that were below the EPA's indoor air cleanup levels. TCE, PCE, and 1,1-DCA concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration levels for Building 45. Because all indoor air COC results exceeded the outdoor ambient air concentration levels but were below the EPA's indoor air cleanup levels, Building is being classified as Tier 3A and continued monitoring is recommended and re-evaluation of mitigation measures are recommended.

5.12 BUILDING 67 (U.S. POST OFFICE)

A walk-through inspection of Building 67 was conducted on February 15, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 67 are included in Appendix A. The indoor air sample at Building 67 was collected on February 22, 2019.

5.12.1 Building Construction

Building 67 is an approximately 2,000 SF, one-story structure that is occupied by the United States Post Office, which operates Monday through Friday, 0700 to 1600, with no weekend use. The

building has a concrete slab floor with visible seams and a break in the slab in the southwestern portion of the building. There are no drains or sumps present in the building. Toilet conduits penetrate the slab floor in Rooms 101 and 102.

5.12.2 HVAC System

Building 67 does not have an HVAC system. Building 67 has a single window-mounted AC unit. Open windows and fans are used for ventilation and air circulation. A building-specific heating system that runs on natural gas is used in the building.

5.12.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 67.

5.12.4 Sampling Locations and Results

5.12.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup level. Building 67 was classified as Tier 3B in 2012, 2014, and 2017, and Tier 3A in 2016. However, according to the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$, Building 67 should have been tiered as 3B in 2016. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.12.4.2 Current (2019) Sampling Results

One passive indoor air sample (seven-day duration) was collected at Building 67. An outdoor ambient air sampler was deployed near Building 67, but it could not be found when the samples were being retrieved. A tenant in Building 67 reported seeing a sampler blowing away during a storm. The indoor air sample was collected on February 22, 2019. The sampling location details are provided in Table 8. Indoor air and outdoor ambient air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE and PCE were measured in indoor air at concentrations of 0.12 and 0.03 $\mu g/m^3$, respectively. The nearest outdoor ambient air samples were collected near Building 15. TCE and PCE were measured in outdoor ambient air at concentrations of 0.23 and 0.21 $\mu g/m^3$, respectively. Table 10 provides the indoor air sampling results.

5.12.5 Response Action Tier Designation

The sample collected had COC concentrations that were below the EPA's indoor air cleanup levels. COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration levels for Building 15. Indoor air TCE concentrations were within the

average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m^3. Building 67 is being classified as Tier 3B, and no further monitoring is recommended.

5.13 BUILDING 76 (LOCKSMITH SHOP)

A walk-through inspection of Building 76 was conducted on February 15, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 76 are included in Appendix A. The passive indoor air sample at Building 76 was collected on February 22, 2019.

5.13.1 Building Condition

Building 76 is an approximately 400 SF, one-story structure that is used as a locksmith shop. The shop operates Monday through Friday, 0800 to 1600. The building has a concrete slab floor and carpeting. Slab conditions are unknown since the floor is covered. Toilet (sewer and water) conduits penetrate the slab floor in Room R102.

5.13.2 HVAC System

Building 76 does not have an HVAC system. There is a single window-mounted AC unit located in Room 101. Open windows and restroom fans provide ventilation and air circulation.

5.13.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 76.

5.13.4 Sampling Locations and Results

5.13.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup level. Building 76 was classified as Tier 3B in 2012, 2014, 2017, and 2018, and Tier 3A in 2016. For 2016, the concentrations of TCE were below the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m^3, and thus should have remained in Tier 3B. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.13.4.2 Current (2019) Sampling Results

One passive indoor air sample (seven-day duration) was collected at Building 76 on February 22, 2019. The sampling location details are provided in Table 8. Indoor air and outdoor ambient air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to the Building 16 outdoor ambient air concentration range, as Building 16 is the closest building with outdoor ambient air samples. TCE and PCE in the indoor air sample were detected below the outdoor ambient air concentration range for Building 16. TCE and PCE were measured in indoor air at concentrations of 0.21 and 0.031 $\mu g/m^3$, respectively. TCE and PCE at Building 16 were measured in outdoor ambient air at concentrations of 0.23 and 0.030 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.13.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 16 outdoor ambient air concentration ranges, as Building 16 is the closest building with outdoor ambient air samples. COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration range for Building 16. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$. Building 76 is being classified as Tier 3B, and no further monitoring is recommended.

5.14 BUILDING 107 (ROICC OFFICE)

A walk-through inspection of Building 107 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 107 are included in Appendix A. The indoor air samples at Building 107 were collected with the HVAC system shut off on February 24, 2019, and were sampled with the HVAC system running on February 28, 2019.

5.14.1 Building Condition

Building 107 is an approximately 1,800 SF, one-story structure that is used as the Navy ROICC management office, which operates on weekdays. The building has a concrete slab floor and carpeting. Slab conditions are unknown. Toilet (sewer and water) conduits penetrate the slab floor in Room R101. Electrical and communication conduits are present in the eastern corner of Room 107.

5.14.2 HVAC System

Building 107 has an HVAC system (zoned heating/cooling) with the intake on the roof. The building has open windows for ventilation purposes. Natural gas is used in the building for heating.

5.14.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 107.

5.14.4 Sampling Locations and Results

5.14.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup levels. Building 107 was classified as Tier 3A in 2012, 2014, and 2016, and Tier 3B in 2017 and 2018. For 2012, 2014, and 2016 the concentrations of TCE were below average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m^3, and as such should have been tiered as 3B. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.14.4.2 Current (2019) Sampling Results

Five indoor air and pathway air samples were collected in Building 107 (including one duplicate), with the HVAC system operating (three samples) and off (two samples). Indoor air samples were collected on February 24, 2019 with the HVAC system off and February 28, 2019 and with the HVAC system on. The sampling location details are provided in Table 8. Indoor and pathway air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had detected COC concentrations below EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 555 outdoor ambient air concentration range, since Building 555 is the closest building with outdoor ambient air samples. Indoor air concentrations exceeding the outdoor ambient air concentration level at Building 555 included TCE (four of five – three samples with HVAC-on; one with HVAC-off) and PCE (two of five – two samples with HVAC-on). TCE and PCE were measured in indoor air at concentrations ranging from 0.055 J to 0.19 µg/m^3 and 0.0099 J to 0.24 µg/m^3, respectively. TCE and PCE were measured in outdoor ambient air at Building 555 at concentrations of 0.034 µg/m^3 and 0.028 µg/m^3, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.14.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 555 outdoor ambient air concentration ranges, as Building 555 is the closest building with outdoor ambient air samples. COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration range for Building 555. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m^3; therefore, Building 107 has been classified as Tier 3B, and no further monitoring is recommended. ECD screening of Building 107 in 2018 confirmed the Tier 3B evaluation as there are no potential VI pathways.

5.15 BUILDING 126 (MOFFETT HISTORICAL SOCIETY MUSEUM)

A walk-through inspection of Building 126 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 126 are included in Appendix A. The indoor air samples at Building 126 were collected with the HVAC system shut off on February 26, 2019, and were sampled again with the HVAC system running on February 28, 2019.

5.15.1 Building Condition

Building 126 is an approximately 13,000 SF, one-story structure that is occupied by the Moffett Historical Society Museum, which operates Wednesday through Saturday, 1000 to 1400. The building has a concrete slab floor and carpeting, with visible seams on the floor slab. Floor drains are present in Rooms 104 and 106A, and there is a sink drain in Room 105. Sewer conduits penetrate the slab floor in Rooms 104 and 106A.

5.15.2 HVAC System

In spring 2012, a new HVAC system was installed in Building 126. A radiant heat system is used in the building for heating purposes with a mechanical dispersion system. NASA modified the HVAC after the 2017 sampling event. This may have affected the 2018 results, which were lower.

5.15.3 Existing Mitigation Measures

This building is currently scheduled for mitigation measures as outlined in the CES Work Plan (CES 2017).

5.15.4 Sampling Locations and Results

5.15.4.1 Historical Sampling Results

Indoor air samples had concentrations of TCE exceeding the EPA's indoor air cleanup levels in 2014 and 2017, and PCE exceeding the EPA's indoor air cleanup levels in 2012, 2014, 2016, 2017, and 2018. Building 126 was classified as Tier 1 in 2012, 2014, 2016, 2017, and 2018. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.15.4.2 Current (2019) Sampling Results

Eleven indoor air samples (including three duplicates) were collected in Building 126, with the HVAC system operating (six samples) and off (five samples). One passive outdoor ambient air sample (seven-day duration) was collected near Building 126 on February 22, 2019. Indoor air samples were collected on February 26, 2019 with the HVAC system off and February 28, 2019 and with the HVAC system on. The sampling location details are provided in Table 8. Indoor and pathway air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

TCE concentrations did not exceed the EPA's indoor air cleanup level in any sample. TCE exceeded the outdoor ambient air concentration in all eleven samples. With the HVAC shut down, TCE concentrations ranged from 0.89 to 2.0 μg/m^3. With the HVAC system on, TCE concentrations ranged from 0.55 to 2.5 μg/m^3. PCE concentrations exceeded the EPA's indoor air cleanup levels for ten of eleven samples. With the HVAC shut down, PCE concentrations ranged from 2.0 to 3.7 μg/m^3. With the HVAC system on, PCE concentrations ranged from 0.89 to 4.2 μg/m^3. All other COC concentrations were below their respective EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration level at Building 126 included TCE (all eleven samples – five with HVAC-off, six with HVAC-on); PCE (all eleven samples– five with HVAC-off, six with HVAC-on); trans-1,2-DCE (one of eleven samples, with HVAC-on); cis-1,2-DCE (all eleven samples -- five with HVAC-off, six with HVAC-on); and VC (all eleven samples -- five with HVAC-off, six with HVAC-on). The COCs 1,1-DCE or 1,1,-DCA were not detected in any samples. TCE and PCE were measured in outdoor ambient air at concentrations of 0.26 μg/m^3 and 0.54 μg/m^3, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.15.5 Response Action Tier Designation

PCE (ten of eleven samples) exceeded the EPA's indoor air cleanup levels. Monitoring of Building 126 will be continued until the proposed VI mitigation measures are implemented (CES 2017). At that time, the sampling rationale will be reevaluated. Building 126 remains classified as Tier 1.

5.16 BUILDING 510 (MAINTENANCE OFFICES)

A walk-through inspection of Building 510 was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 510 are included in Appendix A. The indoor air samples at Building 510 were collected with the HVAC system shut off on February 24, 2019, and were sampled with the HVAC system running on February 26, 2019.

5.16.1 Building Condition

Building 510 is an approximately 5,000 SF, one-story structure. The building is used as an administration building by maintenance contractor Jacobs. The office workers occupy the building Monday through Friday, 0800 to 1700. The facility communications room (Room 108A) in the building is occupied 24 hours per day, 7 days per week, 365 days per year.

The building has a concrete slab, carpeting, and a tile floor. The condition of the slab is unknown. There are floor drains in Rooms R101, R103, and J102. Sink drain conduits penetrate the slab floor in Room 105.

5.16.2 HVAC System

The Building 510 HVAC system consists of two roof-mounted AC units, one for the eastern side of the building and one for the western side. The building has exhaust fans in the two bathrooms for ventilation. The building has a natural gas heating system.

5.16.3 Existing Mitigation Measures

Currently, no mitigation measures are in place at Building 510.

5.16.4 Sampling Locations and Results

5.16.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup levels. Building 510 was classified as Tier 3A in 2012 and 2016, and Tier 3B in 2014, 2017 and 2018. For 2012 and 2016 the concentrations of TCE were below the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$, and as such should have been tiered as 3B. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.16.4.2 Current (2019) Sampling Results

Five indoor air samples were collected in Building 510 (including one duplicate), with the HVAC system operating (three samples) and off (two samples). One passive outdoor ambient air sample (seven-day duration) was collected near Building 510. Indoor air samples were collected on February 24, 2019 with the HVAC system off and February 26, 2019 and with the HVAC system on. The outdoor ambient sample was collected on February 22, 2019. The sampling location details are provided in Table 8. Indoor and pathway air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration range included TCE (two of five samples, both with HVAC-off); PCE (two of five samples, both with HVAC-off); cis-1,2-DCE (two of five samples, with HVAC-off); and 1,1-DCA (one of five – one sample with HVAC-off). VC and trans-1,2, DCE were not detected at Building 510. TCE and PCE were measured in indoor air at concentrations ranging from 0.092 J to 0.21 $\mu g/m^3$ and 0.083 to 0.10 $\mu g/m^3$, respectively. TCE and PCE were measured in outdoor ambient air at concentrations of 0.15 $\mu g/m^3$ and 0.076 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.16.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COC concentrations in indoor air samples were detected at approximately the outdoor ambient air sample concentration range for Building 510. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$. Building 510 is being classified as Tier 3B, and no further monitoring is recommended.

5.17 BUILDING 555 (TENANT OFFICES)

A walk-through inspection of Building 555 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 555 are included in Appendix A. The indoor air samples at Building 555 were collected with the HVAC system shut off on February 24, 2019, and were sampled with the HVAC system running on February 28, 2019.

5.17.1 Building Condition

Building 555 is an approximately 5,000 SF, one-story structure. The building is used as an office by multiple tenants. The office workers occupy the building Monday through Friday, 0800 to 1400. The building has a concrete slab and tile floors. The condition of the slab is unknown as it is covered by carpet. Floor drains are present in Room R112B. There are sink drain conduits penetrating the slab floor in Room 108A, R111 and R110. Conduits for communication lines penetrate the slab floor in Room 107B. A new roof was installed on the building November through December 2016.

5.17.2 HVAC System

Building 555 has an HVAC system (zoned heating/cooling) with three roof-mounted AC units, one each on the western, southern, and the northeastern sides of the building. The building has exhaust fans in two bathrooms for ventilation. The heating system uses natural gas.

5.17.3 Existing Mitigation Measures

No mitigation measures are in place for Building 555.

5.17.4 Sampling Locations and Results

5.17.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup levels. Building 555 was classified as Tier 3A in 2012, 2014, 2016, 2017, and 2018. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.17.4.2 Current (2019) Sampling Results

Four indoor air samples were collected in Building 555, with the HVAC system operating (two samples) and off (two samples). One passive outdoor ambient air sample (seven-day duration) was collected near Building 555 on February 22, 2019. Indoor air and outdoor ambient air samples were collected on February 24, 2019 with the HVAC system off and February 26, 2019 with the HVAC system on. The sampling location details are provided in Table 8. Indoor and pathway air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration range included TCE (four of four – two samples with HVAC-off, two with HVAC-on); cis-1,2-DCE (four of four samples); and 1,1-DCA (two of five – two samples with HVAC-off). PCE; VC; 1,1-DCE; and trans-1,2-DCE were not detected in indoor air at Building 555. TCE was measured in indoor air at concentrations ranging from 0.21 to 2.1 $\mu g/m^3$. TCE and PCE were measured in outdoor ambient air at concentrations of 0.034 $\mu g/m^3$ and 0.028 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.17.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; cis-1,2-DCE; and 1,1-DCA concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building 555. Because indoor air COC results exceeded the outdoor ambient air concentration range, Building 555 is being classified as Tier 3A, and continued monitoring is recommended.

5.18 BUILDING 566 (TENANT OFFICES)

A walk-through inspection of Building 566 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, and 2018. Building forms and a summary table with any modifications from later inspections for Building 566 are included in Appendix A. The indoor air samples at Building 566 were collected with the HVAC system shut off on February 24, 2019, and were sampled with the HVAC system running on February 28, 2019.

5.18.1 Building Condition

Building 566 is an approximately 6,000 SF, one-story structure. The building is used as an office by multiple tenants. Rooms 111, 112, and 113 are occupied seasonally in the summer, Monday through Friday, 0700 to 1500, with occasional weekend use. Rooms 100, 101, 102, 106C, 106E, 107, 109, and 110 are occupied year-round, Monday through Friday, 0800 to 1700. Only part of the building is occupied or utilized.

The building has a concrete slab and tile floors. The condition of the slab is unknown as it is covered by carpet. Floor drains are present in Rooms R101 and R102. Electrical conduits penetrate the slab floor in Room U101. There are electrical outlets located in the floor of Rooms C103, 106, and 103. Sink conduits are present in Room J103 and C104. New ceiling tiles were installed in Room 111 in the summer of 2017.

5.18.2 HVAC System

Building 566 has an HVAC system (zoned heating/cooling), with one AC unit mounted in the center of the roof. A direct-expansion AC unit is mounted on the ground at the northwestern corner of the building. There are fans in the restrooms that provide ventilation. The building has a natural gas heating system.

5.18.3 Existing Mitigation Measures

No mitigation measures are in place at Building 566.

5.18.4 Sampling Locations and Results

5.18.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2016, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup levels. Building 566 was classified as Tier 3B in 2012, 2014, and 2017, and 2018; and Tier 3A in 2016. For 2016 the concentrations of TCE were below average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$, and as such should have been tiered as 3B. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.18.4.2 Current (2019) Sampling Results

Four indoor air samples were collected in Building 566, with the HVAC system operating (two samples) and off (two samples). Indoor air samples were collected on February 24, 2019 with the HVAC system off and February 28, 2019 with the HVAC system on. The sampling location details are provided in Table 8. Indoor and pathway air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 16 outdoor ambient air concentration levels, as Building 16 is the closest building with an outdoor ambient air sample. Indoor air concentrations exceeding the outdoor ambient air concentration range included TCE (four of four – two samples with HVAC-off, two with HVAC-on); PCE (two of four samples, both with HVAC-off); and trans-1,2-DCE (one of four samples, with HVAC-off). All other samples had COC concentrations that were below the EPA's indoor air cleanup level. TCE and PCE were measured in indoor air at concentrations ranging from 0.14 J to 0.31 $\mu g/m^3$ and 0.036 J to 0.039 $\mu g/m^3$, respectively. TCE

and PCE were measured in Building 16 outdoor ambient air at detected concentrations of 0.23 $\mu g/m^3$ and 0.036 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.18.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 16 outdoor ambient air concentration ranges, as Building 16 is the closest building with outdoor ambient air samples. COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration range for Building 16. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$. Building 566 is being classified as Tier 3B, and no further monitoring is recommended.

5.19 BUILDING 567 (WAREHOUSE)

A walk-through inspection of Building 567 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building 567 are included in Appendix A. The indoor air samples at Building 567 were collected on February 22, 2019.

5.19.1 Building Condition

Building 567 is an approximately 9,000 SF, one-story structure. The building is used as a warehouse and operates Monday through Friday, 0700 to 1600. The building has concrete slab floors with visible cracks and seams in the slab. Floor drains are present in Room R101. Holes for former bollard locations exist near bay doors and extend to a depth of approximately 2.5 feet below the floor. Communications conduits penetrate the slab floor in Room 105.

5.19.2 HVAC System

Building 567 does not have an HVAC system. There is a window-mounted AC unit in an enclosed office located in Room 102. Open windows and fans are used for ventilation and air circulation. A radiant heat system is used in the building with a mechanical dispersion system.

5.19.3 Existing Mitigation Measures

No mitigation measures are place in Building 567.

5.19.4 Sampling Location and Results

5.19.4.1 Historical Sampling Results

The previous air sampling events in 2012, 2014, 2017, and 2018 all had samples with COCs that were below the EPA's indoor air cleanup levels. TCE was detected exceeding the EPA's indoor

air cleanup level in the 2016 sampling event. Building 567 was classified as Tier 3A in 2012, 2014, 2017, and 2018, and Tier 1 in 2016. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.19.4.2 Current (2019) Sampling Results

Three indoor air samples were collected at Building 567. One outdoor ambient air sample was collected near Building 567. Passive indoor and outdoor ambient air samplers (seven-day duration) were placed in Building 567 on February 15, 2019 and collected on February 22, 2019. The sampling location details are provided in Table 8. Indoor air and outdoor air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration level included TCE (three of three samples); PCE (three of three samples); trans-1,2-DCE (three of three samples); cis-1,2-DCE (three of three samples); 1,1-DCA (three of three samples); and 1,1-DCE (three of three samples). VC was not detected at Building 567. TCE and PCE were measured in indoor air at concentrations ranging from 1.2 to 2.8 $\mu g/m^3$ and 0.034 to 0.035 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.19.5 Response Action Tier Designation

All Summa samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCE; and 1,1-DCA concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration levels for Building 567. Because all indoor air COC results exceeded the outdoor ambient air concentration levels but were below the EPA's indoor air cleanup levels, Building 567 is being classified as Tier 3A and continued monitoring is recommended.

5.20 BUILDING N210 (OFFICES AND STORAGE [FORMER HANGAR])

A walk-through inspection of Building N210 was conducted on February 14, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections of Building N210 are included in Appendix A. The indoor air samples at Building N210 were collected with the HVAC system shut off on February 24, 2019.

5.20.1 Building Condition

Building N210 is an approximately 95,000 SF, three-story structure that was formerly used as an aircraft hangar and later converted to office space. It operates Monday through Friday, 0800 to 1700. The central portion of the building consists of about 40 office cubicles in a single 4,200-SF

room (Room 145) on a raised floor approximately three feet above slab. The Building N210 crawl space samples were collected from beneath Room 145. The building has a concrete slab floor and carpet, tile, and raised flooring over the slab. Cracks and seams are visible on the slab floor.

Floor drains are present in Rooms 259B, 255B, 256A and 256B, R249, and R250. A sump is present in the former hangar high-bay area basement. There are two elevators in the building. Electrical conduits penetrate the slab floor in server room, Room 240.

5.20.2 HVAC System

Building N210 has a zoned heating/cooling system with two separate HVAC systems. The first and second floors have a chiller and hot water boiler providing heating and cooling to these levels. There are also three A/Hs providing a continuous supply of fresh air to both of these levels of the building (with no recirculated air). Outside air is collected from intakes on the roof. There is an A/H on the eastern roof with a 5-HP roof fan. There are two A/Hs in the attic above Room 257 that separately supply the eastern and western sides of the first and second floors; each has a 40-HP motor and runs off a variable frequency drive.

The other, separate HVAC system is a self-contained air heating and cooling unit that uses recycled air and services only the "penthouse" (a third-floor addition to this building). There is no makeup air: the air supply is through the stairwell. There is an alarm to notify of shutdown; the alarm system operates 24 hours per day.

There are eight exhaust fans on the roof, of which seven are in service. Two of the exhaust fans are for Room 134 (the main chiller room), one is for Room 131, and three are for restrooms.

Ventilation systems such as open windows and restroom fans are present in the building. The building has a heating system that runs on natural gas.

5.20.3 Existing Mitigation Measures

The original HVAC system supplied air through ducts in the subfloor with floor grates, which exacerbated vapor migration into the building. TCE concentrations in indoor air ranged from 0.22 to 176 $\mu g/m^3$ (Haley & Aldrich 2009). The HVAC system was adjusted in 2005 to supply air through a duct system through the ceiling and to run at a high-capacity flow rate to maintain positive pressure in the building. The air intake, which was originally at ground level, was relocated to the roof to prevent intake of air impacted by VI. The original subfloor system was modified under Rooms 143, 145, and L139 on the first floor to capture the vapors beneath the raised floor area with the system exhaust on the roof (Haley & Aldrich 2009). The adjustments in operation of the HVAC system successfully lowered COC concentrations to below EPA's indoor air cleanup levels presented in the ROD Amendment (EPA 2010). The HVAC system has difficulty maintaining temperatures at the high-capacity flow rate. Also, the building occupants have noted odors inside the building when aircraft are taking off from the runway at Moffett Field.

This building is currently scheduled for mitigation measures as outlined in the CES Work Plan (CES 2017).

5.20.4 Sampling Locations and Results

5.20.4.1 Historical Sampling Results

Indoor air samples had concentrations of TCE below the EPA's indoor air cleanup levels in 2012, 2014, 2016, 2017, and 2018. Pathway air samples in the crawlspace under the cubicle farm had concentrations of TCE exceeding the EPA's indoor air cleanup levels in 2012, 2014, 2016, 2017, and 2018. Building N210 was classified as Tier 2 in 2012 and 2014, and Tier 3A in 2016, 2017 and 2018. In 2012 and 2014 the concentrations of TCE detected exceeding the EPA's indoor air cleanup levels were in pathway samples and not indoor air samples, and therefore the building should have been classified as Tier 3A. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.20.4.2 Current (2019) Sampling Results

Eight indoor air samples and three pathway samples (including one duplicate) were collected from Building N210. All eleven samples were collected with the HVAC and subfloor blower under the cubical area shut off. The pathway samples included one crawl space sample (eight-hour duration) and two grab samples. Indoor and pathway air samples were collected on February 24, 2019. The sampling location details are provided in Table 8. Indoor and outdoor air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Pathway sample 19N210-C-11-F collected in the crawlspace under Cube 008 in Room 145 had a TCE concentration of 55 $\mu g/m^3$, exceeding the EPA's indoor air cleanup level. The co-located indoor air sample collected from Cube 008 (19N210-1-12-F) had a TCE concentration of 2.0 $\mu g/m^3$, below the EPA's indoor air cleanup level. At this location the TCE concentration in indoor air was 96 percent lower than in the pathway.

Historically, this pathway area has ranged from 9.7 $\mu g/m^3$ during the 2016 event to 100 $\mu g/m^3$ during the 2018 air sampling event. COCs in indoor air were compared to Building N243 outdoor ambient air concentration ranges, as Building N243 is the closest building with outdoor ambient air samples. Indoor and pathway air concentrations exceeding the Building N243 outdoor ambient air concentration levels included TCE (11 of 11 samples); PCE (11 of 11 samples); cis-1,2-DCE (11 of 11 samples); trans-1,2-DCE (2 of 11 samples); 1,1-DCE (8 of 11 samples); 1,1-DCA (2 of 11 samples); and VC (6 of 11 samples). TCE and PCE were measured in indoor air at concentrations ranging from 1.4 to 2.0 $\mu g/m^3$ and 0.066 J to 0.12 J $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.20.5 Response Action Tier Designation

All indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. One pathway Summa sample (19N210-C-11-F), collected from the crawlspace beneath the raised floor in the work area, exceeded the EPA's indoor air cleanup level. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; 1,1-DCE; and VC concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration levels for Building N243, the nearest building with outdoor ambient air samples. Because indoor air COC results exceeded the outdoor ambient air concentration range and no indoor air work area samples exceed the EPA's indoor air cleanup level, Building N210 is being classified as Tier 3A and continued monitoring is recommended. In addition, re-evaluation of the mitigation measures (CES 2017) is recommended as concentrations of COCs in all indoor air samples collected in 2012, 2014, 2016, 2017, 2018, and 2019 were below the EPA's indoor air cleanup levels.

5.21 BUILDING N239 (LIFE SCIENCES BUILDING [OFFICES AND LABORATORIES])

A walk-through inspection of Building N239 was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections of Building N239 are included in Appendix A. Indoor air samples at Building N239 were collected with the HVAC system running on February 15, 2019 and with the HVAC system shut off on February 24, 2019.

5.21.1 Building Condition

Building N239 is an approximately 150,000 SF, four-story structure with a basement. The building is occupied by NASA's Life Sciences Department, which operates Monday through Friday, 0900 to 1900. The building is always open, with sporadic weekend and afterhours use by researchers and lab technicians.

Building N239 has a full basement that is used for office space, library, storage, and utilities. The basement floor and walls are constructed of concrete. Moisture conditions in the basement are dry.

The building has a concrete slab, carpet, and tile floors. Cracks and seams are visible on the slab floor. There are two sumps in the building: one in Room B053A with depth to water approximately 3 feet below the floor and another one in Room N074 with depth to water approximately 4 to 5 feet below the floor. Floor drains are present in Rooms N067 (three drains), N076A (three drains), and all bathrooms throughout the building.

There is a freight elevator (V002) at the northeastern side of the building and a service elevator (V001) at the southwestern side of the building. Standing water was noted next to V001 which may had infiltrated from the groundwater table due to excessive rain at the beginning of 2019. PID

readings at V002 was non-detect, however PID readings around V001 were approximately 5 ppb around the location of sample 19N239-G-04.

Utility conduits that penetrate the floor and walls are present in Rooms N076B, N076A, N076, and E075. Sewer conduits penetrate the floor in all the bathrooms throughout the building. All utilities (HVAC, water, electricity) are routed through the floors via utility corridors (Rooms U101, U102, U201, U202, etc.). Room B053A is adjacent to a sump that is due to be modified with a one way valve as an EC (CES 2017).

Solvents are used in the laboratories throughout the building. Chlorinated solvents are used in laboratories in Rooms 128, 234, 347, 364, and 432. PID detections were observed in some of the basement rooms. The chemicals were typically stored in the flammable materials cabinets within the laboratories. The laboratories have hooded vents in work areas.

5.21.2 HVAC System

Building N239 has an HVAC system (zoned heating/cooling). There are two 60-HP A/Hs (intake) in the basement and an intake on the outside northern corner of the first floor of the building at ground level. There are 35 exhaust fans and 52 fume hoods. The fume hoods and their exhausts operate separately from the HVAC system. Makeup air for the HVAC system is 100 percent intake, with no recycling of air.

The building has other ventilation systems such as mechanical fans, restroom fans, and chemical fume hoods. The building has natural gas and steam heating systems. The steam is dispersed using a mechanical fan and no outside air is used.

5.21.3 Existing Mitigation Measures

This building is currently scheduled for mitigation measures as outlined in the CES Work Plan (CES 2017).

5.21.4 Sampling Locations and Results

5.21.4.1 Historical Sampling Results

Indoor air samples had concentrations of TCE exceeding the EPA's indoor air cleanup levels in 2014, 2017 and 2018. Indoor air samples had concentrations of COCs below the EPA's indoor air cleanup levels in 2012 and 2016. Building N239 was classified as Tier 3A in 2012 and 2016, and Tier 2 in 2014, 2017, and 2018. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.21.4.2 Current (2019) Sampling Results

Twenty indoor air samples (including two grab pathway samples and two duplicates) were collected at Building N239 with the HVAC system operating (nine samples) and with the HVAC system off (11 samples). One outdoor ambient air sample of 24-hour duration was collected outside Building N239, with HVAC-on. Indoor air samples were collected on February 15, 2019 (nine samples), with the HVAC system operating and on February 24, 2019 (11 samples), with the HVAC system off. The sampling location details are provided in Table 8. Indoor and outdoor air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All sampling results at Building N239 were below the EPA's indoor air cleanup levels, both with the HVAC system operating and off. With the HVAC shut down, TCE concentrations ranged from 0.043 to 0.33 µg/m^3. With the HVAC system on, TCE concentrations ranged from 0.064 to 0.13 µg/m^3. Indoor air concentrations exceeding the outdoor ambient air concentration level included TCE (19 of 20 – 10 samples with HVAC-off, nine samples with HVAC-on); PCE (14 of 20 – 11 samples with HVAC-off, three samples with HVAC-on); trans-1,2-DCE (17 of 20 – eight samples with HVAC-off, nine samples with HVAC-on); cis-1,2-DCE (17 of 20 – eight samples with HVAC-off, nine samples with HVAC-on); 1,1,-DCA (seven of 20 – five samples with HVAC-off, two samples with HVAC-on); and VC (1 of 20 – 1 sample with HVAC-off). No 1,1-DCE was detected in indoor air at Building 239. TCE and PCE were measured in indoor air at concentrations ranging from 0.043 to 0.33 µg/m^3 and 0.025 J to 0.22 µg/m^3, respectively. TCE and PCE were measured in outdoor ambient air at concentrations of 0.045 µg/m^3 and 0.033 J µg/m^3, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.21.5 Response Action Tier Designation

TCE was not detected in Building 239 at a concentration exceeding the EPA's indoor air cleanup level. The basement work area sample located in Room 53A has an interim mitigation measure planned (CES 2017). All indoor air sampling results were below EPA's indoor air cleanup levels for all COCs with the HVAC in operation and off. The operation of the HVAC system is considered to be an EC. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and VC concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building N239. Building N239 is being classified as Tier 3A. Proceeding with planned mitigation measures and continued monitoring are recommended based on historic concentrations reported in Room 054A (Appendix B).

5.22 BUILDING N239A (OFFICES AND CENTRIFUGE)

A walk-through inspection of Building N239A was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections of Building N239A are included in Appendix

A. The indoor air samples at Building N239A were collected with the HVAC system shut off on February 24, 2019, and were sampled with the HVAC system running on February 26, 2019.

5.22.1 Building Condition

Building N239A is an approximately 34,000 SF, two-story structure with a basement. The building is currently used for offices and centrifuge operations. Two offices on the second floor operate Monday through Friday, 0900 to 1700, with possible weekend use.

Building N239A has a basement consisting of two large open vaults located in a high bay (Room 120), which is used for storage and a bio-dome station. The high bay area has frequent activities with possible weekend use. The basement floor and walls are constructed of concrete. Moisture conditions are dry in the basement. There are electrical conduits present in the high bay area. Unknown conduits penetrate the wall of the bio-dome vault area at an elevation that is below grade.

The building has a concrete slab and tile floors. Cracks and seams are visible on the slab floor. Floor drains are present in all bathrooms. A sump is located in Room 144 as well in in the basement Room 120. Moisture was noted in the basement sump. There is an elevator located near Room 160.

5.22.2 HVAC System

Building N239A has an HVAC system (zoned heating/cooling). No information has been provided about the HVAC system. There was limited access within the building during the building survey, and the building point of contact did not have knowledge about the HVAC system. Aerial photos available from Google indicate possible intake A/Hs on the northern end of the building. The building also contains one intake on the southern end and 12 possible vent locations. The large handler and supply and return vents are located in the northern end of the building.

Ventilation systems such as restroom fans and fume hoods are present in the building. The building has natural gas and steam heating systems. The steam is dispersed using a mechanical fan and no outside air is used.

5.22.3 Existing Mitigation Measures

This building is currently scheduled for mitigation measures as outlined in the CES Work Plan (CES 2017).

5.22.4 Sampling Locations and Results

5.22.4.1 Historical Sampling Results

Indoor air samples had concentrations of TCE exceeding the EPA's indoor air cleanup levels in 2012 (one sample in Hallway C102 [entrance way] with HVAC-off), 2014 (one sample in Utility Room U101, and one sample in Hallway C102, both with HVAC-off), 2016 (two samples in Utility

Room U101, and one sample in Room 144, both with HVAC-on), and 2017 (two samples in Utility Room U101 with HVAC-on, one sample in Hallway C102 with HVAC-on, and one sample in Room 125, with HVAC-off). Building N239A was classified as Tier 3A in 2012 and 2014, Tier 1 in 2016, and Tier 2 in 2017 and 2018. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.22.4.2 Current (2019) Sampling Results

Seventeen indoor air samples (including two duplicates and two pathway samples) were collected at Building N239A with the HVAC system operating (ten samples) and with the HVAC system off (seven samples). Indoor air samples were collected on February 24, 2019, with the HVAC system shut off and on February 26, 2019, with the HVAC system on. The sampling location details are provided in Table 8. Indoor and outdoor air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

PCE was detected at a concentration exceeding the EPA's indoor air cleanup level in one sample with the HVAC-on (19N239A-1-05-N), at 2.9 µg/m^3 in Room 102, a work area. All other sampling results were below the indoor air cleanup levels with both the HVAC system operating and off. COCs in indoor air were compared to Building N243 outdoor ambient air concentration ranges, as Building N243 is the closest building with outdoor ambient air samples. Indoor air concentrations exceeding the outdoor ambient air concentration ranges at Building N243 included TCE (13 of 17 – seven samples with HVAC-off, six samples with HVAC-on); PCE (8 of 17 – seven samples with HVAC-off, one with HVAC-on); cis-1,2-DCE (8 of 17 – six samples with HVAC-off, two with HVAC-on); trans-1,2-DCE (4 of 17, all four with HVAC-off); 1,1-DCA (7 of 17 samples, all seven with HVAC-off); and 1,1-DCE (4 of 17 samples, all four with HVAC-off); and VC (8 of 17 – six samples with HVAC-off, two with HVAC-on). TCE and PCE were measured in indoor air and pathway air at concentrations ranging from 0.057 to 2.9 µg/m^3 and 0.027 J to 2.9 µg/m^3, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.22.5 Response Action Tier Designation

Building N239A is being classified as Tier 1 based on PCE exceeding the EPA's indoor air cleanup level with the HVAC-on during the 2019 monitoring event. In addition, indoor air and or work area samples exceeded the EPA's indoor air cleanup level for TCE during the 2013, 2014 and 2017 monitoring events. Due to the current and historic concentrations of COC exceeding the EPA's indoor air cleanup levels, monitoring will be continued until the proposed VI mitigation measures are implemented (CES 2017); at that time, the sampling rationale will be reevaluated.

5.23 BUILDING N243 (FLIGHT GUIDANCE AND SIMULATION LABORATORY)

A walk-through inspection of Building N243 was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections of Building N243 are included in Appendix A. The indoor air samples at Building N243 were collected with the HVAC system shut off on February 24, 2019, and with the HVAC system running on February 26, 2019.

5.23.1 Building Condition

Building N243 is an approximately 130,000 SF, three-story structure used as a flight guidance and simulation lab that operates Monday through Friday, 0800 to 1900. The building is occasionally occupied on the weekends. The building has a half basement at approximately 4.5 feet bgs that is used for office space, storage, and utilities. The basement floor and walls are constructed of concrete.

The building has a concrete slab floor. Cracks and seams are present on the slab floor. There is a sump in Room N032 with water at approximately 3 to 4 feet below the floor. Floor drains are present in Rooms N032 and 039 and all bathrooms. There are two elevators in the building. Electrical conduits penetrate the slab floor in Rooms N032, 039, and E034. Water supply and sewer drains are present in all bathrooms.

Standing water was observed basement Room 054, the vertical flight simulator. Water infiltrates from the ground water table into the room during extreme rain events as was the case during 2019 sampling event. An indoor air sample is collect from the room and a grab sample was added to the room over the location of the standing water.

During refueling and aircraft mobilization for takeoff, fumes often drift onto the facility and are noticeable within the building.

5.23.2 HVAC System

Building N243 has an HVAC system (zoned heating/cooling). Limited information has been provided about the HVAC system. The main intakes and a large cooling unit are located on the roof of the building. The building has natural gas and steam heating systems. The steam is dispersed using a mechanical fan and no outside air is used. Fans are used in the building for ventilation and air circulation.

5.23.3 Existing Mitigation Measures

No mitigation measures are in place at Building N243.

5.23.4 Sampling Locations and Results

5.23.4.1 Historical Sampling Results

All air samples collected in 2012, 2014, 2016, 2017, and 2018 had COC concentrations that were below the EPA's indoor air cleanup levels. Building N243 was classified as Tier 3A in 2012, 2014, 2016, 2017, and 2018. The historical sampling results are included in Table 11. Additional information on the 2012, 2014, 2016, 2017, and 2018 sampling events can be found in Appendix B.

5.23.4.2 Current (2019) Sampling Results

Fourteen indoor air samples (including one grab sample and two duplicates) were collected at Building N243 with the HVAC system operating (seven samples) and with the HVAC system off (seven samples). One outdoor ambient air sample of seven-day duration was collected outside Building N243. Indoor air samples were collected on February 24, 2019, with the HVAC system shut off and on February 26, 2019, with the HVAC system operating. The sampling location details are provided in Table 8. Indoor and outdoor air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

TCE was detected at a concentration exceeding the EPA's indoor air cleanup level grab sample (19N343-G-01-F), over the standing water in Room 054 that had infiltrated from the groundwater table, at a concentration of 18 $\mu g/m^3$. This sample is considered an indoor source sample as the standing water was in the building. A time integrated work area sample was also collected in Room 054 on the same day as the indoor source sample was collected. The time integrated work area sample had a TCE concentration of 0.16 $\mu g/m^3$.

All other indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration range included TCE (10 of 14 – seven samples with HVAC-off, three samples with HVAC-on); PCE (9 of 14 – seven samples with HVAC-off, two samples with HVAC-on); cis-1,2-DCE (9 of 14 – seven samples with HVAC-off, two with HVAC-on); trans-1,2-DCE (4 of 14 samples, all four with HVAC-off); 1,1-DCE (3 of 14 samples, all three with HVAC-off); 1,1-DCA (5 of 14 samples, all five with HVAC-off); and VC (1 of 14 samples, with HVAC-off). TCE and PCE were measured in indoor air at concentrations ranging from 0.076 to 0.64 $\mu g/m^3$ and 0.067 to 0.55 $\mu g/m^3$, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.23.5 Response Action Tier Designation

TCE was detected at a concentration exceeding the EPA's indoor air cleanup level in one indoor source sample. All other samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; 1,1-DCE; and VC concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building N243. Because indoor air COC results exceeded the outdoor

ambient air concentration range, Building N243 is being classified as Tier 3A, and continued monitoring is recommended.

5.24 BUILDING N243A (WELDING AND MACHINE SHOP)

A walk-through inspection of Building N243A was conducted on February 13, 2019. Building survey forms were completed in 2011, 2015, 2016, 2018, and 2019. Building forms and a summary table with any modifications from later inspections for Building N243A are included in Appendix A. The indoor air samples at Building N243A were collected with the HVAC system shut off on February 24, 2019, and were sampled with the HVAC system running on February 26, 2019.

5.24.1 Building Condition

Building N243A is an approximately 9,000 SF, three-story structure used as a welding and machine shop that operates Monday through Friday, 0800 to 1700. The building is infrequently used on the weekends. The building has a basement utility tunnel to the rotunda in Building N243, with conduits penetrating the slab. The basement floor and walls are constructed of concrete.

The building has a concrete slab floor. Cracks and seams are evident on the slab floor. No sumps or drains are present in the building. There are conduits penetrating the slab floor in Rooms 101 and 104. Standing water was noted in the machine pit in Room 104, but not in the basement Room 001.

During refueling and aircraft mobilization for takeoff, fumes often drift onto the facility and are noticeable within the building.

5.24.2 HVAC System

Building N243A has a zoned heating/cooling HVAC system. The second-floor offices have only active HVAC systems. The cooling units are located outside the northwestern side of the building. Limited information has been provided about the HVAC system.

Ventilation systems such as mechanical fans and open air vents on the northern and western walls are present in the building. A steam system is used in the building for heating purposes, and the steam is dispersed using a mechanical fan; no outside air is used.

5.24.3 Existing Mitigation Measures

No mitigation measures are in place at Building N243A.

5.24.4 Sampling Locations and Results

5.24.4.1 Historical Sampling Results

All air samples collected in 2012, 2014, 2016, and 2017 had COC concentrations that were below the EPA's indoor air cleanup levels. In 2018, PCE exceeded the EPA's indoor air cleanup level in

one sample (18N243A-1-01-N), with the HVAC system on. Building N243A was classified as Tier 3A in 2012, 2014, 2016, 2017, and 2018. However, according to the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m^3, Building N243A in the years 2012, 2014, and 2017 should have been tiered as 3B. The historical sampling results are included in Table 11 and in Appendix B.

5.24.4.2 Current (2019) Sampling Results

Seven indoor air samples (including one duplicate) were collected at Building N243A, four samples with the HVAC system operating and three with the HVAC system off. One passive outdoor ambient air sample of seven-day duration was collected outside Building N243A on February 22, 2019. Indoor air samples were collected on February 24, 2019, with the HVAC system shut off and on February 26, 2019, with the HVAC system operating. The sampling location details are provided in Table 8. Indoor and outdoor air sampling location maps are provided in Appendix C. Photographs taken during sampling activities are provided in Appendix D.

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the outdoor ambient air concentration range included TCE (six of seven – three samples each with HVAC-off and on); PCE (three of seven samples, with HVAC-off); cis-1,2-DCE (seven of seven – three samples with HVAC-off and four with HVAC-on); 1,1-DCA (one of seven samples, with HVAC); and VC (six of seven samples – three samples each with HVAC-off and on). No other COCs were detected in indoor air samples. TCE and PCE were measured in indoor air at concentrations ranging from 0.088 J to 0.23 µg/m^3 and 0.091 to 0.13 J µg/m^3, respectively. Table 10 provides the indoor air and outdoor ambient air sampling results.

5.24.5 Response Action Tier Designation

All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; 1,1-DCA; and VC concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building N243A. Because indoor air COC results exceeded the outdoor ambient air concentration range, Building N243A is being classified as Tier 3A and continued monitoring is recommended.

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6.0 QA/QC AND DATA QUALITY ASSESSMENT

This section describes the quality and usability of analytical data collected during the annual VI air sampling conducted in February 2019 at Moffett Field. Field sampling and laboratory analytical activities were performed in accordance with the *Final Sampling and Analysis Plan for Installation Restoration Site 28, Former Naval Air Station Moffett Field, Mountain View, California* (NOREAS 2016).

A total of 189 air samples, including field duplicates and outdoor ambient air samples, were collected from February 15-28, 2019 to evaluate the VI pathways in 23 industrial/commercial buildings at Moffett Field. In support of the site-wide event, an additional 2 samples were collected on June 6, 2019 from Building 16. Table 8 presents the number of samples collected at each building.

Environmental samples were analyzed for VOCs using the EPA Method TO-15 SIM using passivated canisters or EPA Method TO-17 using Radiellos. Target VOCs included VC, 1,1-DCE; 1,1-DCA; cis-1,2-DCE; trans-1,2-DCE; TCE, and PCE. VC was not reported for samples collected using TO-17, because VC is too volatile on passive samplers (i.e., Radiellos) and reliable data cannot be achieved. All samples were received in good condition at the analytical laboratory. Sample analyses were performed by ALS Life Sciences Division (ALS) in Simi Valley, California and by Eurofins Air Toxics Ltd. (Eurofins) in Folsom, California. ALS is accredited (No. 4068) by the NELAP through Oregon ELAP and by the DoD ELAP. Eurofins is accredited (No. CA300005) by the NELAP through Oregon ELAP and by the DoD ELAP. A third-party validation firm, Element Consulting (Element), performed data validation on the chemical analyses for the project samples.

The overall data quality was determined based on the analytical results generated for field and laboratory QA/QC samples during this project. QA/QC for field activities was ensured through standardized sampling methods, rigorous documentation, and the collection of field duplicates as described in the project-specific SAP (NOREAS 2016). Additionally, the laboratory performed QC analyses to assess precision and accuracy of the analytical processes as determined by method-required laboratory QC samples, calibration and verification standards, and method blanks. Results from method blanks were evaluated to assess the possibility of contamination of environmental samples that may have been introduced during the laboratory activities.

6.1 LABORATORY QUALITY CONTROL ANALYSES

Laboratory QC samples were prepared and analyzed by the laboratory to monitor the analytical process. The laboratory QC samples for this sampling event included method blanks, initial and continuing calibration blanks, internal standards, laboratory control samples (LCSs), instrument

tune and calibration verifications, and surrogate spike samples. The laboratory analyzed all instrument calibration and QC samples at the method-required frequency.

6.2 DATA VALIDATION

Data validation was performed by a qualified, independent validation company, Element Consulting Services in San Diego, California, following the EPA Stage 3 (standard) on 80 percent of the project samples and EPA Stage 4 (full) on 20 percent of the project samples (Appendix E).

Data validation was performed on the analytical laboratory data consistent with the measurement performance and validation criteria presented in the *Final Sampling and Analysis Plan Vapor Intrusion Air Monitoring, Installation Restoration 28, Former Naval Air Station Moffett Field* (NOREAS 2016) and under the general guidance of the following documents:

- DoD Quality Systems Manual for Environmental Laboratories (QSM), Version 5.1 (DoD 2017)
- Compendium Method TO-15, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Determination of Volatile Organic Compounds in Ambient Air Collected in Specially-Prepared Summas and Analyzed by Gas Chromatography/Mass Spectrometry (EPA 1999)
- USEPA Method TO-17, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition. Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling onto Sorbent Tubes (USEPA 1999)
- EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (EPA 2017)
- Environmental Work Instruction #1, Chemical Data Validation (NAVFAC SW, 2001).

As specified in the Final SAP, data validation included a review of the following parameters to assess data quality:

- Chain of custody records and sample condition;
- Technical holding time for sample preparation and analysis;
- Reporting limits;
- Laboratory and field blanks;
- Surrogate recoveries;
- LCS and LCS duplicate spike recoveries and relative percent difference (RPD), if applicable;
- Laboratory and field duplicate samples and RPDs;
- Internal standards;
- Instrument tuning and performance checks;

- Initial and continuing calibration;
- Compound identification and quantification; and
- Sample detection and quantitation limits.

The DoD General Data Validation (DoD 2018) data validation qualifiers were applied to sample results, if necessary, during the data validation process, including the following:

- J - The compound was positively identified, and the associated numerical value is the approximate concentration of the compound in the sample, with additional suffix "+" for bias high, plus "-" for bias low, if applicable.
- X - The sample results (including non-detects) were affected by serious deficiencies in the ability to analyze the sample and to meet published method and project quality control criteria. The presence or absence of the compound cannot be substantiated by the data provided. Acceptance or rejection of the data should be decided by the project team (which should include a project chemist), but exclusion of the data is recommended.
- U - The analyte was analyzed for but was not detected above the sample reporting limit.
- UJ - The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- A – Validation finding is based upon technical validation criteria.
- P - Validation finding is based upon a protocol/contractual deviation.
- NQ - No qualification, the result was not significantly impacted by the validation finding; therefore, no qualification was applied.

The electronic data deliverable files also underwent a limited verification with the hardcopy reports and discrepancies were noted. Once the data were reviewed and qualified, the data set was then evaluated using precision, accuracy, representativeness, completeness, comparability, and sensitivity criteria using the field and laboratory QC analyses.

6.2.1 Chain-of-Custody, Sample Condition, and Technical Holding Times

The project samples reportedly arrived intact at the analytical laboratory using proper chain of custody documentation as recorded on the laboratory sample receipt forms. The technical holding times were reviewed for each sample analysis. Each of the air samples was analyzed within the method-specific holding time (30 days). No analytical data were qualified during data validation due to sample receipt, sample condition, or holding time exceedances. No issues regarding sample condition were encountered except for the following:

- The laboratory reported that the sorbent tube for sample 19N210-A-01 in SDG # P1901168 was compromised and cannot be analyzed. Therefore, this sample was cancelled.

6.2.2 Field and Laboratory Duplicates

Field QC samples included a total of 18 sets of field duplicates to assess the overall (i.e., sampling and analytical) precision of the sampling effort. For air samples, an RPD limit of 30 percent was established to evaluate duplicate results 10x greater than the limits of quantitation (LOQs), as specified in the SAP (NOREAS 2016). RPD values were only calculated for detected analytes. In general, RPD values were within the precision goal of 30 percent demonstrating acceptable agreement between the field duplicates and the primary samples for this project. Only the samples identified in the table below exhibited higher RPDs. It must be noted that higher RPDs are expected for low-level analytes. Overall, field duplicate precision data indicate acceptable agreement between the primary and the duplicate sample result based on reported results. A qualified results summary based on field duplicate data review is presented below:

Lab SDG No.	Primary/Duplicate Sample ID	Analyte	RPD	Results (µg/m³)	Validation Qualifier	Reason for Qualification	Reportable?
1903034	19M126-1-05-N 19M326-1-05-N	cis-1,2-DCE	35.3%	1.4 2.0	J-qualify	Field Duplicate	Yes
		TCE	38.1%	1.7 2.5	J-qualify	Field Duplicate	Yes
		PCE	36.6%	2.9 4.2	J-qualify	Field Duplicate	Yes
P1901048	19N243-G-01-F 19N343-G-01-F	cis-1,2-DCE	172.4%	0.046 0.62	J-qualify	Field Duplicate	Yes
		TCE	195.4%	0.21 18	J-qualify	Field Duplicate	Yes

Both the analytical laboratory and the validator performed an in-depth review of the raw analytical data associated with the samples reported in SDG # P1901048. These independent reviews concluded that reported results for TCE and cis-1,2-DCE are valid based on the raw data and laboratory data provided. We are uncertain as to the cause of such discrepancy reported for TCE and cis-1,2-DCE in this field duplicate sample.

The laboratory also prepared laboratory duplicates or duplicate LCSs for every 20 field samples as required by the analytical method and reported detected compounds below the laboratory RPD criteria of 25 percent indicating acceptable analytical precision.

6.2.3 Sample Reporting Limits/Compound Identification and Quantitation

Compound identification was verified for samples that contained target analyte concentrations above the LOQs. The sample concentrations were reported within the calibration range of the SIM instrument used for VOCs analysis.

Sample reporting limits were reported as the LOQs. The actual sample volumes may have resulted in adjustments to the final sample-specific reporting limits. Some analytical results were "J"-qualified, because the results are estimated concentrations (low levels) that are less than the LOQs but greater than or equal to the method detection limits. These qualified trace results remain estimated values with the "J" flags retained during data validation. Following the DoD QSM version 5.1 specifications, not detected data were reported as U at the limit of detection (LOD).

6.2.4 Laboratory QC Analyses

Laboratory QC samples were prepared and analyzed by the laboratory to monitor the analytical process. The laboratory analyzed all instrument calibration and QC samples (e.g., instrument tuning, initial and continuing calibration and calibration verification standards, internal standards, method blanks, surrogate spikes, LCSs) at the method-required frequency. The analyses were performed within all specifications of the TO-15 SIM method. Applicable method QC criteria were met and are considered acceptable for all analytes with minor qualification required for the three samples listed below:

Lab SDG No.	Primary/Duplicate Sample ID	Analyte	%Difference	Results (µg/m³)	Validation Qualifier	Reason for Qualification	Reportable?
P1901048	19N339-G-05-F 19N310-G-03-F 19N343-G-01-F	Vinyl chloride	21.8%	0.028 U 0.029 U 0.029 U	UJ-qualify	Continuing Calibration Verification % D	Yes

6.2.5 Data Usability Summary

Third-party validation reports indicate that data associated with samples collected for the Moffett Field VI air sampling event in February 2019 are usable and acceptable. All analyses were conducted within method-, project SAP-, and DoD QSM version 5.1-specifications. No results were rejected in this report. All technical holding time requirements were met. Minor validation qualification (J or UJ) was necessary based on field duplicate data and continuing calibration verification data evaluations for select few samples. The analytical results and associated data validation qualifiers are provided in Table 10. Copies of the analytical laboratory reports, including chain of custody forms and data validation reports, are provided in Appendix E.

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7.0 FINDINGS AND CONCLUSIONS

A total of 191 air samples, including indoor and outdoor ambient air samples, were collected to evaluate the occurrence of and pathways for VI in 23 industrial/commercial buildings at Moffett Field. This section summarizes the results and conclusions.

7.1 RESPONSE ACTION TIERING SYSTEM EVALUATION

Using relevant historical data from 2012, 2014, 2016, 2017, 2018, and current (2019) indoor air sampling results, and Table 2, the buildings were tiered to determine the need for a response action in accordance with the Response Action Tiering System (Table 3). Indoor air quality results for COCs were compared with the EPA's industrial/commercial indoor air cleanup levels as per the ROD Amendment (EPA 2010), with outdoor ambient air concentration ranges, and with consideration of whether or not an air quality EC is in place. Table 4 provides a summary of current 2019 tiering classification. Figure 4 illustrates the location of all indoor air samples, including 2019 TCE and PCE results that exceeded the EPA's indoor air cleanup levels. Indoor and pathway air sampling location maps including current 2019 and historical COC results at each location are provided in Appendix C.

Of the 23 buildings evaluated, Buildings 126, and N239A were classified as Tier 1. Buildings 3 and 10 were classified as Tier 2. The remaining eighteen buildings are classified as Tier 3A or Tier 3B. Buildings classified as Tier 3A (Buildings 14, 15, 16, 45, 555, 567, N210, N239, N243 and N243A) will require continued long-term monitoring per the ROD Amendment (EPA 2010). Buildings classified as Tier 3B (Buildings 2, 12, 13, 29, 67, 76, 107, 510, and 566) do not require long-term monitoring per the ROD Amendment (EPA 2010). A complete Response Action Tiering System evaluation is presented in Section 7, including a comparison with previous tiering results.

7.1.1 Tier 1 and Tier 2

Buildings classified as Tier 1 or Tier 2 require an appropriate EC be implemented as a remedy to meet EPA's indoor air cleanup levels. Development and implementation of long-term monitoring is also required at buildings classified as Tier 1 and Tier 2 per the ROD Amendment (EPA 2010). The results for buildings that were classified as either Tier 1 or Tier 2 are summarized below.

Of the 23 buildings sampled during the February 2019 air sampling event, six buildings (Buildings 3, 16, 126, N210, N239A, and N243) had one or more indoor air, pathway, or indoor source sampling result with concentrations of TCE and or PCE exceeding the EPA's industrial/commercial indoor air cleanup levels in the ROD Amendment (EPA 2010). Two Buildings (Buildings 126 and N239A) had one or more indoor air sampling result with concentrations of TCE and/or PCE exceeding the EPA's industrial/commercial indoor air cleanup levels in the ROD Amendment (EPA 2010).

Below is a discussion of the buildings classified as Tier 1 (Buildings 126, and N239A), Tier 2 (Buildings 3 and 10), and buildings that had one or more pathway or indoor source samples with concentrations of TCE and/or PCE exceeding the EPA's industrial/commercial indoor air cleanup levels in the ROD Amendment (EPA 2010; Buildings 16, N210, and N243). Specific details and design of mitigation measures are included in the *Draft Work Plan for Vapor Intrusion Mitigation at Installation Restoration Site 28 (Buildings 10, 16, 126, N210, N239, and N239A)* (CES Work Plan; CES 2017).

Building 3 (Conference Center and Cafeteria): Results collected during the February 2019 air sampling event detected PCE in two samples at concentrations that were at or exceeded the EPA's indoor air cleanup level of 2.0 µg/m^3 (EPA 2010). One pathway sample detected a PCE concentration of 2.0 µg/m^3. The second sample that exceeded EPA's indoor air cleanup level for PCE was collected in Building 3, Room 130 during HVAC-off sampling procedures with a PCE concentration of 5.9 µg/m^3. No other COCs exceeded the indoor air cleanup levels in the sample, and no other air sampling results from Building 3 exceeded the EPA's indoor air cleanup levels during either the HVAC-on or HVAC-off sampling events. Based on the sampling results, Building 3 was classified Tier 2 and requires an HVAC-on EC requirement. Building 3 was classified as Tier 2 during the 2014 sampling event and Tier 3A during the 2012, 2016, 2017, and 2018 sampling events.

Building 10 (Boiler Plant for NASA Research Park): All samples collected had COC concentrations below EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and, 1,1-DCE concentrations in indoor air samples were detected at concentrations exceeding the outdoor ambient air concentration range for Building 10. Building 10 is being classified as Tier 2 because no COCs in indoor air samples exceeded the EPA's indoor air cleanup levels during either the 2018 or 2019 monitoring events with the EC (blower) operating. ECD and Summa sampling in June 2018 confirmed multiple VI pathways in Building 10 including the tunnel system, electrical conduit, and the drain in Room 103. Therefore, mitigation measures are still recommended for Building 10 and re-evaluating current remedial design (CES 2017) is also recommended. Building 10 was classified as Tier 1 during the 2017 and 2018 sampling events, Tire 2 during the 2012 and 2015 sampling events, and Tier 3A during the 2016 sampling event.

Building 16 (Maintenance Contractor [IAP World Services] Office and Shops): TCE was detected at a concentration exceeding the EPA's indoor air cleanup level of 5 µg/m^3 in one pathway sample collected during the February 2019 sampling event. A sample collected in the unoccupied server room (Room 118) during HVAC-on sampling procedures detected a TCE concentration of 7.0 µg/m^3. On June 6, 2019, two additional samples were collected from Room 118, one from indoor air and one from the crawlspace beneath the floor. Both of the additional samples had a TCE concentration of 1.0 µg/m^3. No other COCs exceeded EPA's indoor air cleanup levels in the

sample, and no other air sampling results from Building 16 resulted in concentrations that exceeded the EPA's indoor air cleanup levels during either the HVAC-on or HVAC-off sampling measures.

With the exception of the air sample in Room 118, all indoor air Summa samples collected had COC concentrations that were below EPA's indoor air cleanup levels. Two additional samples collected from Room 118 in June 2019 had concentrations below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected above the outdoor ambient air concentration range for Building 16. In 2014, TCE exceeded the EPA's indoor air cleanup level in Room 103. Because the indoor air TCE result exceeded the outdoor ambient air concentration range, Building 16 is being classified as Tier 3A. It was proposed not to go forward with the proposed mitigation measures (CES 2017), since only one exceedance was seen in Room 103 and the results could not be reproduced with Summa sampling in 2016, 2017, 2018, 2019, or with ECD sampling. However, due to the TCE exceedance from this current sampling event, continued indoor air monitoring is recommended, as well as investigation into the source/reproducibility of the exceedance in Room 118.

Building 126 (Moffett Historical Society Museum): During the 2019 air sampling event, PCE was detected at concentrations exceeding the EPA's indoor air cleanup level of 2 $\mu g/m^3$. With the HVAC-on, PCE concentrations ranged from 0.89 $\mu g/m^3$ to 4.2 $\mu g/m^3$, exceeding the EPA's indoor air cleanup level in three of four samples. With the HVAC-off, PCE concentrations ranged from 2.0 $\mu g/m^3$ to 3.7 $\mu g/m^3$, exceeding the EPA's indoor air cleanup level in all four samples.

Monitoring of Building 126 will continue until the proposed VI mitigation measures are implemented (CES 2017). Once mitigation measures are implemented, the sampling rationale will be reevaluated. Building 126 remains classified as Tier 1.

Building N210 (Offices and Storage [former hangar]): During the February 2019 air sampling event, TCE was detected at a concentration exceeding the EPA's indoor air cleanup level of 5 $\mu g/m^3$ in one pathway sample with a detected TCE concentration of 55 $\mu g/m^3$. The pathway sample was collected in the crawl space under Room 008 during the HVAC-off procedure. An indoor air sample was co-located over the crawlspace sample in Room 008. TCE was also detected in this sample at a concentration of 2.0 $\mu g/m^3$, below the EPA's indoor air cleanup level.

All Summa indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; 1,1-DCE; and VC concentrations in indoor air samples were detected at concentrations that exceeded the outdoor ambient air concentration level for Building N243 (the closest building with outdoor ambient air samples). Due to the resulting datum that no indoor air work area samples exceeded EPA's indoor air cleanup level, but that the indoor air COC results for Building N210 exceeded the outdoor ambient air concentration ranges for the COCs investigated, Building N210 is being classified as Tier 3A. Continued monitoring and re-evaluation of mitigation measures are recommended.

Building N239A (Offices and Centrifuges): During the 2019 air sampling event, PCE was detected at a concentration of 2.9 µg/m^3, exceeding the EPA's indoor air cleanup level of 2 µg/m^3 in one sample in Room 102 with the HVAC-on. No other COCs exceeded EPA's indoor air cleanup levels during the HVAC-on or HVAC-off sampling events. Indoor air and/or work area samples exceeded the EPA's indoor air cleanup level for TCE during the 2013, 2014 and 2017 monitoring events.

Based on 2019 PCE detected concentration in the sample exceeding EPA's indoor air cleanup level, along with historic TCE concentrations above EPA's indoor air cleanup levels during previous monitoring events, Building N239A has been reclassified to Tier 1 (from Tier 2, classified in June 2018). Monitoring will continue until the proposed VI mitigation measures are implemented (CES 2017). Once mitigation measures are implemented, the sampling rationale will be reevaluated.

Building N243 (Flight Guidance and Simulation Laboratory): COCs were not detected exceeding the EPA's indoor air cleanup levels in any indoor air samples with the HVAC on or off during the February 2019 air sampling event. TCE was detected at a concentration of 18 µg/m^3, exceeding the EPA's indoor air cleanup level of 5 µg/m^3 in one indoor source grab sample collected above standing water in Room 054 with the HVAC off. The standing water was groundwater that infiltrated into the room due to excessive rain and was identified as the likely indoor source of COCs. A time integrated indoor air sample was also collected in Room 054 with the HVAC off, which had a TCE concentration of 0.16 µg/m^3, below the EPA's indoor air cleanup level.

With the exception of the indoor source grab sample in Room 054, all indoor air samples collected had COC concentrations below the EPA's indoor air cleanup levels. However, TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected at concentrations exceeding the outdoor ambient air concentration range for Building N243. Because indoor air COC results exceeded the outdoor ambient air concentration range, Building N243 is being classified as Tier 3A and continued monitoring is recommended.

7.2 SEASONAL VARIATIONS

The 2019 sampling provided air quality results during the winter season, which were used in conjunction with the late spring 2012, summer 2013, and winter 2014, 2016, 2017, and 2018 sampling results as well as the summer 2018 ECD study to conduct the tier response evaluation. Variations in temperature and moisture content have an impact on how organic compounds partition between soil, groundwater and soil gas (Washington 1996; Davis et al. 2001). VOC concentrations in the vadose zone soil gas tend to increase with increasing temperature and decreasing moisture content. Seasonal effects on vapor levels in soil gas in the interior areas of a building footprint may be limited to changes resulting from fluctuations in the depth to

contaminated groundwater as they relate to the saturation of soils and moisture evaporation/vapor volatilization from changes in the depth of the capillary fringe atop the groundwater. The saturation and evaporation of the capillary fringe with the change in the depth to groundwater likely has an impact on the volatilization of organics from the groundwater. The highest volatilization rates are expected to occur when the water table drops because of low rainfall amounts in late summer and early fall.

The 2014 and 2016 air sampling events occurred during a period of drought, which may have negated any effects on the rate of VI that would have occurred during a normal fall-winter rainy season. The 2017 and 2018 sampling air sampling event occurred during a period of average to above average rainfall (NOREAS 2019), so the effects of seasonal variation were expected to be significant. However, the difference in concentrations of VOCs in indoor air between the 2017 and 2018 winter events, and the 2012 and 2013 summer events was minimal, with concentrations in the winter months being slightly higher than in the summer months. Notable exceptions include Buildings 45 and 126, which had up to an order of magnitude increase in indoor air concentrations during the winter events compared to the summer events. Because concentrations of COCs at NAS Moffett are generally higher during the winter months, buildings at NAS Moffett are sampled during the winter per the California guidance which recommend sampling during summer or winter (Department of Toxic Substance Control 2011).

The 2019 sampling event occurred during a period of extreme rainfall (National Weather Service 2019) which raised groundwater levels. In addition, standing water that had infiltrated from the ground water table was noted in Buildings N239, N243, and N243A. The WATS was offline from November 2018 until the time of sampling as well. The combination of extreme rainfall and the WATS being offline is considered a worst-case scenario for indoor air concentrations. Despite the worst-case scenario, concentrations of COCs in indoor air, pathway, and outdoor ambient samples collected during the 2019 sampling event were similar to historic concentrations. Therefore, Tier 3B buildings can safely be removed from the long term monitoring schedule per the ROD Amendment (EPA 2010).

7.2.1 Factors Affecting Seasonal Variations

Studies have shown that the effects of variations in temperature and moisture content have a major impact on how organic compounds partition between soil, groundwater and soil gas (Washington 1996; Davis et al. 2001). VOC concentrations in the vadose zone soil gas tend to increase with increasing temperature and decreasing moisture content. Based on climatic data for Moffett Federal Airfield, the highest temperatures typically occur during June through September and the lowest occur during December through February. Generally, rainfall occurs during October through April, and little to no rainfall occurs from May through September. Based on seasonal variations in temperature and precipitation, high rates of VI are expected in summer (June to September), and low rates are expected in late fall to early spring (November to April). However

historical date at NAS Moffett shows concentrations of COCs in indoor air are generally slightly higher during winter sampling.

The complexity of site conditions can affect the levels of soil temperature, soil moisture, and air pressure differences (barometric and indoor air pressures from operation of the HVAC systems), making it difficult to clearly distinguish seasonal variations based on a limited number of sampling events. The factors that can influence seasonal variations in the rate of VI include the following:

- Variable site geology (relict sand drainage channels and silt-clay sediments in the interchannel areas);
- Extensive paved areas;
- Buried utility conduits including shallow trench conduits for the former steam lines;
- Building construction – raised wooden buildings with and without enclosed crawlspaces, concrete slab foundations, and a few buildings with basements;
- HVAC systems in some buildings and open window ventilation for other buildings change with occupant preference based on temperature and the season, which can influence air exchange rates; and
- Operation of an extensive groundwater extraction well system.

As most open areas are covered by concrete or asphalt, the sun shining on pavement likely heats shallow soil in paved areas to higher temperatures than the air temperatures, and limits the amount of moisture to reach the unsaturated soil. However, the building structures at the site will insulate the shallow soils beneath the buildings from daily (and possibly seasonal) temperature fluctuations, and will likely limit the influx of moisture from precipitation and changes in humidity, except along subgrade utility conduits that can convey moisture, heat, and vapors. The VI rates are likely different beneath the buildings with concrete foundations and the older wooden buildings, which are set on concrete blocks with crawlspaces. Seasonal effects on vapor levels in soil gas in the interior areas of a building footprint may be limited to changes resulting from fluctuations in the depth to contaminated groundwater as they relate to the saturation of soils and moisture evaporation/vapor volatilization from changes in the depth of the capillary fringe atop the groundwater. The saturation and evaporation of the capillary fringe with the change in the depth to groundwater likely has an impact on the volatilization of organics from the groundwater. The highest volatilization rates are expected to occur when the water table drops because of low rainfall amounts in late summer and early fall.

However, subsurface conditions and the vapor concentration distribution beneath buildings are not the only factors that determine the indoor air concentration due to VI. Indoor air concentration is also influenced by building conditions, which may vary from building to building and may also vary seasonally. Building air exchange rates may be higher in summer than in winter and the stack effect (hot air inside the building rising) may be greater in the winter. Therefore, building

conditions may explain some of the variability in indoor air concentrations found between buildings at the same site and may also explain the variability in indoor air concentration for the same building in different seasons (EPA 2012).

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8.0 RECOMMENDATIONS

Recommendations in this section were prepared based on 2012, 2013, 2014, 2016, 2017, 2018, and 2019 indoor air sampling results and the ROD Amendment (EPA 2010).

8.1 VAPOR INTRUSION MONITORING PROGRAM

Of the 23 buildings evaluated, Buildings 126, and N239A are classified as Tier 1 and require that an appropriate EC be implemented as a remedy to meet EPA's indoor air cleanup levels. Buildings and 3 and 10 classified as Tier 2, and require the use of interim measures/ECs to maintain air quality below EPA's indoor air cleanup levels.

Buildings 14, 15, 16, 45, 555, 567, N210, N239, N243 and N243A are classified as Tier 3A. Indoor air concentrations meet EPA's indoor air cleanup levels in work areas without an EC in place or operating. The response action for buildings classified as Tier 3A requires development and implementation of long-term monitoring per the ROD Amendment (EPA 2010).

Buildings 2, 12, 13, 29, 67, 76, 107, 510, and 566 are classified as Tier 3B. Indoor air concentrations meet EPA's indoor air cleanup levels in work areas without an EC in place or operating and the indoor air concentrations are at or below the outdoor ambient air concentrations. The response action for buildings classified as Tier 3B will not require implementation of long-term monitoring per the ROD Amendment (EPA 2010).

8.2 POTENTIAL MITIGATION MEASURES

Implementation of the mitigation measures for Buildings 10, 126, N239 and N239A is recommended, as outlined in the CES Work Plan (CES 2017). In addition, mitigation measures were recommended for Buildings 3 and 45 (NOREAS 2018). Re-evaluation of the mitigation measures for Building 45 are recommended.

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TABLES

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TABLE 1

BUILDINGS SAMPLED DURING THE FEBRUARY 2019 SAMPLING EVENTS WITHIN THE NAVY AOR OF THE VAPOR INTRUSION STUDY AREA, MOFFETT FIELD, CALIFORNIA

Building Number	Building Use	Building Occupancy and Status
2	Gymnasium	intermittently occupied
3	Conference Center and Cafeteria	occupied
10	Boiler Plant for NASA Research Park	vacant
12	Commissary	occupied
13	Commissary Warehouse	occupied
14	Offices & Storage	intermittently occupied
15	NASA Security	occupied
16	Maintenance Contractor (Jacobs) Office & Shops	occupied
29	Bicycle Shop	occupied less than 8 hours/day
45	Storage Facility	intermittently occupied
67	U.S. Post Office	occupied
76	Locksmith Shop	occupied
107	ROICC Office	occupied
126	Moffett Historical Society Museum	occupied
510	Maintenance Offices	occupied
555	Tenant Offices	occupied
566	Tenant Offices	occupied
567	Warehouse	occupied
N210	Offices and Storage (former hangar)	occupied
N239	Life Sciences Building (offices and laboratories)	occupied
N239A	Offices and Centrifuge	occupied
N243	Flight Guidance and Simulation Laboratory	occupied
N243A	Welding and Machine Shop	occupied

Reference: MMEC October 2015 Work Plan IR Site 28 Vapor Intrusion Indoor Air Monitoring

TABLE 2

RESPONSE ACTION TIERING SYSTEM FOR EXISTING AND FUTURE COMMERCIAL AND RESIDENTIAL BUILDINGS IN VAPOR INTRUSION STUDY AREA (TABLES 6A AND 6B OF THE ROD AMENDMENT, EPA 2010)

TABLE 6A
Response Action Tiering System for Existing Commercial and Residential Buildings in Vapor Intrusion Study Area (Sampled with Passive or Active Engineering Control in Place or Operating)

Tier	Description	Response Action
Tier 1	Building with indoor air concentrations greater than outdoor (background)* air concentrations and indoor air cleanup level.	Implement selected remedy (appropriate engineering control) to meet indoor air cleanup levels. Once indoor air cleanup level achieved and confirmed, building recategorized as Tier 2. Implement governmental, proprietary, and informational ICs (see Table 8).
Tier 2	Building with indoor air concentrations below the indoor air cleanup levels. Former Tier 1 existing building and Tier A future (new) building that confirmed indoor air concentrations are below the indoor air cleanup levels.	Ensure continued operation and maintenance of active ventilation system or other selected engineered remedy to meet RAOs. Develop and implement long-term monitoring and ICs implementation plan. Implement governmental, proprietary, and informational ICs (see Table 8). Where remedy is achieved through operation of an active ventilation system, agreement of property owner must be contained in a recorded agreement.
* Outdoor concentrations of TCE typically range from below laboratory analytical detection limits to 0.4 $\mu g/m^3$.		

TABLE 6B
Response Action Tiering System for Existing Commercial and Residential Buildings in Vapor Intrusion Study Area (Sampled with No Engineering Control in Place or Operating)

Tier	Description	Response Action
Tier 1	Building with indoor air concentrations greater than outdoor (background)* air concentrations and indoor air cleanup level.	Implement selected remedy (appropriate engineering control) to meet indoor air cleanup levels. Once indoor air cleanup level achieved and confirmed, building recategorized as Tier 2. Implement governmental, proprietary, and informational ICs (see Table 8).
Tier 3A	Building with indoor air concentrations below indoor air cleanup levels, but greater than outdoor (background) concentrations.	No engineered remedy required. Develop and implement long-term monitoring plan. Implement governmental ICs (see Table 8).
Tier 3B	Building with indoor air concentrations at or within outdoor air (background)* concentrations.	No engineered remedy nor long-term monitoring required. Implement governmental ICs (see Table 8)
Tier 4	Buildings where converging lines of evidence demonstrate that there is no longer the potential for vapor intrusion into the building exceeding indoor air cleanup levels.	No action required after performance of all necessary confirmation sampling and documentation approved by EPA that no action is necessary.
* Outdoor concentrations of TCE typically range from below laboratory analytical detection limits to 0.4 $\mu g/m^3$.		

Notes:

$\mu g/m^3$ – micrograms per cubic meter
USEPA – U.S. Environmental Protection Agency
IC – Institutional controls
MEW = Middlefield-Ellis-Whisman
RAO – remedial action objective
ROD – Record of Decision
TCE – trichloroethene

Reference: ROD Amendment for the Vapor Intrusion Pathway – MEW Superfund Study Area – August 2010.

TABLE 3

SUMMARY OF TIERING SYSTEM AND RESPONSE ACTIONS FOR EXISTING COMMERCIAL BUILDINGS IN THE VAPOR INTRUSION STUDY AREA, MOFFETT FIELD, CALIFORNIA

Tier	Description	Response Action	Selected Remedy
1	Building with indoor air concentrations greater than outdoor (background) air concentrations and indoor air cleanup levels.	Implement selected remedy (appropriate EC) to meet indoor air cleanup levels. Once indoor air cleanup level is achieved and confirmed, building is recategorized as Tier 2. Implement governmental, proprietary, and information ICs.	Active subslab/submembrane ventilation, monitoring, and ICs (including conduit sealing).[1] ICs consist of : • Permitting and building requirements to install appropriate engineering controls in future construction. • Recorded agreements to ensure installation and operation of engineering controls; require information to be provided to future owners; require information of building changes be provided to USEPA and MEW responsible parties. Tracking service to provide information to USEPA and MEW responsible parties of occupancy and building changes.
2	Building with indoor air concentrations below the indoor air cleanup levels, while an EC is in place or in operation. Also, former Tier 1 buildings with confirmed indoor air concentrations that are below the indoor air cleanup levels.	Ensure continued operation and maintenance of active ventilation system or other selected engineered remedy to meet remedial action objectives. Develop and implement long-term monitoring and IC implementation plan. Implement governmental, proprietary and informational ICs. Where remedy is achieved through operation of an active ventilation system, agreement of property owner must be contained in a recorded agreement.	
3A	Building sampled without EC in place or operating with indoor air concentrations below indoor air cleanup levels, but greater than outdoor (background) concentrations.	No engineered remedy required. Develop and implement long-term monitoring plan. Implement governmental ICs.	No engineering control. ICs only. ICs consist of: Permitting and building requirements to install appropriate ECs in future construction.
3B	Building sampled without EC in place or operating with indoor air concentrations at or within outdoor air (background) concentrations.	No engineered remedy or long-term monitoring required. Implement governmental ICs.	
4	Buildings where converging lines of evidence demonstrate that there is no longer the potential for vapor intrusion into the building exceeding indoor air cleanup levels.	No action required after performance of all necessary confirmation sampling and documentation approved by USEPA that no action is necessary.	No remedy required.

Notes:

1 Alternatively, active indoor air ventilation system, monitoring and ICs (including conduit sealing) may be selected as the vapor intrusion remedy for Tiers 1 and 2 existing commercial building if the property/building owner agrees to use, operate, and monitor the indoor air ventilation system (e.g., HVAC system) in a manner consistent with the operations, maintenance, and monitoring plan developed for that building in a signed recorded agreement.

EC – engineering control;
IC – institutional control;
MEW – Middlefield-Ellis-Whisman;
USEPA – United States Environmental Protection Agency

Reference: MMEC January 2016 Work Plan IR Site 28 Vapor Intrusion Indoor Air Monitoring

TABLE 4

TIER EVALUATION SUMMARY FOR BUILDINGS IN THE NAVY VAPOR INTRUSION AREA OF CONCERN

Building Number	Building Use	2019 Tier Classification	COMMENTS
Buildings with no HVAC Systems			
2	Gymnasium	3B	COC concentrations in indoor air samples were detected at approximately the ambient air sample concentration levels for Building 29 (the closest building with ambient air samples). Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m3. No further monitoring is recommended.
10*	Boiler Plant for NASA Research Park	2	All samples collected had COC concentrations below the EPA's indoor air cleanup levels with the engineering control (blower) operating. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected above the outdoor ambient air concentration levels for Building 10. Implementation of the mitigation measures with continued monitoring is recommended.
13	Commissary Warehouse	3B	COC concentrations in indoor air samples were detected at approximately the ambient air sample concentration levels for Building 12 (the closest building with ambient air samples). Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$. No further monitoring is recommended.
29	Bicycle Shop	3B	COC concentrations in indoor air samples were detected at approximately the outdoor ambient air sample concentration levels for Building 29. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 $\mu g/m^3$. No further monitoring is recommended.
45	Storage Facility	3A	All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; and 1,1-DCAE concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building 45. Continued monitoring is recommended.
67	U.S. Post Office	3B	COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration levels for Building 15 (the closest building with outdoor ambient air samples). Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m3. No further monitoring is recommended.
76	Locksmith Shop	3B	COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration range for Building 16 (the closest building with outdoor ambient air samples). Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m3. No further monitoring is recommended.
567	Warehouse	3A	All samples collected had COC concentrations below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected above the outdoor ambient air concentration levels for Building 567. Continued monitoring is recommended.

TABLE 4

TIER EVALUATION SUMMARY FOR BUILDINGS IN THE NAVY VAPOR INTRUSION AREA OF CONCERN

Building Number	Building Use	2019 Tier Classification	COMMENTS
Buildings with HVAC Systems			
3	Conference Center and Cafeteria	2	TCE concentrations exceeded the EPA's indoor air cleanup level in Room 130 with the HVAC system turned off. All COCs are below the EPA's indoor air cleanup levels with the HVAC on. Because TCE concentrations in Summa samples exceeded the EPA's indoor air cleanup levels with the HVAC off, Building 3 is being classified as Tier 2. Mitigation measures and continued monitoring are recommended.
12	Commissary	3B	COC concentrations in indoor air samples were detected at approximately the outdoor ambient air sample concentration levels for Building 12. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m3. No further monitoring is recommended.
14	Offices & Storage	3A	All samples collected had COC concentrations below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; and 1,1-DCE concentrations in indoor air samples were detected above the outdoor ambient air concentration level at Building 12 (the closest building with outdoor ambient air samples). Continued monitoring is recommended.
15	NASA Security	3A	All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building 15. Continued monitoring is recommended.
16*	Maintenance Contractor (IAP) Office & Shops	3A	All indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. One pathway Summa sample collected from the un-occupied server Room 118, exceeded the EPA's indoor air cleanup level for TCE. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration levels for Building 16. Continued monitoring and investigation in Room 118 is recommended.
107	Resident Officer in Charge of Construction Office	3B	COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration range for Building 555 (the closest building with outdoor ambient air samples). Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m3. No further monitoring is recommended.
126*	Moffett Historical Society Museum	1	PCE exceeded the EPA's indoor air cleanup level with the HVAC turned off (four of four samples) and with the HVAC turned on (three of four samples). Because concentrations of TCE and or PCE have exceeded the EPA's indoor air cleanup levels during the 2012, 2014, 2016, 2017, 2018 and current (2019) monitoring events, Building 126 is being classified as Tier 1. Implementation of the mitigation measures with continued monitoring is recommended.

TABLE 4

TIER EVALUATION SUMMARY FOR BUILDINGS IN THE NAVY VAPOR INTRUSION AREA OF CONCERN

Building Number	Building Use	2019 Tier Classification	COMMENTS
Buildings with HVAC Systems			
510	Maintenance Offices	3B	COC concentrations in indoor air samples were detected at approximately the outdoor ambient air sample concentration range for Building 510. Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m3. No further monitoring is recommended.
555	Tenant Offices	3A	All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; cis-1,2-DCE; and 1,1-DCA concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building 555. Continued monitoring is recommended.
566	Tenant Offices	3B	COC concentrations in indoor air samples were detected at approximately the outdoor ambient air concentration range for Building 16 (the closest building with outdoor ambient air samples). Indoor air TCE concentrations were within the average outdoor ambient TCE range given in Table 6A and 6B of the 2010 ROD Amendment of below laboratory analytical detection limits to 0.4 µg/m3. No further monitoring is recommended.
N210*	Offices & Storage (former hangar)	3A	All indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. One pathway Summa samples collected from the crawlspace beneath the raised floor, exceeded the EPA's indoor air cleanup level for TCE. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration levels for Building N243 (the closest building with outdoor ambient air samples). As the current mitigation measures are keeping indoor air COC concentrations below the EPA's indoor air cleanup level and the mitigation measures are acting as a depressurization system, it is recommended to not continue with proposed vapor mitigation measures. Continued monitoring is recommended and the building is classified as 3A.
N239*	Life Sciences Building (offices & laboratories)	3A	All indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and VC concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration levels for Building N239. It is recommended that mitigation measures be implemented in the basement area with continued monitoring.
N239A*	Offices & Centrifuge	1	PCE exceeded the EPA's indoor air cleanup level with the HVAC turned on (one of eight samples). Because concentrations of PCE exceeded the EPA's indoor air cleanup level during 2019 monitoring events, Building N239A is being classified as Tier 1. Implementation of the mitigation measures with continued monitoring is recommended.

TABLE 4

TIER EVALUATION SUMMARY FOR BUILDINGS IN THE NAVY VAPOR INTRUSION AREA OF CONCERN

Building Number	Building Use	2019 Tier Classification	COMMENTS
Buildings with HVAC Systems			
N243	Flight Guidance & Simulation Laboratory	3A	All indoor air samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; and 1,1-DCE concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building N243. One grab air sample taken in Room 054 just above standing water that had infiltrated from the water table due to excessive rain, exceeded the EPA's indoor air cleanup level for TCE. A time intigrated indoor air sample in Room 054 was below the EPA's indoor air cleanup level for TCE. The building is being classified as Tier 3A and continued monitoring as well as mitigation measures to prevent groundwater infiltration are recommended.
N243A	Welding & Machine Shop	3A	All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. TCE; PCE; cis-1,2-DCE; and 1,1-DCA concentrations in indoor air samples were detected exceeding the outdoor ambient air concentration range for Building N243A. Continued monitoring is recommended.

Notes:

$\mu g/m^3$ - microgram(s) per cubic meter
COC = chemical of concern
ROD = Record of Decision
HVAC = heating, ventilation, and air conditioning
NASA - National Aeronautics and Space Administration
DCA = dichloroethane
DCE = dichloroethene
PCE = tetrachloroethene
TCE = trichloroethene
VC = vinyl chloride
CES = Construction Engineering Services, LLC

*Buildings 10, 16, 126, N210, N239, and N239A are scheduled for implementation of mitigation measures (CES 2017).

TABLE 5

HYDROSTRATIGRAPHY OF MEW AND MOFFETT FIELD AREAS, MOFFETT FIELD, CALIFORNIA

Unit	Unit Subdivision	Range of Approximate Depths (feet below ground surface)	
		Top	Bottom
A	Upper portion of A (A) aquifer	0 to 13	15 to 35
	Lower portion of A (B1) aquifer	15 to 45	45 to 77
A/B	A/B (A/B2) aquitard	45 to 65	60 to 85
B	B2 (B2) aquifer zone	60 to 80	95 to 135
	(B2/B3) aquitard	95 to 105	99 to 111
	B3 (B3) aquifer zone	99 to 130	115 to 160
B/C	B/C (B3/C) aquitard	115 to 140	155 to 180
C	Unknown/undefined	155 to 160	250
Deep	Unknown/undefined	Generally deeper than 250	

Note: The equivalent aquifer/aquitard designations for the MEW study area are in parentheses.

Reference: MMEC October 2015 Work Plan IR Site 28 Vapor Intrusion Indoor Air Monitoring

TABLE 6

INDOOR AIR CLEANUP LEVELS FOR CHEMICALS OF CONCERN IN THE AREA OF VAPOR INTRUSION STUDY AREA, MOFFETT FIELD, CALIFORNIA

Chemical of Concern	Indoor Air Cleanup Level ($\mu g/m^3$) *
	Commercial
Trichloroethene	5
Tetrachloroethene	2
cis-1,2-Dichloroethene	210
trans-1,2-Dichloroethene	210
Vinyl Chloride	2
1,1-Dichloroethane	6
1,1-Dichloroethene	700

Notes:

* Cleanup Levels as presented in the Record of Decision Amendment for the Vapor Intrusion Pathway (EPA 2010)

$\mu g/m^3$ = micrograms per cubic meter

Reference: MMEC October 2015 Work Plan IR Site 28 Vapor Intrusion Indoor Air Monitoring

TABLE 7

NUMBER OF AIR SAMPLES FOR INDIVIDUAL BUILDINGS, MOFFETT FIELD, CALIFORNIA

Building	Indoor Air Samples				Ambient/Outdoor Air Samples	Duplicate Samples	Crawl Space & Pathway Samples	Total Number of Samples
	8-hour	10-hour	7-day	Grab	7-day			
2			4			1	3	4
3		13			1			14
10			9		1	2		10
12		10			1		2	11
13			2			1		2
14	11					1	4	11
15		7			1			8
16		11	2	1	1	1		15
29			2		1			3
45			2		1			3
67			1					1
76			1					1
107	5					1		5
126	11				1	3		12
510		5			1	1		6
555	4				1			5
566	4							4
567			3		1			4
N210	9			2		1	1	11
N239		16		4	1 (24-hour)	2		21
N239A		17				2	6	17
N243		14			1	2	2	15
N243A		7			1	1	2	8
Totals	44	100	26	7	14	18	20	191

Notes:
Total ambient/outdoor air samples: 14 Ambient samples were of 7-day duration except where noted.
Total indoor air samples: 191 (including 18 duplicate and 20 crawl space/pathway air samples)

TABLE 8

PLANNED INDOOR AIR SAMPLING LOCATIONS IN 2016 WORK PLAN, MOFFETT FIELD, CALIFORNIA

Sample Name	Sample Date	Sample Day	Location			HVAC	Sample Duration				Sample Type	Building Information	Sampling Rationale
			Building	Floor	Room	(on or off)	8-Hour	10-Hour	24-Hour	Grab			
Buildings With No HVAC System													
Indoor Air Samples													
YYM002-1-02	TBD	TBD	2	1	107	NA	x				Work Area	Gymnasium	Potential future occupancy
YYM002-1-03	TBD	TBD	2	1	109	NA	x				Work Area	Gymnasium	Potential future occupancy
YYM002-1-04	TBD	TBD	2	1	104	NA	x				Pathway	Gymnasium	Boiler room, not occupied
YYM045-1-01	TBD	TBD	45	1	101	NA	x				Work Area	Former Paint Shop	Storage, unoccupied
YYM045-1-02	TBD	TBD	45	1	102	NA	x				Work Area	Former Paint Shop	Storage, unoccupied
YYM010-1-01	TBD	TBD	10	1	101	NA	x				Work Area	Boiler Plant	Main work area; east side of room
YYM010-1-02	TBD	TBD	10	1	101	NA	x				Work Area	Boiler Plant	Main work area; near cubes in SW corner
YYM014-C-01	TBD	TBD	14	1	Crawl Space	NA	x				Pathway	Demonstration Room	Crawl Space
YYM014-C-02	TBD	TBD	14	1	Crawl Space	NA	x				Pathway	Offices	Crawl Space
YYM014-1-03	TBD	TBD	14	1	Dem. Room	NA	x				Work Area	Demonstration Room	Meeting Room
YYM014-1-04	TBD	TBD	14	1	Workshop	NA	x				Work Area	Workshop	Work Area
YYM014-1-05	TBD	TBD	14	1	Offices	NA	x				Work Area	Offices	Work Area
YYM010-1-03	TBD	TBD	10	1	101	NA	x				Work Area	Boiler Plant	Main work area; near tunnel & sump
YYM010-1-05	TBD	TBD	10	1	102	NA	x				Work Area	Boiler Plant	Office
YYM010-1-06	TBD	TBD	10	1	N104	NA	x				Work Area	Boiler Plant	Boiler room, near water lines and sump
YYM029-B-01	TBD	TBD	29	Basement	Basement	NA	x				Pathway	Bicycle Shop	basement near drain and conduits
YYM029-1-01	TBD	TBD	29	1	106	NA	x				Work Area	Bicycle Shop	work area
YYM067-1-01	TBD	TBD	67	1	C101	NA			x		Work Area	U.S. Post Office	Near bathroom and slab break
YYM076-1-01	TBD	TBD	76	1	101	AC off	x				Work Area	Locksmith Shop	General work area, shut in with AC off
YYM567-1-01	TBD	TBD	567	1	107	NA	x				Work Area	Warehouse	Main work area, near former bollards
YYM567-1-02	TBD	TBD	567	1	102	NA	x				Work Area	Warehouse	Main work area, near electrical conduits
YYM567-1-03	TBD	TBD	567	1	104	NA	x				Work Area	Warehouse	Work area, near bathroom
YYM013-1-01	TBD	TBD	13	1	103	NA			x		Work Area	Commissary Warehouse	Food storage, near cracks or seam
YYM013-1-02	TBD	TBD	13	1	102	NA			x		Work Area	Commissary Warehouse	Merchandising storage, near crack or seam
Ambient Air Samples													
YYM010-A-01	TBD	TBD	10	Ambient Air	NA	NA			x		Background		
YYM013-A-01	TBD	TBD	13	Ambient Air	NA	NA			x		Background		
YYM029-A-01	TBD	TBD	29	Ambient Air	NA	NA			x		Background		
YYM045-A-01	TBD	TBD	45	Ambient Air	NA	NA			x		Background		
YYM067-A-01	TBD	TBD	67	Ambient Air	NA	NA			x		Background		
YYM567-A-01	TBD	TBD	567	Ambient Air	NA	NA			x		Background		
Duplicate Air Samples													
YYM302-1-04	TBD	TBD	2	1	104	NA	x				Duplicate	Gymnasium	Mitigation confirmation
YYM314-1-05	TBD	TBD	14	1	Offices	NA	x				Duplicate	Offices	Work Area
YYM310-1-03	TBD	TBD	10	1	101	NA	x				Duplicate	Boiler Plant	Main work area; near tunnel & sump
		Number of Indoor Air Samples =	**24**		**Ambient Air Samples =**	**6**					**Duplicate Samples =**	**3**	

TABLE 8

PLANNED INDOOR AIR SAMPLING LOCATIONS IN 2016 WORK PLAN, MOFFETT FIELD, CALIFORNIA

Sample Name	Sample Date	Sample Day	Location			HVAC	Sample Duration				Sample Type	Building Information	Sampling Rationale
			Building	Floor	Room	(on or off)	8-Hour	10-Hour	24-Hour	Grab			
Buildings With HVAC Systems – HVAC in Operation													
Indoor Air Samples													
YYM126-1-01-N	TBD	TBD	126	1	103	on	x				Work Area	Museum	Main room in northern corner, near closet opening
YYM126-1-02-N	TBD	TBD	126	1	103	on	x				Work Area	Museum	Main room, south area
YYM126-1-04-N	TBD	TBD	126	1	106	on	x				Work Area	Museum	Access area for bathrooms
YYM126-1-05-N	TBD	TBD	126	1	101	on	x				Work Area	Museum	Previous sample location
YYM003-1-01-N	TBD	TBD	3	1	105	on		x			Work Area	Conference Center/Cafeteria	Hallway, outside of kitchen
YYM003-1-02-N	TBD	TBD	3	1	C104	on		x			Work Area	Conference Center/Cafeteria	Kitchen; near floor drains
YYM003-1-03-N	TBD	TBD	3	1	104A	on		x			Work Area	Conference Center/Cafeteria	Office
YYM003-1-04-N	TBD	TBD	3	1	122	on		x			Work Area	Conference Center/Cafeteria	Banquet Room
YYM003-1-07-N	TBD	TBD	3	1	108	on		x			Work Area	Conference Center/Cafeteria	Dining Room
YYM003-1-08-N	TBD	TBD	3	1	111	on		x			Work Area	Conference Center/Cafeteria	Office; near kitchen
YYM003-1-09-N	TBD	TBD	3	1	128	on		x			Work Area	Conference Center/Cafeteria	Work area with fire place
YYM012-1-01-N	TBD	TBD	12	1	109D	on			x		Work Area	Commissary Warehouse	Cashier office
YYM012-1-02-N	TBD	TBD	12	1	109	on			x		Work Area	Commissary Warehouse	By Cashier
YYM012-1-03-N	TBD	TBD	12	1	119	on			x		Work Area	Commissary Warehouse	Warehouse; near cracks or seams
YYM012-C-05-N	TBD	TBD	12	1	Crawl Space	on			x		Pathway	Commissary Warehouse	Under Room 110
YYM015-1-01-N	TBD	TBD	15	1	135D	on			x		Work Area	NASA Security	Office; staffed 24/7/365
YYM015-1-02-N	TBD	TBD	15	1	117	on			x		Work Area	NASA Security	Office, near electrical conduits
YYM015-1-03-N	TBD	TBD	15	1	C107	on			x		Work Area	NASA Security	Hallway, near Room 163 (HVAC) and Room 166 (office), near cubes
YYM015-1-06-N	TBD	TBD	15	1	C104	on			x		Work Area	NASA Security	Hallway, near Room 101 (drain), R102W and R104M (bathrooms) and N108 (HVAC)
YYN239A-B-01-N	TBD	TBD	N239A	Basement	Basement	on			x		Work Area	Centrifuge and Offices	On bio-dome scaffolding
YYN239A-1-09-N	TBD	TBD	N239A	1	144	on			x		Work Area	Centrifuge and Offices	Offices
YYN239A-1-03-N	TBD	TBD	N239A	1	120	on			x		Work Area	Centrifuge and Offices	Near bio-dome equipment
YYN239A-1-05-N	TBD	TBD	N239A	1	102	on			x		Work Area	Centrifuge and Offices	Office
YYN239A-1-06-N	TBD	TBD	N239A	1	C102	on			x		Work Area	Centrifuge and Offices	Hallway near utility rooms U101 and U102
YYN239A-1-08-N	TBD	TBD	N239A	1	125	on			x		Work Area	Centrifuge and Offices	Opposite flammable cabinet in highbay floor area
YYN239A-1-10-N	TBD	TBD	N239A	1	U101	on			x		Work Area	Centrifuge and Offices	
YYN239A-1-11-N	TBD	TBD	N239A	1	U102	on			x		Work Area	Centrifuge and Offices	
YYN243A-B-01-N	TBD	TBD	N243A	Basement	1	on			x		Pathway	Welding and Machine Shop	Within Tunnel
YYN243A-1-01-N	TBD	TBD	N243A	1	104	on			x		Work Area	Welding and Machine Shop	Main work area; near 10-inch vent conduit
YYN243A-1-02-N	TBD	TBD	N243A	1	101	on			x		Work Area	Welding and Machine Shop	Main work area; near electrical conduits
YYM107-1-01-N	TBD	TBD	107	1	106	on	x				Work Area	ROICC Office	Conference room near comm. conduits
YYM107-1-02-N	TBD	TBD	107	1	C101	on	x				Work Area	ROICC Office	Near Room 102
YYM510-1-02-N	TBD	TBD	510	1	110	on			x		Work Area	Maintenance Contractor Admin Offices	Cubical Area
YYM510-1-03-N	TBD	TBD	510	1	C101	on			x		Work Area	Maintenance Contractor Admin Offices	Near R101 and 103 (bathrooms)
YYM555-1-01-N	TBD	TBD	555	1	112	on	x				Work Area	Former hangar, now offices	Office, near Room 112B (drain)
YYM555-1-03-N	TBD	TBD	555	1	107A	on	x				Work Area	Former hangar, now offices	Near Room 107B (communications)

TABLE 8

PLANNED INDOOR AIR SAMPLING LOCATIONS IN 2016 WORK PLAN, MOFFETT FIELD, CALIFORNIA

Sample Name	Sample Date	Sample Day	Location			HVAC	Sample Duration				Sample Type	Building Information	Sampling Rationale
			Building	Floor	Room	(on or off)	8-Hour	10-Hour	24-Hour	Grab			
YYM566-1-01-N	TBD	TBD	566	1	111	on	x				Work Area	Tenant Offices	Offices near 112 and 113
YYM566-1-02-N	TBD	TBD	566	1	C103	on	x				Work Area	Tenant Offices	Hallway, near electrical outlets in the floor
YYM016-1-01-N	TBD	TBD	16	1	106	on		x			Work Area	Maintenance Contractor (IAP) Offices	Office
YYM016-1-02-N	TBD	TBD	16	1	110	on		x			Work Area	Maintenance Contractor (IAP) Offices	Wood shop near cracks and seams
YYM016-1-03-N	TBD	TBD	16	1	111	on		x			Work Area	Maintenance Contractor (IAP) Offices	HVAC area, near cracks or seams
YYM016-1-04-N	TBD	TBD	16	1	113	on		x			Work Area	Maintenance Contractor (IAP) Offices	Office area; shallow groundwater
YYM016-1-05-N	TBD	TBD	16	1	103	on		x			Work Area	Maintenance Contractor (IAP) Offices	Office
YYN239-B-01-N	TBD	TBD	N239	Basement	53A	on			x		Work Area	Life Sciences Building	Library; SW area, stagnant air
YYN239-B-02-N	TBD	TBD	N239	Basement	053	on			x		Work Area	Life Sciences Building	Break area for library staff
YYN239-B-05-N	TBD	TBD	N239	Basement	C001	on			x		Work Area	Life Sciences Building	Hallway near N089 (or B11); near sump
YYN239-B-06-N	TBD	TBD	N239	Basement	C002	on			x		Work Area	Life Sciences Building	Hallway near Room 030
YYN239-1-02-N	TBD	TBD	N239	1	C104	on			x		Work Area	Life Sciences Building	Hallway near Room 178
YYN239-1-03-N	TBD	TBD	N239	1	191	on			x		Work Area	Life Sciences Building	Office near chem lab
YYN239-1-05-N	TBD	TBD	N239	1	138S	on			x		Work Area	Life Sciences Building	Chem area near Room R103 (bathroom)
YYN239-1-07-N	TBD	TBD	N239	1	102	on			x		Work Area	Life Sciences Building	Cubicles; away from labs
YYN239-1-08-N	TBD	TBD	N239	1	C101	on			x		Work Area	Life Sciences Building	Hallway near stairwell and elevator
YYN243-B-02-N	TBD	TBD	N243	Basement	C002	on			x		Work Area	Flight Guidance/Simulation Lab	Main corridor for offices
YYN243-B-04-N	TBD	TBD	N243	Basement	C008	on			x		Work Area	Flight Guidance/Simulation Lab	Hallway near Office 083
YYN243-B-06-N	TBD	TBD	N243	Basement	050	on			x		Work Area	Flight Guidance/Simulation Lab	Machine shop near sump
YYN243-B-07-N	TBD	TBD	N243	Basement	054	on			x		Work Area	Flight Guidance/Simulation Lab	Near below grade hydraulic equipment
YYN243-1-01-N	TBD	TBD	N243	1	136	on			x		Work Area	Flight Guidance/Simulation Lab	Office, near R102 and R103 (bathrooms)
YYN243-1-02-N	TBD	TBD	N243	1	C104	on			x		Work Area	Flight Guidance/Simulation Lab	Rotunda hallway, previous sample location
Ambient Air Samples													
YYM003-A-01-N	TBD	TBD	3	Ambient Air	NA	NA			x		Background		
YYM012-A-01-N	TBD	TBD	12	Ambient Air	NA	NA			x		Background		
YYM015-A-01-N	TBD	TBD	15	Ambient Air	NA	NA			x		Background		
YYM126-A-01-N	TBD	TBD	126	Ambient Air	NA	NA			x		Background		
YYN239-A-01-N	TBD	TBD	N239	Ambient Air	NA	NA			x		Background		
YYN243A-A-01-N	TBD	TBD	N243A	Ambient Air	NA	NA			x		Background		
YYM510-A-01-N	TBD	TBD	510	Ambient Air	NA	NA			x		Background		
YYM555-A-01-N	TBD	TBD	555	Ambient Air	NA	NA			x		Background		
YYM016-A-01-N	TBD	TBD	16	Ambient Air	NA	NA			x		Background		
YYN210-A-01-N	TBD	TBD	N210	Ambient Air	NA	NA			x		Background		
YYN243-A-01-N	TBD	TBD	N243	Ambient Air	NA	NA			x		Intake		
YYN243-A-02-N	TBD	TBD	N243	Ambient Air	NA	NA			x		Background		
Duplicate Samples													
YYM326-1-02-F	TBD	TBD	126	1	103	NA	x				Duplicate	Museum	
YYM303-1-07-N	TBD	TBD	3	1	108	on		x			Duplicate	Conference Center/Cafeteria	Mitigation measures confirmation near conduit
YYM416-1-02-N	TBD	TBD	16	1	110	on		x			Duplicate	Maintenance Contractor (IAP) Offices	

TABLE 8

PLANNED INDOOR AIR SAMPLING LOCATIONS IN 2016 WORK PLAN, MOFFETT FIELD, CALIFORNIA

Sample Name	Sample Date	Sample Day	Location			HVAC	Sample Duration				Sample Type	Building Information	Sampling Rationale
			Building	Floor	Room	(on or off)	8-Hour	10-Hour	24-Hour	Grab			
YYM339A-1-10-N	TBD	TBD	N239A	1	U101	on			x		Duplicate	Centrifuge and Offices	Confirmation sample Utility room U101
YYM343A-1-01-N	TBD	TBD	N243A	1	104	on			x		Duplicate	Welding and Machine Shop	Main work area; near 10-inch vent conduit
YYM339-B-01-N	TBD	TBD	N239	Basement	53A	on			x		Duplicate	Life Sciences Building	
YYM355-1-03-NN	TBD	TBD	555	1	107A	on	x				Duplicate	Former hangar, now offices	
		Number of Indoor Air Samples =	**58**		**Ambient Air Samples =**	**12**					**Duplicate Samples =**	**7**	
Buildings With HVAC Systems – HVAC System Shut Down													
Indoor Air Samples													
YYM126-1-01-F	TBD	TBD	126	1	103	NA	x				Work Area	Museum	Main room in northern corner, near closet opening
YYM126-1-02-F	TBD	TBD	126	1	103	NA	x				Work Area	Museum	Main room, south area
YYM126-1-04-F	TBD	TBD	126	1	106	NA	x				Work Area	Museum	Access area for bathrooms
YYM126-1-05-F	TBD	TBD	126	1	101	NA	x				Work Area	Museum	Previous sample location
YYM012-1-01-F	TBD	TBD	12	1	109D	off			x		Work Area	Commissary Warehouse	Cashier office
YYM012-1-02-F	TBD	TBD	12	1	109	off			x		Work Area	Commissary Warehouse	By Cashier
YYM012-1-03-F	TBD	TBD	12	1	119	off			x		Work Area	Commissary Warehouse	Warehouse; near cracks or seams
YYM012-C-05-F	TBD	TBD	12	1	Crawl Space	off			x		Pathway	Commissary Warehouse	Under Room 110
YYM015-1-01-F	TBD	TBD	15	1	135D	off			x		Work Area	NASA Security	Office; staffed 24/7/365
YYM015-1-02-F	TBD	TBD	15	1	117	off			x		Work Area	NASA Security	Office, near electrical conduits
YYM015-1-03-F	TBD	TBD	15	1	C107	off			x		Work Area	NASA Security	Hallway, near Room 163 (HVAC) and Room 166 (office), near cubes
YYM015-1-06-F	TBD	TBD	15	1	C104	off			x		Work Area	NASA Security	Hallway, near Room 101 (drain), R102W and R104M (bathrooms) and N108 (HVAC)
YYN239-B-01-F	TBD	TBD	N239	Basement	53A	off			x		Work Area	Life Sciences Building	Library; SW area, stagnant air
YYN239-B-02-F	TBD	TBD	N239	Basement	053	off			x		Work Area	Life Sciences Building	Break area for library staff
YYN239-G-04-F	TBD	TBD	N239	Basement	C001	off				x	Pathway	Life Sciences Building	Elevator Grab Sample
YYN239-B-05-F	TBD	TBD	N239	Basement	C001	off			x		Work Area	Life Sciences Building	Hallway near N089 (or B11); near sump
YYN239-B-06-F	TBD	TBD	N239	Basement	C002	off			x		Work Area	Life Sciences Building	Hallway near Room 030
YYN239-1-02-F	TBD	TBD	N239	1	C104	off			x		Work Area	Life Sciences Building	Hallway near Room 178
YYN239-1-03-F	TBD	TBD	N239	1	191	off			x		Work Area	Life Sciences Building	Office near chem lab
YYN239-1-05-F	TBD	TBD	N239	1	138S	off			x		Work Area	Life Sciences Building	Chem area near Room R103 (bathroom)
YYN239-1-07-F	TBD	TBD	N239	1	102	off			x		Work Area	Life Sciences Building	Cubicles; away from labs
YYN239-1-08-F	TBD	TBD	N239	1	C101	off			x		Work Area	Life Sciences Building	Hallway near stairwell and elevator
YYN239A-B-01-F	TBD	TBD	N239A	Basement	Basement	off			x		Pathway	Centrifuge and Offices	On bio-dome scaffolding
YYN239A-1-09-F	TBD	TBD	N239A	1	144	off			x		Pathway	Centrifuge and Offices	Near sump with PID detections
YN239A-1-03-F	TBD	TBD	N239A	1	120	off			x		Work Area	Centrifuge and Offices	Near bio-dome equipment
YYN239A-1-05-F	TBD	TBD	N239A	1	102	off			x		Work Area	Centrifuge and Offices	Office
YYN239A-1-06-F	TBD	TBD	N239A	1	C102	off			x		Work Area	Centrifuge and Offices	Hallway near utility rooms U101 and U102
YYN239A-1-08-F	TBD	TBD	N239A	1	125	off			x		Work Area	Centrifuge and Offices	Opposite flammable cabinet in highbay floor area
YYN239A-1-10-F	TBD	TBD	N239A	1	U101	off			x		Work Area	Centrifuge and Offices	

TABLE 8

PLANNED INDOOR AIR SAMPLING LOCATIONS IN 2016 WORK PLAN, MOFFETT FIELD, CALIFORNIA

Sample Name	Sample Date	Sample Day	Location			HVAC	Sample Duration				Sample Type	Building Information	Sampling Rationale
			Building	Floor	Room	(on or off)	8-Hour	10-Hour	24-Hour	Grab			
YYN239A-1-11-F	TBD	TBD	N239A	1	U102	off			x		Work Area	Centrifuge and Offices	
YYN243-B-02-F	TBD	TBD	N243	Basement	C002	off			x		Work Area	Flight Guidance/Simulation Lab	Main corridor for offices
YYN243-B-03-F	TBD	TBD	N243	Basement	N032	off			x		Pathway	Flight Guidance/Simulation Lab	Utility room
YYN243-B-04-F	TBD	TBD	N243	Basement	C008	off			x		Work Area	Flight Guidance/Simulation Lab	Hallway near Office 083
YYN243-B-06-F	TBD	TBD	N243	Basement	050	off			x		Work Area	Flight Guidance/Simulation Lab	Machine shop near sump
YYN243-B-07-F	TBD	TBD	N243	Basement	054	on			x		Work Area	Flight Guidance/Simulation Lab	Near below grade hydraulic equipment
YYN243-1-01-F	TBD	TBD	N243	1	136	off			x		Work Area	Flight Guidance/Simulation Lab	Office, near R102 and R103 (bathrooms)
YYN243-1-02-F	TBD	TBD	N243	1	C104	off			x		Work Area	Flight Guidance/Simulation Lab	Rotunda hallway, previous sample location
YYN243A-B-01-F	TBD	TBD	N243A	Basement	1	off			x		Work Area	Welding and Machine Shop	Within Tunnel
YYN243A-1-01-F	TBD	TBD	N243A	1	104	off			x		Work Area	Welding and Machine Shop	Main work area; near 10-inch vent conduit
YYN243A-1-02-F	TBD	TBD	N243A	1	101	off			x		Work Area	Welding and Machine Shop	Main work area; near electrical conduits
YYM510-1-02-F	TBD	TBD	510	1	110	off			x		Work Area	Maintenance Contractor Admin Offices	Cubical Area
YYM510-1-03-F	TBD	TBD	510	1	C101	off			x		Work Area	Maintenance Contractor Admin Offices	Near R101 and 103 (bathrooms)
YYM003-1-01-F	TBD	TBD	3	1	105	off		x			Work Area	Conference Center/Cafeteria	Office; above crawl space sample
YYM003-1-02-F	TBD	TBD	3	1	C104	off		x			Work Area	Conference Center/Cafeteria	Hallway outside of kitchen
YYM003-1-03-F	TBD	TBD	3	1	104A	off		x			Work Area	Conference Center/Cafeteria	Office
YYM003-1-04-F	TBD	TBD	3	1	122	off		x			Work Area	Conference Center/Cafeteria	Banquet Room
YYM003-1-06-F	TBD	TBD	3	1	130	off		x			Pathway	Conference Center/Cafeteria	Near conduit; phone lines penetrate floor
YYM003-1-07-F	TBD	TBD	3	1	108	off		x			Work Area	Conference Center/Cafeteria	Dining Room
YYM003-1-08-F	TBD	TBD	3	1	111	off		x			Work Area	Conference Center/Cafeteria	Office; near kitchen
YYM003-1-09-F	TBD	TBD	3	1	128	off		x			Work Area	Conference Center/Cafeteria	Work area with fire place
YYM016-1-01-F	TBD	TBD	16	1	106	off		x			Work Area	Maintenance Contractor (IAP) Offices	Office
YYM016-1-02-F	TBD	TBD	16	1	110	off		x			Work Area	Maintenance Contractor (IAP) Offices	Wood shop near cracks and seams
YYM016-1-03-F	TBD	TBD	16	1	111	off		x			Work Area	Maintenance Contractor (IAP) Offices	HVAC area, near cracks or seams
YYM016-1-04-F	TBD	TBD	16	1	113	off		x			Work Area	Maintenance Contractor (IAP) Offices	Office area; shallow groundwater
YYM016-1-05-F	TBD	TBD	16	1	103	off		x			Work Area	Maintenance Contractor (IAP) Offices	Office
YYM107-1-01-F	TBD	TBD	107	1	106	off	x				Work Area	ROICC Office	Conference room near comm. conduits
YYM107-1-02-F	TBD	TBD	107	1	C101	off	x				Work Area	ROICC Office	Near Room 102
YYN210-1-01-F	TBD	TBD	N210	1	143	off	x				Work Area	Former hangar, now offices	Near communications & offices
YYN210-1-02-F	TBD	TBD	N210	1	C117A	off	x				Work Area	Former hangar, now offices	Hallway near cubical
YYN210-G-03-F	TBD	TBD	N210	1	near V101	off				x	Pathway	Former hangar, now offices	Elevator Grab Sample
YYN210-1-04-F	TBD	TBD	N210	1	138E	off	x				Work Area	Former hangar, now offices	Office
YYN210-1-05-F	TBD	TBD	N210	1	146	off	x				Work Area	Former hangar, now offices	Display in stairwell; previous sample location
YYN210-1-06-F	TBD	TBD	N210	1	Q134	off	x				Pathway	Former hangar, now offices	AC Room
YYN210-1-07-F	TBD	TBD	N210	1	100A	off	x				Work Area	Former hangar, now offices	Access room
YYN210-1-08-F	TBD	TBD	N210	1	C10	off	x				Work Area	Former hangar, now offices	Near 010
YYN210-1-09-F	TBD	TBD	N210	1	148	off	x				Work Area	Former hangar, now offices	Near wall of hanger pit
YYN210-1-10-F	TBD	TBD	N210	1	near 033 & 036	off	x				Work Area	Former hangar, now offices	Cubicles

TABLE 8

PLANNED INDOOR AIR SAMPLING LOCATIONS IN 2016 WORK PLAN, MOFFETT FIELD, CALIFORNIA

Sample Name	Sample Date	Sample Day	Location			HVAC	Sample Duration				Sample Type	Building Information	Sampling Rationale
			Building	Floor	Room	(on or off)	8-Hour	10-Hour	24-Hour	Grab			
YYN210-C-11-F	TBD	TBD	N210	1	Crawl Space	off	x				Pathway	Crawl Space where vapor extraction system is located	Crawl Space beneath raised floor
YYM555-1-01-F	TBD	TBD	555	1	112	off	x				Work Area	Former hangar, now offices	Office, near Room 112B (drain)
YYM555-1-03-F	TBD	TBD	555	1	107A	off	x				Work Area	Former hangar, now offices	Near Room 107B (communications)
YYM566-1-01-F	TBD	TBD	566	1	111	off	x				Work Area	Tenant Offices	Offices near 112 and 113
YYM566-1-02-F	TBD	TBD	566	1	C103	off	x				Work Area	Tenant Offices	Hallway, near electrical outlets in the floor
Ambient Air Samples													
YYM012-A-01-F	TBD	TBD	12	Ambient Air	NA	NA			x		Background		
YYM015-A-01-F	TBD	TBD	15	Ambient Air	NA	NA			x		Background		
YYN239-A-01-F	TBD	TBD	N239	Ambient Air	NA	NA			x		Background		
YYN243-A-01-F	TBD	TBD	N243	Intake	NA	NA			x		Background		
YYN243A-A-01-F	TBD	TBD	N243A	Ambient Air	NA	NA			x		Background		
YYN243A-A-02-F	TBD	TBD	N243A	Ambient Air	NA	NA			x		Background		
YYM510-A-01-F	TBD	TBD	510	Ambient Air	NA	NA			x		Background		
YYM003-A-01-F	TBD	TBD	3	Ambient Air	NA	NA			x		Background		
YYM016-A-01-F	TBD	TBD	16	Ambient Air	NA	NA			x		Background		
YYN210-A-01-F	TBD	TBD	N210	Ambient Air	NA	NA			x		Background		
YYM555-A-01-F	TBD	TBD	555	Ambient Air	NA	NA			x		Background		
YYM126-A-01-F	TBD	TBD	126	Ambient Air	NA	NA			x		Background		
Duplicate Air Samples													
YYM312-1-03-F	TBD	TBD	12	1	Crawl Space	off			x		Duplicate	Commissary Warehouse	Under Room 110
YYM315-1-03-F	TBD	TBD	15	1	C107	off			x		Duplicate	NASA Security	hallway near 163 and 166
YYM339A-1-10-F	TBD	TBD	N239A	1	U101	off			x		Duplicate	Centrifuge and Offices	Confirmation sample Utility room U101
YYM343-B-07-F	TBD	TBD	N243	Basement	054	off			x		Duplicate	Flight Guidance/Simulation Lab	Near below grade hydraulic equipment
YYM339-1-07-F	TBD	TBD	N239	1	102	off			x		Duplicate	Life Sciences Building	Cubicles; away from labs
YYM303-1-06-F	TBD	TBD	3	1	130	off		x			Duplicate	Conference Center/Cafeteria	Mitigation measures confirmation near conduit
YYM316-1-03-F	TBD	TBD	16	1	111	off		x			Duplicate	Maintenance Contractor (IAP) Offices	HVAC area, near cracks or seams
YYM310-1-10-F	TBD	TBD	N210	1	near 033 & 036	off	x				Duplicate	Former hangar, now offices	Cubicles
		Number of Indoor Air Samples =	**72**		**Ambient Air Samples =**	**12**					**Duplicate Samples =**	**8**	
		Total Indoor Air Samples =	**154**		**Total Ambient Air Samples =**	**30**					**Total Duplicate Samples =**	**18**	
											Total Samples =	**202**	

Notes:
AC – air conditioning
HVAC – heating, ventilation, and air conditioning
NASA – National Aeronautics and Space Administration
ROICC – Resident Officer in Charge of Construction
TBD – to be determined
SW – southwest

TABLE 9

DEVIATIONS FROM SAMPLING PLAN, MOFFETT FIELD, CALIFORNIA

Planned Sample Name	Revised Sample Name	Building Affected	Deviation Notes
N/A	N/A	2	In accordance with FCRF-3028-01, building with out HVAC were sampled with Radiello passive samplers using EPA Method TO-17
N/A	N/A	10	In accordance with FCRF-3028-01, building with out HVAC were sampled with Radiello passive samplers using EPA Method TO-17
N/A	N/A	13	In accordance with FCRF-3028-01, building with out HVAC were sampled with Radiello passive samplers using EPA Method TO-17
N/A	N/A	29	In accordance with FCRF-3028-01, building with out HVAC were sampled with Radiello passive samplers using EPA Method TO-17
N/A	N/A	45	In accordance with FCRF-3028-01, building with out HVAC were sampled with Radiello passive samplers using EPA Method TO-17
N/A	N/A	67	In accordance with FCRF-3028-01, building with out HVAC were sampled with Radiello passive samplers using EPA Method TO-17
N/A	N/A	76	In accordance with FCRF-3028-01, building with out HVAC were sampled with Radiello passive samplers using EPA Method TO-17
N/A	N/A	567	In accordance with FCRF-3028-01, building with out HVAC were sampled with Radiello passive samplers using EPA Method TO-17
N/A	N/A	12	In accordance with FCRF-3028-01, 24 hours were converted to 10 hour samples
N/A	N/A	15	In accordance with FCRF-3028-01, 24 hours were converted to 10 hour samples
N/A	N/A	510	In accordance with FCRF-3028-01, 24 hours were converted to 10 hour samples
N/A	N/A	N239	In accordance with FCRF-3028-01, 24 hours were converted to 10 hour samples
N/A	N/A	N239A	In accordance with FCRF-3028-01, 24 hours were converted to 10 hour samples
N/A	N/A	N243	In accordance with FCRF-3028-01, 24 hours were converted to 10 hour samples
N/A	N/A	N243A	In accordance with FCRF-3028-01, 24 hours were converted to 10 hour samples
N/A	N/A	N210	At Building N210, at the request of the FSM, the building was sampled while the HVAC system was in operation. Building N210 has several servers that require continuous cooling to prevent overheating. As an alternative to turning off the HVAC system, the air intake was restricted with plastic sheeting to limit the amount of outdoor air entering the building.
N/A	N/A	N243	At Building N243, at the request of the FSM, the building was sampled while the HVAC system was in operation. Building N243 has several servers that require continuous cooling to prevent overheating. As an alternative to turning off the HVAC system, the air intake was restricted with plastic sheeting to limit the amount of outdoor air entering the building.
N/A	N/A	13	At the request of the EPA, Tier 3B buildings were sampled as the WATS was not operational and heavy storm conditions.
N/A	N/A	29	At the request of the EPA, Tier 3B buildings were sampled as the WATS was not operational and heavy storm conditions.
N/A	N/A	67	At the request of the EPA, Tier 3B buildings were sampled as the WATS was not operational and heavy storm conditions.
N/A	N/A	76	At the request of the EPA, Tier 3B buildings were sampled as the WATS was not operational and heavy storm conditions.
N/A	N/A	107	At the request of the EPA, Tier 3B buildings were sampled as the WATS was not operational and heavy storm conditions.
N/A	N/A	510	At the request of the EPA, Tier 3B buildings were sampled as the WATS was not operational and heavy storm conditions.
N/A	N/A	566	At the request of the EPA, Tier 3B buildings were sampled as the WATS was not operational and heavy storm conditions.
19M003-1-01-F	N/A	3	Sample was omitted due to limitations of sample media
19M003-1-08-F	N/A	3	Sample was omitted due to limitations of sample media

TABLE 9

DEVIATIONS FROM SAMPLING PLAN, MOFFETT FIELD, CALIFORNIA

Planned Sample Name	Revised Sample Name	Building Affected	Deviation Notes
19M003-A-01-N	19M003-A-01	3	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M003-A-01-F	19M003-A-01	3	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M010-1-01	19M010-1-01-19Q1	10	Updated sample name in accordance with FCRF-003
19M010-1-02	19M010-1-02-19Q1	10	Updated sample name in accordance with FCRF-003
19M010-1-03	19M010-1-03-19Q1	10	Updated sample name in accordance with FCRF-003
19M310-1-03	19M310-1-03-19Q1	10	Updated sample name in accordance with FCRF-003
19M010-1-05	19M010-1-05-19Q1	10	Updated sample name in accordance with FCRF-003
19M010-1-06	19M010-1-06-19Q1	10	Updated sample name in accordance with FCRF-003
19M010-1-07	19M010-1-07-19Q1	10	Updated sample name in accordance with FCRF-003
19M010-1-10	19M010-1-10-19Q1	10	Updated sample name in accordance with FCRF-003
19M310-1-10	19M310-1-10-19Q1	10	Updated sample name in accordance with FCRF-003
19M010-A-01	19M010-A-01-19Q1	10	Updated sample name in accordance with FCRF-003
N/A	19M012-1-04-F	12	Collocated with crawlspace sample to prove attenuation factor between crawlspace pathway sample and indoor air sample
N/A	19M012-1-04-N	12	Collocated with crawlspace sample to prove attenuation factor between crawlspace pathway sample and indoor air sample
19M012-A-01-N	19M012-A-01	12	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M012-A-01-F	19M012-A-01	12	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M013-A-01	N/A	13	Ambient sample blew away during storm
N/A	19M014-1-03-N	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M014-1-04-N	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M014-1-05-N	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M314-1-05-N	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M014-C-01-N	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M014-C-02-N	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M014-1-03-F	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M014-1-04-F	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019. (Sample was omitted due to limitations of sample media)
N/A	19M014-1-05-F	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.

TABLE 9

DEVIATIONS FROM SAMPLING PLAN, MOFFETT FIELD, CALIFORNIA

Planned Sample Name	Revised Sample Name	Building Affected	Deviation Notes
N/A	19M014-C-01-F	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M014-C-02-F	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
N/A	19M014-1-06-N	14	Collocated with crawlspace sample to prove attenuation factor between crawlspace pathway sample and indoor air sample
19M014-1-03	N/A	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
19M014-1-04	N/A	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
19M014-1-05	N/A	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
19M314-1-05	N/A	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
19M014-C-01	N/A	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
19M014-C-02	N/A	14	Building 14 was discovered to have had an HVAC system installed after the 2014 sampling event. Building 14 was sampled with the HVAC Off and On scenarios in 2019.
19M015-1-02-F	N/A	15	Sample was omitted due to limitations of sample media
19M015-A-01-N	19M015-A-01	15	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M015-A-01-F	19M015-A-01	15	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M016-1-01-F	N/A	16	Sample was omitted due to limitations of sample media
19M016-1-04-F	N/A	16	Sample was omitted due to limitations of sample media
N/A	19M016-1-06-N	16	Room 108 sampled to investigate potential vapor intrusion pathways.
N/A	19M016-1-07-N	16	Room 118 sampled to investigate potential vapor intrusion pathways.
N/A	19M016-G-08-N	16	Room 118 sampled to investigate potential vapor intrusion pathways.
19M016-A-01-N	19M016-A-01	16	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M016-A-01-F	19M016-A-01	16	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M416-1-02-N	19M316-1-02-N	16	Renamed sample to follow duplicate sample nomenclature.
N/A	19M016-1-07-N-R	16	Additional sample collected on June 6, 2019 from the indoor air of Building 16 Room 118
N/A	19M016-1-09-N	16	Additional sample collected on June 6, 2019 from the crawlspace beneath Building 16 Room 118
19M067-A-01	N/A	67	Ambient sample blew away during storm
19M126-A-01-N	19M126-A-01	126	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M126-A-01-F	19M126-A-01	126	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M326-1-02-F	19M326-1-02-N	126	Renamed sample to reflect "HVAC On" nomenclature.

TABLE 9

DEVIATIONS FROM SAMPLING PLAN, MOFFETT FIELD, CALIFORNIA

Planned Sample Name	Revised Sample Name	Building Affected	Deviation Notes
19M510-A-01-N	19M510-A-01	510	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M510-A-01-F	19M510-A-01	510	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M355-1-03-NN	19M355-1-03-N	555	Renamed sample to follow HVAC on sample nomenclature.
19M555-A-01-N	19M555-A-01	555	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19M555-A-01-F	19M555-A-01	555	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19N210-A-01-F	N/A	N210	Ambient sample blew away during storm
N/A	19N310-G-03-F	N210	Added duplicate sample
N/A	19N210-1-12-F	N210	Collocated with crawlspace sample to prove attenuation factor between crawlspace pathway sample and indoor air sample
19N239-1-07-F	N/A	N239	Sample was omitted due to limitations of sample media
19N239-1-08-F	N/A	N239	Sample was omitted due to limitations of sample media
19N239-A-01-N	19N239-A-01	N239	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19N239-A-01-F	19N239-A-01	N239	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
N/A	19N339-G-04-F	N239	Added duplicate sample
N/A	19N239-G-05-F	N239	Sampled air over standing water which may had infiltrated from the groundwater table due to excessive rain to investigate possible indoor air sources
N/A	19N339-G-05-F	N239	Duplicate sample air over standing water which may had infiltrated from the groundwater table due to excessive rain to investigate possible indoor air sources
19N239A-1-05-F	N/A	N239A	Sample was omitted due to limitations of sample media
19N243-1-01-F	N/A	N243	Sample was omitted due to limitations of sample media
19N243-A-01-N	19N243-A-01	N243	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19N243-A-01-F	19N243-A-01	N243	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19N243-A-02-N	19N243-A-02	N243	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19N243-A-02-F	19N243-A-02	N243	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
N/A	19N243-G-01-F	N243	Sampled air over standing water which may had infiltrated from the groundwater table due to excessive rain to investigate possible indoor air sources
N/A	19N343-G-01-F	N243	Duplicate sample air over standing water which may had infiltrated from the groundwater table due to excessive rain to investigate possible indoor air sources
19N243A-A-02-F	19N243-A-02-F	N243	Renamed sample to reflect correct building sampled.
19N243A-A-02-N	19N243A-A-02	N243A	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media
19N243A-A-02-F	19N243A-A-02	N243A	Sample was taken using a 7-day Radiallo sample media using EPA Method TO-17 due to limitations of sample media

TABLE 9

DEVIATIONS FROM SAMPLING PLAN, MOFFETT FIELD, CALIFORNIA

Planned Sample Name	Revised Sample Name	Building Affected	Deviation Notes

NOTES:
EPA = environmental protection agency
FCRF = field change request form
HVAC = heating ventilation and air conditioning
FSM = facilities site manager
WATS = West-Side Aquifer Treatment System

TABLE 10
2019 ANNUAL VAPOR INTRUSION AIR MONITORING DATA

Analyte									1,1-DCA	1,1,-DCE	*cis*- 1,2-DCE	PCE	TCE	*trans*- 1,2-DCE	Vinyl Chloride
Indoor Commercial Screening Level (µg/m³)									6.0	700	210	2.0	**5.0**	210	2.0
Building	**Sample ID**	**Floor**	**Room**	**HVAC (on/off)**	**Sample Type**	**Sample Duration (hr)**	**Analytical Method**	**Sample Date**							
2	19M002-1-02	First	107	NH	Pathway	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.032**	**0.056**	0.0013 U	N/A
2	19M002-1-03	First	109	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.038**	**0.16**	0.0013 U	N/A
2	19M002-1-04	First	104	NH	Pathway	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.039**	**0.15**	0.0013 U	N/A
2	19M302-1-04	First	104	NH	Duplicate	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.039**	**0.14**	0.0013 U	N/A
3	19M003-1-01-N	First	105	On	Work Area	10	TO-15 SIM	2/27/2019	0.13 U	0.062 U	0.12 U	**0.24**	**0.45**	0.62 U	0.080 U
3	19M003-1-02-F	First	C104	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.01 J**	0.034 U	**0.023 J**	**0.039 J**	**0.41**	0.034 U	0.034 U
3	19M003-1-02-N	First	C104	On	Work Area	10	TO-15 SIM	2/27/2019	0.12 U	0.059 U	0.12 U	0.20 U	**0.23**	0.59 U	0.077 U
3	19M003-1-03-F	First	104A	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.022 J**	**0.014 J**	**0.088**	**0.077**	**2.7**	**0.015 J**	**0.031**
3	19M003-1-03-N	First	104A	On	Work Area	10	TO-15 SIM	2/27/2019	0.13 U	0.065 U	0.13 U	0.22 U	**0.55**	0.65 U	0.084 U
3	19M003-1-04-F	First	122	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.024 J**	0.026 U	**0.054**	**0.049**	**1.2**	**0.014 J**	**0.039**
3	19M003-1-04-N	First	122	On	Work Area	10	TO-15 SIM	2/27/2019	0.12 U	0.061 U	0.12 U	0.21 U	**0.32**	0.61 U	0.079 U
3	19M003-1-06-F	First	130	Off	Pathway	10	TO-15 SIM	2/24/2019	**0.033**	**0.013 J**	**0.091**	**5.9**	**1.9**	**0.011 J**	**0.024 J**
3	19M003-1-07-F	First	108	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.031 J**	**0.012 J**	**0.088**	**0.10**	**1.9**	**0.017 J**	**0.019 J**
3	19M003-1-07-N	First	108	On	Work Area	10	TO-15 SIM	2/27/2019	0.13 U	0.062 U	**0.10 J**	0.21 U	**3.3**	0.62 U	0.080 U
3	19M003-1-08-N	First	111	On	Work Area	10	TO-15 SIM	2/27/2019	0.12 U	0.059 U	0.12 U	0.20 U	**0.24**	0.59 U	0.076 U
3	19M003-1-09-F	First	128	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.016 J**	0.026 U	**0.051**	**0.17**	**0.87**	**0.0099 J**	**0.057**
3	19M003-1-09-N	First	128	On	Work Area	10	TO-15 SIM	2/27/2019	0.13 U	0.065 U	0.13 U	0.22 U	**0.77**	0.65 U	**0.046 J**
3	19M003-A-01	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	0.0015 U	**0.033**	**0.045**	0.0014 U	N/A
10	19M010-1-01-19Q1	First	101	NH	Work Area	168	TO-17	2/15/2019	**0.0092 J**	**0.0094 J**	**0.11**	**0.049**	**2.8**	**0.01**	N/A
10	19M010-1-02-19Q1	First	101	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.063**	**0.045**	**1.7**	0.0013 U	N/A
10	19M010-1-03-19Q1	First	101	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.054**	**0.046**	**1.7**	0.0013 U	N/A
10	19M310-1-03-19Q1	First	101	NH	Duplicate	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.063**	**0.047**	**1.8**	0.0013 U	N/A
10	19M010-1-05-19Q1	First	102	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.075**	**0.045**	**2.2**	**0.0094 J**	N/A
10	19M010-1-06-19Q1	First	N104	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.074**	**0.049**	**1.6**	0.0013 U	N/A
10	19M010-1-07-19Q1	First	Exhaust	NH	Outdoor	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.032**	**0.038**	**0.44**	0.0013 U	N/A
10	19M010-1-10-19Q1	First	103	NH	Work Area	168	TO-17	2/15/2019	**0.011**	**0.013**	**0.11**	**0.044**	**4.6**	**0.011**	N/A
10	19M310-1-10-19Q1	First	103	NH	Duplicate	168	TO-17	2/15/2019	**0.011**	**0.01**	**0.11**	**0.053**	**4.8**	**0.011**	N/A
10	19M010-A-01-19Q1	Ambient	N/A	NH	Ambient	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.015**	**0.031**	**0.26**	0.0013 U	N/A
12	19M012-1-01-F	First	109D	Off	Work Area	10	TO-15 SIM	2/25/2019	0.13 U	0.062 U	0.12 U	0.21 U	**0.22**	0.62 U	0.080 U
12	19M012-1-01-N	First	109D	On	Work Area	10	TO-15 SIM	2/27/2019	0.12 U	0.061 U	0.12 U	0.21 U	**0.092 J**	0.61 U	0.079 U
12	19M012-1-02-F	First	109	Off	Work Area	10	TO-15 SIM	2/25/2019	0.13 U	0.063 U	0.13 U	0.22 U	**0.18**	0.63 U	0.081 U
12	19M012-1-02-N	First	109	On	Work Area	10	TO-15 SIM	2/27/2019	0.13 U	0.063 U	0.13 U	0.22 U	**0.098 J**	0.63 U	0.081 U
12	19M012-1-03-F	First	101	Off	Work Area	10	TO-15 SIM	2/25/2019	0.12 U	0.059 U	0.12 U	0.20 U	0.16 U	0.59 U	0.077 U
12	19M012-1-03-N	First	101	On	Work Area	10	TO-15 SIM	2/27/2019	0.12 U	0.057 U	0.11 U	0.19 U	**0.072 J**	0.57 U	0.073 U
12	19M012-1-04-F	First	109F	Off	Work Area	10	TO-15 SIM	2/25/2019	0.12 U	0.061 U	0.12 U	0.21 U	**0.18**	0.61 U	0.079 U
12	19M012-1-04-N	First	109	On	Work Area	10	TO-15 SIM	2/27/2019	0.12 U	0.060 U	0.12 U	0.21 U	**0.096 J**	0.60 U	0.078 U
12	19M012-A-01	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	0.0015 U	**0.03**	**0.065**	0.0014 U	N/A
12	19M012-C-05-F	Crawl Space	Crawl Space	Off	Pathway	10	TO-15 SIM	2/25/2019	0.13 U	0.063 U	0.12 U	0.21 U	**0.46**	0.63 U	0.081 U
12	19M012-C-05-N	Crawl Space	Crawl Space	On	Pathway	10	TO-15 SIM	2/27/2019	0.16 U	0.076 U	0.15 U	0.26 U	**0.35**	0.76 U	0.098 U
13	19M013-1-01	First	103	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.035**	**0.16**	**0.25**	0.0013 U	N/A
13	19M013-1-02	First	102	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.035**	**0.082**	0.0013 U	N/A
14	19M014-1-03-F	First	101	Off	Work Area	8	TO-15 SIM	2/24/2019	0.12 U	0.061 U	**0.2**	**0.14 J**	**1.4**	0.61 U	0.079 U
14	19M014-1-03-N	First	101	On	Work Area	8	TO-15 SIM	2/28/2019	0.11 U	0.054 U	0.11 U	0.18 U	**0.11 J**	0.54 U	0.070 U
14	19M014-1-04-N	First	C101	On	Work Area	8	TO-15 SIM	2/28/2019	0.11 U	0.055 U	0.11 U	0.19 U	**0.22**	0.55 U	0.071 U
14	19M014-1-05-F	First	106	Off	Work Area	8	TO-15 SIM	2/24/2019	0.13 U	0.062 U	**0.10 J**	0.21 U	**1.6**	0.62 U	0.080 U
14	19M014-1-05-N	First	106	On	Work Area	8	TO-15 SIM	2/28/2019	0.13 U	0.065 U	**0.046 J**	0.22 U	**0.59**	0.65 U	0.084 U
14	19M314-1-05-N	First	106	On	Duplicate	8	TO-15 SIM	2/28/2019	0.12 U	0.061 U	**0.040 J**	**0.070 J**	**0.64**	0.61 U	0.079 U
14	19M014-1-06-N	First	101	On	Work Area	8	TO-15 SIM	2/28/2019	0.13 U	0.065 U	0.13 U	**0.098 J**	**0.39**	0.65 U	0.084 U
14	19M014-C-01-F	Crawl Space	Crawl Space	Off	Pathway	8	TO-15 SIM	2/24/2019	0.13 U	0.063 U	**0.16**	0.22 U	**1.6**	0.63 U	0.082 U
14	19M014-C-01-N	Crawl Space	Crawl Space	On	Pathway	8	TO-15 SIM	2/28/2019	0.11 U	0.053 U	**0.056 J**	**0.069 J**	**1.1**	0.53 U	0.068 U
14	19M014-C-02-F	Crawl Space	Crawl Space	Off	Pathway	8	TO-15 SIM	2/24/2019	0.12 U	**0.039 J**	**0.13**	0.20 U	**0.81**	0.59 U	**0.11**
14	19M014-C-02-N	Crawl Space	Crawl Space	On	Pathway	8	TO-15 SIM	2/28/2019	0.13 U	0.065 U	**0.11 J**	0.22 U	**2.0**	0.65 U	**0.087**
15	19M015-1-01-F	First	135D	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.025 J**	0.033 U	**0.059**	**0.052**	**0.93**	0.033 U	0.033 U
15	19M015-1-01-N	First	135D	On	Work Area	10	TO-15 SIM	2/26/2019	0.11 U	0.054 U	0.11 U	0.18 U	0.15 U	0.54 U	0.070 U
15	19M015-1-02-N	First	117	On	Work Area	10	TO-15 SIM	2/26/2019	0.11 U	0.053 U	0.11 U	**0.097 J**	**0.18**	0.53 U	0.068 U
15	19M015-1-03-F	First	C107	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.013 J**	0.031 U	**0.026 J**	**0.046**	**0.4**	**0.012 J**	0.031 U
15	19M015-1-03-N	First	C107	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.065 U	0.13 U	0.22 U	0.18 U	0.65 U	0.084 U
15	19M015-1-06-F	First	C104	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.02 J**	**0.013 J**	**0.083**	**0.053**	**1.3**	**0.013 J**	0.03 U
15	19M015-1-06-N	First	C104	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.065 U	0.13 U	0.22 U	0.18 U	0.65 U	0.084 U
15	19M015-A-01	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	0.0015 U	**0.029**	**0.084**	0.0014 U	N/A
16	19M016-1-01-N	First	106	On	Work Area	10	TO-15 SIM	2/27/2019	0.13 U	0.065 U	0.13 U	0.22 U	**0.13 J**	0.65 U	0.084 U
16	19M016-1-02-F	First	110	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.022 J**	**0.014 J**	**0.11**	**0.12**	**1.3**	**0.015 J**	0.03 U

TABLE 10
2019 ANNUAL VAPOR INTRUSION AIR MONITORING DATA

Analyte									1,1-DCA	1,1,-DCE	*cis*- 1,2-DCE	PCE	TCE	*trans*- 1,2-DCE	Vinyl Chloride
Indoor Commercial Screening Level (µg/m³)									6.0	700	210	2.0	5.0	210	2.0
Building	Sample ID	Floor	Room	HVAC (on/off)	Sample Type	Sample Duration (hr)	Analytical Method	Sample Date							
16	19M016-1-02-N	First	110	On	Work Area	10	TO-15 SIM	2/27/2019	0.11 U	0.056 U	0.11 U	**0.22**	**0.39**	**0.15 J**	0.072 U
16	19M016-1-03-F	First	111	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.02 J**	0.03 U	**0.10**	**0.15**	**0.75**	**0.013 J**	0.03 U
16	19M016-1-03-N	First	111	On	Work Area	10	TO-15 SIM	2/27/2019	0.12 U	0.059 U	0.12 U	**0.2**	**0.33**	0.59 U	0.077 U
16	19M016-1-04-N	First	113	On	Work Area	10	TO-15 SIM	2/27/2019	0.10 U	0.051 U	0.10 U	**0.11 J**	**0.38**	**0.084 J**	0.065 U
16	19M016-1-05-F	First	103	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.052**	**0.061**	**0.14**	**0.064**	**4.0**	**0.026 J**	**0.013 J**
16	19M016-1-05-N	First	103	On	Work Area	10	TO-15 SIM	2/27/2019	0.12 U	0.061 U	0.12 U	0.21 U	**0.24**	0.61 U	0.078 U
16	19M316-1-05-N	First	110	On	Duplicate	10	TO-15 SIM	2/27/2019	0.10 U	0.051 U	0.10 U	0.17 U	**0.11 J**	0.51 U	0.065 U
16	19M016-1-06-N	First	110	On	Work Area	10	TO-15 SIM	2/27/2019	0.11 U	0.053 U	0.11 U	**0.10 J**	**0.50**	0.53 U	0.068 U
16	19M016-1-07-N	First	118	On	Pathway	10	TO-15 SIM	2/27/2019	0.12 U	0.060 U	**0.43**	**0.14 J**	**7.0**	0.60 U	0.078 U
16	19M016-1-07-N-R	First	118	On	Pathway	168	TO-17	6/6/2019	**0.047**	**0.0026 J**	**0.012**	**0.051**	**1.0**	**0.004 J**	N/A
16	19M016-A-01	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	0.0015 U	**0.03**	**0.23**	0.0014 U	N/A
16	19M016-G-08-N	First	118	On	Pathway	Grab	TO-15 SIM	2/27/2019	0.12 U	0.059 U	**0.15**	0.20 U	**3.0**	0.59 U	0.077 U
16	19M016-1-09-N	Crawl Space	118	On	Pathway	168	TO-17	6/6/2019	0.0016 U	**0.0034 J**	**0.06**	**0.048**	**1.0**	**0.005 J**	N/A
29	19M029-1-01	First	106	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.086**	**0.14**	0.0013 U	N/A
29	19M029-A-01	Ambient	N/A	NH	Ambient	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.033**	**0.04**	0.0013 U	N/A
29	19M029-B-01	Basement	Basement	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.056**	**0.089**	0.0013 U	N/A
45	19M045-1-01	First	101	NH	Work Area	168	TO-17	2/15/2019	**0.011**	0.0016 U	**0.014**	**0.21**	**1.3**	0.0013 U	N/A
45	19M045-1-02	First	102	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.013**	**0.25**	**1.2**	0.0013 U	N/A
45	19M045-A-01	Ambient	N/A	NH	Ambient	168	TO-17	2/15/2019	0.0015 U	0.0016 U	**0.025**	**0.21**	**0.22**	0.0013 U	N/A
67	19M067-1-01	First	C101	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.03**	**0.12**	0.0013 U	N/A
76	19M076-1-01	First	101	NH	Work Area	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.031**	**0.21**	0.0013 U	N/A
107	19M107-1-01-F	First	106	Off	Work Area	8	TO-15 SIM	2/24/2019	0.12 U	0.061 U	0.12 U	0.21 U	0.17 U	0.61 U	0.079 U
107	19M107-1-01-N	First	106	On	Work Area	8	TO-15 SIM	2/28/2019	0.11 U	0.053 U	0.11 U	**0.24**	**0.055 J**	0.53 U	0.068 U
107	19M107-1-02-F	First	C101	Off	Work Area	8	TO-15 SIM	2/24/2019	0.12 U	0.058 U	0.12 U	0.20 U	**0.055 J**	0.58 U	0.075 U
107	19M107-1-02-N	First	C101	On	Work Area	8	TO-15 SIM	2/28/2019	0.13 U	0.063 U	0.12 U	0.21 U	**0.14 J**	0.63 U	0.081 U
107	19M307-1-02-N	First	C101	On	Duplicate	8	TO-15 SIM	2/28/2019	0.13 U	0.064 U	0.13 U	**0.099 J**	**0.19**	0.64 U	0.082 U
126	19M126-1-01-F	First	103	Off	Work Area	8	TO-15 SIM	2/26/2019	0.17 U	0.085 U	**1.5**	**2.4**	**1.3**	0.85 U	**0.14**
126	19M326-1-01-F	First	103	Off	Duplicate	8	TO-15 SIM	2/26/2019	0.17 U	0.082 U	**1.3**	**2.2**	**1.2**	0.82 U	**0.13**
126	19M126-1-01-N	First	103	On	Work Area	8	TO-15 SIM	2/28/2019	0.16 U	0.078 U	**1.2**	**2.8**	**1.6**	0.78 U	**0.12**
126	19M126-1-02-F	First	103	Off	Work Area	8	TO-15 SIM	2/26/2019	0.18 U	0.087 U	**2.4**	**3.7**	**2.0**	0.87 U	**0.22**
126	19M126-1-02-N	First	103	On	Work Area	8	TO-15 SIM	2/28/2019	0.15 U	0.076 U	**1.9**	**3.0**	**1.6**	0.76 U	**0.2**
126	19M326-1-02-N	First	103	On	Duplicate	8	TO-15 SIM	2/28/2019	0.16 U	0.078 U	**2.1**	**3.3**	**1.7**	0.78 U	**0.23**
126	19M126-1-04-F	First	106	Off	Work Area	8	TO-15 SIM	2/26/2019	0.16 U	0.081 U	**1.4**	**2.1**	**0.89**	0.81 U	**0.14**
126	19M126-1-04-N	First	106	On	Work Area	8	TO-15 SIM	2/28/2019	0.15 U	0.076 U	**0.56**	**0.89**	**0.55**	0.76 U	**0.068 J**
126	19M126-1-05-F	First	101	Off	Work Area	8	TO-15 SIM	2/26/2019	0.12 U	0.060 U	**0.59**	**2.0**	**1.5**	0.60 U	**0.055 J**
126	19M126-1-05-N	First	101	On	Work Area	8	TO-15 SIM	2/28/2019	0.11 U	0.053 U	**1.4**	**2.9**	**1.7**	**0.037 J**	**0.15**
126	19M326-1-05-N	First	101	On	Duplicate	8	TO-15 SIM	2/28/2019	0.16 U	0.078 U	**2.0**	**4.2**	**2.5**	0.78 U	**0.21**
126	19M126-A-01	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	**0.18**	**0.54**	**0.26**	0.0014 U	N/A
510	19M510-1-02-F	First	110	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.0086 J**	0.027 U	**0.024 J**	**0.083**	**0.18**	0.027 U	0.027 U
510	19M510-1-02-N	First	110	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.065 U	0.13 U	0.22 U	**0.094 J**	0.65 U	0.084 U
510	19M510-1-03-F	First	C101	Off	Work Area	10	TO-15 SIM	2/24/2019	0.032 U	0.032 U	**0.03 J**	**0.10**	**0.21**	0.032 U	0.032 U
510	19M510-1-03-N	First	C101	On	Work Area	10	TO-15 SIM	2/26/2019	0.11 U	0.055 U	0.11 U	0.19 U	**0.092 J**	0.55 U	0.071 U
510	19M310-1-03-N	First	C101	On	Duplicate	10	TO-15 SIM	2/26/2019	0.13 U	0.066 U	0.13 U	0.22 U	**0.13 J**	0.66 U	0.085 U
510	19M510-A-01	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	0.0015 U	**0.076**	**0.15**	0.0014 U	N/A
555	19M555-1-01-F	First	112	Off	Work Area	8	TO-15 SIM	2/24/2019	**0.079 J**	0.060 U	**0.72**	0.21 U	**2.1**	0.60 U	0.078 U
555	19M555-1-01-N	First	112	On	Work Area	8	TO-15 SIM	2/28/2019	0.13 U	0.065 U	**0.076 J**	0.22 U	**0.29**	0.65 U	0.084 U
555	19M555-1-03-F	First	107A	Off	Work Area	8	TO-15 SIM	2/24/2019	**0.072 J**	0.061 U	**0.65**	0.21 U	**1.9**	0.61 U	0.079 U
555	19M555-1-03-N	First	107A	On	Work Area	8	TO-15 SIM	2/28/2019	0.13 U	0.064 U	**0.078 J**	0.22 U	**0.21**	0.64 U	0.082 U
555	19M555-A-01	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	0.0015 U	**0.028**	**0.034**	0.0014 U	N/A
566	19M566-1-01-F	First	111	Off	Work Area	8	TO-15 SIM	2/24/2019	0.031 U	0.031 U	0.031 U	**0.036 J**	**0.29**	0.031 U	0.031 U
566	19M566-1-01-N	First	111	On	Work Area	8	TO-15 SIM	2/28/2019	0.13 U	0.063 U	0.12 U	0.21 U	**0.16 J**	0.63 U	0.081 U
566	19M566-1-02-F	First	C103	Off	Work Area	8	TO-15 SIM	2/24/2019	0.03 U	0.03 U	0.03 U	**0.039**	**0.31**	**0.011 J**	0.03 U
566	19M566-1-02-N	First	C103	On	Work Area	8	TO-15 SIM	2/28/2019	0.13 U	0.065 U	0.13 U	0.22 U	**0.14 J**	0.65 U	0.084 U
567	19M567-1-01	First	107	NH	Work Area	168	TO-17	2/15/2019	**0.0099 J**	**0.011**	**0.01**	**0.033**	**1.2**	**0.019**	N/A
567	19M567-1-02	First	102	NH	Work Area	168	TO-17	2/15/2019	**0.013**	**0.024**	**0.017**	**0.035**	**2.8**	**0.024**	N/A
567	19M567-1-03	First	104	NH	Work Area	168	TO-17	2/15/2019	**0.015**	**0.052**	**0.024**	**0.034**	**1.6**	**0.025**	N/A
567	19M567-A-01	Ambient	N/A	NH	Ambient	168	TO-17	2/15/2019	0.0015 U	0.0016 U	0.0014 U	**0.029**	**0.067**	0.0013 U	N/A
N210	19N210-1-01-F	First	143	Off	Work Area	8	TO-15 SIM	2/24/2019	0.13 U	**0.074**	**0.28**	**0.091 J**	**1.9**	0.62 U	0.080 U
N210	19N210-1-02-F	First	C117A	Off	Work Area	8	TO-15 SIM	2/24/2019	0.12 U	**0.071**	**0.28**	**0.091 J**	**1.9**	**0.038 J**	0.078 U
N210	19N210-1-04-F	First	138E	Off	Work Area	8	TO-15 SIM	2/24/2019	0.13 U	0.062 U	**0.31**	**0.066 J**	**1.6**	0.62 U	**0.063 J**

TABLE 10
2019 ANNUAL VAPOR INTRUSION AIR MONITORING DATA

Analyte									1,1-DCA	1,1,-DCE	*cis*- 1,2-DCE	PCE	TCE	*trans*- 1,2-DCE	Vinyl Chloride
Indoor Commercial Screening Level (µg/m³)									6.0	700	210	2.0	**5.0**	210	2.0
Building	**Sample ID**	**Floor**	**Room**	**HVAC (on/off)**	**Sample Type**	**Sample Duration (hr)**	**Analytical Method**	**Sample Date**							
N210	19N210-1-05-F	First	146	Off	Work Area	8	TO-15 SIM	2/24/2019	0.13 U	**0.051 J**	**0.39**	**0.074 J**	**1.8**	0.62 U	0.080 U
N210	19N210-1-07-F	First	100A	Off	Work Area	8	TO-15 SIM	2/24/2019	0.13 U	**0.042 J**	**0.32**	**0.11 J**	**1.5**	0.62 U	**0.057 J**
N210	19N210-1-08-F	First	C10	Off	Work Area	8	TO-15 SIM	2/24/2019	0.12 U	**0.044 J**	**0.27**	**0.12 J**	**1.4**	0.61 U	**0.047 J**
N210	19N210-1-10-F	First	Near 033 & 036	Off	Work Area	8	TO-15 SIM	2/24/2019	0.13 U	**0.051 J**	**0.26**	**0.094 J**	**1.5**	0.62 U	**0.046 J**
N210	19N210-1-12-F	First	008	Off	Work Area	8	TO-15 SIM	2/24/2019	**0.038 J**	**0.052 J**	**0.44**	**0.080 J**	**2.0**	0.56 U	**0.068 J**
N210	19N210-C-11-F	Crawl Space	Crawl Space 008	Off	Pathway	8	TO-15 SIM	2/24/2019	**0.12 J**	**0.085**	**0.88**	**0.58**	**55**	**0.095 J**	**0.047 J**
N210	19N210-G-03-F	Grab	Near V101	Off	Duplicate	Grab	TO-15 SIM	2/24/2019	0.026 U	0.026 U	**0.16**	**0.15**	**0.079**	0.026 U	0.026 U
N210	19N310-G-03-F	Grab	Near V101	Off	Grab	Grab	TO-15 SIM	2/24/2019	0.029 U	0.029 U	**0.14**	**0.039**	**0.062**	0.029 U	0.029 U
N239	19N239-1-02-F	First	C104	Off	Work Area	10	TO-15 SIM	2/24/2019	0.03 U	0.03 U	0.03 U	**0.044**	**0.043**	**0.015 J**	0.03 U
N239	19N239-1-02-N	First	C104	On	Work Area	10	TO-15 SIM	2/15/2019	**0.011 J**	0.034 U	**0.041**	**0.03 J**	**0.11**	**0.041**	0.034 U
N239	19N239-1-03-F	First	191	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.01 J**	0.031 U	**0.019 J**	**0.054**	**0.064**	**0.018 J**	0.031 U
N239	19N239-1-03-N	First	191	On	Work Area	10	TO-15 SIM	2/15/2019	0.027 U	0.027 U	**0.046**	**0.033**	**0.13**	**0.024 J**	0.027 U
N239	19N239-1-05-F	First	138S	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.0097 J**	0.029 U	**0.014 J**	**0.049**	**0.057**	**0.015 J**	0.029 U
N239	19N239-1-05-N	First	138S	On	Work Area	10	TO-15 SIM	2/15/2019	0.026 U	0.026 U	**0.045**	**0.059**	**0.066**	**0.023 J**	0.026 U
N239	19N239-1-07-N	First	C101	On	Work Area	10	TO-15 SIM	2/15/2019	0.034 U	0.034 U	**0.026 J**	**0.026 J**	**0.064**	**0.022 J**	0.034 U
N239	19N239-1-08-N	First	C101	On	Work Area	10	TO-15 SIM	2/15/2019	0.032 U	0.032 U	**0.028 J**	**0.036 J**	**0.13**	**0.028 J**	0.032 U
N239	19N239-A-01-N	Ambient	N/A	On	Ambient	24	TO-15 SIM	2/15/2019	0.033 U	0.033 U	**0.016 J**	**0.033 J**	**0.045**	**0.017 J**	0.033 U
N239	19N239-B-01-F	Basement	53A	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.0089 J**	0.03 U	**0.1**	**0.049**	**0.33**	**0.02 J**	**0.013 J**
N239	19N239-B-01-N	Basement	53A	On	Work Area	10	TO-15 SIM	2/15/2019	0.025 U	0.025 U	**0.033**	**0.027 J**	**0.089**	**0.021 J**	0.025 U
N239	19N239-B-02-F	Basement	053	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.045**	0.025 U	**0.05**	**0.069**	**0.11**	**0.018 J**	0.025 U
N239	19N239-B-02-N	Basement	053	On	Work Area	10	TO-15 SIM	2/15/2019	0.03 U	0.03 U	**0.035 J**	**0.025 J**	**0.097**	**0.02 J**	0.03 U
N239	19N239-B-05-F	Basement	C001	Off	Work Area	10	TO-15 SIM	2/24/2019	0.031 U	0.031 U	**0.019 J**	**0.10**	**0.067**	**0.019 J**	0.031 U
N239	19N239-B-05-N	Basement	C001	On	Work Area	10	TO-15 SIM	2/15/2019	**0.0086 J**	0.025 U	**0.035**	**0.079**	**0.09**	**0.018 J**	0.025 U
N239	19N239-B-06-F	Basement	C002	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.011 J**	0.03 U	**0.022 J**	**0.10**	**0.081**	**0.012 J**	0.03 U
N239	19N239-B-06-N	Basement	C002	On	Work Area	10	TO-15 SIM	2/15/2019	0.025 U	0.025 U	**0.037**	**0.027 J**	**0.1**	**0.03 J**	0.025 U
N239	19N239-G-04-F	Grab	C001	Off	Pathway	Grab	TO-15 SIM	2/24/2019	0.028 U	0.028 U	**0.016 J**	**0.12**	**0.057**	**0.018 J**	0.028 U
N239	19N339-G-04-F	Grab	C001	Off	Duplicate	Grab	TO-15 SIM	2/24/2019	0.027 U	0.027 U	**0.018 J**	**0.18**	**0.063**	**0.019 J**	0.027 U
N239	19N239-G-05-F	Grab	C001	Off	Indoor Source	Grab	TO-15 SIM	2/24/2019	0.03 U	0.03 U	**0.017 J**	**0.22**	**0.087**	**0.02 J**	0.03 U
N239	19N339-G-05-F	Grab	C001	Off	Duplicate	Grab	TO-15 SIM	2/24/2019	0.028 U	0.028 U	**0.017 J**	**0.12**	**0.061**	**0.021 J**	0.028 U
N239A	19N239A-1-03-F	First	120	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.038**	**0.061**	**0.99**	**0.13**	**2.9**	**0.037**	**0.095**
N239A	19N239A-1-03-N	First	120	On	Work Area	10	TO-15 SIM	2/26/2019	0.12 U	0.058 U	0.12 U	0.20 U	**0.16**	0.58 U	0.075 U
N239A	19N239A-1-05-N	First	102	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.063 U	0.13 U	**2.9**	0.17 U	0.63 U	0.082 U
N239A	19N239A-1-06-F	First	C102	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.037 J**	0.087 U	0.087 U	**0.046 J**	**0.11**	0.087 U	0.087 U
N239A	19N239A-1-06-N	First	C102	On	Work Area	10	TO-15 SIM	2/26/2019	0.12 U	0.059 U	0.12 U	0.20 U	0.16 U	0.59 U	0.076 U
N239A	19N339A-1-06-N	First	C102	On	Duplicate	10	TO-15 SIM	2/26/2019	0.14 U	0.070 U	0.14 U	0.24 U	0.19 U	0.70 U	0.090 U
N239A	19N239A-1-08-F	First	125	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.034**	**0.059**	**0.96**	**0.087**	**2.8**	**0.041**	**0.092**
N239A	19N239A-1-08-N	First	125	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.063 U	0.12 U	0.21 U	**0.10 J**	0.63 U	0.081 U

TABLE 10
2019 ANNUAL VAPOR INTRUSION AIR MONITORING DATA

Analyte									1,1-DCA	1,1,-DCE	*cis*- 1,2-DCE	PCE	TCE	*trans*- 1,2-DCE	Vinyl Chloride
Indoor Commercial Screening Level (µg/m³)									6.0	700	210	2.0	**5.0**	210	2.0
Building	**Sample ID**	**Floor**	**Room**	**HVAC (on/off)**	**Sample Type**	**Sample Duration (hr)**	**Analytical Method**	**Sample Date**							
N239A	19N239A-1-09-F	First	144	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.026 J**	**0.038**	**0.61**	**0.1**	**1.7**	**0.035**	**0.059**
N239A	19N239A-1-09-N	First	144	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.064 U	**0.58**	0.22 U	**1.3**	0.64 U	**0.042 J**
N239A	19N339A-1-09-N	First	144	On	Duplicate	10	TO-15 SIM	2/26/2019	0.13 U	0.064 U	**0.72**	0.22 U	**1.5**	0.64 U	**0.058 J**
N239A	19N239A-1-10-F	First	U101	Off	Pathway	10	TO-15 SIM	2/24/2019	**0.013 J**	0.026 U	**0.052**	**0.053**	**0.097**	0.026 U	**0.038**
N239A	19N239A-1-10-N	First	U101	On	Pathway	10	TO-15 SIM	2/26/2019	0.13 U	0.065 U	0.13 U	0.22 U	0.18 U	0.65 U	0.083 U
N239A	19N239A-1-11-F	First	U102	Off	Pathway	10	TO-15 SIM	2/24/2019	**0.067 J**	0.13 U	**0.8**	**0.11 J**	**2.5**	0.13 U	**0.082 J**
N239A	19N239A-1-11-N	First	U102	On	Pathway	10	TO-15 SIM	2/26/2019	0.18 U	0.086 U	0.17 U	0.29 U	**0.23 J**	0.86 U	0.11 U
N239A	19N239A-B-01-F	Basement	Basement	Off	Pathway	10	TO-15 SIM	2/24/2019	**0.029 J**	**0.043**	**0.71**	**0.071**	**2.0**	**0.021 J**	**0.068**
N239A	19N239A-B-01-N	Basement	Basement	On	Pathway	10	TO-15 SIM	2/26/2019	0.13 U	0.062 U	0.12 U	0.21 U	**0.096 J**	0.62 U	0.080 U
N243	19N243-1-01-N	First	136	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.063 U	0.13 U	0.22 U	0.17 U	0.63 U	0.082 U
N243	19N343-1-01-N	First	136	On	Duplicate	10	TO-15 SIM	2/26/2019	0.13 U	0.065 U	0.13 U	0.22 U	0.18 U	0.65 U	0.084 U
N243	19N243-1-02-F	First	C104	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.012 J**	0.031 U	**0.082**	**0.42**	**0.33**	**0.017 J**	**0.013 J**
N243	19N243-1-02-N	First	C104	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.065 U	0.13 U	0.22 U	**0.094 J**	0.65 U	0.084 U
N243	19N243-A-02	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	0.0015 U	**0.036**	**0.031**	0.0014 U	N/A
N243	19N243-B-02-F	Basement	C002	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.0099 J**	**0.022 J**	**0.038**	**0.067**	**0.076**	0.031 U	0.031 U
N243	19N243-B-02-N	Basement	C002	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.065 U	0.13 U	0.22 U	0.18 U	0.65 U	0.084 U
N243	19N243-B-04-F	Basement	C008	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.011 J**	0.026 U	**0.092**	**0.55**	**0.31**	**0.018 J**	**0.018 J**
N243	19N243-B-04-N	Basement	C008	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.066 U	0.13 U	0.22 U	0.18 U	0.66 U	0.085 U
N243	19N243-B-06-F	Basement	050	Off	Work Area	10	TO-15 SIM	2/24/2019	**0.01 J**	**0.018 J**	**0.065**	**0.24**	**0.64**	**0.01 J**	0.028 U
N243	19N243-B-06-N	Basement	050	On	Work Area	10	TO-15 SIM	2/26/2019	0.12 U	0.061 U	**0.18**	**0.53**	**1.0**	0.61 U	0.079 U
N243	19N243-B-07-F	Basement	054	Off	Work Area	10	TO-15 SIM	2/24/2019	0.03 U	0.03 U	**0.022 J**	**0.099**	**0.16**	0.03 U	0.03 U
N243	19N243-B-07-N	Basement	054	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.064 U	**0.084 J**	**0.27**	**0.50**	0.64 U	0.083 U
N243	19N243-G-01-F	Basement	054	Off	Indoor Source	10	TO-15 SIM	2/24/2019	**0.014 J**	0.032 U	**0.046**	**0.12**	**0.21**	0.032 U	0.032 U
N243	19N343-G-01-F	Basement	054	Off	Duplicate	10	TO-15 SIM	2/24/2019	**0.022 J**	**0.022 J**	**0.62**	**0.11**	**18**	**0.042**	0.029 U
N243A	19N243A-1-01-F	First	104	Off	Work Area	10	TO-15 SIM	2/24/2019	0.10 U	0.052 U	**0.5**	**0.13 J**	**0.23**	0.52 U	**0.14**
N243A	19N243A-1-01-N	First	104	On	Work Area	10	TO-15 SIM	2/26/2019	0.14 U	0.070 U	**0.19**	0.24 U	**0.098 J**	0.70 U	**0.073 J**
N243A	19N343A-1-01-N	First	104	On	Duplicate	10	TO-15 SIM	2/26/2019	0.13 U	0.065 U	**0.19**	0.22 U	**0.096 J**	0.65 U	**0.074 J**
N243A	19N243A-1-02-F	First	101	Off	Work Area	10	TO-15 SIM	2/24/2019	0.12 U	0.059 U	**0.38**	**0.11 J**	**0.19**	0.59 U	**0.075 J**
N243A	19N243A-1-02-N	First	101	On	Work Area	10	TO-15 SIM	2/26/2019	0.13 U	0.062 U	**0.068 J**	0.21 U	0.17 U	0.62 U	0.080 U
N243A	19N243A-A-01	Ambient	N/A	On/Off	Ambient	168	TO-17	2/22/2019	0.0016 U	0.0018 U	0.0015 U	**0.047**	**0.055**	0.0014 U	N/A
N243A	19N243A-B-01-F	Basement	Basement	Off	Pathway	10	TO-15 SIM	2/24/2019	**0.018 J**	0.054 U	**0.18**	**0.091**	**0.10**	0.054 U	**0.028 J**
N243A	19N243A-B-01-N	Basement	Basement	On	Pathway	10	TO-15 SIM	2/26/2019	0.13 U	0.063 U	**0.18**	0.22 U	**0.088 J**	0.63 U	**0.045 J**

1,1-DCE = 1,1-dichloroethene
trans-1,2-DCE = *trans*-1,2-dichloroethene
1,1-DCA = 1,1-dichloroethane
cis-1,2-DCE = *cis*-1,2-dichloroethene
TCE = trichloroethene
PCE = tetrachloroethene
SIM = selected ion monitoring
HVAC = heating, ventilation, and air conditioning unit
NH = building does not have a HVAC
N/A = not applicable, vinyl chloride was not reported, because vinyl chloride is too volatile on passive samplers (i.e., sorbent Radiellos) and reliable data cannot be achieved.
U = not detected at or above the limit of detection
J = the result is an estimated concentration
$\mu g/m^3$ = micrograms per cubic meter
bold = detection
bold = Detections above ROD Indoor Commercial Screening Level.

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
2	M002-1-01	1	100	NH	Work Area	8 hr	5/18/2012	<0.014	<0.016	<0.015	<0.015	0.025 J	0.15	0.033 J
2	M002-1-02	1	107	NH	Work Area	8 hr	5/18/2012	<0.015	<0.017	<0.015	<0.015	0.012 J	0.049	0.066
2	M002-1-03	1	109	NH	Work Area	8 hr	5/18/2012	<0.015	<0.017	<0.016	<0.016	0.020 J	0.12	0.033 J
2	M002-1-04	1	104	NH	Pathway	8 hr	5/18/2012	<0.015	<0.017	<0.015	<0.015	0.022 J	0.34	0.033 J
2	13M002-G-04	1	104	NH	Pathway	Grab hr	5/17/2013	0.12	0.095	0.11	0.59	12	**11**	0.15
2	13M002-1-04	1	104	NH	Confirmation	8 hr	5/24/2013	<0.0078	<0.0086	<0.017	0.014 J	0.03 J	0.92	0.23
2	13M202-1-04	1	104	NH	Duplicate	8 hr	5/24/2013	<0.0081	<0.0089	<0.018	0.011 J	0.025 J	0.62	0.032 J
2	13M002-A-01	Ambient Air	NA	NH	Background	24 hr	5/24/2013	<0.0070	<0.0077	<0.015	0.022 J	0.04	0.091	0.031 J
2	14M002-1-02	1	107	NH	Work Area	8 hr	2/11/2014	<0.025	<0.028	0.017 J	<0.028	0.029 J	0.10	0.046
2	14M002-1-03	1	109	NH	Work Area	8 hr	2/11/2014	0.018 J	0.012 J	0.011 J	0.016 J	0.22	0.69	0.067
2	14M002-1-04	1	104	NH	Pathway	8 hr	2/11/2014	<0.029	<0.032	<0.032	<0.032	0.052	0.39	0.055
2	14M302-1-04	1	104	NH	Duplicate	8 hr	2/11/2014	<0.029	<0.032	<0.032	<0.032	0.052	0.41	0.055
2	16M002-1-02	1	107	NH	Work Area	8 hr	1/12/2016	0.037 U	0.039 U	0.057	0.039 U	0.045 J	0.13	0.084
2	16M002-1-03	1	109	NH	Work Area	8 hr	1/12/2016	0.044 J	0.036 J	0.063	0.043 J	0.35	1.0	0.086
2	16M302-1-04	1	104	NH	Duplicate	8 hr	1/12/2016	0.036 U	0.038 U	0.044 J	0.019 J	0.042 J	0.18	0.062
2	16M002-1-04	1	104	NH	Pathway	8 hr	1/12/2016	0.041 U	0.043 U	0.045 J	0.043 U	0.041 J	0.17	0.061
2	17M002-1-02	First	107	NH	Work Area	7h 48min	1/17/2017	0.029 U	0.03 U	0.044	0.029 U	0.043	0.25	0.082
2	17M002-1-03	First	109	NH	Work Area	7h 45min	1/17/2017	0.072	0.021 J	0.044	0.024 J	0.23	0.72	0.076
2	17M302-1-03	First	104	NH	Work Area	7h 42min	1/17/2017	0.052	0.018 J	0.054	0.024 J	0.19	0.60	0.088
2	17M002-1-04	First	104	NH	Work Area	7h 44min	1/17/2017	0.065 U	0.068 U	0.036 J	0.065 U	0.068 U	0.063 J	0.059 J
2	17M302-1-04	First	104	NH	Work Area	7h 44min	1/17/2017	0.03 U	0.032 U	0.026 J	0.011 J	0.016 J	0.091	0.067
2	18M002-1-02	First	107	NH	Work Area	8	1/9/2018	0.029 U	0.029 U	0.026 J	0.028 U	0.029 U	0.08	0.043
2	18M002-1-03	First	109	NH	Work Area	8	1/9/2018	0.033 U	0.033 U	0.029 J	0.01 J	0.051	0.38	0.046
2	18M002-1-04	First	104	NH	Work Area	8	1/9/2018	0.032 U	0.032 U	0.036 J	0.03 U	0.02 J	0.44	0.062
2	18M302-1-04	First	104	NH	Work Area	8	1/9/2018	0.033 U	0.033 U	0.027 J	0.031 U	0.02 J	0.42	0.059
2	19M002-1-02	First	107	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.056	0.032
2	19M002-1-03	First	109	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.16	0.038
2	19M002-1-04	First	104	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.15	0.039
2	19M302-1-04	First	104	NH	Duplicate	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.14	0.039
3	M003-1-01-N	1	105	On	Work Area	10 hr	5/18/2012	<0.018	<0.020	<0.018	0.0077J	0.048	0.59	0.032 J
3	M403-1-01-N	1	130	On	Duplicate	10 hr	5/18/2012	0.041	0.062	0.029 J	0.065	0.51	**7.6**	0.11
3	M003-1-02-N	1	C104	On	Work Area	10 hr	5/18/2012	<0.018	<0.020	<0.018	0.010 J	0.057	0.31	0.096
3	M003-1-03-N	1	104A	On	Work Area	10 hr	5/18/2012	0.011 J	<0.017	<0.016	<0.016	0.040 J	0.39	0.033 J
3	M003-1-04-N	1	122	On	Work Area	10 hr	5/18/2012	0.029 J	<0.018	<0.017	0.0091 J	0.054	0.33	0.032 J
3	M003-1-06-N	1	130	On	Pathway	10 hr	5/18/2012	0.043	0.066	0.035 J	0.065	0.53	**7.9**	0.12
3	M003-1-07-N	1	108	On	Work Area	10 hr	5/18/2012	0.12	0.023 J	0.011 J	0.025 J	0.22	2.7	0.056
3	M003-1-08-N	1	111	On	Work Area	10 hr	5/18/2012	0.012 J	<0.017	<0.016	<0.016	0.021J	0.12	0.032J
3	M003-1-09-N	1	128	On	Work Area	10 hr	5/18/2012	0.21	<0.016	0.0076 J	0.014 J	0.14	0.78	0.044
3	M003-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/18/2012	<0.013	<0.014	<0.013	0.006 J	0.04	0.14	0.081
3	M003-C-05-N	1	Crawl Space	On	Pathway	10 hr	5/18/2012	<0.029	<0.033	<0.030	<0.030	0.18	2.0	0.078
3	M003-1-01-F	1	105	Off	Work Area	10 hr	5/28/2012	<0.014	<0.016	<0.015	<0.015	0.036 J	0.39	0.021 J
3	M403-1-01-F	1	130	Off	Duplicate	10 hr	5/28/2012	0.014	<0.016	<0.015	0.018 J	0.12	1.2	0.09
3	M003-1-02-F	1	C104	Off	Work Area	10 hr	5/28/2012	<0.012	0.10	0.020 J	0.081	0.72	3.0	0.021 J
3	M003-1-03-F	1	104A	Off	Work Area	10 hr	5/28/2012	0.021 J	<0.017	<0.015	0.0063 J	0.031 J	0.25	0.066
3	M003-1-04-F	1	122	Off	Work Area	10 hr	5/28/2012	0.04	<0.017	<0.016	0.0076 J	0.038 J	0.18	0.020 J
3	M003-1-06-F	1	130	Off	Pathway	10 hr	5/28/2012	0.098 J	<0.020	<0.018	0.019 J	0.13	1.4	0.07
3	M003-1-07-F	1	108	Off	Work Area	10 hr	5/28/2012	0.06	0.029 J	0.0086 J	0.032 J	0.23	3.9	0.032 J
3	M003-1-08-F	1	111	Off	Work Area	10 hr	5/28/2012	0.20	0.022 J	<0.020	0.027 J	0.25	2.0	0.039J
3	M003-1-09-F	1	128	Off	Work Area	10 hr	5/28/2012	0.56	<0.017	<0.016	0.0087 J	0.045	0.22	0.073
3	M003-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/28/2012	<0.014	<0.016	<0.015	0.0086 J	0.063	0.24	0.094
3	M003-C-05-F	1	Crawl Space	Off	Pathway	10 hr	5/28/2012	<0.020	<0.023	<0.021	<0.021	0.12	1.8	0.053
3	13M003-G-05-N	1	Conduit 105	On	Pathway	Grab hr	5/17/2013	<0.0077	0.04	<0.017	0.054	0.16	2.7	0.026 J
3	13M003-G-06-N	1	Conduit 130	On	Pathway	Grab hr	5/17/2013	<0.0074	<0.0081	<0.016	0.025 J	<0.016	0.087	0.12
3	13M003-1-06-N	1	130	On	Confirmation	10 hr	5/24/2013	0.13	0.063	0.021 J	0.035 J	0.18	2.9	0.12
3	13M303-1-06-N	1	130	On	Duplicate	10 hr	5/24/2013	0.11	0.069	0.022 J	0.035	0.20	3.2	0.14
3	13M003-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/24/2013	<0.0076	<0.0083	<0.017	0.10	0.035 J	0.11	0.030 J
3	13M003-C-05-N	1	105	On	Confirmation	10 hr	5/24/2013	<0.0078	0.05	<0.017	0.27	0.15	2.2	0.036 J
3	13M003-1-06-F	1	130	Off	Confirmation	10 hr	5/26/2013	0.27	0.023 J	<0.017	0.019 J	0.075	0.92	0.058
3	13M303-1-06-F	1	130	Off	Duplicate	10 hr	5/26/2013	0.28	0.023 J	<0.018	0.018 J	0.075	0.92	0.061
3	13M003-C-05-F	1	105	Off	Confirmation	10 hr	5/26/2013	<0.0076	0.041	<0.017	0.083	0.11	1.5	0.021 J
3	13M003-G-05-F	1	Conduit 105	Off	Pathway	Grab hr	5/26/2013	<0.0078	0.046	<0.017	0.066	0.17	3.0	0.023 J
3	13M003-G-06-F	1	Conduit 130	Off	Pathway	Grab hr	5/26/2013	0.056	<0.0072	<0.014	0.038	0.017 J	0.15	0.026

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
3	13M003-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/27/2013	<0.0078	<0.0086	<0.017	0.013 J	0.021 J	0.069	0.016 J
3	13M303-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/27/2013	<0.0071	<0.0078	<0.016	0.061 J	0.022 J	0.074	0.019 J
3	14M003-1-01-N	1	105	On	Work Area	10 hr	2/12/2014	<0.031	<0.034	0.020 J	0.012 J	0.055	0.50	0.072
3	14M003-1-02-N	1	C104	On	Work Area	10 hr	2/12/2014	<0.030	0.024 J	0.019 J	0.024 J	0.13	0.94	0.10
3	14M003-1-03-N	1	104A	On	Work Area	10 hr	2/12/2014	<0.044	<0.048	<0.048	<0.048	0.030 J	0.27	0.088
3	14M003-1-04-N	1	122	On	Work Area	10 hr	2/12/2014	0.016 J	0.011 J	0.017 J	0.014 J	0.066	0.46	0.95
3	14M003-1-07-N	1	108	On	Work Area	10 hr	2/12/2014	0.047	0.032 J	0.017 J	0.023 J	0.089	1.7	0.22
3	14M303-1-07-N	1	108	On	Duplicate	10 hr	2/12/2014	0.046	0.031 J	0.020 J	0.022 J	0.087	1.6	0.22
3	14M003-1-08-N	1	111	On	Work Area	10 hr	2/12/2014	0.016 J	<0.031	0.013 J	<0.031	0.028 J	0.21	0.11
3	14M003-1-09-N	1	128	On	Work Area	10 hr	2/12/2014	0.10	<0.032	0.13 J	<0.032	0.038	0.21	0.19
3	14M003-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/13/2014	<0.023	<0.025	0.012 J	<0.025	0.053	0.18	0.051
3	14M003-1-01-F	1	105	Off	Work Area	10 hr	2/16/2014	<0.029	0.030 J	<0.032	0.026 J	0.093	1.5	0.038 J
3	14M003-1-02-F	1	C104	Off	Work Area	10 hr	2/16/2014	0.014 J	0.15	0.041	0.10	0.62	4.5	0.030 J
3	14M003-1-03-F	1	104A	Off	Work Area	10 hr	2/16/2014	<0.027	0.014 J	0.015 J	0.015 J	0.049	0.66	0.035 J
3	14M003-1-04-F	1	122	Off	Work Area	10 hr	2/16/2014	0.045	0.016 J	<0.030	0.013 J	0.043	0.35	0.025 J
3	14M003-1-06-F	1	130	Off	Pathway	10 hr	2/16/2014	0.05	0.045	0.015 J	0.038	0.13	1.7	0.09
3	14M303-1-06-F	1	130	Off	Duplicate	10 hr	2/16/2014	0.052	0.044 J	0.022 J	0.037 J	0.14	1.6	0.092
3	14M003-1-07-F	1	108	Off	Work Area	10 hr	2/16/2014	0.048	0.069	0.013 J	0.046	0.14	4.0	0.041
3	14M003-1-08-F	1	111	Off	Work Area	10 hr	2/16/2014	0.045	0.011 J	<0.035	0.011 J	0.039 J	0.51	0.028 J
3	14M003-1-09-F	1	128	Off	Work Area	10 hr	2/16/2014	0.38	0.016 J	<0.032	0.020 J	0.058	0.25	0.034 J
3	14M003-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/17/2014	<0.028	<0.031	<0.031	<0.031	0.053	0.058	0.44
3	16M003-1-01-N	1	105	On	Work Area	10 hr	1/12/2016	0.033 U	0.035 U	0.069	0.13	0.078	0.47	0.13
3	16M003-1-01-N	1	105	On	Work Area	10 hr	1/12/2016	0.033 U	0.035 U	0.069	0.13	0.078	0.47	0.13
3	16M003-1-02-N	1	C104	On	Work Area	10 hr	1/12/2016	0.031 U	0.033 U	0.11	0.011 J	0.041	0.31	0.11
3	16M003-1-03-N	1	104A	On	Work Area	10 hr	1/12/2016	0.013 J	0.033 U	0.061	0.016 J	0.064	0.39	0.11
3	16M003-1-04-N	1	122	On	Work Area	10 hr	1/12/2016	0.022 J	0.031 U	0.089	0.019 J	0.061	0.44	0.11
3	16M003-1-07-N	1	108	On	Work Area	10 hr	1/12/2016	0.037 J	0.037 U	0.061	0.014 J	0.076	0.85	0.11
3	16M303-1-07-N		108	On	Duplicate	10 hr	1/12/2016	0.037 J	0.035 U	0.061	0.012 J	0.074	0.87	0.11
3	16M003-1-08-N	1	111	On	Work Area	10 hr	1/12/2016	0.041 U	0.043 U	0.061	0.013 J	0.035 J	0.21	0.10
3	16M003-1-09-N	1	128	On	Work Area	10 hr	1/12/2016	0.041 J	0.039 U	0.062	0.039 U	0.040 J	0.15	0.098
3	16M003-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/13/2016	0.034 U	0.036 U	0.029 J	0.036 U	0.026 J	0.12	0.07
3	16M003-1-01-F	1	105	Off	Work Area	10 hr	1/17/2016	0.026 J	0.030 U	0.030 U	0.0089 J	0.020 J	0.22	0.042
3	16M003-1-02-F	1	C104	Off	Work Area	10 hr	1/17/2016	0.029 U	0.077	0.024 J	0.068	0.21	2.5	0.034 J
3	16M003-1-03-F	1	104A	Off	Work Area	10 hr	1/17/2016	0.058	0.034 U	0.034 U	0.028 J	0.030 J	0.46	0.054
3	16M003-1-04-F	1	122	Off	Work Area	10 hr	1/17/2016	0.033 U	0.035 U	0.035 U	0.035 U	0.020 J	0.32	0.046
3	16M003-1-06-F	1	130	Off	Pathway	10 hr	1/17/2016	0.030 J	0.12	0.014 J	0.056	0.27	**6.8**	0.087
3	16M303-1-06-F	1	130	Off	Duplicate	10 hr	1/17/2016	0.031 J	0.12	0.015 J	0.056	0.26	**6.6**	0.084
3	16M003-1-07-F	1	108	Off	Work Area	10 hr	1/17/2016	0.036 J	0.039	0.012 J	0.032 J	0.11	3.5	0.056
3	16M003-1-08-F	1	111	Off	Work Area	10 hr	1/17/2016	0.025 J	0.030 U	0.030 U	0.017 J	0.023 J	0.36	0.038
3	16M003-1-09-F	1	128	Off	Work Area	10 hr	1/17/2016	0.15	0.031 U	0.031 U	0.027 J	0.017 J	0.14	0.04
3	16M003-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/18/2016	0.031 U	0.033 U	0.033 U	0.033 U	0.033 U	0.038 J	0.037 J
3	17M003-1-01-N	First	Room 105	On	Work Area	10hr	1/10/2017	0.02 J	0.012 J	0.027 J	0.023 J	0.037	0.15	0.073
3	17M003-1-02-N	First	Room C100	On	Work Area	10hr	1/10/2017	0.03 U	0.032 U	0.032 U	0.03 U	0.016 J	0.23	0.045
3	17M003-1-03-N	First	Room 108A	On	Work Area	10hr	1/10/2017	0.016 J	0.034 U	0.034 U	0.015 J	0.021 J	0.19	0.055
3	17M003-1-04-N	First	Room 122	On	Work Area	10hr	1/10/2017	0.015 J	0.034 U	0.034 U	0.013 J	0.023 J	0.34	0.042
3	17M003-1-07-N	First	101B	On	Work Area	10hr	1/10/2017	0.023 J	0.033 U	0.033 U	0.031 U	0.023 J	0.26	0.047
3	17M303-1-07-N	First	101B	On	Duplicate	10hr	1/10/2017	0.023 J	0.034 U	0.034 U	0.033 U	0.023 J	0.26	0.048
3	17M003-1-08-N	First	111	On	Work Area	10hr	1/10/2017	0.017 J	0.029 U	0.029 U	0.014 J	0.046	0.79	0.05
3	17M003-1-09-N	First	128	On	Work Area	10hr	1/10/2017	0.029 J	0.034 U	0.034 U	0.032 U	0.034 U	0.096	0.046
3	17M003-A-01-N	Ambient	Ambient	On	Ambient	24hr	1/10/2017	0.026 U	0.027 U	0.027 U	0.014 J	0.027 U	0.087	0.039
3	17M003-1-01-F	First	105	Off	Work Area	9h 50min	1/16/2017	0.016 J	0.018 J	0.22	0.028 J	0.091	1.5	0.084
3	17M003-1-02-F	First	C104	Off	Work Area	9h 57min	1/16/2017	0.013 J	0.019 J	0.049	0.031 J	0.084	1.4	0.059
3	17M003-1-03-F	First	104A	Off	Work Area	9h 50min	1/16/2017	0.032 J	0.029 J	0.45	0.031 J	0.14	2.6	0.11
3	17M003-1-04-F	First	122	Off	Work Area	9h 58min	1/16/2017	0.043	0.013 J	0.06	0.035 J	0.071	1.7	0.058
3	17M003-1-06-F	First	130	Off	Work Area	10h	1/16/2017	0.11	0.033 U	0.029 J	0.016 J	0.052	0.66	0.084
3	17M303-1-06-F	First	130	Off	Work Area	10h	1/16/2017	0.10	0.03 U	0.028 J	0.016 J	0.047	0.73	0.047
3	17M003-1-07-F	First	108	Off	Work Area	9h 55min	1/16/2017	0.073	0.047	0.071	0.046	0.21	4.6	0.078
3	17M003-1-08-F	First	111	Off	Work Area	9h 54min	1/16/2017	0.052	0.044	0.067	0.044	0.20	4.5	0.081
3	17M003-1-09-F	First	128	Off	Work Area	9h 59min	1/16/2017	0.11	0.024 J	0.045	0.028 J	0.081	0.90	0.11
3	17M003-A-01-F	Ambient	NA	Off	Ambient	22h 15min	1/16/2017	0.025 U	0.026 U	0.034	0.025 U	0.023 J	0.087	0.058
3	18M003-1-01-N	First	105	On	Work Area	10	1/9/2018	0.016 J	0.031 U	0.046	0.011 J	0.07	0.39	0.11
3	18M003-1-02-N	First	C104	On	Work Area	10	1/9/2018	0.029 U	0.029 U	0.022 J	0.027 U	0.029 U	0.12	0.04

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
3	18M003-1-03-N	First	104A	On	Work Area	10	1/9/2018	0.03 U	0.03 U	0.019 J	0.029 U	0.03 U	0.18	0.042
3	18M003-1-04-N	First	122	On	Work Area	10	1/9/2018	0.014 J	0.028 U	0.022 J	0.012 J	0.018 J	0.27	0.05
3	18M003-1-07-N	First	108	On	Work Area	10	1/9/2018	0.016 J	0.033 J	0.027 J	0.037 J	0.089	2.1	0.064
3	18M303-1-07-N	First	108	On	Duplicate	10	1/9/2018	0.019 J	0.033	0.026 J	0.028 J	0.074	2.1	0.052
3	18M003-1-08-N	First	111	On	Work Area	10	1/9/2018	0.029 U	0.029 U	0.021 J	0.028 U	0.029 U	0.28	0.044
3	18M003-1-09-N	First	128	On	Work Area	10	1/9/2018	0.024 J	0.03 U	0.021 J	0.011 J	0.016 J	0.29	0.042
3	18M003-A-01-N	Ambient	NA	On	Ambient	24	1/9/2018	0.03 U	0.03 U	0.031 U	0.028 U	0.03 U	0.033 J	0.035 J
3	18M003-1-01-F	First	105	Off	Work Area	10	1/15/2018	0.031 U	0.013 J	0.063	0.016 J	0.06	0.85	0.088
3	18M003-1-02-F	First	C104	Off	Work Area	10	1/15/2018	0.026 J	0.023 J	0.074	0.024 J	0.082	1.8	0.086
3	18M003-1-03-F	First	104A	Off	Work Area	10	1/15/2018	0.036 J	0.035 J	0.088	0.034 J	0.12	2.2	0.10
3	18M003-1-04-F	First	122	Off	Work Area	10	1/15/2018	0.054	0.03 J	0.094	0.05	0.077	1.7	0.088
3	18M003-1-06-F	First	130	Off	Work Area	10	1/15/2018	0.054	0.045	0.085	0.11 J	0.14 J	2.7 J	0.11
3	18M303-1-06-F	First	130	Off	Duplicate	10	1/15/2018	0.031 U	0.031 U	0.079	0.038 J	0.029 J	0.11 J	0.13
3	18M003-1-07-F	First	108	Off	Work Area	10	1/15/2018	0.085	0.13	0.12	0.097	0.36	**9.8**	0.13
3	18M003-1-08-F	First	111	Off	Work Area	10	1/15/2018	0.026 J	0.025 J	0.069	0.028 J	0.091	1.9	0.092
3	18M003-1-09-F	First	128	Off	Work Area	10	1/15/2018	0.14	0.03 J	0.092	0.034 J	0.094	1.5	0.095
3	18M003-A-01-F	Ambient	NA	Off	Ambient	24	1/15/2018	0.05	0.04	0.077	0.04	0.12	2.3	0.10
3	18M003-1-06-F-R	First	130	Off	Resample	10	2/19/2018	0.03 U	0.03 U	0.032 U	0.018 J	0.042	1.6	0.062
3	18M003-1-07-F-R	First	108	Off	Resample	10	2/19/2018	0.015 J	0.092	0.021 J	0.065	0.19	**6.4**	0.049
3	18M003-1-06-N-R	First	130	On	Resample	10	2/21/2018	0.013 J	0.047	0.028 J	0.045	0.16	4.0	0.11
3	18M003-1-07-N-R	First	108	On	Resample	10	2/21/2018	0.014 J	0.028 J	0.021 J	0.022 J	0.064	1.9	0.041
3	19M003-A-01	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.0015 U	0.045	0.033
3	19M003-1-02-F	First	C104	Off	Work Area	10	2/24/2019	0.034 U	0.034 U	0.034 U	0.01 J	0.023 J	0.41	0.039 J
3	19M003-1-03-F	First	104A	Off	Work Area	10	2/24/2019	0.031	0.014 J	0.015 J	0.022 J	0.088	2.7	0.077
3	19M003-1-04-F	First	122	Off	Work Area	10	2/24/2019	0.039	0.026 U	0.014 J	0.024 J	0.054	1.2	0.049
3	19M003-1-06-F	First	130	Off	Work Area	10	2/24/2019	0.024 J	0.013 J	0.011 J	0.033	0.091	1.9	**5.9**
3	19M003-1-07-F	First	108	Off	Work Area	10	2/24/2019	0.019 J	0.012 J	0.017 J	0.031 J	0.088	1.9	0.1
3	19M003-1-09-F	First	128	Off	Work Area	10	2/24/2019	0.057	0.026 U	0.0099 J	0.016 J	0.051	0.87	0.17
3	19M003-1-09-N	First	128	On	Work Area	10	2/27/2019	0.046 J	0.065 U	0.65 U	0.13 U	0.13 U	0.77	0.22 U
3	19M003-1-04-N	First	122	On	Work Area	10	2/27/2019	0.079 U	0.061 U	0.61 U	0.12 U	0.12 U	0.32	0.21 U
3	19M003-1-02-N	First	C104	On	Work Area	10	2/27/2019	0.077 U	0.059 U	0.59 U	0.12 U	0.12 U	0.23	0.20 U
3	19M003-1-08-N	First	111	On	Work Area	10	2/27/2019	0.076 U	0.059 U	0.59 U	0.12 U	0.12 U	0.24	0.20 U
3	19M003-1-07-N	First	108	On	Work Area	10	2/27/2019	0.080 U	0.062 U	0.62 U	0.13 U	0.10 J	3.3	0.21 U
3	19M003-1-03-N	First	104A	On	Work Area	10	2/27/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.55	0.22 U
3	19M003-1-01-N	First	105	On	Work Area	10	2/27/2019	0.080 U	0.062 U	0.62 U	0.13 U	0.12 U	0.45	0.24
10	M010-1-01	1	101	NH	Work Area	8 hr	5/18/2012	<0.019	0.19	0.053	0.21	2.3	**8.0**	**5.4**
10	M310-1-01	Tunnel	Tunnel	NH	Duplicate	8 hr	5/18/2012	<0.54	21	6.0	**24**	**270**	**820**	**650**
10	M010-1-02	1	101	NH	Work Area	8 hr	5/18/2012	<0.014	0.20	0.059	0.22	2.6	**8.2**	**5.9**
10	M010-1-03	1	101	NH	Work Area	8 hr	5/18/2012	0.021 J	0.61	0.18	0.69	7.9	**26**	**19**
10	M010-1-05	1	102	NH	Work Area	8 hr	5/18/2012	0.0080 J	0.22	0.063	0.24	2.7	**8.9**	**6.3**
10	M010-1-06	1	N104	NH	Work Area	8 hr	5/18/2012	<0.014	0.076	0.020 J	0.068	0.87	4.0	1.2
10	M010-A-01	Ambient Air	NA	NH	Background	10 hr	5/18/2012	<0.014	<0.016	<0.015	0.0066 J	0.056	0.057	0.13
10	M010-T-04	Tunnel	Tunnel	NH	Pathway	8 hr	5/18/2012	<0.92	24	7.1	**28**	**310**	**960**	**770**
10	14M010-1-01	1	101	NH	Work Area	8 hr	2/11/2014	<0.028	0.037	0.011 J	0.022 J	0.17	1.4	0.069
10	14M010-1-02	1	101	NH	Work Area	8 hr	2/11/2014	<0.025	0.026 J	0.010 J	0.019 J	0.15	1.1	0.063
10	14M010-1-03	1	101	NH	Work Area	8 hr	2/11/2014	<0.030	0.025 J	0.010 J	0.018 J	0.13	1.0	0.12
10	14M010-1-05	1	102	NH	Work Area	8 hr	2/11/2014	<0.024	0.032	0.011 J	0.020 J	0.16	1.1	0.14
10	14M010-1-06	1	N104	NH	Work Area	8 hr	2/11/2014	<0.025	0.089	0.018 J	0.07	0.55	3.7	0.24
10	14M010-H-08	1	Floor Trench-N	NH	Work Area	8 hr	2/11/2014	<0.023	1.8	0.18	0.93	5.6	**46**	0.43
10	14M010-T-04	1	Floor Trench-S	NH	Pathway	8 hr	2/11/2014	0.016 J	1.4	0.14	0.78	5.0	**73**	0.79
10	14M010-T-09	1	Tunnel	NH	Work Area	8 hr	2/11/2014	<0.14	1.2	0.13 J	0.67	4.1	**34**	0.32
10	14M310-1-03	1	101	NH	Duplicate	24 hr	2/12/2014	<0.041	0.022 J	0.024 J	0.018 J	0.20	0.66	0.072
10	14M010-A-01	Ambient Air	NA	NH	Background	24 hr	2/12/2014	<0.024	<0.027	0.010 J	<0.027	0.13	0.043	0.04
10	16M010-1-01	1	101	NH	Work Area	8 hr	1/12/2016	0.034 U	0.021 J	0.053	0.024 J	0.093	1.1	0.11
10	16M010-1-02	1	101	NH	Work Area	8 hr	1/12/2016	0.032 U	0.015 J	0.055	0.025 J	0.08	1.1	0.12
10	16M010-1-03	1	101	NH	Work Area	8 hr	1/12/2016	0.035 U	0.018 J	0.051	0.019 J	0.077	1.3	0.11
10	16M310-1-03	1	101	NH	Duplicate	8 hr	1/12/2016	0.030 U	0.014 J	0.056	0.015 J	0.062	0.88	0.11
10	16M010-1-05	1	102	NH	Work Area	8 hr	1/12/2016	0.044 U	0.046 U	0.055	0.015 J	0.061	0.86	0.11
10	16M010-1-06	1	N104	NH	Work Area	8 hr	1/12/2016	0.032 U	0.020 J	0.061	0.04	0.13	1.1	0.14
10	16M010-A-01	Ambient Air	NA	NH	Background	24 hr	1/13/2016	0.032 U	0.034 U	0.030 J	0.034 U	0.015 J	0.056	0.068
10	M010-1-03	Quarterly	102	NH	Work Area	7day	11/30/2016	**	0.0048 J	0.014	0.0055 J	0.031	1.9	0.11
10	M010-1-07	Quarterly	Exhaust	NH	Work Area	7day	11/30/2016	**	0.0025 J	0.014	0.0015 U	0.0094 J	0.2	0.085

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
10	M010-1-10	Quarterly	103	NH	Work Area	7day	11/30/2016	**	0.0043 J	0.014	0.0042 J	0.029	1.2	0.079
10	M310-1-10	Quarterly	103	NH	Work Area	7day	11/30/2016	**	0.0032 J	0.014	0.0041 J	0.026	1.2	0.076
10	17M010-1-01	First	101	NH	Work Area	8hr	1/12/2017	0.023 U	0.034	0.029 J	0.037	0.38	2.6	0.068
10	17M010-1-02	First	101	NH	Work Area	8hr	1/12/2017	0.025 U	0.031 J	0.026 J	0.042	0.35	2.4	0.064
10	17M010-1-03	First	101	NH	Work Area	8hr	1/12/2017	0.028 U	0.025 J	0.022 J	0.028 U	0.28	1.9	0.064
10	17M310-1-03	First	101	NH	Work Area	8hr	1/12/2017	0.027 U	0.025 J	0.023 J	0.03 J	0.28	1.9	0.056
10	17M010-1-05	First	102	NH	Work Area	8hr	1/12/2017	0.027 U	0.046	0.027 J	0.042	0.27	2.5	0.069
10	17M010-1-06	First	N104	NH	Work Area	8hr	1/12/2017	0.027 U	0.029 U	0.017 J	0.023 J	0.088	0.65	0.042
10	17M010-1-07	Outdoor	Exhaust	NH	Work Area	8hr	1/12/2017	0.027 U	0.028 U	0.012 J	0.027 U	0.028 U	0.037	0.028 J
10	17M010-1-10	First	103	NH	Work Area	8hr	1/12/2017	0.029 U	0.15	0.048	0.18	2.0	**11**	0.10
10	17M310-1-10	First	103	NH	Work Area	8hr	1/12/2017	0.027 U	0.14	0.054	0.13	1.9	**11**	0.10
10	17M010-A-01	Ambient	NA	NH	Ambient	24hr 24min	1/12/2017	0.025 U	0.026 U	0.071	0.025 U	0.015 J	0.061	0.043
10	18M010-A-01-18Q1	Ambient	NA	NH	Ambient	24	1/16/2018	0.029 U	0.029 U	0.041	0.013 J	0.015 J	0.077	0.08
10	18M010-1-01-18Q1	First	101	NH	Work Area	8	1/17/2018	0.027 U	0.027 U	0.036	0.0091 J	0.03 J	0.46	0.073
10	18M010-1-02-18Q1	First	101	NH	Work Area	8	1/17/2018	0.027 U	0.027 U	0.037	0.0095 J	0.028 J	0.47	0.14
10	18M010-1-03-18Q1	First	101	NH	Work Area	8	1/17/2018	0.027 U	0.027 U	0.036	0.0081 J	0.024 J	0.40	0.081
10	18M310-1-03-18Q1	First	101	NH	Duplicate	8	1/17/2018	0.025 U	0.025 U	0.04	0.0096 J	0.038 J	0.48	0.089
10	18M010-1-05-18Q1	First	102	NH	Work Area	8	1/17/2018	0.027 U	0.027 U	0.042	0.026 U	0.025 J	0.35	0.10
10	18M010-1-06-18Q1	First	N104	NH	Work Area	8	1/17/2018	0.025 U	0.025 U	0.042	0.015 J	0.044	0.44	0.19
10	18M010-1-07-18Q1	First	Exhaust	NH	Work Area	8	1/17/2018	0.028 U	0.028 U	0.038	0.027 U	0.022 J	0.09	0.08
10	18M010-1-10-18Q1	First	103	NH	Work Area	8	1/17/2018	0.028 U	0.018 J	0.043	0.014 J	0.062	0.98	0.11
10	18M310-1-10-18Q1	First	103	NH	Duplicate	8	1/17/2018	0.026 U	0.017 J	0.042	0.016 J	0.056	0.79	0.082
10	19M010-1-01-19Q1	First	101	NH	Work Area	168	2/15/2019	N/A	0.0094 J	0.01	0.0092 J	0.11	2.8	0.049
10	19M010-1-02-19Q1	First	101	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.063	1.7	0.045
10	19M010-1-03-19Q1	First	101	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.054	1.7	0.046
10	19M310-1-03-19Q1	First	101	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.063	1.8	0.047
10	19M010-1-05-19Q1	First	102	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0094 J	0.0015 U	0.075	2.2	0.045
10	19M010-1-06-19Q1	First	N104	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.074	1.6	0.049
10	19M010-1-07-19Q1	First	Exhaust	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.032	0.44	0.038
10	19M010-1-10-19Q1	First	103	NH	Work Area	168	2/15/2019	N/A	0.013	0.011	0.011	0.11	4.6	0.044
10	19M310-1-10-19Q1	First	103	NH	Duplicate	168	2/15/2019	N/A	0.01	0.011	0.011	0.11	4.8	0.053
10	19M010-A-01-19Q1	Ambient	N/A	NH	Ambient	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.015	0.26	0.031
12	M012-1-01-N	1	109D	On	Work Area	24 hr	5/21/2012	<0.015	0.022 J	<0.015	<0.015	0.029 J	0.20	0.27 J
12	M412-1-01-N	1	109D	On	Duplicate	24 hr	5/21/2012	<0.016	0.021 J	<0.017	<0.017	0.027 J	0.20	0.13 J
12	M012-1-02-N	1	109	On	Work Area	24 hr	5/21/2012	<0.015	0.018 J	<0.015	<0.015	0.030 J	0.20	0.081
12	M012-1-03-N	1	119	On	Work Area	24 hr	5/21/2012	<0.015	<0.017	<0.015	<0.015	<0.015	0.017 J	0.46
12	M012-2-01-N	2	214	On	Work Area	24 hr	5/21/2012	<0.014	<0.016	<0.014	<0.014	0.010 J	0.053	0.058
12	M012-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/21/2012	<0.014	<0.015	<0.014	<0.014	<0.014	0.014 J	0.21
12	M012-C-04-N	1	Crawl Space	On	Pathway	24 hr	5/21/2012	<0.031	<0.035	<0.032	<0.032	0.094	1.4	0.082
12	M012-C-05-N	1	Crawl Space	On	Pathway	24 hr	5/21/2012	<0.026	0.053 J	0.034J	0.079	0.48	**6.1**	0.12
12	M012-1-01-F	1	109D	Off	Work Area	24 hr	5/27/2012	<0.015	<0.017	<0.016	0.0067 J	0.022 J	0.16	0.088
12	M012-1-02-F	1	109	Off	Work Area	24 hr	5/27/2012	<0.016	<0.018	<0.016	<0.016	0.018 J	0.094	0.12
12	M012-1-03-F	1	119	Off	Work Area	24 hr	5/27/2012	<0.016	<0.018	<0.016	<0.016	0.0098 J	0.019 J	0.15
12	M012-2-01-F	2	214	Off	Work Area	24 hr	5/27/2012	<0.015	<0.017	<0.016	<0.016	0.020 J	0.062	0.032 J
12	M012-C-04-F	1	Crawl Space	Off	Pathway	24 hr	5/27/2012	<0.030	<0.035	<0.031	<0.031	0.43	3.7	0.33
12	M012-C-05-F	1	Crawl Space	Off	Pathway	24 hr	5/27/2012	<0.031	<0.035	<0.032	0.035 J	0.086	0.74	0.050 J
12	13M012-G-04-N	1	Conduit C102	On	Pathway	Grab hr	5/17/2013	<0.0079	<0.0087	<0.017	0.037 J	0.11	1.8	0.045
12	13M012-G-05-N	1	Conduit 110	On	Pathway	Grab hr	5/17/2013	ND	ND	ND	0.0192 J	ND	0.267	0.0342 J
12	13M012-1-01-N	1	109D	On	Work Area	24 hr	5/24/2013	<0.0080	0.010 J	<0.017	0.021 J	0.025 J	0.20	0.05
12	13M412-1-01-N (Dup)	1	109D	On	Duplicate	24 hr	5/24/2013	<0.0072	0.0094 J	<0.016	0.015 J	0.024 J	0.20	0.056
12	13M012-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/24/2013	<0.0067	<0.0073	<0.015	0.024 J	0.013 J	0.059	0.026 J
12	13M012-C-04-N	1	C102	On	Confirmation	24 hr	5/24/2013	<0.0075	0.026 J	<0.016	0.039	0.065	0.89	0.032 J
12	13M012-C-05-N	1	110	On	Confirmation	24 hr	5/24/2013	<0.0080	0.034 J	0.023 J	0.062	0.24	3.0	0.028 J
12	13M012-G-04-F	1	Conduit C102	Off	Pathway	Grab hr	5/26/2013	<0.0069	<0.0076	<0.015	0.059	0.026 J	0.049	0.032 J
12	13M012-G-05-F	1	Conduit 110	Off	Pathway	Grab hr	5/26/2013	<0.0068	0.018 J	<0.015	0.066 J	0.12	1.5	0.024 J
12	13N312-G-05-F	1	Conduit 110	Off	Duplicate	24 hr	5/26/2013	<0.0065	0.020 J	<0.014	0.029 J	0.13	1.8	0.025 J
12	13M012-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/27/2013	<0.0060	<0.0066	<0.013	0.0074 J	<0.013	0.056	0.020 J
12	13M012-C-04-F	1	C102	Off	Confirmation	24 hr	5/27/2013	<0.029	<0.031	<0.063	<0.030	<0.063	0.41	0.030 J
12	13M012-C-05-F	1	110	Off	Confirmation	24 hr	5/27/2013	<0.043	<0.047	<0.095	0.24	0.23	2.6	0.037 J
12	14M012-1-01-N	1	109D	On	Work Area	24 hr	2/13/2014	<0.029	0.013 J	0.016 J	<0.032	0.057	0.28	0.087
12	14M012-1-02-N	1	109	On	Work Area	8 hr	2/13/2014	<0.029	0.011 J	0.014 J	<0.032	0.059	0.25	0.092
12	14M012-1-03-N	1	119	On	Work Area	8 hr	2/13/2014	<0.031	<0.034	0.014 J	<0.034	0.047	0.074	0.058

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
12	14M012-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/13/2014	<0.028	<0.031	0.015 J	<0.031	0.055	0.081	0.056
12	14M012-C-05-N	1	Crawl Space	On	Pathway	8 hr	2/13/2014	0.010 J	0.091	0.046	0.089	0.30	**6.0**	0.056
12	14M012-1-01-F	1	109D	Off	Work Area	24 hr	2/18/2014	<0.036	0.017 J	0.016 J	0.013 J	0.1	0.46	0.07
12	14M012-1-02-F	1	109	Off	Work Area	24 hr	2/18/2014	<0.027	0.014 J	0.012 J	0.012 J	0.096	0.38	0.083
12	14M012-1-03-F	1	119	Off	Work Area	24 hr	2/18/2014	<0.027	<0.029	<0.029	<0.029	0.077	0.13	0.051
12	14M012-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/18/2014	<0.035	<0.038	<0.038	<0.038	0.082	0.078	0.046
12	14M012-C-05-F	1	Crawl Space	Off	Pathway	24 hr	2/18/2014	<0.028	0.075	0.038	0.079	0.27	**6.1**	0.046
12	14M312-C-05-F	1	Crawl Space	Off	Duplicate	24 hr	2/18/2014	<0.028	0.064	0.036 J	0.07	0.31	**5.2**	0.046
12	17M012-1-01-N	First	109D	On	Work Area	24h	1/10/2016	0.031 U	0.033 U	0.033 U	0.031 U	0.015 J	0.17	0.063
12	17M012-1-03-N	First	119	On	Work Area	24h	1/10/2016	0.027 U	0.028 U	0.028 U	0.027 U	0.014 J	0.068	0.061
12	17M012-A-01-N	Ambient	Ambient	On	Ambient	24h	1/10/2016	0.025 U	0.027 U	0.027 U	0.025 U	0.027 U	0.086	0.034
12	17M012-1-02-N	First	109	On	Work Area	23h 50min	1/12/2016	0.025 U	0.026 U	0.061	0.013 J	0.061	0.37	0.083
12	17M012-C-05-N	Crawl Space	Pathway under 110	On	Crawl Space	23h 50min	1/12/2016	0.012 J	0.022 J	0.017 J	0.042	0.30	1.8	0.03 J
12	16M012-1-01-N	1	109D	On	Work Area	24 hr	1/14/2016	0.032 U	0.034 U	0.051	0.011 J	0.027 J	0.24	0.078
12	16M012-1-02-N	1	109	On	Work Area	24 hr	1/14/2016	0.034 U	0.036 U	0.036 J	0.036 U	0.027 J	0.19	0.079
12	16M012-1-03-N	1	119	On	Work Area	25 hr	1/14/2016	0.029 U	0.030 U	0.041	0.030 U	0.027 J	0.071	0.056
12	16M012-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/14/2016	0.027 U	0.028 U	0.027 J	0.028 U	0.024 J	0.074	0.042
12	16M012-C-05-N	1	Crawl Space	On	Pathway	24 hr	1/14/2016	0.032 U	0.046	0.081	0.19	0.12	4.2	0.047
12	16M012-1-02-F	1	109	Off	Work Area	24 hr	1/19/2016	0.030 U	0.014 J	0.018 J	0.012 J	0.036 J	0.16	0.13
12	16M012-1-03-F	1	119	Off	Work Area	24 hr	1/19/2016	0.031 U	0.033 U	0.022 J	0.033 U	0.043	0.11	0.081
12	16M012-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/19/2016	0.031 U	0.033 U	0.021 J	0.025 J	0.038 J	0.079	0.098
12	16M012-C-05-F	1	Crawl Space	Off	Pathway	24 hr	1/19/2016	0.030 U	0.078	0.089	0.12	0.18	**7.1**	0.062
12	16M312-C-05-F	1	Crawl Space	Off	Duplicate	24 hr	1/19/2016	0.032 U	0.069	0.11	0.11	0.17	**7.2**	0.081
12	17M012-1-01-F	First	109D	Off	Work Area	23h 45min	1/15/2017	0.037 U	0.039 U	0.77	0.02 J	0.069	0.65	0.14
12	17M012-1-02-F	First	109	Off	Work Area	23h 44min	1/15/2017	0.053 U	0.056 U	0.11	0.053 U	0.041 J	0.31	0.076
12	17M012-1-03-F	First	109	Off	Work Area	23h 46min	1/15/2017	0.025 U	0.026 U	0.079	0.025 U	0.019 J	0.06	0.089
12	17M312-1-03-F	First	109	Off	Work Area	23h 45min	1/15/2017	0.03 U	0.032 U	0.45	0.03 U	0.019 J	0.062	0.11
12	17M012-A-01-F	Ambient	NA	Off	Ambient	23h 47min	1/15/2017	0.027 U	0.028 U	0.079	0.0095 J	0.02 J	0.097	0.069
12	17M012-C-05-F	Crawl Space	Crawl Space	Off	Crawl Space	23h 50min	1/15/2017	0.14	0.015 J	0.20	0.025 J	0.15	0.98	0.063
12	18M012-1-01-N	First	109D	On	Work Area	24	1/9/2018	0.033 U	0.033 U	0.034 U	0.0099 J	0.033 U	0.21	0.11
12	18M012-1-02-N	First	109	On	Work Area	24	1/9/2018	0.032 U	0.032 U	0.033 J	0.016 J	0.032 U	0.18	0.10
12	18M012-1-03-N	First	101	On	Work Area	24	1/9/2018	0.03 U	0.03 U	0.011 J	0.029 U	0.03 U	0.02 J	0.035 J
12	18M012-A-01-N	Ambient	NA	On	Ambient	24	1/9/2018	0.03 U	0.03 U	0.013 J	0.029 U	0.03 U	0.062	0.033 J
12	18M012-C-05-N	Crawl Space	Crawl Space	On	Crawl Space	24	1/9/2018	0.029 J	0.03 J	0.032 J	0.05	0.14	2.4	0.053
12	18M012-1-01-F	First	109D	Off	Work Area	24	1/16/2018	0.031 U	0.014 J	0.15	0.021 J	0.018 J	0.34	0.18
12	18M012-1-02-F	First	109	Off	Work Area	24	1/16/2018	0.032 U	0.032 U	0.13	0.03 U	0.015 J	0.20	0.17
12	18M012-1-03-F	First	101	Off	Work Area	24	1/16/2018	0.03 U	0.03 U	0.045	0.01 J	0.014 J	0.05	0.071
12	18M312-1-03-F	First	101	Off	Work Area	24	1/16/2018	0.028 U	0.028 U	0.046	0.027 U	0.014 J	0.05	0.076
12	18M012-A-01-F	Ambient	NA	Off	Ambient	24	1/16/2018	0.028 U	0.028 U	0.12	0.027 U	0.015 J	0.079	0.074
12	18M012-C-05-F	Crawl Space	Crawl Space	Off	Crawl Space	24	1/16/2018	0.027 U	0.034	0.11	0.094	0.10	**7.3**	0.089
12	18M012-1-04-F-R	First	109F	Off	Resample	24	2/19/2018	0.03 U	0.021 J	0.044	0.013 J	0.029 J	0.77	0.11
12	18M312-1-04-F-R	First	109F	Off	Duplicate	24	2/19/2018	0.027 U	0.019 J	0.043	0.013 J	0.028 J	0.74	0.12
12	18M012-C-05-F-R	Crawl Space	Crawl Space	Off	Resample	24	2/19/2018	0.062	0.013 J	0.037	0.026 J	0.034 J	2.2	0.032 J
12	18M012-1-04-N-R	First	109F	On	Resample	24	2/21/2018	0.031 U	0.031 U	0.016 J	0.03 U	0.031 U	0.23	0.075
12	18M312-1-04-N-R	First	109F	On	Duplicate	24	2/21/2018	0.03 U	0.03 U	0.017 J	0.01 J	0.03 U	0.21	0.11
12	18M012-C-05-N-R	Crawl Space	Crawl Space	On	Resample	24	2/21/2018	0.096	0.014 J	0.031 J	0.046	0.029 J	1.0	0.31
12	19M012-A-01	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.0015 U	0.065	0.03
12	19M012-1-02-F	First	109	Off	Work Area	10	2/25/2019	0.081 U	0.063 U	0.63 U	0.13 U	0.13 U	0.18	0.22 U
12	19M012-1-01-F	First	109D	Off	Work Area	10	2/25/2019	0.080 U	0.062 U	0.62 U	0.13 U	0.12 U	0.22	0.21 U
12	19M012-1-04-F	First	109F	Off	Work Area	10	2/25/2019	0.079 U	0.061 U	0.61 U	0.12 U	0.12 U	0.18	0.21 U
12	19M012-1-03-F	First	101	Off	Work Area	10	2/25/2019	0.077 U	0.059 U	0.59 U	0.12 U	0.12 U	0.16 U	0.20 U
12	19M012-C-05-F	Crawl Space	Crawl Space	Off	Pathway	10	2/25/2019	0.081 U	0.063 U	0.63 U	0.13 U	0.12 U	0.46	0.21 U
12	19M012-1-02-N	First	109	On	Work Area	10	2/27/2019	0.081 U	0.063 U	0.63 U	0.13 U	0.13 U	0.098 J	0.22 U
12	19M012-1-01-N	First	109D	On	Work Area	10	2/27/2019	0.079 U	0.061 U	0.61 U	0.12 U	0.12 U	0.092 J	0.21 U
12	19M012-1-04-N	First	109	On	Work Area	10	2/27/2019	0.078 U	0.060 U	0.60 U	0.12 U	0.12 U	0.096 J	0.21 U
12	19M012-1-03-N	First	101	On	Work Area	10	2/27/2019	0.073 U	0.057 U	0.57 U	0.12 U	0.11 U	0.072 J	0.19 U
12	19M012-C-05-N	Crawl Space	Crawl Space	On	Pathway	10	2/27/2019	0.098 U	0.076 U	0.76 U	0.16 U	0.15 U	0.35	0.26 U
13	M013-1-01	1	103	NH	Work Area	24 hr	5/27/2012	<0.018	<0.020	<0.018	<0.018	0.021 J	0.093	0.024 J
13	M313-1-01	1	103	NH	Duplicate	24 hr	5/27/2012	<0.016	<0.018	<0.016	<0.016	0.025 J	0.099	0.18 J
13	M013-1-02	1	102	NH	Work Area	24 hr	5/27/2012	<0.013	<0.015	<0.013	0.0063 J	0.12	0.32	0.15
13	14M013-1-01	1	103	NH	Work Area	24 hr	2/18/2014	<0.027	<0.029	0.0091 J	0.011 J	0.21	0.39	0.057
13	14M013-1-02	1	102	NH	Work Area	24 hr	2/18/2014	<0.026	<0.029	<0.029	<0.029	0.11	0.19	0.046

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
13	14M013-A-01	Ambient Air	NA	NH	Background	24 hr	2/18/2014	<0.032	<0.035	<0.035	<0.035	0.066	0.061	0.043
13	16M013-1-01	1	103	NH	Work Area	24 hr	1/14/2016	0.033 U	0.035 U	0.034 J	0.016 J	0.031 J	0.077	0.053
13	16M013-1-02	1	102	NH	Work Area	24 hr	1/14/2016	0.026 U	0.027 U	0.04	0.071	0.22	0.46	0.056
13	16M013-A-01	Ambient Air	NA	NH	Background	24 hr	1/14/2016	0.030 U	0.031 U	0.030 J	0.023 J	0.018 J	0.055	0.038
13	17M013-1-01	First	103	NH	Work Area	23h 49min	1/18/2017	0.024 U	0.025 U	0.015 J	0.012 J	0.019 J	0.038	0.037
13	17M013-1-02	First	102	NH	Work Area	23h 49min	1/18/2017	0.028 U	0.029 U	0.029 U	0.028 U	0.013 J	0.049	0.034 J
13	17M313-1-02	First	102	NH	Work Area	23h 48min	1/18/2017	0.028 U	0.03 U	0.03 U	0.028 U	0.03 U	0.039	0.032 J
13	17M013-A-01	Ambient	NA	NH	Ambient	23h 49min	1/18/2017	0.028 U	0.03 U	0.03 U	0.028 U	0.03 U	0.042	0.03 J
13	18M013-1-01	First	103	NH	Work Area	24	1/16/2018	0.029 U	0.029 U	0.045	0.028 U	0.057	0.15	0.13
13	18M013-1-02	First	102	NH	Work Area	24	1/16/2018	0.03 U	0.03 U	0.048	0.029 U	0.015 J	0.059 J	0.076 J
13	18M313-1-02	First	102	NH	Duplicate	24	1/16/2018	0.031 U	0.031 U	0.045	0.029 U	0.054	0.12 J	0.19 J
13	18M013-A-01	Ambient	NA	NH	Ambient	24	1/16/2018	0.03 U	0.03 U	0.044	0.029 U	0.03 U	0.045	0.12
13	19M013-1-01	First	103	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.035	0.25	0.16
13	19M013-1-02	First	102	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.082	0.035
14	M314-1-01	1	Unoccupied Office	NH	Duplicate	8 hr	6/12/2012	<0.015	<0.017	0.014 J	<0.016	0.049	0.44	0.080 J
14	M014-1-03	1	Demo Room	NH	Work Area	8 hr	6/12/2012	<0.014	<0.016	<0.014	<0.014	0.0095 J	0.028 J	0.12
14	M014-1-04	1	Workshop	NH	Work Area	8 hr	6/12/2012	<0.016	<0.019	0.058	<0.017	<0.017	0.024 J	0.06
14	M014-1-05	1	Offices	NH	Work Area	8 hr	6/12/2012	<0.016	<0.018	0.064	<0.017	<0.017	0.020 J	0.042
14	M014-1-06	1	Unoccupied Office	NH	Work Area	8 hr	6/12/2012	<0.016	<0.018	<0.016	<0.016	0.05	0.46	0.086
14	M014-1-07	1	Unoccupied Office	NH	Work Area	8 hr	6/12/2012	<0.019	<0.022	0.032 J	<0.020	0.050 J	0.46	0.11 J
14	M014-C-01	1	Crawl Space	NH	Pathway	8 hr	6/12/2012	<0.061	<0.069	<0.063	<0.063	0.22	1.8	0.079 J
14	M014-C-02	1	Crawl Space	NH	Pathway	8 hr	6/12/2012	<0.065	<0.073	<0.067	<0.067	0.27	2.3	0.045 J
14	14M014-1-03	1	Demo Room	NH	Work Area	8 hr	2/12/2014	<0.027	<0.030	<0.030	<0.030	0.014 J	0.05	0.053
14	14M014-1-04	1	Workshop	NH	Work Area	8 hr	2/12/2014	<0.034	<0.038	<0.038	<0.038	0.016 J	0.16	0.052
14	14M014-1-05	1	Offices	NH	Work Area	8 hr	2/12/2014	<0.029	<0.032 J	0.011 J	<0.032 J	0.022 J	0.28	0.058
14	14M314-1-05	1	Offices	NH	Duplicate	8 hr	2/12/2014	<0.029	0.011 J	0.012 J	0.020 J	0.044 J	0.29	0.06
14	14M014-C-01	1	Crawl Space	NH	Pathway	8 hr	2/12/2014	<0.031	0.041	0.019 J	0.041	0.078	1.5	0.052
14	14M014-C-02	1	Crawl Space	NH	Pathway	8 hr	2/12/2014	<0.029	0.11	0.029 J	0.066	0.17	4.5	0.057
14	16M014-1-03-N	1	Dem. Room	On	Work Area	8 hr	1/13/2016	0.031 U	0.032 U	0.020 J	0.032 U	0.032 U	0.026 J	0.055
14	16M014-1-04-N	1	Workshop	On	Work Area	8 hr	1/13/2016	0.032 U	0.034 U	0.020 J	0.034 U	0.034 U	0.026 J	0.027 J
14	16M014-1-05-N	1	Offices	On	Work Area	8 hr	1/13/2016	0.032 U	0.034 U	0.018 J	0.034 U	0.034 U	0.085	0.044
14	16M314-1-05-N	1	Offices	On	Duplicate	8 hr	1/13/2016	0.033 U	0.035 U	0.019 J	0.035 U	0.035 U	0.086	0.045
14	16M014-C-01-N	1	Crawl Space	NH	Pathway	8 hr	1/13/2016	0.036 U	0.030 J	0.058	0.12	0.07	1.6	0.035 J
14	16M014-C-02-N	1	Crawl Space	NH	Pathway	8 hr	1/13/2016	0.029 U	0.07	0.081	0.063	0.14	**5.5**	0.051
14	16M014-1-03-F	1	Dem. Room	Off	Work Area	8 hr	1/17/2016	0.030 U	0.032 U	0.032 U	0.015 J	0.027 J	0.23	0.15
14	17M014-1-03-N	First	Dem. Room	On	Work Area	6h 59min	1/17/2016	0.038 U	0.04 U	0.047 J	0.038 U	0.022 J	0.082	0.093
14	16M014-1-04-F	1	Workshop	Off	Work Area	8 hr	1/17/2016	0.028 U	0.030 U	0.030 U	0.032 J	0.042	0.39	0.04
14	17M014-1-04-N	First	Workshop	On	Work Area	6h 59min	1/17/2016	0.033 U	0.035 U	0.042	0.033 U	0.022 J	0.078	0.09
14	16M014-1-05-F	1	Offices	Off	Work Area	8 hr	1/17/2016	0.024 U	0.025 U	0.025 U	0.025 U	0.025 U	0.027 J	0.026 J
14	17M014-1-05-N	First	Offices	On	Work Area	7h 2min	1/17/2016	0.034 U	0.035 U	0.056	0.014 J	0.053	0.76	0.096
14	17M314-1-05-N	First	Offices	On	Work Area	7h 1min	1/17/2016	0.041 U	0.043 U	0.057	0.015 J	0.058	0.76	0.086
14	16M014-C-01-F	1	Crawl Space	NH	Pathway	8 hr	1/17/2016	0.027 U	0.10	0.048	0.09	0.24	**6.8**	0.047
14	17M014-C-01-N	Crawl Space	Crawl Space	On	Crawl Space	7h 18min	1/17/2016	0.066	0.014 J	0.065	0.022 J	0.058	0.54	0.087
14	16M014-C-02-F	1	Crawl Space	NH	Pathway	8 hr	1/17/2016	0.025 U	0.20	0.052	0.081	0.26	**7.0**	0.064
14	17M014-C-02-N	Crawl Space	Crawl Space	On	Crawl Space	7h 15min	1/17/2016	0.076	0.028 J	0.082	0.037 J	0.14	3.2	0.089
14	17M014-1-03-F	First	Dem. Room	Off	Work Area	7h 43min	1/16/2017	0.029 U	0.03 U	0.052	0.021 J	0.18	0.94	0.21
14	17M014-1-04-F	First	Workshop	Off	Work Area	7h 49min	1/16/2017	0.031 U	0.032 U	0.052	0.021 J	0.20	0.96	0.23
14	17M014-1-05-F	First	Offices	Off	Work Area	7h 44min	1/16/2017	0.036 U	0.038 U	0.044 J	0.019 J	0.068	1.3	0.11
14	17M014-C-01-F	Crawl Space	Crawl Space	Off	Crawl Space	7h 43min	1/16/2017	0.14	0.034 J	0.81	0.079	0.32	4.6	0.15
14	17M014-C-02-F	Crawl Space	Crawl Space	Off	Crawl Space	7h 49min	1/16/2017	0.064	0.027 J	0.053	0.046	0.14	3.1	0.094
14	18M014-1-03-F	First	Dem. Room	Off	Work Area	8	1/15/2018	0.03 U	0.03 U	0.082	0.018 J	0.079	0.75	0.17
14	18M014-1-04-F	First	Workshop	Off	Work Area	8	1/15/2018	0.026 U	0.026 U	0.081	0.016 J	0.074	0.70	0.28
14	18M014-1-05-F	First	Offices	Off	Work Area	8	1/15/2018	0.029 U	0.013 J	0.09	0.019 J	0.055	1.3	0.086
14	18M014-C-01-F	Crawl Space	Crawl Space	Off	Crawl Space	8	1/15/2018	0.013 J	0.028 J	0.097	0.031	0.038	0.93	0.09
14	18M014-C-02-F	Crawl Space	Crawl Space	Off	Crawl Space	8	1/15/2018	0.10	0.029 J	0.077	0.028 J	0.053	2.0	0.13
14	18M014-1-03-N	First	Dem. Room	On	Work Area	8	1/17/2018	0.029 U	0.029 U	0.039	0.011 J	0.014 J	0.069	0.087
14	18M014-1-04-N	First	Workshop	On	Work Area	8	1/17/2018	0.029 U	0.029 U	0.038	0.075	0.013 J	0.072	0.086
14	18M014-1-05-N	First	Offices	On	Work Area	8	1/17/2018	0.026 U	0.026 U	0.048	0.025 U	0.023 J	0.24	0.10 J
14	18M314-1-05-N	First	Offices	On	Duplicate	8	1/17/2018	0.027 U	0.027 U	0.045	0.026 U	0.021 J	0.24	0.20 J
14	18M014-C-01-N	Crawl Space	Crawl Space	On	Crawl Space	8	1/17/2018	0.034 J	0.017 J	0.078	0.024 J	0.052	1.4	0.12
14	18M014-C-02-N	Crawl Space	Crawl Space	On	Crawl Space	8	1/17/2018	0.049	0.026 J	0.072	0.024 J	0.064	2.0	0.10
14	19M014-C-02-F	Crawl Space	Crawl Space	Off	Pathway	8	2/24/2019	0.11	0.039 J	0.59 U	0.12 U	0.13	0.81	0.20 U

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
14	19M014-C-01-F	Crawl Space	Crawl Space	Off	Pathway	8	2/24/2019	0.082 U	0.063 U	0.63 U	0.13 U	0.16	1.6	0.22 U
14	19M014-1-03-F	First	101	Off	Work Area	8	2/24/2019	0.079 U	0.061 U	0.61 U	0.12 U	0.2	1.4	0.14 J
14	19M014-1-05-F	First	106	Off	Work Area	8	2/24/2019	0.080 U	0.062 U	0.62 U	0.13 U	0.10 J	1.6	0.21 U
14	19M014-1-06-N	First	101	On	Work Area	8	2/28/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.39	0.098 J
14	19M014-1-04-N	First	C101	On	Work Area	8	2/28/2019	0.071 U	0.055 U	0.55 U	0.11 U	0.11 U	0.22	0.19 U
14	19M014-1-03-N	First	101	On	Work Area	8	2/28/2019	0.070 U	0.054 U	0.54 U	0.11 U	0.11 U	0.11 J	0.18 U
14	19M014-1-05-N	First	106	On	Work Area	8	2/28/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.046 J	0.59	0.22 U
14	19M314-1-05-N	First	106	On	Duplicate	8	2/28/2019	0.079 U	0.061 U	0.61 U	0.12 U	0.040 J	0.64	0.070 J
14	19M014-C-01-N	Crawl Space	Crawl Space	On	Pathway	8	2/28/2019	0.068 U	0.053 U	0.53 U	0.11 U	0.056 J	1.1	0.069 J
14	19M014-C-02-N	Crawl Space	Crawl Space	On	Pathway	8	2/28/2019	0.087	0.065 U	0.65 U	0.13 U	0.11 J	2.0	0.22 U
15	M015-1-01-N	1	135D	On	Work Area	24 hr	5/22/2012	<0.014	<0.016	<0.015	<0.015	0.0082 J	0.032 J	0.12
15	M415-1-01-N	1	117	On	Duplicate	24 hr	5/22/2012	<0.017	<0.020	<0.018	<0.018	0.019 J	0.12	0.026 J
15	M015-1-02-N	1	117	On	Work Area	24 hr	5/22/2012	<0.013	<0.015	<0.014	<0.014	0.017 J	0.13	0.035 J
15	M015-1-03-N	1	C107	on	Work Area	24 hr	5/22/2012	<0.016	<0.018	<0.016	<0.016	0.0093 J	0.037 J	0.51
15	M015-1-04-N	1	C107	on	Work Area	24 hr	5/22/2012	<0.016	<0.019	<0.017	<0.017	<0.017	0.033 J	0.043
15	M015-1-05-N	1	128	On	Work Area	24 hr	5/22/2012	<0.015	<0.017	<0.015	<0.015	0.0093 J	0.04	0.024 J
15	M015-1-06-N	1	C104	On	Work Area	24 hr	5/22/2012	<0.016	<0.018	<0.016	<0.016	0.014 J	0.084	0.022 J
15	M015-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/22/2012	<0.014	<0.016	<0.014	<0.014	0.0087 J	0.021 J	0.16
15	M015-1-01-F	1	135D	Off	Work Area	24 hr	5/27/2012	<0.015	0.020 J	<0.016	0.015 J	0.13	1.6	0.26
15	M315-1-01-F	Ambient Air	NA	NH	Duplicate	24 hr	5/27/2012	<0.014	<0.016	<0.015	<0.015	0.019 J	0.038	0.022 J
15	M015-1-02-F	1	117	Off	Work Area	24 hr	5/27/2012	<0.016	0.059	0.0086 J	0.024 J	0.24	2.5	0.042
15	M015-1-03-F	1	C107	Off	Work Area	24 hr	5/27/2012	0.010 J	0.019 J	<0.014	0.015 J	0.12	1.5	0.051
15	M015-1-04-F	1	C107	Off	Work Area	24 hr	5/27/2012	0.0078 J	0.022 J	<0.012	0.012 J	0.084	1.1	0.19
15	M015-1-05-F	1	128	Off	Work Area	24 hr	5/27/2012	<0.017	<0.019	<0.018	0.015 J	0.13	1.5	0.05
15	M015-1-06-F	1	C104	Off	Work Area	24 hr	5/27/2012	<0.014	0.020 J	<0.014	0.013 J	0.13	1.3	0.05
15	M015-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/27/2012	<0.013	<0.015	<0.014	<0.014	0.017 J	0.035	0.095 J
15	14M015-1-01-N	1	135D	On	Work Area	8 hr	2/13/2014	<0.025	<0.028	0.012 J	<0.028	0.084	0.074	0.048
15	14M015-1-02-N	1	117	On	Work Area	8 hr	2/13/2014	<0.029	<0.032	<0.032	<0.032	0.15	0.17	0.058
15	14M015-1-03-N	1	C107	on	Work Area	8 hr	2/13/2014	<0.038	<0.042	0.013 J	<0.042	0.11	0.079	0.077
15	14M015-1-06-N	1	C104	On	Work Area	8 hr	2/13/2014	<0.027	<0.030	0.012 J	<0.030	0.11	0.12	0.047
15	14M015-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/14/2014	<0.031	<0.034	0.015 J	<0.034	0.061	0.063	0.068
15	14M015-1-01-F	1	135D	Off	Work Area	24 hr	2/17/2014	0.10	0.017 J	0.021 J	<0.044	0.14	1.8	0.12
15	14M015-1-02-F	1	117	Off	Work Area	24 hr	2/17/2014	<0.033	<0.036	0.012 J	<0.036	0.092	0.25	0.051
15	14M015-1-03-F	1	C107	Off	Work Area	24 hr	2/17/2014	0.043	0.015 J	0.015 J	<0.031	0.12	1.5	0.071
15	14M315-1-03-F	1	C107	Off	Duplicate	24 hr	2/17/2014	0.047 J	0.017 J	<0.049 J	<0.049	0.13	1.6	0.062
15	14M015-1-06-F	1	C104	Off	Work Area	24 hr	2/17/2014	0.023 J	0.018 J	0.014 J	0.020 J	0.12	1.5	0.054
15	14M015-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/17/2014	<0.023	<0.026	<0.026	<0.026	0.028 J	0.06	0.034
15	17M015-A-01-N	Ambient	Ambient	On	Ambient	23h 55min	1/12/2016	0.027 U	0.028 U	0.075	0.027 U	0.028 U	0.028 J	0.038
15	16M015-1-01-N	1	135D	On	Work Area	24 hr	1/14/2016	0.037 U	0.039 U	0.026 J	0.039 U	0.018 J	0.08	0.039 J
15	16M015-1-02-N	1	117	On	Work Area	24 hr	1/14/2016	0.033 U	0.034 U	0.025 J	0.034 U	0.025 J	0.13	0.10
15	16M015-1-03-N	1	C107	on	Work Area	24 hr	1/14/2016	0.032 U	0.034 U	0.026 J	0.034 U	0.018 J	0.078	0.041
15	16M015-1-06-N	1	C104	On	Work Area	24 hr	1/14/2016	0.034 U	0.035 U	0.024 J	0.019 J	0.019 J	0.091	0.045
15	16M015-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/14/2016	0.024 U	0.026 U	0.018 J	0.026 U	0.012 J	0.054	0.033
15	16M015-1-01-F	1	135D	Off	Work Area	24 hr	1/18/2016	0.039	0.031 U	0.031 U	0.013 J	0.051	0.77	0.039
15	16M015-1-02-F	1	117	Off	Work Area	24 hr	1/18/2016	0.028 U	0.013 J	0.033 J	0.011 J	0.031 J	1.5	0.063
15	16M015-1-03-F	1	C107	Off	Work Area	24 hr	1/18/2016	0.056	0.038 U	0.038 U	0.038 U	0.07	0.69	0.049
15	16M315-1-03-F	1	C107	Off	Duplicate	24 hr	1/18/2016	0.058	0.035 U	0.035 U	0.013 J	0.066	0.62	0.046
15	16M015-1-06-F	1	C104	Off	Work Area	24 hr	1/18/2016	0.0099 J	0.026 U	0.026 U	0.0088 J	0.026 J	0.86	0.031
15	16M015-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/18/2016	0.032 U	0.034 U	0.034 U	0.034 U	0.024 J	0.085	0.025 J
15	17M015-1-01-N	First	135D	On	Work Area	24hr	1/10/2017	0.053 U	0.056 U	0.056 U	0.024 J	0.056 U	0.071	0.03 J
15	17M015-1-02-N	First	117	On	Work Area	24hr	1/10/2017	0.03 U	0.032 U	0.032 U	0.0093 J	0.032 U	0.15	0.032 J
15	17M015-1-03-N	First	C107	On	Work Area	24hr	1/10/2017	0.039 U	0.041 U	0.041 U	0.039 U	0.041 U	0.073	0.033 J
15	17M015-1-06-N	First	C104	On	Work Area	24hr	1/10/2017	0.032 U	0.034 U	0.013 J	0.032 U	0.034 U	0.081	0.04 J
15	17M015-1-01-F	First	135D	Off	Work Area	23h 42min	1/15/2017	0.038 U	0.028 J	0.068	0.04 J	0.18	3.3	0.12
15	17M015-1-02-F	First	117	Off	Work Area	23h 36min	1/15/2017	0.034 U	0.036 U	0.067	0.034 U	0.019 J	0.09	0.058
15	17M015-1-03-F	First	C107	Off	Work Area	23h 41min	1/15/2017	0.035 U	0.037 U	0.063	0.016 J	0.057	0.95	0.072
15	17M315-1-03-F	First	C107	Off	Work Area	23h 42min	1/15/2017	0.029 U	0.03 U	0.054	0.012 J	0.048	0.88	0.062
15	17M015-1-06-F	First	C104	Off	Work Area	23h 41min	1/15/2017	0.029 U	0.03 U	0.056	0.011 J	0.042	1.1	0.058
15	17M015-A-01-F	Ambient	NA	Off	Ambient	23h 38min	1/15/2017	0.025 U	0.027 U	0.073	0.01 J	0.021 J	0.082	0.06
15	18M015-1-01-N	First	135D	On	Work Area	24	1/9/2018	0.031 U	0.031 U	0.052	0.03 U	0.025 J	0.10	0.064
15	18M015-1-02-N	First	117	On	Work Area	24	1/9/2018	0.033 U	0.033 U	0.034 U	0.031 U	0.033 U	0.14	0.029 J
15	18M015-1-03-N	First	C107	On	Work Area	24	1/9/2018	0.032 U	0.032 U	0.034 U	0.031 U	0.032 U	0.047	0.034 J

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
15	18M015-1-06-N	First	C104	On	Work Area	24	1/9/2018	0.032 U	0.032 U	0.034 U	0.031 U	0.032 U	0.074	0.031 J
15	18M015-A-01-N	Ambient	NA	On	Ambient	24	1/9/2018	0.028 U	0.028 U	0.029 U	0.027 U	0.019 J	0.053	0.029 J
15	18M015-1-01-F	First	135D	Off	Work Area	24	1/14/2018	0.026 U	0.014 J	0.064	0.014 J	0.051	1.0	0.091
15	18M015-1-02-F	First	117	Off	Work Area	24	1/14/2018	0.038	0.03 U	0.061	0.017 J	0.028 J	0.16	0.11
15	18M015-1-03-F	First	C107	Off	Work Area	24	1/14/2018	0.025 U	0.025 U	0.047	0.008 J	0.018 J	0.27	0.065
15	18M315-1-03-F	First	C107	Off	Duplicate	24	1/14/2018	0.028 U	0.028 U	0.061	0.0095 J	0.025 J	0.35	0.064
15	18M015-1-06-F	First	C104	Off	Work Area	24	1/14/2018	0.067 U	0.067 U	0.056 J	0.064 U	0.067 U	0.43	0.066 J
15	18M015-A-01-F	Ambient	NA	Off	Ambient	24	1/14/2018	0.032 U	0.032 U	0.059	0.031 U	0.017 J	0.062	0.062
15	19M015-A-01	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.0015 U	0.084	0.029
15	19M015-1-01-F	First	135D	Off	Work Area	10	2/24/2019	0.033 U	0.033 U	0.033 U	0.025 J	0.059	0.93	0.052
15	19M015-1-03-F	First	C107	Off	Work Area	10	2/24/2019	0.031 U	0.031 U	0.012 J	0.013 J	0.026 J	0.4	0.046
15	19M015-1-06-F	First	C104	Off	Work Area	10	2/24/2019	0.03 U	0.013 J	0.013 J	0.02 J	0.083	1.3	0.053
15	19M015-1-03-N	First	C107	On	Work Area	10	2/26/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.18 U	0.22 U
15	19M015-1-01-N	First	135D	On	Work Area	10	2/26/2019	0.070 U	0.054 U	0.54 U	0.11 U	0.11 U	0.15 U	0.18 U
15	19M015-1-06-N	First	C104	On	Work Area	10	2/26/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.18 U	0.22 U
15	19M015-1-02-N	First	117	On	Work Area	10	2/26/2019	0.068 U	0.053 U	0.53 U	0.11 U	0.11 U	0.18	0.097 J
16	M016-1-01-N	1	106	On	Work Area	10 hr	5/24/2012	<0.015	<0.017	<0.015	0.0077 J	0.07	0.067	0.030 J
16	M416-1-01-N	1	106	On	Duplicate	10 hr	5/24/2012	<0.015	<0.017	<0.015	0.0077 J	0.067	0.066	0.067 J
16	M016-1-02-N	1	110	On	Work Area	10 hr	5/24/2012	<0.015	<0.017	<0.015	0.0087 J	0.089	0.17	0.072
16	M016-1-03-N	1	111	On	Work Area	10 hr	5/24/2012	<0.015	<0.017	<0.016	0.0084 J	0.085	0.18	0.075
16	M016-1-04-N	1	113	On	Work Area	10 hr	5/24/2012	<0.014	<0.016	<0.015	0.009 J	0.11	0.20	0.059
16	M016-1-05-N	1	103	On	Work Area	10 hr	5/24/2012	<0.015	<0.017	<0.016	0.0077 J	0.071	0.082	0.033 J
16	M016-A-01-N	Ambient Air	NA	On	Background	24 hr	5/24/2012	<0.016	<0.018	<0.016	<0.016	0.010 J	0.024 J	0.037 J
16	M016-1-01-F	1	106	Off	Work Area	10 hr	5/28/2012	<0.014	<0.016	<0.015	0.017 J	0.13	0.64	0.100 J
16	M416-1-01-F	1	106	Off	Duplicate	10 hr	5/28/2012	<0.019	<0.022	<0.020	0.021 J	0.14	0.68	0.031 J
16	M016-1-02-F	1	110	Off	Work Area	10 hr	5/28/2012	<0.016	0.019 J	<0.017	0.024 J	0.27	1.1	0.19
16	M016-1-03-F	1	111	Off	Work Area	10 hr	5/28/2012	0.0071 J	0.022 J	0.0067 J	0.024 J	0.33	1.1	0.073
16	M016-1-04-F	1	113	Off	Work Area	10 hr	5/28/2012	<0.015	0.031 J	<0.016	0.022 J	0.25	1.9	0.071
16	M016-1-05-F	1	103	Off	Work Area	10 hr	5/28/2012	<0.015	0.032 J	0.0079 J	0.031 J	0.25	1.2	0.18
16	M016-A-01-F	Ambient Air	NA	Off	Background	24 hr	5/28/2012	<0.016	<0.018	<0.016	<0.016	0.020 J	0.034 J	0.036 J
16	14M016-1-01-N	1	106	On	Work Area	10 hr	2/12/2014	<0.028	<0.030	0.019 J	<0.030	0.11	0.15	0.064
16	14M016-1-02-N	1	110	On	Work Area	10 hr	2/12/2014	<0.030	<0.033	0.016 J	0.011 J	0.11 J	0.46	0.19
16	14M416-1-02-N	1	110	On	Duplicate	10 hr	2/12/2014	<0.029	<0.032	0.016 J	0.012 J	0.17 J	0.46	0.19
16	14M016-1-03-N	1	111	On	Work Area	10 hr	2/12/2014	<0.029	<0.032	0.014 J	<0.032	0.083	0.34	0.15
16	14M016-1-04-N	1	113	On	Work Area	10 hr	2/12/2014	<0.025	0.010 J	0.016 J	0.012 J	0.12	0.89	0.20
16	14M016-1-05-N	1	103	On	Work Area	10 hr	2/12/2014	<0.024	<0.026	0.017 J	<0.026	0.12	0.11	0.058
16	14M016-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/13/2014	<0.028	<0.031	0.014 J	<0.031	0.065	0.049	0.045
16	14M016-1-01-F	1	106	Off	Work Area	10 hr	2/16/2014	<0.026	0.032 J	0.022 J	0.038	0.17	2.0	0.075
16	14M016-1-02-F	1	110	Off	Work Area	10 hr	2/16/2014	<0.027	0.022 J	0.011 J	0.032 J	0.13	1.9	0.28
16	14M016-1-03-F	1	111	Off	Work Area	10 hr	2/16/2014	<0.026	0.015 J	0.17 J	<0.028	0.10	1.2	0.25
16	14M316-1-03-F	1	111	Off	Duplicate	10 hr	2/16/2014	<0.029	0.016 J	0.015 J	0.024 J	0.11	1.4	0.25
16	14M016-1-04-F	1	113	Off	Work Area	10 hr	2/16/2014	<0.023	0.024 J	0.015 J	0.028 J	0.18	2.6	0.31
16	14M016-1-05-F	1	103	Off	Work Area	10 hr	2/16/2014	<0.028	0.074	0.027 J	0.075	0.52	**6.6**	0.10
16	14M016-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/17/2014	<0.030	<0.033	0.011 J	<0.033	0.089	0.083	0.046
16	16M016-1-01-N	1	106	On	Work Area	10 hr	1/13/2016	0.037 U	0.039 U	0.017 J	0.013 J	0.039 U	0.099	0.028 J
16	16M016-1-02-N	1	110	On	Work Area	10 hr	1/13/2016	0.012 J	0.033 U	0.017 J	0.011 J	0.018 J	0.21	0.064
16	16M416-1-02-N	1	110	On	Duplicate	10 hr	1/13/2016	0.026 U	0.028 U	0.10	0.0098 J	0.023 J	0.25	0.11
16	16M016-1-03-N	1	111	On	Work Area	10 hr	1/13/2016	0.034 U	0.036 U	0.017 J	0.036 U	0.021 J	0.31	0.11
16	16M016-1-04-N	1	113	On	Work Area	10 hr	1/13/2016	0.033 U	0.035 U	0.019 J	0.011 J	0.021 J	0.49	0.14
16	16M016-1-05-N	1	103	On	Work Area	10 hr	1/13/2016	0.039 U	0.041 U	0.035 J	0.041 U	0.041 U	0.17	0.096
16	16M016-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/14/2016	0.028 U	0.029 U	0.017 J	0.013 J	0.042	0.19	0.036
16	16M016-1-01-F	1	106	Off	Work Area	10 hr	1/17/2016	0.78	0.027 J	0.021 J	0.019 J	0.7	1.1	0.26
16	16M016-1-02-F	1	110	Off	Work Area	10 hr	1/17/2016	1.5	0.037	0.037	0.013 J	1.5	0.78	0.59
16	16M016-1-03-F	1	111	Off	Work Area	10 hr	1/17/2016	0.84	0.021 J	0.021 J	0.014 J	0.80	0.63	0.34
16	16M316-1-03-F	1	111	Off	Duplicate	10 hr	1/17/2016	0.78	0.021 J	0.020 J	0.015 J	0.77	0.62	0.34
16	16M016-1-04-F	1	113	Off	Work Area	10 hr	1/17/2016	0.026 U	0.028 U	0.028 U	0.022 J	0.019 J	0.71	0.059
16	16M016-1-05-F	1	103	Off	Work Area	10 hr	1/17/2016	0.71	0.026 J	0.020 J	0.019 J	0.65	1.1	0.24
16	16M016-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/18/2016	0.031 U	0.032 U	0.032 U	0.032 U	0.016 J	0.055	0.030 J
16	17M016-1-01-F	First	106	Off	Work Area	9h 50min	1/16/2017	0.029 U	0.031 U	0.043	0.02 J	0.15	0.88	0.12
16	17M016-1-02-F	First	110	Off	Work Area	9h 48min	1/16/2017	0.029 U	0.03 U	0.039	0.03 J	0.16	0.81	0.14
16	17M016-1-03-F	First	111	Off	Work Area	9h 51min	1/16/2017	0.029 U	0.03 U	0.036	0.021 J	0.16	0.79	0.16
16	17M316-1-03-F	First	111	Off	Work Area	9h 48min	1/16/2017	0.029 U	0.03 U	0.038	0.018 J	0.16	0.77	0.17

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	Sample Name	Floor	Room	HVAC (on/Off)	Sample Type	Sample Duration (hr)	Sample Date							
16	17M016-1-04-F	First	113	Off	Work Area	9h 54min	1/16/2017	0.038 U	0.04 U	0.075	0.033 J	0.29	1.8	0.25
16	17M016-1-05-F	First	103	Off	Work Area	9h 50min	1/16/2017	0.035 U	0.037 U	0.038 J	0.021 J	0.14	0.79	0.11
16	17M016-1-06-F	First	108	Off	Work Area	9h 43min	1/16/2017	0.041	0.032 U	0.064	0.023 J	0.23	0.92	0.20
16	17M016-A-01-F	Ambient	NA	Off	Ambient	23h 29min	1/16/2017	0.027 U	0.028 U	0.069	0.01 J	0.053	0.27	0.059
16	17M016-1-01-N	First	106	On	Work Area	9h 37min	1/18/2017	0.032 U	0.034 U	0.034 U	0.017 J	0.019 J	0.20	0.064
16	17M016-1-02-N	First	110	On	Work Area	9h 34min	1/18/2017	0.033 U	0.034 U	0.034 U	0.033 U	0.034 U	0.029 J	0.18
16	17M316-1-02-N	First	110	On	Work Area	9h 36min	1/18/2017	0.034 U	0.035 U	0.035 U	0.017 J	0.025 J	0.43	0.099
16	17M016-1-03-N	First	111	On	Work Area	9h 35min	1/18/2017	0.029 U	0.03 U	0.03 U	0.029 U	0.019 J	0.49	0.14
16	17M016-1-04-N	First	113	On	Work Area	9h 35min	1/18/2017	0.038 U	0.04 U	0.04 U	0.038 U	0.04 U	0.44	0.055
16	17M016-1-05-N	First	103	On	Work Area	9h 57min	1/18/2017	0.028 U	0.03 U	0.019 J	0.01 J	0.03 J	0.27	0.057
16	17M016-1-06-N	First	108	On	Work Area	9h 59min	1/18/2017	0.036	0.017 J	0.086	0.03 J	0.089	0.57	1.5
16	17M016-A-01-N	Ambient	NA	On	Ambient	23h 50min	1/18/2017	0.029 U	0.03 U	0.03 U	0.029 U	0.03 J	0.17	0.03 J
16	18M016-1-01-F	First	106	Off	Work Area	10	1/15/2018	0.027 U	0.038	0.083	0.048	0.16	4.0	0.14
16	18M016-1-02-F	First	110	Off	Work Area	10	1/15/2018	0.025 U	0.021 J	0.083	0.03	0.13	2.3	0.25
16	18M016-1-03-F	First	111	Off	Work Area	10	1/15/2018	0.028 U	0.02 J	0.078	0.03 J	0.12	2.0	0.25
16	18M316-1-03-F	First	111	Off	Duplicate	10	1/15/2018	0.027 U	0.02 J	0.084	0.054 J	0.12	1.9	0.24
16	18M016-1-04-F	First	113	Off	Work Area	10	1/15/2018	0.026 U	0.017 J	0.066	0.023 J	0.08	2.0	0.17
16	18M016-1-05-F	First	103	Off	Work Area	10	1/15/2018	0.028 U	0.039	0.077	0.052	0.16	4.1	0.14
16	18M016-1-06-F	First	108	Off	Work Area	10	1/15/2018	0.088	0.021 J	0.088	0.033 J	0.10	1.6	0.18
16	18M016-A-01-F	Ambient	NA	Off	Ambient	24	1/15/2018	0.03 U	0.03 U	0.077	0.029 U	0.04	0.21	0.58
16	18M016-1-01-N	First	106	On	Work Area	10	1/16/2018	0.033 U	0.033 U	0.037 J	0.032 U	0.016 J	0.19	0.082
16	18M016-1-02-N	First	110	On	Work Area	10	1/16/2018	0.032 U	0.032 U	0.039	0.03 U	0.02 J	0.28	0.14
16	18M316-1-02-N	First	110	On	Duplicate	10	1/16/2018	0.03 U	0.03 U	0.039	0.029 U	0.019 J	0.28	0.12
16	18M016-1-03-N	First	111	On	Work Area	10	1/16/2018	0.03 U	0.03 U	0.036	0.011 J	0.02 J	0.28	0.11
16	18M016-1-04-N	First	113	On	Work Area	10	1/16/2018	0.029 U	0.029 U	0.041	0.028 U	0.023 J	0.60	0.18
16	18M016-1-05-N	First	103	On	Work Area	10	1/16/2018	0.026 U	0.026 U	0.041	0.025 U	0.016 J	0.13	0.065
16	18M016-1-06-N	First	108	On	Work Area	10	1/16/2018	0.03 U	0.03 U	0.043	0.0091 J	0.025 J	0.47	0.10
16	18M016-A-01-N	Ambient	NA	On	Ambient	24	1/16/2018	0.028 U	0.028 U	0.046	0.014 J	0.033	0.17	0.07
16	19M016-A-01	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.0015 U	0.23	0.03
16	19M016-1-02-F	First	110	Off	Work Area	10	2/24/2019	0.03 U	0.014 J	0.015 J	0.022 J	0.11	1.3	0.12
16	19M016-1-03-F	First	111	Off	Work Area	10	2/24/2019	0.03 U	0.03 U	0.013 J	0.02 J	0.1	0.75	0.15
16	19M016-1-05-F	First	103	Off	Work Area	10	2/24/2019	0.013 J	0.061	0.026 J	0.052	0.14	4.0	0.064
16	19M016-1-04-N	First	113	On	Work Area	10	2/27/2019	0.065 U	0.051 U	0.084 J	0.10 U	0.10 U	0.38	0.11 J
16	19M016-1-02-N	First	110	On	Work Area	10	2/27/2019	0.072 U	0.056 U	0.15 J	0.11 U	0.11 U	0.39	0.22
16	19M016-1-01-N	First	106	On	Work Area	10	2/27/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.13 J	0.22 U
16	19M016-1-03-N	First	111	On	Work Area	10	2/27/2019	0.077 U	0.059 U	0.59 U	0.12 U	0.12 U	0.33	0.2
16	19M316-1-05-N	First	110	On	Duplicate	10	2/27/2019	0.065 U	0.051 U	0.51 U	0.10 U	0.10 U	0.11 J	0.17 U
16	19M016-1-05-N	First	103	On	Work Area	10	2/27/2019	0.078 U	0.061 U	0.61 U	0.12 U	0.12 U	0.24	0.21 U
16	19M016-1-07-N	First	118	On	Pathway	10	2/27/2019	0.078 U	0.060 U	0.60 U	0.12 U	0.43	**7.0**	0.14 J
16	19M016-1-07-N-R	First	118	On	Pathway	168	6/6/2019	N/A	0.0026 J	0.004 J	0.047	0.012	1.0	0.051
16	19M016-G-08-N	First	118	On	Work Area	10	2/27/2019	0.077 U	0.059 U	0.59 U	0.12 U	0.15	3.0	0.20 U
16	19M016-1-09-N	First	118	On	Pathway	168	6/6/2019	N/A	0.0034 J	0.005 J	0.0016 U	0.06	1.0	0.048
16	19M016-1-06-N	First	108	On	Work Area	10	2/28/2019	0.068 U	0.053 U	0.53 U	0.11 U	0.11 U	0.5	0.10 J
29	M029-1-01	1	106	NH	Work Area	8 hr	5/21/2012	<0.014	<0.016	<0.014	<0.014	0.075	0.18	0.23
29	M029-A-01	Ambient Air	NA	NH	Background	24 hr	5/21/2012	<0.016	<0.018	<0.016	<0.016	0.034 J	0.056	0.027 J
29	M029-B-01	Basement	Basement	NH	Pathway	8 hr	5/21/2012	<0.015	<0.017	<0.015	<0.015	0.053	0.13	0.19
29	14M029-1-01	1	106	NH	Work Area	8 hr	2/11/2014	<0.036	<0.040	<0.040	<0.040	0.089	0.069	0.061
29	14M029-A-01	Ambient Air	NA	NH	Background	8 hr	2/11/2014	<0.029	<0.032	<0.032	<0.032	0.013 J	0.04	0.049
29	14M029-B-01	Basement	Basement	NH	Pathway	8 hr	2/11/2014	<0.033	<0.036	0.012 J	<0.036	0.020 J	0.063	0.06
29	16M029-1-01	1	106	NH	Work Area	8 hr	1/12/2016	0.027 U	0.028 U	0.05	0.028 U	0.054	0.17	0.091
29	16M029-B-01	Basement	Basement	NH	Pathway	8 hr	1/12/2016	0.030 U	0.032 U	0.056	0.16	0.047	0.15	0.093
29	16M029-A-01	Ambient Air	NA	NH	Background	24 hr	1/13/2016	0.030 U	0.032 U	0.029 J	0.032 U	0.068	0.12	0.093
29	17M029-1-01	First	106	NH	Work Area	8hr	1/9/2017	0.031 J	0.031 U	0.031 U	0.016 J	0.16	0.39	0.29
29	17M029-A-01	Ambient	NA	NH	Ambient	24hr	1/9/2017	0.029 U	0.03 U	0.03 U	0.029 U	0.037	0.07	0.066
29	17M029-B-01	First	Basement	NH	Work Area	8hr	1/9/2017	0.029 J	0.031 U	0.031 U	0.013 J	0.14	0.35	0.26
29	18M029-1-01	First	106	NH	Work Area	8	1/10/2018	0.14	0.053	0.066	0.07	0.96	2.8	**2.4**
29	18M029-A-01	Ambient	NA	NH	Ambient	24	1/10/2018	0.03 U	0.03 U	0.033 J	0.028 U	0.045	0.14	0.083
29	18M029-B-01	Basement	Basement	NH	Basement	8	1/10/2018	0.027 U	0.027 U	0.028 U	0.026 U	0.042	0.096	0.12
29	18M029-1-01-R	First	106	NH	Resample	8	2/21/2018	0.035 U	0.035 U	0.023 J	0.029 J	0.022 J	0.27	0.065
29	19M029-1-01	First	106	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.14	0.086
29	19M029-A-01	Ambient	N/A	NH	Ambient	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.04	0.033
29	19M029-B-01	Basement	Basement	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.089	0.056

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
45	M345-1-01	1	101	NH	Duplicate	8 hr	5/24/2012	<0.015	<0.017	<0.015	0.0089 J	0.071	0.37	0.037 J
45	M045-1-01	1	101	NH	Work Area	8 hr	5/24/2012	<0.015	<0.017	<0.015	0.0084 J	0.07	0.37	0.04
45	M045-1-02	1	102	NH	Work Area	8 hr	5/24/2012	0.0096 J	<0.017	<0.015	0.0098 J	0.10	0.44	0.068
45	14M045-1-01	1	101	NH	Work Area	8 hr	2/12/2014	0.012 J	0.013 J	0.014 J	0.019 J	0.19	0.62	0.12
45	14M045-1-02	1	102	NH	Work Area	8 hr	2/12/2014	0.016 J	0.017 J	0.015 J	0.016 J	0.23	0.8	0.26
45	14M045-A-01	Ambient Air	NA	NH	Background	24 hr	2/13/2014	<0.024	0.0096 J	0.012 J	<0.026	0.13	0.38	0.072
45	16M045-1-01	1	101	NH	Work Area	8 hr	1/12/2016	0.16	0.11	0.10	0.18	2.8	**7.0**	**5.0**
45	16M045-1-02	1	102	NH	Work Area	8 hr	1/12/2016	0.074	0.054	0.07	0.096	1.4	3.9	**2.6**
45	16M045-A-01	Ambient Air	NA	NH	Background	24 hr	1/13/2016	0.032 U	0.034 U	0.027 J	0.034 U	0.15	0.35	0.15
45	17M045-1-01	First	101	NH	Work Area	7h 47min	1/17/2017	0.085	0.054	0.095	0.20	1.2	4.8	**2.6**
45	17M045-1-02	First	102	NH	Work Area	7h 44min	1/17/2017	0.074	0.048	0.082	0.19	1.1	4.7	**2.6**
45	17M045-A-01	Ambient	NA	NH	Ambient	23h 56min	1/17/2017	0.016 J	0.029 U	0.041	0.01 J	0.18	0.46	0.30
45	18M045-1-01	First	101	NH	Work Area	8	1/17/2018	0.026 U	0.026 U	0.044	0.031 J	0.079	0.63	0.15
45	18M045-1-02	First	102	NH	Work Area	8	1/17/2018	0.028 U	0.028 U	0.045	0.033	0.085	0.78	0.16
45	18M045-A-01	Ambient	NA	NH	Ambient	24	1/17/2018	0.027 U	0.027 U	0.039	0.026 U	0.037	0.22	0.18
45	19M045-1-01	First	101	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.011	0.014	1.3	0.21
45	19M045-1-02	First	102	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.013	1.2	0.25
45	19M045-A-01	Ambient	N/A	NH	Ambient	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.025	0.22	0.21
67	M367-1-01	Ambient Air	NA	NH	Duplicate	24 hr	5/21/2012	<0.013	<0.015	<0.014	<0.014	0.011 J	0.021 J	0.034 J
67	M067-1-01	1	C101	NH	Work Area	24 hr	5/21/2012	<0.013	<0.015	<0.014	<0.014	0.012 J	0.086	0.039
67	M067-1-02	1	104	NH	Work Area	24 hr	5/21/2012	<0.015	<0.017	<0.016	<0.016	0.011 J	0.046	0.025 J
67	M067-A-01	Ambient Air	NA	NH	Background	24 hr	5/21/2012	<0.016	<0.018	<0.017	<0.017	0.012 J	0.023 J	0.078 J
67	14M067-1-01	1	C101	NH	Work Area	24 hr	2/12/2014	<0.030	<0.033	0.012 J	<0.033	0.022 J	0.086	0.042
67	14M067-A-01	Ambient Air	NA	NH	Background	24 hr	2/12/2014	<0.022	<0.025	0.012 J	<0.025	0.028 J	0.049	0.06
67	16M067-1-01	1	C101	NH	Work Area	24 hr	1/13/2016	0.030 U	0.031 U	0.041	0.013 J	0.031 U	0.18	0.068
67	16M067-A-01	Ambient Air	NA	NH	Background	24 hr	1/13/2016	0.035 U	0.037 U	0.026 J	0.015 J	0.037 U	0.055	0.056
67	17M067-1-01	First	C101	NH	Work Area	23h 51min	1/17/2017	0.028 U	0.03 U	0.042	0.0096 J	0.031 J	0.34	0.072
67	17M067-A-01	First	NA	NH	Work Area	23h 46min	1/17/2017	0.025 U	0.026 U	0.038	0.02 J	0.039	0.14	0.069
67	18M067-1-01	First	C101	NH	Work Area	24	1/16/2018	0.03 U	0.03 U	0.043	0.028 U	0.03 U	0.16	0.078
67	18M067-A-01	Ambient	NA	NH	Ambient	24	1/16/2018	0.03 U	0.03 U	0.042	0.028 U	0.03 U	0.044	0.065
67	19M067-1-01	First	C101	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.12	0.03
76	M076-1-01	1	101	NH	Work Area	24 hr	5/21/2012	<0.015	0.053	<0.015	0.007 J	0.078	0.12	0.052
76	M076-1-01-N	1	101	NH	Work Area	24 hr	6/12/2012	<0.018	0.038 J	<0.019	<0.019	0.048	0.15	0.055
76	14M076-1-01	1	101	AC Off	Work Area	8 hr	2/11/2014	<0.029	0.012 J	0.0098 J	<0.032	0.14	0.14	0.06
76	16M076-1-01	1	101	AC Off	Work Area	8 hr	1/12/2016	0.039 U	0.041 U	0.069	0.041 U	0.040 J	0.36	0.12
76	17M076-1-01	First	101	NH	Work Area	7h 4min	1/17/2017	0.025 U	0.026 U	0.037	0.011 J	0.034	0.27	0.067
76	18M076-1-01	First	101	NH	Work Area	8	1/10/2018	0.034 U	0.034 U	0.035 U	0.032 U	0.018 J	0.24	0.032 J
76	19M076-1-01	First	101	NH	Work Area	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.21	0.031
107	M107-1-01-N	1	106	On	Work Area	8 hr	5/23/2012	<0.014	<0.016	<0.015	<0.015	0.022 J	0.10	0.065
107	M107-1-02-N	1	C101	On	Work Area	8 hr	5/23/2012	<0.016	<0.018	<0.016	<0.016	0.014 J	0.043	0.051
107	M107-1-01-F	1	106	Off	Work Area	8 hr	5/28/2012	<0.016	0.059	<0.016	<0.016	0.037 J	0.11	0.058
107	M107-1-02-F	1	C101	Off	Work Area	8 hr	5/28/2012	<0.013	0.030 J	<0.014	<0.014	0.028 J	0.051	<0.013
107	14M107-1-01-N	1	106	On	Work Area	8 hr	2/11/2014	<0.031	<0.034	<0.034	<0.034	0.036 J	0.13	0.11
107	14M107-1-02-N	1	C101	On	Work Area	8 hr	2/11/2014	<0.032	<0.035	<0.035	<0.035	0.027 J	0.055	0.073
107	14M107-1-01-F	1	106	Off	Work Area	8 hr	2/16/2014	<0.029	<0.032	<0.032	0.013 J	0.022 J	0.13	0.12
107	14M107-1-02-F	1	C101	Off	Work Area	8 hr	2/16/2014	<0.026	<0.029	<0.029	<0.029	0.017 J	0.11	0.086
107	16M107-1-01-N	1	106	On	Work Area	8 hr	1/12/2016	0.040 U	0.042 U	0.055	0.016 J	0.045 J	0.13	0.13
107	16M107-1-02-N	1	C101	On	Work Area	8 hr	1/12/2016	0.036 U	0.037 U	0.054	0.037 U	0.027 J	0.095	0.11
107	16M107-1-01-F	1	106	Off	Work Area	8 hr	1/17/2016	0.21	0.031 U	0.031 U	0.66	0.25	0.12	0.15
107	16M107-1-02-F	1	C101	Off	Work Area	8 hr	1/17/2016	0.096	0.031 U	0.031 U	0.024 J	0.11	0.073	0.08
107	17M107-1-01-F	First	106	Off	Work Area	7h 59min	1/16/2017	0.026 U	0.027 U	1.1	0.026 U	0.02 J	0.075	0.11
107	17M107-1-02-F	First	C101	Off	Work Area	7h 57min	1/16/2017	0.028 U	0.029 U	0.029 J	0.028 U	0.015 J	0.058	0.048
107	17M107-1-01-N	First	106	On	Work Area	7h 39min	1/17/2017	0.03 U	0.032 U	0.055	0.01 J	0.022 J	0.082	0.067
107	17M107-1-02-N	First	C102	On	Work Area	7h 39min	1/17/2017	0.025 U	0.026 U	0.062	0.0092 J	0.018 J	0.078	0.065
107	18M107-1-01-N	First	106	On	Work Area	8	1/8/2018	0.028 U	0.028 U	0.064	0.026 U	0.028 U	0.071	0.066
107	18M107-1-02-N	First	C101	On	Work Area	8	1/8/2018	0.032 U	0.032 U	0.067	0.03 U	0.032 U	0.062	0.061
107	18M107-1-01-F	First	106	Off	Work Area	8	1/15/2018	0.028 U	0.028 U	0.059	0.027 U	0.015 J	0.083	0.069
107	18M107-1-02-F	First	C101	Off	Work Area	8	1/15/2018	0.028 U	0.028 U	0.062	0.027 U	0.016 J	0.07	0.059
107	19M107-1-01-F	First	106	Off	Work Area	8	2/24/2019	0.079 U	0.061 U	0.61 U	0.12 U	0.12 U	0.17 U	0.21 U
107	19M107-1-02-F	First	C101	Off	Work Area	8	2/24/2019	0.075 U	0.058 U	0.58 U	0.12 U	0.12 U	0.055 J	0.20 U
107	19M107-1-02-N	First	C101	On	Work Area	8	2/28/2019	0.081 U	0.063 U	0.63 U	0.13 U	0.12 U	0.14 J	0.21 U
107	19M307-1-02-N	First	C101	On	Duplicate	8	2/28/2019	0.082 U	0.064 U	0.64 U	0.13 U	0.13 U	0.19	0.099 J

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
107	19M107-1-01-N	First	106	On	Work Area	8	2/28/2019	0.068 U	0.053 U	0.53 U	0.11 U	0.11 U	0.055 J	0.24
126	M126-1-01-N	1	103	On	Work Area	8 hr	5/18/2012	0.027 J	0.044	0.013 J	0.043	0.85	2.2	**2.8**
126	M126-1-02-N	1	103	On	Work Area	8 hr	5/18/2012	0.028 J	0.06	0.013 J	0.038	0.87	1.8	**2.6**
126	M126-1-03-N	1	102	On	Work Area	8 hr	5/18/2012	0.017 J	0.038	0.010 J	0.029 J	0.52	1.6	1.9
126	M126-1-04-N	1	106	On	Work Area	8 hr	5/18/2012	0.053	0.052	0.016 J	0.057	1.4	2.3	**2.7**
126	M126-1-05-N	1	101	On	Work Area	8 hr	5/18/2012	0.013 J	0.057	0.010 J	0.038 J	0.55	2.8	**2.8**
126	M126-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/18/2012	<0.014	<0.015	<0.014	<0.014	0.061	0.065	0.20
126	M126-A-02-N	Ambient Air	NA	NH	Background	24 hr	5/22/2012	<0.016	<0.019	<0.017	<0.017	0.030 J	0.088	0.088
126	M126-A-03-N	Ambient Air	NA	NH	Background	24 hr	5/23/2012	<0.013	<0.015	<0.014	<0.014	0.039	0.051	0.07
126	M126-A-04-N	Ambient Air	NA	NH	Background	24 hr	5/24/2012	<0.016	<0.019	<0.017	<0.017	<0.017	0.027 J	0.10
126	M126-A-05-F	Ambient Air	NA	NH	Background	24 hr	5/27/2012	<0.015	<0.017	<0.016	<0.016	0.033 J	0.056	0.11
126	M126-A-06-F	Ambient Air	NA	NH	Background	24 hr	5/28/2012	<0.016	<0.018	<0.017	<0.017	0.031 J	0.039 J	0.039 J
126	M326-1-01-F	1	102	Off	Duplicate	8 hr	6/12/2012	0.023 J	0.053	0.065 J	0.035 J	0.55	1.8	**2.3**
126	M126-1-01-F	1	103	Off	Work Area	8 hr	6/12/2012	0.038 J	0.069	0.07	0.054	0.93	2.6	**3.2**
126	M126-1-02-F	1	103	Off	Work Area	8 hr	6/12/2012	0.035 J	0.083	0.073	0.044	0.86	2.0	**2.7**
126	M126-1-03-F	1	102	Off	Work Area	8 hr	6/12/2012	0.023 J	0.062	0.097 J	0.035 J	0.54	1.8	**2.2**
126	M126-1-04-F	1	106	Off	Work Area	8 hr	6/12/2012	0.053	0.044	0.066	0.046	1.1	1.4	2.0
126	M126-1-05-F	1	101	Off	Work Area	8 hr	6/12/2012	0.023 J	0.082	0.081	0.055	0.73	3.1	**4.4**
126	M126-A-07-F	Ambient Air	NA	NH	Background	24 hr	6/12/2012	<0.017	<0.019	<0.017	<0.017	0.030 J	0.046	0.049
126	14M126-1-01-N	1	103	On	Work Area	8 hr	2/12/2014	0.036 J	0.043 J	0.024 J	0.05	0.70	2.8	**3.7**
126	14M126-1-02-N	1	103	On	Work Area	8 hr	2/12/2014	0.040 J	0.027 J	0.020 J	0.035 J	0.66	1.8	**2.4**
126	14M326-1-02-N	1	103	NH	Duplicate	8 hr	2/12/2014	0.035 J	0.029 J	0.021 J	0.037 J	0.65	1.8	**2.4**
126	14M126-1-04-N	1	106	On	Work Area	8 hr	2/12/2014	0.026 J	0.023 J	0.018 J	0.030 J	0.48	1.4	1.8
126	14M126-1-05-N	1	101	On	Work Area	8 hr	2/12/2014	0.023 J	0.11	0.037 J	0.079	0.7	**5.8**	**6.5**
126	14M126-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/13/2014	<0.033	<0.037	0.017 J	<0.037	0.096	0.093	0.092
126	14M126-1-01-F	1	103	Off	Work Area	8 hr	2/18/2014	0.035 J	0.053	0.018 J	0.044	0.66	2.4	**3.1**
126	14M126-1-02-F	1	103	Off	Work Area	8 hr	2/18/2014	0.037 J	0.046	0.018 J	0.045	0.73	2.3	**3.0**
126	14M126-1-04-F	1	106	Off	Work Area	8 hr	2/18/2014	0.022 J	0.029 J	0.013 J	0.027 J	0.42	1.3	1.7
126	14M126-1-05-F	1	101	Off	Work Area	8 hr	2/18/2014	0.026 J	0.093	0.024 J	0.063	0.69	4.7	**5.2**
126	14M126-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/19/2014	<0.026	<0.028	<0.028	<0.028	0.06	0.045	0.065
126	16M126-1-01-N	1	103	On	Work Area	8 hr	1/13/2016	0.08	0.050 U	0.018 J	0.018 J	0.53	0.82	1.6
126	16M126-1-02-N	1	103	On	Work Area	8 hr	1/13/2016	0.09	0.017 J	0.021 J	0.18	0.67	1.0	1.9
126	16M126-1-04-N	1	106	On	Work Area	8 hr	1/13/2016	0.067	0.038 U	0.024 J	0.045 J	0.54	0.74	1.4
126	16M126-1-05-N	1	101	On	Work Area	8 hr	1/13/2016	1.8	0.12	0.066	0.076	1.9	4.6	**9.7**
126	16M126-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/14/2016	0.057	0.034 U	0.019 J	0.034 U	0.15	0.15	0.29
126	16M126-1-01-F	1	103	Off	Work Area	8 hr	1/19/2016	1.7	0.09	0.048	0.055	1.6	3.3	**6.5**
126	16M126-1-02-F	1	103	Off	Work Area	8 hr	1/19/2016	1.5	0.085	0.044	0.051	1.7	3.3	**6.4**
126	16M326-1-02-F	1	103	Off	Duplicate	8 hr	1/19/2016	1.5	0.084	0.043	0.048	1.7	3.3	**6.4**
126	16M126-1-04-F	1	106	Off	Work Area	8 hr	1/19/2016	1.0	0.057	0.032 J	0.035 J	1.6	2.3	**4.9**
126	16M126-1-05-F	1	101	Off	Work Area	8 hr	1/19/2016	**2.3**	0.13	0.066	0.064	1.7	4.8	**8.9**
126	16M126-A-01-F	Ambient Air	NA	Off	Background	8 hr	1/19/2016	0.030 U	0.032 U	0.032 U	0.0096 J	0.032 U	0.025 J	0.047
126	17M126-1-01-N	First	17M126-1-01-N	On	Work Area	6h 20min	1/11/2017	0.84	0.29	0.12	0.24	17	**13**	**29**
126	17M126-1-02-N	First	17M126-1-02-N	On	Work Area	6h 21min	1/11/2017	1.3	0.43	0.16	0.35	24	**18**	**41**
126	17M326-1-02-N	First	17M326-1-02-N	On	Work Area	6h 21min	1/11/2017	1.3	0.43	0.17	0.35	24	**19**	**41**
126	17M126-1-04-N	First	17M126-1-04-N	On	Work Area	6h 22min	1/11/2017	0.81	0.26	0.10	0.22	15	**12**	**26**
126	17M126-A-01-N	Ambient	17M126-A-01-N	On	Ambient	24hr	1/11/2017	0.081	0.027 J	0.023 J	0.029 J	1.5	1.3	**2.7**
126	17M126-1-01-F	First	103	Off	Work Area	8h 11min	1/17/2017	1.3	0.29	0.14	0.29	21	**15**	**32**
126	17M126-1-02-F	First	103	Off	Work Area	8h 11min	1/17/2017	**2.1**	0.49	0.22	0.46	34	**23**	**51**
126	17M126-1-04-F	First	106	Off	Work Area	8h 10min	1/17/2017	**2.4**	0.50	0.25	0.48	37	**24**	**56**
126	17M126-1-05-F	First	101	Off	Work Area	8h 12min	1/17/2017	0.45	0.096	0.053	0.10	6.8	**5.3**	**11**
126	17M126-A-01-F	Ambient	NA	Off	Ambient	23h 38min	1/17/2017	0.038	0.03 U	0.043	0.016 J	0.52	0.43	0.85
126	17M126-1-05-N	First	17M126-1-05-N	On	Work Area	5hr 59min	1/18/2017	0.2	0.045	0.027 J	0.051	3.0	2.6	**5.4**
126	M126-103-01-ON	First	103	On	Work Area	24 hr	7/21/2017	ND	ND	-	0.089	0.15	0.58	1.0
126	M126-103-02-ON	First	103	On	Work Area	24 hr	7/21/2017	ND	ND	-	ND	0.46	0.97	1.6
126	M126-103-02-OND	First	103	On	Work Area	24 hr	7/21/2017	ND	ND	-	ND	0.85	1.5	**2.8**
126	M126-106-04-ON	First	106	On	Work Area	24 hr	7/21/2017	ND	ND	-	ND	0.24	1.7	**2.3**
126	M126-101-05-ON	First	101	On	Work Area	24 hr	7/21/2017	ND	ND	-	ND	0.20	0.31	0.42
126	M126-001-01-BKG	Ambient Air	NA	On	Work Area	24 hr	7/21/2017	ND	ND	-	ND	0.077	0.16	0.21
126	M126-103-01-ON	First	103	On	Work Area	24 hr	11/16/2017	ND	ND	-	ND	0.056	0.061	0.13
126	M126-103-02-ON	First	103	On	Work Area	24 hr	11/16/2017	0.067	0.05	-	ND	0.84	1.5	**2.7**
126	M126-103-02-OND	First	103	On	Work Area	24 hr	11/16/2017	0.068	0.05	-	ND	1.1	1.7	**3.4**
126	M126-106-04-ON	First	106	On	Work Area	24 hr	11/16/2017	0.079	ND	-	ND	ND	0.042	0.076

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
126	M126-101-05-ON	First	101	On	Work Area	24 hr	11/16/2017	ND	ND	-	ND	0.21	0.32	0.47
126	M126-001-01-BKG	Ambient Air	NA	On	Work Area	24 hr	11/16/2017	ND	ND	-	ND	0.21	0.30	0.41
126	18M126-1-01-N	First	103	On	Work Area	8	1/10/2018	0.045 U	0.045 U	0.048 U	0.043 U	0.11	0.88	**2.6**
126	18M126-1-02-N	First	103	On	Work Area	8	1/10/2018	0.019 J	0.031 J	0.049 U	0.014 J	0.29	0.57	0.78
126	18M326-1-02-N	First	103	On	Duplicate	8	1/10/2018	0.019 J	0.041 J	0.046 U	0.014 J	0.28	0.56	0.74
126	18M126-1-04-N	First	106	On	Work Area	8	1/10/2018	0.043 U	0.043 U	0.046 U	0.041 U	0.20	0.41	0.53
126	18M126-1-05-N	First	101	On	Work Area	8	1/10/2018	0.018 J	0.018 J	0.046 U	0.02 J	0.33	1.4	1.9
126	18M126-A-01-N	Ambient	NA	On	Work Area	24	1/10/2018	0.023 J	0.041 U	0.041 J	0.012 J	0.31	0.44	0.69
126	18M126-1-01-F	First	103	Off	Work Area	8	1/16/2018	0.46	0.17	0.12	0.17	7.0	**9.2**	**16**
126	18M126-1-02-F	First	103	Off	Work Area	8	1/16/2018	0.58	0.21	0.13	0.21	8.9	**11**	**20**
126	18M126-1-04-F	First	106	Off	Work Area	8	1/16/2018	0.32	0.11	0.089	0.11	4.7	**6.0**	**11**
126	18M126-1-05-F	First	101	Off	Work Area	8	1/16/2018	0.14	0.07	0.066	0.069	2.3	4.1	**6.7**
126	18M126-A-01-F	Ambient	NA	Off	Work Area	24	1/16/2018	0.015 J	0.029 U	0.039	0.011 J	0.20	0.28	0.47
126	19M126-A-01	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.18	0.26	0.54
126	19M126-1-05-F	First	101	Off	Work Area	8	2/26/2019	0.055 J	0.060 U	0.60 U	0.12 U	0.59	1.5	2.0
126	19M126-1-01-F	First	103	Off	Work Area	8	2/26/2019	0.14	0.085 U	0.85 U	0.17 U	1.5	1.3	**2.4**
126	19M326-1-01-F	First	103	Off	Duplicate	8	2/26/2019	0.13	0.082 U	0.82 U	0.17 U	1.3	1.2	**2.2**
126	19M126-1-04-F	First	106	Off	Work Area	8	2/26/2019	0.14	0.081 U	0.81 U	0.16 U	1.4	0.89	**2.1**
126	19M126-1-02-F	First	103	Off	Work Area	8	2/26/2019	0.22	0.087 U	0.87 U	0.18 U	2.4	2.0	**3.7**
126	19M126-1-05-N	First	101	On	Work Area	8	2/28/2019	0.15	0.053 U	0.037 J	0.11 U	1.4	1.7	**2.9**
126	19M326-1-05-N	First	101	On	Duplicate	8	2/28/2019	0.21	0.078 U	0.78 U	0.16 U	2.0	2.5	**4.2**
126	19M126-1-01-N	First	103	On	Work Area	8	2/28/2019	0.12	0.078 U	0.78 U	0.16 U	1.2	1.6	**2.8**
126	19M126-1-04-N	First	106	On	Work Area	8	2/28/2019	0.068 J	0.076 U	0.76 U	0.15 U	0.56	0.55	0.89
126	19M126-1-02-N	First	103	On	Work Area	8	2/28/2019	0.2	0.076 U	0.76 U	0.15 U	1.9	1.6	**3.0**
126	19M326-1-02-N	First	103	On	Duplicate	8	2/28/2019	0.23	0.078 U	0.78 U	0.16 U	2.1	1.7	**3.3**
510	M510-1-01-N	1	108A	On	Work Area	24 hr	5/23/2012	<0.015	<0.017	<0.015	0.0089 J	0.110 J	0.084	0.057
510	M510-1-02-N	1	110	On	Work Area	24 hr	5/23/2012	<0.014	0.018 J	<0.014	0.010 J	0.13	0.096	0.048
510	M510-1-03-N	1	C101	On	Work Area	24 hr	5/23/2012	<0.020	<0.023	<0.021	0.012 J	0.16	0.10	0.52
510	M410-1-01-N	1	108A	On	Duplicate	24 hr	5/23/2012	<0.016	<0.018	<0.016	0.010 J	0.150 J	0.095	0.052
510	M510-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/23/2012	<0.014	0.045	0.0087 J	0.022 J	0.41	0.20	0.11
510	M510-1-01-F	1	108A	Off	Work Area	24 hr	5/27/2012	<0.016	0.037 J	<0.016	0.019 J	0.33	0.12	0.064
510	M410-1-01-F	Ambient Air	NA	NH	Duplicate	24 hr	5/27/2012	<0.016	0.09	0.019 J	0.051	1.0	0.17	0.160 J
510	M510-1-02-F	1	110	Off	Work Area	24 hr	5/27/2012	<0.016	0.032 J	<0.017	0.020 J	0.31	0.12	0.049
510	M510-1-03-F	1	C101	Off	Work Area	24 hr	5/27/2012	<0.014	0.044	<0.015	0.024 J	0.44	0.15	0.058
510	M510-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/27/2012	<0.014	0.092	0.018 J	0.049	1.0	0.15	0.092 J
510	14M510-1-02-N	1	110	On	Work Area	24 hr	2/13/2014	<0.027	0.016 J	0.016 J	<0.030	0.30	0.10	0.055
510	14M510-1-03-N	1	C101	On	Work Area	24 hr	2/13/2014	<0.030	0.018 J	0.018 J	<0.034	0.32	0.12	0.06
510	14M510-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/13/2014	<0.027	0.033 J	0.021 J	0.021 J	0.65	0.12	0.065
510	14M510-1-02-F	1	110	Off	Work Area	24 hr	2/17/2014	<0.035	0.019 J	0.014 J	<0.039	0.44	0.16	0.073
510	14M510-1-03-F	1	C101	Off	Work Area	24 hr	2/17/2014	<0.038	0.025 J	0.013 J	0.020 J	0.48	0.19	0.075
510	14M510-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/17/2014	<0.029	0.07	0.029 J	0.044	1.5	0.17	0.068
510	16M510-1-02-N	1	110	On	Work Area	24 hr	1/14/2016	0.025 U	0.026 U	0.016 J	0.026 U	0.021 J	0.091	0.036
510	16M510-1-03-N	1	C101	On	Work Area	24 hr	1/14/2016	0.028 U	0.029 U	0.019 J	0.029 U	0.023 J	0.10	0.04
510	16M510-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/14/2016	0.014 J	0.035 U	0.015 J	0.016 J	0.032 J	0.069	0.040 J
510	16M510-1-02-F	1	110	Off	Work Area	24 hr	1/18/2016	0.034 U	0.036 U	0.036 U	0.036 U	0.036 U	0.086	0.088
510	16M510-1-03-F	1	C101	Off	Work Area	24 hr	1/18/2016	0.032 U	0.033 U	0.033 U	0.033 U	0.033 U	0.084	0.031 J
510	16M510-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/18/2016	0.031 U	0.033 U	0.033 U	0.0096 J	0.033 U	0.020 J	0.025 J
510	17M510-1-02-F	First	110	Off	Work Area	23h 34min	1/15/2017	0.027 U	0.028 U	0.069	0.027 U	0.024 J	0.17	0.055
510	17M510-1-03-F	First	C101	Off	Work Area	23h 34min	1/15/2017	0.029 U	0.03 U	0.061	0.029 U	0.029 J	0.19	0.06
510	17M510-A-01-F	Ambient	NA	Off	Ambient	23h 35min	1/15/2017	0.013 J	0.029 U	0.061	0.027 U	0.029 J	0.12	0.061
510	17M510-1-02-N	First	110	On	Work Area	23h 50min	1/18/2017	0.029 U	0.03 U	0.03 U	0.029 U	0.03 U	0.072	0.043
510	17M510-1-03-N	First	C101	On	Work Area	23h 50min	1/18/2017	0.029 U	0.03 U	0.03 U	0.029 U	0.03 U	0.06	0.05
510	17M510-A-01-N	Ambient	NA	On	Ambient	23h 50min	1/18/2017	0.028 U	0.03 U	0.03 U	0.028 U	0.03 U	0.037	0.052
510	18M510-1-02-F	First	110	Off	Work Area	24	1/14/2018	0.028 U	0.028 U	0.054	0.027 U	0.036	0.24	0.12
510	18M510-1-03-F	First	C101	Off	Work Area	24	1/14/2018	0.03 U	0.03 U	0.055	0.029 U	0.053	0.35	0.42
510	18M510-A-01-F	Ambient	NA	Off	Ambient	24	1/14/2018	0.041 U	0.041 U	0.046 J	0.039 U	0.069	0.36	0.55
510	18M510-1-02-N	First	110	On	Work Area	24	1/16/2018	0.03 U	0.03 U	0.045	0.01 J	0.017 J	0.10	0.088
510	18M510-1-03-N	First	C101	On	Work Area	24	1/16/2018	0.029 U	0.029 U	0.041	0.028 U	0.015 J	0.088	0.11
510	18M510-A-01-N	Ambient	NA	On	Ambient	24	1/16/2018	0.029 U	0.029 U	0.041	0.028 U	0.029 J	0.15	0.11
510	19M510-A-01	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.0015 U	0.15	0.076
510	19M510-1-02-F	First	110	Off	Work Area	10	2/24/2019	0.027 U	0.027 U	0.027 U	0.0086 J	0.024 J	0.18	0.083
510	19M510-1-03-F	First	C101	Off	Work Area	10	2/24/2019	0.032 U	0.032 U	0.032 U	0.032 U	0.03 J	0.21	0.1

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
510	19M510-1-03-N	First	C101	On	Work Area	10	2/26/2019	0.071 U	0.055 U	0.55 U	0.11 U	0.11 U	0.092 J	0.19 U
510	19M310-1-03-N	First	C101	On	Duplicate	10	2/26/2019	0.085 U	0.066 U	0.66 U	0.13 U	0.13 U	0.13 J	0.22 U
510	19M510-1-02-N	First	110	On	Work Area	10	2/26/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.094 J	0.22 U
555	N555-1-01-N	1	112	On	Work Area	8 hr	5/23/2012	<0.016	<0.018	<0.017	0.009 J	0.047	0.17	0.036 J
555	N555-1-02-N	1	C101	On	Work Area	8 hr	5/23/2012	<0.015	<0.017	<0.015	0.0078 J	0.052	0.21	0.038 J
555	N555-1-03-N	1	107A	On	Work Area	8 hr	5/23/2012	<0.015	<0.017	<0.016	0.0084 J	0.06	0.23	0.04
555	M555-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/23/2012	<0.016	<0.018	<0.017	<0.017	0.017 J	0.026 J	0.078
555	N555-1-01-F	1	112	Off	Work Area	8 hr	5/28/2012	0.017 J	0.021 J	<0.015	0.023 J	0.49	0.85	0.038
555	N555-1-02-F	1	C101	Off	Work Area	8 hr	5/28/2012	0.018 J	0.023 J	<0.016	0.024 J	0.50	0.87	0.14
555	N555-1-03-F	1	107A	Off	Work Area	8 hr	5/28/2012	0.026 J	0.032 J	0.0099 J	0.032 J	0.72	1.3	0.11
555	M555-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/28/2012	<0.017	<0.019	<0.017	<0.017	0.036 J	0.019 J	0.018 J
555	14M555-1-01-N	1	112	On	Work Area	8 hr	2/12/2014	<0.042	<0.047	<0.047	<0.047	0.039 J	0.16	0.049 J
555	14M355-1-03-N	1	107A	On	Duplicate	8 hr	2/12/2014	<0.028	<0.031	0.015 J	<0.031	0.035 J	0.13	0.062
555	14M555-1-03-N	1	107A	On	Work Area	8 hr	2/12/2014	<0.027	<0.030	0.014 J	<0.030	0.037	0.14	0.068
555	14M555-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/13/2014	<0.032	<0.035	0.013 J	<0.035	0.037 J	0.044	0.044
555	14M555-1-01-F	1	112	Off	Work Area	8 hr	2/16/2014	<0.029	<0.032	<0.032	0.020 J	0.041	0.42	0.044
555	14M555-1-03-F	1	107A	Off	Work Area	8 hr	2/16/2014	<0.032	<0.035	<0.035	0.021 J	0.046	0.46	0.047
555	14M555-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/18/2014	<0.029	<0.032	0.010 J	<0.032	0.012 J	0.033 J	0.04
555	16M555-1-01-N	1	112	On	Work Area	8 hr	1/13/2016	0.029 U	0.031 U	0.031 U	0.019 J	0.031 U	0.057	0.027 J
555	16M555-1-03-N	1	107A	On	Work Area	8 hr	1/13/2016	0.031 U	0.032 U	0.032 U	0.92	0.032 U	0.032 U	0.027 J
555	16M355-1-03-N	1	107A	On	Duplicate	8 hr	1/13/2016	0.029 U	0.031 U	0.031 U	0.031 U	0.031 U	0.056	0.024 J
555	16M555-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/14/2016	0.031 U	0.033 U	0.013 J	0.033 U	0.033 U	0.043	0.035 J
555	16M555-1-01-F	1	112	Off	Work Area	8 hr	1/17/2016	0.035 U	0.037 U	0.037 U	0.037 U	0.037 U	0.14	0.031 J
555	16M555-1-03-F	1	107A	Off	Work Area	8 hr	1/17/2016	0.031 U	0.032 U	0.032 U	0.010 J	0.032 U	0.14	0.031 J
555	16M555-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/18/2016	0.032 U	0.034 U	0.034 U	0.034 U	0.034 U	0.018 J	0.024 J
555	17M555-1-01-F	First	112	Off	Work Area	7h 51min	1/16/2017	0.021 J	0.032 U	0.052	0.033 J	0.45	0.76	0.12
555	17M555-1-03-F	First	107A	Off	Work Area	7h 49min	1/16/2017	0.022 J	0.012 J	0.055	0.037	0.51	0.86	0.13
555	17M555-A-01-F	Ambient	NA	Off	Ambient	23h 36min	1/16/2017	0.027 U	0.028 U	0.05	0.027 U	0.034 J	0.063	0.057
555	17M355-1-01-N	First	112	On	Work Area	7h 53min	1/18/2017	0.26 U	0.27 U	0.27 U	0.26 U	0.27 U	0.16 J	0.27 U
555	17M555-1-01-N	First	112	On	Work Area	7h 53min	1/18/2017	0.03 U	0.032 U	0.019 J	0.011 J	0.069	0.21	0.059
555	17M555-1-03-N	First	107A	On	Work Area	7h 53min	1/18/2017	0.032 U	0.034 U	0.016 J	0.014 J	0.066	0.19	0.061
555	17M555-A-01-N	Ambient	NA	On	Ambient	23h 49min	1/18/2017	0.029 U	0.031 U	0.011 J	0.0091 J	0.024 J	0.23	0.032 J
555	18M555-1-01-N	First	112	On	Work Area	8	1/8/2018	0.031 U	0.031 U	0.062	0.029 U	0.031 U	0.087	0.056
555	18M355-1-01-N	First	107A	On	Duplicate	8	1/8/2018	0.023 J	0.023 U	0.052	0.022 U	0.023 U	0.068	0.05 J
555	18M555-1-03-N	First	107A	On	Work Area	8	1/8/2018	0.03 U	0.03 U	0.064	0.029 U	0.03 U	0.085	0.08 J
555	18M555-A-01-N	Ambient	NA	On	Ambient	24	1/8/2018	0.046 J	0.046 U	0.033 J	0.043 U	0.046 U	0.20	0.046 J
555	18M555-1-01-F	First	112	Off	Work Area	8	1/15/2018	0.01 J	0.026 U	0.068	0.023 J	0.18	0.55	0.10
555	18M555-1-03-F	First	107A	Off	Work Area	8	1/15/2018	0.012 J	0.029 U	0.07	0.04	0.20	0.58	0.092
555	18M555-A-01-F	Ambient	NA	Off	Ambient	24	1/15/2018	0.026 U	0.026 U	0.08	0.025 U	0.024 J	0.097	0.17
555	19M555-A-01	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.0015 U	0.034	0.028
555	19M555-1-03-F	First	107A	Off	Work Area	8	2/24/2019	0.079 U	0.061 U	0.61 U	0.072 J	0.65	1.9	0.21 U
555	19M555-1-01-F	First	112	Off	Work Area	8	2/24/2019	0.078 U	0.060 U	0.60 U	0.079 J	0.72	2.1	0.21 U
555	19M555-1-03-N	First	107A	On	Work Area	8	2/28/2019	0.082 U	0.064 U	0.64 U	0.13 U	0.078 J	0.21	0.22 U
555	19M555-1-01-N	First	112	On	Work Area	8	2/28/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.076 J	0.29	0.22 U
566	M566-1-01-N	1	111	On	Work Area	8 hr	5/23/2012	<0.016	<0.018	<0.016	<0.016	<0.016	0.013 J	0.030 J
566	M566-1-02-N	1	C103	On	Work Area	8 hr	5/23/2012	<0.018	<0.021	<0.019	<0.019	<0.019	0.012 J	0.033 J
566	M566-1-03-N	1	C104	On	Work Area	8 hr	5/23/2012	<0.014	<0.016	<0.015	<0.015	<0.015	0.012 J	0.082
566	M566-1-01-F	1	111	Off	Work Area	8 hr	5/28/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.04	0.028 J
566	M566-1-02-F	1	C103	Off	Work Area	8 hr	5/28/2012	<0.020	<0.022	<0.020	<0.020	<0.020	0.065	0.019 J
566	M566-1-03-F	1	C104	Off	Work Area	8 hr	5/28/2012	<0.016	<0.018	<0.016	<0.016	<0.016	0.097	0.021 J
566	14M566-1-01-N	1	111	On	Work Area	8 hr	2/11/2014	<0.027	<0.030	<0.030	<0.030	0.052	0.043	0.069
566	14M566-1-02-N	1	C103	On	Work Area	8 hr	2/11/2014	<0.028	<0.031	<0.031	<0.031	0.063	0.062	0.078
566	14M566-1-01-F	1	111	Off	Work Area	8 hr	2/16/2014	<0.024	<0.026	<0.026	<0.026	0.020 J	0.16	0.16
566	14M566-1-02-F	1	C103	Off	Work Area	8 hr	2/16/2014	<0.033	<0.037	<0.037	<0.037	0.015 J	0.13	0.06
566	16M566-1-01-N	1	111	On	Work Area	8 hr	1/12/2016	0.043 U	0.045 U	0.067	0.045 U	0.022 J	0.17	0.099
566	16M566-1-02-N	1	C103	On	Work Area	8 hr	1/12/2016	0.032 U	0.034 U	0.06	0.010 J	0.022 J	0.17	0.11
566	16M566-1-01-F	1	111	Off	Work Area	8 hr	1/17/2016	0.029 U	0.031 U	0.031 U	0.031 U	0.031 U	0.075	0.028 J
566	16M566-1-02-F	1	C103	Off	Work Area	8 hr	1/17/2016	0.012 J	0.031 U	0.031 U	0.031 U	0.015 J	0.13	0.029 J
566	17M566-1-01-N	First	111	On	Work Area	8hr	1/9/2017	0.032 U	0.033 U	0.013 J	0.013 J	0.024 J	0.14	0.039 J
566	17M566-1-02-N	First	C103	On	Work Area	8hr	1/9/2017	0.034 U	0.036 U	0.036 U	0.034 U	0.016 J	0.15	0.04 J
566	17M566-1-01-F	First	111	Off	Work Area	7h 56min	1/16/2017	0.027 U	0.028 U	0.033 J	0.027 U	0.028 U	0.14	0.047
566	17M566-1-02-F	First	C103	Off	Work Area	7h 53min	1/16/2017	0.03 U	0.031 U	0.037 J	0.03 U	0.014 J	0.17	0.047

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
566	18M566-1-01-N	First	111	On	Work Area	8	1/8/2018	0.029 U	0.029 U	0.058	0.028 U	0.029 U	0.14	0.057
566	18M566-1-02-N	First	C103	On	Work Area	8	1/8/2018	0.03 U	0.03 U	0.057	0.028 U	0.03 U	0.14	0.052
566	18M566-1-01-F	First	111	Off	Work Area	8	1/15/2018	0.028 U	0.028 U	0.064	0.013 J	0.018 J	0.23	0.075
566	18M566-1-02-F	First	C103	Off	Work Area	8	1/15/2018	0.026 U	0.026 U	0.067	0.0084 J	0.016 J	0.21	0.14
566	19M566-1-01-F	First	111	Off	Work Area	8	2/24/2019	0.031 U	0.031 U	0.031 U	0.031 U	0.031 U	0.29	0.036 J
566	19M566-1-02-F	First	C103	Off	Work Area	8	2/24/2019	0.03 U	0.03 U	0.011 J	0.03 U	0.03 U	0.31	0.039
566	19M566-1-01-N	First	111	On	Work Area	8	2/28/2019	0.081 U	0.063 U	0.63 U	0.13 U	0.12 U	0.16 J	0.21 U
566	19M566-1-02-N	First	C103	On	Work Area	8	2/28/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.14 J	0.22 U
567	M567-1-01	1	107	NH	Work Area	24 hr	5/21/2012	<0.016	0.037 J	<0.016	0.047	0.24	2.6	0.53
567	M567-1-02	1	102	NH	Work Area	24 hr	5/21/2012	<0.016	0.049	0.011 J	0.057	0.36	3.9	0.75
567	M567-1-03	1	104	NH	Work Area	24 hr	5/21/2012	<0.015	0.028 J	<0.015	0.030 J	0.11	1.2	0.22
567	14M567-1-01	1	107	NH	Work Area	8 hr	2/18/2014	<0.030	0.05	0.020 J	0.071	0.20	3.5	0.061
567	14M567-1-02	1	102	NH	Work Area	8 hr	2/18/2014	<0.026	0.051	0.020 J	0.062	0.21	3.6	0.064
567	14M467-1-03	1	104	NH	Work Area	8 hr	2/18/2014	<0.027	0.037	0.014 J	0.06	0.16	1.9	0.053
567	14M567-1-03	1	104	NH	Work Area	8 hr	2/18/2014	<0.030	0.036 J	0.015 J	0.055	0.15	1.8	0.057
567	14M567-A-01	Ambient Air	NA	NH	Background	24 hr	2/19/2014	<0.029	<0.032	0.010 J	<0.032	0.22	0.048	0.035 J
567	16M567-1-01	1	107	NH	Work Area	8 hr	1/12/2016	0.033 U	0.077	0.075	0.16	0.15	**5.0**	0.12
567	16M567-1-02	1	102	NH	Work Area	8 hr	1/12/2016	0.033 U	0.083	0.079	0.16	0.16	**5.3**	0.12
567	16M567-1-03	1	104	NH	Work Area	8 hr	1/12/2016	0.042 U	0.049 J	0.069	0.13	0.13	3.0	0.10
567	16M567-A-01	Ambient Air	NA	NH	Background	24 hr	1/13/2016	0.038 U	0.040 U	0.049	0.040 U	0.040 U	0.11	0.075
567	17M567-1-01	First	107	NH	Work Area	8hr	1/11/2017	0.033 U	0.059	0.015 J	0.097	0.076	2.7	0.074
567	17M567-1-02	First	102	NH	Work Area	8hr	1/11/2017	0.029 U	0.055	0.016 J	0.095	0.074	2.7	0.075
567	17M567-1-03	First	104	NH	Work Area	8hr	1/11/2017	0.031 U	0.069	0.013 J	0.15	0.051	1.4	0.066
567	17M567-A-01	Ambient	NA	NH	Ambient	24hr	1/11/2017	0.024 U	0.025 U	0.013 J	0.024 U	0.025 U	0.052	0.04
567	18M567-1-01	First	107	NH	Work Area	8	1/10/2018	0.028 U	0.046	0.0099 J	0.093	0.088	3.5	0.053
567	18M567-1-02	First	102	NH	Work Area	8	1/10/2018	0.028 U	0.032 J	0.01 J	0.069	0.06	2.9	0.054
567	18M567-1-03	First	104	NH	Work Area	8	1/10/2018	0.026 U	0.044	0.011 J	0.07	0.11	3.6	0.052
567	18M567-A-01	Ambient	NA	NH	Ambient	24	1/10/2018	0.03 U	0.03 U	0.052	0.029 U	0.028 J	0.085	0.066
567	19M567-1-01	First	107	NH	Work Area	168	2/15/2019	N/A	0.011	0.019	0.0099 J	0.01	1.2	0.033
567	19M567-1-02	First	102	NH	Work Area	168	2/15/2019	N/A	0.024	0.024	0.013	0.017	2.8	0.035
567	19M567-1-03	First	104	NH	Work Area	168	2/15/2019	N/A	0.052	0.025	0.015	0.024	1.6	0.034
567	19M567-A-01	Ambient	N/A	NH	Ambient	168	2/15/2019	N/A	0.0016 U	0.0013 U	0.0015 U	0.0014 U	0.067	0.029
N210	M310-1-01-F	1	100	Off	Duplicate	8 hr	5/28/2012	<0.016	0.027 J	<0.017	0.011 J	0.098	1.1	0.086 J
N210	N210-1-01-F	1	143	Off	Work Area	8 hr	5/28/2012	<0.016	0.021 J	<0.017	0.0072 J	0.061	0.55	0.033 J
N210	N210-1-02-F	1	C117A	Off	Work Area	8 hr	5/28/2012	<0.015	0.025 J	<0.015	0.0081 J	0.055	0.49	0.029 J
N210	M310-1-02-F	1	148	Off	Duplicate	8 hr	5/28/2012	<0.016	<0.018	<0.017	<0.017	0.018 J	0.15	0.670 J
N210	N210-1-04-F	1	138E	Off	Work Area	8 hr	5/28/2012	<0.016	0.018 J	<0.016	0.0078 J	0.06	0.58	0.028 J
N210	N210-1-05-F	1	146	Off	Work Area	8 hr	5/28/2012	<0.017	<0.019	<0.017	0.012 J	0.15	0.47	0.032 J
N210	N210-1-06-F	1	Q134	Off	Pathway	8 hr	5/28/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.15	0.046
N210	14N210-1-06-F	1	Q134	Off	Pathway	8 hr	5/28/2012	<0.027	<0.030	<0.030	<0.030	0.072	0.06	0.025 J
N210	N210-1-07-F	1	100	Off	Work Area	8 hr	5/28/2012	<0.015	0.033 J	<0.015	0.012 J	0.11	1.2	0.047 J
N210	N210-1-08-F	1	C10	Off	Work Area	8 hr	5/28/2012	<0.016	0.022 J	<0.016	0.011 J	0.10	1.4	0.036 J
N210	N210-1-09-F	1	148	Off	Work Area	8 hr	5/28/2012	<0.016	<0.018	<0.016	<0.016	0.017 J	0.14	0.034 J
N210	N210-1-10-F	1	near 033 & 036	Off	Work Area	8 hr	5/28/2012	<0.015	0.031 J	<0.015	0.016 J	0.18	2.0	0.11
N210	N210-1-11-F	1	near 033 & 036	Off	Pathway	8 hr	5/28/2012	<0.016	0.086	0.025 J	0.056	0.74	**17**	0.20
N210	N210-1-12-F	1	143	Off	Pathway	8 hr	5/28/2012	<0.016	0.022 J	<0.017	<0.017	0.085	0.80	0.13
N210	N210-2-01-F	2	L244	Off	Work Area	8 hr	5/28/2012	<0.015	0.036 J	<0.015	0.013 J	0.14	1.4	0.043
N210	N210-2-02-F	2	C248	Off	Work Area	8 hr	5/28/2012	<0.015	0.042	<0.016	0.014 J	0.15	1.7	0.05
N210	N210-2-03-F	2	255A	Off	Work Area	8 hr	5/28/2012	<0.014	0.019 J	<0.014	0.011 J	0.10	1.2	0.051
N210	M210-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/28/2012	<0.016	<0.018	<0.016	<0.016	<0.016	0.015 J	0.048
N210	N210-G-03-F	1	near V101	Off	Pathway	Grab hr	5/28/2012	<0.013	<0.015	<0.014	<0.014	0.10	0.51	0.032 J
N210	M310-G-03-F	1	near V101	Off	Duplicate	Grab hr	5/28/2012	<0.014	0.019 J	<0.014	<0.014	0.12	0.51	0.030 J
N210	14N210-1-01-F	1	143	Off	Work Area	8 hr	2/16/2014	<0.026	0.017 J	<0.029	0.011 J	0.06	1.0	0.048
N210	14N210-1-02-F	1	C117A	Off	Work Area	8 hr	2/16/2014	<0.030	0.016 J	<0.033	<0.033	0.057	0.94	0.045
N210	14N210-1-04-F	1	138E	Off	Work Area	8 hr	2/16/2014	<0.033	0.019 J	<0.036	<0.036	0.093	1.4	0.051
N210	14N210-1-05-F	1	146	Off	Work Area	8 hr	2/16/2014	<0.029	<0.032	<0.032	<0.032	0.038	0.38	0.034 J
N210	14N210-1-07-F	1	100A	Off	Work Area	8 hr	2/16/2014	<0.029	0.013 J	0.010 J	<0.033	0.057	0.89	0.045
N210	14N210-1-08-F	1	C10	Off	Work Area	8 hr	2/16/2014	<0.027	0.016 J	<0.030	0.012 J	0.062	1.1	0.049
N210	14N210-1-09-F	1	148	Off	Work Area	8 hr	2/16/2014	<0.023	<0.026	<0.026	<0.026	0.027 J	0.43	0.041
N210	14M310-1-10-F	1	near 033 & 036	Off	Duplicate	8 hr	2/16/2014	<0.030	0.016 J	<0.033	<0.033 J	0.067	1.2	0.65 J
N210	14N210-1-10-F	1	near 033 & 036	Off	Work Area	8 hr	2/16/2014	<0.029	0.017 J	<0.033	0.011 J	0.07	1.2	0.058 J
N210	14N210-C-11-F	Crawl Space	Crawl Space 008	Off	Pathway	8 hr	2/16/2014	<0.030	0.41	0.072	0.18	1.6	**40**	0.27

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N210	14N210-G-03-F	1	near V101	Off	Pathway	Grab hr	2/16/2014	<0.030	<0.033	<0.033	<0.033	0.076	0.56	0.039 J
N210	14N210-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/17/2014	<0.024	<0.027	0.017 J	<0.027	0.033	0.068	0.06
N210	16N210-1-01-F	1	143	Off	Work Area	8 hr	1/17/2016	0.031 U	0.014 J	0.032 U	0.013 J	0.19	1.1	0.075
N210	16N210-1-02-F	1	C117A	Off	Work Area	8 hr	1/17/2016	0.029 U	0.039	0.030 U	0.022 J	0.25	2.5	0.077
N210	16N210-1-04-F	1	138E	Off	Work Area	8 hr	1/17/2016	0.027 U	0.018 J	0.028 U	0.015 J	0.24	1.3	0.072
N210	16N210-1-05-F	1	146	Off	Work Area	8 hr	1/17/2016	0.030 U	0.017 J	0.031 U	0.013 J	0.22	1.4	0.10
N210	16N210-1-06-F	1	Q134	Off	Pathway	8 hr	1/17/2016	0.035 U	0.037 U	0.037 U	0.027 J	0.041 J	0.12	0.035 J
N210	16N210-1-07-F	1	100A	Off	Work Area	8 hr	1/17/2016	0.030 U	0.015 J	0.031 U	0.012 J	0.21	1.3	0.078
N210	16N210-1-08-F	1	C10	Off	Work Area	8 hr	1/17/2016	0.030 U	0.016 J	0.032 U	0.013 J	0.21	1.3	0.077
N210	16N210-1-10-F	1	near 033 & 036	Off	Work Area	8 hr	1/17/2016	0.030 U	0.014 J	0.032 U	0.014 J	0.19	1.0	0.072
N210	16M310-1-10-F	1	near 033 & 036	Off	Duplicate	8 hr	1/17/2016	0.029 U	0.013 J	0.030 U	0.012 J	0.19	1.0	0.074
N210	16N210-C-11-F	Crawl Space	Crawl Space 008	Off	Pathway	8 hr	1/17/2016	0.033 U	0.095	0.054	0.10	0.61	**9.7**	0.12
N210	16N210-G-03-F	1	near V101	Off	Pathway	Grab hr	1/17/2016	0.033 U	0.034 U	0.017 J	0.034 U	0.15	0.95	0.054
N210	16N210-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/18/2016	0.035 U	0.036 U	0.036 U	0.06	0.045	0.084	0.039 J
N210	17N210-1-01-F	First	143	Off	Work Area	7h 50min	1/16/2017	0.032 U	0.033 U	0.13	0.032 U	0.028 J	0.32	0.063
N210	17N210-1-02-F	First	C117A	Off	Work Area	7h 52min	1/16/2017	0.03 U	0.031 U	0.024 J	0.03 U	0.026 J	0.3	0.047
N210	17N210-1-04-F	First	138E	Off	Work Area	8h 19min	1/16/2017	0.029 U	0.03 U	0.041	0.029 U	0.037	0.52	0.061
N210	17N210-1-06-F	First	Q134	Off	Work Area	7h 21min	1/16/2017	0.041 U	0.043 U	0.022 J	0.02 J	0.043 U	0.29	0.066
N210	17N210-1-07-F	First	100A	Off	Work Area	7h 49min	1/16/2017	0.026 J	0.021 J	0.036 J	0.026 J	0.32	1.3	0.064
N210	17N210-1-08-F	First	C10	Off	Work Area	7h 49min	1/16/2017	0.01 J	0.011 J	0.035	0.014 J	0.14	1.1	0.062
N210	17N210-1-10-F	First	near 033 & 036	Off	Work Area	7h 54min	1/16/2017	0.033 U	0.035 U	0.029 J	0.033 U	0.054	0.85	0.041 J
N210	17M310-1-10-F	First	near 033 & 036	Off	Work Area	7h 53min	1/16/2017	0.03 U	0.032 U	0.031 J	0.01 J	0.053	0.96	0.085
N210	17N210-A-01-F	Ambient	NA	Off	Ambient	24h 13min	1/16/2017	0.028 U	0.029 U	0.072	0.0085 J	0.021 J	0.058	0.069
N210	17N210-C-11-F	Crawl Space	Crawl Space 008	Off	Crawl Space	7h 40min	1/16/2017	0.024 U	0.46	0.21	0.36	2.5	**95**	0.84
N210	17N210-G-03-F	Elevator	near V101	Off	Work Area	NA	1/16/2017	0.028 U	0.03 U	0.046	0.096	0.11	0.54	0.10
N210	18N210-1-01-F	First	143	Off	Work Area	8	1/15/2018	0.02 J	0.023 J	0.076	0.022 J	0.16	1.3	0.099
N210	18N210-1-02-F	First	C117A	Off	Work Area	8	1/15/2018	0.03 U	0.025 J	0.074	0.02 J	0.17	1.4	0.096
N210	18N210-1-04-F	First	138E	Off	Work Area	8	1/15/2018	0.021 J	0.022 J	0.085	0.025 J	0.21	1.9	0.09
N210	18N210-1-05-F	First	146	Off	Work Area	8	1/15/2018	0.026 J	0.029 J	0.07	0.031 J	0.39	1.7	0.084
N210	18N210-1-06-F	First	Q134	Off	Work Area	8	1/15/2018	0.037 U	0.037 U	0.036 J	0.035 U	0.037 U	0.082	0.057
N210	18N210-1-07-F	First	100A	Off	Work Area	8	1/15/2018	0.015 J	0.017 J	0.075	0.018 J	0.15	1.1	0.12
N210	18N210-1-08-F	First	C10	Off	Work Area	8	1/15/2018	0.018 J	0.02 J	0.074	0.024 J	0.17	1.2	0.097
N210	18N210-1-09-F	First	148	Off	Work Area	8	1/15/2018	0.11	0.031 U	0.049	0.011 J	0.031 U	0.086	0.11
N210	18N210-1-10-F	First	near 033 & 036	Off	Work Area	8	1/15/2018	0.021 J	0.036	0.083	0.028 J	0.20	2.6	0.58
N210	18N210-A-01-F	Ambient	NA	Off	Ambient	24	1/15/2018	0.031 U	0.031 U	0.061	0.029 U	0.018 J	0.076	0.21
N210	18N210-C-11-F	Crawl Space	Crawl Space 008	Off	Crawl Space	8	1/15/2018	0.025 J	1.0	0.28	0.42	2.3	**100**	0.86
N210	18N210-G-03-F	Grab	near V101	Off	Grab	Grab	1/15/2018	0.011 J	0.029 U	0.15	0.016 J	0.079	0.56	0.097
N210	18N210-1-12-F-R	First	near 033 & 036	Off	Resample	8	2/19/2018	0.03 U	0.024 J	0.031 U	0.015 J	0.067	2.6	0.051
N210	18N210-C-11-F-R	Crawl Space	Crawl Space 008	Off	Resample	8	2/19/2018	0.029 U	0.41	0.089	0.19	1.1	**60**	0.47
N210	18M310-1-10-F	First	near 033 & 036	Off	Work Area	8	2/21/2018	0.02 J	0.035 J	0.078	0.025 J	0.20	2.4	0.11
N210	18N210-1-12-N-R	First	008	On	Resample	8	2/21/2018	0.03 U	0.03 U	0.021 J	0.028 U	0.03 U	0.06	0.035 J
N210	18N210-C-11-N-R	Crawl Space	Crawl Space 008	On	Resample	8	2/21/2018	0.028 U	0.32	0.086	0.14	0.91	**46**	0.33
N210	18N210-C-11-18Q2-N	Crawl Space	Crawl Space 008	On	Crawl Space	8	6/7/2018	0.026 U	0.59	0.14	0.26	1.5	**65**	0.37
N210	18N210-C-13-18Q2-N	Crawl Space	Crawl Space 040	On	Crawl Space	8	6/7/2018	0.030 U	0.039	0.033	0.022	0.11	4.9	0.066
N210	18N210-C-11-18Q2-F	Crawl Space	Crawl Space 008	Off	Crawl Space	8	6/8/2018	0.025 U	0.17	0.1	0.089	0.51	**25**	0.24
N210	18N210-C-13-18Q2-F	Crawl Space	Crawl Space 040	Off	Crawl Space	8	6/8/2018	0.029 U	0.24	0.11	0.1	0.66	**25**	0.19
N210	19N310-G-03-F	Grab	Near V101	Off	Grab	Grab	2/24/2019	0.029 U	0.029 U	0.029 U	0.029 U	0.14	0.062	0.039
N210	19N210-G-03-F	Grab	Near V101	Off	Duplicate	Grab	2/24/2019	0.026 U	0.026 U	0.026 U	0.026 U	0.16	0.079	0.15
N210	19N210-1-01-F	First	143	Off	Work Area	8	2/24/2019	0.080 U	0.074	0.62 U	0.13 U	0.28	1.9	0.091 J
N210	19N210-1-02-F	First	C117A	Off	Work Area	8	2/24/2019	0.078 U	0.071	0.038 J	0.12 U	0.28	1.9	0.091 J
N210	19N210-C-11-F	Crawl Space	Crawl Space 008	Off	Pathway	8	2/24/2019	0.047 J	0.085	0.095 J	0.12 J	0.88	**55.0**	0.58
N210	19N210-1-08-F	First	C10	Off	Work Area	8	2/24/2019	0.047 J	0.044 J	0.61 U	0.12 U	0.27	1.4	0.12 J
N210	19N210-1-12-F	First	008	Off	Work Area	8	2/24/2019	0.068 J	0.052 J	0.56 U	0.038 J	0.44	2	0.080 J
N210	19N210-1-07-F	First	100A	Off	Work Area	8	2/24/2019	0.057 J	0.042 J	0.62 U	0.13 U	0.32	1.5	0.11 J
N210	19N210-1-10-F	First	Near 033 & 036	Off	Work Area	8	2/24/2019	0.046 J	0.051 J	0.62 U	0.13 U	0.26	1.5	0.094 J
N210	19N210-1-05-F	First	146	Off	Work Area	8	2/24/2019	0.080 U	0.051 J	0.62 U	0.13 U	0.39	1.8	0.074 J
N210	19N210-1-04-F	First	138E	Off	Work Area	8	2/24/2019	0.063 J	0.062 U	0.62 U	0.13 U	0.31	1.6	0.066 J
N239	N239-1-01-N	1	C103	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.015	<0.015	<0.015	0.009 J	0.13
N239	N239-1-02-N	1	C104	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.0091 J	0.027 J
N239	N239-1-03-N	1	191	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.011 J	0.025 J
N239	N239-1-04-N	1	U102	On	Pathway	24 hr	5/24/2012	<0.016	<0.018	<0.016	0.013 J	0.024 J	0.015 J	0.043
N239	N239-1-05-N	1	138S	On	Work Area	24 hr	5/24/2012	<0.014	<0.016	<0.015	<0.015	<0.015	0.014 J	0.027 J

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N239	N239-1-06-N	1	U101	On	Pathway	24 hr	5/24/2012	<0.016	<0.018	<0.016	<0.016	<0.016	0.013 J	0.16
N239	N239-1-07-N	1	102	On	Work Area	24 hr	5/24/2012	0.013 J	<0.022	0.014 J	0.018 J	0.016 J	0.026 J	0.039 J
N239	N239-1-08-N	1	C101	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.0083 J	0.049
N239	N239-2-01-N	2	211	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.017 J	0.024 J
N239	N239-2-03-N	2	275	On	Work Area	24 hr	5/24/2012	<0.016	<0.019	<0.017	<0.017	<0.017	0.0093 J	0.023 J
N239	N239-3-01-N	3	355	On	Work Area	24 hr	5/24/2012	<0.016	<0.019	<0.017	<0.017	<0.017	0.025 J	0.021 J
N239	N239-3-02-N	3	C303	On	Work Area	24 hr	5/24/2012	<0.014	<0.016	<0.015	<0.015	<0.015	0.011 J	0.023 J
N239	N239-4-01-N	4	C401	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.015	<0.015	<0.015	0.0092 J	0.094
N239	N239-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/24/2012	<0.016	<0.018	<0.017	<0.017	<0.017	0.0099 J	0.16
N239	N239-B-01-N	Basement	53A	On	Work Area	24 hr	5/24/2012	<0.017	<0.020	<0.018	<0.018	<0.018	0.0098 J	0.032 J
N239	N239-B-02-N	Basement	53	On	Work Area	24 hr	5/24/2012	<0.013	<0.015	<0.014	<0.014	<0.014	0.0092 J	0.17
N239	N239-B-03-N	Basement	C001	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.0089 J	0.046
N239	N239-B-05-N	Basement	C001	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.0093 J	0.25
N239	N239-B-06-N	Basement	C002	On	Work Area	24 hr	5/24/2012	<0.018	<0.020	<0.019	<0.019	<0.019	0.0077 J	0.025 J
N239	N239-G-04-N	Basement	C001	On	Pathway	Grab hr	5/24/2012	<0.014	<0.016	<0.015	<0.015	<0.015	0.13	0.093
N239	N239-G-07-N	Basement	C004	On	Pathway	Grab hr	5/24/2012	<0.014	<0.016	<0.015	<0.015	<0.015	0.038	0.14
N239	N239-1-01-F	1	C103	Off	Work Area	24 hr	5/27/2012	<0.015	<0.017	<0.016	<0.016	0.017 J	0.07	0.2
N239	M339-1-01-F	1	102	Off	Duplicate	24 hr	5/27/2012	<0.015	<0.017	<0.016	0.016	0.034 J	0.15	0.087 J
N239	N239-1-02-F	1	C104	Off	Work Area	24 hr	5/27/2012	<0.014	<0.015	<0.014	<0.014	0.012 J	0.042	0.12
N239	N239-1-03-F	1	191	Off	Work Area	24 hr	5/27/2012	<0.015	<0.017	<0.016	<0.016	0.014 J	0.046	0.10
N239	N239-1-04-F	1	U102	Off	Pathway	24 hr	5/27/2012	<0.014	<0.016	<0.015	<0.015	0.018 J	0.064	0.12
N239	N239-1-06-F	1	U101	Off	Pathway	24 hr	5/27/2012	<0.015	0.017 J	<0.016	0.0078 J	0.041	0.16	0.23
N239	N239-1-07-F	1	102	Off	Work Area	24 hr	5/27/2012	<0.016	<0.018	<0.017	0.0074 J	0.037 J	0.16	0.160 J
N239	N239-1-08-F	1	C101	Off	Work Area	24 hr	5/27/2012	<0.013	<0.015	<0.014	<0.014	0.021 J	0.082	0.096
N239	N239-2-01-F	2	211	Off	Work Area	24 hr	5/27/2012	<0.013	<0.015	<0.014	<0.014	0.018 J	0.095	0.18
N239	N239-2-02-F	2	U202	Off	Pathway	24 hr	5/27/2012	<0.016	<0.018	<0.017	<0.017	0.019 J	0.066	0.12
N239	N239-2-03-F	2	275	Off	Work Area	24 hr	5/27/2012	<0.016	<0.018	<0.016	<0.016	0.016 J	0.045	0.061
N239	N239-2-04-F	2	U201	Off	Pathway	24 hr	5/27/2012	<0.014	0.021 J	<0.015	0.0089 J	0.059	0.26	0.13
N239	N239-3-01-F	3	355	Off	Work Area	24 hr	5/27/2012	<0.012	<0.014	<0.013	0.0053 J	0.019 J	0.26	0.076
N239	M339-3-01-F	3	U302	Off	Duplicate	24 hr	5/27/2012	<0.016	<0.018	<0.016	<0.016	0.016 J	0.062	0.170 J
N239	N239-3-02-F	3	C303	Off	Work Area	24 hr	5/27/2012	<0.015	<0.017	<0.016	<0.016	0.019 J	0.086	0.12
N239	N239-3-03-F	3	U302	Off	Work Area	24 hr	5/27/2012	<0.013	<0.015	<0.013	<0.013	0.019 J	0.07	0.220 J
N239	N239-4-01-F	4	C401	Off	Work Area	24 hr	5/27/2012	<0.016	0.022 J	<0.017	0.0074 J	0.021 J	0.092	0.12
N239	N239-4-02-F	4	U401	Off	Pathway	24 hr	5/27/2012	<0.012	<0.014	<0.013	<0.013	0.037	0.064	0.020 J
N239	N239-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/27/2012	<0.015	<0.017	<0.016	<0.016	0.014 J	0.025 J	0.024 J
N239	N239-B-01-F	Basement	53A	Off	Work Area	24 hr	5/27/2012	0.061	0.19	0.018 J	0.058	1.1	3.8	0.056 J
N239	M339-B-01-F	Basement	53A	Off	Duplicate	24 hr	5/27/2012	0.059	0.17	0.024 J	0.062	1.1	3.6	0.940 J
N239	N239-B-02-F	Basement	53	Off	Work Area	24 hr	5/27/2012	<0.018	0.023 J	<0.018	<0.018	0.077	0.30	0.098
N239	N239-B-03-F	Basement	C001	Off	Work Area	24 hr	5/27/2012	<0.017	<0.019	<0.017	<0.017	0.032 J	0.14	0.089
N239	N239-B-05-F	Basement	C001	Off	Work Area	24 hr	5/27/2012	<0.015	0.027 J	0.013 J	0.011 J	0.018 J	0.13	0.55
N239	N239-B-06-F	Basement	C002	Off	Work Area	24 hr	5/27/2012	<0.014	0.065	<0.015	0.017 J	0.063	0.29	0.096
N239	N239-G-04-F	Basement	C001	Off	Pathway	Grab hr	5/27/2012	<0.014	<0.016	<0.014	<0.014	0.011 J	1.0	0.14
N239	N239-G-07-F	Basement	C004	Off	Pathway	Grab hr	5/27/2012	<0.013	<0.015	<0.013	0.0069 J	0.0093 J	0.043	0.085
N239	N239-1-05-F	1	138S	Off	Work Area	24 hr	5/28/2012	<0.014	<0.016	<0.014	<0.014	0.019 J	0.065	0.12
N239	14N239-1-02-N	1	C104	On	Work Area	24 hr	2/14/2014	<0.030	<0.033	0.016 J	<0.033	0.063	0.032 J	0.074
N239	14N239-1-03-N	1	189	On	Work Area	24 hr	2/14/2014	<0.030	<0.033	<0.033	<0.033	0.012 J	0.035 J	0.027 J
N239	14N239-1-05-N	1	138S	On	Work Area	24 hr	2/14/2014	<0.029	<0.032	<0.032	<0.032	0.010 J	0.049	0.032 J
N239	14N239-1-07-N	1	102	On	Work Area	24 hr	2/14/2014	<0.027	<0.030	0.013 J	<0.030	0.012 J	0.052	0.038
N239	14N239-1-08-N	1	C101	On	Work Area	24 hr	2/14/2014	<0.034	<0.037	<0.037	<0.037	0.012 J	0.029 J	0.032 J
N239	14N239-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/14/2014	<0.030	<0.033	<0.033	<0.033	<0.035	0.023 J	0.025 J
N239	14M339-B-01-N	Basement	53A	On	Duplicate	24 hr	2/14/2014	<0.028	<0.031	<0.031	<0.031	0.013 J	0.029 J	0.04
N239	14N239-B-01-N	Basement	53A	On	Work Area	24 hr	2/14/2014	<0.029	<0.033	<0.033	<0.033	0.0096 J	0.025 J	0.026 J
N239	14N239-B-02-N	Basement	053	On	Work Area	24 hr	2/14/2014	<0.026	<0.029	<0.029	<0.029	0.010 J	0.028 J	0.029 J
N239	14N239-B-05-N	Basement	C001	On	Work Area	24 hr	2/14/2014	<0.029	<0.032	<0.032	<0.032	0.011 J	0.038 J	0.08
N239	14N239-B-06-N	Basement	C002	On	Work Area	24 hr	2/14/2014	<0.031	<0.034	<0.034	<0.034	0.011 J	0.027 J	0.025 J
N239	14N239-G-04-F	Basement	C001	Off	Pathway	Grab hr	2/16/2014	<0.026	<0.029	<0.029	0.0099 J	0.092	0.41	0.11
N239	14N239-1-02-F	1	C104	Off	Work Area	24 hr	2/17/2014	<0.031	<0.034	0.012 J	<0.034	0.11	0.34	0.063
N239	14N239-1-03-F	1	189	Off	Work Area	24 hr	2/17/2014	<0.029	<0.032	0.012 J	<0.032	0.064	0.21	0.055
N239	14N239-1-05-F	1	138S	Off	Work Area	24 hr	2/17/2014	<0.030	<0.033	<0.033	<0.033	0.039 J	0.097	0.046
N239	14M339-1-07-F	1	102	Off	Duplicate	24 hr	2/17/2014	<0.041	<0.045	<0.045	<0.045	0.047 J	0.13	0.052 J
N239	14N239-1-07-F	1	102	Off	Work Area	24 hr	2/17/2014	<0.041	<0.045	<0.045	<0.045	0.047 J	0.13	0.051 J
N239	14N239-1-08-F	1	C101	Off	Work Area	24 hr	2/17/2014	<0.031	<0.034	<0.034	<0.034	0.079	0.26	0.063

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N239	14N239-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/17/2014	<0.029	<0.032	<0.032	<0.032	0.030 J	0.059	0.04
N239	14N239-B-01-F	Basement	53A	Off	Work Area	24 hr	2/17/2014	0.083	0.12	0.033 J	0.083	1.8	**5.8**	0.061
N239	14N239-B-02-F	Basement	053	Off	Work Area	24 hr	2/17/2014	<0.029	0.022 J	0.012 J	0.013 J	0.17	0.63	0.063
N239	14N239-B-05-F	Basement	C001	Off	Work Area	24 hr	2/17/2014	<0.032	0.017 J	0.021 J	0.017 J	0.19	0.78	0.33
N239	14N239-B-06-F	Basement	C002	Off	Work Area	24 hr	2/17/2014	<0.029	<0.033	0.013 J	0.014 J	0.085	0.34	0.10
N239	16N239-1-02-N	1	C104	On	Work Area	24 hr	1/15/2016	0.036 U	0.038 U	0.014 J	0.038 U	0.044 J	0.1	0.036 J
N239	16N239-1-03-N	1	189	On	Work Area	24 hr	1/15/2016	0.033 U	0.035 U	0.015 J	0.035 U	0.053	0.12	0.11
N239	16N239-1-05-N	1	138S	On	Work Area	24 hr	1/15/2016	0.068 U	0.071 U	0.071 U	0.071 U	0.041 J	0.092	0.033 J
N239	16N239-1-07-N	1	102	On	Work Area	24 hr	1/15/2016	0.033 U	0.035 U	0.015 J	0.035 U	0.041 J	0.094	0.034 J
N239	16N239-1-08-N	1	C101	On	Work Area	24 hr	1/15/2016	0.031 U	0.033 U	0.033 U	0.033 U	0.056	0.033 U	0.031 U
N239	16N239-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/15/2016	0.030 U	0.032 U	0.014 J	0.032 U	0.037 J	0.087	0.041
N239	16N239-B-01-N	Basement	53A	On	Work Area	24 hr	1/15/2016	0.033 U	0.035 U	0.015 J	0.035 U	0.044	0.10	0.035 J
N239	16M339-B-01-N	Basement	53A	On	Duplicate	24 hr	1/15/2016	0.032 U	0.033 U	0.015 J	0.033 U	0.043	0.10	0.035 J
N239	16N239-B-02-N	Basement	053	On	Work Area	24 hr	1/15/2016	0.034 U	0.035 U	0.016 J	0.022 J	0.047	0.11	0.037 J
N239	16N239-B-05-N	Basement	C001	On	Work Area	24 hr	1/15/2016	0.036 U	0.038 U	0.015 J	0.038 U	0.042 J	0.20	0.14
N239	16N239-B-06-N	Basement	C002	On	Work Area	24 hr	1/15/2016	0.038 U	0.039 U	0.015 J	0.039 U	0.044 J	0.098	0.051
N239	16N239-G-04-F	Basement	C001	Off	Pathway	Grab hr	1/17/2016	0.035 U	0.037 U	0.037 U	0.015 J	0.086	0.17	0.026 J
N239	16N239-1-02-F	1	C104	Off	Work Area	24 hr	1/18/2016	0.031 U	0.032 U	0.018 J	0.012 J	0.10	0.28	0.04
N239	16N239-1-03-F	1	189	Off	Work Area	24 hr	1/18/2016	0.035 U	0.037 U	0.015 J	0.092	0.024 J	0.15	0.033 J
N239	16N239-1-05-F	1	138S	Off	Work Area	24 hr	1/18/2016	0.064 U	0.067 U	0.024 J	0.067 U	0.23	0.56	0.033 J
N239	16M339-1-07-F	1	102	Off	Duplicate	24 hr	1/18/2016	0.042 U	0.044 U	0.022 J	0.044 U	0.044 J	0.14	0.031 J
N239	16N239-1-07-F	1	102	Off	Work Area	24 hr	1/18/2016	0.029 U	0.030 U	0.030 U	0.030 U	0.055	0.15	0.035 J
N239	16N239-1-08-F	1	C101	Off	Work Area	24 hr	1/18/2016	0.029 U	0.031 U	0.031 U	0.0098 J	0.066	0.18	0.094
N239	16N239-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/18/2016	0.032 U	0.034 U	0.034 U	0.034 U	0.016 J	0.071	0.040 J
N239	16N239-B-01-F	Basement	53A	Off	Work Area	24 hr	1/18/2016	0.028 J	0.027 J	0.019 J	0.024 J	0.47	1.2	0.039 J
N239	16N239-B-02-F	Basement	053	Off	Work Area	24 hr	1/18/2016	0.032 U	0.033 U	0.014 J	0.028 J	0.086	0.27	0.053
N239	16N239-B-05-F	Basement	C001	Off	Work Area	24 hr	1/18/2016	0.05	0.055	0.023 J	0.064	0.78	2.1	0.15
N239	16N239-B-06-F	Basement	C002	Off	Work Area	24 hr	1/18/2016	0.032 U	0.034 U	0.015 J	0.045	0.066	0.18	0.033 J
N239	17N239-1-02-N	First	C104	On	Work Area	24hr	1/12/2017	0.042 U	0.044 U	0.051 J	0.015 J	0.065	0.16	0.052 J
N239	17N239-1-03-N	First	191	On	Work Area	24hr 5min	1/12/2017	0.036 U	0.038 U	0.049	0.036 U	0.071	0.19	0.052
N239	17N239-1-05-N	First	138S	On	Work Area	24hr	1/12/2017	0.027 U	0.028 U	0.053	0.027 U	0.029 J	0.08	0.051
N239	17N239-1-07-N	First	102	On	Work Area	24hr 6min	1/12/2017	0.028 U	0.03 U	0.051	0.028 U	0.035 J	0.094	0.053
N239	17N239-1-08-N	First	C101	On	Work Area	24hr 2 mn	1/12/2017	0.028 U	0.029 U	0.051	0.028 U	0.045	0.12	0.054
N239	17N239-A-01-N	Ambient	NA	On	Ambient	24hr 5min	1/12/2017	0.025 U	0.027 U	0.05	0.025 U	0.027 U	0.021 J	0.057
N239	17N239-B-01-N	Basement	53A	On	Work Area	24hr 5min	1/12/2017	0.028 U	0.029 U	0.048	0.028 U	0.051	0.14	0.053
N239	17M339-B-01-N	Basement	53A	On	Work Area	24hr 5min	1/12/2017	0.027 U	0.029 U	0.052	0.054	0.052	0.14	0.053
N239	17N239-B-02-N	Basement	053	On	Work Area	24hr 2 min	1/12/2017	0.048 U	0.051 U	0.038 J	0.048 U	0.051 U	0.032 J	0.057 J
N239	17N239-B-05-N	Basement	C001	On	Work Area	23h 59min	1/12/2017	0.024 U	0.025 U	0.049	0.0083 J	0.052	0.13	0.089
N239	17N239-B-06-N	Basement	C002	On	Work Area	23h 59min	1/12/2017	0.028 U	0.03 U	0.054	0.028 U	0.05	0.14	0.12
N239	17N239-1-02-F	First	C104	Off	Work Area	23h 13min	1/15/2017	0.025 J	0.016 J	0.088	0.041	0.38	0.87	0.10
N239	17N239-1-03-F	First	138S	Off	Work Area	23h 10min	1/15/2017	0.027 U	0.028 U	0.069	0.0099 J	0.09	0.21	0.065
N239	17N239-1-05-F	First	102	Off	Work Area	23h 19min	1/15/2017	0.022 J	0.015 J	0.088	0.028 U	0.31	0.73	0.089
N239	17N239-1-07-F	First	C101	Off	Work Area	23h 17min	1/15/2017	0.024 U	0.025 U	0.068	0.0098 J	0.06	0.15	0.064
N239	17M339-1-07-F	First	C101	Off	Work Area	23h 16min	1/15/2017	0.026 U	0.028 U	0.16	0.026 U	0.079	0.14	0.085
N239	17N239-1-08-F	First	Basement	Off	Work Area	23h 15min	1/15/2017	0.03 J	0.02 J	0.096	0.028 J	0.43	0.96	0.15
N239	17N239-A-01-F	Ambient	NA	Off	Ambient	23h 17min	1/15/2017	0.029 U	0.03 U	0.074	0.029 U	0.016 J	0.04	0.057
N239	17N239-B-01-F	Basement	53A	Off	Work Area	23h 7min	1/15/2017	0.26	0.22	0.13	0.15	4.2	**11**	0.10
N239	17N239-B-02-F	Basement	053	Off	Work Area	23h 8min	1/15/2017	0.033 J	0.027 J	0.072	0.031 J	0.55	1.4	0.067
N239	17N239-B-05-F	Basement	C002	Off	Work Area	23h 8min	1/15/2017	0.039	0.036	0.093	0.049	0.40	0.95	0.37
N239	17N239-B-06-F	Basement	C104	Off	Work Area	23h 7min	1/15/2017	0.035 J	0.023 J	0.082	0.036 J	0.52	1.1	0.33
N239	17N239-G-04-F	Elevator	C001	Off	Work Area	N/a	1/15/2017	0.026 J	0.018 J	0.089	0.026 J	0.36	0.81	0.20
N239	18N239-1-02-N	First	C104	On	Work Area	24	1/11/2018	0.03 U	0.03 U	0.096	0.029 U	0.06	0.19	0.18
N239	18N239-1-03-N	First	189	On	Work Area	24	1/11/2018	0.03 U	0.03 U	0.073	0.0092 J	0.076	0.22	0.067
N239	18N239-1-05-N	First	138S	On	Work Area	24	1/11/2018	0.026 U	0.026 U	0.051	0.026 J	0.077	0.24	0.13
N239	18N239-1-07-N	First	102	On	Work Area	24	1/11/2018	0.026 U	0.026 U	0.063	0.025 U	0.03 J	0.087	0.046
N239	18N239-1-08-N	First	C101	On	Work Area	24	1/11/2018	0.026 U	0.026 U	0.058	0.02 J	0.028 J	0.22	0.18
N239	18N239-1-09-N	First	144	On	Work Area	24	1/11/2018	0.032 U	0.032 U	0.062	0.03 U	0.014 J	0.045	0.047
N239	18N239-A-01-N	Ambient	NA	On	Ambient	24	1/11/2018	0.026 U	0.026 U	0.079	0.025 U	0.013 J	0.053	0.11
N239	18N239-B-01-N	Basement	53A	On	Work Area	24	1/11/2018	0.03 U	0.03 U	0.076	0.015 J	0.054	0.15	0.07
N239	18M339-B-01-N	Basement	53A	On	Work Area	24	1/11/2018	0.026 U	0.026 U	0.067	0.0082 J	0.05	0.20	0.053
N239	18N239-B-02-N	Basement	053	On	Work Area	24	1/11/2018	0.025 U	0.025 U	0.02 J	0.0081 J	0.049	0.17	0.096
N239	18N239-B-05-N	Basement	C001	On	Work Area	24	1/11/2018	0.032 U	0.032 U	0.068	0.01 J	0.05	0.081	0.056

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N239	18N239-B-06-N	Basement	C002	On	Work Area	24	1/11/2018	0.025 U	0.025 U	0.068	0.0074 J	0.042	0.13	0.065
N239	18N239-1-02-F	First	C104	Off	Work Area	24	1/14/2018	0.21	0.19	0.22	0.13	3.1	**10**	0.28
N239	18N239-1-03-F	First	189	Off	Work Area	24	1/14/2018	0.018 J	0.014 J	0.20	0.013 J	0.15	0.50	0.069
N239	18N239-1-05-F	First	102	Off	Work Area	24	1/14/2018	0.14	0.12	0.13	0.092	1.7	**5.6**	0.24
N239	18N239-1-07-F	First	C101	Off	Work Area	24	1/14/2018	0.031 U	0.031 U	0.07	0.029 U	0.11	0.39	0.052 J
N239	18M339-1-07-F	First	C101	Off	Duplicate	24	1/14/2018	0.03 U	0.03 U	0.062	0.012 J	0.11	0.39	0.076 J
N239	18N239-1-08-F	First	C101	Off	Work Area	24	1/14/2018	0.078	0.068	0.10	0.055	1.1	3.7	0.27
N239	18N239-1-09-F	First	144	Off	Work Area	24	1/14/2018	0.022 J	0.017 J	0.069	0.017 J	0.28	0.94	0.27
N239	18N239-A-01-F	Ambient	NA	Off	Ambient	24	1/14/2018	0.028 U	0.028 U	0.061	0.027 U	0.017 J	0.054	0.06
N239	18N239-B-01-F	Basement	53A	Off	Work Area	24	1/14/2018	0.49	0.44	0.19	0.28	7.0	**24**	0.13
N239	18N239-B-02-F	Basement	053	Off	Work Area	24	1/14/2018	0.065	0.062	0.076	0.04	0.81	2.7	0.064
N239	18N239-B-05-F	Basement	C002	Off	Work Area	24	1/14/2018	0.10	0.095	0.093	0.075	1.3	4.5	0.45
N239	18N239-B-06-F	Basement	C104	Off	Work Area	24	1/14/2018	0.041	0.029 J	0.067	0.034	0.39	1.3	0.11
N239	18N239-G-04-F	Grab	C001	Off	Grab	Grab	1/14/2018	0.093	0.082	0.15	0.062	1.3	4.2	0.18
N239	18N239-1-02-F-R	First	C104	Off	Resample	24	2/18/2018	0.032 U	0.032 U	0.09	0.03 U	0.04	0.18	0.059
N239	18N239-1-05-F-R	First	138S	Off	Resample	24	2/18/2018	0.03 U	0.03 U	0.059	0.0096 J	0.07	0.3	0.93
N239	18N239-1-02-N-R	First	C104	On	Resample	24	2/21/2018	0.031 U	0.031 U	0.022 J	0.03 U	0.03 J	0.074	0.033 J
N239	18N239-1-05-N-R	First	138S	On	Resample	24	2/21/2018	0.031 U	0.031 U	0.032 U	0.029 U	0.014 J	0.04	0.035 J
N239	19N239-1-02-N	First	C104	On	Work Area	10	2/15/2019	0.034 U	0.034 U	0.041	0.011 J	0.041	0.11	0.03 J
N239	19N239-1-03-N	First	191	On	Work Area	10	2/15/2019	0.027 U	0.027 U	0.024 J	0.027 U	0.046	0.13	0.033
N239	19N239-1-05-N	First	138S	On	Work Area	10	2/15/2019	0.026 U	0.026 U	0.023 J	0.026 U	0.045	0.066	0.059
N239	19N239-1-07-N	First	C101	On	Work Area	10	2/15/2019	0.034 U	0.034 U	0.022 J	0.034 U	0.026 J	0.064	0.026 J
N239	19N239-1-08-N	First	C101	On	Work Area	10	2/15/2019	0.032 U	0.032 U	0.028 J	0.032 U	0.028 J	0.13	0.036 J
N239	19N239-A-01-N	Ambient	N/A	On	Ambient	24	2/15/2019	0.033 U	0.033 U	0.017 J	0.033 U	0.016 J	0.045	0.033 J
N239	19N239-B-01-N	Basement	53A	On	Work Area	10	2/15/2019	0.025 U	0.025 U	0.021 J	0.025 U	0.033	0.089	0.027 J
N239	19N239-B-02-N	Basement	053	On	Work Area	10	2/15/2019	0.03 U	0.03 U	0.02 J	0.03 U	0.035 J	0.097	0.025 J
N239	19N239-B-05-N	Basement	C001	On	Work Area	10	2/15/2019	0.025 U	0.025 U	0.018 J	0.0086 J	0.035	0.09	0.079
N239	19N239-B-06-N	Basement	C002	On	Work Area	10	2/15/2019	0.025 U	0.025 U	0.03 J	0.025 U	0.037	0.1	0.027 J
N239	19N239-1-02-F	First	C104	Off	Work Area	10	2/24/2019	0.03 U	0.03 U	0.015 J	0.03 U	0.03 U	0.043	0.044
N239	19N239-1-03-F	First	191	Off	Work Area	10	2/24/2019	0.031 U	0.031 U	0.018 J	0.01 J	0.019 J	0.064	0.054
N239	19N239-1-05-F	First	138S	Off	Work Area	10	2/24/2019	0.029 U	0.029 U	0.015 J	0.0097 J	0.014 J	0.057	0.049
N239	19N239-B-01-F	Basement	53A	Off	Work Area	10	2/24/2019	0.013 J	0.03 U	0.02 J	0.0089 J	0.1	0.33	0.049
N239	19N239-B-02-F	Basement	053	Off	Work Area	10	2/24/2019	0.025 U	0.025 U	0.018 J	0.045	0.05	0.11	0.069
N239	19N239-B-05-F	Basement	C001	Off	Work Area	10	2/24/2019	0.031 U	0.031 U	0.019 J	0.031 U	0.019 J	0.067	0.1
N239	19N239-B-06-F	Basement	C002	Off	Work Area	10	2/24/2019	0.03 U	0.03 U	0.012 J	0.011 J	0.022 J	0.081	0.1
N239	19N339-G-04-F	Grab	C001	Off	Duplicate	Grab	2/24/2019	0.027 U	0.027 U	0.019 J	0.027 U	0.018 J	0.063	0.18
N239	19N239-G-04-F	Grab	C001	Off	Grab	Grab	2/24/2019	0.028 U	0.028 U	0.018 J	0.028 U	0.016 J	0.057	0.12
N239	19N339-G-05-F	Grab	C001	Off	Duplicate	Grab	2/24/2019	0.028 U	0.028 U	0.021 J	0.028 U	0.017 J	0.061	0.12
N239	19N239-G-05-F	Grab	C001	Off	Grab	Grab	2/24/2019	0.03 U	0.03 U	0.02 J	0.03 U	0.017 J	0.087	0.22
N239A	M439-1-01-N	1	144	On	Duplicate	24 hr	5/22/2012	<0.016	<0.018	<0.016	<0.016	0.065	0.20	0.023 J
N239A	N239A-1-02-N	1	145	On	Work Area	24 hr	5/22/2012	<0.014	<0.016	<0.015	<0.015	0.064	0.21	0.11
N239A	N239A-1-03-N	1	120	On	Work Area	24 hr	5/22/2012	0.016 J	0.024 J	0.0075 J	0.024 J	0.34	1.7	0.11
N239A	N239A-1-04-N	1	120	On	Work Area	24 hr	5/22/2012	0.021 J	0.029 J	<0.016	0.027 J	0.42	2.0	0.055
N239A	N239A-1-06-N	1	C102	On	Work Area	24 hr	5/22/2012	0.034 J	0.043	0.0096 J	0.023 J	0.49	1.8	0.032 J
N239A	N239A-1-08-N	1	125	On	Work Area	24 hr	5/22/2012	<0.016	0.023 J	<0.016	0.021 J	0.34	1.5	0.040 J
N239A	N239A-1-09-N	1	144	On	Work Area	24 hr	5/22/2012	<0.016	<0.018	<0.016	<0.016	0.072	0.22	0.024 J
N239A	N239A-2-01-N	2	226	On	Work Area	24 hr	5/22/2012	0.014 J	0.032 J	<0.015	0.022 J	0.45	1.6	0.21
N239A	N239A-B-01-N	Basement	Basement	On	Work Area	24 hr	5/22/2012	0.0085 J	<0.016	<0.014	0.0083 J	0.074	0.34	0.083
N239A	N239A-G-07-N	1	142	On	Pathway	Grab hr	5/22/2012	<0.020	<0.022	<0.020	<0.020	0.019 J	0.15	0.032 J
N239A	M439-1-01-F	1	144	Off	Duplicate	24 hr	5/27/2012	<0.012	<0.014	<0.013	<0.013	0.087	0.30	0.033 J
N239A	N239A-1-02-F	1	145	Off	Work Area	24 hr	5/27/2012	<0.014	<0.016	<0.015	<0.015	0.045	0.20	0.088
N239A	N239A-1-03-F	1	120	Off	Work Area	24 hr	5/27/2012	0.017 J	0.036	<0.013	0.016 J	0.26	1.4	0.088
N239A	N239A-1-04-F	1	120	Off	Work Area	24 hr	5/27/2012	0.020 J	0.044	<0.015	0.020 J	0.31	1.6	0.082
N239A	N239A-1-05-F	1	102	Off	Work Area	24 hr	5/27/2012	<0.014	<0.016	<0.014	<0.014	0.013 J	0.025 J	0.021 J
N239A	N239A-1-06-F	1	C102	Off	Work Area	24 hr	5/27/2012	0.10	0.15	0.025 J	0.073	1.6	**6.8**	0.052
N239A	N239A-1-08-F	1	125	Off	Work Area	24 hr	5/27/2012	0.037 J	0.071	0.020 J	0.035 J	0.41	1.9	0.10
N239A	N239A-1-09-F	1	144	Off	Pathway	24 hr	5/27/2012	<0.016	<0.018	<0.017	<0.017	0.088	0.31	0.064 J
N239A	N239A-2-01-F	2	226	Off	Work Area	24 hr	5/27/2012	0.044 J	0.058	0.0093 J	0.034 J	0.49	2.0	0.055
N239A	N239A-B-01-F	Basement	Basement	Off	Pathway	24 hr	5/27/2012	0.032 J	0.037 J	<0.018	0.017 J	0.26	1.2	0.42
N239A	N239A-G-07-F	1	142	Off	Pathway	Grab hr	5/28/2012	<0.022	<0.025	<0.023	0.010 J	0.13	0.82	0.041 J
N239A	13N239A-1-06-N	1	C102	On	Confirmation	24 hr	5/24/2013	0.011 J	0.013 J	<0.019	0.021 J	0.13	0.53	0.033 J
N239A	13N239A-1-10-N	1	U101	On	Work Area	24 hr	5/24/2013	0.033 J	0.045 J	<0.021	0.067	0.43	1.8	0.11

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N239A	13N239A-1-11-N	1	U102	On	Duplicate	24 hr	5/24/2013	0.17	0.23	0.039	0.11	2.4	**10**	0.066
N239A	13N239A-1-11-N	1	U102	On	Work Area	24 hr	5/24/2013	0.17	0.23	0.04	0.11	2.3	**9.7**	0.066
N239A	13N239-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/24/2013	<0.0070	<0.0076	<0.015	0.074	<0.015	0.024 J	0.029 J
N239A	13N239A-G-10-N	1	U101	On	Conduit	Grab hr	5/24/2013	0.026 J	0.028 J	<0.015	0.058	1.5	**6.3**	0.16
N239A	13N239A-G-10-F	1	U101	Off	Conduit	Grab hr	5/26/2013	<0.0075	<0.0082	<0.016	0.033 J	0.53	3.6	0.10
N239A	13N239A-1-06-F	1	C102	Off	Confirmation	24 hr	5/27/2013	<0.0086	<0.0095	<0.019	0.015 J	<0.019	0.039 J	0.021 J
N239A	13N239A-1-10-F	1	U101	Off	Work Area	24 hr	5/27/2013	<0.0076	<0.0084	<0.017	0.017 J	0.05	0.41	0.079
N239A	13N239A-1-11-F	1	U102	Off	Work Area	24 hr	5/27/2013	0.0091 J	0.010 J	<0.015	0.010 J	0.12	0.6	0.067
N239A	13N239-A-01-F	Ambient Air	NA	NH	Background	24 hr	5/27/2013	<0.0069	<0.0075	<0.015	0.0054 J	<0.015	0.0085 J	0.016 J
N239A	14N239A-1-03-N	1	120	On	Work Area	24 hr	2/14/2014	<0.031	0.011 J	<0.035	<0.035	0.20	0.66	0.056
N239A	14N239A-1-05-N	1	102	On	Work Area	24 hr	2/14/2014	<0.029	<0.032	<0.032	<0.032	0.035 J	0.10	0.027 J
N239A	14N239A-1-06-N	1	C102	On	Work Area	24 hr	2/14/2014	0.11	0.12	0.035 J	0.072	1.8	**5.6**	0.046
N239A	14N239A-1-08-N	1	125	On	Work Area	24 hr	2/14/2014	0.022 J	0.023 J	0.011 J	0.018 J	0.39	1.2	0.099
N239A	14N239A-1-09-N	1	144	On	Work Area	24 hr	2/14/2014	0.014 J	0.014 J	<0.034	0.013 J	0.28	0.73	0.032 J
N239A	14M339A-1-10-N	1	U101	On	Duplicate	24 hr	2/14/2014	0.72	0.74	0.19	0.49	14	**40**	0.13
N239A	14N239A-1-10-N	1	U101	On	Work Area	24 hr	2/14/2014	0.90	0.72	0.21	0.47	13	**39**	0.13
N239A	14N239A-1-11-N	1	U102	On	Work Area	24 hr	2/14/2014	0.027 J	0.027 J	0.013 J	0.024 J	0.50 J	1.5 J	0.10 J
N239A	14N239A-B-01-N	Basement	Basement	On	Work Area	24 hr	2/14/2014	<0.029	<0.032	0.0099 J	<0.032	0.12	0.33	0.056
N239A	14N239A-1-03-F	1	120	Off	Work Area	24 hr	2/17/2014	<0.045	<0.050	<0.050	0.025 J	0.25	1.1	0.19
N239A	14N239A-1-05-F	1	102	Off	Work Area	24 hr	2/17/2014	<0.040	<0.044	<0.044	<0.044	0.044 J	0.088	0.049 J
N239A	14N239A-1-06-F	1	C102	Off	Work Area	24 hr	2/17/2014	<0.029	<0.033	0.013 J	<0.033	0.065	0.15	0.055
N239A	14N239A-1-08-F	1	125	Off	Work Area	24 hr	2/17/2014	<0.030	<0.034	<0.034	<0.034	0.051	0.37	0.087
N239A	14N239A-1-09-F	1	144	Off	Pathway	24 hr	2/17/2014	<0.058	<0.064	<0.064	<0.064	0.24	0.62	0.067 J
N239A	14M339A-1-10-F	1	U101	Off	Duplicate	24 hr	2/17/2014	<0.027	<0.030	0.016 J	<0.030	0.074	0.4	0.13
N239A	14N239A-1-10-F	1	U101	Off	Work Area	24 hr	2/17/2014	<0.027	<0.030	0.011 J	<0.030	0.07	0.38	0.11
N239A	14N239A-1-11-F	1	U102	Off	Work Area	24 hr	2/17/2014	<0.030	<0.033	0.012 J	<0.033	0.15	0.67	0.12
N239A	14N239A-B-01-F	Basement	Basement	Off	Pathway	24 hr	2/17/2014	<0.028	<0.030	0.015 J	<0.030	0.084	0.55	0.13
N239A	16N239A-1-03-N	1	120	On	Work Area	24 hr	1/15/2016	0.053	0.052	0.031 J	0.048	1.1	2.6	0.086
N239A	16N239A-1-06-N	1	C102	On	Work Area	24 hr	1/15/2016	0.084	0.076	0.038 J	0.062	1.6	3.5	0.054
N239A	16N239A-1-08-N	1	125	On	Work Area	24 hr	1/15/2016	0.026 J	0.024 J	0.045	0.027 J	0.52	1.2	0.056
N239A	16N239A-1-09-N	1	144	On	Work Area	24 hr	1/15/2016	0.20	0.18	0.071	0.15	4.3	**8.7**	0.10
N239A	16M339A-1-10-N	1	U101	On	Duplicate	24 hr	1/15/2016	0.16	0.24	0.071	0.23	5.3	**12**	0.20
N239A	16N239A-1-10-N	1	U101	On	Work Area	24 hr	1/15/2016	0.18	0.28	0.081	0.25	6.1	**14**	0.22
N239A	16N239-A-1-11-N	1	U102	On	Work Area	24 hr	1/15/2016	0.053	0.05	0.029 J	0.045	1.1	2.4	0.076
N239A	16N239A-B-01-N	Basement	Basement	On	Work Area	24 hr	1/15/2016	0.032 U	0.033 U	0.055	0.027 J	0.46	0.76	0.075
N239A	16N239A-1-03-F	1	120	Off	Work Area	24 hr	1/18/2016	0.034 U	0.035 U	0.046	0.014 J	0.19	0.72	0.081
N239A	16N239A-1-06-F	1	C102	Off	Work Area	24 hr	1/18/2016	0.031 U	0.033 U	0.025 J	0.018 J	0.12	0.35	0.051
N239A	16N239A-1-08-F	1	125	Off	Work Area	24 hr	1/18/2016	0.014 J	0.033 U	0.091	0.026 J	0.25	0.93	0.092
N239A	16N239A-1-09-F	1	144	Off	Pathway	24 hr	1/18/2016	0.021 J	0.018 J	0.018 J	0.020 J	0.58	1.1	0.064
N239A	16M339A-1-10-F	1	U101	Off	Duplicate	24 hr	1/18/2016	0.021 J	0.018 J	0.05	0.028 J	0.34	1.0	0.088
N239A	16N239A-1-10-F	1	U101	Off	Work Area	24 hr	1/18/2016	0.020 J	0.018 J	0.051	0.019 J	0.33	1.0	0.099
N239A	16N239A-1-11-F	1	U102	Off	Work Area	24 hr	1/18/2016	0.020 J	0.017 J	0.058	0.018 J	0.32	0.99	0.091
N239A	16N239A-B-01-F	Basement	Basement	Off	Pathway	24 hr	1/18/2016	0.032 U	0.017 J	0.11	0.047	0.20	0.79	0.12
N239A	17N239A-1-03-N	First	120	On	Work Area	24 hr	1/10/2017	0.085	0.075	0.025 J	0.055	1.4	3.6	0.069
N239A	17N239A-1-05-N	First	104	On	Work Area	24 hr	1/10/2017	0.023 J	0.019 J	0.033 U	0.018 J	0.36	0.92	0.035 J
N239A	17N239A-1-06-N	First	C102	On	Work Area	24 hr	1/10/2017	0.18	0.16	0.039	0.11	3.1	**7.0**	0.05
N239A	17N239A-1-08-N	First	125	On	Work Area	24 hr	1/10/2017	0.016 J	0.012 J	0.014 J	0.018 J	0.26	3.3	0.048
N239A	17N239A-1-09-N	First	144	On	Work Area	24 hr	1/10/2017	0.016 J	0.013 J	0.029 J	0.026 J	0.20	0.47	0.038
N239A	17N239A-1-10-N	First	U101	On	Work Area	24 hr	1/10/2017	0.29	0.27	0.068	0.20	5.4	**12**	0.19
N239A	17M339A-1-10-N	First	C102	On	Work Area	24 hr	1/10/2017	0.29	0.25	0.067	0.18	5.2	**13**	0.24
N239A	17N239A-1-11-N	First	U102	On	Work Area	24 hr	1/10/2017	0.22	0.19	0.05	0.13	3.7	**8.8**	0.074
N239A	17N239A-B-01-N	Basement	Basement under 120	On	Work Area	24 hr	1/10/2017	0.016 J	0.013 J	0.013 J	0.018 J	0.24	0.73	0.045
N239A	17N239A-1-03-F	First	120	Off	Work Area	23h 51min	1/15/2017	0.028 U	0.03 U	0.066	0.028 U	0.076	0.47	0.11
N239A	17N239A-1-05-F	First	102	Off	Work Area	23h 51min	1/15/2017	0.029 U	0.03 U	0.08	0.029 U	0.024 J	0.071	0.054
N239A	17N239A-1-06-F	First	C102	Off	Work Area	23h 33min	1/15/2017	0.013 J	0.031 U	0.081	0.018 J	0.042	0.095	0.075
N239A	17N239A-1-08-F	First	125	Off	Work Area	23h 14min	1/15/2017	0.028 U	0.03 U	0.085	0.015 J	0.14	**10**	0.10
N239A	17N239A-1-09-F	First	144	Off	Work Area	23h 31min	1/15/2017	0.03 U	0.032 U	0.067	0.03 U	0.12	0.51	0.082
N239A	17N239A-1-10-F	First	U101	Off	Work Area	23h 15min	1/15/2017	0.015 J	0.013 J	0.08	0.013 J	0.24	0.95	0.11
N239A	17M339A-1-10-F	First	U101	Off	Work Area	23h 13min	1/15/2017	0.012 J	0.032 U	0.085	0.012 J	0.21	0.85	0.12
N239A	17N239A-1-11-F	First	U102	Off	Work Area	23h 51min	1/15/2017	0.027 U	0.029 U	0.08	0.0099 J	0.15	0.68	0.11
N239A	17N239A-B-01-F	Basement	Basement	Off	Work Area	23h 49min	1/15/2017	0.026 U	0.028 U	0.041	0.0091 J	0.035	0.29	0.088
N239A	18N239A-1-03-N	First	120	On	Work Area	24 hr	1/11/2018	0.016 J	0.013 J	0.086	0.016 J	0.22	0.78	0.084

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N239A	18N239A-1-05-N	First	102	On	Work Area	24 hr	1/11/2018	0.033 U	0.033 U	0.069	0.032 U	0.093	0.33	0.18
N239A	18N239A-1-06-N	First	C102	On	Work Area	24 hr	1/11/2018	0.034 UJ	0.034 UJ	0.074 J	0.032 UJ	0.04 J	0.13 J	0.18 J
N239A	18N239A-1-08-N	First	125	On	Work Area	24 hr	1/11/2018	0.03 J	0.028 J	0.12	0.023 J	0.46	1.5	0.075
N239A	18N239A-1-09-N	First	144	On	Work Area	24 hr	1/11/2018	0.033 U	0.033 U	0.078	0.032 U	0.082	0.33	0.093
N239A	18N239A-1-10-N	First	U101	On	Work Area	24 hr	1/11/2018	0.015 J	0.027 J	0.082	0.033 J	0.42	1.6	0.11
N239A	18M339A-1-10-N	First	U101	On	Duplicate	24 hr	1/11/2018	0.016 J	0.023 J	0.076	0.025 J	0.34	1.3	0.12
N239A	18N239A-1-11-N	First	U102	On	Work Area	24 hr	1/11/2018	0.052	0.043	0.082	0.034 J	0.75	2.3	0.14
N239A	18N239A-B-01-N	Basement	Basement	On	Work Area	24 hr	1/11/2018	0.03 U	0.03 U	0.082	0.029 U	0.076	0.31	0.071
N239A	18N239A-1-03-F	First	120	Off	Work Area	24	1/14/2018	0.03 U	0.03 U	0.06	0.029 U	0.033 J	0.23	0.099
N239A	18N239A-1-05-F	First	102	Off	Work Area	24	1/14/2018	0.029 U	0.029 U	0.053	0.027 U	0.019 J	0.065	0.059
N239A	18N239A-1-06-F	First	C102	Off	Work Area	24	1/14/2018	0.03 U	0.03 U	0.059	0.029 U	0.023 J	0.076	0.059
N239A	18N239A-1-08-F	First	125	Off	Work Area	24	1/14/2018	0.026 U	0.026 U	0.064	0.025 U	0.031 J	0.26	0.091
N239A	18N239A-1-09-F	First	144	Off	Work Area	24	1/14/2018	0.036 UJ	0.036 UJ	0.066 J	0.024 J	0.047 J	0.19 J	0.095 J
N239A	18N239A-1-10-F	First	U101	Off	Work Area	24	1/14/2018	0.03 U	0.03 U	0.057	0.029 U	0.034 J	0.21	0.11
N239A	18M339A-1-10-F	First	U101	Off	Duplicate	24	1/14/2018	0.03 U	0.03 U	0.063	0.029 U	0.037	0.21	0.11
N239A	18N239A-1-11-F	First	U102	Off	Work Area	24	1/14/2018	0.034 U	0.034 U	0.062	0.033 U	0.035 J	0.21	0.11
N239A	18N239A-B-01-F	Basement	Basement	Off	Work Area	24	1/14/2018	0.028 U	0.028 U	0.057	0.027 U	0.027 J	0.16	0.078
N239A	19N239A-1-03-F	First	120	Off	Work Area	10	2/24/2019	0.095	0.061	0.037	0.038	0.99	2.9	0.13
N239A	19N239A-1-06-F	First	C102	Off	Work Area	10	2/24/2019	0.087 U	0.087 U	0.087 U	0.037 J	0.087 U	0.11	0.046 J
N239A	19N239A-1-08-F	First	125	Off	Work Area	10	2/24/2019	0.092	0.059	0.041	0.034	0.96	2.8	0.087
N239A	19N239A-1-09-F	First	144	Off	Work Area	10	2/24/2019	0.059	0.038	0.035	0.026 J	0.61	1.7	0.1
N239A	19N239A-1-10-F	First	U101	Off	Pathway	10	2/24/2019	0.038	0.026 U	0.026 U	0.013 J	0.052	0.097	0.053
N239A	19N239A-1-11-F	First	U102	Off	Pathway	10	2/24/2019	0.082 J	0.13 U	0.13 U	0.067 J	0.8	2.5	0.11 J
N239A	19N239A-B-01-F	Basement	Basement	Off	Pathway	10	2/24/2019	0.068	0.043	0.021 J	0.029 J	0.71	2.0	0.071
N239A	19N239A-1-09-N	First	144	On	Work Area	10	2/26/2019	0.042 J	0.064 U	0.64 U	0.13 U	0.58	1.3	0.22 U
N239A	19N339A-1-09-N	First	144	On	Duplicate	10	2/26/2019	0.058 J	0.064 U	0.64 U	0.13 U	0.72	1.5	0.22 U
N239A	19N239A-B-01-N	Basement	Basement	On	Pathway	10	2/26/2019	0.080 U	0.062 U	0.62 U	0.13 U	0.12 U	0.096 J	0.21 U
N239A	19N239A-1-03-N	First	120	On	Work Area	10	2/26/2019	0.075 U	0.058 U	0.58 U	0.12 U	0.12 U	0.16	0.20 U
N239A	19N239A-1-05-N	First	102	On	Work Area	10	2/26/2019	0.082 U	0.063 U	0.63 U	0.13 U	0.13 U	0.17 U	**2.9**
N239A	19N239A-1-06-N	First	C102	On	Work Area	10	2/26/2019	0.076 U	0.059 U	0.59 U	0.12 U	0.12 U	0.16 U	0.20 U
N239A	19N339A-1-06-N	First	U101	On	Duplicate	10	2/26/2019	0.090 U	0.070 U	0.70 U	0.14 U	0.14 U	0.19 U	0.24 U
N239A	19N239A-1-11-N	First	U102	On	Pathway	10	2/26/2019	0.11 U	0.086 U	0.86 U	0.18 U	0.17 U	0.23 J	0.29 U
N239A	19N239A-1-10-N	First	U101	On	Pathway	10	2/26/2019	0.083 U	0.065 U	0.65 U	0.13 U	0.13 U	0.18 U	0.22 U
N239A	19N239A-1-08-N	First	125	On	Work Area	10	2/26/2019	0.081 U	0.063 U	0.63 U	0.13 U	0.12 U	0.10 J	0.21 U
N243	N243-1-01-N	1	136	On	Work Area	24 hr	5/24/2012	<0.016	<0.018	<0.016	<0.016	<0.016	0.021 J	0.27 J
N243	M343-1-01-N	1	136	On	Duplicate	24 hr	5/24/2012	<0.021	<0.023	<0.021	<0.021	<0.021	0.022 J	0.11 J
N243	N243-1-02-N	1	C104	On	Work Area	24 hr	5/24/2012	<0.014	<0.016	<0.015	<0.015	<0.015	0.020 J	0.10
N243	N243-1-03-N	1	C103	On	Work Area	24 hr	5/24/2012	<0.013	<0.014	<0.013	0.0061 J	0.013 J	0.038	0.076
N243	N243-2-01-N	2	C202	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.022 J	0.045
N243	N243-2-02-N	2	248	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.015	<0.015	<0.015	0.021 J	0.047
N243	N243-2-03-N	2	C207	On	Work Area	24 hr	5/24/2012	<0.017	<0.019	<0.017	<0.017	<0.017	0.018 J	0.062
N243	N243-3-01-N	3	N310	On	Pathway	24 hr	5/24/2012	<0.015	<0.017	<0.015	<0.015	<0.015	0.013 J	0.022J
N243	M243-A-01-N	Ambient Air	NA	NH	Background	24 hr	5/24/2012	<0.017	<0.019	<0.017	<0.017	<0.017	0.0083 J	0.024 J
N243	M243-A-02-N	Intake	NA	On	Intake	24 hr	5/24/2012	<0.012	<0.014	<0.013	<0.013	<0.013	<0.013	0.20
N243	N243-B-01-N	Basement	63	On	Work Area	24 hr	5/24/2012	<0.016	<0.018	<0.017	<0.017	0.013 J	0.029 J	0.047
N243	N243-B-02-N	Basement	C002	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	<0.016	<0.016	0.023 J	0.079
N243	N243-B-03-N	Basement	N032	On	Pathway	24 hr	5/24/2012	<0.012	<0.014	<0.013	0.0053 J	<0.013	0.0075 J	0.066 J
N243	M343-B-03-N	Basement	N032	On	Duplicate	24 hr	5/24/2012	<0.014	<0.016	<0.014	0.014	<0.014	0.0075 J	0.022 J
N243	N243-B-04-N	Basement	C008	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.015	0.0069 J	<0.015	0.015 J	0.023 J
N243	N243-B-06-N	Basement	50	On	Work Area	24 hr	5/24/2012	<0.016	<0.018	<0.017	<0.017	0.0099 J	0.027 J	0.033 J
N243	N243-B-07-N	Basement	54	On	Work Area	24 hr	5/24/2012	<0.015	<0.017	<0.016	0.015 J	0.18	0.6	0.35
N243	N243-B-08-N	Basement	C010	On	Pathway	24 hr	5/24/2012	0.058	0.021 J	0.0081 J	0.026 J	0.92	0.15	0.14
N243	M343-B-08-N	Basement	C010	On	Duplicate	24 hr	5/24/2012	0.056	0.018 J	0.015	0.024 J	0.84	0.15	0.12
N243	N243-G-05-N	Basement	C001	On	Pathway	Grab hr	5/24/2012	<0.014	<0.016	<0.014	<0.014	<0.014	0.025 J	0.044
N243	N243-1-01-F	1	136	Off	Work Area	24 hr	5/27/2012	<0.016	<0.018	<0.017	0.0130 J	0.12	0.24	0.069
N243	M343-1-01-F	1	C103	Off	Duplicate	24 hr	5/27/2012	0.016	0.018	0.017	0.017	0.052 J	0.13	0.084
N243	N243-1-02-F	1	C104	Off	Work Area	24 hr	5/27/2012	<0.016	<0.019	<0.017	<0.017	0.026 J	0.054	0.033 J
N243	N243-1-03-F	1	C103	Off	Work Area	24 hr	5/27/2012	0.036 J	0.041 J	0.032 J	0.038 J	0.086 J	0.16	0.096
N243	N243-2-01-F	2	C202	Off	Work Area	24 hr	5/27/2012	<0.013	0.049	<0.014	<0.014	0.10	0.21	0.06
N243	N243-2-02-F	2	248	Off	Work Area	24 hr	5/27/2012	<0.016	0.046	<0.016	0.013 J	0.097	0.20	0.15
N243	N243-2-03-F	2	C207	Off	Work Area	24 hr	5/27/2012	<0.016	<0.018	<0.016	<0.016	0.028 J	0.063	0.08
N243	N243-3-01-F	3	N310	Off	Pathway	24 hr	5/27/2012	<0.014	<0.015	<0.014	0.0074 J	0.084	0.14	0.034J

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N243	M243-A-01-F	Intake	NA	Off	Intake	24 hr	5/27/2012	<0.030	<0.034	<0.031	<0.031	<0.031	<0.030	0.052 J
N243	M343-B-01-F	Basement	N032	Off	Duplicate	24 hr	5/27/2012	<0.022	<0.025	<0.023	<0.023	0.023	0.023 J	0.15
N243	N243-B-02-F	Basement	C002	Off	Work Area	24 hr	5/27/2012	<0.016	<0.018	<0.017	<0.017	0.018 J	0.041 J	0.032 J
N243	N243-B-03-F	Basement	N032	Off	Pathway	24 hr	5/27/2012	<0.016	<0.018	<0.016	<0.016	0.013 J	0.022 J	0.14
N243	N243-B-04-F	Basement	C008	Off	Work Area	24 hr	5/27/2012	<0.017	<0.019	<0.017	<0.017	0.020 J	0.042 J	0.030 J
N243	N243-B-06-F	Basement	50	Off	Work Area	24 hr	5/27/2012	0.023 J	0.067	<0.016	0.027 J	0.64	1.6	0.21
N243	N243-B-08-F	Basement	C010	Off	Pathway	24 hr	5/27/2012	0.06	0.019 J	0.0081 J	0.024J	0.85	0.17	0.096
N243	N243-G-05-F	Basement	C001	Off	Pathway	Grab hr	5/27/2012	<0.016	<0.018	<0.016	0.015 J	0.029 J	0.15	0.041
N243	14N243-1-01-N	1	136	On	Work Area	24 hr	2/14/2014	<0.031	<0.034	<0.034	<0.034	0.029 J	0.10	0.072
N243	14N243-1-02-N	1	C104	On	Work Area	24 hr	2/14/2014	<0.031	<0.034	<0.034	<0.034	0.20	0.041	0.058
N243	14N243-A-01-N	Ambient Air	NA	NH	Intake	24 hr	2/14/2014	<0.028	<0.031	<0.031	<0.031	<0.033	0.021 J	0.027 J
N243	14N243-A-02-N	Ambient Air	NA	NH	Background	24 hr	2/14/2014	<0.029	<0.032	<0.032	<0.032	0.012 J	0.04	0.030 J
N243	14N243-B-02-N	Basement	C002	On	Work Area	24 hr	2/14/2014	<0.031	<0.034	<0.034	<0.034	0.026 J	0.085	0.074
N243	14N243-B-04-N	Basement	C008	On	Work Area	24 hr	2/14/2014	<0.033 J	<0.036 J	<0.036 J	<0.036 J	0.061 J	0.039 J	0.043 J
N243	14N243-B-06-N	Basement	050	On	Work Area	24 hr	2/14/2014	<0.027	0.012 J	<0.030	<0.030	0.047	0.84	0.037
N243	14N243-B-07-F	Basement	054	Off	Work Area	24 hr	2/14/2014	<0.029	<0.032	<0.032	0.012 J	0.11	0.35	0.10
N243	14N243-1-01-F	1	136	Off	Work Area	24 hr	2/17/2014	<0.035	<0.039	0.013 J	<0.039	0.22	0.46	0.08
N243	14N243-1-02-F	1	C104	Off	Work Area	24 hr	2/17/2014	0.016 J	0.016 J	0.015 J	0.034 J	0.35	1.1	0.40
N243	14N243-A-01-F	Intake	NA	NH	Background	24 hr	2/17/2014	<0.030	<0.033	0.011 J	<0.033	0.059	0.12	0.046
N243	14N243-B-02-F	Basement	C002	Off	Work Area	24 hr	2/17/2014	<0.027	<0.030	0.011 J	<0.030	0.12	0.26	0.075
N243	14N243-B-03-F	Basement	N032	Off	Pathway	24 hr	2/17/2014	<0.028	<0.031	0.011 J	<0.031	0.055	0.11	0.058
N243	14N243-B-04-F	Basement	C008	Off	Work Area	24 hr	2/17/2014	0.032 J	0.015 J	0.015 J	0.036	0.30	0.93	0.36
N243	14M343-B-06-F	Basement	050	Off	Work Area	24 hr	2/17/2014	0.015 J	0.021 J	0.016 J	0.026 J	0.42	1.3	0.32
N243	14N243-B-06-F	Basement	050	Off	Work Area	24 hr	2/17/2014	0.016 J	0.021 J	0.037 J	0.029 J	0.41	1.3	0.32
N243	16N243-1-01-N	1	136	On	Work Area	24 hr	1/15/2016	0.034 U	0.036 U	0.014 J	0.036 U	0.11	0.22	0.066
N243	16N243-1-02-N	1	C104	On	Work Area	24 hr	1/15/2016	0.036 U	0.037 U	0.037 U	0.012 J	0.083	0.20	0.077
N243	16M243-1-02-N	1	101	On	Duplicate	24 hr	1/15/2016	0.028 U	0.030 U	0.014 J	0.012 J	0.092	0.18	0.062
N243	16N243-A-01-N	Ambient Air	NA	NH	Intake	24 hr	1/15/2016	0.028 U	0.029 U	0.013 J	0.011 J	0.095	0.18	0.054
N243	16N243-A-02-N	Ambient Air	NA	NH	Background	24 hr	1/15/2016	0.027 U	0.029 U	0.051	0.0087 J	0.14	0.19	0.063
N243	16N243-B-02-N	Basement	C002	On	Work Area	24 hr	1/15/2016	0.032 U	0.034 U	0.013 J	0.014 J	0.10	0.21	0.07
N243	16N243-B-04-N	Basement	C008	On	Work Area	24 hr	1/15/2016	0.024 U	0.025 U	0.012 J	0.0084 J	0.08	0.21	0.082
N243	16N243-B-06-N	Basement	050	On	Work Area	24 hr	1/15/2016	0.015 J	0.035 U	0.015 J	0.018 J	0.26	0.71	0.2
N243	16N243-B-07-N	Basement	054	Off	Work Area	24 hr	1/15/2016	0.028 U	0.030 U	0.014 J	0.014 J	0.12	0.34	0.094
N243	16N243-1-01-F	1	136	Off	Work Area	24 hr	1/18/2016	0.017 J	0.033 U	0.033 U	0.019 J	0.22	0.63	0.27
N243	16M343-1-01-F	1	136	Off	Duplicate	24 hr	1/18/2016	0.016 J	0.031 U	0.031 U	0.033 J	0.21	0.59	0.25
N243	16N243-1-02-F	1	C104	Off	Work Area	24 hr	1/18/2016	0.042	0.026 J	0.017 J	0.036 J	0.52	1.7	0.87
N243	16N243-A-01-F	Ambient Air	NA	NH	Intake	24 hr	1/18/2016	0.031 U	0.033 U	0.033 U	0.033 U	0.079	0.16	0.064
N243	16N243-B-02-F	Basement	C002	Off	Work Area	24 hr	1/18/2016	0.014 J	0.033 U	0.044	0.019 J	0.19	0.52	0.36
N243	16N243-B-03-F	Basement	N032	Off	Pathway	24 hr	1/18/2016	0.030 U	0.031 U	0.031 U	0.011 J	0.066	0.12	0.053
N243	16N243-B-04-F	Basement	C008	Off	Work Area	24 hr	1/18/2016	0.021 J	0.031 U	0.031 U	0.019 J	0.19	0.61	0.33
N243	16N243-B-06-F	Basement	050	Off	Work Area	24 hr	1/18/2016	0.012 J	0.032 U	0.032 U	0.019 J	0.21	0.68	0.26
N243	17N243-1-01-N	First	136	On	Work Area	23h 53min	1/12/2017	0.031 U	0.033 U	0.042	0.031 U	0.033 U	0.03 J	0.062
N243	17N243-1-02-N	First	C104	On	Work Area	23h 53min	1/12/2017	0.026 U	0.028 U	0.039	0.026 U	0.02 J	0.058	0.11
N243	17N243-A-01-N	Ambient	NA	On	Ambient	23h 55min	1/12/2017	0.026 U	0.028 U	0.043	0.026 U	0.028 U	0.023 J	0.049
N243	17N243-A-02-N	Ambient	NA	On	Ambient	24hr	1/12/2017	0.026 U	0.028 U	0.043	0.026 U	0.028 U	0.026 J	0.051
N243	17N243-B-02-N	Basement	C002	On	Work Area	23h 53min	1/12/2017	0.025 U	0.026 U	0.043	0.011 J	0.015 J	0.12	0.061
N243	17N243-B-04-N	Basement	C008	On	Work Area	23h 49min	1/12/2017	0.027 U	0.028 U	0.035	0.53	0.026 J	0.065	0.21
N243	17N243-B-06-N	Basement	050	On	Work Area	23h 53min	1/12/2017	0.048 U	0.051 U	0.045 J	0.048 U	0.082	0.37	0.18
N243	17N243-B-07-N	Basement	054	On	Work Area	24hr 5min	1/12/2017	0.013 J	0.028 U	0.045	0.011 J	0.18	0.45	0.32
N243	17N243-1-01-F	First	136	Off	Work Area	24h 5min	1/15/2017	0.015 J	0.03 U	0.064	0.013 J	0.18	0.38	0.28
N243	17N243-1-02-F	First	C104	Off	Work Area	24h 1min	1/15/2017	0.047	0.032 J	0.068	0.035 J	0.53	1.9	1.2
N243	17N243-A-01-F	Ambient	NA	Off	Ambient	23h 55min	1/15/2017	0.028 U	0.029 U	0.07	0.028 U	0.026 J	0.053	0.066
N243	17N243-A-02-F	Ambient	NA	Off	Ambient	23h 55min	1/15/2017	0.029 U	0.03 U	0.081	0.029 U	0.021 J	0.049	0.076
N243	17N243-B-02-F	Basement	C002	Off	Work Area	24h 2min	1/15/2017	0.031 U	0.032 U	0.06	0.031 U	0.033 J	0.077	0.083
N243	17N243-B-03-F	Basement	N032	Off	Work Area	23h 40min	1/15/2017	0.026 U	0.028 U	0.06	0.0081 J	0.021 J	0.05	0.075
N243	17N243-B-04-F	Basement	C008	Off	Work Area	24h 3min	1/15/2017	0.021 J	0.033 U	0.061	0.016 J	0.20	0.68	0.87
N243	17N243-B-06-F	Basement	050	Off	Work Area	23h 43min	1/15/2017	0.021 J	0.025 J	0.21	0.021 J	0.31	1.2	0.59
N243	17N243-B-07-F	Basement	054	Off	Work Area	23h 42min	1/15/2017	0.017 J	0.014 J	0.063	0.016 J	0.25	0.75	0.44
N243	17M343-B-07-F	Basement	054	Off	Work Area	23h 34min	1/15/2017	0.02 J	0.016 J	0.10	0.017 J	0.28	0.81	0.44
N243	18N243-1-01-N	First	136	On	Work Area	24	1/11/2018	0.028 U	0.028 U	0.054	0.027 U	0.013 J	0.042	0.071
N243	18M343-1-01-N	First	136	On	Work Area	24	1/11/2018	0.033 U	0.033 U	0.054	0.032 U	0.033 U	0.041	0.089
N243	18N243-1-02-N	First	C104	On	Work Area	24	1/11/2018	0.032 U	0.032 U	0.059	0.031 U	0.027 J	0.09	0.15

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N243	18N243-A-01-N	Ambient	NA	On	Ambient	24	1/11/2018	0.032 U	0.032 U	0.073	0.031 U	0.02 J	0.042	0.08
N243	18N243-A-02-N	Ambient	NA	On	Ambient	24	1/11/2018	0.032 U	0.032 U	0.062	0.031 U	0.032 U	0.032 J	0.057
N243	18N243-B-02-N	Basement	C002	On	Work Area	24	1/11/2018	0.034 U	0.034 U	0.053	0.032 U	0.034 U	0.045	0.076
N243	18N243-B-04-N	Basement	C008	On	Work Area	24	1/11/2018	0.033 U	0.033 U	0.051	0.031 U	0.033 U	0.054	0.083
N243	18N243-B-06-N	Basement	050	On	Work Area	24	1/11/2018	0.013 J	0.027 U	0.058	0.013 J	0.14	0.87	0.45
N243	18M343-B-07-F	Basement	054	Off	Duplicate	24	1/11/2018	0.031 U	0.031 U	0.05	0.02 J	0.082	0.4	0.30
N243	18N243-B-07-N	Basement	054	On	Work Area	24	1/11/2018	0.015 J	0.015 J	0.071	0.02 J	0.11	0.48	1.1
N243	18N243-1-01-F	First	136	Off	Work Area	24	1/14/2018	0.017 J	0.016 J	0.057	0.02 J	0.26	0.96	0.69
N243	18N243-1-02-F	First	C104	Off	Work Area	24	1/14/2018	0.017 J	0.016 J	0.082	0.02 J	0.27	1.0	0.78
N243	18N243-A-01-F	Ambient	NA	Off	Ambient	24	1/14/2018	0.029 U	0.029 U	0.05	0.0094 J	0.019 J	0.068	0.083
N243	18N243-A-02-F	Ambient	NA	Off	Ambient	24	1/14/2018	0.03 U	0.03 U	0.05	0.028 U	0.039	0.13	0.11
N243	18N243-B-02-F	Basement	C002	Off	Work Area	24	1/14/2018	0.03 U	0.03 U	0.053	0.029 U	0.041	0.14	0.11
N243	18N243-B-03-F	Basement	N032	Off	Work Area	24	1/14/2018	0.03 U	0.03 U	0.05	0.029 U	0.02 J	0.067	0.066
N243	18N243-B-04-F	Basement	C008	Off	Work Area	24	1/14/2018	0.031 J	0.022 J	0.06	0.032 J	0.41	1.5	1.6
N243	18N243-B-06-F	Basement	050	Off	Work Area	24	1/14/2018	0.011 J	0.016 J	0.053	0.02 J	0.22	1.2	0.74
N243	18N243-B-07-F	Basement	054	Off	Work Area	24	1/14/2018	0.028 U	0.028 U	0.046	0.015 J	0.083	0.4	0.30
N243	19N243-A-02	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.0015 U	0.031	0.036
N243	19N243-1-02-F	First	C104	Off	Work Area	10	2/24/2019	0.013 J	0.031 U	0.017 J	0.012 J	0.082	0.33	0.42
N243	19N243-G-01-F	First	C104	Off	Grab	10	2/24/2019	0.032 U	0.032 U	0.032 U	0.014 J	0.046	0.21	0.12
N243	19N343-G-01-F	First	C104	Off	Duplicate	10	2/24/2019	0.029 U	0.022 J	0.042	0.022 J	0.62	**18.0**	0.11
N243	19N243-B-02-F	Basement	C002	Off	Work Area	10	2/24/2019	0.031 U	0.022 J	0.031 U	0.0099 J	0.038	0.076	0.067
N243	19N243-B-04-F	Basement	C008	Off	Work Area	10	2/24/2019	0.018 J	0.026 U	0.018 J	0.011 J	0.092	0.31	0.55
N243	19N243-B-06-F	Basement	050	Off	Work Area	10	2/24/2019	0.028 U	0.018 J	0.01 J	0.01 J	0.065	0.64	0.24
N243	19N243-B-07-F	Basement	054	Off	Work Area	10	2/24/2019	0.03 U	0.03 U	0.03 U	0.03 U	0.022 J	0.16	0.099
N243	19N243-B-06-N	Basement	050	On	Work Area	10	2/26/2019	0.079 U	0.061 U	0.61 U	0.12 U	0.18	1.0	0.53
N243	19N243-B-07-N	Basement	054	On	Work Area	10	2/26/2019	0.083 U	0.064 U	0.64 U	0.13 U	0.084 J	0.5	0.27
N243	19N243-1-02-N	First	C104	On	Work Area	10	2/26/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.094 J	0.22 U
N243	19N243-B-04-N	Basement	C008	On	Work Area	10	2/26/2019	0.085 U	0.066 U	0.66 U	0.13 U	0.13 U	0.18 U	0.22 U
N243	19N243-1-01-N	First	136	On	Work Area	10	2/26/2019	0.082 U	0.063 U	0.63 U	0.13 U	0.13 U	0.17 U	0.22 U
N243	19N343-1-01-N	First	136	On	Duplicate	10	2/26/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.18 U	0.22 U
N243	19N243-B-02-N	Basement	C002	On	Work Area	10	2/26/2019	0.084 U	0.065 U	0.65 U	0.13 U	0.13 U	0.18 U	0.22 U
N243A	N243A-1-01-N	1	104	On	Work Area	24 hr	5/22/2012	<0.014	<0.016	<0.014	0.0092 J	0.033 J	0.028 J	0.26
N243A	N243A-1-02-N	1	101	On	Work Area	24 hr	5/22/2012	<0.016	<0.018	<0.016	<0.016	0.015 J	0.033 J	0.026 J
N243A	N243A-2-01-N	2	201	On	Work Area	24 hr	5/22/2012	<0.016	<0.018	<0.016	0.0095 J	0.038 J	0.11	0.12
N243A	M243A-A-01-N	Ambient Air	NA	On	Background	24 hr	5/22/2012	<0.016	<0.018	<0.016	<0.016	<0.016	0.013 J	0.022 J
N243A	M343A-B-01-N	Basement	1	On	Duplicate	24 hr	5/22/2012	<0.035	<0.040	<0.036	<0.036	0.15	0.043 J	0.098
N243A	N243A-B-01-N	Basement	1	On	Pathway	24 hr	5/22/2012	<0.029	0.041 J	<0.030	<0.030	0.16	0.047 J	0.10
N243A	N243A-1-01-F	1	104	Off	Work Area	24 hr	5/27/2012	<0.015	<0.017	<0.015	0.010 J	0.052	0.058	0.04
N243A	N243A-1-02-F	1	101	Off	Work Area	24 hr	5/27/2012	<0.016	<0.018	<0.017	0.0075 J	0.039 J	0.067	0.032 J
N243A	N243A-2-01-F	2	201	Off	Work Area	24 hr	5/27/2012	<0.016	0.022 J	<0.016	0.012 J	0.061	0.21	0.087
N243A	N243A-A-01-F	Ambient Air	NA	Off	Background	24 hr	5/27/2012	<0.016	<0.018	<0.016	<0.016	0.012 J	0.024 J	0.17
N243A	M343A-B-01-F	Basement	1	Off	Duplicate	24 hr	5/27/2012	<0.018	<0.020	<0.018	<0.018	0.062	0.062	0.15
N243A	N243A-B-01-F	Basement	1	Off	Work Area	24 hr	5/27/2012	<0.017	0.020 J	<0.018	<0.018	0.063	0.061	0.15
N243A	14M343A-1-01-N	1	104	On	Duplicate	24 hr	2/14/2014	<0.031	0.026 J	<0.034 J	0.020 J	0.053	0.046	0.056
N243A	14N243A-1-01-N	1	104	On	Work Area	24 hr	2/14/2014	<0.029	0.025 J	0.011 J	0.020 J	0.051	0.046	0.063
N243A	14N243A-1-02-N	1	101	On	Work Area	24 hr	2/14/2014	<0.026	0.012 J	<0.029	0.012 J	0.033 J	0.062	0.049
N243A	14N243A-A-01-N	Ambient Air	NA	NH	Background	24 hr	2/14/2014	<0.033	<0.036	<0.036	<0.036	<0.038	0.021 J	0.041 J
N243A	14N243A-B-01-N	Basement	1	On	Pathway	24 hr	2/14/2014	0.039	0.034 J	0.011 J	0.028 J	0.12	0.053	0.053
N243A	14N243A-1-01-F	1	104	Off	Work Area	24 hr	2/17/2014	<0.079	0.034 J	<0.087	<0.087	0.11	0.16	0.081 J
N243A	14N243A-1-02-F	1	101	Off	Work Area	24 hr	2/17/2014	<0.037	0.025 J	0.014 J	0.021 J	0.10	0.19	0.085
N243A	14N243A-A-01-F	Ambient Air	NA	NH	Background	24 hr	2/17/2014	<0.026	<0.029	<0.029	<0.029	0.047	0.095	0.048
N243A	14N243A-B-01-F	Basement	1	Off	Work Area	24 hr	2/17/2014	<0.027	0.076	0.020 J	0.056	0.20	0.15	0.072
N243A	16N243A-1-01-N	1	104	On	Work Area	24 hr	1/15/2016	0.025 U	0.011 J	0.012 J	0.014 J	0.083	0.17	0.069
N243A	16N243A-1-02-N	1	101	On	Work Area	24 hr	1/15/2016	0.029 U	0.031 U	0.015 J	0.020 J	0.097	0.23	0.084
N243A	16N243A-A-01-N	Ambient Air	NA	NH	Background	24 hr	1/15/2016	0.023 J	0.027 U	0.015 J	0.0086 J	0.045	0.11	0.079
N243A	16N243A-B-01-N	Basement	1	On	Pathway	24 hr	1/15/2016	0.030 U	0.031 U	0.038	0.024 J	0.12	0.20	0.082
N243A	16N243A-1-01-F	1	104	Off	Work Area	24 hr	1/18/2016	0.028 U	0.013 J	0.030 U	0.017 J	0.11	0.31	0.15
N243A	16N243A-1-02-F	1	101	Off	Work Area	24 hr	1/18/2016	0.013 J	0.015 J	0.015 J	0.026 J	0.15	0.43	0.21
N243A	16N243A-A-01-F	Ambient Air	NA	NH	Background	24 hr	1/18/2016	0.032 U	0.034 U	0.034 U	0.034 U	0.024 J	0.10	0.031 J
N243A	16N243A-B-01-F	Basement	1	Off	Work Area	24 hr	1/18/2016	0.032 U	0.021 J	0.037 J	0.023 J	0.15	0.33	0.16
N243A	17N243A-1-01-N	First	104	On	Work Area	24hr	1/12/2017	0.034 U	0.036 U	0.042 J	0.014 J	0.095	0.09	0.11
N243A	17M343A-1-01-N	First	104	On	Work Area	24hr	1/12/2017	0.024 U	0.025 U	0.035	0.015 J	0.097	0.083	0.13

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							
N243A	17N243A-1-02-N	First	101	On	Work Area	24hr	1/12/2017	0.026 U	0.027 U	0.04	0.0093 J	0.032 J	0.068	0.079
N243A	17N243A-A-01-N	Ambient	NA	On	Ambient	24hr	1/12/2017	0.025 U	0.026 U	0.041	0.025 U	0.027 J	0.076	0.084
N243A	17N243A-B-01-N	Basement	Basement	On	Work Area	24hr	1/12/2017	0.035 J	0.03 U	0.058	0.023 J	0.59	0.082	0.10
N243A	17N243A-1-01-F	First	104	Off	Work Area	23h 44min	1/15/2017	0.029 U	0.03 U	0.047	0.014 J	0.10	0.11	0.11
N243A	17N243A-1-02-F	First	101	Off	Work Area	23h 44min	1/15/2017	0.033 U	0.035 U	0.053	0.017 J	0.084	0.14	0.10
N243A	17N243A-A-01-F	Ambient	NA	Off	Ambient	24h 5 min	1/15/2017	0.028 U	0.029 U	0.094	0.028 U	0.032 J	0.097	0.088
N243A	17N243A-B-01-F	First	Basement	Off	Work Area	23h 39min	1/15/2017	0.038	0.03 U	0.052	0.02 J	0.51	0.12	0.11
N243A	18N243A-1-01-N	First	104	On	Work Area	24	1/11/2018	0.028 U	0.028 U	0.046	0.013 J	0.058	0.20	**4.8**
N243A	18N243A-1-02-N	First	101	On	Work Area	24	1/11/2018	0.029 U	0.014 J	0.046	0.023 J	0.082	0.13	0.32
N243A	18N243A-A-01-N	Ambient	NA	On	Work Area	24	1/11/2018	0.03 U	0.03 U	0.046	0.029 U	0.017 J	0.067	0.33
N243A	18N243A-B-01-N	Basement	Basement	On	Work Area	24	1/11/2018	0.017 J	0.027 J	0.052	0.027 J	0.25	0.13	0.20
N243A	18N243A-1-01-F	First	104	Off	Work Area	24	1/14/2018	0.026 U	0.029 J	0.053	0.027 J	0.15	0.14	0.24
N243A	18N243A-1-02-F	First	101	Off	Work Area	24	1/14/2018	0.025 U	0.023 J	0.046	0.02 J	0.11	0.14	0.19
N243A	18N243A-A-01-F	Ambient	NA	Off	Work Area	24	1/14/2018	0.03 U	0.03 U	0.032 J	0.028 U	0.016 J	0.03 U	0.03 U
N243A	18N243A-B-01-F	Basement	Basement	Off	Work Area	24	1/14/2018	0.027 U	0.028 J	0.053	0.025 J	0.16	0.18	0.20
N243A	19N243A-A-01	Ambient	N/A	On/Off	Ambient	168	2/22/2019	N/A	0.0018 U	0.0014 U	0.0016 U	0.0015 U	0.055	0.047
N243A	19N243A-B-01-F	Basement	Basement	Off	Pathway	10	2/24/2019	0.028 J	0.054 U	0.054 U	0.018 J	0.18	0.1	0.091
N243A	19N243A-1-01-F	First	104	Off	Work Area	10	2/24/2019	0.14	0.052 U	0.52 U	0.10 U	0.5	0.23	0.13 J
N243A	19N243A-1-02-F	First	101	Off	Work Area	10	2/24/2019	0.075 J	0.059 U	0.59 U	0.12 U	0.38	0.19	0.11 J
N243A	19N243A-1-02-N	First	101	On	Work Area	10	2/26/2019	0.080 U	0.062 U	0.62 U	0.13 U	0.068 J	0.17 U	0.21 U
N243A	19N243A-1-01-N	First	104	On	Work Area	10	2/26/2019	0.073 J	0.070 U	0.70 U	0.14 U	0.19	0.098 J	0.24 U
N243A	19N343A-1-01-N	First	104	On	Duplicate	10	2/26/2019	0.074 J	0.065 U	0.65 U	0.13 U	0.19	0.096 J	0.22 U
N243A	19N243A-B-01-N	Basement	Basement	On	Pathway	10	2/26/2019	0.045 J	0.063 U	0.63 U	0.13 U	0.18	0.088 J	0.22 U

TABLE 11
ANNUAL VAPOR INTRUSION HISTORICAL AIR MONITORING DATA

Analyte *								Vinyl Chloride	1,1,-DCE	*trans-1,2-DCE*	1,1-DCA	*cis-1,2-DCE*	TCE	PCE
Indoor Commercial Screening Level (µg/m³)								2.0	700	210	6.0	210	5.0	2.0
Building	**Sample Name**	**Floor**	**Room**	**HVAC (on/Off)**	**Sample Type**	**Sample Duration (hr)**	**Sample Date**							

Notes:

Sampling Identification Number - Explanation of Nomenclature:

N210	1	1	1	N
(Building Number)	(Floor Level)	(Floor Level)	(Sample Location ID)	(HVAC Operation Code Status)

Samples names ending with N – Engineering Control (HVAC) is operating
Sample names ending with F – Engineering Control (HVAC) is shut down, or
If the HVAC code is absent, the building is without an operational engineering control (e.g., HVAC system)

1,1-DCE = 1,1-dichloroethene
trans-1,2-DCE = trans-1,2-dichloroethene
1,1-DCA = 1,1-dichloroethane
cis-1,2-DCE = cis-1,2-dichloroethene
TCE = trichloroethene — Screening level concentration for TCE: 5 $\mu g/m^3$
PCE = tetrachloroethene — Screening level concentration for PCE: 2 $\mu g/m^3$
HVAC = heating, ventilation, and air conditioning unit
NH = building does not have a HVAC
N/A = not applicable, vinyl chloride was not reported, because vinyl chloride is too volatile on passive samplers (i.e., sorbent Radiellos) and reliable data cannot be achieved.
U or < = Not detected at or above the reported limit
J = The result is an estimated concentration that is less than the method reporting limit (MRL) but greater than or equal to the method detection limit (MDL).
$\mu g/m^3$ = micrograms per cubic meter
bold = Detections above ROD Indoor Commercial Screening Level.

TABLE 12

JANUARY 2018 OVERALL AMBIENT AIR CONCENTRATION RANGES, AREA OF VAPOR INTRUSION STUDY AREA

Chemical of Concern	Ambient Air Concentration Range (µg/m^3)[a]
Trichloroethene	0.031 to 0.26
Tetrachloroethene	0.028 to 0.54
cis-1,2-Dichloroethene	0.0014U to 0.18
trans-1,2-Dichloroethene	0.0013U to 0.017J
Vinyl Chloride	0.033U
1,1-Dichloroethane	0.0015U to 0.033U
1,1-Dichloroethene	0.0016U to 0.033U

Notes:

[a] Established from the results of outdoor air samples collected as per the Work Plan (NOREAS 2016).

J = the results is an estimated concentration that is less than the limit of quantitation but greater than or equal to the method detection limit.

µg/m^3 = micrograms per cubic meter

FIGURES

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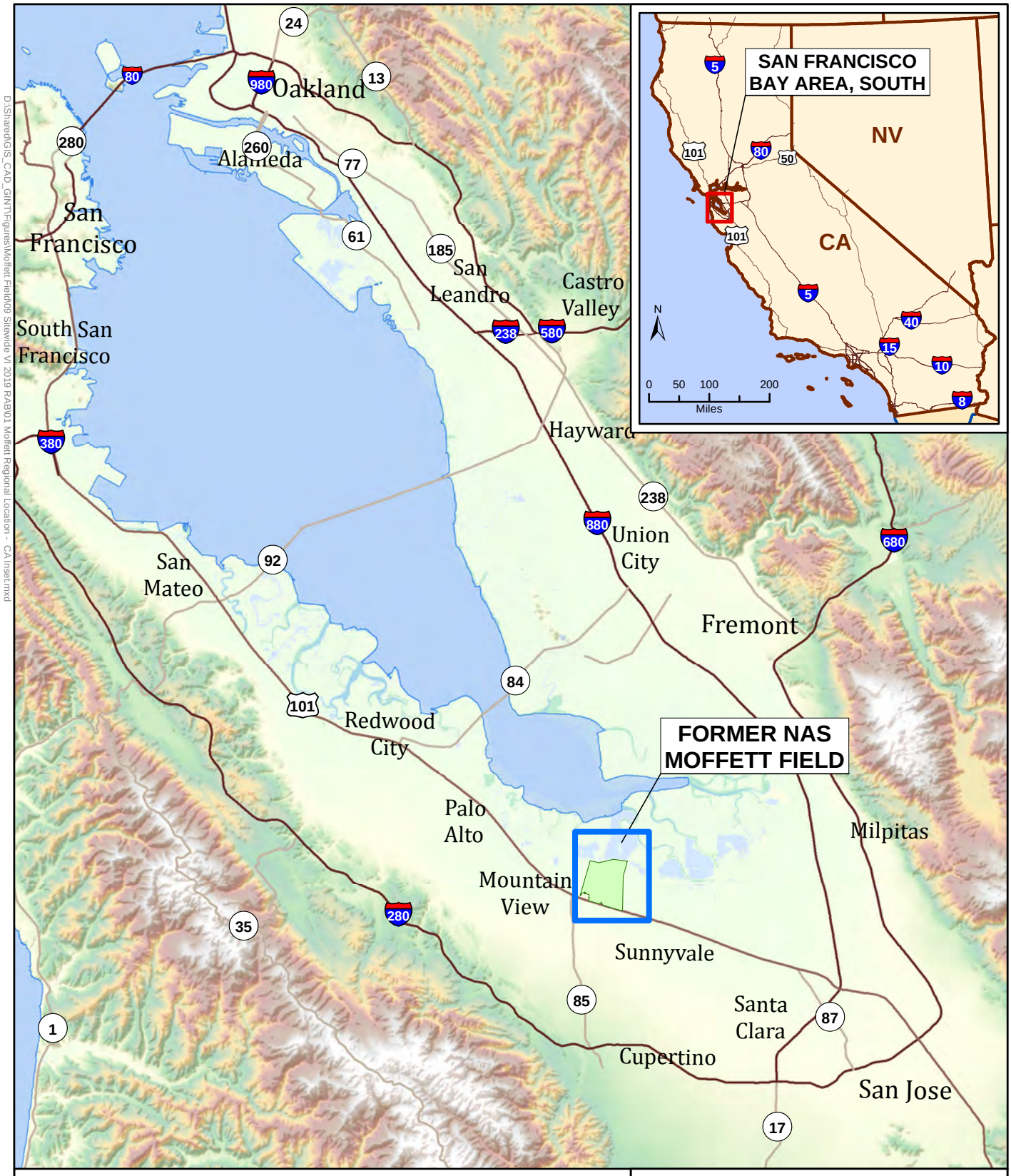

LEGEND

- Interstate
- U.S. Highway
- State Higway

0 2 4 8 Miles

N

REGIONAL LOCATION MAP

IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE
1

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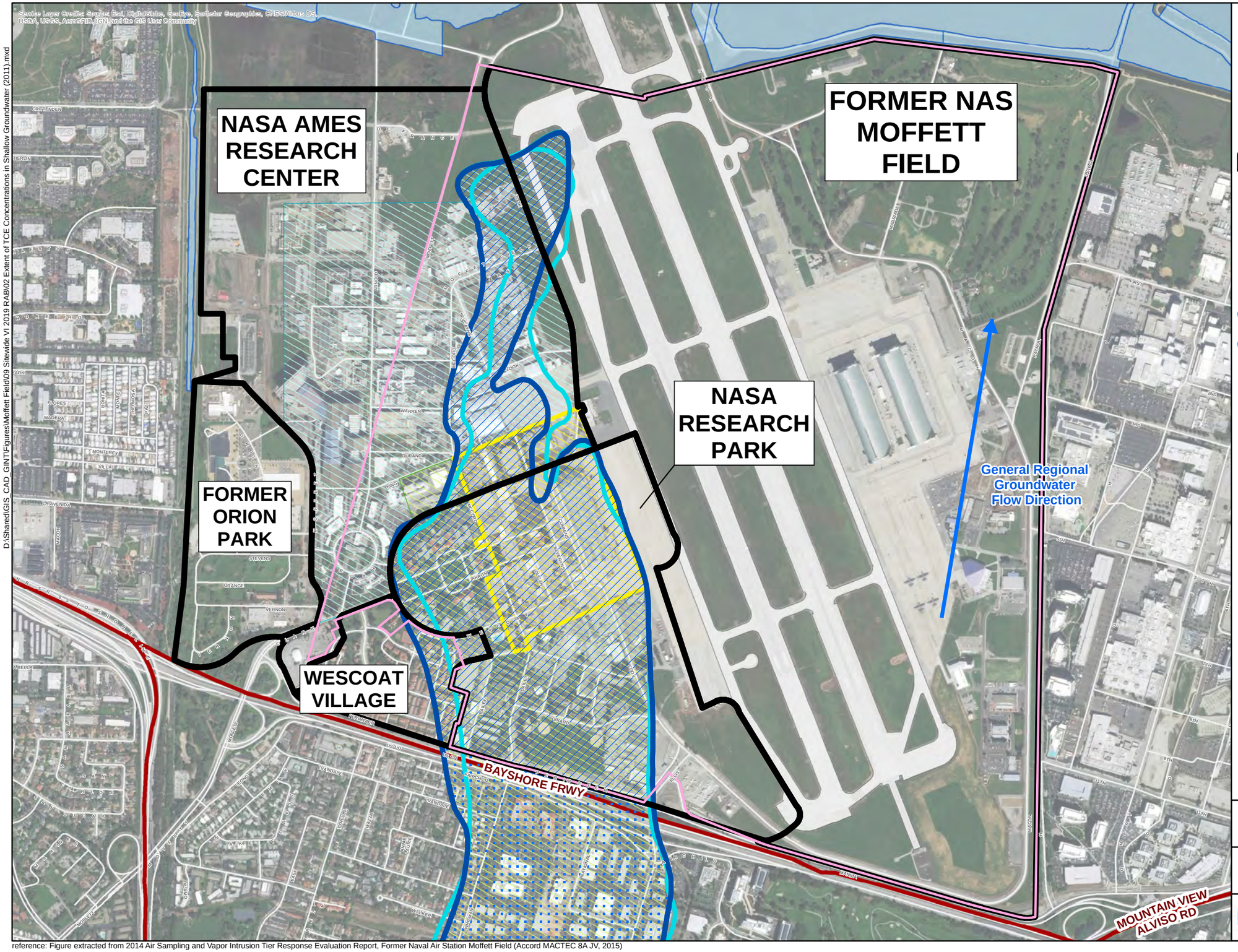

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LEGEND

Vapor Intrusion Area of Responsibility

- NAVY Area of Responsibility
- MEW Area of Responsibility
- NASA Area of Responsibility
- Moffett Field Parcel Boundary
- Zoning Boundaries
- Highway / Major Corridor
- Streets
- RUNWAY
- 5 µg/L TCE Isopleth in shallow groundwater (as understood in 2011)

*Original Vapor Intrusion Study Area**

- VI Study Area - MEW
- VI Study Area - Moffet

*Defined as the approximate limit of TCE plume exceeding 5 parts per billion (ppb) in shallow groundwater as understood in 2009.

NOTE: 2015 TCE and PCE isopleths shown only for Moffett Field section of the VI Study Area

MEW - Middlefield-Ellis-Whisman
NASA - National Aeronautics and Space Administration
NAVY - Department of the Navy
PCE - Tetrachloroethene
TCE - Trichloroethene
VI - Vapor Intrusion
µg/L - micrograms per liter

N

0 500 1,000 2,000 Feet

1 inch = approximately 1,000 feet

EXTENT OF TCE CONCENTRATIONS OF THE AQUIFER A/A1 ZONE IN THE MEW SUPERFUND STUDY AREA

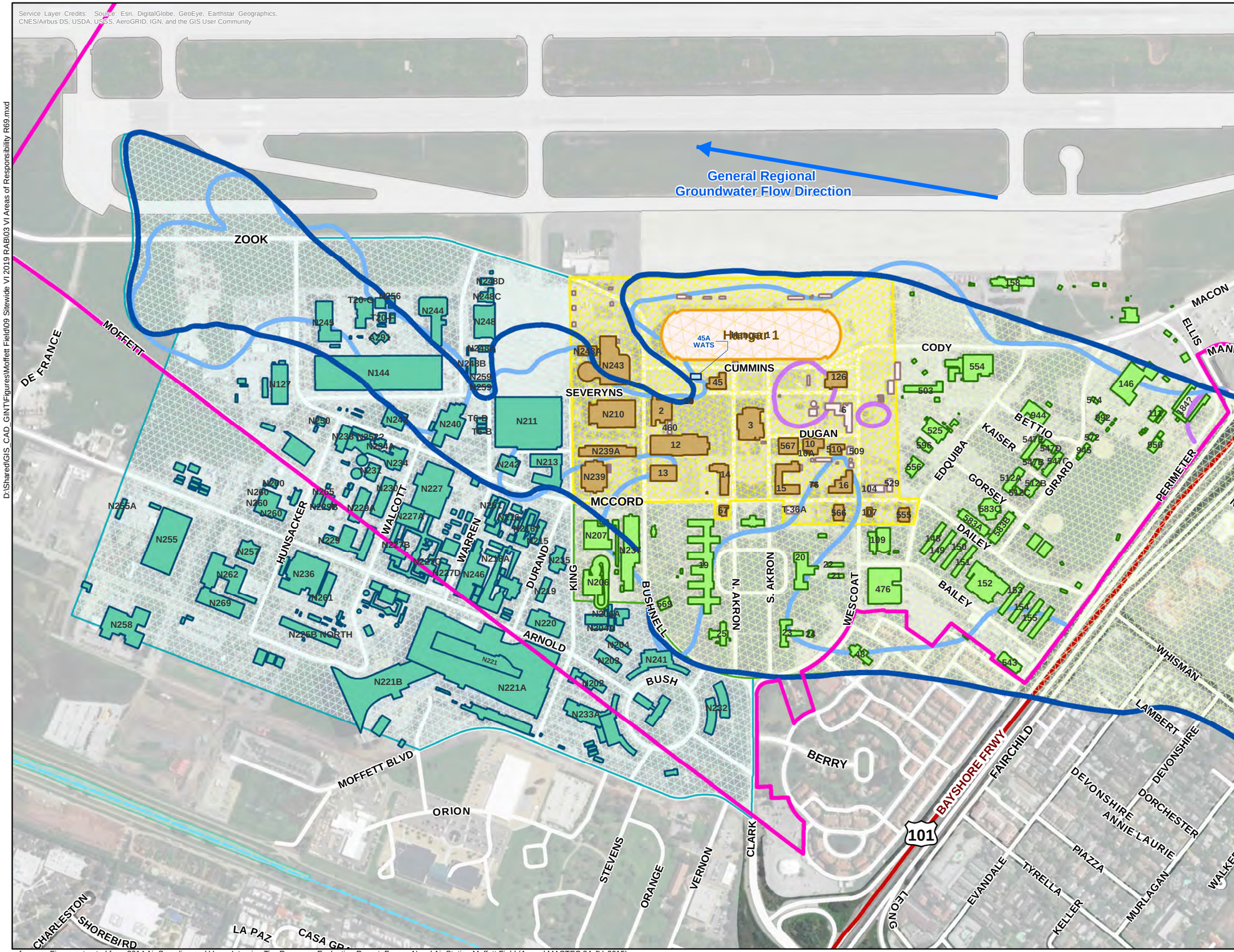
IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE 2

reference: Figure extracted from 2014 Air Sampling and Vapor Intrusion Tier Response Evaluation Report, Former Naval Air Station Moffett Field (Accord MACTEC 8A JV, 2015)



LEGEND

Vapor Intrusion Area of Responsibility

- NAVY Area of
- MEW Area of
- NASA Area of

Buildings by Area of Responsibity

- NAVY (sampled during 2012-2016 Vapor Intrusion Study)
- Navy buildings not sampled
- NASA
- MEW
- WATS (West Side Aquifers Treatment System)
- HANGAR 1
- Moffett Field Parcel Boundary
- Runway
- Highway
- Street
- Creek, Canal or Watercourse
- 5 µg/L TCE Isopleth in shallow groundwater (as understood in 2015)
- 5 µg/L PCE Isopleth in shallow groundwater (as understood in 2015)
- Original Vapor Intrusion Study Area* (Moffett Field section only)

*Defined as the approximate limit of TCE plume exceeding 5 parts per billion (ppb) in shallow groundwater as understood in 2009.

NOTE: 2015 TCE and PCE isopleths shown only for Moffett Field section of the VI Study Area

MEW - Middlefield-Ellis-Whisman
NASA - National Aeronautics and Space Administration
NAVY - Department of the Navy
PCE - Tetrachloroethene
TCE - Trichloroethene
VI - Vapor Intrusion
µg/L - micrograms per liter

N

0 300 600 1,200 Feet

VAPOR INTRUSION
AREAS OF RESPONSIBILITY

IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE 3

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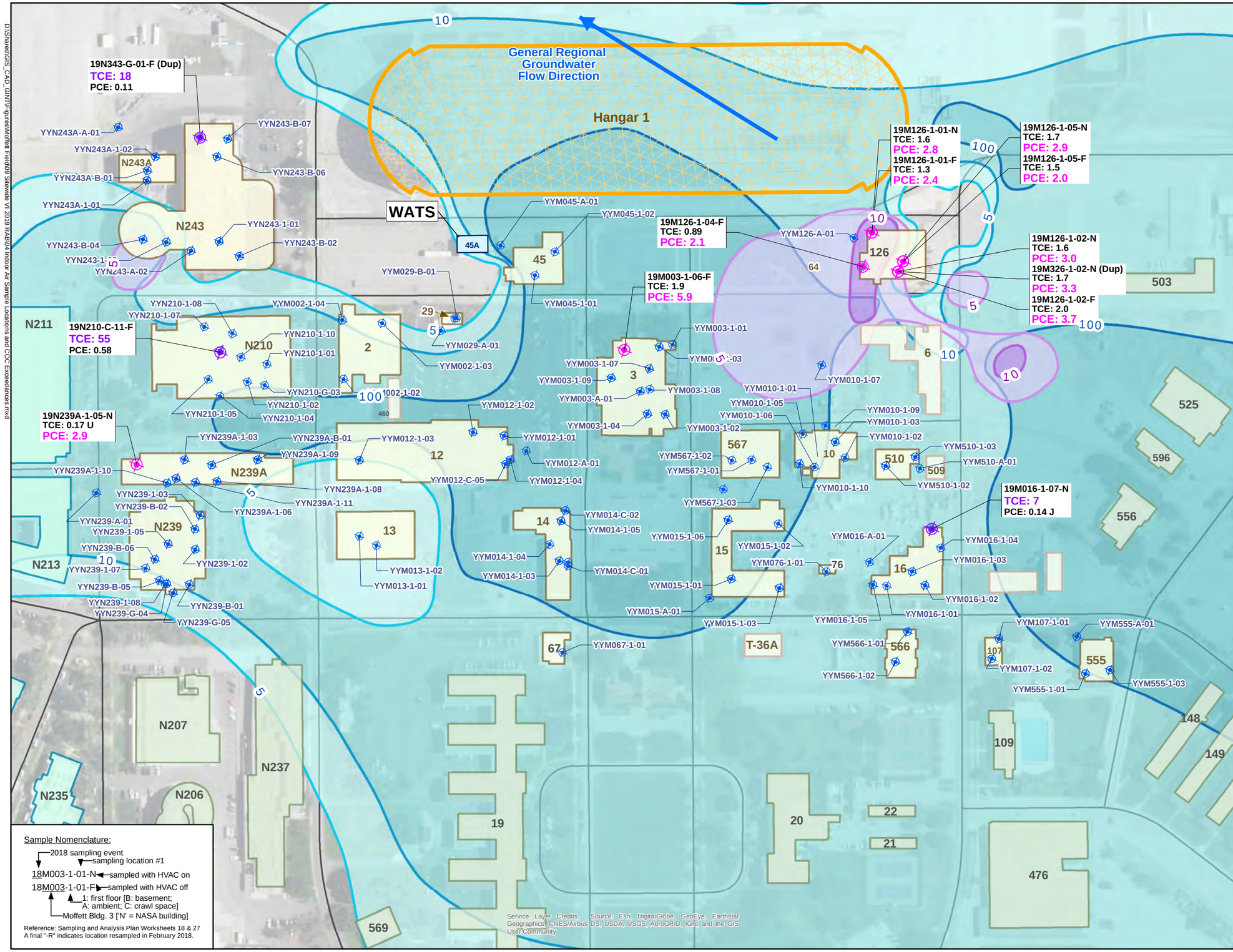
reference: Figure extracted from 2014 Air Sampling and Vapor Intrusion Tier Response Evaluation Report, Former Naval Air Station Moffett Field (Accord MACTEC 8A JV, 2015)



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Sample Nomenclature:

- 2018 sampling event
- sampling location #1
- 18M003-1-01-N — sampled with HVAC on
- 18M003-1-01-F — sampled with HVAC off
- 1: first floor [B: basement; A: ambient; C: crawl space]
- Moffett Bldg. 3 ['N' = NASA building]

Reference: Sampling and Analysis Plan Worksheets 18 & 27
A final "-R" indicates location resampled in February 2018.

LEGEND

- Air Sampling Location
- TCE Detected Above Indoor Air Cleanup Level
- PCE Detected Above Indoor Air Cleanup Level
- NAVY BUILDINGS (sampled)
- NAVY BUILDINGS (not sampled)
- MEW BUILDINGS (not sampled)
- NASA BUILDINGS
- Hangar 1
- WATS (Westside Aquifers Treatment System)

PCE Isopleth in shallow groundwater (µg/L) [September 2018]
- 10
- 5

TCE Isopleth in shallow groundwater (µg/L) [September 2018]
- 100
- 10
- 5

NOTES:

Results are shown for ocations where TCE or PCE was detected above screening levels in air samples in 2018.

Concentrations are in micrograms per cubic meter (µg/m^3).

Indoor Air Screening Level for PCE: 2 µg/m^3
Indoor Air Screening Level for TCE: 5 µg/m^3

Samples were collected on the first floor, and in basements or crawl spaces where applicable. Ambient (outdoor) air was sampled in selected areas. See table at lower left for explanation of sample nomenclature.

HVAC Heating, Ventilation and Air Conditioning
PCE Tetrachloroethene
TCE Trichloroethene
µg/L micrograms per liter

N

0 100 200 400 Feet

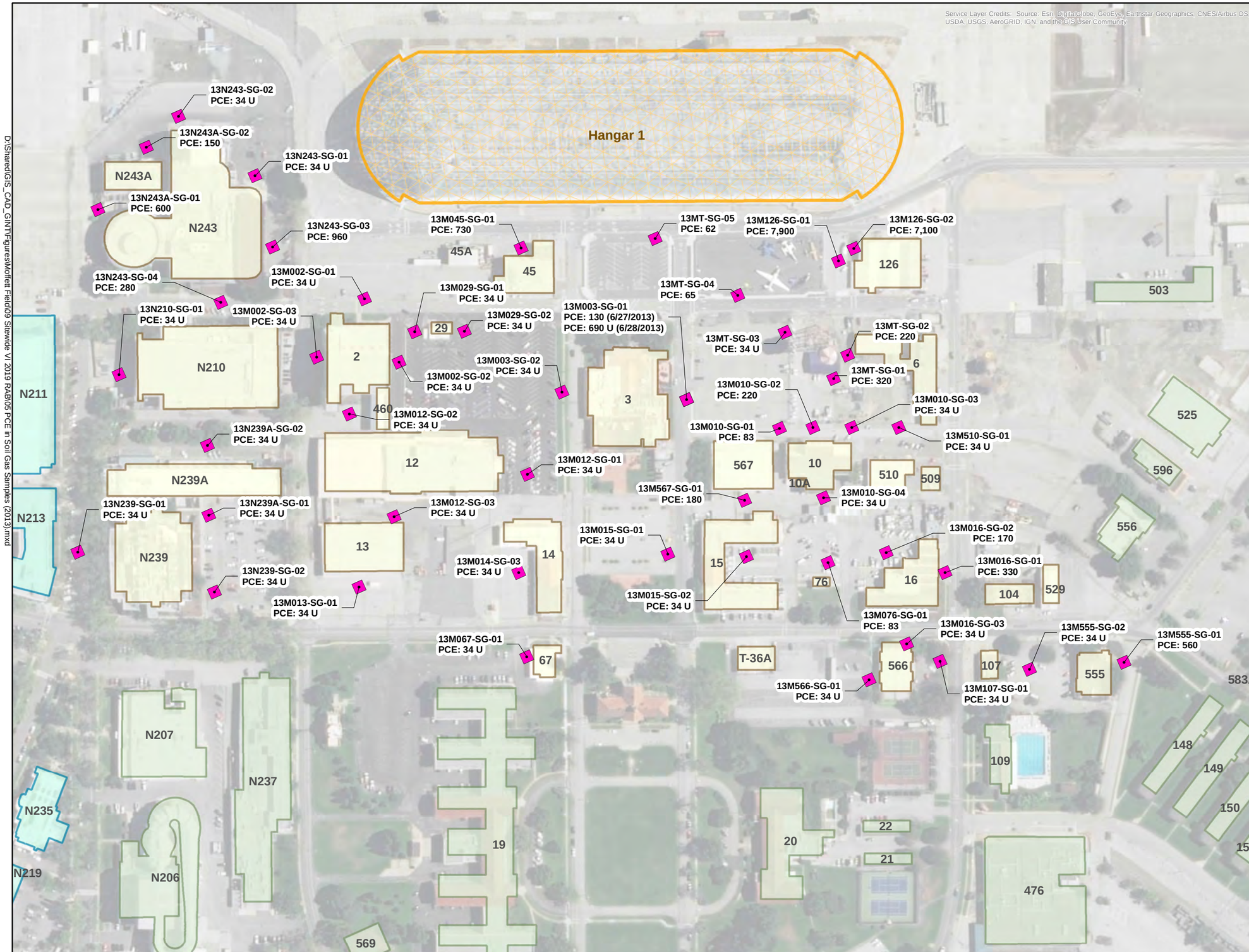
INDOOR AIR SAMPLING LOCATIONS WITH TCE OR PCE EXCEEDANCES

IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE 4



LEGEND

Buildings by Area of Responsibity

- NAVY BUILDINGS
- MEW BUILDINGS
- NASA BUILDINGS
- HANGAR 1
- PCE RESULTS - SOIL GAS SAMPLING LOCATION (2013)

NOTE:

PCE concentrations shown are from soil gas samples collected by AM8AJV, June- July 2013.

Results in micrograms per cubic meter (µg/m^3)

PCE -- tetrachloroethene (perchloroethene)

N

0 100 200 400 Feet

DISTRIBUTION OF TETRACHLOROETHENE IN SOIL GAS

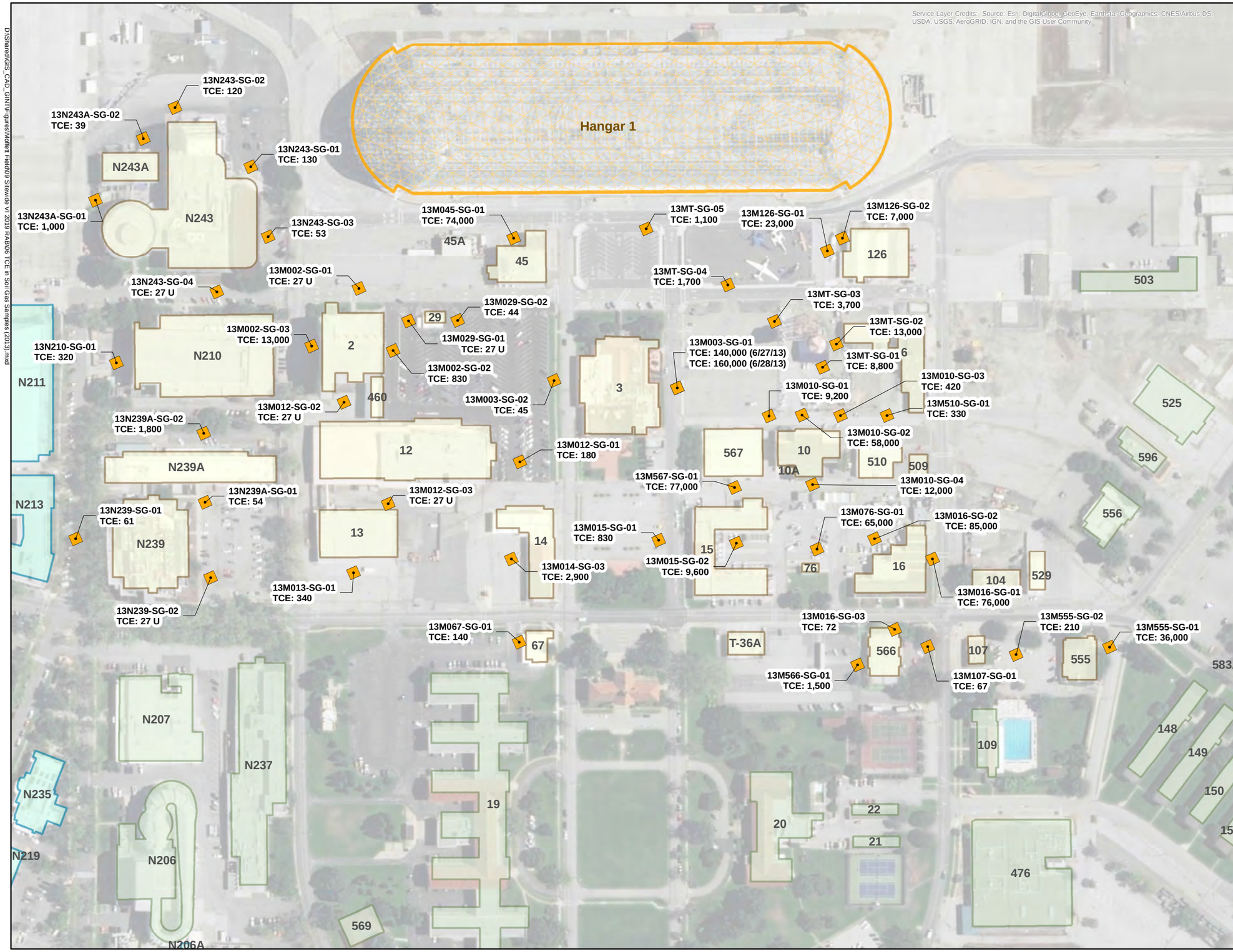
IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE 5

D:\Shared\GIS_CAD_GIN\Figures\Moffett Field\09 Sitewide VI 2019 RAB\05 PCE in Soil Gas Samples (2013).mxd



LEGEND

Buildings by Area of Responsibity

- NAVY BUILDINGS
- MEW BUILDINGS
- NASA BUILDINGS
- HANGAR 1
- TCE RESULTS - SOIL GAS SAMPLING LOCATION (2013)

NOTE:

TCE concentrations shown are from soil gas samples collected by AM8AJV, June- July 2013.

Results in micrograms per cubic meter ($\mu g/m^3$)

TCE -- trichloroethene

DISTRIBUTION OF
TRICHLOROETHENE IN SOIL GAS

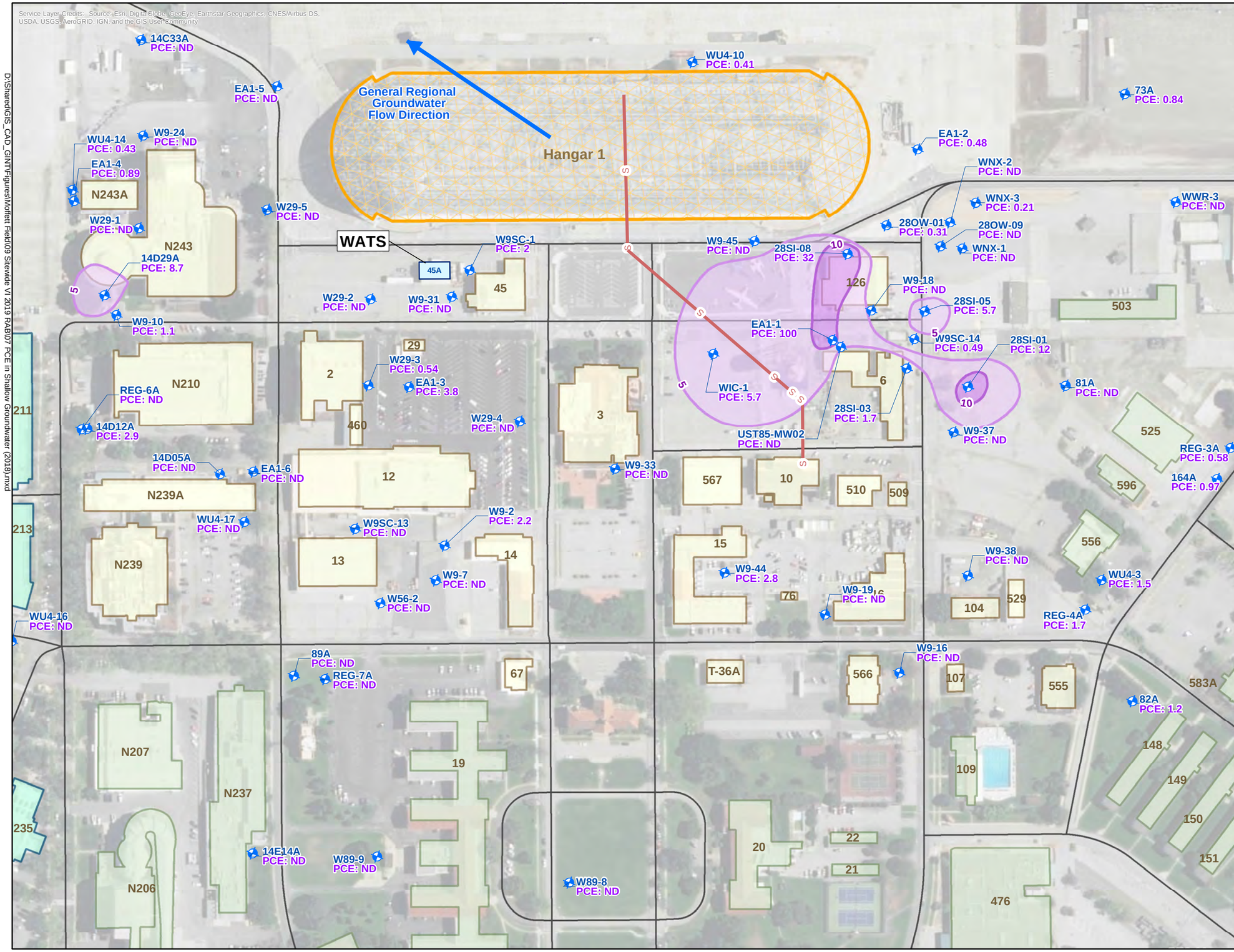
IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE
6

D:\Shared\GIS_CAD_GINT\Figures\Moffett Field\09 Sitewide VI 2019 RAB\06 TCE in Soil Gas Samples (2013).mxd



LEGEND

Buildings by Area of

- NAVY BUILDINGS
- MEW BUILDINGS
- NASA BUILDINGS
- HANGAR 1
- WATS (Westside Aquifers Treatment System)
- Street Edges (Moffett
- Steam Distribution Line
- Groundwater Sampling Location [September 2018]

PCE Isopleth in shallow groundwater (µg/L) [September 2018]

- 10
- 5

NOTES:

PCE - Tetrachloroethene

µg/L - micrograms per liter (groundwater samples)

PCE concentrations shown are from groundwater samples collected in September 2018.
Plume outline shapefiles provided by NASA.

N

0 100 200 400 Feet

DISTRIBUTION OF TETRACHLOROETHENE IN SHALLOW GROUNDWATER

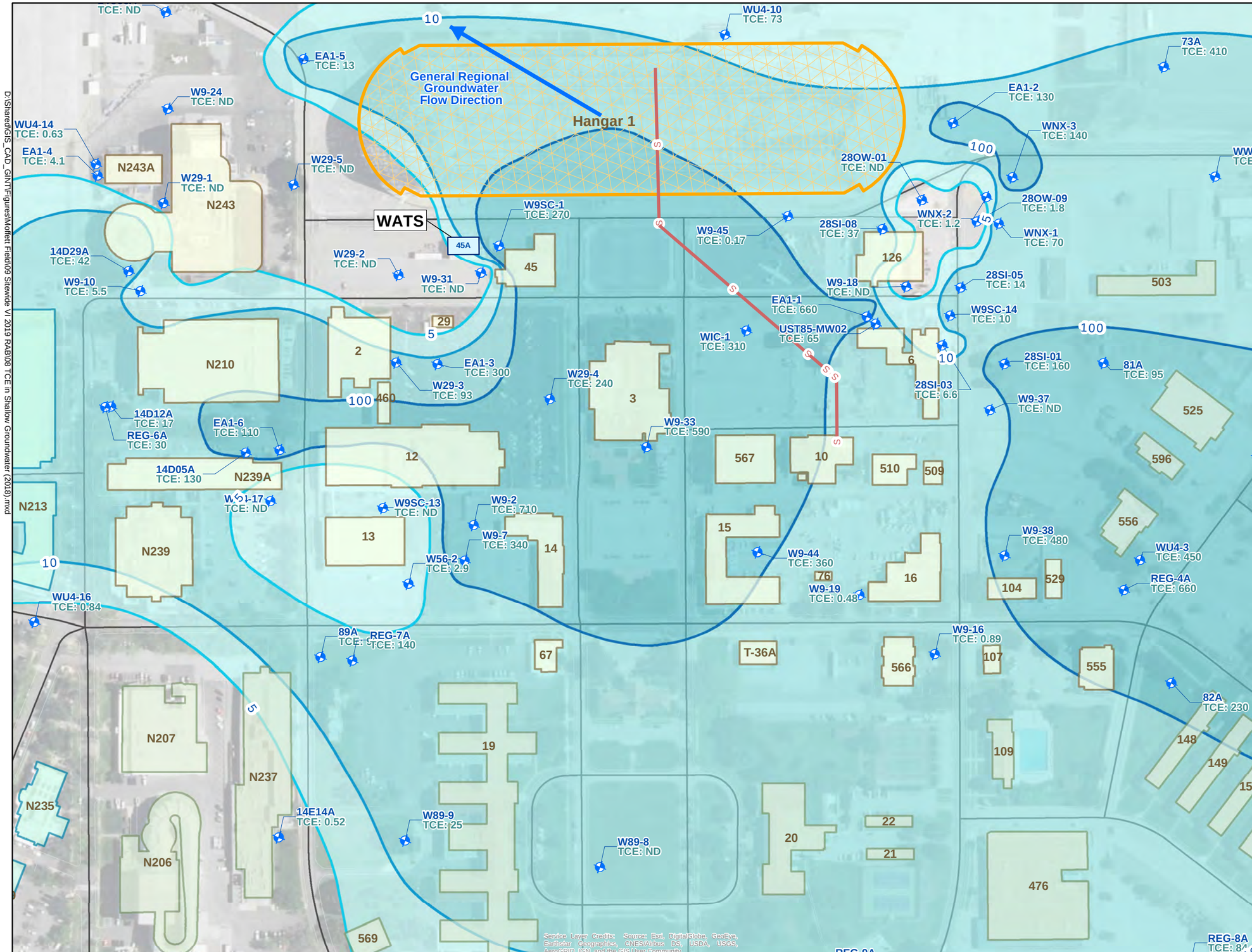
IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE 7

D:\Shared\GIS_CAD_GIN\Figures\Moffett Field\09 Stewide V1 2019 RAB\07 PCE in Shallow Groundwater (2018).mxd



LEGEND

Buildings by Area of Responsibity

- NAVY BUILDINGS
- MEW BUILDINGS
- NASA BUILDINGS
- HANGAR 1
- WATS (Westside Aquifers Treatment System)
- Street Edges (Moffett Area)
- Steam Distribution Line
- Groundwater Sampling Location [September 2018]

TCE Isopleth in shallow groundwater (µg/L) [September 2018]

- 100
- 10
- 5

NOTES:

TCE - Trichloroethene

µg/L - micrograms per liter (groundwater samples)

TCE concentrations shown are from groundwater samples collected in September 2018.
Plume outline shapefiles provided by NASA.

N

0 100 200 400 Feet

DISTRIBUTION OF TRICHLOROETHENE IN SHALLOW GROUNDWATER

IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

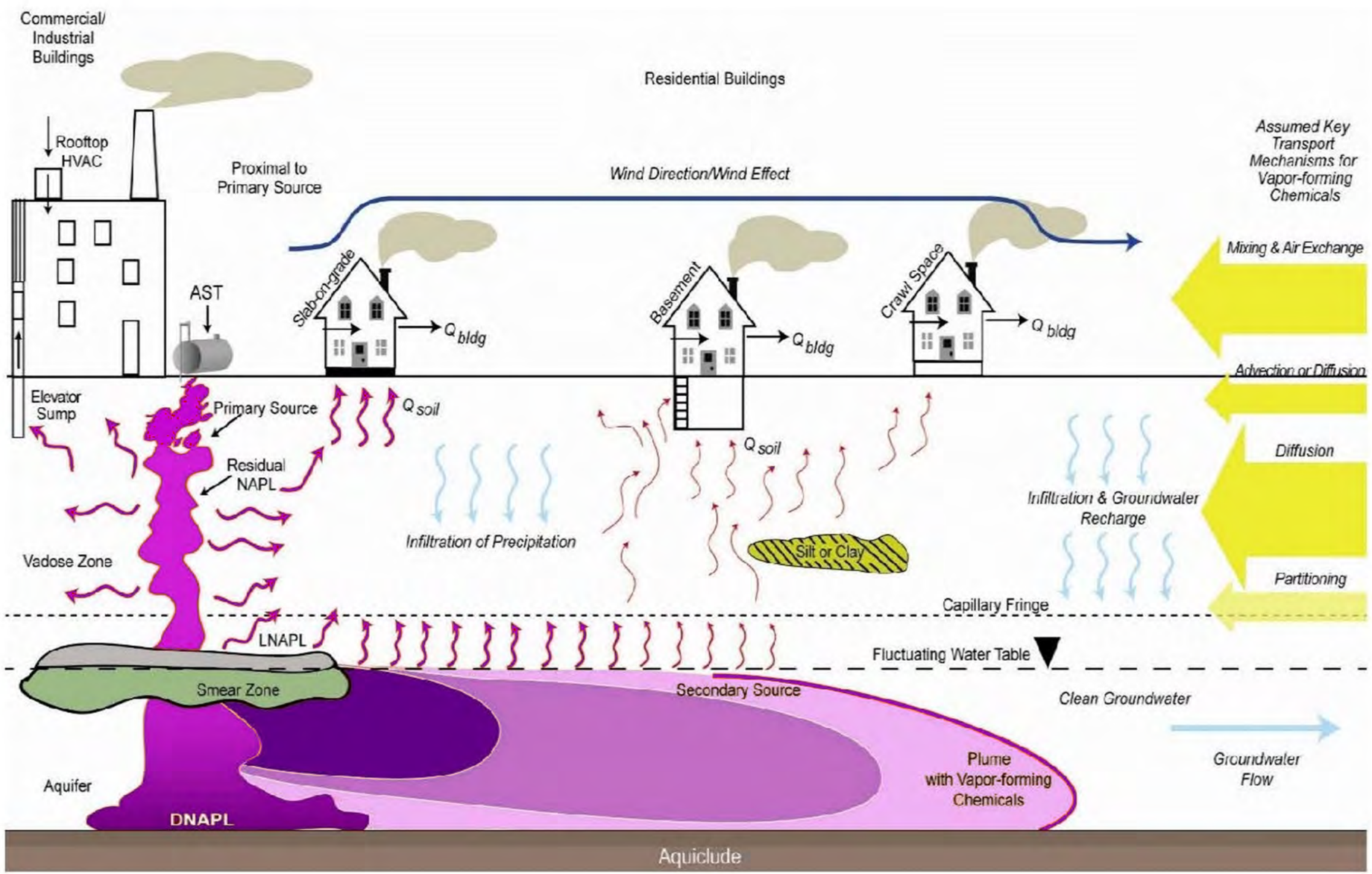
NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE 8

D:\Shared\GIS_CAD_GIN\Figures\Moffett Field\09 Stewride VI 2019 RAB\08 TCE in Shallow Groundwater (2018).mxd

D:\Shared\GIS_CAD_GINT\Figures\Moffett Field\09 Sitewide VI 2019 RAB\09 VI Conceptual Diagram (EPA 2015) GRAPHIC.mxd



Shows several key elements and processes entailed with vapor intrusion. A subsurface source of vapor-forming chemicals is present underneath and near an industrial building in the form of contaminated soil and groundwater. Groundwater contaminated with vapor-forming chemicals is also present some distance from the industrial property, potentially affecting residential buildings with different types of construction. Vapors emanate from the contaminated soil and groundwater into the surrounding and overlying vadose zone and migrate (primarily by diffusion) in soil pore spaces towards the buildings. Soil gas enters the buildings through various openings, primarily under the influence of advection. Ambient air can infiltrate into the buildings or can be drawn into a building mechanically. Other aspects illustrate that precipitation can influence soil moisture in the vadose zone; that groundwater recharge percolating through clean soil can, in some circumstances, dilute concentrations of groundwater contaminants in the uppermost zone; and that low-permeability layers (such as silt and clay) can impede vapor migration in the vadose zone.

SOURCE: *Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air*, US EPA, June 2015
Figure 2-1:
Illustration of Key Elements of the Conceptual Model of Soil Vapor Intrusion

SOURCE: *Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air*, US EPA, June 2015
Figure 2-1:
Illustration of Key Elements of the Conceptual Model of Soil Vapor Intrusion Note: Q_{soil} represents soil gas entry; Qbldg represents air exchange.

VAPOR INTRUSION PATHWAY
CONCEPTUAL DIAGRAM (EPA 2015)

IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE
9

APPENDIX A

BUILDING SURVEY FORMS AND SUMMARY TABLE

(provided on electronic copy only)

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TABLE A-1. SUMMARY OF BUILDING SURVEY RESULTS

Building Number	Type of Building (# of floors; area)	Building Work Hours	Basement Information	Floor Information	Conduits Penetrating Floor and Elevator Information	HVAC Systems Details	Recent Remodeling Information	Further Building Related Information
M002	Gymnasium (2 floors; approximately 17,000 square feet)	Hours of Operation: Monday through Friday, 10am to 2pm, 4pm to 8pm. Intermittent use of basketball court, locker rooms, and office	N/A.	Floor Details: Raised wooden floor basketball court, tiled bathroom and locker rooms. Floor Conditions: No breaks in wooden or tile floor visible.	Shower and floor drains: Rms 101B, 101C, 103, 104, 111A, and 111B. Conduit Penetrating Slab: Rm 100 electrical conduits penetrate wooden floor in eastern corner; Rms 103 and 111A sewer plumbing; Rm 104 gas line (boiler room)	Building does not have an HVAC system. Other ventilation: Open Windows, Restroom Fans, AC unit in Rm 110. Heat Type: Steam; delivery involves mechanical fan to disperse heat; no outside air used.	N/A.	Cleaning supplies in Room 101A. Asbestos tank in Room 104 (boiler room). Cleaner odor in Room 101 (locker room). ppbRAE: highest reading was 134 ppb in Room 101.
M003	Conference Center and Cafeteria (1 floor; approximately 25,000 square feet)	Cafeteria operates Monday through Friday for breakfast and lunch. The facility intermittently hosts various meetings and functions, including on weekends. Offices operate Monday through Friday 8 am to 6 pm.	Basement: Partial crawl space, approximately 3 feet bgs. Basement Usage: Utilities. Basement Floor: Concrete where visible. Basement Walls: Wooden construction	Floor Details: Concrete and raised wooden floor above crawl space and carpeted over. Crawl space (basement) present from Rms 105, 127, 124, C110, and 110 to the northeastern end of the bldg. Slab Conditions: Cracks and seams are present in concrete where visible.	Floor Drains: Rms 126, 110, R102M, R101W, R103W, R101M, R105W, R100M, J123, 107. Other Conduits: Rm 110 kitchen--electrical conduits located in northeast corner of room; Rm 112--electrical conduits; Rm 130 communication room--phone line penetrations.	HVAC system is a zoned heating/cooling system that runs continuously. Air intake in on the roof. All HVAC equipment is mounted on the roof. 20 exhaust fans. Fans in kitchen areas are 3 to 5 HP, all other fans are 1 HP. Exhaust fans located in the following rooms: R101W, 111, 111B, Kitchen, 112, R101M, 125, 127, 128A, 105W, R100M, 101A, 108, 101B, Rm 128 - 2 fans, Rms 103, 110 - 5 fans, Rm 104 - 2 fans, Rm 116 - 2 fans Rms 102, 113, 122, 124, 127 - 2 fans, Rm 105 9 AC units with capacity from 5 to 20 tons. Kitchen blowers on for events, fans off at night. Other ventilation: Mechanical Fans, Open Windows, Restroom Fans. Cool air blowers in Kitchen from roof air supply. Heating System: Building specific heating system with delivery involves mechanical fan to disperse steam heat, no outside air used.	Complete renovation of R105D, new carpet in 104A, and new tile in Rm 108.	Cleaning supplies in meat cooler. Janitorial supplies in J123. Carbon dioxide tanks in Kitchen. Table cloths/linen is dry cleaned for events. ppbRAE: highest reading was of 29 ppb in Rm 108 (Cafe)
M010	Former main boiler plant for NASA Research Park (1 floor; approximately 12,000 square feet)	Former boiler plant. The boiler was taken out of service by Feb. 2014 and removed during Mar.–Apr. 2014. The facility formerly operated Monday through Friday for 8 hours per day with no weekend use. Building 10 is no longer continuously occupied; the building is only intermittently occupied during the day	Basement Type: Tunnel to Hangar 1. Basement Usage: Former utilities. Pipes through tunnels. Basement Floor: Concrete. Floor cracks and seams. Basement Walls: Poured Concrete. Moisture: Unknown.	Floor Details: Concrete slab. Slab Condition: Cracks and seams are present. Rm N104 grates over pipe tunnel. Rm N102 tile over concrete slab. Grates cover former utility tunnels and tunnel leading to Hangar 1.	Drains/Sumps: Rm N104-sump; Rm 101--sump in floor trench access to tunnel with probable groundwater seepage. Steam lines: present in Rm N104 Floor drains: Rm 101 (3 drains) and Rm R106. Other Conduits: Rm101--water lines; Rm R106--toilet/sink; Rms 107 and N104--electrical conduits.	No HVAC system in building. Other ventilation: Open Windows, Restroom Fans, 2 window mounted AC units. Heating System: formerly housed the boiler for the steam line that distributed steam by below ground trenches to the other buildings in NASA Ames. Delivery involved mechanical fans to disperse heat.	The boiler was taken out of service by Feb. 2014, and removed during Mar.- Apr. 2014. In May 2017 a wall was constructed across the tunnel directly under the building and an additional blower was added.	Steel frame, stucco interior, high ceilings. Miscellaneous abandoned calibration solutions in N108. There is furniture made of pressed wood products throughout the building. ppbRAE: highest indoor reading was 7 ppb in room 103. Outside, the reading was 323 ppb in the duct for the blower vent. With the boiler being removed in 2014, the building is no longer continuously occupied. The building was leaking during the recent rain event.
M012	Military Commissary - First floor: Grocery Store and Warehouse Second floor: Offices (2 floors; approximately 59,000 square feet)	Building is used 24 hour per day, Monday through Sunday evening. Closed Sunday 9pm to Monday 5 am. Grocery store hours: Monday through Wednesday - 9 am to 6 pm; Thursday - 9 am to 7 pm; Friday - 9 am to 6 pm; Saturday - 9 am to 6 pm. Open at night for stocking	Crawl space under entire building, except under Rm 101. Unknown condition.	Floor Details: Raised floor throughout the building. Floor is carpeted or tiled except Rm 101. Rm 101 is a warehouse storage and has a concrete floor. Cracks and seams present in Rm 101 floor	Floor Drains: Rms 118 & 117 (meat kitchen), 113, 101, 104B/C, and 105D (bathrooms) Sinks: 117, 118, 104, 104D Other Conduits: Rms 110 and 117--electrical conduits; Rm 110 Unknown conduits. Sumps: Rms 105 and 118 Elevator shafts: 112, 113 and 109A/B (not in use) Fire suppression main: 101	HVAC system is central air system and has exhaust capability which is in operation continuously. HVAC is managed by Jacobs (facilities). 4X3-ton AC units (not in use) and a 10 ton unit - all mounted on the roof with intakes on the roof. 6 exhaust fans located on roof. Other ventilation: Mechanical Fans, Open Windows, Restroom Fans . No HVAC in Rm 101. Heating System: Building specific heating system with natural gas and electric space heaters.	N/A.	Rm 118: Cleaners for meat kitchen. Rm 104: Chemical (cleaners) storage. Rm 109: Sealed cleaners, batteries, air fresheners, etc. (Market). Second floor: Pressed wood office furniture. ppbRAE: highest reading was of 850 ppb in Rm109. Most rooms in building had readings over 300 ppb.
M013	Storage Warehouse (1 floor; approximately 16,000 square feet)	Building open 24 hours per day, people in/out of building throughout the day for stocking Building 12.	Crawl space under Rm 102.	Floor Details: Steel frame with concrete foundation, concrete slab present in Rm 103. Raised concrete floor in Rm 102. Floor details of Rm 101 is unknown (empty storage area). Slab Condition: Cracks and seams are present in Rm 103.	Drains/Sumps: none. Other Conduits: Rm 102--electrical conduits penetrate raised concrete floor at northern side. Rm 103--water main and electrical conduits.	No HVAC system for building. Open air ventilation. Other ventilation: Open Windows. Mechanics fans. Heating System: None Other: large refrigeration unit in building.	N/A.	Rm 102: sealed cans of hair spray, cleaners, deodorant, air freshener, paint, foam, gas/diesel cans. Rm 103: Moisture noted, coming from a leak in roof. ppbRAE reading was 0 in all Rooms.

TABLE A-1. SUMMARY OF BUILDING SURVEY RESULTS

Building Number	Type of Building (# of floors; area)	Building Work Hours	Basement Information	Floor Information	Conduits Penetrating Floor and Elevator Information	HVAC Systems Details	Recent Remodeling Information	Further Building Related Information
M014	Tenant-occupied offices - Western portion is leased to SkyTran, an alternative transportation company; eastern portion is leased to the U.S. Geological Survey (USGS). Former tenant Virgin America moved out about 6 months ago.	SkyTran side typically utilized 5 to 6 hours at a time for demonstrations; however some months the area is used for several days to prepare for presentations. USGS is in the proces of moving in; usage details unknown.	Building constructed over crawl space (raised foundation; wood floors; stucco sides), except Rms 119 and 120 (concrete foundation).	Concrete slab floor covered by carpeting/tile except Rm 119 and 120 which is bare concrete.	Communication conduits in Northern side of building. Communications and electrical conduits penetrate the concrete floor in the utility room near the western demonstration room. Steam lines and water pipes are located throughout much of the building; bathrooms and a kitchenette is located north of the demonstration room. Additional bathrooms are located in the eastern wing. Boiler area: Rm C101, water conduits penetrate floor.	HVAC system is a zoned heating/cooling system that runs continuously on SkyTrain and USGS sides. HVAC intake on roof. HVAC is managed by Jacobs (facilities). Also mechanical fans, restroom vent fans and open windows. Heating System: Building specific heating system with natural gas.	An HVAC system was installed between the Feb. 2014 and Jan. 2016 sampling events.	Chemicals in kitchen, Rm 101 (work shop), and rest rooms. Room 116/118 no longer occupied. Pressed wood office furniture throughout the building. Non-exempt employees, so building was occupied during shutdown. ppbRAE: highest reading was 28 ppb in Rm 104 (conference room).
M015	NASA Security (1 floor; approximately 17,000 square feet)	Majority of offices staffed 8 hours per day, 5 days a week with infrequent weekend use. Lieutenant office (Rm 135D) is staffed 24 hours per day, 7 days per week.	N/A.	Floor Details: Concrete slab. Tile and carpet floor. Slab Condition: Cracks and seams where visible.	Floor drains: Rms 101, R102W, R104M, 146, N108, 117A, N163, and 150. Other Conduits: Rms R113, R115, R102W, R104M--Toilets.	HVAC system runs continuously . HVAC piped into rooms, no HVAC vents in hallways. Chiller in room 118. Jacobs (facilities) manages HVAC system. 2 air handlers: A/H-1 in Rm 163 - SW corner of building; A/H-2 in Rm 108 - E side of building; Air intake is outside of mechanical rooms at approx. 8 feet above ground surface. 5 exhaust fans - 3 on east wing: 1 at NE corner, 2 at central area of east wing, 2 on west wing, 1 at NW corner, 1 at SW corner. Other ventilation: Open Windows, Restroom Fans, AC window mounted unit in Rm 111 and 112. Heating System: Building specific boiler system with natural gas. HVAC does have exhaust capabilities (exhaust fans).	New carpet installed in 2018.	Vapor intrusion mitigation method - maintains positive pressure with makeup air adjustment. Waste oil: N163 and N106. Cleaners and air fresheners: restrooms and janitor closet. Uniforms are dry cleaned. Offices have carpet, tile in hallway. The highest ppbRAE reading was 171 in one of the offices (room number not noted).
M016	Occupied by Jacobs the Facilities Maintenance Contractor (approximately 15,000 square feet)	Majority of workers are in the building Monday Through Friday from 6AM - 4 PM and swing shift crew of two people.	N/A.	Floor Details: Concrete slab. Slab Condition: Cracks and seams are present.	Drains/Sumps: None. Other Conduits: Rms R101 & R102--sink drain conduit and toilet plumbing; Rm 118--electrical conduits.	HVAC system is a forced air system, with intake from roof. Jacobs (facilities) manages system. System is operational on weekends. Rooms with HVAC ventilation: 114, 112, 116, 117, 119, 110A, 111, 110, 108, 106, 102, 106, 104, 105, 103, R101. Air handler is in Rm 111. Small exhaust fan in Rm 106. Other ventilation: Open Windows, Restroom Fans, mechanics fans, AC window mounted unit in Rm 110A. Heating System: Building specific boiler system with natural gas (currently not working, but blower on). Office space heaters.	The majority of the building was reroofed and remodeled from October to December 2017.	Vapor intrusion mitigation method - maintains positive pressure with makeup air adjustment. Rm 115: calibration gas Rm 111: lubricants Outside: generator and transformer use diesel fuel (NE of 118) Chemicals used in building: shop chemicals (lubricants), calibration solutions, and calibration gas. Pressed wood and office furniture throughout the building. ppbRAE: highest reading was 39 in Rm 114 (an office).
M029	Bicycle Repair Shop (Basement plus 1 floor; 1,400 square feet)	Building operating hours are intermittent, buy typically the building is occupied a 2-4 hours a day. Swing shift crew.	Basement Type: Full basement under Rm 106. Basement Usage: Storage and utilities. Basement Floor: Concrete with cracks and seams. Basement Walls: Poured Concrete. Moisture: Dry	Floor Details: Concrete, tile; Room 106 has raised wood. Slab Conditions: Cracks and seams where visible.	Drains/Sumps: Drain located in basement below Rm 106. Rm 102 (restroom) floor and shower drain. Other Conduits: Unknown conduits located in the basement and Rm 103.	No HVAC system in building. Other ventilation: Open Windows, Restroom Fans, mechanics fans. Heating System: Steam; delivery involves mechanical fan to disperse heat; no outside air used. Electric space heaters.		Cleaners: Rm 102 (restroom) Pressed furniture throughout the building. Rm 103: Portable generator and fuel. Basement: propane and bicycle grease. Rm 106 has furniture made of particleboard. ppbRAE: all readings were 0 or 1 ppb except for Rm 103 (fuel tank storage), which had a reading of 30.
M045	Former paint shop. Currently used for the purpose of housing technical demonstrations of mechanical rover (UAV). (1 floor; approximately 9,000 square feet)	Infrequent use of the building--estimated at a few days per week for 2 to 4 hours at a time.	N/A.	Floor Details: Concrete slab. Slab Condition: Cracks and seams present. Tile: Rm 105 and 106 A/B	Sump: Room 107A, approximately 6 feet deep Other Conduits: Rm 101, 101A, and 102--electrical conduits and utility corridor located in floor. The corridor traverses building from east to west at an unknown depth. Sinks and toilets: Rm 106A/B	No HVAC system in the building. There are two large mechanical venting systems to the South and West walls (not in service). Other ventilation: Open Windows, Restroom Fans, and mechanics fans.	Between the Jan. 2016 and Jan. 2017 air sampling events, the walls separating Rms 101, 101A, 102, and 102A have been removed and are now all part of Rm 101.	Cleaners: Rm 106A Future chemical storage: Rm 105 Future Remodeling: walls between 105 and 105A will be demolished. Rm 105 will have AC unit installed, hold chemicals, and be a soldering station. ppbRAE: 982 in sump; 226 at Rm 103 grate; 26 at Rm 101 grate. All other rooms had readings of 0 ppb.

TABLE A-1. SUMMARY OF BUILDING SURVEY RESULTS

Building Number	Type of Building (# of floors; area)	Building Work Hours	Basement Information	Floor Information	Conduits Penetrating Floor and Elevator Information	HVAC Systems Details	Recent Remodeling Information	Further Building Related Information
M067	US Post Office. 1 floor; approximately 2,000 square feet; concrete slab foundation & stucco sides.	Monday through Saturday, 08:30 am to 3:30 pm.	N/A.	Floor Details: Concrete slab. Slab Condition: Seams and a break between footer and slab on southwest portion of building. Floor: All tiled floor/ linoleum over concrete. Walls: Stucco.	Drains/Sumps: None. Other Conduits: Rms 101 and 102--toilets.	No HVAC system in building. A single window mounted AC unit. Small floor and desk fans used to move air around in building. Other ventilation: Open Windows, Restroom Fans. Heating System: Building specific system with natural gas heating. Electric heaters with fans.	New roof installed in 2016. Carpeting removed in 2014.	Rm 101: air freshener, perfume, bathroom cleaners, car cleaners, tire cleaner, motor oil. Pressboard office furniture. ppbRAE: All rooms had readings above 40 ppb. Highest reading was 75 ppb in Rm L101 (Post Office).
M076	Locksmith shop (1 floor; approximately 400 square feet)	Monday through Friday, 8 am to 4 pm	N/A.	Floor Details: Concrete throughout and tile in restroom.	Drains/Sumps: none. Other Conduits: Rm R102--sewer and water conduits.	No HVAC system. Single window mounted AC unit located in Rm 101. A/C unit on 24/7. Other ventilation: Open Windows, Restroom Fans. Heating System: Steam; delivery involves mechanical fan to disperse heat; no outside air used.	N/A.	Rm 101: orange degreaser. Rm R102: restroom cleaner. ppbRAE: highest reading was of 104 ppb in Rm R101 (lock shop/orange degreaser). 75 ppb in Rm 103 (entry/storage) and 85 ppb in Rm 102 (restroom).
M107	ROICC Management Office (1 floor; approximately 1,800 square feet)	Hours of Operation: Monday through Friday, 7:30 AM to 5:00 PM.	N/A.	Floor Details: Concrete and carpet. Slab Condition: Unknown.	Drains/Sumps: Drain in Rm R101 Other Conduits: Rm R101--sewer conduit for toilet and sink pipes; Rm 107--electrical and communication conduits in eastern corner of room and kitchen sink.	HVAC system is a central heating/cooling system. Intake on the roof. HVAC is maintained by Jacobs (facilities) HVAC system runs continuously. Heating also by HVAC. Vents in Rms: 105, 106, 104, 103, 102, and 101. Other ventilation: Open Windows. Office fans. Heating Fuels: Natural Gas.	N/A.	Rm 101: cleaners ppbRAE: Highest reading 24 ppb (Rm 100); all other readings in building were between 11 and 19 ppb.
M126	Moffett Historical Society Museum (1 floor; 3 buildings; approximately 13,000 square feet)	Museum hours are Wednesday through Saturday, 10 am to 2 pm. Workers occupy building from 9:30 AM to 3:00 PM Wednesday through Saturday.	N/A.	Floor Details: Concrete (Rm 101 and 102) and carpet (103). Slab: Seams where visible. Tile: 106, 106A, 105, 104, 105A	Floor Drains: 104, 105, and 106A. Other Conduits: Rms 104 and 106A--sewer conduits; Rm 105--sink drain. Server Conduits: Rm 104 and Rm 106A, running through void space.	HVAC system in main building (Rm 103, 104, 105, 106, and 106A). System maintained by Jacobs (facilities). Other ventilation: Mechanical Fans, Open Windows, Restroom Fans. Heating System: Radiant heat (natural gas and electricity) with mechanical dispersion system (Rm 101 and 102).	HVAC System installed in early 2012.	Cleaners: Rm 104, 105, and 105A. Paints/solvents: Rm 102. Historical uniforms are dry cleaned (Rm 101). ppbRAE: highest reading was 109 ppb in Rm 103 in the breakroom (strong coffee smell).
N210	Former aircraft Hangar converted to office space. (3 floor; approximately 95,000 square feet)	Monday through Friday, 8 am to 6 pm. The building is rarely used on weekends, during day shift only.	Basement floor: Located in former Hangar area. Concrete. Foundation walls: Poured concrete. Dry. Utilities forcomputer numerical control machine shop.	Floor Details: Concrete, carpeted, tile, raised flooring over concrete slab. Slab Condition: Cracks and seams visible.	Sump: basement, restrooms (MR137 showers) Floor Drains/cleanouts: First floor bathrooms - 259B, 255B, 256A&B, R249, 135, J140, R140 C/D, Q134, J140, C117A, 117, 148, C190B, hangar pit, and R250. Elevators: Two elevators (V101 and V102) (PID readings were non detect). Other Conduits: Rm 240--electrical conduits.	HVAC system is a zoned heating/cooling system with two separate HVAC systems. The system operates at a set point temperature. The 1st and 2nd floors have a chiller and natural gas hot water boiler providing heating and cooling to these levels. There are also three air handlers (fans) providing a continuous supply of fresh air to both of these levels of the building (with no recirculated air). Outside air is collected from intakes on the roof. There is an air handler on the east roof with a 5 HP roof fan. There are 2 air handlers in the attic space above Rm 257; they supply east and west sides of 1st & 2nd floors separately; each have 40 HP and run off VFDs. The other, separate HVAC system is a self-contained (air is recycled) air hearting and cooling unit that services only the "penthouse" (a 3rd floor addition to this building); there is no makeup air, the air supply is through the stairwell. These are alarmed to prevent failure and the alarm system operates 24 hours each day. There are 8 exhaust fans on the roof; 7 are in service. Two of the exhaust fans are for Room 134 (the main chiller room). One is for Rm 131. Three are for restrooms. Occupants often complain about the operation of the HVAC unit. Other ventilation: Open Windows, Restroom Fans Heating System: Natural Gas	Nov./Dec. 2016: High bay area has been modified by new tenants tenant as a computer numerical control machine shop.	Large voids are located between Rms 259B and C247 that are at least two stories high and used for utilities with a concrete slab present and no flooring. During re-fueling and when aircrafts mobilize for take off, fumes often drift onto the facility and are noticeable within the facility. Majority of office space on first floor is on raised flooring. The building was converted in the 1950s from one large hangar to 2/3 office space that is 2 stories in height (E, S, and W perimeters of building) and 1/3 highbay. There is a vapor extraction system installed under the raised floor beneath Rooms 143 and 145; the exhaust fan for the system is on the roof. New chemicals in the high bay area include; cleaners, paint, HAZ waste (resin), Heat transfer fluid ppbRAE: One reading in Rm 121 of 20 ppb, all other readings in the building were between 0 and 12 ppb.

TABLE A-1. SUMMARY OF BUILDING SURVEY RESULTS

Building Number	Type of Building (# of floors; area)	Building Work Hours	Basement Information	Floor Information	Conduits Penetrating Floor and Elevator Information	HVAC Systems Details	Recent Remodeling Information	Further Building Related Information
N239	Life Sciences Building (Basement + 3 floors with 4th floor penthouse (approximately 150,000 square feet)	Building is typically occupied Monday through Friday, 6 am to 6 pm. Building is always open with sporadic weekend and after hour use. Building could be occupied at any time due to needs of timed lab experiments.	Full Basement Basement Usage: Office Space, storage, and utilities. Basement Floor: Concrete. Basement Walls: Poured Concrete. Moisture: Dry. HVAC: continuously on in basement.	Floor Details: Concrete, carpet, and tile. Slab Condition: Cracks and seams visible.		HVAC system is a zoned heating/cooling system. The HVAC is operated continuously. HVAC system is operated by Jacobs (facilities). Two 60 HP air handlers located in the basement - intake on the roof of the building. Make up air is 100% intake, no recycling. Air felt stagnant in NW portion of the library (Rm 053). Other ventilation: Mechanical Fans, Restroom Fans, Chemical fume hoods 35 exhaust fans and 52 fume hoods (see fan and chemical fume hood inventory list for details and room numbers). Heating Systems: Natural Gas, Steam. Steam delivery involves mechanical fan to disperse heat and radiators; no outside air used.	Nov./Dec. 2016: carpet was installed in Rm 138 (carpet glue was used to attach the carpeting to the floor slab). 2016; Roofing completed in 2017. Current renovations are to a penthouse and greenhouse.	The transferring of chemicals from bulk storage to the labs usually entails a sealed container placed inside an unsealed carrying container. Solvents used throughout labs. Trichloroethene was observed in lab number 432. PID detections were observed in association with solvents and chemicals with a high VOC content located in many of the laboratories. The chemicals were typically stored in the flammable cabinets within the laboratories. Lab coats are dry cleaned. Generator on NE side of building near open windows. ppbRAE: All readings were between 0 and 2 ppb, except for Rooms B053
N239A	Offices and Centrifuge Operations (Basement + 2 floors; approximately 34,000 square feet)	Two offices on 2nd floor: Monday through Friday, 6 am to 4 pm. Office is occupied by students, who work on highly varied schedule with possible weekend use. Rare weekend use. Centrifuge testing areas has not been used regularly for the past two years. Highbay area and first floor shops: Monday through Friday, 6 am to 4 pm, but intermittently	Basement Type: Two large open vaults located in highbay (Rm 120) Basement Usage: Storage and bio-dome station. Basement Floor: Concrete. Basement Walls: Poured Concrete. Moisture: Dry.	Floor Details: Concrete and tile. Slab Condition: Cracks and seams visible.	Sumps: Rm 144--Depth approximately 8 feet below floor, dry, PID reading = 250 to 270 ppb. Floor Drains: all bathrooms, 120, R121, R102, 141, 142, 145. Elevators: Two elevator shafts (E101 and S102), PID reading = non detect. Other Conduits: Electrical conduits in highbay area; unknown conduits penetrate wall of bio- dome vault area at elevation that is below grade. Utility conduits: U102, 120, 104, 144, 145, 142, 141.	HVAC system is a zoned heating/cooling system. HVAC operates 24/7. Building FSM did not have knowledge of number of air handlers or air intake location. Aerial photos indicate possibly three intake air handlers on north end of building. One intake on south end of building. 12 possible vent locations. Jacobs (facilities) maintains and manages HVAC system operation. Other Information: Supply and return vents located in office area (Rm 243). Other ventilation: Open Windows, Restroom Fans, Chemical fume hoods. Heating System: Natural Gas, Steam. Steam delivery involves mechanical fan to disperse heat and radiators; no outside air used.	N/A.	Rm 120: paint, lab supplies, flammable lockers Rm 125: paint, solvents, lubricants, glues, and flammable lockers Rm 104: glues Lab coats are dry cleaned. There is office furniture made of plywood located throughout the building. ppbRAE: all readings in building were between 4 and 35 ppb. The highest reading was in Rm 144 (at sump level).
N243	Flight Guidance and Simulation Lab (Basement + 3 floors; approximately 130,000 square feet). Basement is multilevel and includes flight simulators and offices.	Monday through Friday, 6 am to 6 pm. Some weekend work and late/night work.	Basement Type: Half basement--approximately 4.5 feet bgs. Basement Usage: Office Space, storage, and utilities. Basement Floor: Concrete and mixed tile/carpet in offices in southern portion of basement. Basement Walls: Poured concrete. Moisture: Water intruding through floor in vertical flight simulator room. A pump was present but not running. Standing water on extensive area of floor.	Floor Details: Concrete. Slab. New carpet on Southern part of 1st floor. Mixed tile and carpet in the SW portion of the building (Rm 189). Condition: Cracks and seams are present.	Sumps: Rm N032--Water at approximately 3 to 4 ft. below the floor. Floor Drains: Rms N032 (3 drains), 039, 117, 174, and all bathrooms. Elevators: Two typical personnel elevators (PID readings were non detect). Other Conduits: Rms N032, 039, 052, E034, simulators--electrical conduits. Water supply and sewer drain in all bathrooms and breakrooms.	HVAC system is a zoned heating/cooling system. HVAC is operated continuously.Main intake is located at grade on western side of bldg, near Rm 113A. Also an active intake is located on the roof.Air handlers in basement. Air handler in 039 active, others are broken/off. Air handler in lab may be turned off due to notice. Jacobs (facilities) maintains and manages the HVAC system operation.Other ventilation: Mechanical fans, restroom fans, open bay doors. Heating Systems: Natural Gas, Steam. Steam delivery involves mechanical fan to disperse heat and radiators; no outside air used. PB requests HVAC to Rom 242 to remain on during HVAC Off time frame, to protect servers.	N/A.	During re-fueling and when aircrafts mobilize for take off, fumes often drift onto the facility and are noticeable within the building. Generators in simulator rooms are vented outside, but it was noted that exhaust leaks to building. Gas powered tools used in building. Chemicals in rooms: 50, 59, 189, 201 (over 50 chemicals used in building). Flammable locker in Rm 120; unknown contents. Motion simulators/shops: oil, gas, glues, etc. Recarpeting in 136 area on 1st floor in Oct. 2016 (carpet glue was used to bond carpet to slab). Office furniture made of plywood located throughout the building. ppbRAE: all readings were between 5 and 37 ppb. Highest ppbRae reading was in Corridor C103 at 37 ppb.

TABLE A-1. SUMMARY OF BUILDING SURVEY RESULTS

Building Number	Type of Building (# of floors; area)	Building Work Hours	Basement Information	Floor Information	Conduits Penetrating Floor and Elevator Information	HVAC Systems Details	Recent Remodeling Information	Further Building Related Information
N243A	Welding and Machine Shop (Basement + 3 floors, 3 stories; approximately 9,000 square feet)	Monday through Friday, 8 am to 5 pm. Infrequent weekend use.	Basement Type: Tunnel to rotunda in Building N243. Basement Usage: Utilities condor. Basement Floor: Concrete. Basement Walls: Poured concrete. Moisture: Water intruding through bay pit where motor is housed. Sump pump is operational but still standing	Floor Details: Concrete. Slab Condition: Cracks and seams are present.	Drains/Sumps: None Other conduits: Rms 101 and 104 Utilities: See utility map	HVAC system is a zoned heating/cooling system. HVAC operated continuously. HVAC Zones: 2nd floor offices have only active HVAC systems. Jacobs (facilities) maintains and manages HVAC system operation. Other ventilation: Mechanical fans, open bay doors, open air vents located on Northern and Western walls. Heating System: Steam; delivery involves mechanical fan to disperse heat; no outside air used.	N/A	During re-fueling and when aircrafts mobilize for take off, fumes often drift onto the facility and are noticeable within the building. Chemicals: Rm 102A (21 chemicals used in building) ppbRAE: all readings were between 33 and 40 ppb. Highest reading was in Rm 101.

Abbreviations

AC = air conditioning
Bldg = building
bgs = below ground surface
DTW = Depth to water
DX = direct exchange
HP = horse power
HVAC = heating, ventilation and air conditioning
N/A = not applicable
PID = photoionization detector
Rm = room

Date: 2 / 15 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS _____

BUILDING MONITORING RECORD

BUILDING NUMBER: 2

TIME	bbp	Room Number	Comments
1206	25	C101	
1207	131	101	locker room, cleaner odor
1208	5	104	M002-1-04 location, boiler room
1209	6	102	Storage
1210	2	107	M002-1-02 location
1211	0	100	Gym
1211	0	101	Gym
1212	66	109	M002-1-03 location

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 2	Date: 2/15/19
Building Contact: None Currently	Phone: N/A
email: N/A	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:	No. of Stories

Building Use:
gymnasium

General Building Description, Construction Materials:
Steel Frame, Concrete floors, hardwood basketball court

What type of basement does the building have?
None Full basement Other (specify):

How is the basement used? (Circle all that apply.) N/A
Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify): N/A
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify):
hardwood basketball court and tiled bathrooms

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
Rooms: 103, 104, 101B, 101C, 111A, 111B

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
101A - cleaning supplies

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Rooms: 103, 104, 101C, 111A, 111B, + 109
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N)
If not, what type of HVAC system is used in this building? How many? No HVAC
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: N/A
Other HVAC items (specify and describe): Wall mounted A/C unit in Room 110
Does the HVAC system have an exhaust capability? (Y/N) N/A
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans and large floor fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation? N/A
Describe the control sequencing and operation of the HVAC system with respect to: Hours of operation: The intake of outside air: N/A Minimum: Maximum: Relative percentage of outside air: Differences between day and evening operation of weekdays and weekends:
What type(s) of fuel(s) for space heating and water heating are used in this building? (Circle all that apply.) Solar Natural gas Electricity Steam Other (specify):
Are any other fuels or chemicals used in this building? (Y/N) Describe:
What are the hours during which a majority of the workers are in the building during a work day? 1030 - 1900 M-F Is the building or portions of the building occupied/utilized on weekends? (Y/N) If yes, is the HVAC system operational on weekends? (Y/N) N/A Provide details on weekend use.
Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
Was there any recent remodeling or painting done in the buildings? (Y/N)
When and where was the most recent carpeting applied in the building? N/A
What adhesives were used to attach the carpeting to the floor slab? (Y/N) N/A
Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture
Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	110 / janitor closet / restrooms	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot / road

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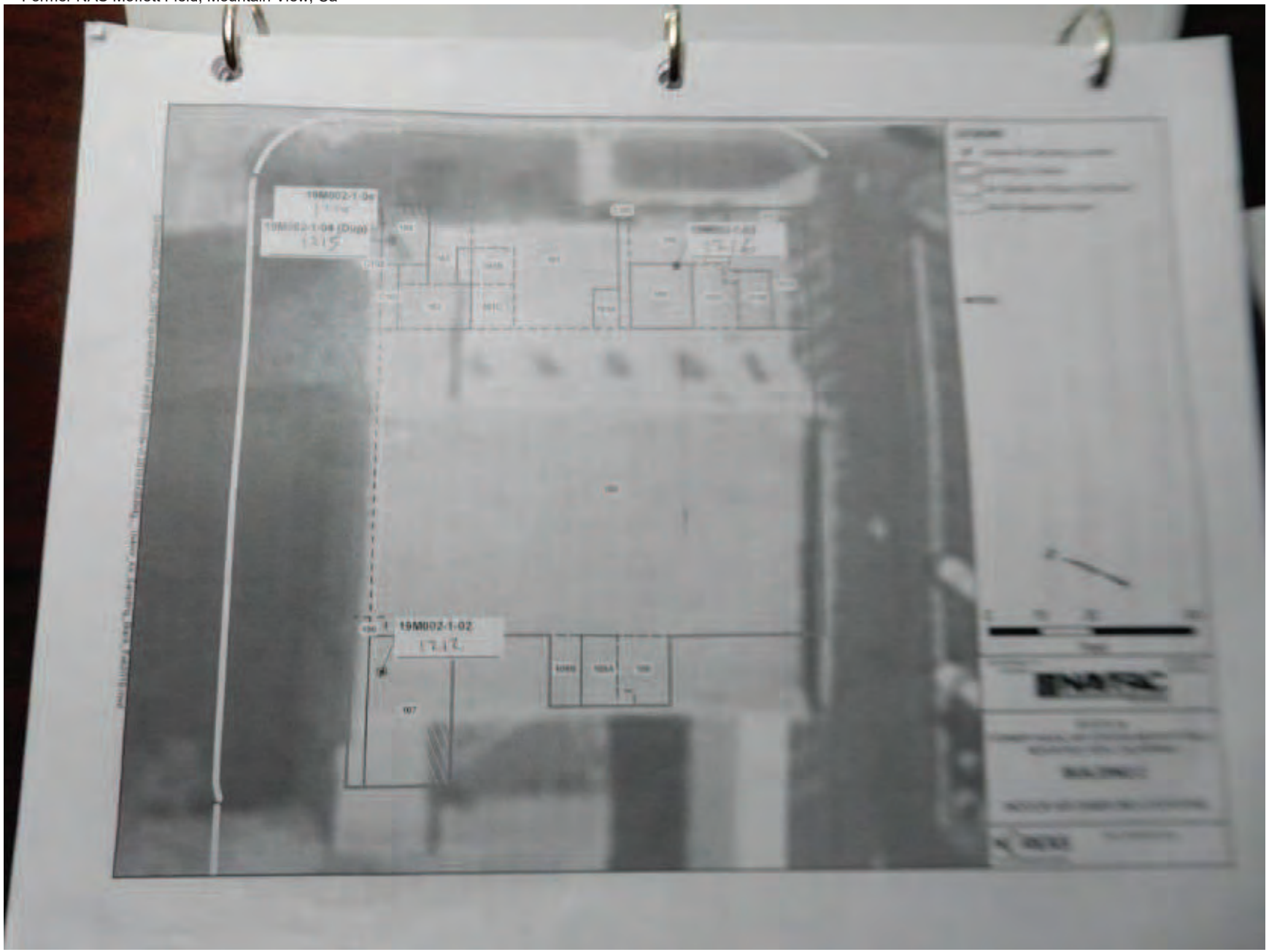
BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.


19M002-1-04 (Dup)
1215
19M002-1-02
1212

Date: 2/14/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☐ FRESH AIR (ZERO)
☐ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS_____

BUILDING MONITORING RECORD

BUILDING NUMBER: 3

TIME	bbp	Room Number	Comments
0725	0	108	M003-1-09 location
0726	0	128A	office
0727	0	127	conference Room
0728	0	122	Main Ballroom M003-1-04 location
0728	0	C106	Hallway
0729	0	C108	Hallway
0731	0	C112	Conference room
0733	0	C101	Entry way
0734	0	104A	M003-1-03 location
0735	0	105	M003-1-01 location
0736	5	107	office
0737	0	102	office
0738	0	~~113B~~ Ep 116	Storage
0739	0	C111B	M003-1-02 location
0740	1	115	food Storage
0741	0	110	Kitchen
0742	1	111	office M003-1-08 location
0743	0	112	Prep Kitchen
0745	0	108	M003-1-07 location
0745	2	108	four of space bar S.W. side
0746	0	108	S.E floor of space bar
0747	0	108	floor @ M003-1-07 location
0746	0	C105	Hallway

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 3	Date: 2/14/19
Building Contact: Moisse Ortiz (Conference Center)	Phone: 650-967-4144
email: moises.ortiz@nasa.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:

No. of Stories: 1 + Crawl Space

Building Use: Conference Center / Cafeteria

General Building Description, Construction Materials:

Brick / Concrete Covered w/ stucco + Some wood paneling

What type of basement does the building have?

None Full basement Other (specify): Crawl Space Under 105+127

How is the basement used? (Circle all that apply.)

Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)

Basement floor: Concrete Other (specify): wood walls, basement + floors concrete

Foundation Walls: Poured concrete Other (specify):

Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)

Concrete Carpeted Tiled Stone Other (specify):

Cracks Seams Other (specify): raised wood floor over crawl space

Are drains or sumps present? (Y/N)

Record location (Room #) and information on contents for each drain/sump:

Drains: rest rooms (Room 110 + 107) / Sumps: 110 (kitchen), 107 (Bar)

Are elevator shafts present? (Y?N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)

List chemicals, storage location and use; attach addition sheets as necessary.

Kitchen Cleaners Stored in 115 & used in 110

Cleaning Supplies (office / rest room) in 5123 + R106

CO_2 in R 110

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N)
Describe each:
Kitchen Sinks in 110+106, restroom plumbing (sinks/toilets)

Were foundation design specification and as-built drawings for the facility obtained? (Y/N)

Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N)
Describe:

Was vapor barrier installed under the floor slab? (Y/N)
Describe:

Were any other liners installed under the floor slab? (Y/N)
Describe:

Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N)
Describe:

Were other techniques used to restrict vapor migration through the floor slab? (Y/N)
Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
9 A/C units, Zone heating/cooling, ~~Five 20 ton AC units, 4 other~~ mp

Is the HVAC system a zone cooling/heating system? (Y/N)

If not, what type of HVAC system is used in this building?
How many? N/A

Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:
All HVAC Equipment mounted on Roof. Air Supplied from Roof Fans to kitchen (2) are 3-5Hp. All other fans are 1Hp

Other HVAC items (specify and describe): Cool/Heat air blowers in kitchen, air Supplied from roof
* at time of sampling, heat to kitchen not working

Does the HVAC system have an exhaust capability? (Y/N)

What other type of mechanical ventilation systems are present and/or currently operating in the building?
Mechanics fans Open windows
Other (specify):

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to: 24/7
Hours of operation:
The intake of outside air: yes
Minimum:
Maximum:
Relative percentage of outside air: 100%.
Differences between day and evening operation of weekdays and weekends:
None, HVAC runs 100% of time, Kitchen fans / blowers turn off when kitchen closes

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)
Describe:

What are the hours during which a majority of the workers are in the building during a work day? 8am - 8pm m-f
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N) → special events
Provide details on weekend use.
HVAC on 24/7, kitchen fans on when kitchen in use

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
Chef Jackets & table cloths / linens for events

Was there any recent remodeling or painting done in the buildings? (Y/N)
Space bar (108) in late 2016 / early 2017 Rest Rooms conference center

When and where was the most recent carpeting applied in the building?
R105D, 104A (new carpet) R108 (new tile) in 2017

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
unknown

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)
Table Cloths

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	5123, R106m	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.	rest rooms	
Other (specify):	CO2 in 110	
Other (specify):	Kitchen (industrial) in 115	
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.
Parking lot / Road

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Environmental Engineering and Science

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

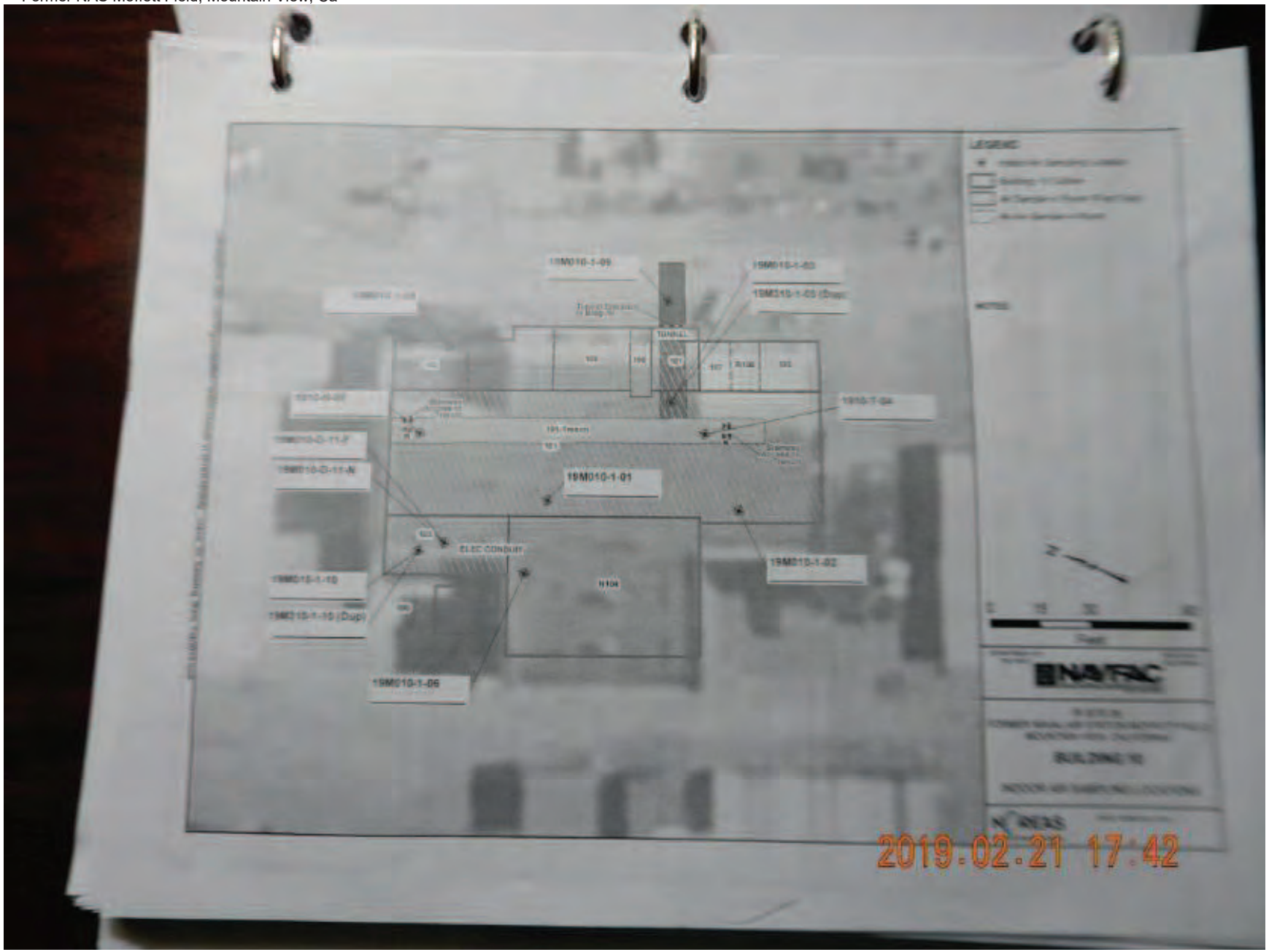
Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N)
Describe:

Was the Building occupied during the government shut down? (Y/N)

100% Furloughed

If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.


19M010-1-09
19M010-1-03
19M010-1-01
ELEC CONDUIT
19M010-1-02
19M010-1-06
2019.02.21 17:42

Date: 2 / 13 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: 10

TIME	bbp	Room Number	Comments
1316	5	N104	Storage
1317	3	N104	19M010-1-06 location
1318	2	~~10~~ 101	19M010-1-01 location
1319	7	103	19M010-1-10 location
1320	1	102	19M010-1-05 location
1321	2	101	19M010-1-03 location
1321	4	101	19M010-1-02 location
1322	3	109	Kitchen
1328	323	outside	Blower vent (inside duct)
1329	3	outside	19M010-1-07 location

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 10	Date: 2/13/19
Building Contact: Daniel Mendolla	Phone: 650-604-5961
email: Daniel.v.mandolla@navy.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:	No. of Stories 1

Building Use:
former boiler plant, decommissioned and used for storage

General Building Description, Construction Materials:
Concrete foundation, steel frame and stucco material, boiler removed in april 2014, tunnels under floor, and in tunnels into hanger 1 still exist.

What type of basement does the building have?
None Full basement Other (specify): tunnel into hanger 1

How is the basement used? (Circle all that apply.)
Not used Office Space Storage Utilities Other (specify): former utility tunnel

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify): cracks + seams (pipes running through tunnel)
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify): lots of building leaks to rain

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify):
grates over the former utility tunnels

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
Drains in rooms R106, N101, Sump in room 103

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
misc. calibration solutions in room 108

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Steam lines running ~~from~~ through 101 through N104, utility trench in room 101, plumbing in R106 and 109
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: July 2012 indoor air abatement system conducted in tunnel leading to hanger 1. May 2013 additional blower + wall added to tunnel directly under building

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) No HVAC
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: N/A
Other HVAC items (specify and describe): N/A
Does the HVAC system have an exhaust capability? (Y/N) N/A
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify):

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation? N/A
Describe the control sequencing and operation of the HVAC system with respect to: Hours of operation: The intake of outside air: N/A Minimum: Maximum: Relative percentage of outside air: Differences between day and evening operation of weekdays and weekends:
What type(s) of fuel(s) for space heating and water heating are used in this building? (Circle all that apply.) Solar Natural gas Electricity Steam Other (specify): N/A
Are any other fuels or chemicals used in this building? (Y/N) Describe:
What are the hours during which a majority of the workers are in the building during a work day? Is the building or portions of the building occupied/utilized on weekends? (Y/N) If yes, is the HVAC system operational on weekends? (Y/N) Provide details on weekend use. Not continuously occupied as workers are in/out intermitently. Building used for storage
Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
Was there any recent remodeling or painting done in the buildings? (Y/N)
When and where was the most recent carpeting applied in the building? N/A
What adhesives were used to attach the carpeting to the floor slab? (Y/N) N/A
Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture
Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:

Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner		
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify): mix	calibration solutions in room 108	
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

JR2
~~parking lot~~

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N) JR2 Yes
Describe the sources and show the locations on the area map.

road + parking lot

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

Building leaking during rain event.

Date: 2/14/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594 - 902159 CALIBRATED BY MP

CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)

☒ 10 PPM Isobutylene LOT # THBI - 248 - 10 - 8

INSTRUMENT BATTERY VOLTAGE: _____V

COMMENTS _____

BUILDING MONITORING RECORD

BUILDING NUMBER: 12

TIME	bbp	Room Number	Comments
1027	311	110	Stair case
1028	562	109	M012 - 1-04 location
1028	733	109C	M012 - 1 - 01 location
1029	850	109	M012 - 1 - 02 location
1029	620	109	near elevator in front of store
1030	434	105	Com
1030	403	109	near water line utility penetration
1031	471	C~~101~~ up	produce storage
1031	426	104A	office
1032	351	C101	Hallway
1034	325	104D	lunch / room
1036	546	104C	chemical storage (cleaners)
1037	231	101	M012-1-03 location, storage
1038	209	102A	meat department
1039	245	118	storage, near sink
1040	394	114A	storage
1040	432	115	office
1041	471	112	former elevator

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 12	Date: 2/14/19
Building Contact: Youngboon Hicks	Phone: 650-386-8211 EX 3002
email: Youngboon.hicks@deca.mil	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: 1953	No. of Stories 2

Building Use:
1st floor - military commissary, grocery, warehouse; 2nd floor - offices

General Building Description, Construction Materials:
Raised floor throughout building w/ crawl space, steel frame

What type of basement does the building have?
None Full basement Other (specify): Crawl space

How is the basement used? (Circle all that apply.)
Not used Office Space Storage Utilities Other (specify): N/A

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify): Crawl spaced over raised floor, R101 concrete slab w/ no crawl space
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify): R101 concrete foundation

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
Sumps rooms 109 + 101
drains in restrooms R117 + R113

Are elevator shafts present? (Y/N) Describe each:
Elevators not in use and located in rooms 109/113/112

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
104C - chemical cleaner storage area
118 - butcher shop, chemicals used to clean
104B + 111B - restroom cleaners R109 - household cleaners

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: restroom sinks - 117, 118, 104, 104d electrical conduit - 110 + 117 fire supression main sump - 109
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: unknown

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) Central air
If not, what type of HVAC system is used in this building? How many? Central air
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: 4 - 3 ton A/c units not in use 1 - 10 ton roof mounted heater 6 - ~~exhat~~ exhaust fans on roof
Other HVAC items (specify and describe): no HVAC in room 101
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation: 24/7
The intake of outside air: ES - roof
Minimum:
Maximum:
Relative percentage of outside air: 100%
Differences between day and evening operation of weekdays and weekends:
none

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify): water heater
electrical space heater

Are any other fuels or chemicals used in this building? (Y/N)
Describe:
chemical cleaners

What are the hours during which a majority of the workers are in the building during a work day? 0600 – 2200
Is the building or portions of the building occupied/utilized on weekends? (Y/N) open
If yes, is the HVAC system operational on weekends? (Y/N) 24/7
Provide details on weekend use.
worker shifts vary

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
meat department coats drycleaned

Was there any recent remodeling or painting done in the buildings? (Y/N)
Removed carpet and tiled in 2013

When and where was the most recent carpeting applied in the building?
N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied? gluetraps

Sources of Chemical Contaminates:

Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents	R04C, used in R118	
Lubricants		
Air fresheners	restrooms	
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	restrooms	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot / road

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

19M012-1-02-F
19M012-1-02-N
19M012-1-03-F
19M312-1-03-F (Dup)
19M012-1-03-N
C102
2019.02.21 17:44

Date: 2 / 14 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-1D-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS_____

BUILDING MONITORING RECORD

BUILDING NUMBER: 13

TIME	bbp	Room Number	Comments
1044	0	103	Storage
1045	0	103	M013-1-02 location
1046	0	103	near water line penitration
1046	0	101	empty Storage area
1047	0	102	M013-1-01 location
1048	0	102	non food Storage
			moisture noted in 103, coming
			from leak in roof

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 13	Date: 2/14/19
Building Contact: Youngboon Hicks	Phone: 650-386-8211 EX 3002
email: youngboon.hicks@deca.mil	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:

No. of Stories: 1

Building Use: Warehouse

General Building Description, Construction Materials: steel Frame, Concrete foundation

What type of basement does the building have?
None Full basement Other (specify): Crawl space under room 102

How is the basement used? (Circle all that apply.)
Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify): Crawl space - unknown construction
Foundation Walls: Poured concrete Other (specify): Concrete over elevated slab in room 102
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify):

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
102: unopened cleaners, paint + gas, and diesel cans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: electrical conduit in room 102 water main + electrical conduit in 103
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) no HVAC
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: N/A
Other HVAC items (specify and describe): N/A
Does the HVAC system have an exhaust capability? (Y/N) N/A
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): open doors

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

N/A

Describe the control sequencing and operation of the HVAC system with respect to:

Hours of operation:

The intake of outside air: N/A

Minimum:

Maximum:

Relative percentage of outside air:

Differences between day and evening operation of weekdays and weekends:

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)

Solar Natural gas (Electricity) Steam Other (specify): large refrigeration unit in building

Are any other fuels or chemicals used in this building? (Y/(N))

Describe:

What are the hours during which a majority of the workers are in the building during a work day?

Is the building or portions of the building occupied/utilized on weekends? (Y/N)

If yes, is the HVAC system operational on weekends? (Y/N)

Provide details on weekend use.

Workers go in and out of building to stock building 12. No long term occupancy.

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/(N))

Was there any recent remodeling or painting done in the buildings? (Y/(N))

When and where was the most recent carpeting applied in the building?

N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)?((Y)/N) Pallets

Are there any new upholstery, drapes, or textiles in the building? (Y/(N))

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?
glretraps
How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners	102	
Gasoline-powered equipment /diesel	102	
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners (unopened)	102	
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray (unopened)	102	
Nail polish, nail polish remover		
Bathroom cleaner (unopened)	102	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.
delivery vehicles

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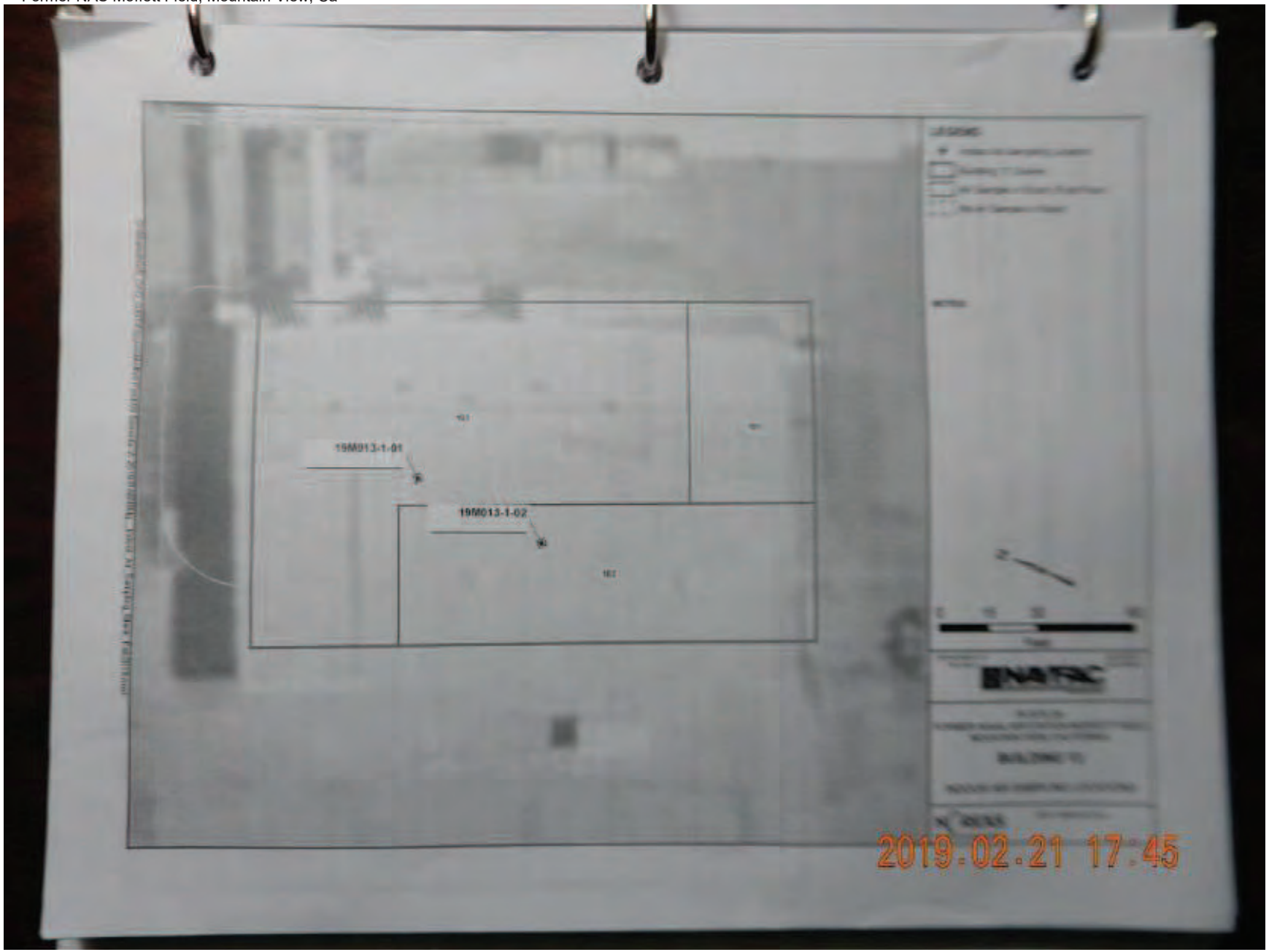
BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.


19M013-1-01
19M013-1-02
2019.02.21 17:45

Date: 2/13/18

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☑ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # TIHBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS _____

BUILDING MONITORING RECORD

BUILDING NUMBER: 14

TIME	bbp	Room Number	Comments
1307	4	106	19M014-1-05 location office
1308	6	111	office
1309	3	112	office
1310	4	110	office
1311	4	117	Break room
1311	0	115	office
1430	26	101	office
1432	20	101	19M014-1-03 location
1433	28	104	conference room
1435	26	101	19M014-1-04 location

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 14	Date: 2/13/19
Building Contact: Angela Wilkins	Phone: 831-241-2830 408-891-9043 Pager sky train
email: angela.r.wilkins	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: 1930	No. of Stories 1

Building Use: offices/Storage 2 tenants < Sky Train USGS

General Building Description, Construction Materials: building constructed over crawl space (raised foundation) wood floors stucco sides

What type of basement does the building have? crawl space under entire building except Room 119/120 concrete foundation

None Full basement Other (specify):

How is the basement used? (Circle all that apply.)

Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)

Basement floor: Concrete Other (specify):

Foundation Walls: Poured concrete Other (specify): cinder block

Moisture: Dry Damp Wet Other (specify): unknown

What are the characteristics of the floor slab? (Circle all that apply.)

Concrete Carpeted Tiled Stone Other (specify): wood floors

Cracks Seams Other (specify): carpet/tiled floor over wooden floor boards

Are drains or sumps present? (Y/N) NO

Record location (Room #) and information on contents for each drain/sump:

~~dra~~mp

Are elevator shafts present? (Y?N) Describe each:

NO

Are there locations where chemicals were or are used or stored? (Y/N) yes

List chemicals, storage location and use; attach addition sheets as necessary.

kitchen area, restrooms, room 101 (work shop)

6 month - USGS

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: plumbing in restrooms, boiler room (C101) (steam/water pipes) com. conduits throughout building
Were foundation design specification and as-built drawings for the facility obtained? (Y/N) No
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe: NO
Was vapor barrier installed under the floor slab? (Y/N) Describe: NO
Were any other liners installed under the floor slab? (Y/N) Describe: NO
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: NO

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N) NO
Is the HVAC system a zone cooling/heating system? (Y/N) yes
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: ~~unknown for zones~~ np HVAC intake on roof
Other HVAC items (specify and describe): 2 zones, 1 on USGS side, 1 on sky train zone
Does the HVAC system have an exhaust capability? (Y/N) ~~Restroom fans, AC units~~ np NO
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): rest room fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation: 24/7
The intake of outside air: roof
Minimum:
Maximum:
Relative percentage of outside air: 100 %
Differences between day and evening operation of weekdays and weekends:
NONE

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)
Describe: NO

What are the hours during which a majority of the workers are in the building during a work day? Varies
Is the building or portions of the building occupied/utilized on weekends? (Y/N) NO
If yes, is the HVAC system operational on weekends? (Y/N) Yes
Provide details on weekend use.
Sky Train: week days 9-5 pm but not 5 days a week
USGS: moving into building, unknown

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
NO

Was there any recent remodeling or painting done in the buildings? (Y/N)
NO

When and where was the most recent carpeting applied in the building?
USGS side 5 years ago

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
Yes, glue

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) NO

Are there any new upholstery, drapes, or textiles in the building? (Y/N)
NO

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

NO

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	Rest rooms + Room 105	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify): Rubing alcohol	101	
Other (specify): Kitchen Cleaner	101	
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N) NO
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

Parking lot / street

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Yes

Describe: Virgin moved out of building ~6 months ago
USGS moving in
Room 118 /116 not occupied anymore

Was the Building occupied during the government shut down? (Y/N)

Yes, emploies not exempt

If Yes, who is a contact person who can grant access to the building during another shutdown?

USGS Call Laurie: 831-233-2795 Skytrain Rodser 408-891-9043

Photograph and mark potential sample locations on the attached floor plan.

Date: 2 / 15 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: 15

TIME	bbp	Room Number	Comments
1333	16	~~166~~ ap L10.0	Lobby
1339	20	C104	MU15-1-05 Location
1338	21	101	copy room
1339	15	124	office
1339	22	133	offices
1340	19	132	office
1341	17	140	office
1342	17	142	office
1343	23	C101	Hallway
1345	39	~~A40~~ 135D	MU15-01-01 location
1346	25	135A	conference room
1347	24	158	office
1348	28	164	office
1349	25	166	office
1356	171		office
1357	50	117	MU15-1-02 location
1358	97	118	office

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 15	Date: 2/15/19
Building Contact: Dirk Meier	Phone: 650-604-4358
email:	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: / No. of Stories: 1 + loft (not in use)
Building Use: NASA Security
General Building Description, Construction Materials: Concrete Foundation, Concrete Building, Carpet and tile
What type of basement does the building have? None Full basement Other (specify):
How is the basement used? (Circle all that apply.) N/A Not used Office Space Storage Utilities Other (specify):
What are the characteristics of the basement? (Circle all the apply.) N/A Basement floor: Concrete Other (specify): Foundation Walls: Poured concrete Other (specify): Moisture: Dry Damp Wet Other (specify):
What are the characteristics of the floor slab? (Circle all that apply.) Concrete Carpeted Tiled Stone Other (specify): Cracks Seams Other (specify):
Are drains or sumps present? (Y/N) Record location (Room #) and information on contents for each drain/sump: Restroom drains: N108, N117A, N163
Are elevator shafts present? (Y/N) Describe each:
Are there locations where chemicals were or are used or stored? (Y/N) List chemicals, storage location and use; attach addition sheets as necessary. Waste oil – N163 + N108 Cleaners/air fresheners – restrooms

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: toilets / sinks in restrooms, conduit in N108 + ~~N165~~ N163
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe: N/A
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe:
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N)
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: 2 - air handlers (AH) in N163 and N108 air intake outside 8 ft above ground surface 5 - exhaust fans
Other HVAC items (specify and describe): window A/C units in 111 + 112
Does the HVAC system have an exhaust capability? (Y/N) exhaust fans
What other type of mechanical ~~ventilation~~ systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to: 24/7
Hours of operation: 24/7
The intake of outside air:
Minimum:
Maximum:
Relative percentage of outside air:
Differences between day and evening operation of weekdays and weekends:

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar (Natural gas) Electricity Steam Other (specify): water heater

Are any other fuels or chemicals used in this building? (Y/N)
Describe: Cleaners and waste oil

What are the hours during which a majority of the workers are in the building during a work day? 24/7
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N) workers on 8hr days
Provide details on weekend use. building occupied 24/7

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
uniforms

Was there any recent remodeling or painting done in the buildings? (Y/N)
new carpet 2018

When and where was the most recent carpeting applied in the building?
NW portion of building

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
unknown

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:

Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	117A 1148	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):	Waste oil N106 N163	
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

~~parking lot~~ / road

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot / road

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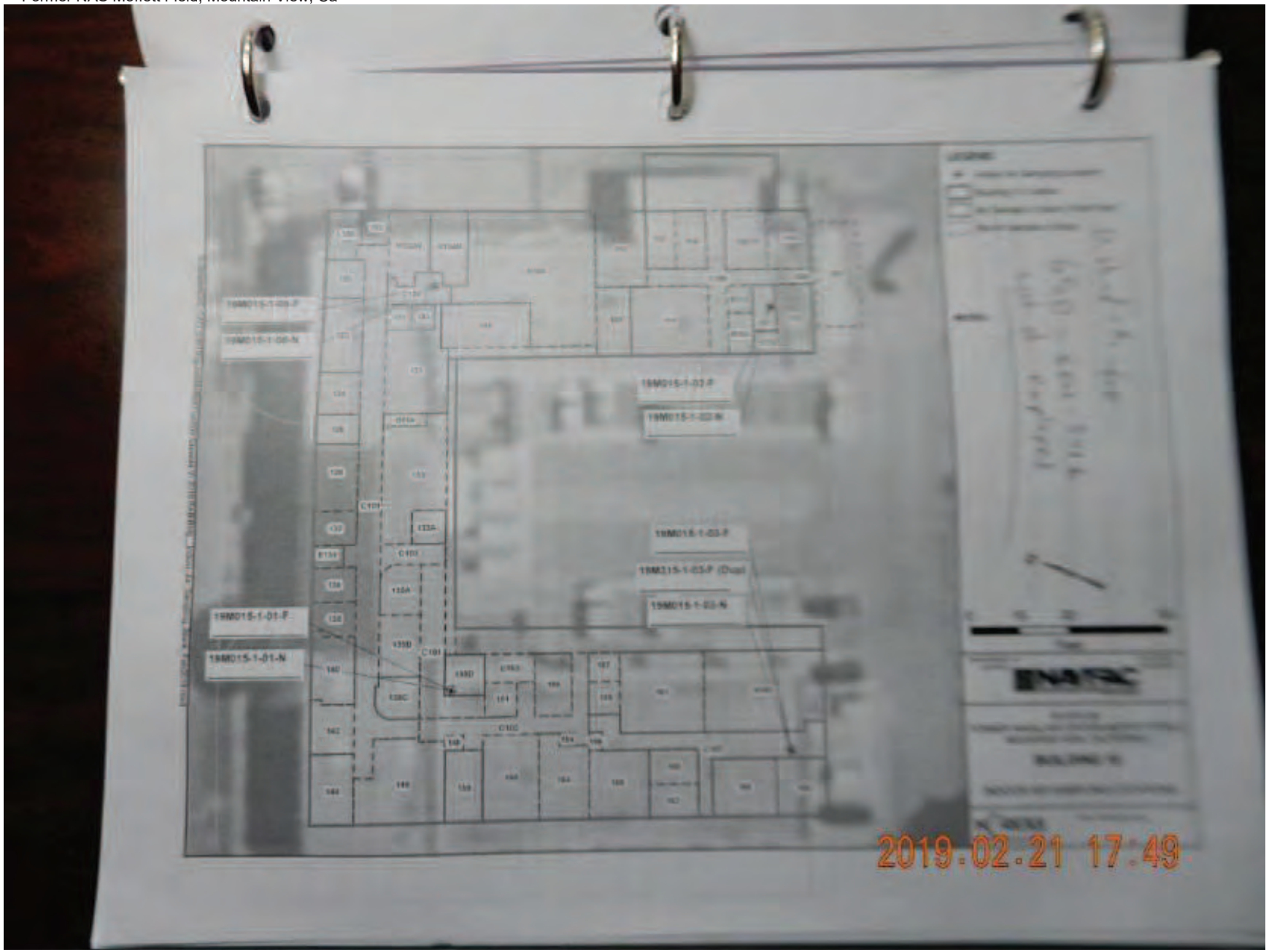
BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.


19M015-1-03-F
19M015-1-03-N
19M015-1-03-F
19M015-1-03-F (Dup)
19M015-1-03-N
19M015-1-01-F
19M015-1-01-N
2019.02.21 17:49

Date: 2 / 13 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: 16

TIME	bbp	Room Number	Comments
1535	27	102	uniform Storage
1535	19	101	office
1536	13	106	M016-1-01 location
1537	23	108	office
1538	21	110	M016-1-02 location
1539	14	119	M016-1-04 location
1540	39	114	offices
1542	23	103	M016-1-05 location
1543	19	111	M016-1-03 location
1544	33	104	offices

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 16	Date: 2/13/18
Building Contact: Tom Dashiell	Phone: 650-772-1468
email: Thomas.L.Dashiell@NASA.Gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: 1932

No. of Stories: 2

Building Use: Occupied by maintenance contractor Jacobs, facilities/maintenence

General Building Description, Construction Materials:

Stucco exterior, metal frame, concrete slab, some metal siding

What type of basement does the building have?

None Full basement Other (specify):

How is the basement used? (Circle all that apply.) N/A

Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.) N/A

Basement floor: Concrete Other (specify):

Foundation Walls: Poured concrete Other (specify):

Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)

Concrete Carpeted Tiled Stone Other (specify): office area

Cracks Seams Other (specify):

Are drains or sumps present? (Y/N)

Record location (Room #) and information on contents for each drain/sump:

restrooms and SE corner of room 111

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)

List chemicals, storage location and use; attach addition sheets as necessary.

room 111 lubricants, v101 grease, room 115 Calibration gases

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: restrooms and room 118 has communications conduit
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe:
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) non-zone cooling + heating forced air
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: ventilation in most rooms, forced air
Other HVAC items (specify and describe): N/A
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): Spare heaters

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation:
The intake of outside air: from roof
Minimum:
Maximum:
Relative percentage of outside air: 100%
Differences between day and evening operation of weekdays and weekends:
none

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)
Describe: lubricants, calibration solutions and gases

What are the hours during which a majority of the workers are in the building during a work day?
swing shift crew
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N)
Provide details on weekend use.

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
uniforms

Was there any recent remodeling or painting done in the buildings? (Y/N)
majority of building remodeled from Oct 2017 – Dec 2017

When and where was the most recent carpeting applied in the building?
original carpet

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture and wood shop

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used? glue traps

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants	111 + V101	
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray	restrooms	
Nail polish, nail polish remover		
Bathroom cleaner	115 + restrooms	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):	calibration gas in 115	
Other (specify):	dry cleaned clothes room 119	
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.
generator and transformer NE of room 118
wood shavings from wood shop (vented outside)

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot + road

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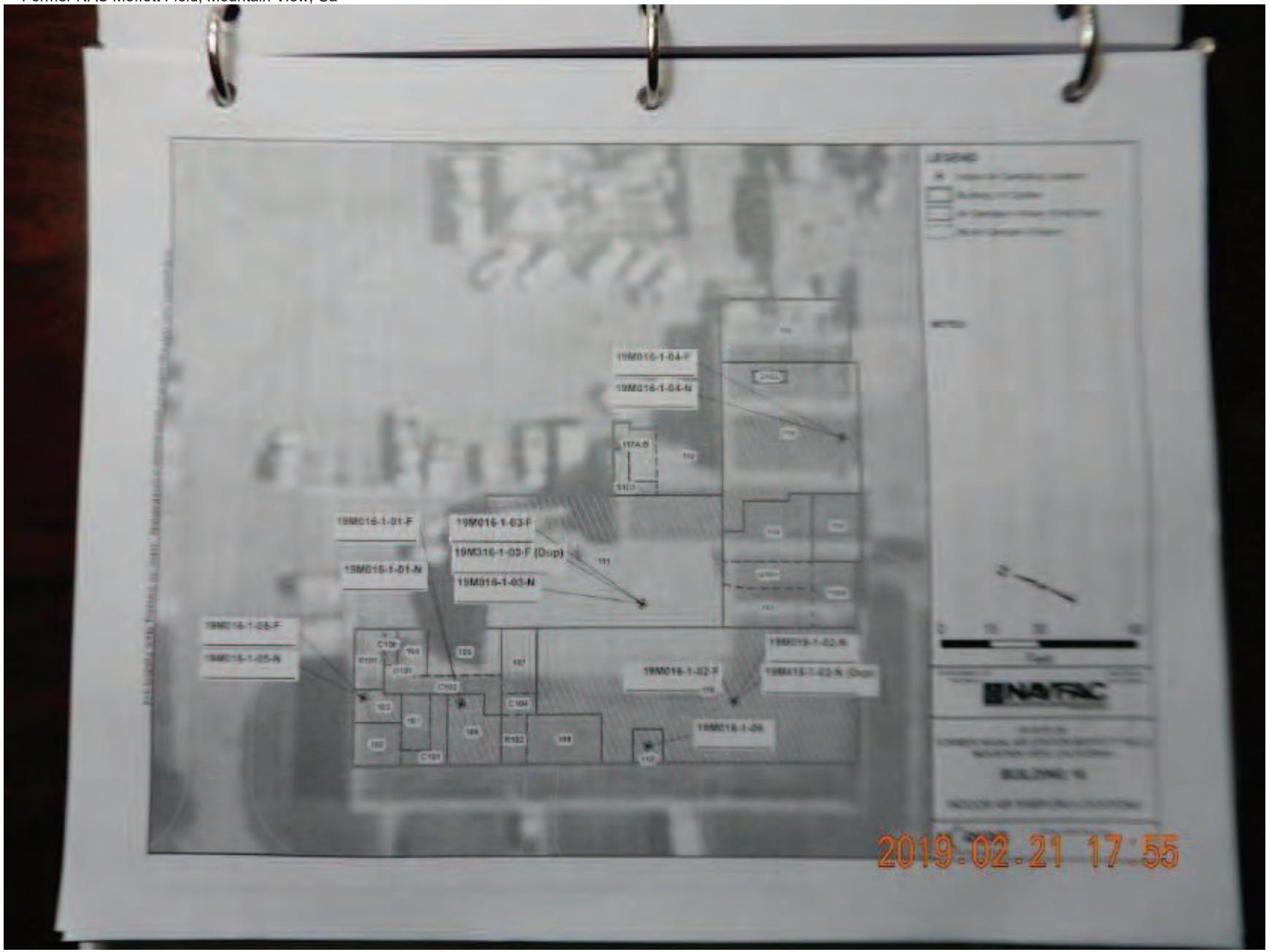
BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.


19M015-1-01-F
19M015-1-01-N
19M016-1-03-F
19M316-1-03-F (Dup)
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19M016-1-05-F
19M016-1-05-N
19M016-1-02-F
19M016-1-02-N
2019.02.21 17:55

Date: 2/14/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS_____

BUILDING MONITORING RECORD

BUILDING NUMBER: 29

TIME	bbp	Room Number	Comments
0711	0	100	19M029-1-01 location
0712	1	106	storage
0713	1	Basement	M012-B-01 location
0714	0	102	Restroom, Cleaners
0715	30	103	Storage, fuel tank in room for Honda generator

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 29	Date: 2/14/19
Building Contact: Jim Malone	Phone: 650-444-4770
email: —	Alt. Brian 650-346-0424
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: 1940's	No. of Stories 1 + basement

Building Use: bicycle repair shop

General Building Description, Construction Materials: Steel frame, concrete foundation, stucco walls, room 106 is a plywood loft over the basement

What type of basement does the building have?
None (Full basement) Other (specify):

How is the basement used? (Circle all that apply.)
Not used Office Space (Storage) (Utilities) Other (specify):

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: (Concrete) Other (specify):
Foundation Walls: (Poured concrete) Other (specify):
Moisture: (Dry) Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
(Concrete) Carpeted Tiled Stone Other (specify):
(Cracks) (Seams) Other (specify):

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
Drains in basement and the bathroom (room 102)

Are elevator shafts present? (Y?(N)) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
Bathroom cleaners in room 102

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: 102 pipes in sinks 103 electrical conduit and basement electrical conduit
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) N/A
If not, what type of HVAC system is used in this building? How many? no HVAC
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: N/A
Other HVAC items (specify and describe): N/A
Does the HVAC system have an exhaust capability? (Y/N) N/A
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): gas heater and restroom vent fan

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

N/A

Describe the control sequencing and operation of the HVAC system with respect to:

Hours of operation:

The intake of outside air: N/A

Minimum:

Maximum:

Relative percentage of outside air:

Differences between day and evening operation of weekdays and weekends:

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)

Solar Natural gas Electricity Steam Other (specify):

electric water heater

space heater

Are any other fuels or chemicals used in this building? (Y/N)

Describe: Portable generator w/ fuel being stored in room 103, bicycle grease

What are the hours during which a majority of the workers are in the building during a work day?

Is the building or portions of the building occupied/utilized on weekends? (Y/N)

If yes, is the HVAC system operational on weekends? (Y/N)

Provide details on weekend use.

Occupied ≈ 3hr per day beginning @ about 8am M-F

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

Was there any recent remodeling or painting done in the buildings? (Y/N)

When and where was the most recent carpeting applied in the building?

N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture and plywood flooring in room 106

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:

Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	102	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):	propane in basement	
Other (specify):	bike grease in basement	
Other (specify):	generator in 103	
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

Date: 2 / 13 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: 45

TIME	bbp	Room Number	Comments
0800	226	113	at gates
0800	0	103	breathing zones
0801	0	101	breathing zones
0802	982	101	sump
0803	26	100	"gates" highest value
0804	0	107	
0805	0	105	
0805	0	10((A/B)	

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 45	Date: 2/13/19
Building Contact: Sonie Lau	Phone: 650-417-5179
email: Sonnie.Lau@NASA.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:

No. of Stories: 1

Building Use: VAV testing

General Building Description, Construction Materials: Concrete, Concrete floors, utility trench running through basement

What type of basement does the building have?

None Full basement Other (specify):

How is the basement used? (Circle all that apply.) N/A

Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)

Basement floor: Concrete Other (specify):

Foundation Walls: Poured concrete Other (specify): N/A

Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.) N/A

Concrete Carpeted Tiled Stone Other (specify): in room 105 and 106 (A18)

Cracks Seams Other (specify):

Are drains or sumps present? (Y/N)

Record location (Room #) and information on contents for each drain/sump:

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)

List chemicals, storage location and use; attach addition sheets as necessary.

Bathroom cleaners in 106A

NOREAS

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Utility trench running through room 101 Plumbing in restrooms
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N) no HVAC
Is the HVAC system a zone cooling/heating system? (Y/N) N/A
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: N/A
Other HVAC items (specify and describe): large ventilation system on the south wall of building (not in service) Window AC in room 105
Does the HVAC system have an exhaust capability? (Y/N) N/A
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans

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Environmental Engineering and Science

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

N/A

Describe the control sequencing and operation of the HVAC system with respect to:

Hours of operation: N/A

The intake of outside air:

Minimum:

Maximum:

Relative percentage of outside air:

Differences between day and evening operation of weekdays and weekends:

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)

Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)

Describe:

What are the hours during which a majority of the workers are in the building during a work day?

Is the building or portions of the building occupied/utilized on weekends? (Y/N)

If yes, is the HVAC system operational on weekends? (Y/N)

Provide details on weekend use.
building occupied a few days a week for testing purposes

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

Was there any recent remodeling or painting done in the buildings? (Y/N)
paint being done in 103 during time of sampling

When and where was the most recent carpeting applied in the building?

N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:

Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	106	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot + road

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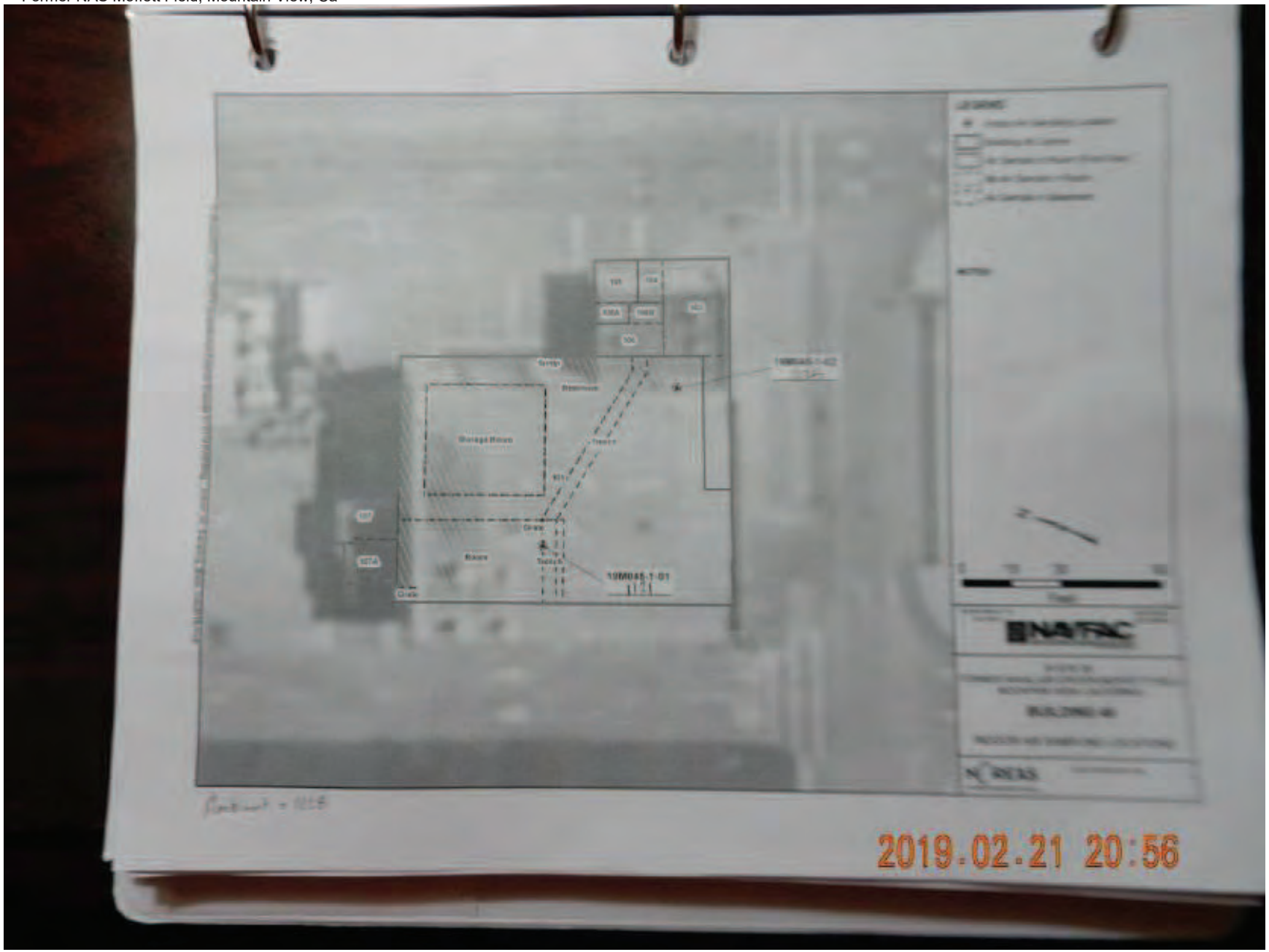
BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.


2019.02.21 20:56

Date: 2 / 15 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☑ FRESH AIR (ZERO)
☑ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: 67

TIME	bbp	Room Number	Comments
1030	45	101	MOC7-1-01 location
1031	71	104	Storage
1031	46	107	Storage
1032	42	105	office
1033	75	L101	post office

NORESAS
Environmental Engineering and Science

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 67	Date: 2/15/19
Building Contact: Margie Ortiz	Phone: 650-967-4144
email:	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:	No. of Stories 1

Building Use:
US Postoffice

General Building Description, Construction Materials:
stucco sides, concrete foundation, concrete slab foundation

What type of basement does the building have?
None Full basement Other (specify):

How is the basement used? (Circle all that apply.) N/A
Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify): N/A
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify): linoleum over concrete slab
Cracks Seams Other (specify):

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
restrooms (101 + 102)

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
101 - air fresheners, perfume, bathroom cleaner, motor/car cleaner

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: restroom plumbing
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) no HVAC
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: N/A
Other HVAC items (specify and describe): N/A
Does the HVAC system have an exhaust capability? (Y/N) N/A
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans, windows, A/c unit in 104, electrical heater/fan

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
N/A

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation: N/A
The intake of outside air:
Minimum:
Maximum:
Relative percentage of outside air:
Differences between day and evening operation of weekdays and weekends:

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify): Space + water heater

Are any other fuels or chemicals used in this building? (Y/N)
Describe:

What are the hours during which a majority of the workers are in the building during a work day? 0830 - 1530
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N) N/A
Provide details on weekend use.

open 3hr on saturdays

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

Was there any recent remodeling or painting done in the buildings? (Y/N)
new roof in 2016

When and where was the most recent carpeting applied in the building?
N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture + boxes

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents	103	
Lubricants		
Air fresheners	101	
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover	101	
Bathroom cleaner		
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):	motor oil 101	
Other (specify):	tire cleaner 101	
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot + delivery trucks

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

19M057-1-01
2019.02.21 20:59

Date: 2 / 15 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 514-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS _____

BUILDING MONITORING RECORD

BUILDING NUMBER: 76

TIME	bbp	Room Number	Comments
1350	104	101	lock shop
1351	75	103	Storage
1352	95	102	rest room

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 76	Date: 2/15/19
Building Contact: Michael Disanto / Dirk Meier	Phone: 650-604-3843
email: Michael.A.Disanto@NASA.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:	No. of Stories 1

Building Use:
Lock Shop

General Building Description, Construction Materials:
Concrete foundation, metal frames, stucco siding

What type of basement does the building have?
None Full basement Other (specify):

How is the basement used? (Circle all that apply.) N/A
Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify): N/A
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify): Carpet removed in 2014

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
room 102 - drain

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
degreaser - 102 grease - 101
restroom cleaner - 102

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Room 102 – toilet + sink
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: Unknown

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)	N/A – no HVAC
Is the HVAC system a zone cooling/heating system? (Y/N)	N/A – no HVAC
If not, what type of HVAC system is used in this building? How many?	N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:	N/A
Other HVAC items (specify and describe):	N/A
Does the HVAC system have an exhaust capability? (Y/N)	N/A
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): Window mounted heating + cooling unit room 101	

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

N/A

Describe the control sequencing and operation of the HVAC system with respect to:

Hours of operation:

The intake of outside air: N/A

Minimum:

Maximum:

Relative percentage of outside air:

Differences between day and evening operation of weekdays and weekends:

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)

Solar Natural gas (Electricity) Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/(N))

Describe:

What are the hours during which a majority of the workers are in the building during a work day? 0700 - 1500 M-F

Is the building or portions of the building occupied/utilized on weekends? (Y/N)

If yes, is the HVAC system operational on weekends? (Y/N) A/C unit on 24/7

Provide details on weekend use.

No work on weekends

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/(N))

Was there any recent remodeling or painting done in the buildings? (Y/(N))

When and where was the most recent carpeting applied in the building?

removed in 2014

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? ((Y)/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/(N))

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents	101	
Lubricants	101	
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	102	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

Parking lots/roads

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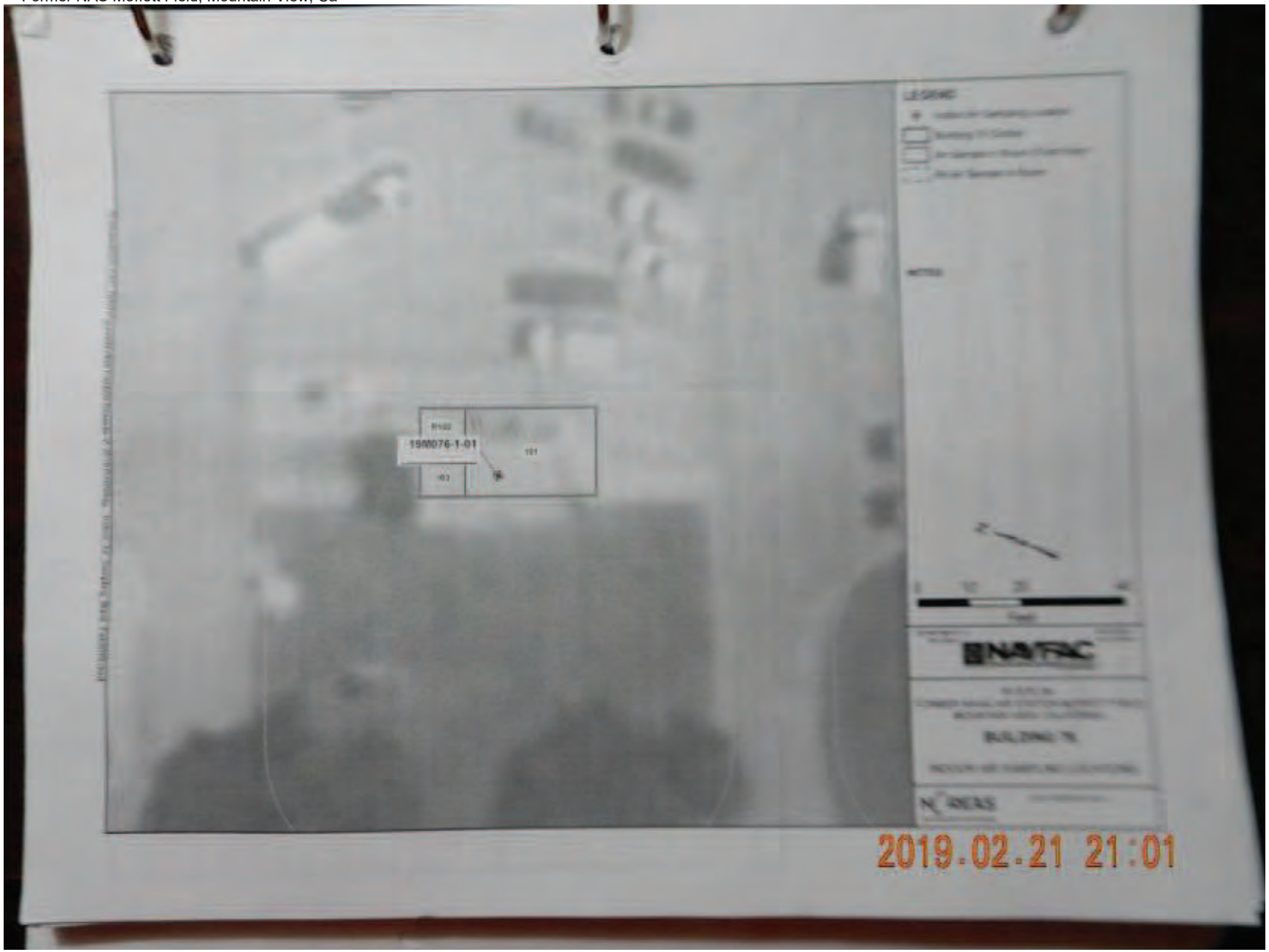
BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.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101
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2019.02.21 21:01

Date: 2/14/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS_____

BUILDING MONITORING RECORD

BUILDING NUMBER: 107

TIME	bbp	Room Number	Comments
0947	19	107	Kitchen / M007-1-02 location
0948	13	C101	Hall
0948	11	106	M007-1-01 location
0948	12	104	Print room
0949	17	103	office
0950	16	102	Library
0950	24	100	

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 107	Date: 2/14/19
Building Contact: LT. Camilo Colorado	Phone: 650-603-9834
email: Camilio.Colorado@navy.mil	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:

No. of Stories: 1

Building Use: Boicc office

General Building Description, Construction Materials: Concrete - bricks

What type of basement does the building have?
None Full basement Other (specify):

How is the basement used? (Circle all that apply.)
Not used Office Space Storage Utilities Other (specify): N/A

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify): N/A
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify): N/A

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify): file in bathroom

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.

Cleaning supplies in room 101

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: 101- bathroom (sink/toilet) 107 - Kitchen (sink)
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe: N/A
Was vapor barrier installed under the floor slab? (Y/N) Describe: N/A
Were any other liners installed under the floor slab? (Y/N) Describe: N/A
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: N/A
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: N/A

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) non-zone cooling and heating
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: roof inlet for HVAC Vents in all rooms
Other HVAC items (specify and describe): open doors/windows
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify):

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation: 24/7
The intake of outside air: roof
Minimum:
Maximum:
Relative percentage of outside air: 100%
Differences between day and evening operation of weekdays and weekends:

none

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all ~~that apply.~~)
Solar Natural gas Electricity Steam Other (specify):
water heater

Are any other fuels or chemicals used in this building? (Y/N)
Describe:

What are the hours during which a majority of the workers are in the building during a work day?
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N)
Provide details on weekend use.

Single tenant 0700 - 1700 M-F

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

Was there any recent remodeling or painting done in the buildings? (Y/N)

When and where was the most recent carpeting applied in the building? N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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Environmental Engineering and Science

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	101	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot / road

NOREAS
Environmental Engineering and Science

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N)
Describe:

Was the Building occupied during the government shut down? (Y/N)

Yes

If Yes, who is a contact person who can grant access to the building during another shutdown?

Lt. Colorado is not furloughed and could give access

Photograph and mark potential sample locations on the attached floor plan.

19M107-1-01-F
19M107-1-01-N
19M107-1-02-F
19M107-1-02-N
2019.02.21 21:02

Date: 2/14/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☐ FRESH AIR (ZERO)
☐ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS _____

BUILDING MONITORING RECORD

BUILDING NUMBER: 126

TIME	bbp	Room Number	Comments
1442	7	103	Entrance room
1443	13	103	office
1444	16	103	Kitchen M126-1-02 location
1445	7	106	M126-1-04 location
1446	5	Crawl space	next to test rooms
1446	3	103	M126-1-01 location
1447	8	102	M126-1-03 location
1448	13	101	M126-1-05 location
1449	16	101	Storage

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 126	Date: 2/14/19
Building Contact: Herb Parsons	Phone:
email: herbndi@sbcglobal.net	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: No. of Stories 1

Building Use: Moffett Historical Society Museum

General Building Description, Construction Materials: Metal siding, steel frame, appears to be 3 prefabricated buildings linked together

What type of basement does the building have? N/A

None Full basement Other (specify):

How is the basement used? (Circle all that apply.) N/A

Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.) N/A

Basement floor: Concrete Other (specify):

Foundation Walls: Poured concrete Other (specify):

Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)

Concrete Carpeted Tiled Stone Other (specify):

Cracks Seams Other (specify): Concrete in rooms 101 + 102
Carpet in Room 103, tile in 105 + 106

Are drains or sumps present? (Y/N)

Record location (Room #) and information on contents for each drain/sump:
Drains
105 + 104

Are elevator shafts present? (Y?N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)

List chemicals, storage location and use; attach addition sheets as necessary.
Cleaning / painting solvents
Paints + Solvents stored in 102
bathroom Cleaners 104 + 105

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Plumbing Pipes in room 104, 105, 106. Conduit / crawl space between 103, 104, 105, 106
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: Unknown

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N)
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: HVAC only in main building Rooms 103, 104, 105, & 106. Rooms 101 + 102 high bay warehouse - No HVAC
Other HVAC items (specify and describe): Heating Rooms 101 + 102
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify):

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Sacobs

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation: HVAC on set point temps, runs 100 % till set point reached
The intake of outside air: yes
Minimum: ↳ from N. side of building near street/
Maximum: parking lot
Relative percentage of outside air:
Differences between day and evening operation of weekdays and weekends:
None

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)
Describe: Paints / Solvents

What are the hours during which a majority of the workers are in the building during a work day? Tu - Sat
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N) 10 am - 3pm
Provide details on weekend use.
Saturday 10 am - 3pm

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
Historical Uniforms dry Cleaned

Was there any recent remodeling or painting done in the buildings? (Y/N)

When and where was the most recent carpeting applied in the building?
Original Carpet

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furnature

Are there any new upholstery, drapes, or textiles in the building? (Y/N)
Historical Uniforms

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners	room 102	
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	105 + 104	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):	Solvents 102	
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

road / parking

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N)
Describe:

Was the Building occupied during the government shut down? (Y/N)
100 % furloughed

If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

Date: 2 / 13 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # 1HBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS _____

BUILDING MONITORING RECORD

BUILDING NUMBER: 510

TIME	bbp	Room Number	Comments
1554	29	C101	MS10-1-03 location
1555	40	~~10~~ 107	office
1556	48	108B	office
1557	46	112	conference room
1558	55	108A	Dispatch (occupied 24/7)
1559	43	110	MS10-1-02 location

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 510	Date: 2/13/19
Building Contact: Chris Perry	Phone: 650-604-4708
email: Chris.L.Perry@NASA.Gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: No. of Stories 1

Building Use: Maintenance contractor (Jacobs) admin. building

General Building Description, Construction Materials:
Concrete + metal / concrete slab

What type of basement does the building have?
None Full basement Other (specify):

How is the basement used? (Circle all that apply.) N/A
Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.) N/A
Basement floor: Concrete Other (specify):
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify):
Concrete slab w/ carpet throughout. Tile in restrooms.

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
restrooms + janitor closets, floor drains

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
Air fresheners throughout building (Glade)
Restroom cleaners in janitor closet (J102)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: restroom + janitor closet
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) Zone 1 rooms 109 + 112, Zone 2 is the rest of the building
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: 2 roof mounted A/c units, 1 per zone
Other HVAC items (specify and describe): used floor heaters
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation:
The intake of outside air: from roof
Minimum:
Maximum:
Relative percentage of outside air: 100%
Differences between day and evening operation of weekdays and weekends:

Zone 2 runs continuously
Zone 1 runs when occupied

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)
Describe:

What are the hours during which a majority of the workers are in the building during a work day?
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N)
Provide details on weekend use.

Room 108A is occupied 24hr by 2 people. The rest of the building is occupied normal business hours.

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

Was there any recent remodeling or painting done in the buildings? (Y/N)

When and where was the most recent carpeting applied in the building?
room 112 in 2016

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
Unknown

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:

Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners	R101 + R103	
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	R102	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

Parking lot

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

19M510-1-03-F
19M510-1-03-N
19M510-1-02-F
19M510-1-02-N
2019.02.21 21:03

Date: 2/14/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP

CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)

☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V

COMMENTS_____

BUILDING MONITORING RECORD

BUILDING NUMBER: 555

TIME	bbp	Room Number	Comments
1410	33	C101	Main hall
1411	23	101	office
1412	23	105	Conference room
1412	22	105B	office
1413	35	112	M555-1-01 location
1413	27	112A	Storage
1414	30	108A	Kitchen
1415	31	107B	Com. Closet
1415	25	107A	office
1415	26	107	M555-1-03 location

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 555	Date: 2/14/19
Building Contact: Mark Newfield	Phone: 650-604-4893
email: mark.e.newfield@nasa.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: No. of Stories 1

Building Use: office building

General Building Description, Construction Materials:

Concrete foundation

What type of basement does the building have?

None Full basement Other (specify):

How is the basement used? (Circle all that apply.)

Not used Office Space Storage Utilities Other (specify): N/A

What are the characteristics of the basement? (Circle all the apply.)

Basement floor: Concrete Other (specify): N/A

Foundation Walls: Poured concrete Other (specify):

Moisture: Dry Damp Wet Other (specify): N/A

What are the characteristics of the floor slab? (Circle all that apply.)

Concrete Carpeted Tiled Stone Other (specify): Crawl space present

Cracks Seams Other (specify):

elevated wooden floor in part of building

Are drains or sumps present? (Y/N) C103

Record location (Room #) and information on contents for each drain/sump:

Are elevator shafts present? (Y?N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)

List chemicals, storage location and use; attach addition sheets as necessary.

Cleaning supplies C103

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: 108A - Kitchen Sink R110 - R111 toilet / sinks
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe:
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N)
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: Zone 1, west side of building Zone 2, South side of building Zone 3, north side of building
Other HVAC items (specify and describe): Heat not working in the Room 107 & 108 areas. Fresh air appears to be coming in, Just no heat. Ticket in with Jacobs for repairs (Zone 2)
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): rest room fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation: M/F 9am - 6pm
The intake of outside air: Yes
Minimum:
Maximum:
Relative percentage of outside air: air recirculated inside building
Differences between day and evening operation of weekdays and weekends: % outside unknown

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)
Describe:

What are the hours during which a majority of the workers are in the building during a work day? M-F 6a - 8p
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N)
Provide details on weekend use.
mostly normal business hours

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

Was there any recent remodeling or painting done in the buildings? (Y/N)
Roofing Nov/Dec 2016

When and where was the most recent carpeting applied in the building?
N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N)
Yes, office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	R 110-R111 C103	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

Road/ Parking lot

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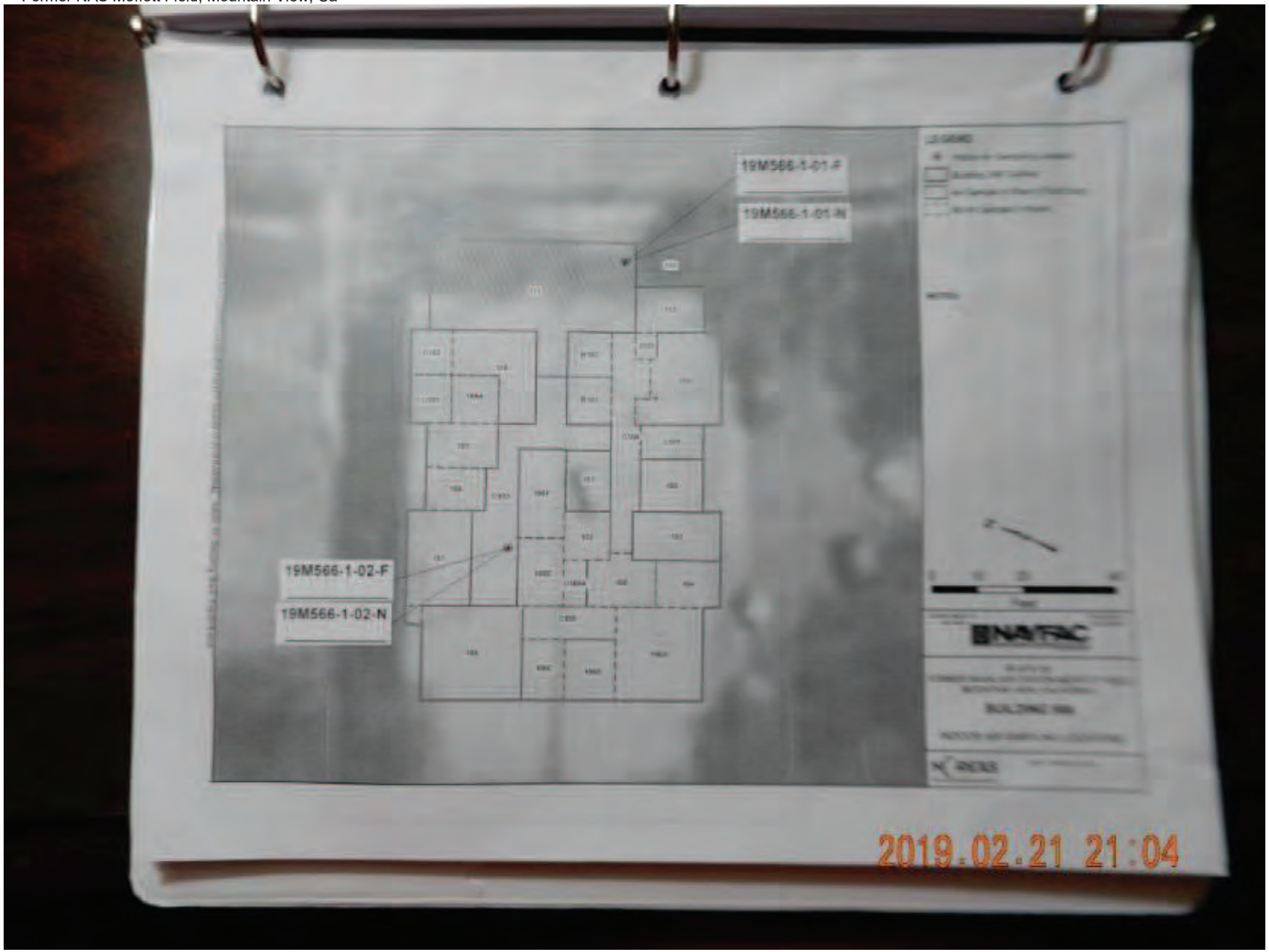
BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N)
Describe:

Was the Building occupied during the government shut down? (Y/N)
Yes, 2 contractors

If Yes, who is a contact person who can grant access to the building during another shutdown?
Contact Mark N on 2/15

Photograph and mark potential sample locations on the attached floor plan.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19M566-1-01-N
19M566-1-02-F
19M566-1-02-N
2019.02.21 21:04

Date: 2/14/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: 566

TIME	bbp	Room Number	Comments
0900	22	111	M566-1-01 location
1001	21	113	office
1001	19	C104	Kitchen / Hall
1002	15	114	office
1003	14	101	print room
1004	18	107	office
1005	up ~~17~~ 15	C103	M566-1-02 location
1005	16	106E	office
1006	up ~~106~~ 17	106A	office
1006	17	105	print room
1007	19	104	office
1008	24	100	office

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Environmental Engineering and Science

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 566	Date: 2/14/19
Building Contact: Rama Krishna Nemani	Phone: ~~60~~ 650-604-6185
email: ~~rama.nemani~~ rama.nemani@nasa.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: No. of Stories

Building Use: Fire department admin. staff office, multiple tenants

General Building Description, Construction Materials:

Concrete foundation

What type of basement does the building have?

None Full basement Other (specify):

How is the basement used? (Circle all that apply.)

Not used Office Space Storage Utilities Other (specify): N/A

What are the characteristics of the basement? (Circle all the apply.)

Basement floor: Concrete Other (specify):

Foundation Walls: Poured concrete Other (specify): N/A

Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)

Concrete Carpeted Tiled Stone Other (specify):

Cracks Seams Other (specify): Carpeted except bathrooms and room 105

Are drains or sumps present? (Y/N) in bathrooms

Record location (Room #) and information on contents for each drain/sump:

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)

List chemicals, storage location and use; attach addition sheets as necessary.

bathroom cleaner

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Plumbing pipes - restrooms / janitor sink Electrical - running through slab, nothing penetrating, multiple rooms
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe: N/A
Was vapor barrier installed under the floor slab? (Y/N) Describe: N/A
Were any other liners installed under the floor slab? (Y/N) Describe: N/A
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: N/A
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: N/A

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N) cooling + heating
If not, what type of HVAC system is used in this building? How many? non-zoned, 1 theromostat for entire building
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: Vents in all rooms / one thermostat
Other HVAC items (specify and describe): one HVAC system on roof and one in NE corner of building (neither in use)
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:

Hours of operation: 24/7

The intake of outside air: NE corner of building 5ft above ground surface

Minimum:

Maximum:

Relative percentage of outside air: 100%

Differences between day and evening operation of weekdays and weekends:

None

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)

Solar Natural gas (Electricity) Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/(N))

Describe:

What are the hours during which a majority of the workers are in the building during a work day? 8-6 M-F

Is the building or portions of the building occupied/utilized on weekends? (Y/N)

If yes, is the HVAC system operational on weekends? (Y/N)

Provide details on weekend use.

Coders in east part building
fire department in west part building

Do the occupants of the building frequently have their cloths dry-cleaned? ((Y)/N)

Fire uniforms

Was there any recent remodeling or painting done in the buildings? ((Y)/N)

2017 – new ceiling tiles, carpet, and paint

When and where was the most recent carpeting applied in the building?

N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard) ((Y)/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/(N))

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:

Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents	Janitor closet	
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	J103 , C101	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot / road

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N)
Describe:

Was the Building occupied during the government shut down? (Y/N)
Y, FD are essential employees

If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

new carpet in 2017, paint / remodel in room 111 / 112 / 113

Date: 2/14/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: 567

TIME	bbp	Room Number	Comments
0825	12	101	M567-1-01 location
0826	7	102	M 567-1-02 location
0827	31	101	Room 101 seam (floor level)
0828	20	101	Room 101 Seam (floor level)
0829	21	101	" " " " "
0830	10	105	Storage
0831	12	106	Storage
0831	12	R101	M367-1-03 location (Rest room)
0832	6	104	Storage
0833	40	104	Near gas cans
			1st to go in fire cabinets
			gas cans being delivered

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. 567	Date: 2/14/19
Building Contact: Steve Edwards	Phone:
email: Steve.Edwards@Nasa.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: No. of Stories 1

Building Use:
warehouse and machine shop

General Building Description, Construction Materials:
steel frame, metal siding, concrete slab, building has a draft

What type of basement does the building have?
None Full basement Other (specify):

How is the basement used? (Circle all that apply.) N/A
Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.) N/A
Basement floor: Concrete Other (specify):
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify):

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
Drain in room 101

Are elevator shafts present? (Y/N) Describe each:

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
101 - cleaners + paint + bathroom cleaners
104 - non-haz waste + gas ~~tanks~~ cans (to be moved to fire cabinets)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: communication conduits room 105 plumbing in room 101 2 rollup doors w/ 4 ballards each ballards approx 2 ft deep
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: unknown

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N) N/A
Is the HVAC system a zone cooling/heating system? (Y/N) no HVAC
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: N/A
Other HVAC items (specify and describe): N/A
Does the HVAC system have an exhaust capability? (Y/N) N/A
What other type of mechanical ventilation systems are present and/or currently operating in the building? ~~Mechanics fans~~ Open windows Other (specify): shop fans, restroom fans, rollup doors, wall mounted A/C unit from room 104 into room 106

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
N/A

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation:
The intake of outside air: N/A
Minimum:
Maximum:
Relative percentage of outside air:
Differences between day and evening operation of weekdays and weekends:

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify): heater for air + water

Are any other fuels or chemicals used in this building? (Y/N)
Describe:

What are the hours during which a majority of the workers are in the building during a work day? 0730 - 1600 M-F
Is the building or portions of the building occupied/utilized on weekends? (Y/N)
If yes, is the HVAC system operational on weekends? (Y/N)
Provide details on weekend use.
Occasional weekend work

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
Uniforms

Was there any recent remodeling or painting done in the buildings? (Y/N)

When and where was the most recent carpeting applied in the building?
N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture and plywood sheets

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners	room 101	
Gasoline-powered equipment		
Gasoline storage cans	101	
Cleaning solvents	101	
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	101	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot and truck loading bay

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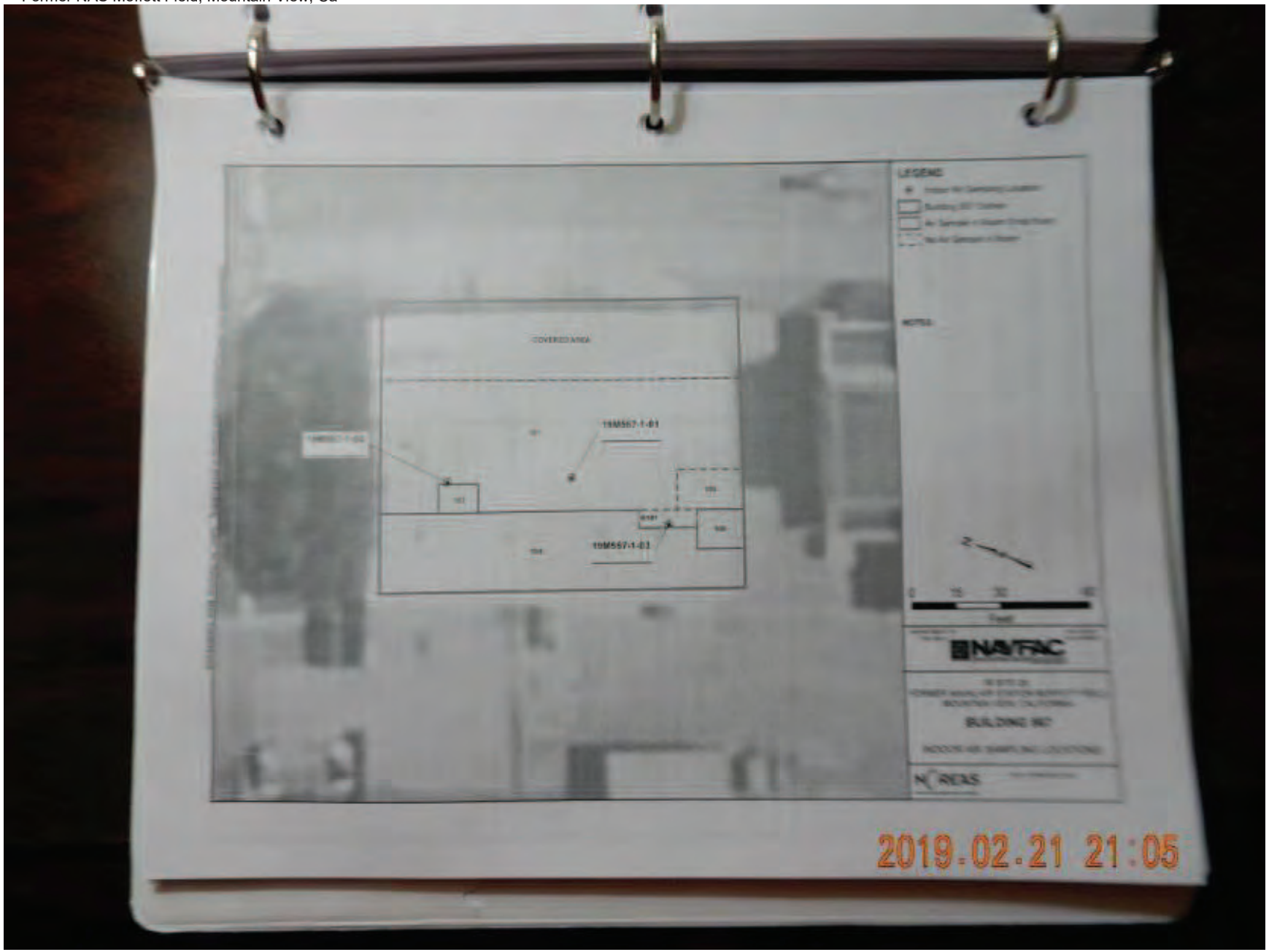
BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.


COVERED AREA
19M557-1-01
19M557-1-01
LEGEND
NOTES:
NAVFAC
BUILDING 167
2019.02.21 21:05

Date: 2 / 14 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS _____

BUILDING MONITORING RECORD

BUILDING NUMBER: N210

TIME	bbp	Room Number	Comments
0908	5	Roof	Blower output
0911	5	C100B	Hall
0912	0	111	Print room
0913	0	110	office
0914	2	108	office
0915	1	104	office
0916	0	C100A	N210-1-07 location
0917	0	103	Conference room
0918	1	102A	office
0918	1	101 A	conference room
0919	2	150	office over raised floor
0919	8	175	cubical Hall
0920	4	8	N210-1-12 location
0921	9	8 under floor	N210-L-11 location
0922	2	40	office former summa lab location
0922	2	143	office
0923	4	V101	N210-G-03 location
0923	12	127	offices
0924	5	C117A	N210-1-02 location
0924	1	138	N210-1-04 location
0925	0	124	office
0925	20	121	office
0926	1	141	office
0927	2	116	conference room
0931	0	D104	N210-1-06 location

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. N210	Date: 2/14/19
Building Contact: Kat Generao	Phone: 650.604.3648
email: Kathrine.r.generao@nasa.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: 1932 No. of Stories 3

Building Use: former aircraft hanger converted into office space, manufacturing facility in Hi-Bay area.

General Building Description, Construction Materials: ~~former aircraft hanger converted into office space, manufacturing facility in hi-bay area~~ JB
2/3 of building was converted into office space (2 stories) ~~hi-bay~~ JB and 1/3 building (room 148) is a Hi-Bay manufacturing area.

What type of basement does the building have?
None Full basement Other (specify): a pit in Hi-Bay area

How is the basement used? (Circle all that apply.) for C+C shop - manufacturing shop in Hi-Bay area
Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify):
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify):

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
Sump in pit area, drains in bathroom + janitor closet.

Are elevator shafts present? (Y/N) Describe each:
1 personnel elevator (V101)

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
room 148: cleaners, paint, solvents, heat transfer fluid + haz. waste (resin)
bathroom cleaners in janitor closets

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Utilities and communication lines penetrate the hanger pit, drains and plumbing in bathrooms + janitor closets.
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe:
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N)
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: HVAC outside air supply for the 1st + 2nd floor offices are supplied by three units on the NW side of building. The 3rd floor penthouse is supplied by 4 d/x units through the stairwell, 1 a-H on the roof w/ 5 HP fans 2 a-H in attic (40 HP + runoff VFds), 8 exhaust fans in the roof, 2 exhaust fans in room 134, 1 exhaust fan for room 131, and 3 exhaust fans for restrooms.
Other HVAC items (specify and describe): 3rd floor air on penthouse is recycled
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:

Hours of operation:

The intake of outside air: NW Corner of building

Minimum:

Maximum:

Relative percentage of outside air: Unknown

Differences between day and evening operation of weekdays and weekends:

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)

Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)

Describe: in C+C manufacturing shop

What are the hours during which a majority of the workers are in the building during a work day? 0900 – 1800

Is the building or portions of the building occupied/utilized on weekends? (Y/N) rarely

If yes, is the HVAC system operational on weekends? (Y/N)

Provide details on weekend use.

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

Was there any recent remodeling or painting done in the buildings? (Y/N)

When and where was the most recent carpeting applied in the building?

N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	Janitor closets	
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify): resin	148	
Other (specify): heat transfer fluid	148	
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

~~parking lot / road / nearby runway~~ JR

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot | road | nearby runway

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality (Y/N) Describe: No access to Hi-Bay area (during surveys or building plan)
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

Date: 2 / 13 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: N239

TIME	bbp	Room Number	Comments
0848	0	039	Basement conference room
0849	0	C002	19N239-B-06 location
0850	0	B020	Former lab no longer chemicals
0853	0	102	19N239-1-07 location
0854	0-2	127	19N239-1-09 location
0855	0	149	19N239-1-03 location
0856	0	C104	19N239-1-02 location
0902	0	C101	19N239-1-08 location
0903	0	106	offices
0904	0	138C	offices
0905	0	138S	19N239-1-05 location
0906	0	138M	former lab
0910	5	B053	library 19N239-B-02 location
0912	0-2	B053A	Break room 19N239-B-01 location
0915	5	C001	19N239-G-04 location, elevator shaft
0917	0-2	C001	19N239-B-05 location

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. N239	Date: 2/13/19
Building Contact: Adam Snell / Shaina Sethna	Phone: 650-604-6348 / 650-604-~~1949~~ 3936
email: adam.b.snell@nasa.gov / Shaina.V.Sethna@nasa.gov	
Plant Engineering Contact: Kevin Fedor	Phone 690-604-1949
email: Kevin.a.fedor@nasa.gov	

Year Building Constructed: unknown

No. of Stories: basement, 3 floors, + penthouse

Building Use: life science building

General Building Description, Construction Materials: Concrete foundation + exterior

What type of basement does the building have?
None Full basement Other (specify):

How is the basement used? (Circle all that apply.)
Not used Office Space Storage Utilities Other (specify): laboritories

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify):
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify): no signs of moisture

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify):
Cracks Seams Other (specify):
→ tile over concrete in hallway. Carpet over concrete in most offices

Are drains or sumps present? (Y/N) Yes
Record location (Room #) and information on contents for each drain/sump:
Sumps: B052, B11, N014
Drains in Restrooms

Are elevator shafts present? (Y?N) Describe each: Yes
V002 + V001, in use

Are there locations where chemicals were or are used or stored? (Y/N) Yes
List chemicals, storage location and use; attach addition sheets as necessary.
Laboritories, see attached data sheets

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Utility Conduits in all basement building running vertically through building. utility run through V001 + V002. plumbing in rest rooms
Were foundation design specification and as-built drawings for the facility obtained? (Y/N) NO
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe: NO
Was vapor barrier installed under the floor slab? (Y/N) Describe: NO
Were any other liners installed under the floor slab? (Y/N) Describe: NO
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: NO

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N) utility maps only
Is the HVAC system a zone cooling/heating system? (Y/N) yes
If not, what type of HVAC system is used in this building? How many? 2 main 60 HP HVAC units in basement
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: All HVAC Handlers/intakes ~~atmp~~ on 2x 60 HP A-H. aprox 36 exhaust fans for labs. additional AH for penthouse
Other HVAC items (specify and describe): All AHs. roof construction finished for season, will run through ~2020
Does the HVAC system have an exhaust capability? (Y/N) yes Hoods
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): rest rooms fans / Hood fans

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to:
Hours of operation: 24/7
The intake of outside air: intake from roof, all intakes operational
Minimum:
Maximum:
Relative percentage of outside air: 100% no recirculation
Differences between day and evening operation of weekdays and weekends:
None

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N) Yes
Describe: see invatory list

What are the hours during which a majority of the workers are in the building during a work day? 6am - 6pm w/ swing shift
Is the building or portions of the building occupied/utilized on weekends? (Y/N) yes
If yes, is the HVAC system operational on weekends? (Y/N) yes
Provide details on weekend use.
Building can be occupied @ any time due to needs of lab experiments

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
lab coats

Was there any recent remodeling or painting done in the buildings? (Y/N)
Roof finished for seas still working but all AHS on

When and where was the most recent carpeting applied in the building?
2016, room 138, 2015 room 160

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
carpet glue

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) Yes, office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)
No

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N) NO
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates: See attached list
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner		
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map. NO

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map. yes, parking lot road, runway

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Environmental Engineering and Science

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N)
Describe:

Was the Building occupied during the government shut down? (Y/N) Yes, mission critical work even during shut down. essential emploies

If Yes, who is a contact person who can grant access to the building during another shutdown?
Security/ Submit names to Adam

Photograph and mark potential sample locations on the attached floor plan.

Date: 2 / 13 / 19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-248-10-8

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS _____

BUILDING MONITORING RECORD

BUILDING NUMBER: N239A

TIME	bbp	Room Number	Comments
1401	9	143	Control room
1402	35	144	Sump Cat sump level
1402	4	144	N239A-1-09 location (Breathing Zone)
1403	~~10~~ 6	145	Lab
1404	20	125	N239A-1-08 location
1405	9	120 (Basement)	Breathing zone N239-B-01 location
1407	12	120 (Basement)	(Sump) Basement @ Sump
1412	16	120	Life science Lab
1413	14	120	N239A-1-03 location
1415	8	104	N239A-1-05 location
1416	11	102	Storage, room over gates
1417	13	103B	Storage
1417	14	103A	Storage
1422	24	S102	N239A-1-06 location
1423	20	U102	N239A-1-11 location

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. N 239A	Date: 2/13/19
Building Contact: Joseph Dweyer	Phone: Cell: 408-784-1480 650-604-1844
email: Joseph.A.Dweyer@NASA.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:

No. of Stories: 2+ basement

Building Use: office, centrifuge and biology lab

General Building Description, Construction Materials: Concrete foundation, concrete exterior

What type of basement does the building have?
None Full basement Other (specify): 2 large open pits/vaults in room 120

How is the basement used? (Circle all that apply.)
Not used Office Space Storage Utilities Other (specify):

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: Concrete Other (specify):
Foundation Walls: Poured concrete Other (specify):
Moisture: Dry Damp Wet Other (specify):

What are the characteristics of the floor slab? (Circle all that apply.)
Concrete Carpeted Tiled Stone Other (specify): restrooms
Cracks Seams Other (specify):

Are drains or sumps present? (Y/N)
Record location (Room #) and information on contents for each drain/sump:
sump 120 (basement), 144 (centrifuge) 8 ft below grade
drains in restrooms, room 120, 145, 142 and 141

Are elevator shafts present? (Y/N) Describe each:
rooms 5102 + 5105 (operational)

Are there locations where chemicals were or are used or stored? (Y/N)
List chemicals, storage location and use; attach addition sheets as necessary.
room 120 — paint, lab chemicals and unknown chemicals in flammable lockers
room 125 — paints, solvents and lubricants
room 102-104 — storage of old lab chemicals (unknown)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: Utility Conduits in V101, V102, 120, 104, 144, 145, 142, and 141 plumbing in restrooms
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: Unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: Unknown

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N)
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: Unknown, SFSM has no knowledge of HVAC zones
Other HVAC items (specify and describe): N/A
Does the HVAC system have an exhaust capability? (Y/N) Unknown
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): restroom fans, wall mounted A/C units rooms 122, 125 and 144

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

JACOBS

Describe the control sequencing and operation of the HVAC system with respect to: 24/7

Hours of operation:

The intake of outside air: 0

Minimum:

Maximum:

Relative percentage of outside air: 100%

Differences between day and evening operation of weekdays and weekends:

None

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)

Solar (Natural gas) Electricity (Steam) Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)

Describe:

What are the hours during which a majority of the workers are in the building during a work day? 6am – 4pm M-F

Is the building or portions of the building occupied/utilized on weekends? (Y/N)

If yes, is the HVAC system operational on weekends? (Y/N)

Provide details on weekend use.

rare weekend use

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

labcoats

Was there any recent remodeling or painting done in the buildings? (Y/N)

When and where was the most recent carpeting applied in the building?

no carpet

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates:
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners	125	
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents	120, 125	
Lubricants	125, 131	
Air fresheners	restrooms	
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner	restroom	
Appliance cleaner	123, 102	
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues	125, 109	
Scented trees, wreaths, potpourri, etc.		
Other (specify):	unknown content of flammable locker in room 120	
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot, road

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N) Describe:
Was the Building occupied during the government shut down? (Y/N) If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

Date: 2/13/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902159 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THB7-248-10-6

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS_____

BUILDING MONITORING RECORD

BUILDING NUMBER: N243

TIME	bbp	Room Number	Comments
0941	5	054	Flight sim water coming through floor
0941			19N243-B-07 location
0942	11	050	19N243-B-06 location
0943	13	~~050~~-053	work shop
0945	16	S013	Below grade storage, no water
0947	22	056	offices
0948	19	042	work shop
0949	22	047	Simulator area
0950	73	039	flight sim area
0951	16	C008	19N243-B-04 location
0951	19	089	office
0952	11	082	office
0954	16	184	Hallway
0955	79	C104	19N243-1-02 location
0956	20	170	offices
0957	26	181	offices
0958	37	C103	Hallway
0959	27	121	Storage
0959	25	120	offices
1000	24	117	Break room
1000	23	109	offices
1001	29	136	19N243-1-01 location
1002	33	101	office / Hall
1002	31	107	conference room
1003	23	100	office
1004	25	11	office
1004	26	16	office
1005	19	19	N243-B-07 location
1006	23	063	storage
1007	19	064	storage
1008	19	062	Rain water coming through roll up
1009	23	010	work shop

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. N243	Date: 2/13/19
Building Contact: Paul Brown / William Warmbrodt	Phone: Paul 650-224-8438
email: Paul.brown@nasa.gov / william.warmbrodt@nasa.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed: 1962 - 1964

No. of Stories: basement + 2 Decks, Penthouse

Building Use: Flight guidance & simulator. offices. machine shop

General Building Description, Construction Materials: Concrete foundation + exterior

What type of basement does the building have? Basement is multilevel includes simulators & offices

None Full basement Other (specify):

How is the basement used? (Circle all that apply.)

Not used Office Space Storage Utilities Other (specify): Flight simulators

What are the characteristics of the basement? (Circle all the apply.)

Basement floor: Concrete Other (specify):

Foundation Walls: Poured concrete Other (specify):

Moisture: Dry Damp Wet Other (specify): Water intruding from subsurface in Room 54 no other moisture present

What are the characteristics of the floor slab? (Circle all that apply.)

Concrete Carpeted Tiled Stone Other (specify):

Cracks Seams Other (specify): carpeted in attire rotunda area

Are drains or sumps present? (Y/N) yes

Record location (Room #) and information on contents for each drain/sump:

Sump: N032

Drains: N032, 117, 114, 039, restrooms

Are elevator shafts present? (Y?N) Describe each:

yes V001 / V002

Are there locations where chemicals were or are used or stored? (Y/N) Yes

List chemicals, storage location and use; attach addition sheets as necessary.

machine shops in Rooms 50/59 see attached inventory list of chemicals

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: utility Conduits in N032, 039, 052, 054, 045, 057 plumbing in rest rooms (simulators)
Were foundation design specification and as-built drawings for the facility obtained? (Y/N) NO
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe: NO
Was vapor barrier installed under the floor slab? (Y/N) Describe: NO
Were any other liners installed under the floor slab? (Y/N) Describe: NO
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: NO / unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe: NO

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N) NO
Is the HVAC system a zone cooling/heating system? (Y/N) Yes
If not, what type of HVAC system is used in this building? How many? N/A
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: Air intake on west side of building near N032 + Air Intake on roof. A-H in basement ~~Post Request~~ mp
Other HVAC items (specify and describe): PB requests HVAC to Room 242 remain on during HVAC shut down to protect servers, NO HVAC in room 054 (vertical flight simulator)
Does the HVAC system have an exhaust capability? (Y/N) Unknown
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans Open windows Other (specify): rest room fans, open bay doors

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?
Jacobs

Describe the control sequencing and operation of the HVAC system with respect to: 24 hrs
Hours of operation:
The intake of outside air: Roof / west side of Building
Minimum:
Maximum:
Relative percentage of outside air:
Differences between day and evening operation of weekdays and weekends:
None

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)
Solar Natural gas Electricity Steam Other (specify): space heaters

Are any other fuels or chemicals used in this building? (Y/N)
Describe: Shops, see inventory list

What are the hours during which a majority of the workers are in the building during a work day? 6am - 6pm
Is the building or portions of the building occupied/utilized on weekends? (Y/N) yes
If yes, is the HVAC system operational on weekends? (Y/N) yes
Provide details on weekend use.
Some weekend / late night / shift work

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)
NO

Was there any recent remodeling or painting done in the buildings? (Y/N)
NO

When and where was the most recent carpeting applied in the building?
2018 on Deck 2

What adhesives were used to attach the carpeting to the floor slab? (Y/N)
Yes, 2018 on Deck 2

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N)
Yes, office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)
NO

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N) No
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates: see Attached List
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner		
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N) yes
Describe the sources and show locations on the area map.
Generators in simulator Rooms vent outside, however fumes can get into building (as seen in 2018) gas power tools, but often w/ bay doors open

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.
Parking lot / Runway / Road

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N)

Describe:

Was the Building occupied during the government shut down? (Y/N)

essential personal visit building every 1 to 2 weeks. no work done / No, except essential personal ever week (1 day [illegible]

If Yes, who is a contact person who can grant access to the building during another shutdown?

Paul Brown

Photograph and mark potential sample locations on the attached floor plan.

~~Bill - N-A~~ Notes in field

Bill warm brunt (Rotonda side)

Send schedule

N242 - HVAC on

Standing water in room 054 from below grade / intrusion

Date: 2/13/19

Ppb RAE CALIBRATION AND AIR MONITORING FORM

Project # NAVFAC 018 Moffett Project Location/Site Moffett

Work Activity Building Monitoring

INSTRUMENT SERIAL NUMBER 594-902150 CALIBRATED BY MP
CALIBRATION GASES USED: ☒ FRESH AIR (ZERO)
☒ 10 PPM Isobutylene LOT # THBI-2418-10-0

INSTRUMENT BATTERY VOLTAGE: _____V
COMMENTS

BUILDING MONITORING RECORD

BUILDING NUMBER: N243A

TIME	bbp	Room Number	Comments
1045	36	101	Shop
1045	41	102	office
1046	40	101	N243A-1-02 location
1047	33	104	N243A-1-01 location
		104 –	water intruding through floor
1049	33	001	N243-B-01 location
			No water in Basement
		104	Note, water intruding through
			by pit where large metal
			is housed. Sump pump is operational
			but still standing water

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Building No. N243A	Date: 2/13/19
Building Contact: Paul Brown + Scott Reardon	Phone: 650-604-3870 + 650-604-1934
email: Paul.S.Brown@Nasa.gov + Scott.Reardon@Nasa.gov	
Plant Engineering Contact:	Phone
email:	

Year Building Constructed:

No. of Stories: 2 + basement

Building Use: Welding + machine shop - Building N243 auxiliary building

General Building Description, Construction Materials: Concrete walls / Concrete foundation

What type of basement does the building have?
None Full basement (Other (specify): utility tunnel for N243)

How is the basement used? (Circle all that apply.)
Not used Office Space Storage (Utilities) Other (specify):

What are the characteristics of the basement? (Circle all the apply.)
Basement floor: (Concrete) Other (specify):
Foundation Walls: (Poured concrete) Other (specify):
Moisture: Dry Damp Wet (Other (specify): Standing water in pit for room 104)

What are the characteristics of the floor slab? (Circle all that apply.)
(Concrete) Carpeted Tiled Stone Other (specify):
(Cracks) (Seams) Other (specify):

Are drains or sumps present? (Y/(N))
Record location (Room #) and information on contents for each drain/sump:

Are elevator shafts present? (Y?(N)) Describe each:

Are there locations where chemicals were or are used or stored? ((Y)/N)
List chemicals, storage location and use; attach addition sheets as necessary.

room 102A, see inventory form

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Describe each: electrical conduits per utility map
Were foundation design specification and as-built drawings for the facility obtained? (Y/N)
Was soil beneath the floor slab treated with lime or cement prior to placing the slab? (Y/N) Describe:
Was vapor barrier installed under the floor slab? (Y/N) Describe:
Were any other liners installed under the floor slab? (Y/N) Describe:
Were fibers or additional rebar added to the concrete floor slab to minimize cracking? (Y/N) Describe: unknown
Were other techniques used to restrict vapor migration through the floor slab? (Y/N) Describe:

Heating, Ventilation and Air Conditioning System (HVAC)

Where HVAC as-build drawings for the facility obtained? (Y/N)
Is the HVAC system a zone cooling/heating system? (Y/N)
If not, what type of HVAC system is used in this building? How many? roof mounted HVAC single zone
Describe and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets: Single zone for entire building / active HVAC in the second floor offices only
Other HVAC items (specify and describe): N/A
Does the HVAC system have an exhaust capability? (Y/N)
What other type of mechanical ventilation systems are present and/or currently operating in the building? Mechanics fans, Open windows Other (specify): bay doors

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Who maintains and manages HVAC system operation?

Jacobs

Describe the control sequencing and operation of the HVAC system with respect to: 24/7

Hours of operation:

The intake of outside air:

Minimum:

Maximum:

Relative percentage of outside air: 100%

Differences between day and evening operation of weekdays and weekends:

None

What type(s) of fuel(s) for space heating and water heating are used in this building?
(Circle all that apply.)

Solar Natural gas Electricity Steam Other (specify):

Are any other fuels or chemicals used in this building? (Y/N)

Describe: Solvents + grease, also see attached inventory list

What are the hours during which a majority of the workers are in the building during a work day?

Is the building or portions of the building occupied/utilized on weekends? (Y/N)

If yes, is the HVAC system operational on weekends? (Y/N)

Provide details on weekend use.

N/A

Do the occupants of the building frequently have their cloths dry-cleaned? (Y/N)

Was there any recent remodeling or painting done in the buildings? (Y/N)

When and where was the most recent carpeting applied in the building?

N/A

What adhesives were used to attach the carpeting to the floor slab? (Y/N)

N/A

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling, particleboard, fiberboard)? (Y/N) office furniture

Are there any new upholstery, drapes, or textiles in the building? (Y/N)

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BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Has the building been treated with any insectoids/pesticides? (Y/N)
If so, what chemicals were used?

How often were they applied?

Sources of Chemical Contaminates: See attached inventory form
Which of these chemicals/mixtures are present in the building? (check all that apply.)

Potential Chemical Source	Source Location	SDS Obtained? (Y/N)
Lacquers, paints, or paint thinners		
Gasoline-powered equipment		
Gasoline storage cans		
Cleaning solvents		
Lubricants		
Air fresheners		
Oven cleaners		
Carpet/ upholstery cleaners		
Hairspray		
Nail polish, nail polish remover		
Bathroom cleaner		
Appliance cleaner		
Furniture/floor polish		
Moth balls		
Fuel tanks		
Wood stove		
Fireplace		
Perfumes/colognes		
Photographic darkroom chemicals		
Glues		
Scented trees, wreaths, potpourri, etc.		
Other (specify):		
Other (specify):		
Other (specify):		
Other (specify):		

Outdoor sources of contamination

Is there any stationary emission source in the vicinity of the building? (Y/N)
Describe the sources and show locations on the area map.

Are there any mobile emission sources (e.g. highway, bus stops, high-traffic) in the vicinity of the building? (Y/N)
Describe the sources and show the locations on the area map.

parking lot + active runway

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Environmental Engineering and Science

BUILDING SURVEY FORM
FORMER NAS MOFFETT FIELD, CALIFORNIA

Is there any other information about the structural features of this building, the habits of the occupants or potential sources of chemical contaminants to the indoor air that may be of importance in the facilitating the evaluation of the indoor air quality? (Y/N)
Describe: No

Was the Building occupied during the government shut down? (Y/N)
NO, no non essential personal in building
If Yes, who is a contact person who can grant access to the building during another shutdown?

Photograph and mark potential sample locations on the attached floor plan.

APPENDIX B

HISTORICAL INVESTIGATIONS AND SAMPLING RESULTS

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Naval Facilities Engineering Command Southwest
BRAC PMO West
San Diego, CA

Appendix B

Historical Investigations and Sampling

INSTALLATION RESTORATION (IR) SITE 28 AIR SAMPLING AND VAPOR INTRUSION TIER RESPONSE EVALUATION REPORT

FORMER NAVAL AIR STATION MOFFETT FIELD, MOUNTAIN VIEW, CA

MAY 2019

Prepared for:

Department of the Navy
Naval Facilities Engineering Command Southwest
BRAC PMO West
33000 Nixie Way, Bldg 50
San Diego, CA 92147

Prepared by:

16361 Scientific Way
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Contract Number: N62473-16-C-2003; Task Order No. 0000
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TABLE OF CONTENTS

TABLE OF CONTENTS ii
ACRONYMS AND ABBREVIATIONS iv
1.0 Previous Site Investigation 1
1.1 2012 Indoor Air Sampling 1
1.2 2013 Investigation 2
1.2.1 Vapor Pathway Investigation 2
1.2.2 Soil Gas Investigation 3
1.2.3 Shallow Groundwater Investigation 4
1.2.4 Utility Tunnel Investigation 5
1.3 2014 Indoor Air Sampling 5
1.4 2015 GroundWater investigation 6
1.5 2016 Indoor Air Sampling 7
1.6 2017 Indoor Air Sampling 7
2.0 Previous Sampling Results by Building 11
2.1 Building 2 - Previous Sampling Results 11
2.2 Building 3 - Previous Sampling Results 12
2.3 Building 10 - Previous Sampling Results 15
2.4 Building 12 - Previous Sampling Results 17
2.5 Building 13 - Previous Sampling Results 19
2.6 Building 14 - Previous Sampling Results 20
2.7 Building 15 - Previous Sampling Results 22
2.8 Building 16 - Previous Sampling Results 23
2.9 Building 29 - Previous Sampling Results 25
2.10 Building 45 - Previous Sampling Results 27
2.11 Building 67 - Previous Sampling Results 28
2.12 Building 76 - Previous Sampling Results Builiding 76 28
2.13 Building 107 - Previous Sampling Results Building 107 29
2.14 Building 126 - Previous Sampling Results Building 126 31
2.15 Building 510 - Previous Sampling Results Building 510 33

2.16 Building 555 - Previous Sampling Results Building 555 35
2.17 Building 566 - Previous Sampling Results - Building 566 36
2.18 Building 567 - Previous Sampling Results - Building 567 37
2.19 Building N210 - Previous Sampling Results - Building N210 39
2.20 Building N239 - Previous Sampling Results - Building N239 42
2.21 Building N239A - Previous Sampling Results - Building N239A 44
2.22 Building N243 - Previous Sampling Results - Building N243 47
2.23 Building N243A - Previous Sampling Results..... 49
3.0 REFERENCES 51

FIGURES

Figure B1 Distribution of Tetrachloroethene in Soil Gas
Figure B2 Distribution of Trichloroethene in Soil Gas
Figure B3 Distribution of Tetrachloroethene in Shallow Groundwater
Figure B4 Distribution of Trichloroethene in Shallow Groundwater

TABLES

Table B1 Buildings Sampled During the January 2018 Sampling Events within the Navy AOR of the Vapor Intrusion Study Area, Moffett Field, California
Table B2 EPA's indoor air cleanup levels for Chemicals of Concern in the Area of Vapor Intrusion Study Area, Moffett Field, California
Table B3 2013 Soil Gas Sample Results, Former Naval Air Station, Moffett Field, California
Table B4 2015 Groundwater Sample Results, Moffett Field, California

ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	microgram(s) per cubic meter
AC	air conditioning
AOR	area of responsibility
bgs	below ground surface
COC	chemical of concern
DCA	dichloroethane
DCE	dichloroethene
DOD	Department of Defense
EC	Engineering Control
ELAP	Environmental Laboratory Accreditation Program
EPA	United States Environmental Protection Agency
HVAC	heating, ventilation, and air conditioning
IR	Installation Restoration
NASA	National Aeronautics and Space Administration
Navy	United States Department of the Navy
NELAP	National Environmental Laboratory Accreditation Program
PCE	tetrachloroethene
ROD Amendment	Record of Decision Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman Superfund Study Area
ROD	record of decision
SIM	selected ion monitoring
TCE	trichloroethene
U.S.	United States
VC	vinyl chloride
VOC	volatile organic compound
WATS	West-Side Aquifer Treatment System

1.0 Previous Site Investigation

This section provides a description and discussion of previous site investigations at Moffett Field relating to shallow groundwater, soil gas, and vapor intrusion.

1.1 2012 INDOOR AIR SAMPLING

A vapor intrusion investigation was conducted that consisted of indoor air sampling and outdoor ambient air sampling to determine the appropriate tier and corresponding response action for the industrial/commercial buildings within the United States Department of the Navy (Navy) area of responsibility (AOR).

The initial indoor air investigation was conducted from May 18–28, 2012 and on June 12, 2012. The work involved collecting indoor air samples from 23 buildings, as identified in Table B1, and outdoor ambient air samples at Moffett Field per the 2012 Work Plan (AM8AJV 2012). The 23 buildings were included in the 2012 study on the basis of occupancy and ventilation criteria for the building use and construction. A total of 287 air samples, including 258 indoor and 29 outdoor ambient air samples, were collected to evaluate the vapor intrusion pathways in the 23 fully or partially occupied buildings at Moffett Field, where partially occupied implies that only a part of a building is occupied or utilized. Indoor and outdoor ambient air samples were analyzed by an analytical laboratory using the United States Environmental Protection Agency (EPA) Method TO-15 selected ion monitoring (SIM) for tetrachloroethene, trichloroethene, cis- and trans-1,2-dichloroethene, 1,1-dichloroethene, 1,1-dichloroethane, and vinyl chloride (PCE, TCE, cis- and trans-1,2-DCE, 1,1-DCE, 1,1-DCA, and VC, respectively). Results were reported in micrograms per cubic meter ($\mu g/m^3$).

Using the indoor air sampling results and the 2010 Record of Decision Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman Superfund Study Area (ROD Amendment) Vapor Intrusion Tiering System, the buildings were preliminarily tiered to determine the need for a response action in accordance with the EPA's Response Action Tiering System. The air sampling results and the preliminary tier evaluation for the 23 buildings were presented in the *Air Sampling and Vapor Intrusion Tier Response Evaluation Report, Former Naval Air Station Moffett Field, California, Revision 1* (AM8AJV 2014a). Indoor air quality was compared with the record of decision (ROD) Amendment commercial EPA's indoor air cleanup levels for contaminants of concern (COCs), which are provided in Table B2, and with outdoor ambient air concentrations, with consideration of whether or not an air quality engineering control (EC) was in place and operating correctly.

Of the 23 buildings evaluated during the 2012 study, only two buildings (Buildings 10 and 126) were classified as Tier 1 (AM8AJV 2014a), which mandates that an appropriate EC be implemented as a remedy to meet EPA's indoor air cleanup levels. Building N210 was classified

as Tier 2 because it has a required EC. The majority of the buildings are classified as Tier 3A (Buildings 2, 3, 13, 14, 15, 16, 29, 45, 107, N210, N239, N239A, N243, N243A, 510, 555, and 567) because indoor air concentrations met EPA's indoor air cleanup levels in work areas without an EC in place or operating; however, one or more samples from each building had one or more COCs at concentrations that exceeded the outdoor ambient air concentration. The response action for buildings classified as Tier 3A requires the development and implementation of long-term monitoring per the ROD Amendment. Three of the buildings (Buildings 67, 76, and 566) were classified as Tier 3B and do not require ECs or long-term monitoring.

Based on 2012 indoor air sampling results, recommendations were made to collect follow-up samples at various buildings to evaluate the tier classification and vapor intrusion pathways and to implement interim mitigation measures, including sealing cracks and conduits that penetrate foundations and floors; refurbishing, retrofitting, and/or installing passive or active ventilation systems; and installing air purification systems.

1.2 2013 INVESTIGATION

As a follow-on investigation to the 2012 air sampling, a total of 32 indoor air samples were collected in May and June 2013 to determine the source of TCE detected in an air sample collected in a hallway in Building N239A and to evaluate the effectiveness of a potential interim measure to reduce or mitigate vapor intrusion detected in Buildings 2, 3, and 12. Also, a total of 56 soil gas and 20 groundwater samples were collected from the perimeters of buildings to better understand the potential for vapor intrusion from volatilization of organic compounds dissolved in the shallow groundwater and to assess the feasibility of reclassifying selected buildings that were tentatively ranked as Tier 3B to Tier 4 (no further action) under the ROD Amendment Response Action Tiering System.

1.2.1 Vapor Pathway Investigation

Indoor air samples were collected in May–June 2013 to investigate vapor pathways in Buildings 2, 3, 12, and N239A. These buildings had isolated non-work areas (e.g., crawl spaces and pipeline conduits in utility closets) with COC concentrations that exceeded the EPA's indoor air cleanup levels and/or outdoor ambient air concentration ranges in 2012.

During the 2012 sampling, TCE was detected at a concentration of 6.8 $\mu g/m^3$, which is above the indoor air cleanup level, in Hallway C102 in Building N239A. The short hallway connects a building entry with Room 120 and has access points to two utility rooms, U101 and U102. The hallway and the two utility rooms were sampled in May 2013 to determine whether the source of TCE was the utility rooms. The results for the 2013 sampling showed that Room U102 had elevated TCE concentrations (9.7 and 10 $\mu g/m^3$) with the heating, ventilation, and air conditioning (HVAC) system operating, and low TCE concentrations (0.6 and 1.5 $\mu g/m^3$) with the HVAC system off. Room U102 has utility floor trenches and 3-inch-diameter holes near the floor in the

eastern wall that connect to the basement area. TCE levels were low in Room U101 (AM8AJV 2014c).

In May–June 2012, TCE vapors were detected in indoor air at isolated areas in Buildings 2, 3, and 12 at concentrations that exceeded either the industrial/commercial indoor air cleanup level or the outdoor ambient air concentration range (AM8AJV 2014a). These detections were generally in non-work areas (e.g., near pipe conduits in utility closets and in crawl spaces). Interim mitigation measures, consisting of sealing conduits around utility lines that penetrate foundations and floors, were performed at selected locations in these three buildings on May 17, 2013. Grab air samples were collected from the crawl spaces through the conduits prior to sealing them.

After placing the seals, follow-up indoor air and outdoor ambient air samples were collected from May 23–24, 2013 and May 27–28, 2013, to confirm the effectiveness of the mitigation measures and to characterize the nearby areas to confirm the tier classification. The results indicated that placing the seals in Building 2 helped to control vapor migration; Building 2 does not have a HVAC system. However, in Buildings 3 and 12, which have HVAC systems, the results indicated that the seals had little effect on controlling vapors, which suggested more complex or widespread flow pathways (AM8AJV 2014c).

1.2.2 Soil Gas Investigation

In June and July of 2013, a total of 56 soil gas samples (including five duplicates) were collected from 48 locations around the perimeter of the 23 buildings and along the utility tunnel connecting Building 10 to Hangar 1 in the Navy AOR to identify potential vapor intrusion pathways in the proximity of the buildings (Figures B1 and B2).

A direct-push rig was used to install each soil gas probe at locations near the perimeters of the buildings to sample vapors in soil gas near the outer edge of the foundation. The soil gas samples were collected at depths ranging from 4 to 7.2 feet below ground surface (bgs), at an approximate depth of two feet above the water table. The probes were allowed to equilibrate for a minimum of 48 hours prior to sampling (AM8AJV 2014c).

The probes were used to collect samples in accordance with *Advisory: Active Soil Gas Investigations* published jointly by the California Department of Toxic Substances Control and the California Regional Water Quality Control Board, Los Angeles and San Francisco Bay Regions (California Department of Toxic Substances Control / California Regional Water Quality Control Board, San Francisco Bay Region 2012). The probes were purged prior to collection of the sample. The soil gas samples were collected using a 1-milliliter syringe. Details on soil gas probe installation and sampling protocols are provided in the *Draft Vapor Pathway, Soil Gas and Groundwater Sampling Report* (AM8AJV 2014c). The probes were removed after collecting the soil gas samples, with the boreholes backfilled with bentonite chips and hydrated, and the boring patched with concrete. All samples were analyzed for PCE, TCE, cis- and trans-1,2-DCE, 1,1-

DCE, 1,1-DCA, and VC by the EPA Method TO-15 SIM at an onsite mobile laboratory. The results are provided in Table B3.

TCE vapors in soil gas are distributed across the Navy AOR because of the dispersion/spreading of the vapors that volatize from groundwater that is contaminated with TCE. PCE vapors are principally concentrated in a short band in the southwestern area of Installation Restoration (IR) Site 28 from contaminated groundwater and across the southeastern area of IR Site 28 from release areas south of Building 6 and southeast of Building 126. Figures B1 and B2 show the distribution of PCE and TCE in soil gas in the Navy AOR (AM8AJV 2014c).

The EPA (2012) has conducted a statistical evaluation of the occurrence of TCE and PCE in subslab soil gas and concentrations of the compounds in indoor air from vapor intrusion using 1,582 data pairs from 913 buildings at 41 sites in 15 states and has determined an attenuation factor of 0.03 at a 95th percentile value. Because the ROD Amendment EPA's indoor air cleanup levels do not apply to soil gas, soil gas screening levels were derived by applying the 0.03 attenuation factor as a weighting multiplier with the EPA's indoor air cleanup levels (AM8AJV 2014c). Soil gas screening values, provided in Table B3, are not soil gas cleanup goals, but rather are proposed for use in consideration of potential risk posed by volatile COCs in soil gas.

1.2.3 Shallow Groundwater Investigation

A total of 20 groundwater samples (including two duplicates) were collected from 18 locations around the perimeter of the buildings and along the utility tunnel connecting Building 10 to Hangar 1 to identify potential vapor sources upgradient and in the proximity of the buildings. All samples were analyzed for the seven COCs. Samples were collected using temporary wells and dedicated/disposable bailers. Each borehole was advanced using a direct-push rig, and the temporary well was placed to collect the groundwater sample (AM8AJV 2014c).

The depth to groundwater in the Navy AOR ranges from approximately 4 to 11 feet bgs. Groundwater samples were collected from the upper two feet of groundwater. The groundwater sample was collected from the well/sampler using a bailer and transferred to a volatile organic analysis vial. The samples were not filtered, although many of the groundwater samples were turbid. The analytical results for the groundwater samples may be elevated by volatile organic compounds (VOCs) adsorbed on the sediment.

Elevated concentrations of PCE, relative to the rest of the AOR, were only detected in shallow groundwater in the southeastern site area, near Building 126 and Hangar 1. TCE was detected in shallow groundwater at concentrations exceeding 100 µg/L in a band through the central area of the site extending from Building 16 to Building N210, parallel to the north to north-northeast groundwater flow direction. In the southeastern area of the site, the extent of TCE mimics the distribution of PCE near Building 126 and Hangar 1 (AM8AJV 2014c).

1.2.4 Utility Tunnel Investigation

An investigation of the vapor and groundwater seepage pathways in the utility tunnel that connects with Building 10 and Hangar 1 was conducted on April 22, 2013. Seven air samples and seven water samples were collected and analyzed for the seven chlorinated COCs. The investigation was part of an inspection and evaluation of the structural integrity of the tunnel and contaminant pathways to develop vapor intrusion mitigation options. The tunnel is a pathway for vapor intrusion into Building 10 and vapor migration to tunnel accesses in the area of Hangar 1 (AM8AJV 2015b).

In the utility tunnel that connects Building 10 and Hangar 1, elevated concentrations of COCs, including TCE and PCE, were reported in the tunnel air and in standing water samples (AM8AJV 2014c). Concentrations of TCE and PCE in the tunnel air exceeded the ROD Amendment industrial/commercial EPA's indoor air cleanup levels; however, the utility tunnel is not considered a work area and therefore, the ROD Amendment EPA's indoor air cleanup levels do not apply.

The tunnel water sampling locations and results are shown on Figures B3 and B4, which show the PCE and TCE distribution in shallow groundwater. The water in the utility tunnel accumulates from groundwater that enters the tunnel through cracks in the tunnel walls and flows or ponds within the tunnel; therefore, the COC concentrations in the tunnel water represent a mixture of groundwater from the immediate area, rather than the results for discrete groundwater samples collected from the temporary wells, as discussed in Section 1.2.3.

1.3 2014 INDOOR AIR SAMPLING

A total of 203 air samples, including indoor and outdoor ambient air samples, were collected from February 11–19, 2014, to evaluate the occurrence of and pathways for vapor intrusion in 23 industrial/commercial buildings at Moffett Field. A total of 172 indoor air samples (including duplicates) were collected from 93 locations within the 23 buildings, and a total of 27 outdoor ambient air samples were collected outside four buildings. Sampling locations and numbers of samples collected for each building were selected using the results of the building surveys, the 2012 indoor air sampling locations, and the 2012 sampling results. Samples were collected from the basement and in the breathing zone of first-floor work areas (office areas, meeting rooms, and high-traffic areas such as hallways), at potential vapor intrusion pathways (foundation cracks, expansion joints, crawl spaces, drains, and pipe inlets), and in outdoor air. In buildings with HVAC systems, indoor air samples were collected during normal work hours with the HVAC system operating and at the end of a three-day holiday weekend after the HVAC system had been shut down for 36 to 48 hours. The sampling duration for the indoor air samples was 8, 10, or 24 hours, depending on the length of daily occupancy in each building.

Indoor air and outdoor ambient air samples were collected using 6-liter canisters, each equipped with a fixed-rate flow controller and a particulate filter. The number of samples per building varied

from one in Building 76 to 21 in Building 239. Outdoor ambient air samples were collected outside the building, including near the air ventilation system air intake, for comparison to indoor air to evaluate the potential contribution of VOCs from outdoor air to indoor air. Indoor and outdoor ambient air samples were analyzed by an analytical laboratory certified by the United States Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) and National Environmental Laboratory Accreditation Program (NELAP) using the EPA Method TO-15 SIM for the COCs (PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1-DCA, and VC).

The results of the 2014 sampling are presented in the Final Air Sampling and Vapor Intrusion Tier Response Evaluation Report, Former Naval Air Station Moffett Field, Moffett Field, California (AM8AJV 2015a) issued in June 2015. The report included tentative tier rankings for the buildings, identified potential indoor air issues, and recommended mitigation measures and tier response data gaps. Of the 23 buildings evaluated during the 2014 study, only Building 126 was classified as Tier 1 (AM8AJV 2015a). Buildings 10 and N210 were ranked as Tier 2 based on historical results and the use of interim measures/ECs to maintain air quality below EPA's indoor air cleanup levels. Buildings 16 and N239 were also ranked as Tier 2 based on a single work-area sample location exceeding the indoor air cleanup level for TCE in 2014. All other buildings were classified as either Tier 3A or Tier 3B.

1.4 2015 GROUNDWATER INVESTIGATION

In 2013 and 2014, the Navy installed 24 additional monitoring wells to further delineate Navy sources near the former Building 88 Area and the Traffic Island Area. Seven of these wells were installed in the upper portion of the A Aquifer.

In 2015, 50 groundwater samples were collected from IR Site 28 monitoring wells in the upper portion of the A Aquifer. These groundwater samples indicate that the regional TCE and cis-1,2-DCE plumes extend downgradient (north) from south of U.S. (United States) Highway 101. These regional plumes have an axis that generally trends south to north. The plumes are similar in shape and extent to the TCE and cis-1,2-DCE plumes shown on maps prepared since 2003. However, data from monitoring wells added to the Navy, National Aeronautics and Space Administration (NASA), and Middlefield-Ellis-Whisman sampling programs since 2008 have allowed better definition, and suggest a separate plume downgradient of the West-Side Aquifer Treatment System (WATS) capture area. The eastern groundwater plume periphery has higher TCE and cis-1,2-DCE concentrations than the western periphery. TCE and cis-1,2-DCE concentrations from 2015 sampling suggest that the detached southern portions of the plume remains separate from the main body of the WATS plume. The PCE plume in the upper portion of the A Aquifer is located southwest of Hangar 1 and is limited in extent compared to the other groundwater VOC plumes. The PCE plume in the upper portion of the A Aquifer trends in a north south direction and is similar to the 2014 PCE plume. The 2013 depiction of the PCE plume shows one continuous plume next to the southwest corner of Hangar 1, but the 2014 and 2015 depictions of the PCE plume show two smaller PCE plume areas, both within the footprint of the 2013 PCE plume. Figures B3

and B4 show the distribution of PCE and TCE in the shallow groundwater in the Navy AOR (SES-TECH 2016). The results of the shallow groundwater samples are provided in Table B4.

1.5 2016 INDOOR AIR SAMPLING

A total of 200 air samples, including indoor and outdoor ambient air samples, were collected from January 11–20, 2016, to evaluate the occurrence of and pathways for vapor intrusion in 23 industrial/commercial buildings at Moffett Field. A total of 172 indoor air samples (including duplicates) were collected from 93 locations within the 23 buildings. Sampling locations and numbers of samples collected for each building were selected using the results of the building surveys, the 2012 and 2014 indoor air sampling locations, and the 2012 and 2014 sampling results. Samples were collected from the basement and in the breathing zone of first-floor work areas (office areas, meeting rooms, and high-traffic areas such as hallways), at potential vapor intrusion pathways (foundation cracks, expansion joints, crawl spaces, drains, and pipe inlets), and in outdoor ambient air. In buildings with HVAC systems, indoor air samples were collected during normal work hours with the HVAC system operating and at the end of a three-day holiday weekend after the HVAC system had been shut down for 36 to 48 hours. The sampling duration for the indoor air samples was 8, 10, or 24 hours, depending on the length of daily occupancy in each building.

Indoor air and outdoor ambient air samples were collected using 6-liter canisters, each equipped with a fixed-rate flow controller and a particulate filter. The number of samples per building varied from one in Building 76 to 21 in Building N239. Outdoor ambient air samples were collected outside the building, including near the air ventilation system air intake, for comparison to indoor air to evaluate the potential contribution of VOCs from outdoor air to indoor air. Indoor and outdoor ambient air samples were analyzed by an analytical laboratory certified by the U.S. DoD ELAP and NELAP using the EPA Method TO-15 SIM for the COCs (PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1-DCA, and VC).

Using the relevant historical data, 2012, 2013, 2014, and 2016 indoor air sampling results, and Tables 6A and 6B of the ROD Amendment (EPA 2010), the buildings were tiered to determine the need for a response action in accordance with the Response Action Tiering System. Indoor air quality results for COCs were compared with the ROD Amendment commercial EPA's indoor air cleanup levels and with outdoor ambient air concentration ranges, with consideration of whether or not an air quality EC is in place. Of the 23 buildings evaluated, Buildings 45, 126, 567, and N239A were classified as Tier 1. The remaining 19 buildings were classified as Tier 3A because indoor air concentrations meet EPA's indoor air cleanup levels. No buildings were categorized as Tier 2, Tier 3B or Tier 4 (MMEC 2015).

1.6 2017 INDOOR AIR SAMPLING

A total of 211 air samples, including indoor and outdoor ambient air samples, were collected from January 9–19, 2017, to evaluate the occurrence of and pathways for vapor intrusion in 23

industrial/commercial buildings at Moffett Field. A total of 182 indoor air samples (including duplicates) were collected from 97 locations within the 23 buildings. Sampling locations and numbers of samples collected for each building were selected using the results of the building surveys (by avoiding areas of solvent use and storage), the 2013 soil gas and ground water sampling results, and the 2012, 2014, and 2016 indoor air sampling locations and results. Samples were collected from the basement and in the breathing zone of first-floor work areas (office areas, meeting rooms, and high-traffic areas such as hallways), at potential vapor intrusion pathways (foundation cracks, expansion joints, crawl spaces, drains, and pipe inlets), and in outdoor ambient air. In buildings with HVAC systems, indoor air samples were collected during normal work hours with the HVAC system operating and at the end of a three-day holiday weekend after the HVAC system had been shut down for 36 to 48 hours. The sampling duration for the indoor air samples was 8, 10, or 24 hours, depending on the length of daily occupancy in each building.

Indoor air and outdoor ambient air samples were collected using 6-liter canisters, each equipped with a fixed-rate flow controller and a particulate filter. The number of samples per building varied from one in Building 76 to 21 in Building N239. Outdoor ambient air samples were collected outside the building, including near the air ventilation system air intake, for comparison to indoor air to evaluate the potential contribution of VOCs from outdoor air to indoor air. Indoor and outdoor ambient air samples were analyzed by an analytical laboratory certified by the U.S. DoD ELAP and NELAP using the EPA Method TO-15 SIM for the COCs (PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1-DCA, and VC).

Using the relevant historical data, 2012, 2013, 2014, 2016, and 2017 indoor air sampling results, and Tables 6A and 6B of the ROD Amendment (EPA 2010), the buildings were tiered to determine the need for a response action in accordance with the Response Action Tiering System. Indoor air quality results for COCs were compared with the ROD Amendment commercial EPA's indoor air cleanup levels and with outdoor ambient air concentration ranges, with consideration of whether or not an air quality EC is in place. Of the 23 buildings evaluated, Buildings 10, 45, and 126 were classified as Tier 1, and Buildings N239 and N239A were classified as Tier 2. Buildings 2, 3, 12, 14, 15, 16, 555, N210, N243, and N243A were classified as Tier 3A, and Buildings 13, 29, 67, 76, 107, 510, 566, and 567 were classified as Tier 3B. No buildings were categorized as Tier 4.

1.7 2018 INDOOR AIR SAMPLING

A total of 184 indoor air work area samples (including duplicates and confirmation samples) were collected from 97 locations within the 23 buildings. The number of indoor air samples per building varied from one in Building 76 to 26 in Building N239. Sampling locations and number of samples collected for each building were selected using the results of the building surveys (by avoiding areas of solvent use and storage), the 2013 soil gas and ground water sampling results, and the 2012, 2014, 2016, and 2017 indoor air sampling locations and results. Indoor air samples were collected only from the basement (when present) and ground floor of the buildings. The inlet of

the indoor air sampling devices was placed within the breathing zone. Duplicate samples were collected at a rate of 10 percent for a total of 22.

Indoor air samples were collected using 6-liter canisters, each equipped with a fixed-rate flow controller and a particulate filter. Indoor and outdoor ambient air samples were analyzed by an analytical laboratory certified by the U.S. DoD ELAP and NELAP using the EPA Method TO-15 SIM for the COCs (PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1-DCA, and VC).

Buildings sampled in the Vapor Intrusion Study Area were tiered on the basis of whether the building was sampled with or without an operating EC:

- Group 1: Buildings sampled with an operating EC (e.g., HVAC system)
- Group 2: Buildings sampled without an operating EC or with the EC turned off

1.7.1 Group 1: Buildings Sampled with Engineering Control (HVAC System) Operating

Buildings with an EC (e.g., HVAC system) were sampled while the EC (HVAC system) was in operation during normal working hours and at the end of the weekend after the HVAC system was shut down for 36 to 48 hours. The exception to this procedure was at Buildings N210 and N243, where it was not possible to turn off the HVAC system because of potential overheating at computer server rooms. This exception is explained further in Section 4.7.

Time-integrated 8-, 10-, or 24-hour air samples were collected for the ventilation system operation samples to coincide with building-specific, normal workday occupancy. The sampling period for the EC (HVAC) shutdown samples matched the duration of sampling for the EC (HVAC) operation samples.

Information regarding EC (HVAC) operations was verified with NASA to provide a basis for proper shutdown and sampling duration criteria. The available shutdown and sampling period was limited to weekend hours. The EC (HVAC) shutdown air samples were collected at the same locations as the EC (HVAC) operating samples. Air samples were collected using 6-liter canisters to provide consistent data collection methods during both sampling events. Pathway samples from the elevator shafts were collected as grab samples.

1.7.2 Group 2: Buildings Sampled Without Engineering Control Systems

Air samples were collected during normal occupancy hours using 6-liter canisters, with the building windows shut to the extent possible. Time-integrated 8-, 10-, or 24-hour air samples were collected to coincide with building-specific, normal workday occupancy.

Using the relevant historical data, 2012, 2013, 2014, 2016, 2017, and 2018 indoor air sampling results, and Tables 6A and 6B of the ROD Amendment (EPA 2010), the buildings were tiered to determine the need for a response action in accordance with the Response Action Tiering System.

Indoor air quality results for COCs were compared with the ROD Amendment commercial EPA's indoor air cleanup levels and with outdoor ambient air concentration ranges, with consideration of whether or not an air quality EC is in place. Of the 23 buildings evaluated, Buildings 10, 45, and 126 were classified as Tier 1, and Buildings 3, N239 and N239A were classified as Tier 2. Buildings 2, 12, 14, 15, 16, 555, 567, N210, N243, and N243A were classified as Tier 3A, and Buildings 13, 29, 67, 76, 107, 510, and 566 were classified as Tier 3B. No buildings were categorized as Tier 4.

2.0 Previous Sampling Results by Building

This section provides a description and discussion of previous indoor air sampling at each of the 23 buildings in the Navy AOR were identified for the vapor intrusion study.

2.1 BUILDING 2 - PREVIOUS SAMPLING RESULTS

2012: A total of four indoor air samples were collected in Building 2 on May 18, 2012. One pathway sample, collected beneath the raised floor in Room 104, detected TCE at a concentration that exceeded the outdoor air concentration range; however, all COC detections were lower than EPA's indoor air cleanup levels and within outdoor air concentration ranges for samples collected in work areas (AM8AJV 2014a).

2013: One grab pathway sample was collected from the crawl space beneath the raised floor in Room 104 prior to implementing the interim measure in May 2013. After implementing the interim mitigation measures, two samples (including one duplicate) were collected in work areas of Room 104 from May 23–24, 2013, to confirm the effectiveness of the interim mitigation measures for Building 2. TCE was detected at a concentration of 11 $\mu g/m^3$, exceeding the indoor air cleanup level of 5 $\mu g/m^3$, in the grab sample collected in the crawl space beneath Room 104 prior to implementing the interim measure. COCs (PCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1-DCA, and VC) were detected in confirmation samples collected after installing the interim mitigation measure at concentrations below the EPA's indoor air cleanup levels (AM8AJV 2014c).

2014: A total of four indoor air samples were collected in Building 2 on February 11, 2014: one each from two rooms (Rooms 107 and 109) where potential future occupancy was expected and two pathway samples (including one duplicate) in the Boiler Room (Room 104). No outdoor samples associated with Building 2 were collected. All sampling results for Building 2 were below the EPA's indoor air cleanup levels. Indoor air sampling results were compared with the outdoor air concentration range. Pathway samples (including one duplicate), collected beneath the raised floor in Room 104, and the sample collected in Room 109, had concentrations of TCE that exceeded the outdoor air concentration range, all other COC detections were within outdoor air concentration ranges for all the samples. TCE and PCE were measured in indoor air at concentrations ranging from 0.010 to 0.69 $\mu g/m^3$ and 0.046 to 0.067 $\mu g/m^3$, respectively.

2016: A total of four indoor air samples were collected in Building 2 on January 12, 2016: one from Room 109, which is an intermittently occupied office used by the building manager; two pathway samples (including one duplicate) in the Boiler Room (Room 104); and one pathway sample from Room 107, which is currently used to store gym equipment. No outdoor samples associated with Building 2 were collected. All sampling results for Building 2 were below the EPA's indoor cleanup levels. Indoor air sampling results were also compared with the overall outdoor air concentration range. Pathway samples (including one duplicate), collected in Room

104, had COC concentrations that were below outdoor air concentrations. The sample collected in Room 109 had concentrations that exceeded the outdoor air concentration ranges for TCE, cis-1,2-DCE, trans-1,2-DCE, and 1,1-DCE. TCE and PCE were measured in indoor air at concentrations ranging from 0.13 to 1.0 μg/m^3 and 0.061 to 0.086 μg/m^3, respectively (MMEC 2015).

2017: A total of five indoor air samples were collected in Building 2 on January 17, 2017: two from Room 109 (including one duplicate), which is an intermittently occupied office used by the building manager; two pathway samples (including one duplicate) in the Boiler Room (Room 104); and one pathway sample from Room 107, which is currently used to store gym equipment. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 29 ambient air concentration levels, as Building 29 is the closest building with an ambient air sample. Indoor air concentrations exceeding the ambient air concentration level at Building 29 included TCE (4 of 5 samples), PCE (4 of 5 samples) cis-1,2-DCE (2 of 5 samples), trans-1,2-DCE (5 of 5 samples), 1,1-DCA (3 of 5 samples), 1,1-DCE (2 of 5 samples), and VC (2 of 5 samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.063J to 0.72 μg/m^3 and 0.016J to 0.23 μg/m^3, respectively.

2018: Four indoor air samples were collected in Building 2 on January 9, 2018: one from Room 109, which is an intermittently occupied office used by the building manager; two pathway samples (including one duplicate) in the Boiler Room (Room 104); and one pathway sample from Room 107, which is currently used to store gym equipment. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 29 ambient air concentration levels, as Building 29 is the closest building with an ambient air sample. Indoor air concentrations exceeding the ambient air concentration level at Building 29 included TCE (three of four samples); cis-1,2-DCE (one of four samples); trans-1,2-DCE (one of four samples); and 1,1-DCA (one of four samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.084 to 0.44 μg/m^3 and 0.043 to 0.062 μg/m^3, respectively.

2.2 BUILDING 3 - PREVIOUS SAMPLING RESULTS

2008: Four indoor air samples were collected in February 2008 from Building 3. TCE was measured at concentrations ranging from 0.212 to 2.683 μg/m^3 (Neptune 2008).

2012: A total of 20 indoor air samples were collected in May 2012 at Building 3 with the HVAC system operating and with the HVAC system off. All sampling results for Building 3 were below EPA's indoor air cleanup levels except one pathway sample collected near the conduits penetrating the floor in Room 130 (sample M003-1-06-N), where TCE was detected at a concentration of 7.9 μg/μg/m^3 exceeding the indoor air cleanup level of 5 μg/m^3 (AM8AJV 2014a).

Interim Mitigation Measures and Confirmation Sampling (2013): Interim mitigation measures, including sealing conduits around utility lines that penetrate foundations and floors,

were implemented in Rooms 130 and 105 of Building 3. All results for confirmation samples collected after implementing the mitigation measures in 2013 in Rooms 130 and 105 with both the HVAC system on and off were reported below EPA's indoor air cleanup levels. Also, results for all grab samples from the crawl spaces were below the EPA's indoor air cleanup levels. However, for all samples, the outdoor air concentration ranges were exceeded for most of the COCs (AM8AJV 2014c).

2014: A total of 17 indoor air samples (including two duplicates) were collected at Building 3 with the HVAC system operating and with the HVAC system off. Two outdoor air samples of 24 hour duration were collected on the roof of Building 3. Indoor air samples were collected on February 12, 2014, with the HVAC system operating and on February 16, 2014, with the HVAC system off. All COC detections for indoor air samples collected at Building 3 were lower than the EPA's indoor air cleanup levels. Detected COC concentrations exceeding the outdoor air concentration ranges included PCE (6 of 17 samples – only samples with HVAC system on), TCE (10 of 17), trans-1,2-DCE (2 of 17), 1,1-DCE (1 of 17 – sample with HVAC system off), 1,1-DCA (2 of 17 – only samples with HVAC system off), and VC (12 of 17). TCE and PCE were measured in indoor air at concentrations ranging from 0.21 to 4.5 $\mu g/m^3$ and 0.025J to 0.95 $\mu g/m^3$, respectively, for all samples collected in Building 3.

2016: A total of 17 indoor air samples (including two duplicates) were collected at Building 3 with the HVAC system operating and with the HVAC system off. Two outdoor air samples of 24-hour duration were collected on the roof of Building 3. Indoor air samples were collected on January, 12, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. TCE was detected at concentrations exceeding the EPA's indoor air cleanup level in one pathway sample from Room 130 (16M003-1-06-F) and the associated duplicate sample (16M303-1-06-F) when the HVAC system was off. Room 130 is a small utility room with no regular occupancy that has multiple conduits that penetrate the floor. All other COC detections for indoor air samples collected at Building 3 were lower than the EPA's indoor air cleanup levels. Detected COC concentrations exceeding the outdoor air concentration ranges included TCE (17 of 17 – 9 samples with HVAC off, 8 samples with HVAC on), PCE (10 of 17 samples – 2 samples with HVAC system off, 8 samples with the HVAC on), trans-1,2-DCE (9 of 17 – 1 samples with the HVAC off, 8 with the HVAC on), 1,1-DCE (4 of 17 – all samples with HVAC system off), 1,1-DCA (15 of 17 – 8 samples with HVAC system off, 7 samples with HVAC on), cis-1,2-DCE (11 of 17 – 3 samples with the HVAC system off, 8 samples with the HVAC on), and VC (12 of 17 – 7 samples with the HVAC off, 5 with the HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.14 to 6.8 $\mu g/m^3$ and 0.034J to 0.13 $\mu g/m^3$, respectively, for all samples collected at Building 3 (MMEC 2015).

2017: A total of seventeen indoor air samples (including two duplicates) were collected at Building 3 with the HVAC system operating (eight samples) and with the HVAC system off (nine samples). Two ambient air samples of 24-hour duration were collected in the south east corner outside

Building 3. Indoor air samples were collected on January, 10, 2017, with the HVAC system operating and on January 16, 2017, with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration ranges included TCE (17 of 17– 9 samples with HVAC off, 8 samples with HVAC on), PCE (8 of 17 samples – 7 samples with HVAC system off, 1 samples with the HVAC on), trans-1,2-DCE (7 of 17 – all samples with the HVAC system off), 1,1-DCE (8 of 17 – 7 samples with the HVAC off, 1 with the HVAC on), 1,1-DCA (11 of 17 – 9 samples with HVAC system off, 2 samples with HVAC on), cis-1,2-DCE (11 of 17 – 9 samples with the HVAC system off, 2 samples with the HVAC on), and VC (16 of 17 – 9 samples with the HVAC off, 7 with the HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.096 to 4.5 $\mu g/m^3$ and 0.046 to 0.11 $\mu g/m^3$, respectively.

2018: Twenty-one indoor air samples (including two duplicates) were collected at Building 3 with the HVAC system operating (ten samples) and with the HVAC system off (eleven samples). Two ambient air samples of 24-hour duration were collected in the southeast corner outside Building 3. Indoor air samples were collected on January 19, 2018 (eight samples) and February 19, 2018 (two confirmation samples), with the HVAC system operating and on January 15, 2018 (nine samples) and February 21, 2018 (two confirmation samples), with the HVAC system off. TCE was detected at concentrations exceeding the EPA's indoor air cleanup level in one work area sample from Room 108 (18M003-1-07-F) and the associated confirmation sample (18M003-1-07-F-R). All other COC detections for indoor air samples collected at Building 3 were lower than the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration ranges included TCE (seven of 21– three samples with HVAC off, four samples with HVAC on); PCE (12 of 21 samples – three samples with HVAC system off, nine samples with the HVAC on); trans-1,2-DCE (15 of 21 – five samples with HVAC system off, 10 samples with the HVAC on); 1,1-DCE (seven of 21 – three samples with the HVAC off, four with the HVAC on); 1,1-DCA (11 of 21 – four samples with HVAC system off, seven samples with HVAC on); cis-1,2-DCE (11 of 21 – four samples with the HVAC system off, seven samples with the HVAC on); and VC (four of 21 – four samples with the HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.11J to 9.8 $\mu g/m^3$ and 0.04 to 0.13 $\mu g/m^3$, respectively.

2.2.1.1 June 2018 ECD Screening

Twenty discrete ECD samples were collected from Building 3 with the HVAC system operating (13 samples) and with the HVAC system off (seven samples). Of the 20 sample locations, four were indoor air samples 16 were potential vapor intrusion pathway samples. TCE was detected at concentrations exceeding the EPA's indoor air cleanup level in three potential vapor intrusion pathway ECD samples collected at ground level on the east side of Room 108 (B003-2-F, B003-6-F, and B003-14-N). ECD samples collected in Rooms 101B, 103, 106, 107, 110 and 111 as well as on the north and west side of Room 108 were all less than the EPA's indoor air cleanup level.

2.3 BUILDING 10 - PREVIOUS SAMPLING RESULTS

2012: A total of seven indoor air samples (including one duplicate) were collected from Building 10 on May 18, 2012, from the main work area, the boiler room, and near the tunnel access area, including one pathway sample from within the tunnel access. TCE and PCE were detected at concentrations exceeding the EPA's indoor air cleanup levels in all the samples except one (M010-1-06 from Room N104). 1,1-DCA and cis-1,2-DCE (along with TCE and PCE) were detected at concentrations exceeding the EPA's indoor air cleanup levels for only one pathway sample (M010-T-04), which was collected in the tunnel access area (AM8AJV 2014a).

The results for samples collected on July 18 and August 9, 2012, as a follow-up to the interim action vapor control on July 11, 2012, reported TCE detections in indoor air at concentrations ranging from 0.89 to 1.1 $\mu g/m^3$ for all work area samples collected in Building 10. The VOC results for samples collected at the tunnel access were reduced considerably in comparison with the May 2012 sampling results (AM8AJV 2014a).

2014: A total of nine indoor air samples (including one duplicate) were collected from Building 10 on February 11, 2014, from the main work area, the boiler room, and near the tunnel access area, including three pathway samples from within the floor trench and the tunnel access. One outside air sample (24-hour duration) was collected immediately outside Building 10, along with indoor air samples. TCE was detected at concentrations exceeding the EPA's indoor air cleanup level in the three pathway samples collected from the tunnel and floor trenches. COC (PCE, cis-1,2-DCE, 1,1-DCA, trans-1,2-DCE, 1,1-DCE, and VC) detections in all work area samples for Building 10 were significantly lower than the EPA's indoor air cleanup levels, but were still above the outdoor air concentrations for TCE. TCE and PCE were measured in indoor air at concentrations ranging from 0.66 to 3.7 $\mu g/m^3$ and 0.063 to 0.79 $\mu g/m^3$, respectively, for all work area samples collected at Building 10. The maximum TCE concentration (73 $\mu g/m^3$) was detected in a sample collected in a floor trench (14M010-T-04) in Building 10.

2016: A total of six indoor air samples (including one duplicate) were collected from Building 10 on January 12, 2016, from the main work area, the boiler room, and near the tunnel access area, including a pathway sample (and duplicate) from within the floor trench and the tunnel access. One outside air sample of 24-hour duration was collected immediately outside Building 10, along with indoor air samples. All sampling results were below EPA's indoor air cleanup levels for all COCs. Detected COC concentrations that exceeded the outdoor air concentration ranges include PCE (six of six samples), TCE (six of six samples), trans-1,2-DCE (six of six samples), cis-1,2-DCE (five of six samples), 1,1-DCA (six of six samples), and 1,1-DCE (six of six samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.86 to 1.3 $\mu g/m^3$ and 0.11 to 0.14 $\mu g/m^3$, respectively, for all samples collected at Building 10 (MMEC 2015).

2017: A total of eight indoor air samples (including two duplicates) were collected from Building 10 on January 12, 2017, from the main work area, the boiler room, near the tunnel access area,

Room 103 (duplicate), and the Room 102 office (duplicate). One outdoor air sample at the tunnel exhaust vent was collected. One ambient air sample of 24-hour duration was collected immediately outside Building 10, along with indoor air samples. TCE was detected at concentrations exceeding the EPA's indoor air cleanup level in one work area sample from Room 103 (17M010-1-10) and the associated duplicate sample (17M310-1-10). Room 103 is a former storage area with a sump that penetrates the floor slab. All other COC detections for work area samples collected at Building 10 were lower than the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration levels included TCE (8 of 8 samples), PCE (7 of 8 samples), cis-1,2-DCE (8 of 8 samples), 1,1-DCA (7 of 8 samples), and 1,1-DCE (7 of 8 samples). All indoor air concentrations of trans-1,2-DCE were below the ambient air concentration level. There were no detections of VC in indoor or ambient air samples. All COCs detected in the outdoor tunnel exhaust vent location were below the ambient air concentration level. TCE and PCE were measured in indoor air at concentrations ranging from 0.65 to 11 $\mu g/m^3$ and 0.056 to 0.1 $\mu g/m^3$, respectively.

2018: Eight indoor air samples (including two duplicates) were collected from Building 10 on January 17, 2018, from the main work area (duplicate), the boiler room, near the tunnel access area, Room 103 (duplicate), and the Room 102 office. One outdoor air sample at the tunnel exhaust vent was collected. One ambient air sample of 24-hour duration was collected immediately outside Building 10, along with the indoor air samples. All sampling results were below EPA's indoor air cleanup levels for all COCs. Indoor air concentrations exceeding the ambient air concentration levels included TCE (eight of eight samples); PCE (seven of eight samples), trans-1,2-DCE (four of eight); cis-1,2-DCE (eight of eight samples); 1,1-DCA (three of eight samples); and 1,1-DCE (two of eight samples). There were no detections of VC in indoor or ambient air samples. The outdoor exhaust sample had concentrations of cis-1,2-DCE and TCE exceeding the ambient air concentration level. TCE and PCE were measured in indoor air at concentrations ranging from 0.35 to 0.98 $\mu g/m^3$ and 0.073 to 0.19 $\mu g/m^3$, respectively.

2.3.1.1 June 2018 ECD Screening

Fifteen discrete ECD samples were collected from Building 10 with the tunnel blower operating (eight samples) and with the tunnel blower off (seven samples). Of the fifteen sample locations, two were indoor air samples and thirteen were potential vapor intrusion pathway samples. TCE was detected at a concentration exceeding the industrial/commercial indoor air cleanup level of 5 $\mu g/m^3$ in ECD samples collected in the tunnel system under Building 10 (eight of eight samples), the electrical conduit on the north east side of Building 10 (two of two samples), and the drain in room 103 (three of three samples), indicating multiple vapor intrusion pathways. Both of the Building 10 indoor air samples collected with the blower off were below the indoor air cleanup level.

2.4 BUILDING 12 - PREVIOUS SAMPLING RESULTS

2008: Two indoor air samples were collected in February 2008 from Building 12. TCE was measured at concentrations ranging from 0.345 to 0.447 µg/m^3 (Neptune 2008).

2012: A total of 13 indoor air samples (including one duplicate) were collected in May 2012 from two floors, including the crawl space beneath the raised floor of Building 12, with both the HVAC system operating and the HVAC system off. All sampling results were below EPA's indoor air cleanup levels except one pathway sample (M012-C-05-N) collected in the crawl space beneath Room 110, where TCE was detected at a concentration of 6.1 µg/m^3, exceeding the cleanup level of 5 µg/m^3 (AM8AJV 2014a).

Interim Mitigation Measures and Confirmation Sampling (2013): Interim mitigation measures were implemented at Building 12, which consisted of sealing conduits penetrating the floor slab above the crawl space in Room 110 and allowing passive venting of the crawl space. Follow-up confirmation air samples were collected in Room 110 and Hallway C102 with the HVAC system both on and off to evaluate the effectiveness of the interim mitigation measures. All results for samples collected near the conduits penetrating the floor in Room 110 and Hallway C102 in Building 12 with the HVAC system both on and off were reported below EPA's indoor air cleanup levels. However, all samples had concentrations of TCE that exceeded the outdoor air concentration range for TCE.

2014: Nine indoor air samples (including one duplicate) were collected from Building 12, including from the crawl space beneath the raised floor, with the HVAC system operating and off. Two outside air samples (24-hour duration) were collected near Building 12. Indoor air and outdoor air samples were collected on February 13, 2014, with the HVAC system operating and on February 18, 2014, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels except for those of pathway samples (14M012-C-05-F, 14M012-C-05-N, and 14M312-C-05-F) collected in the crawl space beneath Room 110, where TCE was detected at concentrations of 6.1, 6.0, and 5.2 µg/m^3, respectively, exceeding the cleanup level of 5 µg/m^3. All other detected COC (PCE, cis-1,2-DCE, 1,1-DCA, trans-1,2-DCE, 1,1-DCE, and VC) concentrations were lower than the EPA's indoor air cleanup levels. PCE was detected at concentrations within the outdoor air concentration range for all samples except one (14M012-1-01-F) with the HVAC system off. 1,1-DCA (three of three pathway samples), 1,1 DCE (two of three pathway samples), and trans-1,2-DCE (three of three pathway samples) were detected at concentrations above the outdoor air concentration ranges. All COCs were within outdoor air concentration ranges for all work area samples except TCE for one sample (14M012-1-01-F at 0.46 µg/m^3 with HVAC off).

2016: Eight indoor air samples (including one duplicate) were collected from Building 12, including from the crawl space beneath the raised floor, with the HVAC system operating and off. Four samples were collected with the HVAC system running and four samples were collected with

the HVAC system off. Two outside air samples (24-hour duration) were collected near Building 12. Indoor air and outdoor air samples were collected on January 13, 2016, with the HVAC system operating and on January 18, 2016, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels except for those from one pathway sampling location (16M012-C-05-F and 16M312-C-05-F) collected in the crawl space beneath Room 110, where TCE was detected at concentrations of 7.1 and 7.2 μg/m^3, respectively, exceeding the cleanup level of 5 μg/m^3. Samples from the crawl space were the only samples with concentrations that exceeded the EPA's indoor air cleanup levels. All other detected COC (PCE, cis-1,2-DCE, 1,1-DCA, trans-1,2-DCE, 1,1-DCE, and VC) concentrations were lower than the EPA's indoor air cleanup levels. PCE was detected at concentrations above the outdoor air concentration range for every sample collected with the HVAC system on (ranging from 0.047 to 0.079 μg/m^3); however, only one sample had a PCE concentration above the outdoor air concentration range (16M012-1-01-F) with the HVAC system off. With the HVAC system off, the following COCs were detected in work area samples at concentrations above the outdoor air concentration ranges: TCE (two of two samples), PCE (one of two samples), cis-1,2-DCE (one of two samples), and 1,1-DCE (one of two samples). With the HVAC system on, the following COCs were detected in work area samples at concentrations above the outdoor air concentration ranges: TCE (two of three samples) and trans-1,2-DCE (three of three samples) (MMEC 2015).

2017: Nine indoor air samples (including one duplicate) were collected from Building 12, including from the crawl space beneath the raised floor, with the HVAC system operating (four samples) and off (five samples). Two ambient air samples (24-hour duration) were collected near Building 12. Indoor air and ambient air samples were collected on January 10, 2017, with the HVAC system operating and on January 15, 2017, with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration ranges included TCE (6 of 9 – 3 samples with HVAC off, 3 samples with HVAC on), PCE (5 of 9 – 4 samples with HVAC system off, 1 sample with the HVAC on), cis-1,2-DCE (5 of 9 – 4 samples with the HVAC system off, 1 sample with the HVAC on), trans-1,2-DCE (3 of 9 – 3 samples with the HVAC system off), 1,1-DCA (2 of 9 – 1 sample with HVAC system off, 1 sample with the HVAC on), 1,1-DCE (2 of 9 – 1 sample with the HVAC off, 1 sample with the HVAC on), and VC (2 of 9 – 1 sample with the HVAC off, 1 sample with the HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.060 to 1.8 μg/m^3 and 0.030J to 0.14 μg/m^3, respectively.

2018: Eleven indoor air samples (including three duplicates) were collected from Building 12, with the HVAC system operating (five samples) and off (six samples). Four pathway air samples were collected from the crawlspace beneath the raised floor beneath Building 12. Two ambient air samples (24-hour duration) were collected near Building 12. Indoor air, pathway, and ambient air samples were collected on January 9, 2018 (five samples) and February 21, 2018 (three confirmation samples), with the HVAC system operating and on January 16, 2018 (six samples) and February 19, 2018 (three confirmation samples), with the HVAC system off. TCE was

detected at a concentration of 7.3 µg/m^3 exceeding the EPA's indoor air cleanup level for one pathway air sample from the crawlspace, sample (18M012-C-05-F) with the HVAC System off. The EPA noted that there is no indoor air sample in the vicinity of the pathway sample 18M012-C-05-F, the concentrations of COCs detected in the crawlspace would have to be assumed to be in the indoor air. Confirmation samples were collected from the crawlspace and indoor air immediately over the crawlspace with the HVAC on and HVAC off. TCE concentrations from confirmation samples in the crawlspace were 2.2 µg/m^3 with the HVAC off and 1.0 µg/m^3 with the HVAC on. TCE concentrations from confirmation sample in the indoor air over the pathway samples were 0.77 and 0.74 µg/m^3 with the HVAC off and 0.21 and 0.23 µg/m^3 with the HVAC on. TCE concentrations in indoor air were 65 percent lower than in the pathway with the HVAC off and 77 percent lower than in the pathway with the HVAC on.

All other samples collected had COCs that did not exceed the EPA's indoor air cleanup level. Indoor air concentrations exceeding the ambient air concentration ranges included TCE (12 of 15 – six samples with HVAC off, six samples with HVAC on); PCE (11 of 15 – five samples with HVAC system off, six samples with the HVAC on); cis-1,2-DCE (seven of 15 – five samples with the HVAC system off, two samples with the HVAC on); trans-1,2-DCE (seven of 15 – two samples with the HVAC system off, five samples with the HVAC on); 1,1-DCA (11 of 15 – six samples with HVAC system off, five samples with the HVAC on); 1,1-DCE (seven of 15 – five samples with the HVAC off, two samples with the HVAC on); and VC (three of 15 – one sample with the HVAC off, two samples with the HVAC on); TCE and PCE were measured in indoor air at concentrations ranging from 0.02J to 7.3 µg/m^3 and 0.032J to 0.31 µg/m^3, respectively.

2.5 BUILDING 13 - PREVIOUS SAMPLING RESULTS

2012: A total of three indoor air samples (including one duplicate) were collected at Building 13 in May 2012. All sampling results were below EPA's indoor air cleanup levels for all COCs. Only TCE was detected at a concentration slightly above the outdoor air concentration range for one sample (M013-1-02); all other sampling results were within the outdoor air concentration ranges for all COCs (AM8AJV 2014a).

2014: Two indoor air samples were collected in Building 13. Indoor air samples were collected on February 18, 2014. All sampling results were below EPA's indoor air cleanup levels for all COCs. Only TCE was detected at a concentration slightly above the outdoor air concentration range for one sample (14M013-1-01); all other sampling results were within the outdoor air concentration ranges for all COCs. TCE was measured in indoor air at concentrations ranging from 0.19 to 0.39 µg/m^3 in Building 13.

2016: Two indoor air samples were collected in Building 13. Indoor air samples were collected on January 13, 2016. All sampling results were below EPA's indoor air cleanup levels for all COCs. The following COCs were detected in work area samples at concentrations above the outdoor air concentration ranges: TCE (two of two samples), PCE (two of two samples), cis-1,2-DCE (two of

two samples),1,1-DCA (one of two samples), and trans-1,2-DCE (two of two samples) (MMEC 2015).

2017: A total of three indoor air samples (including one duplicate) were collected in Building 13. One ambient air sample (24-hour duration) was collected near Building 13. Indoor and ambient air samples were collected on January 18, 2017. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration levels included TCE (1 of 3 samples), PCE (3 of 3 samples), cis-1,2-DCE (2 of 3 samples),1,1-DCA (1 of 3 samples), and trans-1,2-DCE (1 of 3 samples). No other COCs were detected at concentrations above the ambient air concentration level. TCE and PCE were measured in indoor air at concentrations ranging from 0.038 to 0.049 $\mu g/m^3$ and 0.032J to 0.037 $\mu g/m^3$, respectively, at Building 13. TCE and PCE were measured in ambient air at concentrations of 0.043 and 0.030J $\mu g/m^3$, respectively.

2018: Three indoor air samples (including one duplicate) were collected in Building 13. One ambient air sample (24-hour duration) was collected near Building 13. Indoor and ambient air samples were collected on January 16, 2018. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration levels included TCE (three of three samples); PCE (two of three samples); cis-1,2-DCE (three of three samples); and trans-1,2-DCE (three of three samples). No other COCs were detected at concentrations exceeding the ambient air concentration level. TCE and PCE were measured in indoor air at concentrations ranging from 0.059J to 0.15 $\mu g/m^3$ and 0.076J to 0.19J $\mu g/m^3$, respectively, at Building 13. TCE and PCE were measured in ambient air at concentrations of 0.12 and 0.19 $\mu g/m^3$, respectively.

2.6 BUILDING 14 - PREVIOUS SAMPLING RESULTS

2012: Eight indoor air samples (including one duplicate) were collected in Building 14 on June 12, 2012, of which two samples were collected in the crawl space beneath the raised floor. All sampling results were below EPA's indoor air cleanup levels for all COCs. Only TCE (five of eight samples) and trans-1,2-DCE (three of eight samples) were detected at concentrations exceeding outdoor air concentration ranges (AM8AJV 2014a).

2014: Six indoor air samples (including one duplicate) were collected in Building 14 on February 12, 2014, of which two samples were collected in the crawl space beneath the raised floor. Sampling results were below EPA's indoor air cleanup levels for all COCs. Only TCE (both pathway samples) and 1,1-DCA (one of two pathway samples) were detected at concentrations exceeding the outdoor air concentration ranges for the samples collected in the crawl space beneath the raised floor. TCE and 1,1-DCA were measured in indoor air at concentrations ranging from 0.05 to 4.5 $\mu g/m^3$ and 0.020J to 0.066 $\mu g/m^3$, respectively, at Building 14. All other detected COC (PCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and VC) concentrations were within the outdoor air concentration ranges.

2016: A total of 11 indoor air samples (including one duplicate) were collected in Building 14 from offices with the HVAC system operating (four samples) and off (three samples), and from the crawl space beneath the raised floor (four samples). Indoor air samples were collected on January 13 and 17, 2016. All work area sampling results were below EPA's indoor air cleanup levels for all COCs. Only TCE (three of four samples) was detected at concentrations exceeding the indoor air cleanup level for the samples collected in the crawl space beneath the raised floor (ranging from 5.5 to 7.0 $\mu g/m^3$). With the HVAC system off, TCE was detected in one work area sample at a concentration above the overall outdoor air concentration range. No other COCs were detected at concentrations above the overall outdoor air concentration ranges in work areas with the HVAC system in operation and off (MMEC 2015).

2017: A total of eleven indoor air samples (including one duplicate) were collected in Building 14, including from the crawl space beneath the raised floor, with the HVAC system operating (six samples) and off (five samples). Indoor air samples were collected on January 16, 2017 with the HVAC system off and January 17, 2017 with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 67 ambient air concentration levels, as Building 67 is the closest building with an ambient air sample. Indoor air and pathway sample concentrations exceeding the ambient air concentration level at Building 67 included TCE (9 of 11 – 5 samples with HVAC off, 4 sample with HVAC on), PCE (11 of 11 – 5 samples with HVAC off, 6 samples with HVAC on), cis-1,2-DCE (9 of 11 – 5 samples with HVAC off, 4 samples with HVAC on), trans-1,2,-DCE (11 of 11– 5 samples with HVAC off, 6 samples with HVAC on) 1,1-DCA (6 of 11 – 4 samples with HVAC off, 2 samples with HVAC on), 1,1-DCE (4 of 11 – 2 samples with HVAC off, 2 samples with HVAC on), and VC (4 of 11 – 2 samples with HVAC off, 2 samples with HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.078 to 4.6 $\mu g/m^3$ and 0.086 to 0.23 $\mu g/m^3$, respectively.

2018: Seven indoor air samples (including one duplicate) were collected from Building 14, with the HVAC system operating (four samples) and off (three samples). Four pathway air samples were collected from the crawlspace beneath the raised floor beneath Building 14. Indoor air samples were collected on January 15, 2018 with the HVAC system off and January 17, 2018 with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 67 ambient air concentration levels, as Building 67 is the closest building with an ambient air sample. Indoor air and pathway sample concentrations exceeding the ambient air concentration level at Building 67 included TCE (11 of 11 – five samples with HVAC off, six sample with HVAC on); PCE (11 of 11 – five samples with HVAC off, six samples with HVAC on); cis-1,2-DCE (11 of 11 – five samples with HVAC off, six samples with HVAC on); trans-1,2,-DCE (10 of 11– five samples with HVAC off, five samples with HVAC on); 1,1-DCA (nine of 11 – five samples with HVAC off, four samples with HVAC on); 1,1-DCE (five of 11 – three samples with HVAC off, two samples with HVAC on); and VC (four of 11 – two samples with HVAC off, two samples with

HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.069 to 1.3 μg/m^3 and 0.086 to 0.28 μg/m^3, respectively.

2.7 BUILDING 15 - PREVIOUS SAMPLING RESULTS

2003–2009: Indoor air samples were collected from six locations in Building 15 between 2003 and 2009. Prior to September 2003, TCE concentrations were between 0.3 and 2.0 μg/m^3. Between mid-September 2003 and mid-February 2004, TCE concentrations generally doubled, with concentrations exceeding 5 μg/m^3 in three events. After the makeup air supply was adjusted, TCE concentrations were reduced to less than 1.0 μg/m^3 by early May 2004 (Neptune 2005). Five indoor air samples were collected in March 2009. TCE was measured at concentrations ranging from 0.047 to 0.135 μg/m^3 (NASA 2012).

2012: A total of 13 indoor air samples (including one duplicate) were collected at six sampling locations with the HVAC system operating and off at Building 15 in May 2012. All sampling results were below EPA's indoor air cleanup levels. Only TCE (six of six samples) and PCE (one of six samples) were detected at concentrations exceeding their outdoor air concentration ranges in the samples collected with the HVAC system off. PCE was also detected at a concentration exceeding the outdoor air concentration range in one sample collected with the HVAC system on (AM8AJV 2014a).

2014: Nine indoor air samples (including one duplicate) were collected at four sampling locations with the HVAC system operating and off at Building 15. Two outside air samples (24-hour duration) were collected immediately outside Building 15. Indoor air samples were collected on February 13, 2014, with the HVAC system operating and on February 17, 2014, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels. Only TCE (four of nine samples) and PCE (one of nine samples) were detected at concentrations exceeding their outdoor air concentration ranges in the samples collected with the HVAC system off. TCE and PCE were measured in indoor air at concentrations ranging from 0.060 to 1.8 μg/m^3 and 0.034 to 0.12 μg/m^3, respectively, at Building 15. All other COC (cis-1,2-DCE, 1,1-DCA, trans-1,2-DCE, 1,1-DCE, and VC) concentrations were within their outdoor air concentration ranges.

2016: Nine indoor air samples (including one duplicate) were collected at four sampling locations with the HVAC system operating and off at Building 15. Two outside air samples (24-hour duration) were collected immediately outside Building 15. Indoor air samples were collected on January 13, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels. PCE (four of four samples), TCE (two of four samples), cis-1,2-DCE (one of four samples), trans-1,2-DCE (four of four samples), and 1,1-DCA (one of four samples) were detected at concentrations exceeding their outdoor air concentration ranges in the samples collected with the HVAC system on. With the HVAC system off, the following COCs were found at concentrations above the outdoor air concentrations (including results from one duplicate sample): PCE (five of five samples), TCE

(five of five samples), cis-1,2-DCE (five of five samples), trans-1,2-DCE (one of five samples), 1,1-DCE (one of five samples), and VC (three of five samples) (MMEC 2015).

2017: A total of nine indoor air samples (including one duplicate) were collected in Building 15, with the HVAC system operating (four samples) and off (five samples). Two ambient air samples (24-hour duration) were collected near Building 15. Indoor air and ambient air samples were collected on January 10, 2017 with the HVAC system on and January 15, 2017 with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (6 of 9 – 5 samples with HVAC off, 1 sample with HVAC on), PCE (3 of 9 – 3 samples with HVAC off), cis-1,2-DCE (1 of 9 – 1 sample with HVAC off), 1,1-DCA (6 of 9 – 4 samples with HVAC off, 2 samples with HVAC on), and 1,1-DCE (1 of 11 – 1 sample with HVAC off). No other COCs were detected at concentrations above the ambient air concentration ranges. TCE and PCE were measured in indoor air at concentrations ranging from 0.028J to 3.3 $\mu g/m^3$ and 0.030J to 0.12 $\mu g/m^3$, respectively.

2018: Nine indoor air samples (including one duplicate) were collected in Building 15 with the HVAC system operating (four samples) and off (five samples). Two ambient air samples (24-hour duration) were collected near Building 15. Indoor air and ambient air samples were collected on January 9, 2018 with the HVAC system on and January 14, 2018 with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (eight of nine – five samples with HVAC off, three samples with HVAC on); PCE (eight of nine – five samples with HVAC off, three samples with HVAC on); cis-1,2-DCE (five of nine – four sample with HVAC off, one sample with HVAC on); trans-1,2-DCE (four of nine – three sample with HVAC off, one sample with HVAC on); 1,1-DCA (four of nine – four samples with HVAC off); 1,1-DCE (one of 11 – one sample with HVAC off); and VC (one of 11 – one sample with HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.047 to 1.0 $\mu g/m^3$ and 0.029J to 0.11 $\mu g/m^3$, respectively.

2.8 BUILDING 16 - PREVIOUS SAMPLING RESULTS

2003–2009: Indoor air samples have been collected at two locations in Building 16 (Neptune 2009; NASA 2012). TCE concentrations were between 0.6 and 15.1 $\mu g/m^3$ between December 2003 and April 2004. After adjusting the makeup air supply, TCE concentrations were reduced to less than 1.0 $\mu g/m^3$ by mid-May 2004 (Neptune 2005). Samples collected on February 28, 2007, reported TCE at concentrations of 1.334 and 3.667 $\mu g/m^3$. However, in samples collected in 2008 and 2009, TCE concentrations were less than 1.0 $\mu g/m^3$ (Neptune 2009; NASA 2012).

2012: A total of 12 indoor air samples (including two duplicates) were collected with the HVAC system operating and with the HVAC system off at Building 16 in May 2012. All sampling results were below EPA's indoor air cleanup levels with the HVAC system both operating and shut down.

Only TCE was detected at a concentration exceeding the outdoor air concentration range in all the samples collected with the HVAC system off. All of the COC results were within their respective outdoor air concentration ranges with the HVAC system on (AM8AJV 2014a).

2014: A total of 12 indoor air samples (including 2 duplicates) and 2 outdoor air samples were collected with the HVAC system operating and off at Building 16. Indoor air samples were collected on February 12, 2014, with the HVAC system operating and on February 16, 2014, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels with the HVAC system both operating and shut down, except for one sample (14M016-1-05-F from Room 103), where TCE was detected at a concentration of 6.6 $\mu g/m^3$ with the HVAC off. TCE was detected at concentrations exceeding the outdoor air concentration range in all of the samples collected with the HVAC system off and in two samples (14M016-1-02-N and 14M016-1-04-N) with the HVAC system operating. PCE was detected at concentrations exceeding the outdoor air concentration range in all of the samples with the HVAC system operating and in all three samples (14M016-1-01-F, 14M016-1-01-N, and 14M016-1-05-N) with the HVAC system off. 1,1-DCE and 1,1-DCA were also detected at concentrations exceeding their outdoor air concentration ranges in sample 14M016-1-05-F (the same sample where the TCE concentration exceeded the indoor air cleanup level for TCE). All other COC results were within their outdoor air concentration ranges with the HVAC system on and off.

2016: A total of 12 indoor air samples (including 2 duplicates) and 2 outdoor air samples were collected with the HVAC system operating and off at Building 16. Indoor air samples were collected on January 13, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels with the HVAC system both operating and shut down. With the HVAC system on, the following COCs were detected at concentrations above the outdoor air concentration ranges (including results from one duplicate sample): PCE (five of six samples), TCE (four of six samples), trans-1,2-DCE (three of six samples), and VC (one of six samples). With the HVAC system off, the following COCs were detected at concentrations above the outdoor air concentration ranges (including results from one duplicate sample): PCE (three of six samples), TCE (six of six samples), cis-1,2-DCE (five of six samples), trans-1,2-DCE (five of six samples), 1,1-DCE (five of six samples), 1,1-DCA (five of six samples), and VC (five of six samples) (MMEC 2015).

2017: A total of fourteen indoor air samples (including two duplicates) were collected in Building 16, with the HVAC system operating (seven samples) and off (seven samples). Two ambient air samples (24-hour duration) were collected near Building 16. Indoor air samples were collected on January 16, 2017 with the HVAC system off and January 18, 2017 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (11 of 14 – 7 samples with HVAC off, 4 sample with HVAC on), PCE (11 of 14 – 7 samples with HVAC off, 4 samples with HVAC on), cis-1,2-DCE (8 of 14 – 7 samples with HVAC off, 1 sample

with HVAC on), trans-1,2-DCE (2 of 14 – 1 sample with HVAC off, 1 sample with HVAC on), 1,1-DCA (6 of 14 – 4 samples with HVAC off, 2 samples with HVAC on), 1,1-DCE (11 of 14 – 7 samples with HVAC off, 4 samples with HVAC on), and VC (2 of 14 – 1 sample with HVAC off, 1 sample with HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.20 to 0.92 µg/m^3 and 0.055 to 1.5 µg/m^3, respectively.

2018: Fourteen indoor air samples (including two duplicates) were collected in Building 16, with the HVAC system operating (seven samples) and off (seven samples). Two ambient air samples (24-hour duration) were collected near Building 16. Indoor air samples were collected on January 15, 2018 with the HVAC system off and January 16, 2018 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (13 of 14 – seven samples with HVAC off, six samples with HVAC on), PCE (six of 14 – six samples with HVAC on), cis-1,2-DCE (seven of 14 – seven samples with HVAC off); trans-1,2-DCE (five of 14 – five samples with HVAC off); 1,1-DCA (seven of 14 – seven samples with HVAC off); 1,1-DCE (seven of 14 – seven samples with HVAC off); and VC (one of 14 – one sample with HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.13 to 4.1 µg/m^3 and 0.065 to 0.25 µg/m^3, respectively.

2.8.1.1 June 2018 ECD Screening

Twenty-three discrete ECD samples were collected from Building 16 with the HVAC system operational. Of the 23 sample locations, 20 were indoor air samples three were potential vapor intrusion pathway samples. TCE was detected at a concentration exceeding the industrial/ commercial indoor air cleanup level of 5 µg/m^3 in one indoor air ECD sample collected in Room 118. Four additional ECD samples were taken from Room 118, TCE concentrations of the ECD Samples ranged from 3.0 µg/m^3 to 4.2 µg/m^3. Discrete ECD samples collected from Room 103, the associated trench, and conduit were all non-detect for TCE and PCE.

2.9 BUILDING 29 - PREVIOUS SAMPLING RESULTS

2012: Two indoor air samples (including one in the basement) were collected in Building 29 in May 2012. All sampling results were below EPA's indoor air cleanup levels for all COCs. Only one sample contained PCE (0.23 µg/m^3) at a concentration that exceeded the outdoor air concentration range (AM8AJV 2014a).

2014: Two indoor air samples were collected in Building 29. One outdoor air sample was collected just outside Building 29. Indoor and outdoor air samples were collected on February 11, 2014. All sampling results were below EPA's indoor air cleanup levels and outdoor air concentration ranges for all COCs. TCE and PCE were measured in indoor air at concentrations ranging from 0.04 to 0.069 µg/m^3 and 0.049 to 0.061 µg/m^3, respectively.

2016: Two indoor air samples were collected in Building 29. One outdoor air sample was collected just outside Building 29. Indoor air and outdoor air samples were collected on January 12, 2016. All sampling results were significantly below EPA's indoor air cleanup levels. TCE (two of two samples), trans-1,2-DCE (two of two samples), and 1,1-DCA (one of two samples) were detected at concentrations above outdoor air concentration ranges. TCE was measured in indoor air at concentrations ranging from 0.15 to 0.17 μg/m^3, and PCE was detected at concentrations of 0.091 to 0.093 μg/m^3 (MMEC 2015).

2017: A total of two indoor air samples were collected in Building 29. One ambient air sample (24-hour duration) was collected near Building 29. Indoor and ambient air samples were collected on January 9, 2017. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration ranges included TCE (two of two samples), PCE (two of two samples), cis-1,2-DCE (two of two samples), 1,1-DCA (two of two samples), and VC (two of two samples). No other COCs were detected at concentrations above the ambient air concertation levels. TCE and PCE were measured in indoor air at concentrations ranging from 0.35 to 0.39 μg/m^3 and 0.26 to 0.29 μg/m^3, respectively. TCE and PCE were measured in ambient air at concentrations of 0.037 and 0.070 μg/m^3, respectively.

2018: Three indoor air samples were collected in Building 29. One ambient air sample (24-hour duration) was collected near Building 29. Indoor and ambient air samples were collected on January 10, 2018, and one confirmation sample was collected February 21, 2018. PCE was detected exceeding the EPA's indoor air cleanup level in Room 106 (18M029-1-01) at 2.4 μg/m^3 and TCE was detected at a concentration of 2.8 μg/m^3. Historic concentrations of PCE at 18M029-1-01 ranges from 0.061 to 0.29 μg/m^3. It was noted that granular activated carbon filter replacement was being performed on the WATS groundwater treatment system on January 10, 2018 during the initial sampling event. Air with elevated concentrations of COCs from the WATS system could have entered a window and cross contaminated sample 18M029-1-01. A confirmation sample was collected in Room 106 on February 21, 2018. The confirmation sample had PCE and TCE concentrations of 0.065 and 0.27 μg/m^3 respectively. The data collected during the February 2018 confirmation sampling event shows that the data collected during the January 2018 event are outside the interquartile range and appear to be outliers.

All other samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration ranges included TCE (two of three samples); PCE (two of three samples); trans-1,2-DCE (one of three samples); cis-1,2-DCE (one of three samples); 1,1-DCA (two of three samples); 1,1-DCE (one of three samples); and VC (one of three samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.096 to 2.8 μg/m^3 and 0.065 to 2.4 μg/m^3, respectively. TCE and PCE were measured in ambient air at concentrations of 0.14 and 0.083 μg/m^3, respectively.

2.10 BUILDING 45 - PREVIOUS SAMPLING RESULTS

2012: Three indoor air samples (including one duplicate) were collected at Building 45 in May 2012. Sampling results were below EPA's indoor air cleanup levels for all COCs. Only TCE was detected at a concentration exceeding the outdoor air concentration range (AM8AJV 2014a).

2014: Two indoor air samples were collected in Building 45. Indoor air samples were collected on February 12, 2014. Sampling results were below EPA's indoor air cleanup levels for all COCs. TCE and PCE were detected at concentrations that exceeded the outdoor air concentration ranges for both of the indoor air samples at Building 45. TCE and PCE were measured in indoor air at concentrations ranging from 0.62 to 0.80 $\mu g/m^3$ and 0.12 to 0.26 $\mu g/m^3$, respectively.

2016: Two indoor air samples were collected from Building 45. One outside air sample (24-hour duration) was collected immediately outside Building 45. All samples were collected on January 12, 2016. PCE and TCE concentrations exceeded EPA's indoor air cleanup levels for sample 16M045-1-01, and PCE concentrations exceeded EPA's indoor air cleanup levels for sample 16M045-1-02. For sample 16M045-1-01, which was located in Room 101, PCE and TCE were measured at concentrations of 5.0 and 7.0 $\mu g/m^3$, respectively. For sample 16M045-1-02, which was located in Room 102, PCE was detected at a concentration of 2.6 $\mu g/m^3$. Both of the indoor air samples had results that exceeded the outdoor air concentration ranges for all of the COCs (MMEC 2015).

2017: Two indoor air samples were collected from Building 45. One outside air sample (24-hour duration) was collected near Building 45. All samples were collected on January 17, 2017. PCE concentrations exceeded indoor air cleanup levels for samples 17M045-1-01 and 17M045-1-02, from Room 101 and the former location of Room 102, respectively. Rooms 101 and former 102 are main work areas in the building with floor trenches in the area. Both of the indoor air samples had results that exceeded the ambient air concentration level for all of the COCs. TCE and PCE were measured in indoor air at concentrations ranging from 4.7 to 4.8 µg/m3 for TCE and at 2.6 µg/m3 for both PCE samples.

2018: Two indoor air samples were collected from Building 45. One outside air sample (24-hour duration) was collected near Building 45. All samples were collected on January 17, 2018. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration ranges included TCE (two of two samples); trans-1,2-DCE (two of two samples); cis-1,2-DCE (two of two samples); and 1,1-DCA (two of two samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.63 to 0.78 $\mu g/m^3$ for TCE and from 0.15 to 0.16 $\mu g/m^3$ for PCE. Ambient air concentrations for TCE and PCE ranged from 0.22 to 0.18 $\mu g/m^3$, respectively.

2.11 BUILDING 67 - PREVIOUS SAMPLING RESULTS

2012: Two indoor air samples (including one duplicate) and one ambient air sample were collected at Building 67 in May 2012. All sampling results were below EPA's indoor air cleanup levels and within the outdoor air concentration range for all COCs (AM8AJV 2014a).

2013: Soil gas and groundwater samples collected in areas adjacent to Building 67 during 2013 did not indicate any significant potential for vapor intrusion to exceed the EPA's indoor air cleanup levels. Soil gas and groundwater sampling in areas adjacent to Building 67 provided additional lines of evidence to evaluate the feasibility of a Tier 4 (no further action) ranking, as indoor air sampling results for the May and June 2012 events were below EPA's indoor air cleanup levels and within outdoor air concentration ranges (AM8AJV 2014c).

2014: One indoor air sample and one outdoor air sample were collected at Building 67 on February 12, 2014. All COC results were below EPA's indoor air cleanup levels and within the outdoor air concentration ranges. TCE and PCE were measured in indoor air at concentrations of 0.086 and 0.042 $\mu g/m^3$, respectively.

2016: One indoor air sample and one outdoor air sample were collected at Building 67 on January 12, 2016. All COC results were below EPA's indoor air cleanup levels; however, PCE, TCE, and trans-1,2-DCE concentrations exceeded their outdoor air concentration ranges. PCE and TCE were measured in indoor air at concentrations of 0.068 and 0.18 $\mu g/m^3$, respectively (MMEC 2015).

2017: A total of one indoor air sample was collected at Building 67. One ambient air sample (24-hour duration) was collected near Building 67. Indoor and ambient air samples were collected on January 17, 2017. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration level included TCE, PCE, and trans-1,2-DCE. TCE and PCE were measured in indoor air at concentrations of 0.34 and 0.072 $\mu g/m^3$, respectively. TCE and PCE were measured in ambient air at concentrations of 0.14 and 0.069 $\mu g/m^3$, respectively.

2018: One indoor air sample was collected at Building 67. One ambient air sample (24-hour duration) was collected near Building 67. Indoor and ambient air samples were collected on January 16, 2018. Both samples had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration level included TCE; PCE; and trans-1,2-DCE. TCE and PCE were measured in indoor air at concentrations of 0.16 and 0.078 $\mu g/m^3$, respectively. TCE and PCE were measured in ambient air at concentrations of 0.044 and 0.065 $\mu g/m^3$, respectively.

2.12 BUILDING 76 - PREVIOUS SAMPLING RESULTS BUILIDING 76

2008: One indoor air sample was collected in February 2008 in Building 76. TCE was measured at a concentration of 0.233 $\mu g/m^3$ (Neptune 2008).

2012: Two indoor air samples were collected in May 2012 in Building 76 with the window-mounted air conditioning (AC) off and on. All sampling results were below EPA's indoor air cleanup levels and within the outdoor air concentration ranges for all COCs. TCE was measured in indoor air at concentrations ranging from 0.12 to 0.15 µg/m^3 (AM8AJV 2014a).

2014: One indoor air sample was collected in Building 76 on February 11, 2014, with the window-mounted AC off. All COC results were below EPA's indoor air cleanup levels and within the outdoor air concentration ranges. TCE and PCE were measured in indoor air at concentrations of 0.14 and 0.060 µg/m^3, respectively.

2016: One indoor air sample was collected in Building 76 on January 12, 2016, with the window-mounted AC off. All COC results were below EPA's indoor air cleanup levels; however, the one indoor air sample had concentrations that slightly exceeded the outdoor air concentration ranges for TCE and trans-1,2-DCE (MMEC 2015).

2017: One indoor air sample was collected at Building 76. The indoor sample was collected on January 17, 2017, with the window mounted AC off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to the Building 16 ambient air concentration range, as Building 16 is the closest building with ambient air samples. PCE and 1,1-DCA concentrations in indoor air samples were detected above the ambient air concentration range for Building 16. TCE and PCE were measured in indoor air at concentrations of 0.27 and 0.067 µg/m^3, respectively. TCE and PCE were measured in indoor air in Building 16 at concentrations ranging from 0.17 to 0.27 µg/m^3 and 0.030J to 0.059 µg/m^3, respectively.

2018: One indoor air sample was collected at Building 76, on January 10, 2018, with the window mounted AC shut off. The sample had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to the Building 16 ambient air concentration range, as Building 16 is the closest building with ambient air samples. TCE in the indoor air sample was detected exceeding the ambient air concentration range for Building 16. TCE and PCE were measured in indoor air at concentrations of 0.24 and 0.032J µg/m^3, respectively. TCE and PCE were measured in indoor air in Building 16 at concentrations ranging from 0.17 to 0.21 µg/m^3 and 0.07 to 0.58 µg/m^3, respectively.

2.13 BUILDING 107 - PREVIOUS SAMPLING RESULTS BUILDING 107

2008–2009: Indoor air samples were collected in February and May 2008 in Building 107. In May 2008, TCE and PCE were measured in indoor air at concentrations ranging from 2.553 to 2.825 µg/m^3 and 1.122 to 1.539 µg/m^3, respectively (Neptune 2009). February 2008 sampling results for TCE and PCE were higher than the May 2008 sampling results, possibly due to open windows during the warmer May 2008 event, which provided better ventilation and may have decreased or eliminated the negative pressure in the building, resulting in decreased vapor intrusion (Neptune

2009). Five indoor air samples were collected in March 2009 in Building 107. TCE was measured at concentrations ranging from 0.433 to 1.9 μg/m^3 (NASA 2012).

2012: Four indoor air samples were collected in May 2012 at two sampling locations with the HVAC system operating and with the HVAC system off in Building 107. All sampling results were significantly below EPA's indoor air cleanup levels and within the outdoor air concentration ranges for all COCs. TCE was measured in indoor air at concentrations ranging from 0.043 to 0.11 μg/m^3 (AM8AJV 2014a).

2014: Four indoor air samples were collected at two sampling locations with the HVAC system operating and off at Building 107. Indoor air samples were collected on February 11, 2014, with the HVAC system operating and on February 16, 2014, with the HVAC system off. All sampling results were significantly below EPA's indoor air cleanup levels. PCE was detected at a concentration slightly exceeding the outdoor air concentration range at one location (Room 106) with both the HVAC system on and off. All other sampling results were within the outdoor air concentration ranges for all COCs. PCE and TCE were measured in indoor air at concentrations ranging from 0.073 to 0.12 μg/m^3 and 0.027J to 0.13 μg/m^3, respectively.

2016: Four indoor air samples were collected at two sampling locations with the HVAC system operating and off at Building 107. Indoor air samples were collected on January 12, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. All sampling results were significantly below EPA's indoor air cleanup levels. With the HVAC system operating, trans-1,2-DCE was detected at concentrations slightly exceeding the outdoor air concentration range at both sampling locations. With the HVAC system off, the following COCs were detected at concentrations exceeding their outdoor air concentration ranges: cis-1,2-DCE (one of two samples), 1,1-DCA (one of two samples), and VC (two of two samples). All other sampling results were within the outdoor air concentration ranges (MMEC 2015).

2017: Four indoor air samples (including two duplicates) were collected in Building 107, with the HVAC system operating (two samples) and off (two samples). Indoor air samples were collected on January 16, 2017 with the HVAC system off and January 17, 2017 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 555 ambient air concentration range, as Building 555 is the closest building with ambient air samples. Indoor air concentrations exceeding the ambient air concentration level at Building 555 included PCE (3 of 4 – 1 sample with HVAC off, 2 samples with HVAC on), trans-1,2-DCE (3 of 4 – 1 sample with HVAC off, 2 samples with HVAC on), and 1,1-DCA (2 of 4 – 2 samples with HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.058 to 0.082 μg/m^3 and 0.048 to 0.11 μg/m^3, respectively. TCE and PCE were measured in ambient air at Building 555 at concentrations ranging from 0.063 to 0.23 μg/m^3 and 0.032J to 0.057 μg/m^3, respectively.

2018: Four indoor air samples were collected in Building 107, with the HVAC system operating (two samples) and off (two samples). Indoor air samples were collected on January 8, 2017 with the HVAC system on and January 15, 2017 and with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 555 ambient air concentration range, as Building 555 is the closest building with ambient air samples. Indoor air concentrations exceeding the ambient air concentration level at Building 555 included PCE (two of four – two samples with HVAC on); and trans-1,2-DCE (two of four – two samples with HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.062 to 0.083 $\mu g/m^3$ and 0.059 to 0.069 $\mu g/m^3$, respectively. TCE and PCE were measured in ambient air at Building 555 at concentrations ranging from 0.097 to 0.2 $\mu g/m^3$ and 0.046J to 0.17 $\mu g/m^3$, respectively.

2.13.1.1 June 2018 ECD Screening

Six discrete ECD samples were collected from Building 107 with the HVAC on. All of the six samples were collected from potential vapor intrusion pathway locations. ECD samples were collected from sub slab monitoring points and potential vapor intrusion conduits and pipes identified in *Environmental Technology Verification Report* (EPA 2011). All ECD samples collected were non-detect for PCE and TCE.

2.14 BUILDING 126 - PREVIOUS SAMPLING RESULTS BUILDING 126

2008–2009: Five indoor air samples were collected in March 2009 in Building 126. TCE was measured at concentrations ranging from 2.869 to 5.729 $\mu g/m^3$ (NASA 2012). Indoor air samples were also collected in February and May 2008 in Building 126 (Neptune 2008, 2009). In May 2008, TCE and PCE were reported in indoor air samples at concentrations ranging from 4.606 to 6.647 $\mu g/m^3$ and 3.645 to 4.898 $\mu g/m^3$, respectively (Neptune 2009). February 2008 sampling results for TCE and PCE were higher than May 2008 sampling results possibly due to open windows and doors providing better ventilation during the warmer May 2008 event (Neptune 2009).

2012: A total of 11 indoor air samples (including one duplicate) were collected in May 2012 from five sampling locations with the HVAC system operating and with the HVAC system off in Building 126. Only PCE was detected at a concentration exceeding its indoor air cleanup level at four locations (out of five) with both the HVAC system operating and shut down. All other detected COC (TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, 1,1-DCA, and VC) concentrations were significantly lower than the EPA's indoor air cleanup levels. Detected COC concentrations exceeding the outdoor air concentration ranges included TCE (11 of 11 samples), cis-1,2-DCE (two of 11 samples), trans-1,2-DCE (5 of 11 – only samples with HVAC system off), 1,1-DCA (three of 11 samples), and VC (one of 11 samples) (AM8AJV 2014a).

2014: Nine indoor air samples (including one duplicate) were collected from four sampling locations with the HVAC system operating and with the HVAC system off in Building 126. Two

outdoor air samples were also collected just outside Building 126. Indoor air samples were collected on February 12, 2014, with the HVAC system operating and on February 18, 2014, with the HVAC system off. PCE was detected at concentrations exceeding its indoor air cleanup level for samples at three of four locations with both the HVAC system operating and off. TCE was detected at a concentration slightly exceeding its indoor air cleanup level for only one sample (14M126-1-05-N) with the HVAC system operating. All other detected COC (cis-1,2-DCE, 1,1-DCA, trans-1,2-DCE, 1,1-DCE, and VC) concentrations were significantly lower than the EPA's indoor air cleanup levels. TCE concentrations exceeded the TCE outdoor air concentration range for all the samples with the HVAC system operating and shut down. Detected COC concentrations exceeding the outdoor air concentration ranges also included trans-1,2-DCE (one of nine samples – with HVAC system operating), 1,1-DCA (four of nine samples), and VC (five of nine samples). PCE and TCE were measured in indoor air at concentrations ranging from 1.7 to 6.5 $\mu g/m^3$ and 1.3 to 5.8 $\mu g/m^3$, respectively, in Building 126.

2016: Nine indoor air samples (including one duplicate) were collected from four sampling locations with the HVAC system operating and with the HVAC system off in Building 126. Two outdoor air samples were also collected just outside Building 126. Indoor air samples were collected on January 13, 2016, with the HVAC system operating and on January 19, 2016, with the HVAC system off. PCE concentrations exceeded the EPA's indoor air cleanup levels for six of nine samples (HVAC both on and off). With the HVAC shut down, PCE concentrations ranged from 4.9 to 8.9 $\mu g/m^3$. With the HVAC system on, PCE concentrations ranged from 1.4 to 9.7 $\mu g/m^3$. VC concentrations exceeded the indoor air cleanup level for one of nine samples (collected with the HVAC off). The rest of the COC concentrations were below their respective EPA's indoor air cleanup levels. With the HVAC system in operation, the following COCs were detected at concentrations above their outdoor air concentrations: PCE (four of four samples), TCE (four of four samples), cis-1,2-DCE (four of four samples), trans-1,2-DCE (three of four samples), 1,1-DCE (two of four samples), 1,1-DCA (four of four samples), and VC (four of four samples). With the HVAC system shut off, all COCs were detected at concentrations above their outdoor air concentration ranges for all five samples (including one duplicate sample) (MMEC 2015).

2017: Nine indoor air samples (including one duplicate) were collected in Building 126, with the HVAC system operating (five samples) and off (four samples). Two ambient air samples (24-hour duration) were collected near Building 16. Indoor air samples were collected on January 17, 2017 with the HVAC system off and January 11, 2017 and with the HVAC system on. TCE concentrations exceeded the EPA's indoor air cleanup levels for eight of nine samples (4 samples with HVAC off, 4 samples with HVAC on). With the HVAC shut down, TCE concentrations ranged from 5.3 to 24 $\mu g/m^3$. With the HVAC system on, TCE concentrations ranged from 2.6 to 19 $\mu g/m^3$. PCE concentrations exceeded the EPA's indoor air cleanup levels for nine of nine samples. With the HVAC shut down, PCE concentrations ranged from 11 to 56 $\mu g/m^3$. With the HVAC system on, PCE concentrations ranged from 5.4 to 41 $\mu g/m^3$. VC concentrations exceeded the indoor air cleanup level for two of nine samples (2 samples with HVAC off). With the HVAC

shut down, VC concentrations ranged from 0.45 to 2.4 μg/m^3. With the HVAC system on, VC concentrations ranged from 0.20 to 1.3 μg/m^3. The rest of the COC concentrations were below their respective EPA's indoor air cleanup levels. All COCs were detected at concentrations above their ambient air concentrations levels with the HVAC on and the HVAC off.

2018: Nine indoor air samples (including one duplicate) were collected in Building 126, with the HVAC system operating (five samples) and off (four samples). Two ambient air samples (24-hour duration) were collected near Building 126. Indoor air samples were collected on January 16, 2018 with the HVAC system off and January 10, 2018 and with the HVAC system on. TCE concentrations exceeded the EPA's indoor air cleanup levels for three of nine samples (three samples with HVAC off). With the HVAC shut down, TCE concentrations ranged from 4.1 to 11 μg/m^3. With the HVAC system on, TCE concentrations ranged from 0.41 to 1.4 μg/m^3. PCE concentrations exceeded the EPA's indoor air cleanup levels for five of nine samples. With the HVAC shut down, PCE concentrations ranged from 6.7 to 20 μg/m^3. With the HVAC system on, PCE concentrations ranged from 0.53 to 2.6 μg/m^3. The rest of the COC concentrations were below their respective EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration level at Building 126 included TCE (eight of nine – four samples with HVAC off, four samples with HVAC on); PCE (eight of nine – four samples with HVAC off, four samples with HVAC on); trans-1,2-DCE (four of nine, four samples with HVAC off); cis-1,2-DCE (five of nine – four samples with HVAC off, one sample with HVAC on); 1,1-DCE (seven of nine – four samples with HVAC off, three samples with HVAC on); 1,1,-DCA (six of nine – three samples with HVAC off, three samples with HVAC on); and VC (four of nine – four samples with HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.41 to 11 μg/m^3 and 0.53 to 20 μg/m^3, respectively. TCE and PCE were measured in ambient air at concentrations ranging from 0.28 to 0.44 μg/m^3 and 0.47 to 0.69 μg/m^3, respectively.

2.15 BUILDING 510 - PREVIOUS SAMPLING RESULTS BUILDING 510

2008: One indoor air sample was collected in February 2008 at Building 510. TCE was measured at a concentration below the detection limit, and PCE was detected at a concentration of 0.264 μg/m^3 (Neptune 2008).

2012: Seven indoor air samples (including one duplicate) were collected in May 2012 from Building 510 with the HVAC system operating and shut down. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and off. The PCE concentration exceeded the outdoor air concentration range for only one sample (0.52 μg/m^3) collected with the HVAC system operating. None of the other COCs were detected at concentrations exceeding their outdoor air concentration ranges at Building 510.

2014: Two indoor air samples were collected in Building 510 on February 13, 2014, with the HVAC system operating, and two indoor air samples were collected on February 17, 2014, with the HVAC system off. Two outdoor air samples were collected outside Building 510 in the same 24-hour period as the indoor air samples. All sampling results were below EPA's indoor air cleanup levels and were within the outdoor concentration ranges with both the HVAC system operating and off. TCE and PCE were measured in indoor air at concentrations ranging from 0.10 to 0.19 $\mu g/m^3$ and 0.055 to 0.075 $\mu g/m^3$, respectively.

2016: Two indoor air samples were collected in Building 510 on January 13, 2016, with the HVAC system operating, and two indoor air samples were collected on January 17, 2016, with the HVAC system off. Two outdoor air samples were collected outside Building 510 in the same 24 hour period as the indoor air samples. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and off. TCE and PCE were measured in indoor air at concentrations ranging from 0.084 to 0.1 $\mu g/m^3$ and 0.031J to 0.088 $\mu g/m^3$, respectively. TCE concentrations exceeded the outdoor air concentration range with the HVAC in operation and off (four of four samples). PCE concentrations exceeded the outdoor air concentration range with the HVAC system off (one of two samples). The only other detected COC concentration that exceeded its outdoor air concentration range was trans-1,2-DCE when the HVAC system was on (two of two samples) (MMEC 2015).

2017: Four indoor air samples were collected in Building 510, with the HVAC system operating (two samples) and off (two samples). Two ambient air samples (24-hour duration) were collected near Building 510. Indoor air samples were collected on January 18, 2017 with the HVAC system off and January 15, 2017 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (2 of 4 – both samples with HVAC off) and trans-1,2-DCE (1 of 4 – both samples with HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.060 to 0.19 $\mu g/m^3$ and 0.053 to 0.060 $\mu g/m^3$, respectively. TCE and PCE were measured in ambient air at concentrations ranging from 0.037 to 0.12 $\mu g/m^3$ and 0.052 to 0.061 $\mu g/m^3$, respectively.

2018: Four indoor air samples were collected in Building 510, with the HVAC system operating (two samples) and off (two samples). Two ambient air samples (24-hour duration) were collected near Building 510. Indoor air samples were collected on January 14, 2018 with the HVAC system off and January 16, 2018 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included trans-1,2-DCE (three of four – two samples with HVAC off, one sample with HVAC on); and 1,1-DCA (one of four – one sample with HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.088 to 0.35 $\mu g/m^3$ and 0.088 to 0.42 $\mu g/m^3$, respectively. TCE and PCE were measured in ambient air at concentrations ranging from 0.15 to 0.36 $\mu g/m^3$ and 0.11 to 0.55 $\mu g/m^3$, respectively.

2.16 BUILDING 555 - PREVIOUS SAMPLING RESULTS BUILDING 555

2012: Six indoor air samples were collected in May 2012 from Building 555 with the HVAC system operating and off. All sampling results were below the EPA's indoor air cleanup levels. TCE and VC concentrations exceeded the outdoor air concentration ranges for samples collected with the HVAC system off. TCE was detected in indoor air at concentrations ranging from 0.17 to 1.3 $\mu g/m^3$.

2014: Three indoor air samples (including one duplicate) were collected from Building 555 with the HVAC system operating, and two samples were collected with the HVAC system off. Two outdoor air samples were collected during each indoor air sampling event. Indoor and outdoor air samples were collected on February 12, 2014, with the HVAC system operating and on February 16, 2014, with the HVAC system off. All sampling results were below the EPA's indoor air cleanup levels. Only TCE concentrations exceeded the outdoor air concentration ranges for two samples collected with the HVAC system off. None of the other COCs were detected at concentrations exceeding their outdoor air concentration ranges at Building 555. TCE was detected in indoor air at concentrations ranging from 0.13 to 0.46 $\mu g/m^3$.

2016: Three indoor air samples (including one duplicate) were collected from Building 555 with the HVAC system operating, and two samples were collected with the HVAC system off. One outdoor air sample was collected during each indoor air sampling event, for a total of two outdoor air samples. Indoor and outdoor air samples were collected on January 13, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. All sampling results were below the EPA's indoor air cleanup levels. With the HVAC system operating, the following COCs were found at concentrations above their outdoor air concentrations: TCE (two of three samples) and 1,1-DCA (two of three samples). With the HVAC system off, the following COCs were found at concentrations above their outdoor air concentrations: TCE (two of two samples) and 1,1-DCA (one of two samples). TCE and PCE were detected in indoor air at concentrations ranging from 0.56 to 0.14 $\mu g/m^3$ and 0.024J to 0.31J $\mu g/m^3$, respectively, in Building 555 (MMEC 2015).

2017: Five indoor air samples (including one duplicate) were collected in Building 555, with the HVAC system operating (three samples) and off (two samples). Two ambient air samples (24-hour duration) were collected near Building 555. Indoor air and ambient air samples were collected on January 16, 2017 with the HVAC system off and January 18, 2017 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (2 of 5 – 2 samples with HVAC off), PCE (4 of 5 – 2 samples with HVAC off, 2 samples with HVAC on), cis-1,2-DCE (4 of 5 – 2 samples with HVAC off, 2 samples with HVAC on), trans-1,2-DCE (2 of 5 – 2 samples with HVAC off), 1,1-DCE (1 of 5 – 1 sample with HVAC off), 1,1-DCA (4 of 5 – 2 samples with HVAC off, 2 samples with HVAC on), and VC (2 of 5 – 2 samples with HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.16J to 0.86 $\mu g/m^3$ and 0.059 to 0.13 $\mu g/m^3$, respectively.

2018: Five indoor air samples (including one duplicate) were collected in Building 555, with the HVAC system operating (three samples) and off (two samples). Two ambient air samples (24-hour duration) were collected near Building 555. Indoor air and ambient air samples were collected on January 15, 2018 with the HVAC system off and January 8, 2018 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (two of five – two samples with HVAC off); PCE (three of five – three samples with HVAC on); cis-1,2-DCE (two of five – two samples with HVAC on); trans-1,2-DCE (three of five – three samples with HVAC on); 1,1-DCA (one of five – one sample with HVAC off); and VC (two of five – two samples with HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.085 to 0.58 $\mu g/m^3$ and 0.05J to 0.1 $\mu g/m^3$, respectively.

2.17 BUILDING 566 - PREVIOUS SAMPLING RESULTS - BUILDING 566

2009: Five indoor air samples were collected during the air sampling event conducted in March 2009 in Building 566. TCE was measured at concentrations ranging from 0.0335 to 1.15 $\mu g/m^3$ (NASA 2012).

2012: Three indoor air samples were collected in May 2012 from Building 566 with the HVAC system operating, and three samples were collected with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels and were within the outdoor air concentration ranges with both the HVAC system operating and off. TCE was detected in indoor air at concentrations ranging from 0.012 to 0.097 $\mu g/m^3$ in Building 566.

2013: Soil gas and groundwater samples collected in 2013 to support vapor intrusion tier response evaluation in areas adjacent to Building 566 did not indicate any potential for COC concentrations resulting from vapor intrusion to exceed the EPA's indoor air cleanup levels in Building 566 (AM8AJV 2014c). Soil gas and groundwater sampling in areas adjacent to Building 566 provided additional lines of evidence to evaluate the feasibility of a Tier 4 (no further action) ranking, because indoor air sampling results from 2012 were significantly below EPA's indoor air cleanup levels and within outdoor air concentration ranges at Building 566.

2014: Two indoor air samples were collected from Building 566 with the HVAC system operating, and two samples were collected with the HVAC system off. No outdoor air samples were collected outside Building 566. Indoor air samples were collected on February 11, 2014, with the HVAC system operating and on February 16, 2014, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels and were within outdoor air concentration ranges with both the HVAC system operating and off. None of the COCs were detected at concentrations exceeding their outdoor air concentration ranges at Building 566. TCE was detected in indoor air at concentrations ranging from 0.043 to 0.16 $\mu g/m^3$ in Building 566.

2016: Two indoor air samples were collected from Building 566 with the HVAC system operating, and two samples were collected with the HVAC system off. No outdoor air samples were collected outside Building 566. Indoor air samples were collected on January 12, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. All sampling results were significantly below EPA's indoor air cleanup levels. The only COC detected at concentrations exceeding its overall outdoor air concentration range was trans-1,2-DCE, which was detected at 0.06 and 0.067 $\mu g/m^3$ when the HVAC system was operating. No other COCs were detected at concentrations exceeding the overall outdoor air concentration ranges at Building 566 (MMEC 2015).

2017: Four indoor air samples were collected in Building 566, with the HVAC system operating (two samples) and off (two samples). Indoor air samples were collected on January 16, 2017 with the HVAC system off and January 9, 2017 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 29 ambient air concentration levels, as Building 29 is the closest building with an ambient air sample. All COCs in indoor air were below the ambient air concentration range for Building 29. TCE and PCE were measured in indoor air at concentrations ranging from 0.14 to 0.17 $\mu g/m^3$ and 0.039 to 0.047 $\mu g/m^3$, respectively.

2018: Four indoor air samples were collected in Building 566, with the HVAC system operating (two samples) and off (two samples). Indoor air samples were collected on January 15, 2018 with the HVAC system off and January 8, 2018 and with the HVAC system on. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. COCs in indoor air were compared to Building 16 ambient air concentration levels, as Building 16 is the closest building with an ambient air sample. Indoor air concentrations exceeding the ambient air concentration range included TCE (one of four – one sample with HVAC off), and 1,1-DCA (two of four – two samples with HVAC off). All other samples had COC concentrations that were below the EPA's indoor air cleanup level. TCE and PCE were measured in indoor air at concentrations ranging from 0.14 to 0.23 $\mu g/m^3$ and 0.052 to 0.14 $\mu g/m^3$, respectively.

2.18 BUILDING 567 - PREVIOUS SAMPLING RESULTS - BUILDING 567

2012: Three indoor air samples were collected in Building 567 on May 21, 2012. All sampling results were below EPA's indoor air cleanup levels for all COCs. TCE and PCE were detected at concentrations exceeding their respective outdoor air concentration ranges in all samples, and 1,1-DCA was detected at a concentration exceeding its outdoor air concentration range in one sample. TCE and PCE were measured in indoor air at concentrations ranging from 1.2 to 3.9 $\mu g/m^3$ and 0.22 to 0.75 $\mu g/m^3$, respectively, in Building 567.

2014: Four indoor air samples (including one duplicate) were collected in Building 567 on February 18, 2014. One outdoor air sample was collected outside Building 567. All sampling results were below EPA's indoor air cleanup levels for all COCs. TCE and 1,1-DCA were detected

at concentrations exceeding their respective outdoor air concentration ranges in all of the samples. TCE and PCE were measured in indoor air at concentrations ranging from 1.8 to 3.6 μg/m^3 and 0.053 to 0.064 μg/m^3, respectively, in Building 567.

2016: Three indoor air samples were collected in Building 567 on January 12, 2016. One outdoor air sample was collected outside Building 567. TCE was detected in one sample from Room 102 (16M567-1-02) at a concentration exceeding the indoor air cleanup level. No other COC exceeded the EPA's indoor air cleanup levels. PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE and 1,1-DCA were detected at concentrations exceeding their respective outdoor air concentration ranges for all samples. TCE and PCE were measured in indoor air at concentrations ranging from 3.0 to 5.3 μg/m^3 and 0.1 to 0.12 μg/m^3, respectively, in Building 567 (MMEC 2015).

2017: Three indoor air samples were collected at Building 567. One ambient air sample (24-hour duration) was collected near Building 567. Indoor and ambient air samples were collected on January 11, 2017. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration level included TCE (three of three samples), PCE (three of three samples), cis-1,2-DCE (three of three samples), trans-1,2-DCE (two of three samples), 1,1-DCA (three of three samples), and 1,1-DCE (three of three samples). VC was not detected at concentrations exceeding the ambient air concentration level at Building 567. TCE and PCE were measured in indoor air at concentrations ranging from 1.4 to 2.7 μg/m^3 and 0.066 to 0.075 μg/m^3, respectively.

2018: Three indoor air samples were collected at Building 567. One ambient air sample (24-hour duration) was collected near Building 567. Indoor and ambient air samples were collected on January 10, 2018. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration level included TCE (three of three samples); cis-1,2-DCE (three of three samples); 1,1-DCA (three of three samples); and 1,1-DCE (three of three samples). PCE, trans-1,2-DCE; and VC were not detected at concentrations exceeding the ambient air concentration level at Building 567. TCE and PCE were measured in indoor air at concentrations ranging from 2.9 to 3.6 μg/m^3 and 0.052 to 0.054 μg/m^3, respectively.

2.18.1.1 June 2018 ECD Screening

Twenty-one discrete ECD samples were collected from Building 567. Of the twenty-one sample locations, fourteen were indoor air samples and seven were potential vapor intrusion pathway samples. Based on the results of the discrete ECD sampling, continuous ECD monitoring was conducted at two potential vapor intrusion pathway locations and four indoor air locations. TCE was detected at a concentration exceeding the industrial/commercial indoor air cleanup level of 5 μg/m^3 in two discrete indoor air ECD samples collected in Room 101 and three discrete vapor intrusion pathway (expansion joint) samples in Room 101.

During continuous ECD monitoring, TCE was detected at concentrations exceeding 5 µg/m^3 in two of two vapor intrusion pathway sampling locations (expansion joints) and three of four indoor air sampling locations. Pressure monitors were set up on the bay doors on the building to determine if the doors were open or closed during continuous monitoring. A correlation was seen between the time of day the bay doors were open and decreased TCE concentrations in indoor air in Room 101. Temporal trends of the indoor air samples indicate that on a time-weighted-average the concentration of TCE would be below the indoor air cleanup level as the concentrations of COCs are dependent on whether or not the bay doors are open.

2.19 BUILDING N210 - PREVIOUS SAMPLING RESULTS - BUILDING N210

2009: In 40 indoor air samples collected in March 2009 at Building N210, TCE was measured at concentrations ranging from 0.034 to 0.505 µg/m^3 (NASA 2012).

2012: A total of 18 indoor air samples (including three duplicates and four pathway samples) were collected with the HVAC system off, from two floors, including the crawl space beneath the raised floor, at Building N210. All sampling results were below EPA's indoor air cleanup levels except for results of one pathway sample (N210-1-11-F) collected from the space beneath the raised floor in the work area of Room 145 near cubicles 019 and 021, where TCE was detected at a concentration of 17 µg/m^3. TCE was detected in indoor air for work area samples at concentrations ranging from 0.14 to 1.7 µg/m^3 at Building N210 (AM8AJV 2014a).

2014: A total of 12 indoor air samples (including 1 duplicate and 3 pathway samples) were collected with the HVAC system off on February 16, 2014. Samples were collected from the first floor, including the crawl space beneath the raised floor. One outdoor air sample (14M210-A-01-F) was collected immediately outside Building N210.

All sampling results were below EPA's indoor air cleanup levels except for results of one pathway sample (14N210-C-11-F) collected from the crawl space beneath the raised floor in the work area of Room 145 near the vapor extraction system location with the HVAC system off. In this sample, TCE was detected at a concentration of 40 µg/m^3. A vapor extraction system is used to capture the vapors beneath the raised floor area under normal building operations; the vapor extraction system was turned off for at least 24 hours prior to collection of the samples. All other detected COC (PCE, cis-1,2-DCE, 1,1-DCA, trans-1,2-DCE, 1,1-DCE, and VC) concentrations were significantly lower than the EPA's indoor air cleanup levels. All work area sampling results were below EPA's indoor air cleanup levels. TCE was detected in indoor air for work area samples at concentrations ranging from 0.38 to 1.2 µg/m^3 in Building N210. PCE (two of 12 samples), TCE (11 of 12 samples), cis-1,2-DCE (one of 12 samples), trans-1,2-DCE (one of 12 samples), 1,1-DCE (one of 12 samples), and 1,1-DCA (one of 12 samples) were detected at concentrations slightly above their respective outdoor air concentration ranges.

2016: A total of 11 indoor air samples (including one duplicate and three pathway samples, one of which was a grab sample) were collected from the first floor, including the crawl space beneath the raised floor, with the HVAC system off. One outdoor air sample (16N210-A-01-F) was collected immediately outside Building N210. Samples were not collected with the HVAC system operating. All sampling results were below EPA's indoor air cleanup levels except for results of one pathway sample (16N210-C-11-F) collected from the crawl space beneath the raised floor in the work area of Room 145 near the vapor extraction system location with the HVAC system off. In this sample, TCE was detected at a concentration of 9.7 µg/m^3. A vapor extraction system is used to capture the vapors beneath the raised floor area under normal building operations; the vapor extraction system was turned off for at least 24 hours prior to collection of the samples. All other detected COC concentrations were significantly lower than the EPA's indoor air cleanup levels. All work area sampling results were below EPA's indoor air cleanup levels. TCE was detected in indoor air for work area samples at concentrations ranging from 1.0 to 2.5 µg/m^3 in Building N210. At work area and pathway sampling locations, the following COCs were detected at concentrations above their respective outdoor air concentrations: PCE (10 of 11 samples), TCE (11 of 11 samples), cis-1,2-DCE (10 of 11 samples), trans-1,2-DCE (two of 11 samples), and 1,1-DCE (nine of 11 samples) (MMEC 2015).

2017: Ten indoor air samples (including one duplicate and two pathway samples, one of which was a grab sample) were collected at Building N210 with the HVAC system off. One ambient air samples of 24-hour duration was collected near Building N210. Indoor and outdoor air samples were collected on January, 16, 2017. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. One pathway sample (17N210-C-11-F) collected from the crawl space beneath the raised floor in the work area of Room 145, near the vapor extraction system, exceeded the EPA's indoor air cleanup level at a concentration of 95 µg/m^3. Historically, this concentration has ranged from 9.7 µg/m^3 during the 2016 event to 40 µg/m^3 during the 2014 air sampling event. A vapor extraction system is used to capture the vapors beneath the raised floor area under normal building operations; the vapor extraction system was turned off for at least 24 hours prior to collection of the samples. All other samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration levels included TCE (10 of 10 samples), PCE (three of 10 samples), cis-1,2-DCE (nine of 10 samples), trans-1,2-DCE (two of 10 samples), 1,1-DCE (three of 10 samples), 1,1-DCA (six of 10 samples), and VC (two of 10 samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.29 to 1.3 µg/m^3 and 0.041J to 0.85 µg/m^3, respectively.

2018: Sixteen indoor air samples were collected from Building N210, with HVAC off (14 samples including one duplicate and three pathway samples, one of which was a grab sample) and with HVAC on (two samples, including one pathway sample). One ambient air sample of 24-hour duration was collected near Building N210. Indoor air samples were collected on January 15, 2018. Confirmation samples were collected February 19, 2018 with the HVAC off, and February 21, 2018 with the HVAC on. All indoor air samples collected during the January 2018 event had COC

concentrations that were below the EPA's indoor air cleanup levels. Pathway sample 18N210-C-11-F collected in the crawlspace under Room 145 had a TCE concentration of 100 µg/m^3, exceeding the EPA's indoor air cleanup level. The EPA noted that since there is no indoor air sample in the vicinity of the pathway sample 18N210-C-11-F, the concentrations of COCs detected in the crawlspace would have to be assumed to be in the indoor air.

Confirmation samples were collected from the crawlspace and indoor air immediately over the crawlspace with the HVAC on and HVAC off. TCE concentrations from confirmation pathway samples in the crawlspace were 60 µg/m^3 with the HVAC off and 46 µg/m^3 with the HVAC on. TCE concentrations from confirmation samples in the indoor air over the crawlspace pathway locations were 2.6 µg/m^3 with the HVAC off and 0.06 µg/m^3 with the HVAC on. TCE concentrations in indoor air were 95 percent lower than in the pathway with the HVAC off and 99 percent lower than in the pathway with the HVAC on. All other samples collected, including two samples taken in Room 008 above the crawlspace (with HVAC on and off), had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration levels included TCE (15 of 16 samples); PCE (four of 16 samples); cis-1,2-DCE (13 of 16 samples); trans-1,2-DCE (12 of 16 samples); 1,1-DCE (12 of 16 samples); 1,1-DCA (14 of 16 samples); and VC (10 of 16 samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.082 to 2.6 µg/m^3 and 0.035J to 0.86 µg/m^3, respectively.

2.19.1.1 June 2018 ECD Screening

Twelve discrete ECD samples were collected from Building N210 with the HVAC system operating (six samples) and with the HVAC system off (six samples). Of the 12 sample locations, three were indoor air samples and nine were potential vapor intrusion pathway samples. TCE was detected at concentrations exceeding the industrial/commercial indoor air cleanup level of 5 µg/m^3 in three discrete ECD samples collected from the crawlspace under Room 008 and one discrete ECD sample collected from the crawlspace under Room 004. Concentrations of TCE in ECD samples collected from the crawlspace were an order of magnitude lower than TCE concentrations seen in Summa samples. It is believed that lifting the floor tiles dissipated crawlspace vapors and discrete ECD samples do not accurately capture the condition of the crawlspace as a time-weighted-average Summa can with the floor tiles closed.

Because discrete ECD sampling was determined to be a less effective way of measuring the crawlspace vapors, Summa canisters were placed in the crawlspace under Rooms 008 and 040 with the HVAC operation and off. Samples 18N210-C-11-18Q2-F and 18N210-C-11-18Q2-N (near the intake of the crawlspace blower) had TCE concentrations of 25 µg/m^3 and 65 µg/m^3, respectively. Samples 18N210-C-13-18Q2-F and 18N210-C-13-18Q2-N (away from the intake of the crawlspace blower) had TCE concentrations of 25 µg/m^3 and 4.9 µg/m^3, respectively. It appears with the crawlspace blower on, TCE concentrations are drawing towards the intake as compared

to when the crawlspace blower is off and TCE concentrations are relatively consistent across the crawlspace.

2.20 BUILDING N239 - PREVIOUS SAMPLING RESULTS - BUILDING N239

2012: A total of 47 indoor air samples (including 3 duplicates) were collected in May 2012 from the four floors and basement of Building N239 with the HVAC system operating and off. Two outdoor air samples (24-hour duration) were collected immediately outside Building N239. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and shut down. TCE and PCE were measured in indoor air at concentrations ranging from 0.0077 to 3.8 µg/m^3 and 0.021 to 0.94 µg/m^3, respectively, for work area samples at Building N239. TCE was detected at concentrations exceeding the outdoor air concentration range for five samples collected in the basement and one sample each collected on the second and third floors with the HVAC system off. TCE was not detected at concentrations exceeding the outdoor air concentration range in any samples collected with the HVAC system operating. PCE was detected at concentrations exceeding the outdoor air concentration range for four samples (two samples from one basement location with the HVAC system both on and off, and one sample each collected on the first and third floors with the HVAC system shut down).

2014: A total of 21 indoor air samples (including two duplicates and one grab pathway sample) were collected from the first floor and basement of Building N239 with the HVAC system operating and off. Two outdoor air samples (24-hour duration) were collected immediately outside Building N239. Indoor air and outdoor air samples were collected on February 14, 2014, with the HVAC system operating and on February 17, 2014, with the HVAC system off. One grab pathway sample was collected on February 16, 2014, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and off, except for one basement sample (14239-B-01-F) where the TCE concentration (5.8 µg/m^3) slightly exceeded its indoor air cleanup level. The concentration of TCE in the sample from this location with the HVAC system on was well below the indoor air cleanup level. TCE was detected at concentrations exceeding the outdoor air concentration range for four samples collected in the basement with the HVAC system off. TCE was not detected at concentrations exceeding the outdoor air concentration range in any of the samples collected with the HVAC system operating. PCE was detected at concentrations exceeding the outdoor air concentration range in three samples collected in the basement with the HVAC system off. All other detected COC (cis-1,2-DCE, trans-1,2-DCE, VC, 1,1-DCA, and 1,1-DCE) concentrations exceeded their outdoor air concentration ranges for only one sample (14239-B-01-F) collected in the basement. TCE and PCE were measured in indoor air at concentrations ranging from 0.029J to 0.26 µg/m^3 and 0.027J to 0.063 µg/m^3, respectively, for work area samples in Building N239. TCE and PCE were detected in basement samples at concentrations ranging from 0.025J to 5.8 µg/m^3 and 0.025J to 0.33 µg/m^3, respectively, in Building N239.

2016: A total of 21 indoor air samples (including two duplicates and one grab pathway sample) were collected from the first floor and basement of Building N239 with the HVAC system operating and off. Two outdoor air samples (24-hour duration) were collected immediately outside Building N239. Indoor air and outdoor air samples were collected on January 14, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. One grab pathway sample was collected on January 17, 2016, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and off. With the HVAC system in operation the following COCs were found at concentrations above their outdoor air concentration ranges: PCE (three of 10 samples), TCE (nine of 10 samples), cis-1,2-DCE (10 of 10 samples), 1,1-DCA (one of 10 samples), and trans-1,2-DCE (seven of 10 samples). With the HVAC system off, the following COCs were detected at concentrations above their outdoor air concentration ranges: PCE (three of 11 samples), TCE (11 of 11 samples), cis-1,2-DCE (10 of 11 samples), trans-1,2-DCE (seven of 11 samples), 1,1-DCE (two of 11 samples), 1,1-DCA (eight of 11 samples), and VC (two of 11 samples). TCE and PCE were detected in indoor air at concentrations ranging from 0.092 to 2.1 $\mu g/m^3$ and 0.026J to 0.15 $\mu g/m^3$, respectively, for samples in Building N239.

2017: Twenty-one indoor air samples (including two duplicate and one grab pathway samples) were collected at Building N239 with the HVAC system operating (ten samples) and with the HVAC system off (eleven samples). Two ambient air samples of 24-hour duration were collected outside Building N239. Indoor air samples were collected on January, 12, 2017, with the HVAC system operating and on January 15, 2017, with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels, except for one basement sample (17N239-B-01-F) where the TCE concentration (11 $\mu g/m^3$) exceeded its EPA's indoor air cleanup level with the HVAC system off. The concentration of TCE in the sample from this location with the HVAC system on (17N239-B-01-N) was below the indoor air cleanup level (0.14 $\mu g/m^3$). Indoor air concentrations exceeding the ambient air concentration ranges included TCE (20 of 21 – 9 samples with HVAC off, 11 samples with HVAC on), PCE (13 of 21 – 11 samples with HVAC off, 2 samples with HVAC on), cis-1,2-DCE (20 of 21 – 11 samples with HVAC off, 9 samples with HVAC on), trans-1,2-DCE (9 of 21 – 9 samples with HVAC off), 1,1-DCE (8 of 21 – 8 samples with HVAC off), 1,1-DCA (12 of 21– 9 samples with HVAC off, 3 samples with HVAC on), and VC (8 of 21 – 8 samples with HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.032 to 11 $\mu g/m^3$ and 0.052 to 0.37 $\mu g/m^3$, respectively.

2018: Twenty-seven indoor air samples (including two duplicate and one grab pathway samples) were collected at Building N239 with the HVAC system operating (13 samples) and with the HVAC system off (14 samples). Two ambient air samples of 24-hour duration were collected outside Building N239. Indoor air samples were collected on January 11, 2018 (11 samples), with the HVAC system operating and on January 14, 2018 (12 samples), with the HVAC system off. Confirmation indoor air samples were collected on February 21, 2018 (two confirmation samples), with the HVAC system operating and February 18, 2018 (two confirmation samples), with the

HVAC system off. TCE concentrations exceeded the EPA's indoor air cleanup levels for three of twenty-seven samples (with HVAC off). Of the three samples, two were from the first floor (Rooms C104 and 138S), and one was in the basement (53A). Sample 18N239-1-02-F in Room C104 had a TCE concentration of 10 μg/m^3 and sample 18N239-1-05-F in Room 138S had a TCE concentration of 5.6 μg/m^3.

Historic TCE concentrations of YYN239-1-02-F ranged from 0.042 to 0.87 μg/m^3 and historic TCE concentrations of YYN239-1-05-F range from 0.065 to 0.73 μg/m^3. Because the TCE concentrations from the 2018 sampling event were an order of magnitude higher than the TCE concentrations seen during previous sampling events, confirmation samples were collected in Rooms C104 and 138S. Confirmation samples were collected with the HVAC on and with the HVAC off. Confirmation samples 18N239-1-02-F-R and 18N239-1-02-N-R for Room C104 had TCE concentrations of 0.18 (HVAC off) and 0.074 (HVAC on) μg/m^3 respectively. Confirmation samples 18N239-1-05-F-R and 18N239-1-05-N-R for Room C138S had TCE concentrations of 0.3 (HVAC off) and 0.04 (HVAC on) μg/m^3 respectively. The data collected during the February 2018 confirmation sampling event along with historical data shows that the data collected during the January 2018 are outside the interquartile range and appear to be outliers.

With the HVAC shut down, TCE concentrations ranged from 0.18 to 24 μg/m^3. With the HVAC system on, TCE concentrations ranged from 0.04 to 0.24 μg/m^3. All other COC concentrations were below their respective EPA's indoor air cleanup levels with the HVAC on and HVAC off. Indoor air concentrations exceeding the ambient air concentration level at Building N239 included TCE (25 of 27 – 14 samples with HVAC off, 11 samples with HVAC on); PCE (15 of 27 – 12 samples with HVAC off, three samples with HVAC on); trans-1,2-DCE (14 of 27 – 13 samples with HVAC off, one sample with HVAC on); cis-1,2-DCE (27 of 27 – 14 samples with HVAC off, 13 samples with HVAC on); 1,1-DCE (10 of 27 – 10 samples with HVAC off); 1,1,-DCA (20 of 27 – 12 samples with HVAC off, 8 samples with HVAC on); and VC (10 of 27 –10 samples with HVAC off). TCE and PCE were measured in indoor air at concentrations ranging from 0.0.04 to 24 μg/m^3 and 0.033 to 0.93 μg/m^3, respectively. TCE and PCE were measured in ambient air at concentrations ranging from 0.053 to 0.054 μg/m^3 and 0.06 to 0.11 μg/m^3, respectively.

2.21 BUILDING N239A - PREVIOUS SAMPLING RESULTS - BUILDING N239A

2005: Nine samples were collected from Building N239A during the air sampling event conducted in July 2005. TCE was detected at low concentrations (less than 1.0 μg/m^3) in all samples (Neptune 2006).

2012: A total of 21 indoor air samples (including two duplicates) were collected in May 2012 from the two floors and the basement of Building N239A with the HVAC system operating and off. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and off, except for results of one sample (N239A-1-06-F) collected in Hallway C102 with the HVAC system off, where TCE was detected at a concentration of 6.8 μg/m^3. TCE was

measured in indoor air at concentrations ranging from 0.025 to 6.8 µg/m^3 in Building N239A (AM8AJV 2014a).

2013: A total of 12 indoor air samples (including two duplicates) were collected from Hallway C102 and Utility Rooms U101 and U102 with the HVAC system on and off. These samples were collected to evaluate whether the detection of VOCs in Hallway C102 during the May-June 2012 sampling was due to vapors from floor-level utility conduits in adjacent Rooms U101 and U102. Grab air samples were collected with the HVAC on and off from a floor drain in Room U101 on the same day as the 24-hour samples. TCE was detected at a concentration exceeding the indoor air cleanup level for the grab sample collected in Room U101 and the indoor air sample collected in Room U102 with the HVAC system on. TCE was measured at maximum concentrations of 6.33 and 10 µg/m^3 in Rooms U101 and U102, respectively.

For samples collected in Hallway C102 in May 2013, with both the HVAC system on and off, all results were below EPA's indoor air cleanup levels (in the 2012 sampling event, TCE was detected at concentrations exceeding the indoor air cleanup level) (AM8AJV 2014c).

2014: A total of 16 indoor air samples (including two duplicates and two pathway samples) were collected from the first floor and the basement of Building N239A with the HVAC system operating and off. Indoor air samples were collected on February 14, 2014, with the HVAC system operating and on February 17, 2014, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and off, except for two samples (14N239A-1-10-N and 14N339A-1-10-N) collected in Utility Room U101, and one sample (14N239A-1-06-N) collected in Hallway C102 with the HVAC system operating. In these samples, TCE was detected at concentrations of 40, 39, and 5.6 µg/m^3, respectively. The results for the samples collected from these locations with the HVAC system off were below the TCE indoor air cleanup level. Hallway C102 is adjacent to Rooms U101 and U102 and a door to exit the building. All COCs except PCE were detected at concentrations exceeding their respective outdoor air concentration ranges at this location.

TCE was detected at concentrations exceeding the outdoor air concentration range for 12 samples (out of 18) collected in the building with the HVAC system operating and shut down. PCE was detected at concentrations exceeding the outdoor air concentration range for nine samples (out of 18) collected with the HVAC system off. TCE and PCE were measured in indoor air at concentrations ranging from 0.10 to 40 µg/m^3 and 0.027J to 0.19 µg/m^3, respectively, in Building N239A.

2016: A total of 18 indoor air samples (including two duplicates and two pathway samples) were collected from the first floor and the basement of Building N239A with the HVAC system operating and off. Indoor air samples were collected on January 14, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. All sampling results were below

EPA's indoor air cleanup levels with both the HVAC system operating and off, except two samples (16N239A-1-10-N and its duplicate 16M339A-1-10-N) collected in Utility Room U101, and one sample (16N239A-1-09-N) collected in Room 144 with the HVAC system operating. In these samples, TCE was detected at concentrations of 14, 12, and 8.7 μg/m^3, respectively. TCE was measured in indoor work areas at concentrations ranging from 0.35 to 8.7 μg/m^3 in Building N239A. With the HVAC system operating, the following COCs were found at concentrations above the overall outdoor air concentrations: TCE (eight of eight samples), cis-1,2-DCE (eight of eight samples), trans-1,2-DCE (four of eight samples), 1,1-DCE (seven of eight samples), 1,1-DCA (three of eight samples), and VC (three of eight samples). With the HVAC system off, the following COCs were found at concentrations above the overall outdoor air concentrations: TCE (seven of eight samples), cis-1,2-DCE (seven of eight samples), trans-1,2-DCE (two of eight samples), and 1,1-DCE (five of eight samples) (MMEC 2015).

2017: Eighteen indoor air samples (including two duplicates and two pathway samples) were collected at Building N239A with the HVAC system operating (nine samples) and with the HVAC system off (nine samples). Indoor air samples were collected on January, 10, 2017, with the HVAC system operating and on January 15, 2017, with the HVAC system off.

All sampling results were below the EPA's indoor air cleanup levels with both the HVAC system operating and off, except two samples (17N239A-1-10-N and its duplicate 17M339A-1-10-N) collected in Utility Room U101 with the HVAC system operating, one sample (17N239A-1-06-N) collected in Room C102 with the HVAC system operating, and one sample (17N239A-1-08-F) collected in Room 125 with the HVAC system off. In these samples, TCE was detected at concentrations of 12, 13, 7, and 10 μg/m^3, respectively. TCE and PCE was measured in indoor work areas at concentrations ranging from 0.071 to 13 μg/m^3 and 0.038 to 0.24 μg/m^3 respectively.

COCs in indoor air were compared to Building N243 ambient air concentration ranges, as Building N243 is the closest building with ambient air samples. Indoor air concentrations exceeding the ambient air concentration ranges at Building N243 included TCE (18 of 19 – 9 samples with HVAC off, 9 samples with HVAC on), PCE (9 of 18 – 7 samples with HVAC off, 2 samples with HVAC on), cis-1,2-DCE (17 of 18 – 8 samples with HVAC off, 9 samples with HVAC on), trans-1,2-DCE (2 of 18 – 2 samples with HVAC off), 1,1-DCA (15 of 18 – 6 samples with HVAC off, 9 samples with HVAC on), 1,1-DCE (10 of 18 – 1 sample with HVAC off, 9 samples with HVAC on), and VC (12 of 16 – 3 samples with HVAC off, 9 samples with HVAC on).

2018: Eighteen indoor air samples (including two duplicates and two pathway samples) were collected at Building N239A with the HVAC system operating (nine samples) and with the HVAC system off (nine samples). Indoor air samples were collected on January 11, 2018, with the HVAC system operating and on January 14, 2018, with the HVAC system off. All sampling results were below the EPA's indoor air cleanup levels with both the HVAC system operating and off. COCs in indoor air were compared to Building N243 ambient air concentration ranges, as Building N243

is the closest building with ambient air samples. Indoor air concentrations exceeding the ambient air concentration ranges at Building N243 included TCE (17 of 17 – 8 samples with HVAC off, 9 samples with HVAC on); PCE (15 of 18 – six samples with HVAC off, nine samples with HVAC on); cis-1,2-DCE (17 of 18 – eight samples with HVAC off, nine samples with HVAC on); trans-1,2-DCE (18 of 18 – nine samples with HVAC off, nine samples with HVAC on); 1,1-DCA (seven of 18 – one sample with HVAC off, six samples with HVAC on); and 1,1-DCE (seven of 18 – one sample with HVAC off, six samples with HVAC on); and VC (five of 18 – five samples with HVAC on).

2.22 BUILDING N243 - PREVIOUS SAMPLING RESULTS - BUILDING N243

2004: A total of 31 samples were collected from Building N243 during the air sampling event conducted in March 2004 at Building N243. TCE was measured in indoor air at concentrations ranging from 0.1 to 1.11 $\mu g/m^3$ (NASA 2012).

2012: A total of 33 indoor air samples (including five duplicates) were collected in May 2012 from three floors and the basement of Building N243 with the HVAC system operating and off. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and off. TCE and PCE were measured in indoor air at concentrations ranging from 0.0075 to 1.6 $\mu g/m^3$ and 0.022 to 0.35 $\mu g/m^3$, respectively, in Building N243.

2014: A total of 13 indoor air samples (including one duplicate) were collected from the first floor and basement of Building N243 with the HVAC system operating and off. One outdoor air sample from just outside Building N243 and two samples were collected upwind of the air intake for Building N243 with the HVAC system operating and off. Outdoor/intake air samples were collected along with indoor samples on February 14, 2014, with the HVAC system operating and on February 17, 2014, with the HVAC system off. All sampling results were below EPA's indoor air cleanup levels with both the HVAC system operating and off. TCE was detected at concentrations exceeding the outdoor air concentration range for six samples (out of 13), five of which were collected with the HVAC system off and one with the HVAC system operating. PCE was detected at concentrations exceeding the outdoor air concentration range in three basement samples and two first-floor samples with the HVAC system off. TCE and PCE were measured in indoor air at concentrations ranging from 0.021J to 1.3 $\mu g/m^3$ and 0.027J to 0.40 $\mu g/m^3$, respectively, in Building N243. The maximum concentration of TCE was detected in a basement sample (14N243-B-06-F) collected with the HVAC system shut down.

2016: A total of 13 indoor air samples (including one duplicate) were collected from the first floor and basement of Building N243 with the HVAC system operating and off. One outdoor air sample from just outside Building N243 and two samples upwind of the air intake were collected for Building N243 with the HVAC system operating and off. Outdoor/intake air samples were collected along with indoor samples on January 14, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. All sampling results were below EPA's indoor

air cleanup levels with both the HVAC system operating and off. With the HVAC system operating, the following COCs were detected at concentrations above the outdoor air concentration ranges: PCE (five of five samples), TCE (five of five samples), cis-1,2-DCE (one of five samples), 1,1-DCA (three of five samples), and VC (one of five samples). With the HVAC system off, the following COCs were detected at concentrations above the outdoor air concentration ranges: PCE (seven of eight samples), TCE (seven of eight samples), cis-1,2-DCE (six of eight samples), 1,1-DCA (seven of eight samples), 1,1-DCE (one of eight samples), and VC (six of eight samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.12 to 1.7 $\mu g/m^3$ and 0.054 to 0.87 $\mu g/m^3$, respectively, in Building N243. The maximum concentration of TCE was detected in Room C104, (16N243-1-02-F) collected with the HVAC system off.

2017: Fourteen indoor air samples (including one duplicate) were collected at Building N243 with the HVAC system operating (six samples) and with the HVAC system off (eight samples). Four ambient air samples of 24-hour duration were collected outside Building N243. Indoor air samples were collected on January, 12, 2017, with the HVAC system operating and on January 15, 2017, with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (12 of 14 – 7 samples with HVAC off, 5 samples with HVAC on), PCE (11 of 14 – 7 samples with HVAC off, 4 samples with HVAC on), cis-1,2-DCE (9 of 14 – 7 samples with HVAC off, 2 samples with HVAC on), trans-1,2-DCE (2 of 14 – 2 samples with HVAC off), 1,1-DCE (4 of 14 – 4 samples with HVAC off), 1,1-DCA (10 of 14 – 7 samples with HVAC off, 3 samples with HVAC on), and VC (7 of 14 – 6 samples with HVAC off, 1 sample with HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.030J to 1.9 $\mu g/m^3$ and 0.061 to 1.2 $\mu g/m^3$, respectively.

2018: Fifteen indoor air samples (including two duplicates) were collected at Building N243 with the HVAC system operating (seven samples) and with the HVAC system off (eight samples). Four ambient air samples of 24-hour duration were collected outside Building N243. Indoor air samples were collected on January 11, 2018, with the HVAC system operating and on January 14, 2018, with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (14 of 15 – seven samples with HVAC off, seven samples with HVAC on); PCE (14 of 15 – seven samples with HVAC off, seven samples with HVAC on); cis-1,2-DCE (12 of 15 – eight samples with HVAC off, four samples with HVAC on); trans-1,2-DCE (six of 15 – five samples with HVAC off, one samples with HVAC on); 1,1-DCE (five of 15 – four samples with HVAC off, one sample with HVAC on); 1,1-DCA (eight of 15 – six samples with HVAC off, two samples with HVAC on); and VC (six of 15 – four samples with HVAC off, two samples with HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.041 to 1.5 $\mu g/m^3$ and 0.066 to 1.6 $\mu g/m^3$, respectively.

2.23 BUILDING N243A - PREVIOUS SAMPLING RESULTS

2012: A total of 10 indoor air samples (including two duplicates) were collected in May 2012 from two floors and the basement of Building N243A with the HVAC system operating and off. All sampling results were below the EPA's indoor air cleanup levels with the HVAC system both operating and off. Only PCE was detected at a concentration slightly exceeding the outdoor air concentration range for one sample collected in Room 104 (N243A-1-01-N) with the HVAC system operating (AM8AJV 2014a).

2014: Seven indoor air samples (including one duplicate) were collected from the first floor and basement of Building N243A with the HVAC system operating and off. Two outdoor air samples from just outside Building N243A were collected at the same location with the HVAC system operating and off. Indoor and outdoor air samples were collected on February 14, 2014, with the HVAC system operating and on February 17, 2014, with the HVAC system off. All sampling results were below the EPA's indoor air cleanup levels with the HVAC system both operating and off. 1,1-DCE and 1,1-DCA were detected at concentrations slightly exceeding their outdoor air concentration ranges for one sample collected in the basement (14N243A-B-01-F) with the HVAC system off. VC was detected at a concentration slightly exceeding the outdoor air concentration range for one sample (14N243A-B-01-N) collected in the basement with the HVAC system operating. None of the other COCs, including TCE and PCE, were detected at concentrations exceeding the outdoor air concentration ranges at Building N243A. TCE and PCE were measured in indoor air at concentrations ranging from 0.028 to 0.21 $\mu g/m^3$ and 0.026 to 0.26 $\mu g/m^3$, respectively, in Building N243A.

2016: Seven indoor air samples (including one duplicate) were collected from the first floor and basement of Building N243A with the HVAC system operating and off. Two outdoor air samples from just outside Building N243A were collected at the same location with the HVAC system operating and off. Indoor and outdoor air samples were collected on January 14, 2016, with the HVAC system operating and on January 17, 2016, with the HVAC system off. All sampling results were below the EPA's indoor air cleanup levels with the HVAC system both operating and off. With the HVAC system operating, the following COCs were found at concentrations above their outdoor air concentration ranges: TCE (four of four samples), PCE (two of four samples), cis-1,2-DCE (four of four samples), 1,1-DCA (four of four samples), and 1,1-DCE (one of four samples). With the HVAC system off, the following COCs were found at concentrations above their outdoor air concentration ranges: TCE (three of three samples), PCE (three of three samples), cis-1,2-DCE (three of three samples), 1,1-DCA (three of three samples), trans-1,2-DCE (one of three samples), and 1,1-DCE (three of three samples). TCE and PCE were measured in indoor air at concentrations ranging from 0.17 to 0.43 $\mu g/m^3$ and 0.069 to 0.21 $\mu g/m^3$, respectively, in Building N243A.

2017: Seven indoor air samples (including one duplicate) were collected at Building N243A with the HVAC system operating (three samples) and with the HVAC system off (four samples). Two ambient air samples of 24-hour duration were collected outside Building N243. Indoor air samples

were collected on January, 12, 2017, with the HVAC system operating and on January 15, 2017, with the HVAC system off. All samples collected had COC concentrations that were below the EPA's indoor air cleanup levels. Indoor air concentrations exceeding the ambient air concentration range included TCE (3 of 7 – 3 samples with HVAC off), PCE (6 of 7 – 3 samples with HVAC off, 3 samples with HVAC on), cis-1,2-DCE (6 of 7 – 3 samples with HVAC off, 3 samples with HVAC on), 1,1-DCA (7 of 7 – 3 samples with HVAC off, 4 samples with HVAC on), and VC (2 of 7– 1 sample with HVAC off, 1 samples with HVAC on). No other COCs were detected at concentrations above the overall outdoor air concentration ranges in work areas. TCE and PCE were measured in indoor air at concentrations ranging from 0.068 to 0.12 $\mu g/m^3$ and 0.076 to 0.13 $\mu g/m^3$, respectively.

2018: Six indoor air samples were collected at Building N243A, three samples with the HVAC system operating and three with the HVAC system off. Two ambient air samples of 24-hour duration were collected outside Building N243A. Indoor air samples were collected on January 11, 2018, with the HVAC system operating and on January 14, 2018, with the HVAC system off. PCE was detected exceeding the EPA's indoor air cleanup levels in one sample with the HVAC on, located in Room 104 (18N243A-1-01-N). Historic concentrations in Room 104 range from 0.081 J to 0.26 $\mu g/m^3$. Indoor air concentrations exceeding the ambient air concentration range included TCE (six of six – three samples each with HVAC off and on); PCE (six of six – three samples each with HVAC off and on); cis-1,2-DCE (six of six – three samples each with HVAC off and on); trans-1,2-DCE (5 of 4 – 3 samples with HVAC off, 2 samples with HVAC on); 1,1-DCA (six of six – three samples each with HVAC off and on); 1,1-DCE (5 of 6 – 3 samples with HVAC off and 2 with HVAC on); and VC (one of six, with HVAC on). TCE and PCE were measured in indoor air at concentrations ranging from 0.13 to 0.2 $\mu g/m^3$ and 0.19 to 4.8 $\mu g/m^3$, respectively.

2.23.1.1 June 2018 ECD Screening

Seventeen discrete ECD samples were collected from Building N243A. Of the 17 samples, two were indoor air samples, 12 were potential vapor intrusion pathway samples (inside trenches, electrical conduits, and the basement), and three were potential sources inside the building. PCE was detected at a concentration exceeding the industrial/commercial indoor air cleanup level of 2 $\mu g/m^3$ in one discrete indoor air ECD sample collected in Room 104. All potential vapor intrusion pathway and potential inside source samples collected in Rooms 101 and 104 were non-detect. Two ECD samples collected in the Building N243A basement had PCE concentrations of 1.2 $\mu g/m^3$ and 1.3 $\mu g/m^3$.

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APPENDIX B TABLES

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TABLE B1

BUILDINGS SAMPLED DURING THE FEBRUARY 2019 SAMPLING EVENTS WITHIN THE NAVY AOR OF THE VAPOR INTRUSION STUDY AREA

Building Number	Building Use	Building Occupancy and Status
2	Gymnasium	intermittently occupied
3	Conference Center and Cafeteria	occupied
10	Boiler Plant for NASA Research Park	vacant
12	Commissary	occupied
13	Commissary Warehouse	occupied
14	Offices & Storage	intermittently occupied
15	NASA Security	occupied
16	Maintenance Contractor (Jacobs) Office & Shops	occupied
29	Bicycle Shop	occupied less than 8 hours/day
45	Storage Facility	intermittently occupied
67	U.S. Post Office	occupied
76	Locksmith Shop	occupied
107	ROICC Office	occupied
126	Moffett Historical Society Museum	occupied
510	Maintenance Offices	occupied
555	Tenant Offices	occupied
566	Tenant Offices	occupied
567	Warehouse	occupied
N210	Offices and Storage (former hangar)	occupied
N239	Life Sciences Building (offices and laboratories)	occupied
N239A	Offices and Centrifuge	occupied
N243	Flight Guidance and Simulation Laboratory	occupied
N243A	Welding and Machine Shop	occupied

Reference: MMEC October 2015 Work Plan IR Site 28 Vapor Intrusion Indoor Air Monitoring

TABLE B2

INDOOR AIR CLEANUP LEVELS FOR CHEMICALS OF CONCERN IN THE AREA OF VAPOR INTRUSION STUDY AREA

Chemical of Concern	Indoor Air Cleanup Level ($\mu g/m^3$) *
	Commercial
Trichloroethene	5
Tetrachloroethene	2
cis-1,2-Dichloroethene	210
trans-1,2-Dichloroethene	210
Vinyl Chloride	2
1,1-Dichloroethane	6
1,1-Dichloroethene	700

Notes:

* Cleanup Levels as presented in the Record of Decision Amendment for the Vapor Intrusion Pathway (EPA 2010)

$\mu g/m^3$ = micrograms per cubic meter

Reference: MMEC October 2015 Work Plan IR Site 28 Vapor Intrusion Indoor Air Monitoring

TABLE B3

2013 SOIL GAS SAMPLE RESULTS

Sample ID	Building	Sample Date	Unit	VC	1,1-DCE	trans-1,2-DCE	1,1-DCA	cis-1,2-DCE	TCE	PCE
Indoor Air Cleanup Level (IACL)			µg/m^3	2	700	210	6	210	5	2
Calculated Soil Gas Screening Levels Based on IACL and EPA's Subslab Attenuation Factor (0.03)[1,2]			µg/m^3	67	23,000	7,000	200	7,000	167	67
13M002-SG-02	2	6/27/2013	µg/m^3	<13	**29**	<40	<41	**56**	**830**	<34
13M002-SG-01	2	7/1/2013	µg/m^3	<13	**110**	<40	<41	<40	<27	<34
13M002-SG-03	2	7/1/2013	µg/m^3	<13	**220**	<40	**130**	**920**	**13,000**	<34
13M003-SG-01	3	6/27/2013	µg/m^3	<13	**2,400**	**330**	**1,200**	**7,200**	**140,000**	**130**
13M003-SG-01 (resample)[4]	3	6/28/2013	µg/m^3	<260[4]	**3,000**	<800[4]	**1,700**	**8,500**	**160,000**	<690[4]
13M003-SG-02	3	6/28/2013	µg/m^3	<13	<20	<40	<41	**50**	**45**	<34
13M010-SG-01	10	6/26/2013	µg/m^3	<13	**300**	**44**	**230**	**640**	**9,200**	**83**
13M310-SG-01 (Dup)	10	6/26/2013	µg/m^3	**38**	**35**	<40	<41	**51**	**420**	<34
13M010-SG-02	10	6/26/2013	µg/m^3	<13	**810**	**220**	**750**	**2,900**	**39,000**	**220**
13M010-SG-03	10	6/26/2013	µg/m^3	**36**	**52**	<40	<41	<40	**420**	<34
13M010-SG-04	10	6/27/2013	µg/m^3	<13	**430**	**150**	**340**	**4,300**	**12,000**	<34
13M012-SG-01	12	6/27/2013	µg/m^3	<13	**22**	<40	<41	**330**	**180**	<34
13M312-SG-01 (Dup)	12	6/27/2013	µg/m^3	<13	**48**	<40	<41	**470**	**160**	<34
13M012-SG-02	12	6/28/2013	µg/m^3	**99**	<20	<40	<41	**55**	<27	<34
13M012-SG-03	12	7/2/2013	µg/m^3	<13	<20	<40	<41	**84**	<27	<34
13M013-SG-01	13	7/2/2013	µg/m^3	<13	<20	<40	**66**	**140**	**340**	<34
13M014-SG-03	14	6/28/2013	µg/m^3	**7,400**	**1,200**	**740**	**210**	**9,000**	**2,900**	<34
13M015-SG-01	15	7/2/2013	µg/m^3	<13	<20	<40	<41	**140**	**830**	<34
13M015-SG-02	15	7/2/2013	µg/m^3	**4,400**	**2,900**	**3,600**	**5,900**	**80,000**	**9,600**	<34
13M016-SG-01	16	7/1/2013	µg/m^3	<13	**710**	**120**	**470**	**3,400**	**76,000**	**330**
13M016-SG-02	16	7/2/2013	µg/m^3	**35**	**1,200**	**1,100**	**1,100**	**9,400**	**85,000**	**170**
13M016-SG-03	16	7/2/2013	µg/m^3	<13	<20	<40	<41	<40	**64**	<34
13M316-SG-03 (Dup)	16	7/2/2013	µg/m^3	<13	<20	<40	<41	<40	**72**	<34
13M029-SG-01	29	6/27/2013	µg/m^3	<13	<20	<40	<41	<40	<27	<34
13M029-SG-02	29	6/27/2013	µg/m^3	**680**	<20	<40	<41	**290**	**44**	<34
13M045-SG-01	45	7/1/2013	µg/m^3	<13	**1,100**	**150**	**570**	**2,700**	**74,000**	**730**
13M067-SG-01	67	7/2/2013	µg/m^3	<13	<20	<40	<41	<40	**140**	<34
13M076-SG-01	76	7/2/2013	µg/m^3	<13	**1,200**	**300**	**790**	**4,800**	**65,000**	**83**
13M107-SG-01	107	7/2/2013	µg/m^3	<13	<20	<40	<41	<40	**67**	<34
13M126-SG-01	126	7/1/2013	µg/m^3	<13	**550**	**46**	**270**	**1,300**	**23,000**	**7,900**
13M126-SG-02	126	7/1/2013	µg/m^3	<13	**170**	**44**	**120**	**640**	**7,000**	**7,100**
13N210-SG-01	N210	6/27/2013	µg/m^3	**850**	**250**	**190**	**52**	**7,800**	**320**	<34
13N239-SG-01	N239	6/28/2013	µg/m^3	**16**	<20	<40	<41	**120**	**61**	<34
13N239-SG-02	N239	7/1/2013	µg/m^3	<13	<20	<40	<41	<40	<27	<34

TABLE B3

2013 SOIL GAS SAMPLE RESULTS

Sample ID	Building	Sample Date	Unit	VC	1,1-DCE	trans-1,2-DCE	1,1-DCA	cis-1,2-DCE	TCE	PCE
Indoor Air Cleanup Level (IACL)			µg/m^3	2	700	210	6	210	5	2
Calculated Soil Gas Screening Levels Based on IACL and EPA's Subslab Attenuation Factor (0.03)[1,2]			µg/m^3	67	23,000	7,000	200	7,000	167	67
13N239A-SG-01	N239A	6/27/2013	µg/m^3	<13	<20	<40	<41	<40	**54**	<34
13N239A-SG-02	N239A	6/27/2013	µg/m^3	<13	**32**	**93**	**190**	**410**	**1,800**	<34
13N243-SG-01	N243	6/28/2013	µg/m^3	<13	<20	<40	<41	<40	**50**	<34
13N343-SG-01 (Dup)	N243	6/28/2013	µg/m^3	<13	<20	<40	<41	<40	**130**	<34
13N243-SG-02	N243	6/28/2013	µg/m^3	<13	<20	<40	<41	<40	**120**	<34
13N243-SG-03	N243	6/28/2013	µg/m^3	<13	<20	<40	<41	<40	**53**	**960**
13N243-SG-04	N243	6/28/2013	µg/m^3	<13	<20	**50**	**560**	<40	<27	**280**
13N243A-SG-01	N243A	6/28/2013	µg/m^3	<13	<20	<40	**120**	**88**	**1,000**	**600**
13N243A-SG-02	N243A	6/28/2013	µg/m^3	<13	<20	<40	<41	<40	**39**	**150**
13M510-SG-01	510	6/26/2013	µg/m^3	<13	<20	<40	**370**	**120**	**330**	<34
13M555-SG-02	555	7/1/2013	µg/m^3	<13	<20	<40	<41	<40	**210**	<34
13M355-SG-02 (Dup)	555	7/1/2013	µg/m^3	<13	<20	<40	<41	<40	**180**	<34
13M555-SG-01	555	7/2/2013	µg/m^3	<13	**250**	**83**	**280**	**1,500**	**36,000**	**560**
13M566-SG-01	566	7/2/2013	µg/m^3	<13	**73**	<40	**46**	**87**	**1,500**	<34
13M567-SG-01	567	7/2/2013	µg/m^3	**56**	**690**	**160**	**450**	**4,500**	**77,000**	**180**
13MT-SG-01	Tunnel	7/1/2013	µg/m^3	<13	**71**	**100**	**410**	**1,500**	**8,800**	**320**
13MT-SG-02	Tunnel	7/1/2013	µg/m^3	<13	**120**	**64**	**650**	**1,500**	**13,000**	**220**
13MT-SG-03	Tunnel	6/27/2013	µg/m^3	<13	**130**	<40	<41	**180**	**3,700**	<34
13MT-SG-04	Tunnel	7/1/2013	µg/m^3	<13	**130**	<40	**81**	**250**	**1,700**	**65**
13MT-SG-05	Tunnel	7/1/2013	µg/m^3	<13	<20	<40	<41	**50**	**1,100**	**62**

Notes:

Detections are bold; Attenuated IACL exceedances a r e shaded.

TCE = trichloroethene

DCA = dichloroethane

DCE = dichloroethene

< = Not detected at the detection limit specified

Dup = duplicate

PCE = tetrachloroethene

VC = vinyl chloride

µg/m^3 = micrograms per cubic meter

1. EPA 2012. *EPA's Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings.* Office of Solid Waste and Emergency Response. Washington DC
2. The 95th percentile attenuation factor of 0.03 for TCE and PCE in subslab soil gas, derived from EPA's vapor intrusion database (EPA 2012), is used as a weighting multiplier with the ROD Amendment IACLs for indoor air to provide screening values for soil gas. For example for TCE: 5/0.03 = 167 □g/m^3. These screening values are for consideration of potential risk posed by COCs in soil gas and are not presented as cleanup goals for soil gas.
3. The June 28 13M003-SG-1 resample is a next-day verification sample for the June 27 13M003-SG-01 sample.

Reference: MMEC October 2015 Work Plan IR Site 28 Vapor Intrusion Indoor Air Monitoring

TABLE B4

2015 GROUNDWATER SAMPLE RESULTS

Well	Water Bearing Unit	Date Sampled	TCE (µg/L)	PCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCA (µg/L)	1,1-DCE (µg/L)	VC (µg/L)
U.S. Environmental Protection Agency MCL			**N/A**	**7**	**70**	**5**	**100**	**5**	**2**
California MCL			**5**	**6**	**6**	**5**	**10**	**5**	**0.5**
14C33A	Upper A	9/23/2015	1 U	1 U	**0.39 J**	0.5 U	1 U	1 U	**0.75 J**
14D05A	Upper A	9/23/2015	**30**	25 U	**950**	13 U	**9.6 J**	**11 J**	**230**
14D12A	Upper A	9/22/2015	**32**	13 U	**390**	6.3 U	**6.5 J**	13 U	**5 J**
14D36A	Upper A	9/21/2015	**12**	**0.8 J**	**29**	6.3 U	**6.5 J**	13 U	**0.67 J**
14D39A	Upper A	9/21/2015	1 U	1 U	**0.58 J**	0.5 U	1 U	1 U	1 U
165A	Upper A	9/22/2015	**29**	1 U	**25**	0.5 U	**0.58 J**	1 U	1 U
28SI-01	Upper A	9/24/2015	**260**	**11 J**	**590**	9.1 U	18 U	18 U	18 U
28SI-02	Upper A	9/24/2015	**41 J**	170 U	**4,600**	9.1 U	18 U	18 U	170 U
28SI-03	Upper A	9/24/2015	250 U	250 U	**5,900**	9.1 U	18 U	18 U	250 U
28SI-05	Upper A	9/24/2015	100 U	100 U	**3,000**	50 U	100 U	100 U	**71 J**
EA1-1	Upper A	9/23/2015	**770**	**140**	**770**	10 U	**7.1 J**	**16 J**	**44**
EA1-2	Upper A	9/23/2015	**200**	5 U	**120**	2.5 U	**3.6 J**	**4.1 J**	**2.1 J**
EA1-3	Upper A	9/23/2015	**73**	**1.8 J**	**130**	**1.2 J**	**5.2**	**2.1 J**	**8.1**
EA1-4	Upper A	9/23/2015	**54**	6.7 U	**230**	**1.2 J**	**5.2**	**2.1 J**	6.7 U
EA1-5	Upper A	9/23/2015	**34**	5.7 U	**210**	**1.2 J**	**5.2**	**2.1 J**	**16**
EA1-6	Upper A	9/23/2015	**150**	6.7 U	**230**	**1.2 J**	**5.2**	**2.1 J**	**57**
UST29-MW01	Upper A	9/21/2015	1 U	1 U	**0.51 J**	10 U	**6.4 J**	**11 J**	1 U
UST85-MW02	Upper A	9/24/2015	**15 J**	18 U	**480**	10 U	**6.4 J**	**11 J**	**14 J**
W20-01	Upper A	9/21/2015	1 U	1 U	**1**	0.5 U	1 U	1 U	1 U
W29-1	Upper A	9/22/2015	1 U	1 U	**0.39 J**	0.5 U	1 U	1 U	1 U
W29-2	Upper A	9/21/2015	1 U	1 U	**0.84 J**	0.5 U	**1.6**	1 U	**3.3**
W29-3	Upper A	9/21/2015	**14 J**	25 U	**760**	0.5 U	**1.6**	1 U	**23 J**
W29-4	Upper A	9/21/2015	**190**	5 U	**94**	0.5 U	**1.6**	1 U	5 U
W29-5	Upper A	9/22/2015	1 U	1 U	**0.44 J**	0.5 U	**1.6**	1 U	**0.4 J**
W56-2	Upper A	9/24/2015	**160**	17 U	**480**	8.3 U	**13 J**	**10 J**	**44**
W9-10	Upper A	9/22/2015	33 U	33 U	**1,000**	17 U	33 U	33 U	**77**
W9-18	Upper A	10/9/2015	0.4 U	0.4 U	**1.1**	**0.68 J**	**1.1**	0.4 U	**1.7**
W9-19	Upper A	9/22/2015	**0.6 J**	1.7 U	**30**	**3.2**	**9**	1.7 U	**43**
W9-2	Upper A	9/21/2015	**1,900**	50 U	**1,100**	**1.2 J**	**8.3**	**0.77 J**	50 U
W9-24	Upper A	9/22/2015	1 U	1 U	**0.68 J**	**0.79 J**	**2**	1 U	**17 J**
W9-31	Upper A	9/21/2015	13 U	13 U	**190**	**0.79 J**	**2**	1 U	**380**
W9-37	Upper A	9/24/2015	25 U	25 U	**630**	13 U	**8.1 J**	25 U	**540**
W9-44	Upper A	9/22/2015	**550**	17 U	**270**	0.5 U	1 U	1 U	17 U
W9-45	Upper A	9/24/2015	**330**	**5.4 J**	**170**	0.5 U	1 U	1 U	11 U
W9-7	Upper A	9/21/2015	**290**	29 U	**880**	14 U	29 U	**14 J**	**15 J**
W9SC-1	Upper A	9/21/2015	**560**	20 U	**65**	33 U	67 U	67 U	20 U
W9SC-13	Upper A	9/21/2015	20 U	20 U	**660**	10 U	**18 J**	20 U	**310**
W9SC-14	Upper A	9/23/2015	**8.2 J**	29 U	**870**	14 U	29 U	29 U	**170**
WIC-1	Upper A	9/24/2015	**640**	**8 J**	**340**	25 U	50 U	50 U	22 U

TABLE B4

2015 GROUNDWATER SAMPLE RESULTS

Well	Water Bearing Unit	Date Sampled	TCE (µg/L)	PCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCA (µg/L)	1,1-DCE (µg/L)	VC (µg/L)
U.S. Environmental Protection Agency MCL			**N/A**	**7**	**70**	**5**	**100**	**5**	**2**
California MCL			**5**	**6**	**6**	**5**	**10**	**5**	**0.5**
WNX-1	Upper A	9/23/2015	**160**	10 U	**250**	**4 J**	**7.2 J**	10 U	10 U
WNX-2	Upper A	9/23/2015	50 U	50 U	**1,600**	25 U	**31 J**	**30 J**	**200**
WNX-3	Upper A	9/23/2015	**190**	8 U	**220**	4 U	**3.7 J**	**4.4 J**	8 U
WU4-10	Upper A	9/21/2015	**82**	4 U	**92**	4 U	**3.7 J**	**4.4 J**	4 U
WU4-14	Upper A	9/22/2015	**2.6**	**0.31 J**	**4.4**	**0.31 J**	**0.73 J**	1 U	1 U
WU4-17	Upper A	9/22/2015	1 U	1 U	0.5 U	0.5 U	**1.6**	**1.3**	1 U
WU4-21	Upper A	9/21/2015	**1**	1 U	**26**	0.5 U	**1.6**	**1.3**	**0.48 J**
WU4-24	Upper A	9/21/2015	**1.9**	1 U	**2.1**	0.5 U	**1.6**	**1.3**	1 U
WU4-25	Upper A	9/21/2015	**0.46 J**	1.7 U	**36**	0.84 U	**7.2**	**2.5**	**0.5 J**
WU4-3	Upper A	9/22/2015	**1,100 J**	33 U	**950 J**	17 U	**10 J**	**20 J**	33 U
WWR-3	Upper A	9/22/2015	**41**	3.3 U	**89**	1.7 U	**4.4**	**5.6**	3.3 U

Notes:
TCE = trichloroethene
PCE = tetrachloroethene
DCA = dichloroethane
DCE = dichloroethene
VC = vinyl chloride
µg/L = micrograms per liter
J = estimated concentration less than the limit of quantitation but greater than the detection limit
U = not detected at the reporting limit specificed

Detection are bolded
California MCL exceedances are shaded
MCL - maximum contamination level

APPENDIX B FIGURES

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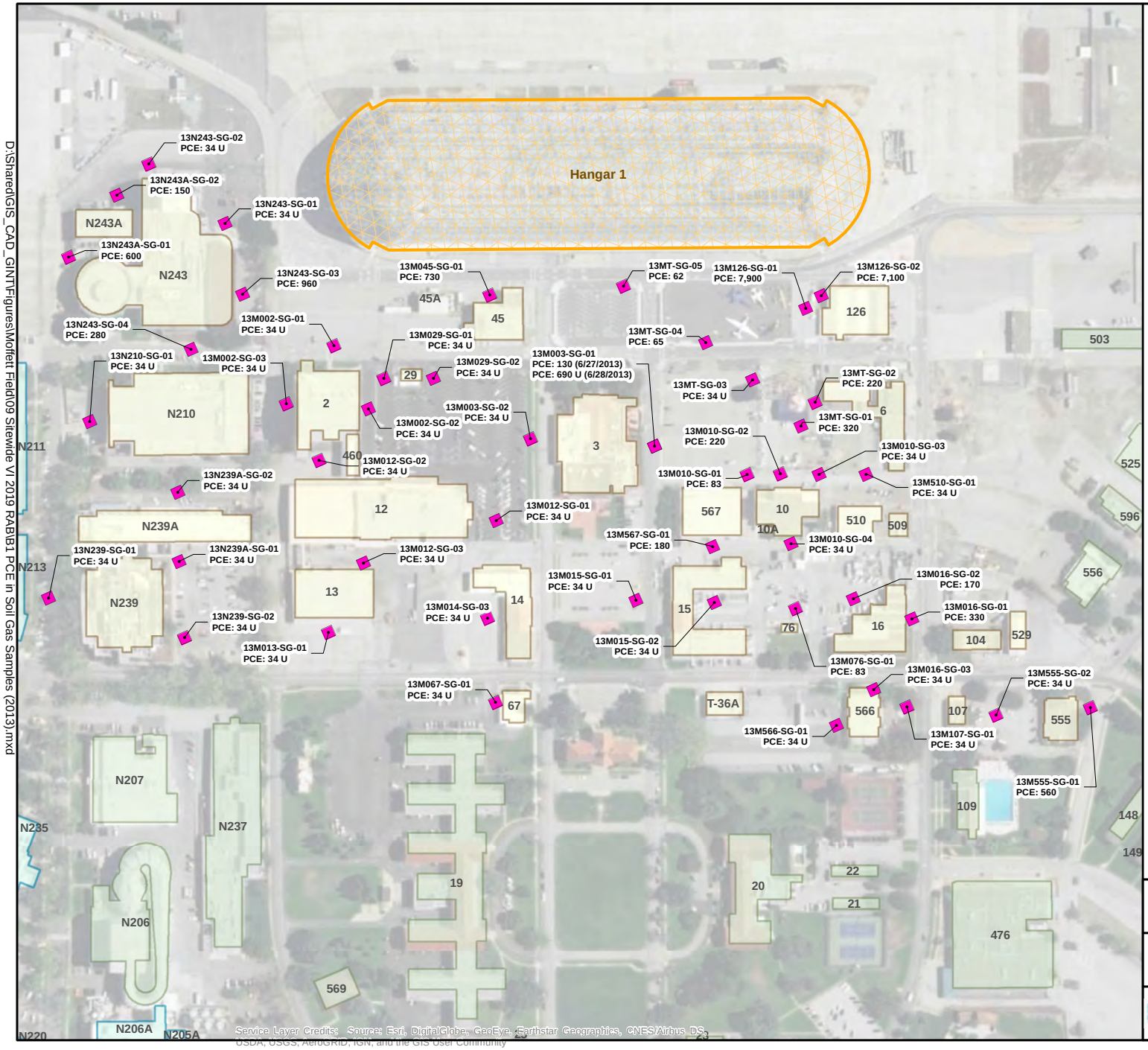

LEGEND

Buildings by Area of

- NAVY BUILDINGS
- MEW BUILDINGS
- NASA BUILDINGS
- PCE RESULTS - SOIL GAS SAMPLING LOCATION (2013)

NOTE:

PCE concentrations shown are from soil gas samples collected by AM8AJV, June- July 2013.

Results in micrograms per cubic meter (µg/m^3)

PCE -- tetrachloroethene (also called perchloroethene)

N

0 125 250 500

Feet

DISTRIBUTION OF TETRACHLOROETHENE IN SOIL GAS

IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE
B1

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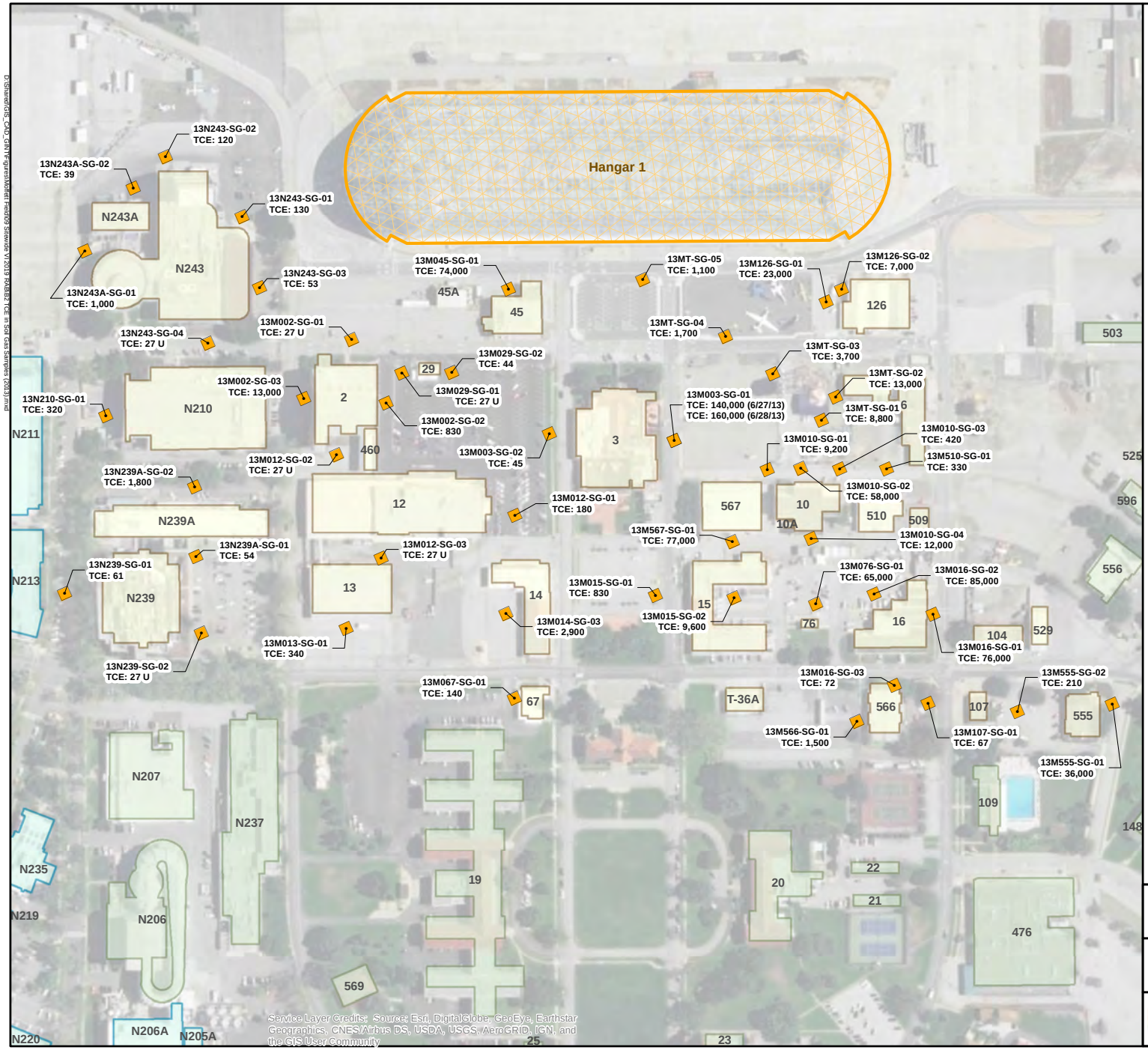


Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

Buildings by Area of

- NAVY BUILDINGS
- MEW BUILDINGS
- NASA BUILDINGS
- HANGAR 1
- TCE RESULTS - SOIL GAS SAMPLING LOCATION (2013)

NOTE:

TCE concentrations shown are from soil gas samples collected by AM8AJV, June- July 2013.

Results in micrograms per cubic meter (µg/m³)

TCE -- trichloroethene

N

0 125 250 500

Feet

DISTRIBUTION OF TRICHLOROETHENE IN SOIL GAS

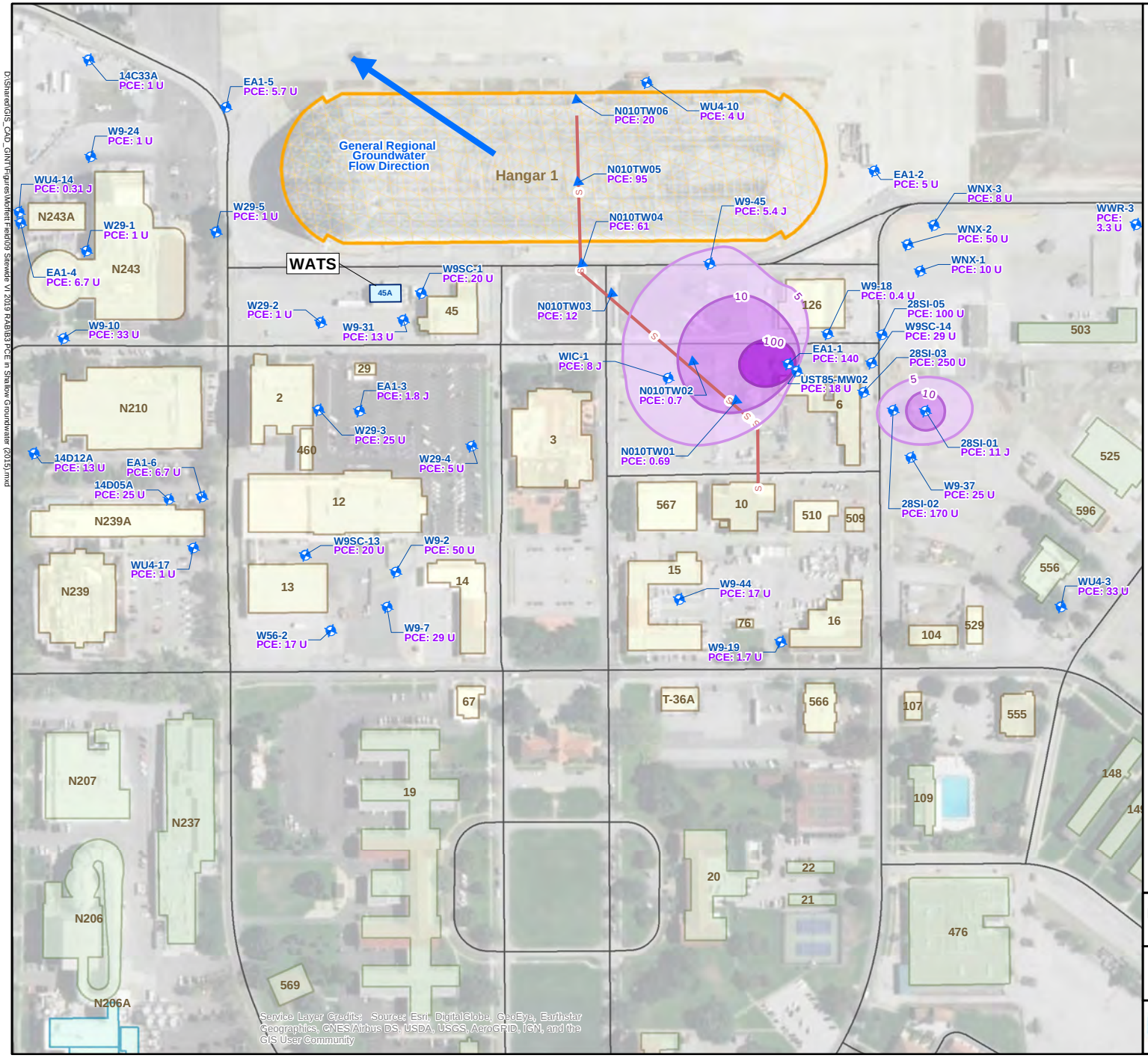
IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE
B2

D:\Shared\GIS_CAD_GIN\Figures\Moffett Field\08 Site\Site 28\2019 FA\B2 TCE in Soil Gas Samples (2013).mxd



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LEGEND

Buildings by Area of Responsibity

- NAVY BUILDINGS
- MEW BUILDINGS
- NASA BUILDINGS
- HANGAR 1
- WATS (Westside Aquifers Treatment System)
- Street Edges (Moffett Area)
- S Steam Distribution Line
- Water Sampling Location, 2010 Tunnel Investigation
- Groundwater Sampling Location

PCE Isopleth in shallow groundwater [as understood in 2015] (µg/L)

- 100
- 10
- 5

NOTES:

PCE - Tetrachloroethene

µg/L - micrograms per liter (groundwater samples)

See Table B4 for a complete summary of 2015 groundwater sampling results.

N

0 125 250 500

Feet

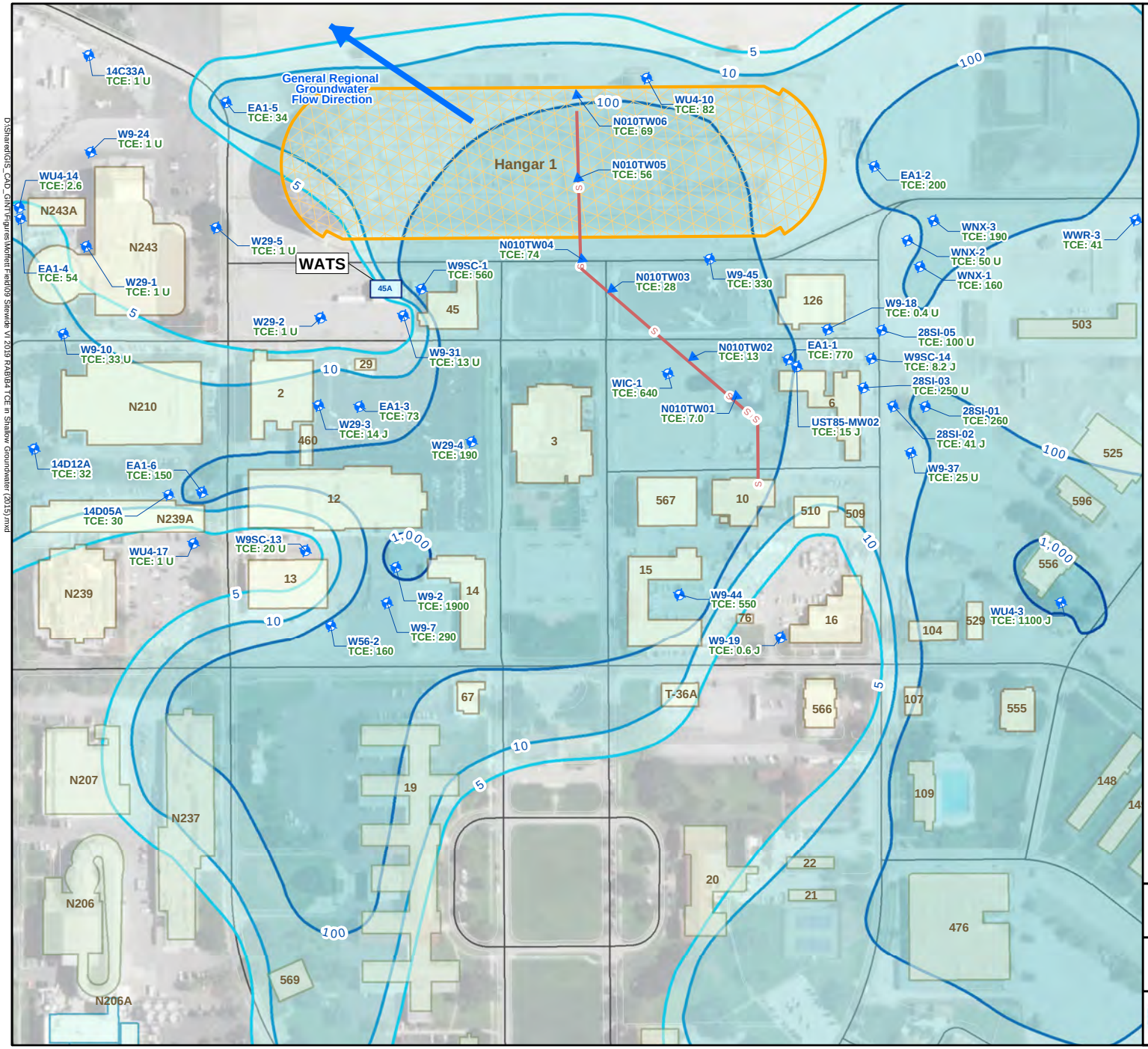
DISTRIBUTION OF TETRACHLOROETHENE IN SHALLOW GROUNDWATER

IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE B3



LEGEND

- Westside Aquifers Treatment System (WATS)
- NAVY BUILDINGS
- MEW BUILDINGS
- NASA BUILDINGS
- HANGAR 1
- Street Edges (Moffett
- S Steam Distribution Line
- Water Sampling Location, 2010 Tunnel Investigation
- Groundwater Sampling

TCE Isopleth in shallow groundwater (µg/L) [as understood in 2015]

- 1,000
- 100
- 10
- 5

NOTES:

TCE - Trichloroethene

µg/L - micrograms per liter (groundwater samples)

See Table B4 for a complete summary of 2015 groundwater sampling results.

N

0 125 250 500

Feet

DISTRIBUTION OF TRICHLOROETHENE IN SHALLOW GROUNDWATER

IR SITE 28
FORMER NAVAL AIR STATION MOFFETT FIELD
MOUNTAIN VIEW, CALIFORNIA

NAVFAC

DATE: JULY 2019
CONTRACT NO.: N62473-16-C-2003
DELIVERY ORDER NO.: 0000
DCN: NRS-2003-0000-0017

FIGURE B4

D:\Shared\GIS_CAD_GIN\Figures\Moffett Field\09 Stewide VI 2019 RAB\B4 TCE in Shallow Groundwater (2015).mxd