

**Building-Specific Air Sampling Report  
Moffett Field, California**

**by**

**Haley & Aldrich, Inc.  
San Jose, California**

**for**

**Raytheon Company  
Schlumberger Technology Corporation**

**File No. 36067-009  
13 September 2011**

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ALDRICH**

13 September 2011  
File No. 36067-009

U.S. Environmental Protection Agency Region 9  
Superfund Division SFD-7-3  
75 Hawthorne Street  
San Francisco, California

Attention: Ms. Alana Lee

Subject: Building-specific Air Sampling Report  
Moffett Field, California

Dear Ms. Lee:

Please find enclosed the report referenced above summarizing the air sampling activities conducted in July 2011 on Moffett Field, California.

If you have questions regarding this document, please feel free to call the undersigned.

Sincerely yours,  
HALEY & ALDRICH, INC.

A handwritten signature in black ink, appearing to read 'Elie H. Haddad', with a stylized flourish extending to the right.

Elie H. Haddad, P.E.  
Vice President

Enclosures

13 September 2011

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## 1. INTRODUCTION

This Building-specific Air Sampling Report (Report) presents the activities and results of the air sampling performed by Haley & Aldrich, Inc. (Haley & Aldrich) at twelve buildings on Moffett Field, California. The Report is being submitted on behalf of Raytheon Company and Schlumberger Technology Corporation. The air samples were collected in the buildings listed below (Figure 1):

- Building 23;
- Building 48;
- Building 146;
- Building 503;
- Building 543;
- Building 554;
- Building 569;
- Building 583A;
- Building 583B;
- Building 583C;
- Building 596; and
- Building 944.

The air sampling was conducted in accordance with the 7 June 2011 Haley & Aldrich “Indoor Air Sampling and Analysis Work Plan for Existing, Unsampled Buildings, Middlefield-Ellis-Whisman (MEW) and Moffett Field Study Area,” ([Site-wide Work Plan], Haley & Aldrich, 2011a) approved by the United States Environmental Protection Agency (EPA) on 1 July 2011. The sampling results included in this Report indicate that there are no short- or long-term potential health risk concerns from the vapor intrusion pathway under current conditions in these buildings.

In accordance with the Statement of Work (SOW) for the vapor intrusion pathway, the MEW Companies are implementing the vapor intrusion work in the areas of the Vapor Intrusion Study Area on Moffett Field designated as the “MEW” area on attached Figure 1. As indicated on Figure 1, vapor intrusion work in certain other areas on Moffett Field will be conducted by the Navy and National Aeronautics Space Administration (NASA).

## 2. REPORT CONTENTS

In accordance with the SOW, the Report should include the items identified below and a cross reference to where those items can be found.

<b>Item</b>	<b>Location in Report</b>
Building conditions, occupancy and use conditions, and a summary of all building/property-specific data, including identification of potential pathways for subsurface vapor intrusion	Sections 5.1 through 5.12, and Appendix A (Building Questionnaires)
Evaluation of current indoor air ventilation system (e.g., heating, ventilation, and air conditioning) operations and completed building surveys	Appendix A (Building Questionnaires)
Map of building/property layout and actual sampling locations, including photographs, where permitted	Maps: Figures 1 through 13 Photographs: Appendix B
Summary of all sampling and data collection results	Sections 5.1 through 5.12, Tables I to XII
Laboratory analytical data	Appendix C
Quality Assurance/Quality Control data and activities	Sections 5.1 through 5.12, Table XIII, Appendix C (Laboratory Reports), and Appendix D (Data Usability Summary Reports)
Schedule, recommendations, and follow-up actions, including additional sampling to determine the source of vapor intrusion exceeding indoor air cleanup levels and if vapor intrusion mitigation measures are needed	Sections 5.1 through 5.12 and Section 6

To expedite the sampling process, EPA agreed that building-specific work plans for these 12 buildings on Moffett Field were not necessary and would be provided in this Report. Below is a list of the information typically included in those work plans and where they are located:

<b>Item</b>	<b>Location in Report</b>
Proposed sampling locations and rationale for each sampling location	Sections 5.1 through 5.12, Figures 2 through 13
Proposed field activity schedule	Sampling was performed between 11 and 15 July 2011. EPA was notified in advance of the sampling schedule.
Sampling method, sampling duration, and operating status of indoor air or sub-slab ventilation system prior to and during sampling	Section 4.4
Provisions for collecting additional information if needed	Not needed
Completed building questionnaire/survey	Appendix A
Submittal date of Building-Specific Indoor Air Sampling Report documenting the field activities, sampling results, and recommended actions	This report – 13 September 2011

### 3. SITE BACKGROUND

The former U.S. Naval Air Station (NAS) was commissioned in 1933 on Moffett Field; the NASA facility opened there in 1940 as a laboratory of the National Advisory Committee on Aeronautics. The U.S. Department of the Navy (Navy) operated continuously on NAS Moffett Field until it transferred most of the facility (with the exception of Navy housing at the Orion Park and Wescoat Housing areas) to NASA in July 1994 (Erler & Kalinowski, Inc., [EKI], 2001). The Navy is responsible under a Federal Facilities Agreement with EPA and the State of California to investigate and clean up releases on Moffett Field. NASA conducts its ongoing environmental activities pursuant to a Memorandum of Understanding between the Navy and NASA (Navy and NASA, 1992).

Land use on Moffett Field is described in the NASA Moffett Field Comprehensive Use Plan (NASA 1994). There are no plans to change ownership (EKI 2001).

## **4. AIR SAMPLING METHODOLOGY**

Indoor air concentrations can be attributed to facility or occupational sources (e.g., sources attributed to building construction, operation, and occupancy), volatilization from the subsurface into the building, and contributions from outdoor air. This section explains the sampling procedures and type of samples collected in the twelve buildings in July 2011.

### **4.1 Chemicals of Concern**

Air samples were analyzed for chemicals of concern (COCs) listed in the 2010 ROD Amendment: trichloroethene (TCE); tetrachloroethene (PCE); 1,1-dichloroethene (1,1-DCE); cis-1,2-dichloroethene (cis-1,2-DCE); trans-1,2-dichloroethene (trans-1,2-DCE); 1,1-dichloroethane (1,1-DCA); and vinyl chloride.

### **4.2 Volatile Organic Compound Sources**

VOC sources in indoor air could include one or a combination of the following:

- Volatilization from the subsurface into the building structure;
- Occupational or consumer product sources within the building space (background indoor air); and/or
- Contribution from outdoor air infiltrating into the building through open doors or windows, or through heating, ventilation, and air conditioning (HVAC) systems (background outdoor air). This outdoor air can include contributions from off-site background (i.e., regional or area-wide) concentrations and nearby industrial emissions (e.g., dry cleaners).

### **4.3 Pre-sampling Activities**

Haley & Aldrich and EPA conducted a building survey on 26 May 2011 to determine which buildings in the MEW area of responsibility on Moffett Field are occupied. Based on the survey, 12 buildings were identified as occupied or partially occupied (Section 1.0). Haley & Aldrich and EPA subsequently conducted a walkthrough at each building the week of 19 June 2011 and 26 June 2011. Haley & Aldrich completed building questionnaire forms based on observations during the walkthroughs and input from NASA and the building facility site manager (Appendix A). During the walkthroughs, Air Systems, Inc. (Air Systems) evaluated the operation of the HVAC system for each building, if one was present. The Air Systems reports are provided in Appendix A.

During the walkthroughs, Haley & Aldrich and EPA jointly selected locations and duration of air samples in each building. To expedite the sampling process, EPA agreed that building-specific work plans for these 12 buildings were not necessary, and that the information typically included in these work plans would be provided in this Report.

With the help of NASA and the building facility site manager, Haley & Aldrich arranged for access and scheduled a sampling date and time convenient to the building tenants.

#### 4.4 Sampling Methodologies

During the building walkthroughs, Haley & Aldrich and EPA jointly selected locations and duration of air samples. Haley & Aldrich subsequently collected indoor and outdoor samples in 6-Liter SUMMA<sup>®</sup> canisters. The samples were analyzed for COCs (Section 3.1) using EPA Method TO-15 SIM by TestAmerica Laboratories, Inc., a laboratory certified by the National Environmental Laboratory Accreditation Conference. Co-located samples were collected at a rate of 1 in 10 samples.

The table below presents a summary of sampling methodology for each building, including method, duration, number of samples collected, and the status of operation of the HVAC system.

Building Number	Sampling Method	Sample Duration	No. of Samples	Status of Operation of the HVAC System
23	Passivated canisters (SUMMA <sup>®</sup> canisters)	24 hours	3 indoor 1 outdoor 2 duplicates	On
48	Passivated canisters (SUMMA <sup>®</sup> canisters)	10 hours	3 indoor 1 outdoor 2 duplicates	On
146	Passivated canisters (SUMMA <sup>®</sup> canisters)	10 hours	3 indoor 1 outdoor	No HVAC system
503	Passivated canisters (SUMMA <sup>®</sup> canisters)	8 hours	2 indoor 1 outdoor	No HVAC system
543	Passivated canisters (SUMMA <sup>®</sup> canisters)	24 hours	2 indoor 1 outdoor 1 duplicate	On
554	Passivated canisters (SUMMA <sup>®</sup> canisters)	24 hours	2 indoor 1 outdoor	No HVAC system
569	Passivated canisters (SUMMA <sup>®</sup> canisters)	8 hours	2 indoor 1 outdoor	On
583A	Passivated canisters (SUMMA <sup>®</sup> canisters)	24 hours	2 indoor 1 outdoor	No HVAC system
583B	Passivated canisters (SUMMA <sup>®</sup> canisters)	24 hours	3 indoor 1 outdoor	No HVAC system
583C	Passivated canisters (SUMMA <sup>®</sup> canisters)	24 hours	3 indoor 1 outdoor	On
596	Passivated canisters (SUMMA <sup>®</sup> canisters)	24 hours	2 indoor 1 outdoor	On
944	Passivated canisters (SUMMA <sup>®</sup> canisters)	24 hours	1 indoor 1 outdoor 1 duplicate	On

#### 4.5 Evaluation Criteria

The EPA's "Record of Decision Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View and Moffett Field, California," (EPA's 2010 VI ROD Amendment]; EPA 2010) lists the COCs for the vapor intrusion pathway to be TCE, PCE, vinyl chloride, 1,1-DCE, 1,1-DCA, cis-1,2-DCE, and trans-1,2-DCE. Haley & Aldrich compared the sample results for these COCs with the following three tiers of evaluation criteria.

**Short-Term Exposure:** The federal Agency for Toxic Substances and Disease Registry (ATSDR) developed acute (14-day) and intermediate (15- to 365-day) minimal risk levels (MRLs) applicable to short or moderate exposure periods for certain chemicals. An acute or intermediate MRL is an estimate of the daily human exposure to a chemical likely to result in no appreciable risk of adverse non-carcinogenic health effects over a specified short-term duration of exposure. These chemical-specific estimates are intended to serve as screening levels and are used by ATSDR health assessors and other responders to identify chemicals and potential health effects that may be of concern at sites. MRLs are not intended to define cleanup or action levels for ATSDR or other agencies. Measured concentrations in the air can be compared to MRLs to assess short-term potential risks.

**Long-Term Exposure:** The long-term exposure goals are based on the indoor air cleanup levels for long-term exposure per EPA's 2010 VI ROD Amendment. For a commercial scenario, the cleanup levels are based on a long-term exposure duration of 25 years, 250 days per year, and 10 hours per day. If workers are present in the building less often, risk would be lower. For example, if a worker works only 5 hours per day instead of 10 hours, the reduced exposure time provides a safety factor of 2 (estimated risks would be half as much). The same is also true if the exposure concentration, the exposure duration, or exposure frequency is less than the exposure assumptions used to determine the 5 (micrograms per cubic meter)  $\mu\text{g}/\text{m}^3$  action level for TCE.

**Outdoor:** Outdoor samples are compared to the indoor samples to evaluate the impact of the outdoor air on the indoor air quality. According to EPA's 2010 VI ROD Amendment, outdoor concentrations of TCE typically range from below the detection limit to  $0.4 \mu\text{g}/\text{m}^3$ . The outdoor air samples can also help assess whether indoor VOC sources or vapor intrusion pathways are present. The VI ROD Amendment states that indoor air concentrations higher than outdoor air concentrations may be indicative of indoor sources and/or vapor intrusion.

## 5. AIR SAMPLING RESULTS

Haley & Aldrich sampled twelve buildings on Moffett Field in July 2011 (Figure 1). *All air samples showed concentrations below long-term cleanup levels established in EPA's 2010 ROD Amendment, and below short-term minimal risk levels.*

The following subsections present the sampling results in each of the buildings sampled. Sample locations and posted concentrations are shown on Figures 2 through 13. For consistency, the sections below are formatted similar to the data presentation provided in Section 4 of the Final Supplemental Remedial Investigation Report (Haley & Aldrich et al, 2009) and include additional information regarding potential pathways per EPA's 2010 ROD Amendment.

### 5.1 Building 23

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 24 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected 24-hour indoor and outdoor air samples at Building 23 from 14 July 2011 to 15 July 2011.

Building Description: Building 23 is an approximately 11,900 square feet two-story wood-framed structure constructed in the 1930s and is occupied by Carnegie Mellon for office, laboratory research, and classrooms. It has two occupied floors and an unoccupied partial basement.

Building 23 has 28 HVAC units: 13 units in the attic and 15 units in the basement. Of these units, 27 have outside air intakes; none of the 28 units have economizers. Given the building use, the HVAC units operate 24 hours a day, seven days a week. Air Systems performed an inspection of the HVAC system on 29 June 2011 and 1 July 2011; a table detailing the system is provided in Appendix A.

Conduits penetrating the floor slab are present in the basement electrical room. A closed conduit also penetrates the slab in an adjacent room in the basement. The building has a partial crawl space. During the walkthrough, lacquers, paints, and thinners were found stored in the basement. The computer research lab had lubricants, glues, and a variety of bathroom cleaners.

Number of Discrete Samples Analyzed: Three indoor samples (plus two duplicate samples) and one outdoor sample were collected.

Sample Locations: Indoor samples 23AMB-1, 23AMB-2, and 23AMB-3 were collected on the first floor from office, laboratory, and classroom areas, respectively. A duplicate sample was also collected at the 23AMB-1 and 23AMB-3 locations. The outdoor sample (23OUT-1) was collected near an HVAC inlet. Photographs taken during sampling activities are provided in Appendix B.

Sample 23AMB-1 was located in an occupied office to represent typical small office occupancy. Sample 23AMB-2 was located in an occupied work area to represent typical work area occupancy. Sample 23AMB-3 was collected in an occupied classroom to represent typical classroom occupancy. The outdoor sample (23OUT-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation and different interior space types in the building.

Sample Duration: 24 hours. Because the HVAC system operates 24 hours a day, seven days a week, air samples cannot be collected with the HVAC system off under current occupancy.

Tables and Figures: The results of the air samples are shown in Table I and posted on Figure 2. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: Quality Assurance/Quality Control (QA/QC) activities complied with the requirements detailed in the Site-wide Work Plan, (Haley & Aldrich 2011a).

Sampling procedures followed the operating procedures presented in the “Responses to EPA’s Comments on the Conditional Approval – Site-wide Indoor Air Sampling and Analysis Work Plan for Existing, Unsampled Commercial Buildings, Middlefield-Ellis-Whisman (MEW) Mountain View, and Moffett Field, California,” ([31 August 2011 submittal]; Haley & Aldrich, 2011b) to EPA. No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and sample analysis. Two field duplicates were collected from Building 23. Relative percent difference (RPD) was calculated when a given analyte was detected above the laboratory reporting limit in both the primary sample and the field duplicate sample at a given location. Results were below the project data quality objective (DQO) of less than (<) 30 percent RPD, as shown in Table XIII. Because all results were valid and samples were collected from all points identified, the Building 23 sampling event achieved the DQO of 100 percent completeness.

Evaluation of Sampling Results: TCE and cis-1,2-DCE were detected in indoor air samples below EPA’s indoor air cleanup levels for long-term exposure as well as ATSDR’s short-term action levels. No other COCs were detected in indoor air. TCE was measured in indoor air at concentrations ranging from 0.12 to 0.27  $\mu\text{g}/\text{m}^3$ , significantly lower than EPA’s long-term indoor air cleanup level of 5  $\mu\text{g}/\text{m}^3$  and significantly below short-term exposure goals.

TCE was not detected in the outdoor air sample during this sampling event (not detected at or above the reporting limit of 0.027  $\mu\text{g}/\text{m}^3$ ); however, TCE in indoor air is consistent with outdoor concentration ranges reported in EPA’s 2010 VI ROD Amendment (i.e., non-detect to 0.4  $\mu\text{g}/\text{m}^3$ ). All concentrations are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway under current conditions.

Schedule, Recommendations, and Follow-up Actions: All concentrations are significantly below both short-term action levels and long-term indoor air cleanup levels. Use of the HVAC system 24 hours per day, seven days per week, is not expected to change as it is necessary to accommodate occupant needs. No additional engineering controls or air sampling are needed.

## **5.2 Building 48**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 24 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected indoor and outdoor 10-hour air samples at Building 48 on 13 July 2011.

Building Description: Building 48 is an approximately 7,700 square feet two-story wood-framed structure constructed in 1941 and is used for recreational purposes (club house for the Wescoat community). It has two occupied floors and an unoccupied partial basement housing equipment.

Building 48 has two HVAC units in the basement. The two units share the same outside air intake and have no economizers. The HVAC system operates seven days a week when the building is occupied, typically 7 AM to 7 PM. Air Systems performed an inspection of the HVAC system on 29 June 2011; a table detailing the system is provided in Appendix A.

During the walkthrough, a sump was identified in the basement where seeping water is collected and discharged through a sump-pump. Piping penetrates the floor slab in the basement at some locations. A crawl space exists under a portion of the building.

During the walkthrough, paint containers were found in the basement. A variety of chemicals are used in the maintenance shop, including paints, thinners, cleaning solvents, glues, and pesticides.

Number of Discrete Samples Analyzed: Three indoor samples (plus one duplicate samples) and one outdoor (including one duplicate) sample were collected.

Sample Locations: Indoor samples 48AMB-1 and 48AMB-2 were collected from the front area and the games and activities room on the first floor, respectively. Indoor sample 48AMB-3 was collected from the training room on the second floor of the rear portion of the building (the first floor of that area of Building 48 is a mechanical shop and is not occupied). A duplicate sample was also collected at the 48AMB-3 locations. The outdoor sample (48OUT-1) was collected near an HVAC inlet. A duplicate sample was also collected next to the outdoor sample. Photographs taken during sampling activities are provided in Appendix B.

Sample 48AMB-1 was located in an occupied open play area to represent typical large open area occupancy. Sample 48AMB-2 was located in an occupied open play area to represent typical open play area occupancy. Sample 48AMB-3 was collected in an occupied training room to represent typical occupancy of the rear portion of the building. The outdoor sample (48OUT-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation and different interior space types in the building.

Sample Duration: 10 hours to simulate typical building occupancy hours. Because the HVAC system operates seven days a week, air samples could not be collected with the HVAC system off under current occupancy.

Tables and Figures: The results of the air samples are shown in Table II and posted on Figure 3. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and sample analysis.

Two field duplicates were collected from Building 48. As shown in Table XIII, RPDs were not calculated for any analytes because no analytes were detected above laboratory reporting limits in either the primary samples or the field duplicate samples. Because all results were valid and samples were

collected from all points identified, the Building 48 sampling event achieved the DQO of 100 percent completeness.

Evaluation of Sampling Results: No COCs were detected in indoor air samples using reporting limits that were well below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No analytes were detected in the outdoor air sample. All reporting limits are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway under current conditions.

Schedule, Recommendations, and Follow-up Actions: No COCs were detected using reporting limits significantly below both short-term action levels and long-term indoor air cleanup levels. Use of the HVAC system during all hours of occupation at Building 48 is not expected to change and it is necessary for comfort to accommodate occupant needs. No additional engineering controls or air sampling are needed at this time.

### **5.3 Building 146**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 23 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected 10-hour indoor and outdoor air samples at Building 146 on 13 July 2011.

Building Description: Building 146 is an approximately 36,800 square feet one-story steel-framed structure without a basement used by the US Air Force for vehicle maintenance activities. The construction year is unknown and only the western portion of the building is occupied.

Building 146 has wall heater units throughout the building. The units do not have an exhaust capacity. Open windows and doors provide ventilation during the typical hours of occupancy (6:30 AM to 3:00 PM Monday through Friday).

Cracks were observed in the concrete floor slab during the walkthrough. Floor drains are present in the janitor room and restrooms.

Several chemicals are used for vehicle maintenance and are stored in designated storage areas. A full survey of chemical use was not performed during the walkthrough due to time constraints. Lubricants were observed in the auto shop.

Number of Discrete Samples Analyzed: Three indoor samples and one outdoor sample were collected.

Sample Locations: Indoor samples 146AMB-1, 146AMB-2, and 146AMB-3 were collected from the library, superintendent's office, and maintenance office, respectively. The outdoor sample (146OUT-1) was collected on the north side of the building. Photographs taken during sampling activities are provided in Appendix B.

Sample 146AMB-1 was located in an occupied library area to represent typical office occupancy. Sample 146AMB-2 was located in an occupied office to represent typical small office occupancy. Sample 146AMB-3 was located in an occupied office to represent typical small office occupancy. The outdoor sample (146OUT-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation and different interior space types in the building.

Sample Duration: 10 hours to simulate typical building occupancy hours. The building is naturally ventilated.

Tables and Figures: The results of the air samples are shown in Table III and posted on Figure 4. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and sample analysis.

Because all results were valid and samples were collected from all points identified, the Building 146 sampling event achieved the DQO of 100 percent completeness.

Evaluation of Sampling Results: No COCs were detected in indoor air samples using reporting limits that were well below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No analytes were detected in the outdoor air sample. All reporting limits are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway.

Schedule, Recommendations, and Follow-up Actions: No COCs were detected using reporting limits significantly below both short-term action levels and long-term indoor air cleanup levels. There are no engineering controls (e.g., HVAC) in the building. No engineering controls or additional air sampling are needed.

#### **5.4 Building 503**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 24 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected 8-hour indoor and outdoor air samples at Building 503 on 12 July 2011.

Building Description: Building 503 is an approximately 11,700 square feet one-story steel-framed structure constructed in 1966 without a basement and contains a shop area, an intermittently-occupied research and teaching area, and an office area. Only the northern portion of Building 503 is occupied. The concrete slab in the southern portion of the building has been removed in places and is therefore not fit for occupancy.

Wall units throughout the building provide heating; these units do not have an exhaust capacity. One wall unit in the northern office area appeared to have an exhaust capacity. Opened doors provide additional ventilation during the typical hours of occupancy (about two hours each morning and occasional weekends during the summer). According to the interview conducted during the walkthrough, the building is unoccupied in winter.

In the southern unoccupied portion of the building, the floor slab is cut in multiple locations, exposing the ground. The wall separating this area from the occupied shop area does not extend to the roof. An emergency shower pipe also penetrates the slab in the southernmost unoccupied portion of the building.

During the walkthrough, the northern portion of the building appeared vacant. Several chemicals were observed in the shop area, including cleaning solvents and lubricants.

Number of Discrete Samples Analyzed: Two indoor samples and one outdoor sample were collected.

Sample Locations: Indoor samples 503AMB-1 and 503AMB-2 were collected from the office and shop areas, respectively. The outdoor sample (503/554OUT-1) was collected between Building 503 and Building 554. Photographs taken during sampling activities are provided in Appendix B.

Sample 503AMB-1 was located in an occupied office to represent typical small office occupancy. Sample 503AMB-2 was located in an occupied work area to represent typical work area occupancy. The outdoor sample (503/554OUT-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation and different interior space types in the building.

Sample Duration: Given the duration of the building occupancy, the indoor samples were collected over 8 hours. The outdoor sample was collected over 24 hours to coincide with sampling conducted at adjacent Building 554. Building 503 is naturally ventilated.

Tables and Figures: The results of the air samples are shown in Table IV and posted on Figure 5. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and analysis of samples.

All data reported were validated, and no qualifications were recommended for any results. Appendix D contains a Data Usability Summary Report (DUSR), which provides additional information regarding the QA/QC evaluation. Because all results were valid and samples were collected from all points identified, the Building 503 sampling event achieved the DQO of 100 percent completeness.

EPA representatives observed deployment of the air sample canisters on 12 July 2011. No deviations or discrepancies were identified for field techniques or sampling protocol.

Evaluation of Sampling Results: TCE, PCE, and cis-1,2-DCE were detected in indoor air samples below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No other COCs were detected in indoor air. TCE was measured in indoor air at concentrations ranging from 0.19 to 0.40  $\mu\text{g}/\text{m}^3$ , significantly lower than EPA's long-term indoor air cleanup level of 5  $\mu\text{g}/\text{m}^3$  and the short-term exposure goals.

The TCE concentration detected in the outdoor air sample was 0.031  $\mu\text{g}/\text{m}^3$ , but the TCE concentrations in the indoor air samples were consistent with outdoor concentration ranges reported in EPA's 2010 VI ROD Amendment (i.e., non-detect to 0.4  $\mu\text{g}/\text{m}^3$ ). All concentrations are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway.

Schedule, Recommendations, and Follow-up Actions: All concentrations are significantly below both short-term action levels and long-term indoor air cleanup levels. There are no engineering controls (e.g., HVAC) in the building. No engineering controls or additional air sampling are needed.

## **5.5 Building 543**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 24 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected 24-hour indoor and outdoor air samples at Building 543 from 14 July 2011 to 15 July 2011.

Building Description: Building 543 is an approximately 11,000 square feet one-story prefabricated metal structure without a basement. The building was constructed in 1973 and is used for fuel cell research and processing activities.

Building 543 has two HVAC units: one unit on the ground on the south side of the building and one unit on the ground on the north side of the building. Both units have outside air intakes and economizers. The HVAC system operates 24 hours a day, seven days a week. An open rollup door near the north side of the building provides additional ventilation. Air Systems performed an inspection of the HVAC system on 29 June 2011; a table detailing the system is provided in Appendix A.

Floor drains are present in the restrooms. No other potential pathways were observed during the walkthrough.

During the walkthrough, it was observed that chemicals used for operations were stored in a chemical shed outside of the building. Bathroom cleaners were present in the janitorial cabinet.

Number of Discrete Samples Analyzed: Two indoor samples (plus one duplicate sample) and one outdoor sample were collected.

Sample Locations: Indoor samples 543AMB-1 and 543AMB-2 were collected from the south and north sides of the building, respectively. A duplicate sample was also collected at the 543AMB-1 location. The outdoor sample (543HVAC-1) was collected near an HVAC inlet. At the tenant's request, photographs taken during sampling activities cannot be published.

Samples 543AMB-1 and 543AMB-2 were located in occupied work areas to represent typical work area occupancy. The outdoor sample (543HVAC-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation in the building.

Sample Duration: 24 hours. Because the HVAC system operates 24 hours a day, seven days a week, air samples cannot be collected with the HVAC system off under current occupancy.

Tables and Figures: The results of the air samples are shown in Table V and posted on Figure 6. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were

identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and analysis of samples.

One (1) field duplicate was collected from Building 543. As shown in Table XIII, RPDs were not calculated for any analytes because no analytes were detected above laboratory reporting limits in either the primary sample or the field duplicate sample. Because all results were valid and samples were collected from all points identified, the Building 543 sampling event achieved the DQO of 100% completeness.

Evaluation of Sampling Results: No COCs were detected in indoor air samples using reporting limits that were well below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No analytes were detected in outdoor air. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway under current conditions.

Schedule, Recommendations, and Follow-up Actions: No COCs were detected using reporting limits significantly below both short-term action levels and long-term indoor air cleanup levels. Use of the HVAC system is required 24 hours per day, seven days per week and is not expected to change as it is necessary to accommodate occupant needs. No additional engineering controls or air sampling are needed.

## **5.6 Building 554**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 23 June 2011 (southern portion) and 1 July 2011 (northern portion). A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected 24-hour indoor and outdoor air samples at Building 554 from 12 July 2011 to 13 July 2011.

Building Description: Building 554 is an approximately 23,900 square feet one-story steel-framed structure constructed in 1975 without a basement. The southern portion of the building is a large shop area used intermittently for teaching and robotics research by Santa Clara University. The northern portion is a combined car maintenance shop and offices occupied by KleenSpeed.

Building 554 has wall heater units throughout the building. The units do not have an exhaust capacity. The northern portion of the building is typically occupied during normal business hours (8 AM to 5 PM); the southern portion of the building is typically occupied four hours per day and Tuesday evenings.

Cracks were noted on the surface in some areas of the tiled floor slab during the walkthrough. Floor drains are present in the restrooms, janitorial closet, and the area near the restrooms. A utility conduit penetrates the slab in the southern portion of the building.

Several chemical are used in the building as shown in Appendix A, including cleaning solvents, lubricants, paints, paint thinners, glues, and lighter fluids in the chemical storage area in the northern portion of the building. A full survey of the chemicals used in the building was not performed due to the large number of containers found and the time constraints.

Number of Discrete Samples Analyzed: Two indoor samples and one outdoor sample were collected.

Sample Locations: Indoor samples (554AMB-1 and 554AMB-2) were collected from the southern open area and northern shop areas, respectively. The outdoor sample (503/554OUT-1) was collected between Building 503 and Building 554. Photographs taken during sampling activities are provided in Appendix B.

Sample 554AMB-1 was located in an occupied open area to represent typical large open area occupancy. Sample 554AMB-2 was located in an occupied work area to represent typical work area occupancy. The outdoor sample (503/554OUT-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation and different interior space types in the building.

Sample Duration: 24 hours. The building does not have an HVAC system.

Tables and Figures: The results of the air samples are shown in Table VI and posted on Figure 7. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and analysis of samples.

Because all results were valid and samples were collected from all points identified, the Building 554 sampling event achieved the DQO of 100 percent completeness.

EPA representatives observed deployment of the air sample canisters on 12 July 2011. No deviations or discrepancies were identified for field techniques or sampling protocol.

Evaluation of Sampling Results: TCE was the only COC detected in both indoor and outdoor air samples. TCE concentrations were below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. TCE was measured in indoor air at concentrations ranging from 0.23 to 0.58  $\mu\text{g}/\text{m}^3$ . In the outdoor air, TCE was detected at 0.031  $\mu\text{g}/\text{m}^3$ .

All concentrations are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway.

Schedule, Recommendations, and Follow-up Actions: All concentrations are significantly below both short-term action levels and long-term indoor air cleanup levels. There are no engineering controls (e.g., HVAC) in the building. No engineering controls or additional air sampling are needed.

## **5.7 Building 569**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 1 July 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected indoor and outdoor air samples at Building 569 on 14 July 2011.

Building Description: Building 569 is an approximately 4,700 square foot one-story wood-framed structure constructed in 1978 without a basement and is used intermittently for its office space and conference rooms.

Building 569 has two HVAC units located on its roof that operate 24 hours a day, seven days a week. Both units have outside air intakes and economizers. Building 569 is typically occupied approximately 20 to 30 hours per week. Air Systems performed an inspection of the HVAC system on 1 July 2011; a table detailing the system is provided in Appendix A.

Floor drains are present in the restrooms; no other potential pathways were observed during the walkthrough.

Chemicals found in the building consisted of several kitchen and bathroom cleaner solutions.

Number of Discrete Samples Analyzed: Two indoor samples and one outdoor sample were collected.

Sample Locations: Indoor samples (569AMB-1 and 569AMB-2) were collected from two conference rooms. The outdoor sample (569OUT-1) was collected near the southwest corner of the building. Photographs taken during sampling activities are provided in Appendix B.

Sample 569AMB-1 was located in an occupied conference room to represent typical conference room occupancy. Sample 569AMB-2 was located in an occupied conference room to represent another conference room with different physical dimensions. The outdoor sample (569OUT-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation and different interior space types in the building.

Sample Duration: 8 hours. Because the HVAC system operates 24 hours a day, seven days a week, air samples could not be collected with the HVAC system off under current occupancy.

Tables and Figures: The results of the air samples are shown in Table VII and posted on Figure 8. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and analysis of samples.

All data reported were validated, and no qualifications were recommended for any results. Appendix D contains a DUSR, which provides additional information regarding the QA/QC evaluation. Because all results were valid and samples were collected from all points identified, the Building 569 sampling event achieved the DQO of 100 percent completeness.

Evaluation of Sampling Results: TCE and PCE were detected in indoor air samples significantly below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No other COCs were detected in indoor air. TCE was measured in indoor air in one sample at 0.044  $\mu\text{g}/\text{m}^3$ , which is significantly lower than EPA's long-term indoor air cleanup level of 5  $\mu\text{g}/\text{m}^3$ . PCE was detected at 0.16  $\mu\text{g}/\text{m}^3$ , which is lower than the cleanup level of 2  $\mu\text{g}/\text{m}^3$ .

TCE in indoor air was also consistent with outdoor concentration ranges reported in EPA's 2010 VI ROD Amendment (i.e., non-detect to 0.4 µg/m<sup>3</sup>). All concentrations are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway under current conditions.

Schedule, Recommendations, and Follow-up Actions: No COCs were detected using reporting limits significantly below both short-term action levels and long-term indoor air cleanup levels. Use of the HVAC system is required 24 hours per day, seven days per week and is not expected to change as it is necessary accommodate occupant needs. No additional engineering controls or air sampling are needed at this time.

## **5.8 Building 583A**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 24 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected 24-hour indoor and outdoor air samples at Building 583A from 11 July 2011 to 12 July 2011.

Building Description: Building 583A is an approximately 12,900 square feet three-story reinforced concrete structure constructed in 1985 without a basement and is used as a hotel.

Each of the 74 rooms has its own wall heater unit. The units are centrally controlled and have an exhaust capacity. Opened windows and ceiling fans provide additional ventilation. Typical occupancy is 50 to 80 days per guest.

Drains are present in the restrooms. A utility corridor runs through the center of the building but was not accessible during the walkthrough and is not an occupied space.

Number of Discrete Samples Analyzed: Two indoor samples and one outdoor sample were collected.

Sample Locations: Indoor samples 583AAMB-1 and 583AAMB-2 were collected from rooms in the southern half and the northern half of the building, respectively. The outdoor sample (583A/583BOUT-1) was collected between Building 583A and Building 583B. Photographs taken during sampling activities are provided in Appendix B.

Sample 583AAMB-1 was located in an occupied hotel room to represent typical hotel room occupancy. Sample 583AAMB-2 was located in an occupied hotel room to represent another hotel room to provide adequate areal representation in the building. The outdoor sample (583A/583BOUT-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation in the building.

Sample Duration: 24 hours. The building does not have an HVAC system.

Tables and Figures: The results of the air samples are shown in Table VIII and posted on Figure 9. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31

August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and sample analysis.

Because all results were valid and samples were collected from all points identified, the Building 583A sampling event achieved the DQO of 100 percent completeness.

EPA representatives observed pick-up of the air sample canisters at the end of the sampling period on 12 July 2011. No deviations or discrepancies were identified for field techniques or sampling protocol.

Evaluation of Sampling Results: TCE was detected in indoor and outdoor air samples below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No other COCs were detected in indoor air. TCE was measured in indoor air at concentrations ranging from 0.035 to 0.054  $\mu\text{g}/\text{m}^3$ . The indoor air samples are significantly lower than EPA's long-term indoor air cleanup level of 5  $\mu\text{g}/\text{m}^3$  and are significantly below short-term exposure goals. TCE was measured at 0.079  $\mu\text{g}/\text{m}^3$  in the outdoor air sample.

The TCE concentration detected in the indoor air samples are consistent with outdoor concentration ranges reported in EPA's 2010 VI ROD Amendment (i.e., non-detect to 0.4  $\mu\text{g}/\text{m}^3$ ). All concentrations are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway.

Schedule, Recommendations, and Follow-up Actions: All concentrations are significantly below both short-term action levels and long-term indoor air cleanup levels. There are no engineering controls (e.g., HVAC) in the building. No engineering controls or additional air sampling are needed.

## **5.9 Building 583B**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 24 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Based on room availability, Haley & Aldrich collected 24-hour indoor and outdoor air samples at Building 583B from 11 July 2011 to 13 July 2011.

Building Description: Building 583B is an approximately 12,900 square feet three-story reinforced concrete structure constructed in 1985 without a basement and is used as a hotel.

The Building 583B description is similar to Building 583A.

Number of Discrete Samples Analyzed: Three indoor samples and one outdoor sample were collected.

Sample Locations: Indoor samples 583BAMB-1, 583BAMB-2, and 583BAMB-3 were collected from rooms near the middle of the building and the eastern and western ends of the building, respectively. The outdoor sample (583A/583BOUT-1) was collected between Building 583A and Building 583B. Photographs taken during sampling activities are provided in Appendix B.

Sample 583BAMB-1 was located in an occupied hotel room to represent typical hotel room occupancy. Samples 583BAMB-2 and 583BAMB-3 were located in two additional occupied hotel rooms to provide adequate areal representation in the building. The outdoor sample (583A/583BOUT-1) was collected to

represent background conditions. The selected indoor sample locations provide adequate areal representation in the building.

Sample Duration: 24 hours. The building does not have an HVAC system.

Tables and Figures: The results of the air samples are shown in Table IX and posted on Figure 10. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and sample analysis.

Because all results were valid and samples were collected from all points identified, the Building 583B sampling event achieved the DQO of 100 percent completeness.

EPA representatives observed pick-up of the air sample canisters at the 583BAMB-1 and outdoor sample locations at the end of the sampling period on 12 July 2011. No deviations or discrepancies were identified for field techniques or sampling protocol.

Evaluation of Sampling Results: TCE and 1,1-DCE were detected in indoor air samples below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No other COCs were detected in indoor air. TCE was measured in indoor air at concentrations ranging from 0.036 to 0.10  $\mu\text{g}/\text{m}^3$ , which are significantly lower than EPA's long-term indoor air cleanup level of 5  $\mu\text{g}/\text{m}^3$  and are significantly below short-term exposure goals. 1,1-DCE was detected in two of the three samples at 0.14 and 0.079  $\mu\text{g}/\text{m}^3$ , significantly lower than the long-term indoor air cleanup level of 700  $\mu\text{g}/\text{m}^3$ . TCE was detected in the outdoor sample at 0.079  $\mu\text{g}/\text{m}^3$ .

The TCE concentrations detected in the indoor air samples are consistent with outdoor concentration ranges reported in EPA's 2010 VI ROD Amendment (i.e., non-detect to 0.4  $\mu\text{g}/\text{m}^3$ ). All concentrations are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway.

Schedule, Recommendations, and Follow-up Actions: All concentrations are significantly below both short-term action levels and long-term indoor air cleanup levels. There are no engineering controls (e.g., HVAC) in the building. No engineering controls or additional air sampling are needed.

## **5.10 Building 583C**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 23 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected indoor and outdoor air samples at Building 583C from 11 July 2011 to 12 July 2011.

Building Description: Building 583C is an approximately 13,100 square feet one-story reinforced concrete structure constructed in 1985 without a basement and is used primarily for classroom and meeting purposes.

Building 583C has three HVAC units located on its roof. All three units have outside air intakes and an exhaust capacity. Two of the units also have economizers. The HVAC system operates 24 hours a day, seven days a week. Building 583C is typically occupied from 8 AM to 10 PM. Opened doors and an exhaust fan provide additional ventilation. Air Systems performed an inspection of the HVAC system on 29 June 2011; a table detailing the system is provided in Appendix A.

The piping from the sink in the janitorial room penetrates the slab. Floor drains are present in the restrooms.

Chemicals found during the walkthrough included cleaning solvents (flux remover), carpet cleaners, and bathroom cleaners in the janitorial room. Air fresheners and bathroom cleaners were found in the restrooms.

Number of Discrete Samples Analyzed: Three indoor samples and one outdoor sample were collected.

Sample Locations: Indoor samples 583CAMB-1, 583CAMB-2, and 583CAMB-3 were collected from the kitchen, an open meeting area, and a conference room, respectively. The outdoor sample (583CHVAC-1) was collected on the roof near an HVAC inlet. Photographs taken during sampling activities are provided in Appendix B.

Sample 583CAMB-1 was located in an occupied kitchen to represent typical kitchen occupancy. Sample 583CAMB-2 was located in an occupied open meeting area to represent typical open office occupancy. Sample 583CAMB-3 was collected in an occupied conference room to represent typical conference room occupancy. The outdoor sample (583HVAC-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation and different interior space types in the building.

Sample Duration: 24 hours. Because the HVAC system operates continuously, air samples could not be collected with the HVAC system off.

Tables and Figures: The results of the air samples are shown in Table X and posted on Figure 11. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and sample analysis.

All data reported were validated, and no qualifications were recommended for any results. Appendix D contains a DUSR, which provides additional information regarding the QA/QC evaluation. Because all results were valid and samples were collected from all points identified, the Building 583C sampling event achieved the DQO of 100 percent completeness.

EPA representatives observed pick-up of the air sample canisters at the end of the sampling period on 12 July 2011. No deviations or discrepancies were identified for field techniques or sampling protocol.

Evaluation of Sampling Results: TCE and cis-1,2-DCE were detected in indoor air samples below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No other COCs were detected in indoor air. TCE was measured in indoor air at concentrations ranging from 0.065 to 0.33  $\mu\text{g}/\text{m}^3$ , which are significantly lower than EPA's long-term indoor air cleanup level of 5  $\mu\text{g}/\text{m}^3$  and are significantly below short-term exposure goals. Cis-1,2-DCE was measured in two indoor air samples at 0.078 and 0.13  $\mu\text{g}/\text{m}^3$ , significantly below the long-term cleanup level of 210  $\mu\text{g}/\text{m}^3$ . TCE was measured in the outdoor air sample at 0.041  $\mu\text{g}/\text{m}^3$ .

The TCE concentration detected in the indoor air samples are consistent with outdoor concentration ranges reported in EPA's 2010 VI ROD Amendment (i.e., non-detect to 0.4  $\mu\text{g}/\text{m}^3$ ). All concentrations are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway under current conditions.

Schedule, Recommendations, and Follow-up Actions: All concentrations are significantly below both short-term action levels and long-term indoor air cleanup levels. Use of the HVAC system is required 24 hours per day, seven days per week and is not expected to change as it is necessary to accommodate occupant needs. No additional engineering controls or air sampling are needed at this time.

### **5.11 Building 596**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 24 June 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected 24-hour indoor and outdoor air samples at Building 596 from 12 July 2011 to 13 July 2011.

Building Description: Building 596 is an approximately 4,600 square feet one-story wood-framed structure constructed in 1985 without a basement and is used for space research activities.

Building 596 has four HVAC units located on its roof. All four units have outside air intakes and economizers. The system does not have an exhaust capacity. The HVAC units operate 24 hours a day, seven days a week. Building 596 is typically occupied from 8 AM to 5 PM. An exhaust fan provides additional ventilation. Air Systems performed an inspection of the HVAC system on 29 June 2011; a table detailing the system is provided in Appendix A.

Building 596 is a former fast-food restaurant; a number of floor drains, piping, and electrical conduits penetrate the slab. Some of the conduits have been sealed.

During the walkthrough, several chemicals were present, including paints, cleaning solvents, lubricants, furniture/floor polish, and glues. The northern part of the building is used for storage and is not typically occupied. A complete survey of chemical usage was not conducted due to time constraints.

Number of Discrete Samples Analyzed: Two indoor samples and one outdoor sample were collected.

Sample Locations: Indoor samples 596AMB-1 and 596AMB-2 were collected from the open office area and film storage area, respectively. The outdoor sample (596HVAC-1) was collected on the roof near an HVAC inlet. At the tenant's request, photographs taken during sampling activities are for internal use only and are not included with this report.

Sample 596AMB-1 was located in an occupied open office area to represent typical open office occupancy. Sample 596AMB-2 was located in an occupied film storage area to represent typical work area occupancy. The outdoor sample (596HVAC-1) was collected to represent background conditions. The selected indoor sample locations provide adequate areal representation and different interior space types in the building.

Sample Duration: 24 hours. Because the HVAC system operates continuously, air samples could not be collected with the HVAC system off.

Tables and Figures: The results of the air samples are shown in Table XI and posted on Figure 12. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and sample analysis.

All data reported were validated, and no qualifications were recommended for any results. Appendix D contains a DUSR, which provides additional information regarding the QA/QC evaluation. Because all results were valid and samples were collected from all points identified, the Building 596 sampling event achieved the DQO of 100 percent completeness.

EPA representatives observed deployment of the air sample canisters on 12 July 2011. No deviations or discrepancies were identified for field techniques or sampling protocol.

Evaluation of Sampling Results: TCE and cis-1,2-DCE were detected in indoor and outdoor air samples below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. No other COCs were detected in indoor air. TCE was measured in indoor air at concentrations ranging from 1.0 to 1.9  $\mu\text{g}/\text{m}^3$ , which are lower than EPA's long-term indoor air cleanup level of 5  $\mu\text{g}/\text{m}^3$  and significantly below short-term exposure goals. Cis-1,2-DCE concentrations ranged from 0.14 to 0.16  $\mu\text{g}/\text{m}^3$ , which are lower than the long-term cleanup goal of 210  $\mu\text{g}/\text{m}^3$ . TCE and cis-1,2-DCE were detected in the outdoor sample at concentrations of 0.098 and 0.14  $\mu\text{g}/\text{m}^3$ , respectively.

All concentrations are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway under current conditions.

Schedule, Recommendations, and Follow-up Actions: All concentrations are significantly below both short-term action levels and long-term indoor air cleanup levels. Use of the HVAC system is required 24 hours per day, seven days per week and is not expected to change as it is necessary to accommodate occupant needs. No additional engineering controls or air sampling are needed at this time.

## **5.12 Building 944**

Haley & Aldrich and EPA representatives conducted a walkthrough in the building on 1 July 2011. A completed Indoor Air Quality Building Survey is included in Appendix A. Haley & Aldrich collected indoor and outdoor air samples at Building 944 from 13 July 2011 to 14 July 2011.

Building Description: Building 944 is an approximately 9,800 square feet one-story wood-framed structure without a basement constructed in 1941; only the southernmost portion is currently occupied and is used intermittently for various recreational club activities.

Building 944 has two HVAC units on ground level on the south side of the building. Both units have outside air intakes and economizers. The HVAC system operates when the building is in use, approximately one to six hours a day. An exhaust fan and a fan coil unit provide additional ventilation. Air Systems performed an inspection of the HVAC system on 1 July 2011; a table detailing the system is provided in Appendix A.

A fire water rise penetrates the floor slab. Chemicals found in the building during the walkthrough included bathroom cleaners in the kitchen and janitorial cabinet.

Number of Discrete Samples Analyzed: One indoor sample (plus one duplicate sample) and one outdoor sample were collected.

Sample Locations: One indoor sample (944AMB-1) was collected from the kitchen area. A duplicate sample was also collected at the 944AMB-1 location. The outdoor sample (944HVAC-1) was collected on the south side of the building near an HVAC inlet. Photographs taken during sampling activities are provided in Appendix B.

Sample 944AMB-1 was located in an occupied open kitchen area to represent typical open recreational area occupancy. The outdoor sample (944HVAC-1) was collected to represent background conditions. The selected indoor sample location provides adequate areal representation of the occupied area of the building.

Sample Duration: 24 hours

Tables and Figures: The results of the air samples are shown in Table XII and posted on Figure 13. TCE concentrations are also posted on Figure 14. The laboratory report is included in Appendix C.

Quality Assurance/Quality Control: QA/QC activities complied with the requirements detailed in the Site-wide Work Plan. Sampling procedures followed the operating procedures presented in the 31 August 2011 submittal to EPA (Haley & Aldrich, 2011b). No deviations or discrepancies were identified in field techniques or sampling protocol. The laboratory followed media preparation procedures for the canisters and sample analysis.

One field duplicate was collected from Building 944. As shown in Table XIII, RPDs were not calculated for any analytes because no analytes were detected above laboratory reporting limits in either the primary sample or the field duplicate sample. Because all results were valid and samples were collected from all points identified, the Building 944 sampling event achieved the DQO of 100 percent completeness.

Evaluation of Sampling Results: No COCs were detected in indoor air samples using reporting limits that were well below EPA's indoor air cleanup levels for long-term exposure as well as ATSDR's short-term action levels. All reporting limits are significantly below short-term exposure goals. Based on these data, there are no short- or long-term potential risk concerns from the vapor intrusion pathway under current conditions.

Schedule, Recommendations, and Follow-up Actions: No COCs were detected with reporting limits significantly below both short-term action levels and long-term indoor air cleanup levels. Use of the HVAC system during hours of occupation is not expected to change as it is necessary to accommodate occupant needs. No additional engineering controls or air sampling are needed at this time.

## 6. FINDINGS AND CONCLUSIONS

Haley & Aldrich collected forty-four samples to evaluate the vapor intrusion pathway in twelve fully- or partially-occupied buildings on Moffett Field. The results and conclusions are detailed in Sections 5.1 through 5.12 and summarized below:

Building Number	No. of Samples	COCs Detected (Concentrations in $\mu\text{g}/\text{m}^3$ )	Concentrations < Short-Term goals?	Concentrations < Long-Term Action Levels?	Additional Engineering Control Needed?
23	3 indoor 1 outdoor 2 duplicates	TCE: 0.12-0.27 Cis-1,2-DCE: 0.11-0.12	Yes	Yes	No
48	3 indoor 1 outdoor 2 duplicates	No COCs were detected.	Yes	Yes	No
146	3 indoor 1 outdoor	No COCs were detected.	Yes	Yes	No
503	2 indoor 1 outdoor	TCE: 0.031-0.40 PCE: 0.19-0.42 Cis-1,2-DCE: 0.16	Yes	Yes	No
543	2 indoor 1 outdoor 1 duplicate	No COCs were detected.	Yes	Yes	No
554	2 indoor 1 outdoor	TCE: 0.031-0.58	Yes	Yes	No
569	2 indoor 1 outdoor	TCE: 0.044 PCE: 0.16	Yes	Yes	No
583A	2 indoor 1 outdoor	TCE: 0.035-0.079	Yes	Yes	No
583B	3 indoor 1 outdoor	TCE: 0.036-0.10 1,1-DCE: 0.079-0.14	Yes	Yes	No
583C	3 indoor 1 outdoor	TCE: 0.041-0.33 Cis-1,2-DCE: 0.078-0.13	Yes	Yes	No
596	2 indoor 1 outdoor	TCE: 0.098-1.9 Cis-1,2-DCE: 0.14-0.16	Yes	Yes	No
944	1 indoor 1 outdoor 1 duplicate	No COCs were detected.	Yes	Yes	No

All concentrations in the 12 buildings were significantly lower than the long-term cleanup levels and the short-term exposure goals. No additional engineering controls are necessary in the buildings.

## REFERENCES

1. Environmental Protection Agency, “Record of Decision Amendment for the Vapor Intrusion Pathway, Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View and Moffett Field, California,” August 2010.
2. Erler & Kalinowski, Inc., “Draft Final Environmental Issues Management Plan, NASA Ames Research Park, Mountain View, California,” December 2001.
3. Haley & Aldrich, Inc. et al, “Final Supplemental Remedial Investigation For Vapor Intrusion Pathway, Middlefield-Ellis-Whisman Study Area, Mountain View and Moffett Field, California,” June 2009.
4. Haley & Aldrich, Inc., 2011a, “Indoor Air Sampling and Analysis Work Plan for Existing, Unsampled Buildings, Middlefield-Ellis-Whisman (MEW) and Moffett Field Study Area, Mountain View, California,” 7 June 2011a.
5. Haley & Aldrich, Inc., 2011b “Responses to EPA's Comments on the Conditional Approval – Site-wide Indoor Air Sampling and Analysis Work Plan for Existing, Unsampled Commercial Buildings, Middlefield-Ellis-Whisman (MEW) Mountain View, and Moffett Field, California,” 31 August 2011b.
6. NASA, “Moffett Field Comprehensive Use Plan, NASA Ames Research Center, Moffett Field, California,” September 1994.
7. U.S. Department of the Navy and NASA, “Memorandum of Understanding Between Department of Navy and NASA Regarding MFA, Moffett Field, California,” December 1992.

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## **TABLES**

**TABLE I**  
 AIR SAMPLING RESULTS - BUILDING 23  
 MOFFETT FIELD, CALIFORNIA

<b>Normal Occupancy Indoor Air Sampling Results</b>								
Sample ID	Date	Vinyl chloride	TCE	PCE	trans-1,2-DCE	cis-1,2-DCE	1,1-DCE	1,1-DCA
23AMB-1	7/14/2011	<0.013	0.12	<0.14	<0.056	<0.056	<0.040	<0.020
23AMB-1*	7/14/2011	<0.013	0.12	<0.14	<0.055	<0.055	<0.040	<0.020
23AMB-2	7/14/2011	<0.013	0.12	<0.14	<0.055	<0.055	<0.040	<0.020
23AMB-3	7/14/2011	<0.013	0.27	<0.14	<0.056	0.12	<0.040	<0.020
23AMB-3*	7/14/2011	<0.013	0.27	<0.14	<0.056	0.11	<0.040	<0.020
23OUT-1	7/14/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 24 hours.  
 Outdoor air sample was collected over 24 hours.  
 \* - denotes duplicate co-located sample  
 <0.040 - denotes result was below respective reporting limit

**TABLE II**  
 AIR SAMPLING RESULTS - BUILDING 48  
 MOFFETT FIELD, CALIFORNIA

<b>Normal Occupancy Indoor Air Sampling Results</b>								
Sample ID	Date	Vinyl chloride	TCE	PCE	trans-1,2-DCE	cis-1,2-DCE	1,1-DCE	1,1-DCA
48AMB-1	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
48AMB-2	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
48AMB-3	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
48AMB-3*	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
48OUT-1	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
48OUT-1*	7/13/2011	<0.013	<0.027	<0.14	<0.056	<0.056	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 10 hours.  
 Outdoor air sample was collected over 10 hours.  
 \* - denotes duplicate co-located sample  
 <0.040 - denotes result was below respective reporting limit

**TABLE III**  
**AIR SAMPLING RESULTS - BUILDING 146**  
**MOFFETT FIELD, CALIFORNIA**

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
146AMB-1	7/13/2011	<0.013	<0.027	<0.14	<0.056	<0.056	<0.040	<0.020
146AMB-2	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
146AMB-3	7/13/2011	<0.013	<0.027	<0.14	<0.056	<0.056	<0.040	<0.020
146OUT-1	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 10 hours.  
 Outdoor air sample was collected over 10 hours.  
 <0.040 - denotes result was below respective reporting limit

**TABLE IV**  
**AIR SAMPLING RESULTS - BUILDING 503**  
**MOFFETT FIELD, CALIFORNIA**

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
503AMB-1	7/12/2011	<0.013	0.40	0.42	<0.055	0.16	<0.040	<0.020
503AMB-2	7/12/2011	<0.013	0.19	0.19	<0.056	<0.056	<0.040	<0.020
503/554OUT-1	7/12/2011	<0.013	0.031	<0.14	<0.055	<0.055	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

Indoor air samples were collected over 8 hours.

Outdoor air sample was collected over 24 hours to coincide with sampling at adjacent Building 554.

<0.040 - denotes result was below respective reporting limit

**TABLE V**  
**AIR SAMPLING RESULTS - BUILDING 543**  
**MOFFETT FIELD, CALIFORNIA**

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
543AMB-1	7/14/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
543AMB-1*	7/14/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
543AMB-2	7/14/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
543HVAC-1	7/14/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

Indoor air samples were collected over 24 hours.

HVAC sample was collected over 24 hours.

\* - denotes duplicate co-located sample

<0.040 - denotes result was below respective reporting limit

**TABLE VI**  
**AIR SAMPLING RESULTS - BUILDING 554**  
**MOFFETT FIELD, CALIFORNIA**

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
554AMB-1	7/12/2011	<0.013	0.58	<0.14	<0.055	<0.055	<0.040	<0.020
554AMB-2	7/12/2011	<0.013	0.23	<0.14	<0.055	<0.055	<0.040	<0.020
503/554OUT-1	7/12/2011	<0.013	0.031	<0.14	<0.055	<0.055	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 24 hours.  
 Outdoor air sample was collected over 24 hours.  
 <0.040 - denotes result was below respective reporting limit

**TABLE VII**  
**AIR SAMPLING RESULTS - BUILDING 569**  
**MOFFETT FIELD, CALIFORNIA**

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
569AMB-1	7/14/2011	<0.013	0.044	0.16	<0.056	<0.056	<0.040	<0.020
569AMB-2	7/14/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
569OUT-1	7/14/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 8 hours.  
 Outdoor air sample was collected over 8 hours.  
 <0.040 - denotes result was below respective reporting limit

**TABLE VIII**  
**AIR SAMPLING RESULTS - BUILDING 583A**  
**MOFFETT FIELD, CALIFORNIA**

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
583AAMB-1	7/11/2011	<0.013	0.035	<0.14	<0.056	<0.056	<0.040	<0.020
583AAMB-2	7/11/2011	<0.013	0.054	<0.14	<0.055	<0.055	<0.040	<0.020
583A/583BOUT-1	7/11/2011	<0.013	0.079	<0.14	<0.056	<0.056	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 24 hours.  
 Outdoor air sample was collected over 24 hours.  
 <0.040 - denotes result was below respective reporting limit

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
583BAMB-1	7/11/2011	<0.013	0.036	<0.14	<0.055	<0.055	0.14	<0.020
583BAMB-2	7/12/2011	<0.013	0.10	<0.14	<0.056	<0.056	0.079	<0.020
583BAMB-3	7/12/2011	<0.013	0.044	<0.14	<0.056	<0.056	<0.040	<0.020
583A/583BOUT-1	7/11/2011	<0.013	0.079	<0.14	<0.056	<0.056	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 24 hours.  
 Outdoor air sample was collected over 24 hours.  
 <0.040 - denotes result was below respective reporting limit

**TABLE X**  
 AIR SAMPLING RESULTS - BUILDING 583C  
 MOFFETT FIELD, CALIFORNIA

<b>Normal Occupancy Indoor Air Sampling Results</b>								
Sample ID	Date	Vinyl chloride	TCE	PCE	trans-1,2-DCE	cis-1,2-DCE	1,1-DCE	1,1-DCA
583CAMB-1	7/11/2011	<0.013	0.065	<0.14	<0.056	<0.056	<0.040	<0.020
583CAMB-2	7/11/2011	<0.013	0.33	<0.14	<0.055	0.13	<0.040	<0.020
583CAMB-3	7/11/2011	<0.013	0.26	<0.14	<0.056	0.078	<0.040	<0.020
583CHVAC-1	7/11/2011	<0.013	0.041	<0.14	<0.056	<0.056	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 24 hours.  
 HVAC sample was collected over 24 hours.  
 <0.040 - denotes result was below respective reporting limit

**TABLE XI**  
**AIR SAMPLING RESULTS - BUILDING 596**  
**MOFFETT FIELD, CALIFORNIA**

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
596AMB-1	7/12/2011	<0.013	1.0	<0.14	<0.055	0.14	<0.040	<0.020
596AMB-2	7/12/2011	<0.013	1.9	<0.14	<0.055	0.16	<0.040	<0.020
596HVAC-1	7/12/2011	<0.013	0.098	<0.14	<0.055	0.14	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).  
 Indoor air samples were collected over 24 hours.  
 HVAC sample was collected over 24 hours.  
 <0.040 - denotes result was below respective reporting limit

**TABLE XII**  
**AIR SAMPLING RESULTS - BUILDING 944**  
**MOFFETT FIELD, CALIFORNIA**

<b>Normal Occupancy Indoor Air Sampling Results</b>								
<b>Sample ID</b>	<b>Date</b>	<b>Vinyl chloride</b>	<b>TCE</b>	<b>PCE</b>	<b>trans-1,2-DCE</b>	<b>cis-1,2-DCE</b>	<b>1,1-DCE</b>	<b>1,1-DCA</b>
944AMB-1	7/13/2011	<0.013	<0.027	<0.14	<0.056	<0.056	<0.040	<0.020
944AMB-1*	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
944HVAC-1	7/13/2011	<0.013	<0.027	<0.14	<0.055	<0.055	<0.040	<0.020
<b>Short-Term Action Levels</b>								
Acute (14 days)		1,300	11,000	1,400	800	NA	NA	NA
Intermediate (15 - 365 days)		80	540	NA	800	NA	80	NA
<b>Long-Term Cleanup Level</b>								
Commercial		2	5	2	210	210	700	6

**Notes:**

All units are micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

Indoor air samples were collected over 24 hours.

HVAC sample was collected over 24 hours.

\* - denotes duplicate co-located sample

<0.040 - denotes result was below respective reporting limit

**TABLE XIII**  
**QUALITY CONTROL RESULTS**  
**MOFFETT FIELD, CALIFORNIA**

Sample Date	Contaminant	23AMB-1	23DUP-1	RPD
14-Jul-11	Vinyl Chloride	<0.013	<0.013	---
	Trichloroethene	0.12	0.12	0
	Tetrachloroethene	<0.14	<0.14	---
	trans-1,2-Dichloroethene	<0.056	<0.055	---
	cis-1,2-Dichloroethene	<0.056	<0.055	---
	1,1-Dichloroethene	<0.040	<0.040	---
	1,1-Dichloroethane	<0.020	<0.020	---

Sample Date	Contaminant	23AMB-3	23DUP-2	RPD
14-Jul-11	Vinyl Chloride	<0.013	<0.013	---
	Trichloroethene	0.27	0.27	0
	Tetrachloroethene	<0.14	<0.14	---
	trans-1,2-Dichloroethene	<0.056	<0.056	---
	cis-1,2-Dichloroethene	0.12	0.11	9
	1,1-Dichloroethene	<0.040	<0.040	---
	1,1-Dichloroethane	<0.020	<0.020	---

Sample Date	Contaminant	48AMB-3	48DUP-2	RPD
13-Jul-11	Vinyl Chloride	<0.013	<0.013	---
	Trichloroethene	<0.027	<0.027	---
	Tetrachloroethene	<0.14	<0.14	---
	trans-1,2-Dichloroethene	<0.055	<0.055	---
	cis-1,2-Dichloroethene	<0.055	<0.055	---
	1,1-Dichloroethene	<0.040	<0.040	---
	1,1-Dichloroethane	<0.020	<0.020	---

Sample Date	Contaminant	48OUT-1	48DUP-1	RPD
13-Jul-11	Vinyl Chloride	<0.013	<0.013	---
	Trichloroethene	<0.027	<0.027	---
	Tetrachloroethene	<0.14	<0.14	---
	trans-1,2-Dichloroethene	<0.055	<0.056	---
	cis-1,2-Dichloroethene	<0.055	<0.056	---
	1,1-Dichloroethene	<0.040	<0.040	---
	1,1-Dichloroethane	<0.020	<0.020	---

Sample Date	Contaminant	543AMB-1	543DUP-1	RPD
14-Jul-11	Vinyl Chloride	<0.013	<0.013	---
	Trichloroethene	<0.027	<0.027	---
	Tetrachloroethene	<0.14	<0.14	---
	trans-1,2-Dichloroethene	<0.055	<0.055	---
	cis-1,2-Dichloroethene	<0.055	<0.055	---
	1,1-Dichloroethene	<0.040	<0.040	---
	1,1-Dichloroethane	<0.020	<0.020	---

Sample Date	Contaminant	944AMB-1	944DUP-1	RPD
13-Jul-11	Vinyl Chloride	<0.013	<0.013	---
	Trichloroethene	<0.027	<0.027	---
	Tetrachloroethene	<0.14	<0.14	---
	trans-1,2-Dichloroethene	<0.056	<0.055	---
	cis-1,2-Dichloroethene	<0.056	<0.055	---
	1,1-Dichloroethene	<0.040	<0.040	---
	1,1-Dichloroethane	<0.020	<0.020	---

**Notes:**

All units are micrograms per liter (µg/L)

<0.040 Result was below respective reporting limit

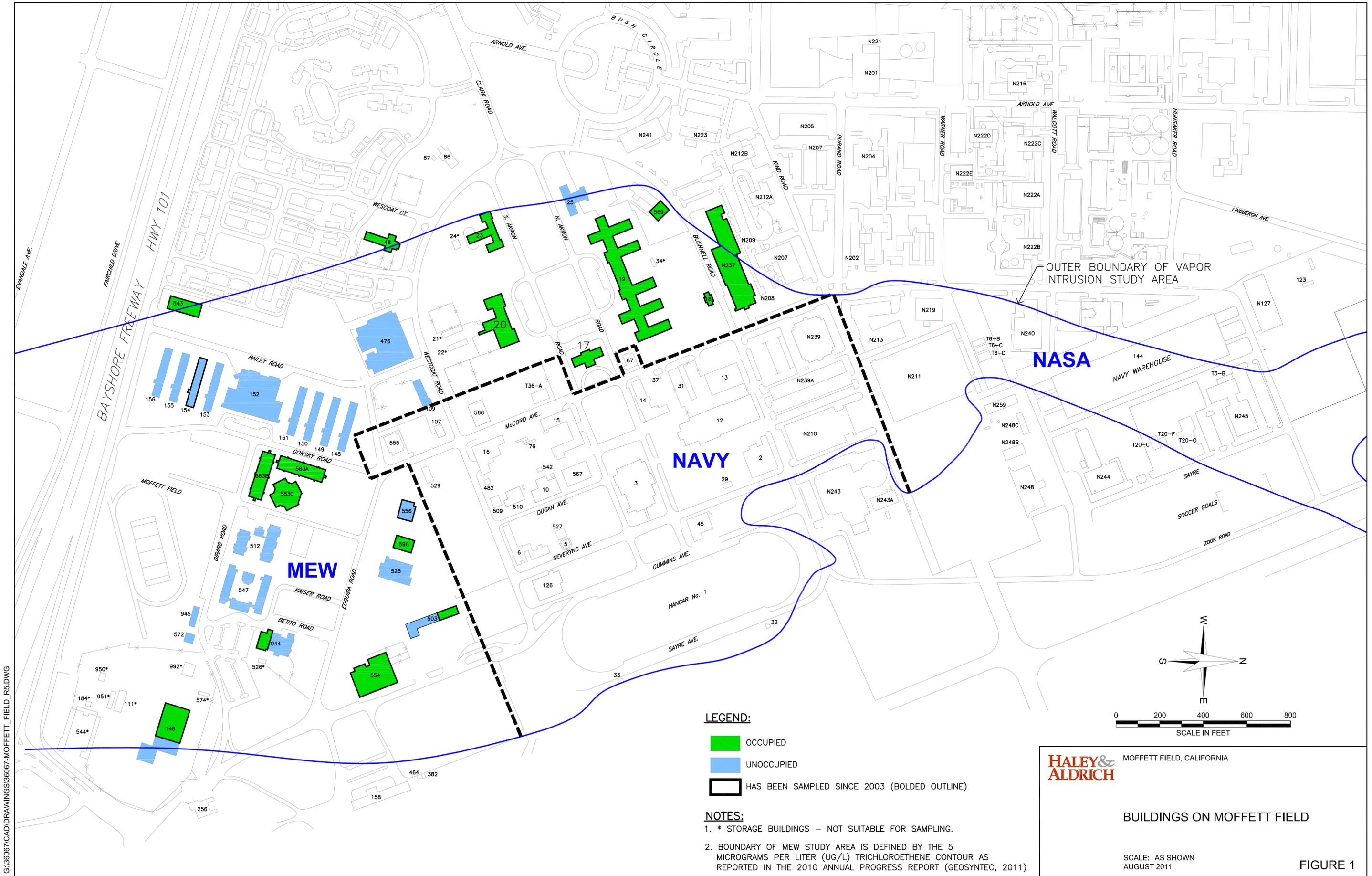
RPD Relative percent difference =  $|X_1 - X_2| / X_3 \times 100$

where:  $X_1$  = concentration of the sample

$X_2$  = concentration of the duplicate

$X_3$  = average  $X_1$  and  $X_2$

## **FIGURES**



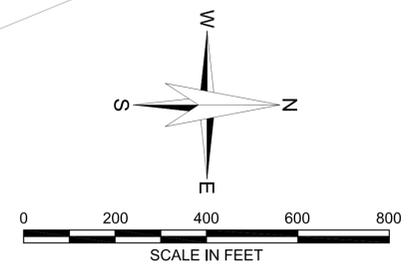
G:\36067\CADDRAWINGS\36067-MOFFETT\_FIELD\_R5.DWG

**LEGEND:**

- OCCUPIED
- UNOCCUPIED
- HAS BEEN SAMPLED SINCE 2003 (BOLDED OUTLINE)

**NOTES:**

1. \* STORAGE BUILDINGS – NOT SUITABLE FOR SAMPLING.
2. BOUNDARY OF MEW STUDY AREA IS DEFINED BY THE 5 MICROGRAMS PER LITER (UG/L) TRICHLOROETHENE CONTOUR AS REPORTED IN THE 2010 ANNUAL PROGRESS REPORT (GEOSYNTEC, 2011)



**HALEY & ALDRICH**

MOFFETT FIELD, CALIFORNIA

**BUILDINGS ON MOFFETT FIELD**

SCALE: AS SHOWN  
AUGUST 2011

**FIGURE 1**

23AMB-1	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.12
Vinyl chloride	ND (0.013)

23DUP-1	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.12
Vinyl chloride	ND (0.013)

23DUP-2	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	0.11
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.27
Vinyl chloride	ND (0.013)

23AMB-3	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	0.12
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.27
Vinyl chloride	ND (0.013)

23OUT-1	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

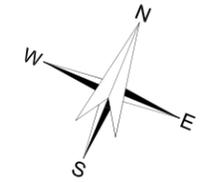
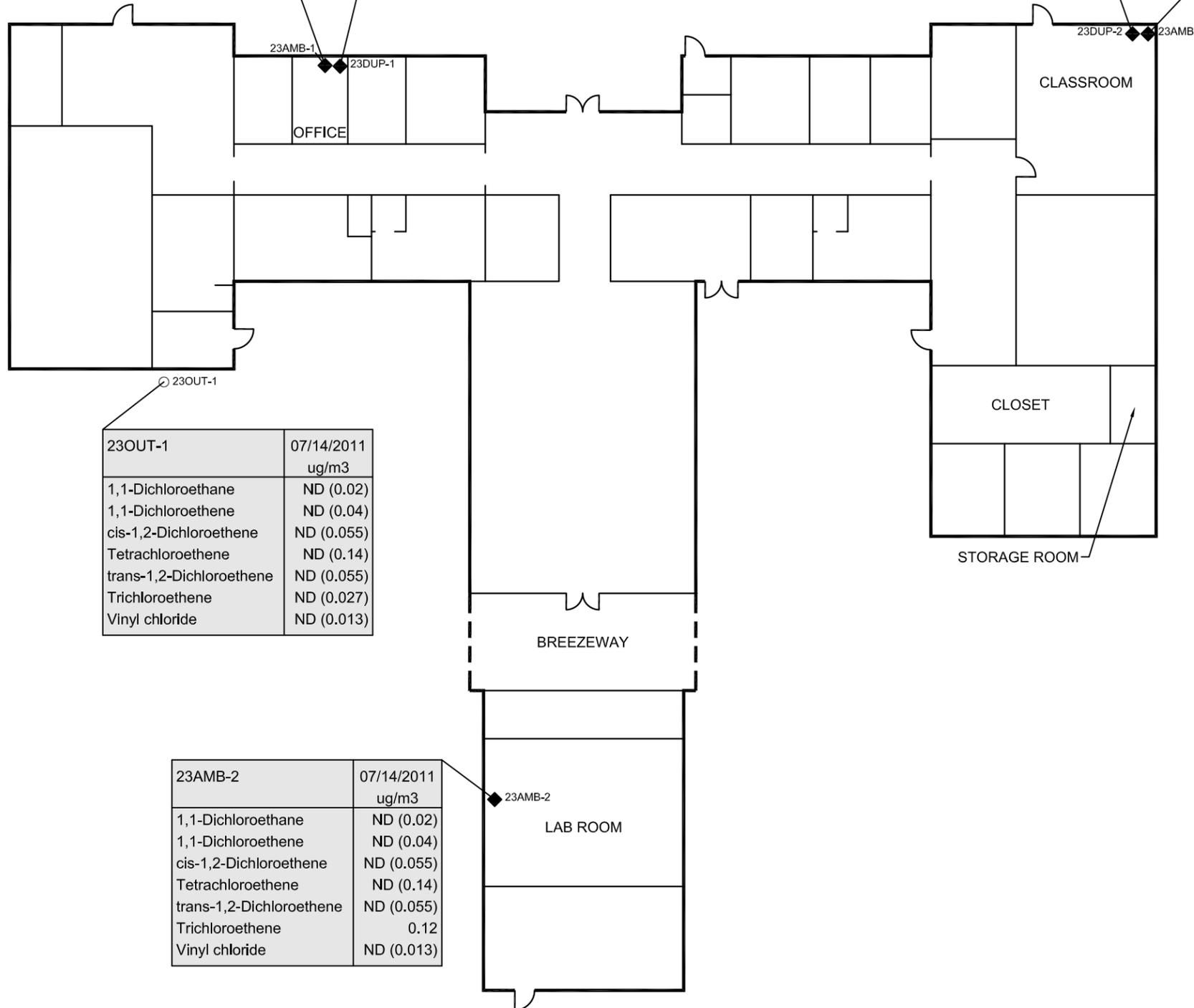
23AMB-2	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.12
Vinyl chloride	ND (0.013)

**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 24 HOURS.



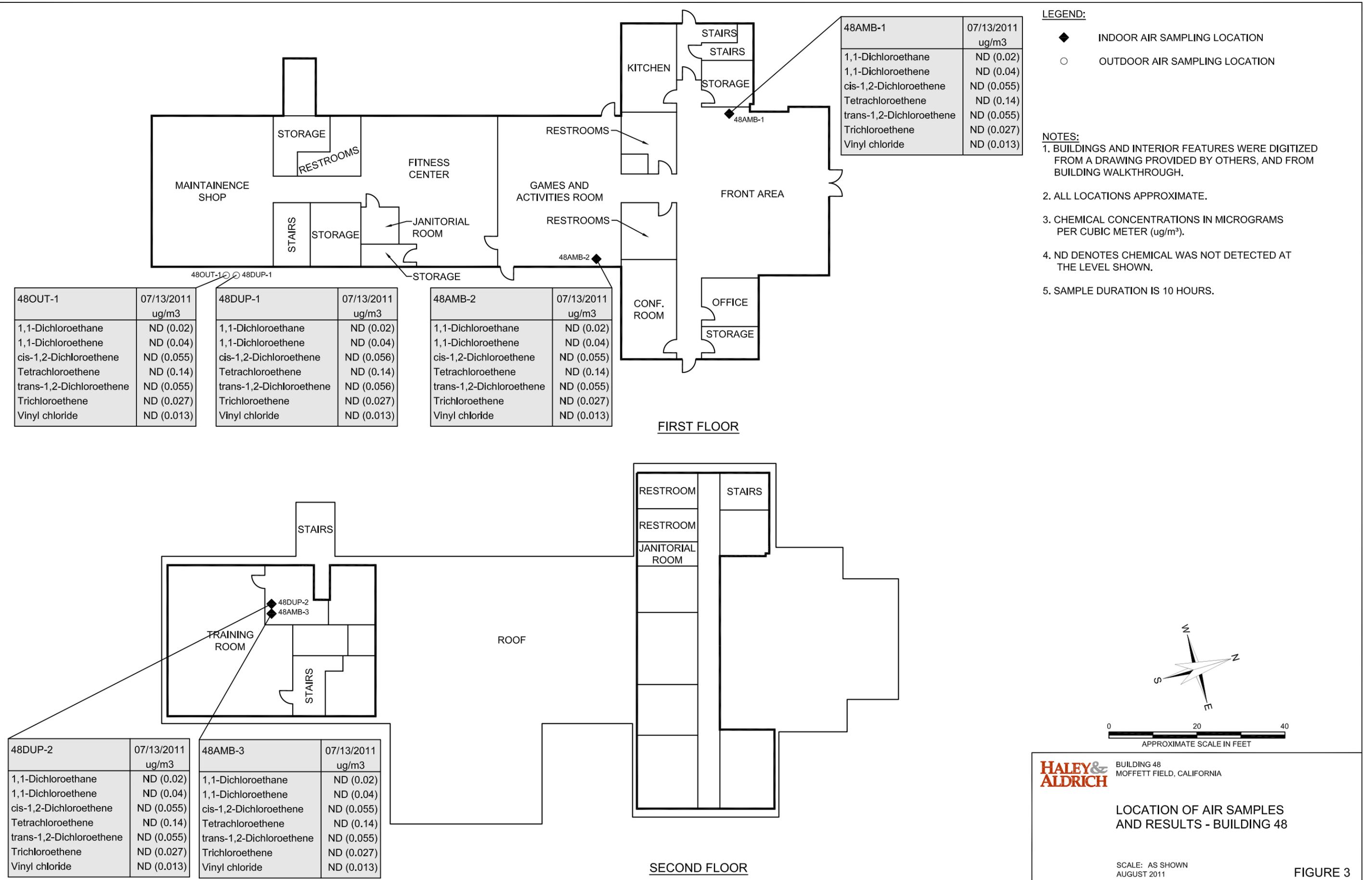
**HALEY & ALDRICH** BUILDING 23  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES  
AND RESULTS - BUILDING 23**

SCALE: AS SHOWN  
AUGUST 2011

**FIGURE 2**

G:\36067\009\CAD\DRAWINGS\36067-48\_WESCOAT\_CT-CHEM\_DATA.DWG



146AMB-3	07/13/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

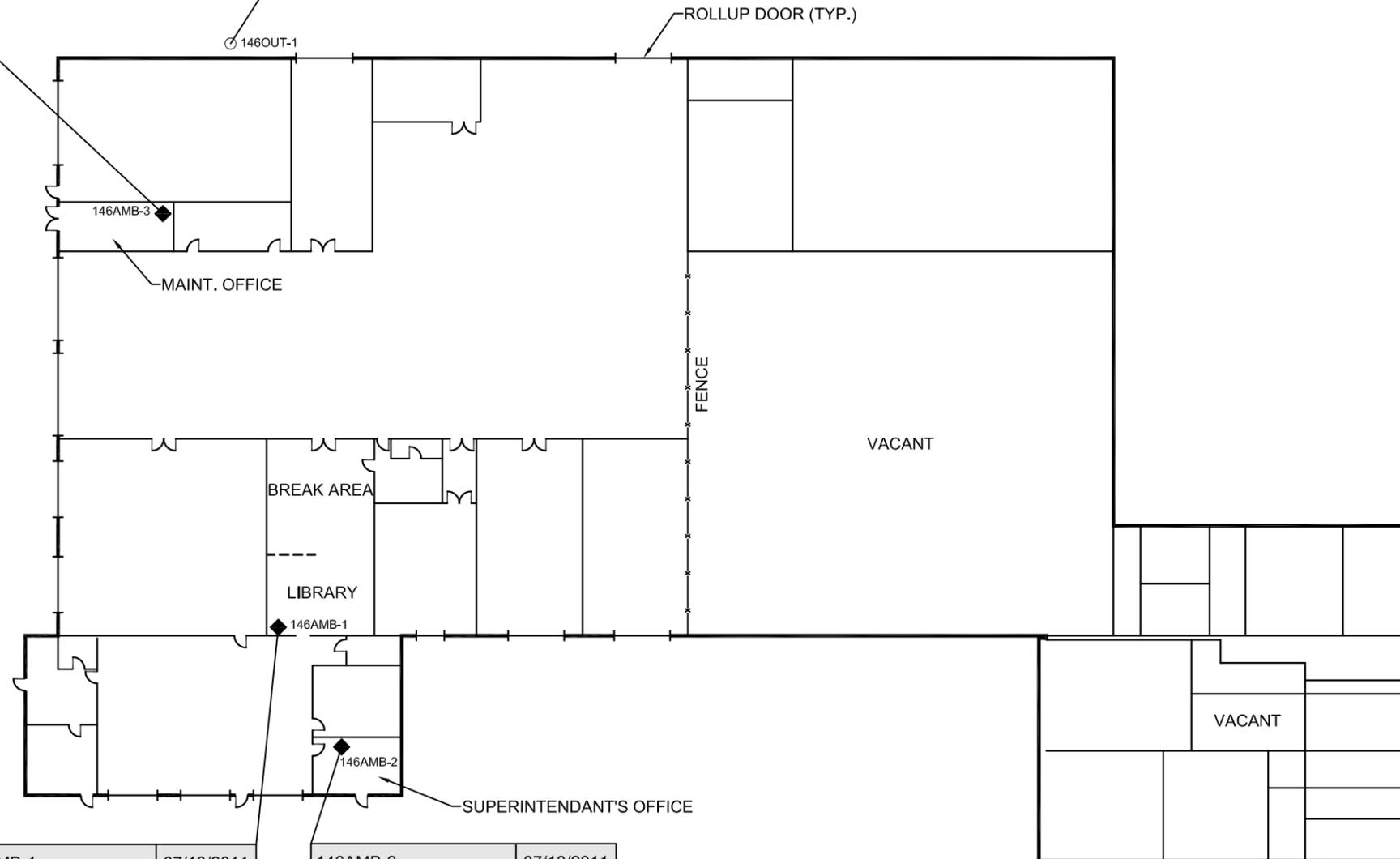
146OUT-1	07/13/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

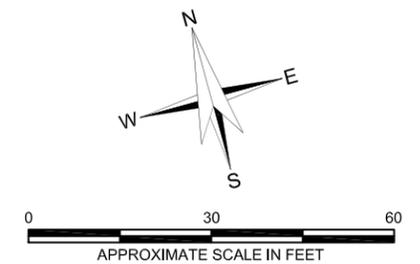
**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 10 HOURS.



146AMB-1	07/13/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

146AMB-2	07/13/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)



**HALEY & ALDRICH**

BUILDING 146  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES  
AND RESULTS - BUILDING 146**

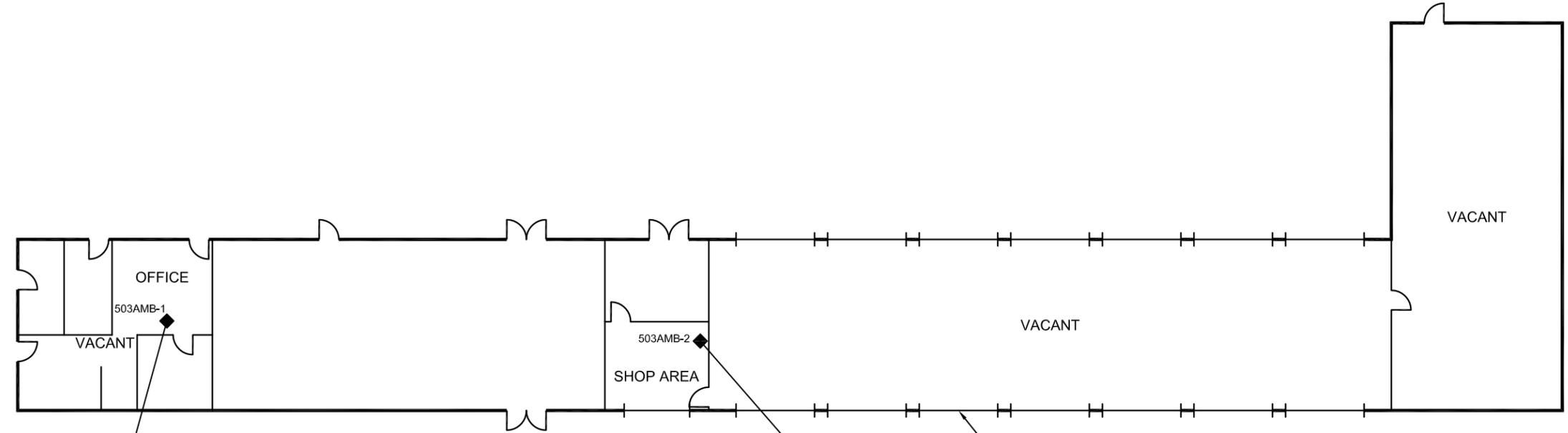
SCALE: AS SHOWN  
AUGUST 2011

**FIGURE 4**

G:\36067\009\CAD\DRAWINGS\36067-503\_CODY\_RD-CHEM\_DATA.DWG

503/554OUT-1	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.031
Vinyl chloride	ND (0.013)

503/554OUT-1



503AMB-1	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	0.16
Tetrachloroethene	0.42
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.40
Vinyl chloride	ND (0.013)

503AMB-2	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	0.19
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.19
Vinyl chloride	ND (0.013)

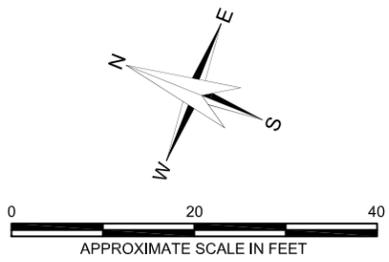
ROLLUP DOOR (TYP.)

**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 8 HOURS.



**HALEY & ALDRICH** BUILDING 503  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES AND RESULTS - BUILDING 503**

SCALE: AS SHOWN  
AUGUST 2011

**FIGURE 5**

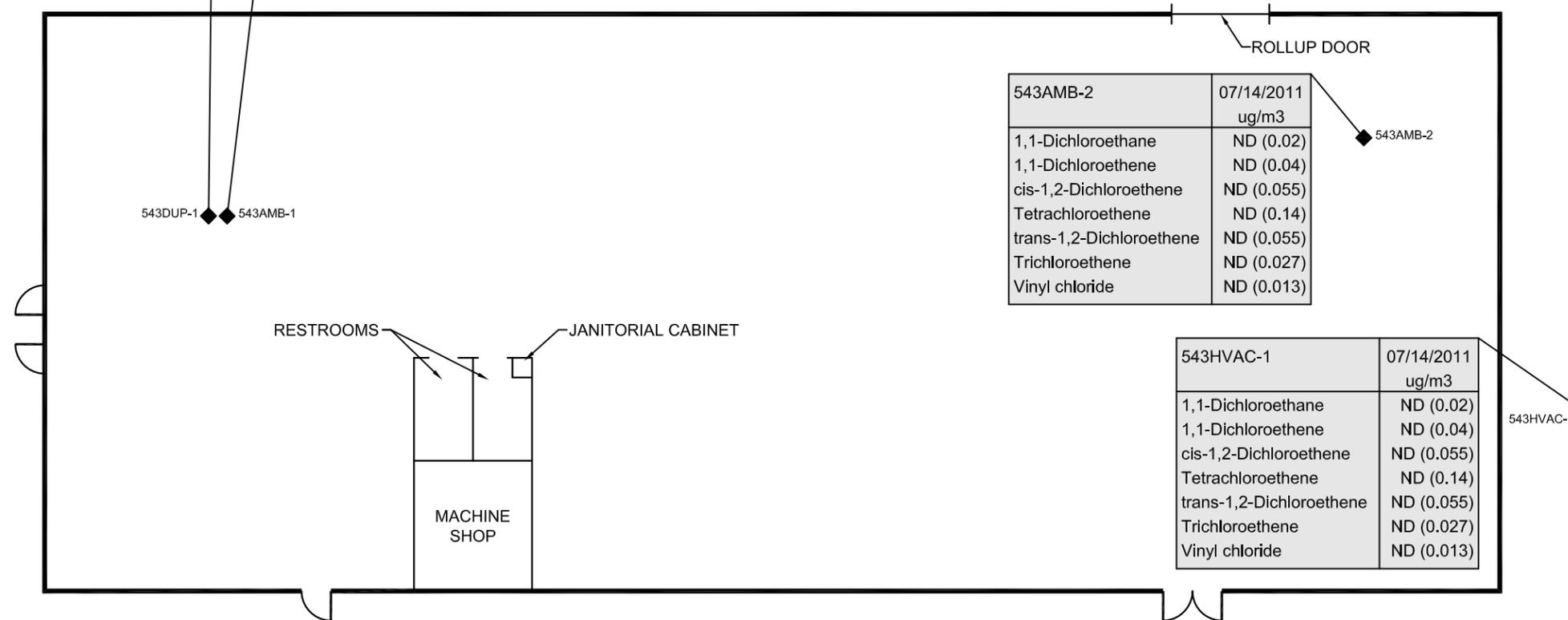
G:\36067\009\CAD\DRAWINGS\36067-543\_s\_PERIMETER-CHEM\_DATA.DWG

543DUP-1	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

543AMB-1	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

543AMB-2	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

543HVAC-1	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

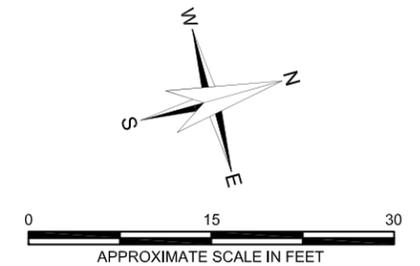


**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 24 HOURS.



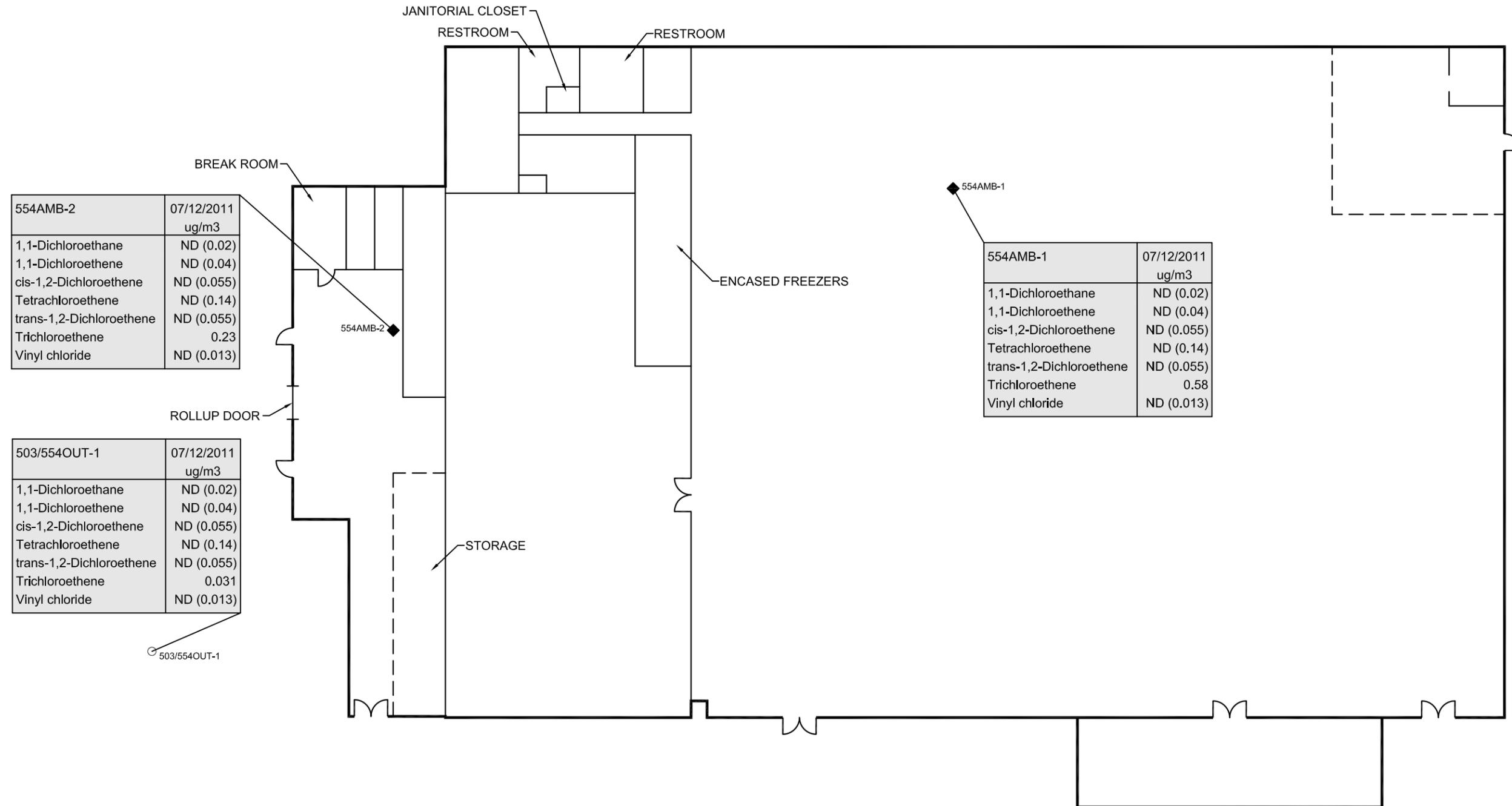
**HALEY & ALDRICH** BUILDING 543  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES  
AND RESULTS - BUILDING 543**

SCALE: AS SHOWN  
AUGUST 2011

**FIGURE 6**

G:\136067\009\CAD\DRAWINGS\38067-554\_CODY\_RD-CHEM\_DATA.DWG



554AMB-2	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.23
Vinyl chloride	ND (0.013)

503/554OUT-1	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.031
Vinyl chloride	ND (0.013)

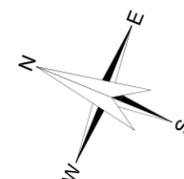
554AMB-1	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.58
Vinyl chloride	ND (0.013)

**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 24 HOURS.



BUILDING 554  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES  
AND RESULTS - BUILDING 554**

SCALE: AS SHOWN  
AUGUST 2011

**FIGURE 7**

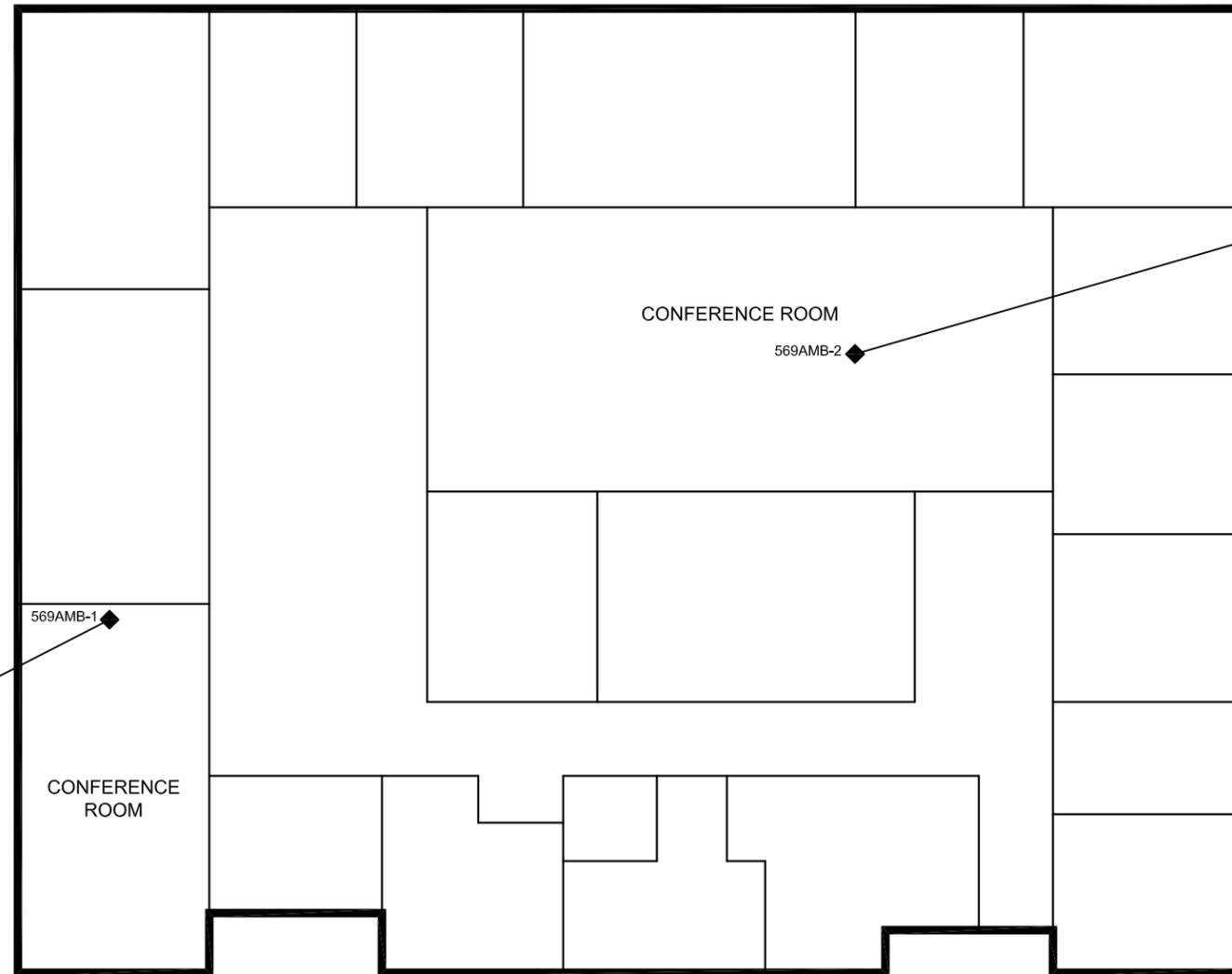
G:\36067\009\CAD\DRAWINGS\36067-569\_BUSHNELL\_RD-CHEM\_DATA.DWG

**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

**NOTES:**

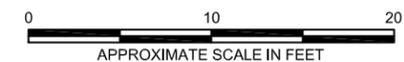
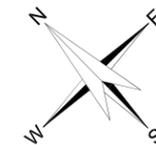
1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 8 HOURS.



569AMB-1	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	0.16
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.044
Vinyl chloride	ND (0.013)

569AMB-2	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

569OUT-1	07/14/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)



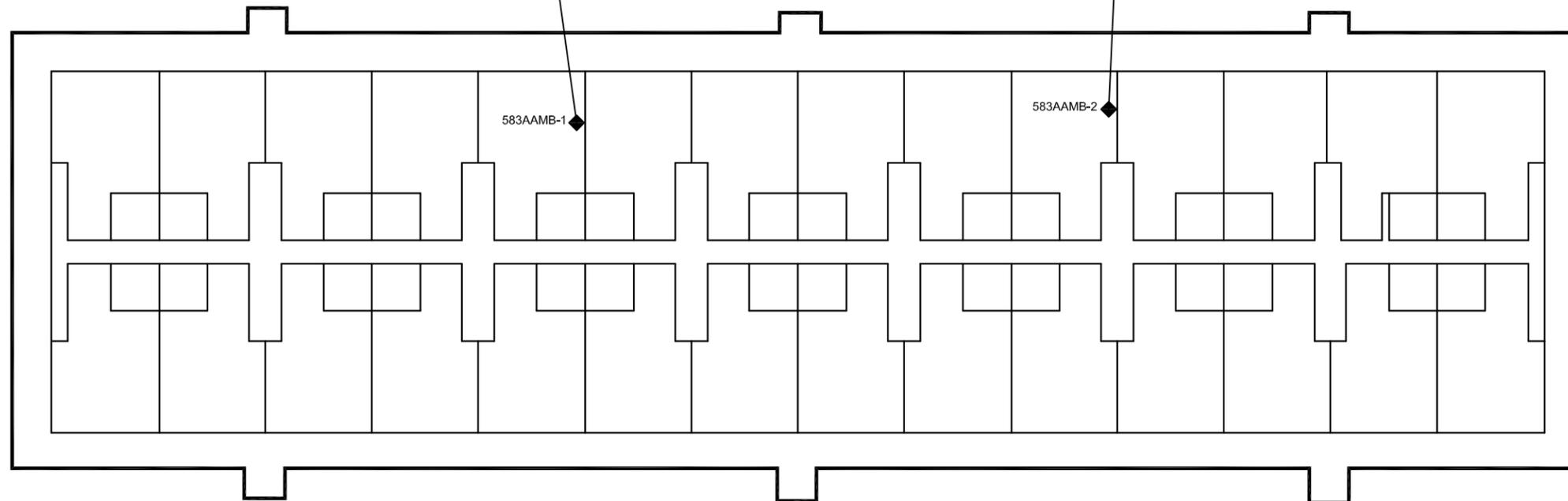
**HALEY & ALDRICH** BUILDING 569  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES  
AND RESULTS - BUILDING 569**

SCALE: AS SHOWN  
AUGUST 2011

583AAMB-1	07/11/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.035
Vinyl chloride	ND (0.013)

583AAMB-2	07/11/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.054
Vinyl chloride	ND (0.013)



583A/583BOUT-1

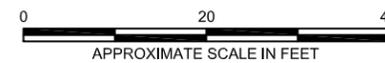
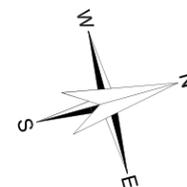
583A/583BOUT-1	07/11/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.079
Vinyl chloride	ND (0.013)

**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 24 HOURS.



**HALEY & ALDRICH** BUILDING 583A  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES  
AND RESULTS - BUILDING 583A**

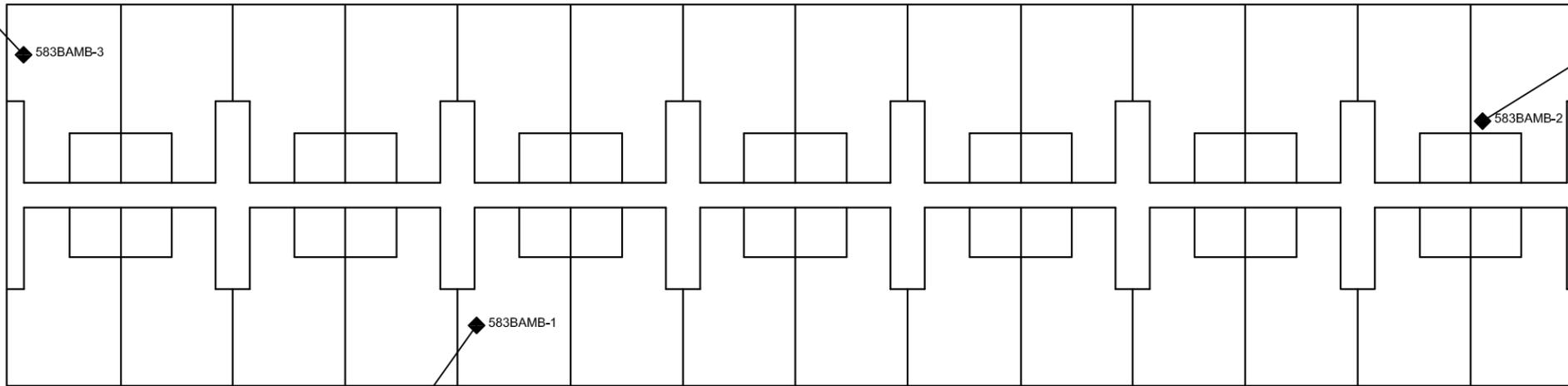
SCALE: AS SHOWN  
AUGUST 2011

**FIGURE 9**

583A/583BOUT-1	07/11/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.079
Vinyl chloride	ND (0.013)

583A/583BOUT-1

583BAMB-3	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.044
Vinyl chloride	ND (0.013)



583BAMB-2	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	0.079
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	0.10
Vinyl chloride	ND (0.013)

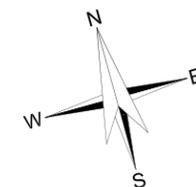
583BAMB-1	07/11/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	0.14
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.036
Vinyl chloride	ND (0.013)

**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 24 HOURS.

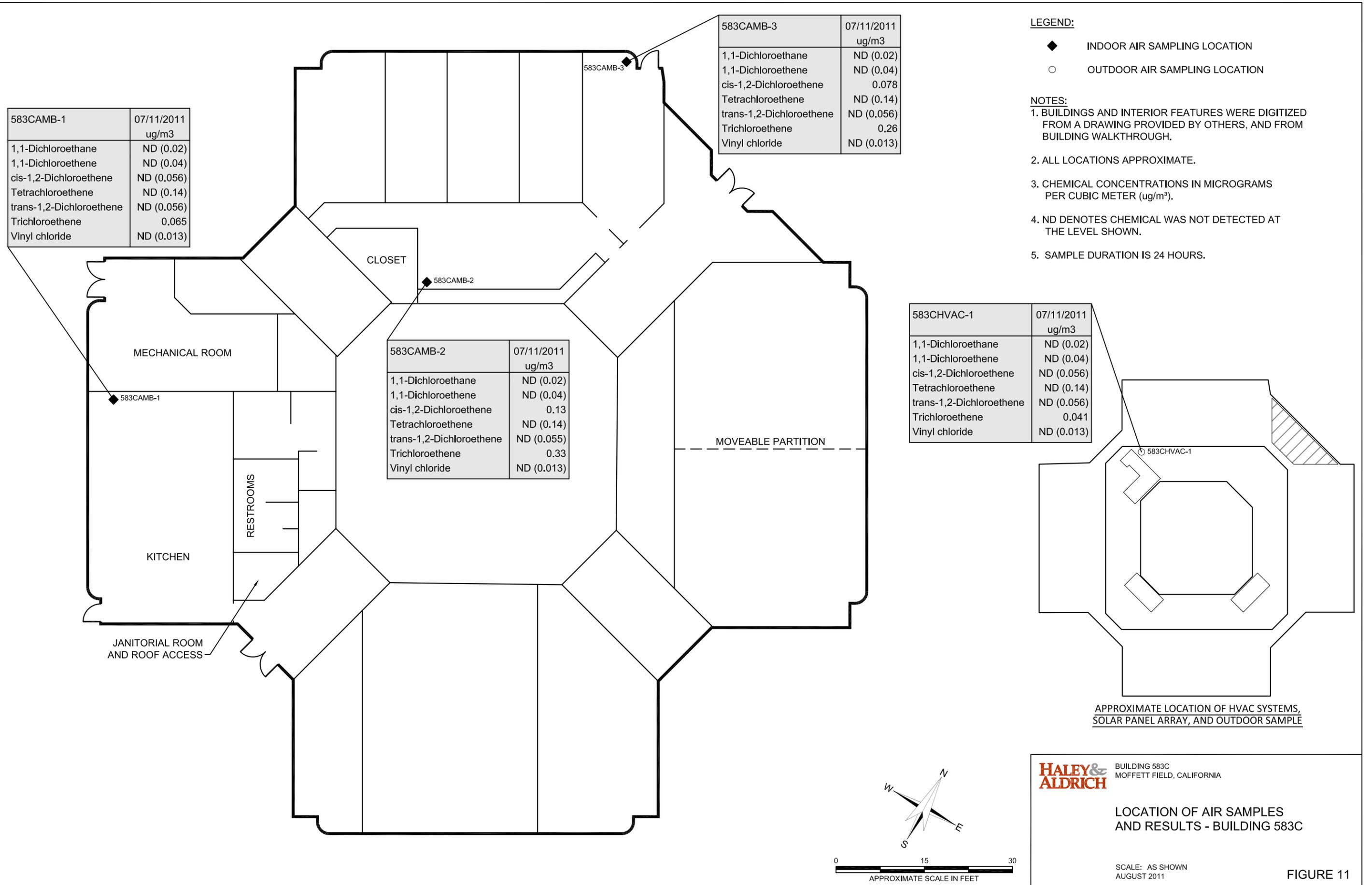


**HALEY & ALDRICH** BUILDING 583B  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES  
AND RESULTS - BUILDING 583B**

SCALE: AS SHOWN  
AUGUST 2011

G:\36067\009\CAD\DRAWINGS\36067-583\_DAILEY\_RD-CHEM\_DATA.DWG

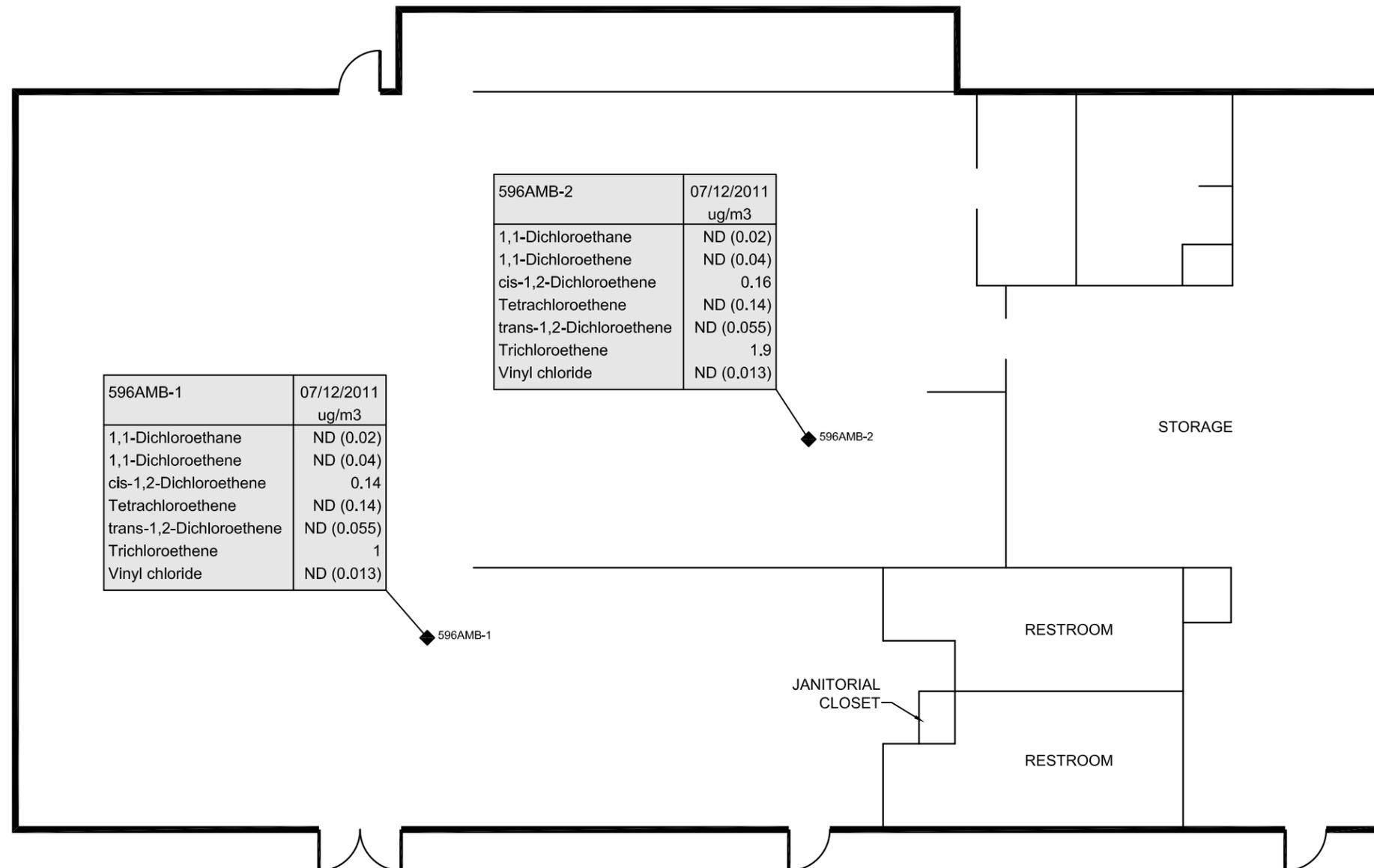


**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

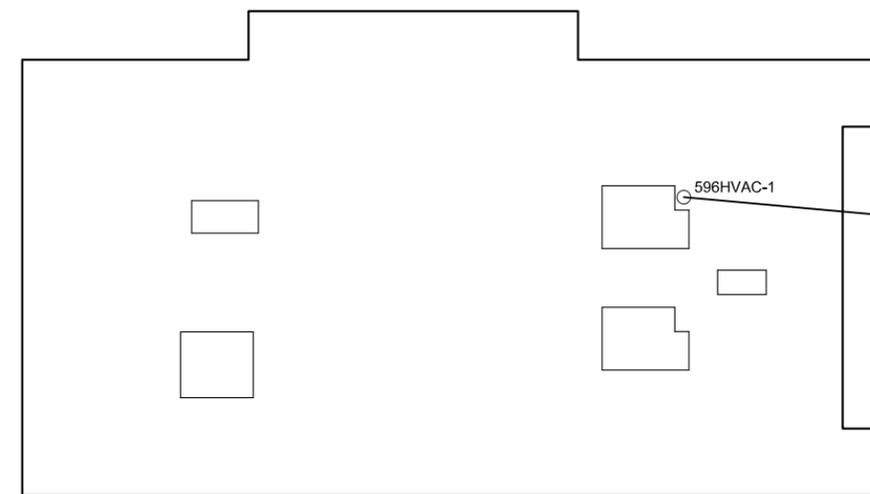
**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 24 HOURS.

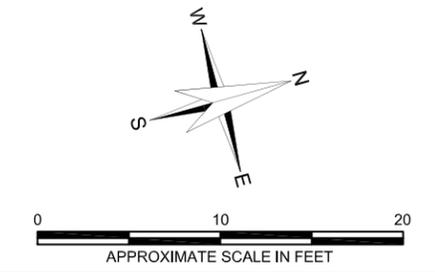


596AMB-1	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	0.14
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	1
Vinyl chloride	ND (0.013)

596AMB-2	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	0.16
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	1.9
Vinyl chloride	ND (0.013)



596HVAC-1	07/12/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	0.14
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	0.098
Vinyl chloride	ND (0.013)



APPROXIMATE LOCATION OF HVAC SYSTEMS AND OUTDOOR SAMPLE

**HALEY & ALDRICH** BUILDING 596  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES AND RESULTS - BUILDING 596**

SCALE: AS SHOWN  
AUGUST 2011

**FIGURE 12**

**LEGEND:**

- ◆ INDOOR AIR SAMPLING LOCATION
- OUTDOOR AIR SAMPLING LOCATION

**NOTES:**

1. BUILDINGS AND INTERIOR FEATURES WERE DIGITIZED FROM A DRAWING PROVIDED BY OTHERS, AND FROM BUILDING WALKTHROUGH.
2. ALL LOCATIONS APPROXIMATE.
3. CHEMICAL CONCENTRATIONS IN MICROGRAMS PER CUBIC METER (ug/m<sup>3</sup>).
4. ND DENOTES CHEMICAL WAS NOT DETECTED AT THE LEVEL SHOWN.
5. SAMPLE DURATION IS 24 HOURS.

944HVAC-1	07/13/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

944DUP-1	07/13/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.055)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.055)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

944AMB-1	07/13/2011 ug/m3
1,1-Dichloroethane	ND (0.02)
1,1-Dichloroethene	ND (0.04)
cis-1,2-Dichloroethene	ND (0.056)
Tetrachloroethene	ND (0.14)
trans-1,2-Dichloroethene	ND (0.056)
Trichloroethene	ND (0.027)
Vinyl chloride	ND (0.013)

944HVAC-1 ○

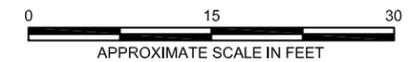
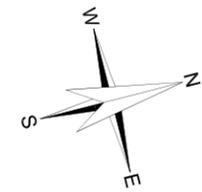
◆ 944DUP-1  
◆ 944AMB-1

RESTROOMS

VACANT

VACANT

VACANT



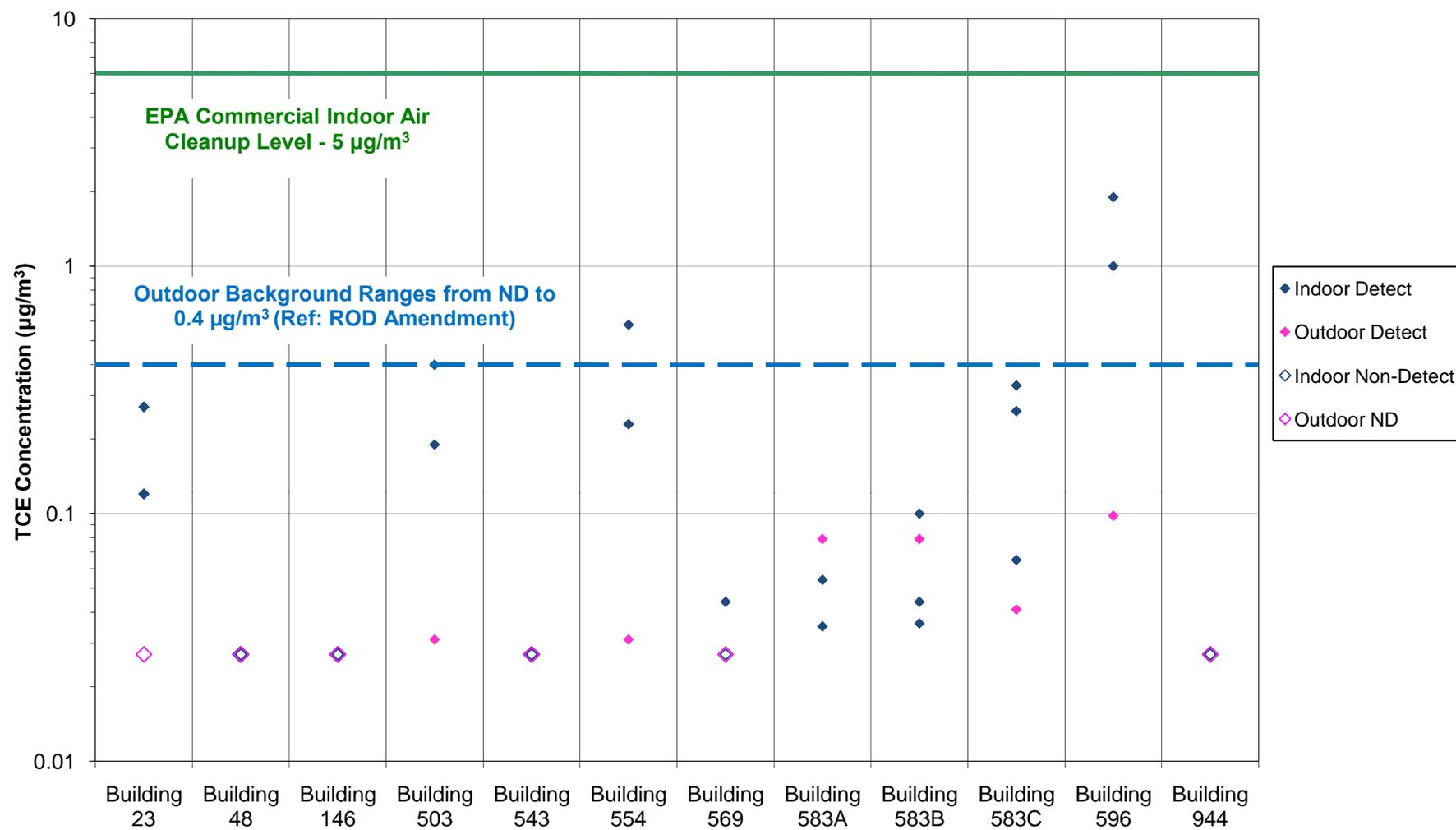
**HALEY & ALDRICH**

BUILDING 944  
MOFFETT FIELD, CALIFORNIA

**LOCATION OF AIR SAMPLES  
AND RESULTS - BUILDING 944**

SCALE: AS SHOWN  
AUGUST 2011

Figure 14: TCE Indoor and Outdoor Air Concentrations - July 2011



## **APPENDIX A**

### **Building Questionnaire Forms**

**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 06/24/2011

BUILDING: Building 23

**Owner/Developer/Property Manager**

Contact Name: Hector D.B. Rastrullo, Director, Business & Finance, Carnegie Mellon

Address: Building 23 (MS 23-11), P.O. Box 1

Moffett Field, CA 94035

Phone: Office: (650) 335-2823; Cell: (510) 449-7528

Email: Hector.Rastrullo@sv.cmu.edu

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Wood-framed

---

How many occupied stories does the building have? 2

What year was the building constructed? 1930s

What type of basement does the building have? (Check all that apply)

None      Full basement      Other (specify): Partial basement (unoccupied)

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

Not used       Office space      Storage Utilities      Other (specify): \_\_\_\_\_

What are the characteristics of the basement? (Check all that apply)

Basement floor:    Concrete       Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete       Other (specify): \_\_\_\_\_

Moisture:            Dry    Wet    Damp    Other (specify): Wet in winter months. Sump pumps on east and west side of basement.

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

Concrete       Carpeted      Tiled      Stone

Cracks              Seams              Other (specify): Also has crawl space

Are drains or sumps present? (Y/N) N Describe each, including information on contents :

---

Are elevator shafts present? (Y/N) N Describe each: Elevator does not extend into the ground.

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

Computer research lab, basement

---

## INDOOR AIR QUALITY BUILDING SURVEY

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Y Describe each:

Conduit in electrical room in basement, and closed conduit in an adjacent room.

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

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

### **Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? \_\_\_\_\_

How Many? 28

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

13 units in attic (12 with outside air intakes, none with economizers); 15 units in basement (all with outside air intakes, none with economizers)

## INDOOR AIR QUALITY BUILDING SURVEY

Also see table attached to this survey.

---

---

Other (specify and describe):

---

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans      Open windows      Restroom vent fans

Other (specify):

---

Who maintains and manages the HVAC system operation?  Not known

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends:  HVAC system operates 24 hours a day seven days a week. Additional information is provided in the attached table.

---

---

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

Natural gas      Electric      Solar      Other (specify):

---

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

Describe:  See list of chemicals on next page

---

## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	Basement
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	
Lubricants	Computer research lab
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Computer research lab
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	Computer research lab
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

8AM to 9PM

---

Do the occupants of the building frequently have their clothes dry-cleaned? (Y/N) Not known

Was there any recent remodeling or painting done in the building? (Y/N) N

When and where was the most recent carpeting applied in the building? Not known

Were glues used to attach the carpeting to the floor slab? (Y/N) Not known

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling,





### Building 23 Basement

Date	HVAC #	Make	Model	Serial Number	Disconnect On/Off	Status	OSA Intake	OSA Temp	Package Unit (y/n)	OSA Damper % on Computer	Actual OSA Damper %	Static	VFD Fan Speed	Coil Size	Coil AK	Coil Avg FMP using Velgrid	Coil CFM	Exhaust Capacity	HVAC # (Cont)	OSA Opening Size	OSA AK	Economizer	Economizer OSA Damper %	Avg FPM	OSA CFM	Note	
7/1/2011	BHP1	Trane	HP3-7 GEHB03641H0110LR	W03C11477	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP1	12" Round	0.78	No	100%	692	545		
7/1/2011	BHP2	Trane	HP3-8 GEHB04241H0110LR	W03C11478	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP2	12" Round	0.78	No	100%	596	465		
7/1/2011	BHP3	Trane	HP3-9 GEHB04841H0110BR	W03C11479	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP3	10" Round	0.54	No	100%	440	240		
7/1/2011	BHP4	Trane	HP3-6 GEHB03041H0110BL	W03C11476	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP4	10" Round	0.54	No	100%	504	275		
7/1/2011	BHP5	Trane	HP3-22 GEHB01811H0110BR	W03C11480	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP5	6" Round	0.19	No	100%	534	100		
7/1/2011	BHP6	Trane	HP3-5 GEHB01811H0110LR	W03C11475	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP6	8" Round	0.34	No	100%	514	180		
7/1/2011	BHP7	Trane	HP3-2 GEHB02411H0110BR	W03C11473	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP7	6" Round	0.19	No	100%	563	105		
7/1/2011	BHP8	Trane	HP3-4 WPHD08041J10AA31	W03C11483	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP8	10" Round	0.54	No	100%	1248	680		
7/1/2011	BHP9	Trane	HP3-3 GEHB03641H0010LR	W03C11474	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP9	10" Round	0.54	No	50%	0	0		
7/1/2011	BHP10	Trane	HPn/a GEHB02411T0100RLD	W08J45566	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP10	6" Round	0.19	No	100%	0	0		
7/1/2011	BHP11	Trane	HP3-1 WPHD008041J10AA31	W03C11482	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BHP11	14" Round	1.07	No	100%	771	825		
7/1/2011	BFAN1	DNL	DNL	DNL	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BFAN1	14" Round	1.07	No	100%	533	570		
7/1/2011	BFAN2	DNL	DNL	DNL	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BFAN2	14" Round	1.07	No	100%	701	750		
7/1/2011	BFAN3	DNL	DNL	DNL	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BFAN3	14" Round	1.07	No	100%	341	365		
7/1/2011	BFAN4	DNL	DNL	DNL	On	On	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	BFAN4	14" Round	1.07	No	100%	434	465		

KEY                      DNL = Data Not Labled, FPM = Feet Per Min, OSA= Outside Air, CFM = Cubic Feet Per Min

**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 06/24/2011

BUILDING: Building 48

**Owner/Developer/Property Manager**

Contact Name: Selena Gillette

Address:

Phone: Office: (650) 965-1754; Cell: (650) 284-9009

Email: sgillette@prmc.com

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Wood-framed

---

How many occupied stories does the building have? 2

What year was the building constructed? 1941

What type of basement does the building have? (Check all that apply)

None      Full basement      Other (specify): Partial basement (unoccupied)

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

Not used       Office space      Storage Utilities      Other (specify): \_\_\_\_\_

What are the characteristics of the basement? (Check all that apply)

Basement floor:    Concrete       Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete       Other (specify): \_\_\_\_\_

Moisture:            Dry    Wet    Damp    Other (specify): Some areas are wet with standing water due to seepage from formation. Basement has a pump to remove water.

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

Concrete       Carpeted      Tiled      Stone

Cracks              Seams      Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y      Describe each, including information on contents :

Basement sump – contains pump to remove water. Restroom floor drains.

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

Are there locations where chemicals were or are used or stored? (Y/N) Y      Describe each: \_\_\_\_\_

Maintenance shop, storage, janitor room

---

**INDOOR AIR QUALITY BUILDING SURVEY**

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Y Describe each:

Plumbing pipes in basement

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

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

**Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building?     

How Many? 2

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

2 (both share the same outside air intake, no economizer).

Also see table attached to this survey.

## INDOOR AIR QUALITY BUILDING SURVEY

Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans      Open windows      Restroom vent fans

Other (specify):  Open doors

Who maintains and manages the HVAC system operation?  Not known

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends:  Typical hours of occupancy 7 AM to 7 PM seven days per week. HVAC operates continuously seven days per week. Additional information is provided in the attached table.

---

---

---

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

Natural gas      Electric      Solar      Other (specify): \_\_\_\_\_

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

Describe:  See list of chemicals on next page

## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	Basement, Maintenance shop
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	Maintenance shop
Lubricants	Maintenance shop
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Janitor room, Maintenance shop
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	Front area
Perfume/colognes	
Photographic darkroom chemicals	
Glues	Maintenance shop
Scented trees, wreaths, potpourri, etc.	
Other (specify): <u>Pesticides</u>	Maintenance shop
Other (specify): _____	

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

7 AM to 7 PM seven days per week. Training room on second floor is occupied two hours per day: 3 PM to 5 PM.

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

Was there any recent remodeling or painting done in the building? (Y/N) Not known

When and where was the most recent carpeting applied in the building? Not known

Were glues used to attach the carpeting to the floor slab? (Y/N) Not known





**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 06/23/2011

BUILDING: Building 146

**Owner/Developer/Property Manager**

Contact Name: MSgt. Noah McDaniel

Address: Building 146

Moffett Field, CA

Phone: (650) 603-9254 or (650) 603-9251

Email:

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Steel-framed

---

How many occupied stories does the building have? 1

What year was the building constructed? Not known

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor:    Concrete      Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete      Other (specify): \_\_\_\_\_

Moisture:      Dry    Wet    Damp    Other (specify): \_\_\_\_\_

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

Concrete       Carpeted       Tiled       Stone

Cracks       Seams      Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y      Describe each, including information on contents:

Janitor room, restrooms

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

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

Auto shop, superintendant's office

**INDOOR AIR QUALITY BUILDING SURVEY**

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) N Describe each:

---

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

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

**Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? Wall heaters

How Many? Not known

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

---

---

**INDOOR AIR QUALITY BUILDING SURVEY**

---

Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans      Open windows       Restroom vent fans

Other (specify):   Open doors  

Who maintains and manages the HVAC system operation?   Not known  

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends: \_\_\_\_\_

---

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

Natural gas       Electric      Solar      Other (specify): \_\_\_\_\_

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

Describe:   See list of chemicals on next page

## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	
Gas-powered equipment	Auto shop
Gasoline storage cans	
Cleaning solvents	
Lubricants	Auto shop
Air fresheners	Superintendent's office
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Auto shop
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	
Scented trees, wreaths, potpourri, etc.	
Other (specify): <u>Pesticides</u>	
Other (specify): _____	

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

6:30 AM to 3:00 PM Monday to Friday

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

Was there any recent remodeling or painting done in the building? (Y/N) Not known

When and where was the most recent carpeting applied in the building? Not known

Were glues used to attach the carpeting to the floor slab? (Y/N) Not known

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling,

## INDOOR AIR QUALITY BUILDING SURVEY

particleboard, fiberboard)? (Y/N) Y

Are there any new upholstery, drapes, or other textiles in the building? (Y/N) Not known

Has the building been treated with any insecticides/pesticides? If so, what chemicals were used and how often were they applied? Not known

### **Outdoor sources of contamination:**

Is there any stationary emission source in the vicinity of the building? No

Are there any mobile emission sources (e.g. highway, bus stop, high-traffic area) in the vicinity of the building? Highway 101

Is there any other information about the structural features of this building, the habits of its occupants or potential sources of chemical contaminants to the indoor air that may be of importance in facilitating the evaluation of the indoor air quality of the building? Building is used as a vehicle maintenance shop. Eastern portion of building is unoccupied.

### **Sketch any key features or proposed sampling locations:**

<b>Provided on a separate figure</b>																			
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**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 06/24/2011

BUILDING: Building 503

**Owner/Developer/Property Manager**

Contact Name: Diane Farrar

Address:

Phone: (650) 604-3934

Email: Diane.Farrar-1@nasa.gov

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Steel-framed

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How many occupied stories does the building have? 1

What year was the building constructed? 1966

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor:    Concrete      Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete      Other (specify): \_\_\_\_\_

Moisture:      Dry    Wet    Damp    Other (specify): \_\_\_\_\_

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

Concrete       Carpeted       Tiled       Stone

Cracks       Seams      Other (specify): Cuts in slab in vacant portion of building

Are drains or sumps present? (Y/N) N Describe each, including information on contents:

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

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

Shop area

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**INDOOR AIR QUALITY BUILDING SURVEY**

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Y Describe each:

Emergency shower pipe (in unoccupied portion of building)

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

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

Describe: Not known

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

Describe:     

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

Describe:     

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

Describe: Not known

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

Describe: Not known

**Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? Wall units

How Many? Not known

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

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## INDOOR AIR QUALITY BUILDING SURVEY

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Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans          Open windows          Restroom vent fans

Other (specify): Open doors

Who maintains and manages the HVAC system operation? Not known

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends: Units provide heat only – no air conditioning. Building is occupied intermittently, about two hours each morning and occasional weekends during the summer. Building is unoccupied during the winter.

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

Natural gas          Electric          Solar          Other (specify): \_\_\_\_\_

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

Describe: See list of chemicals on next page

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## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	Shop area
Lubricants	Shop area
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

2 hours each morning and occasional weekends in summer; unoccupied during the winter

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

Was there any recent remodeling or painting done in the building? (Y/N) Not known

When and where was the most recent carpeting applied in the building? Not known

Were glues used to attach the carpeting to the floor slab? (Y/N) Not known

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling,

## INDOOR AIR QUALITY BUILDING SURVEY

particleboard, fiberboard)? (Y/N) Y

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

Has the building been treated with any insecticides/pesticides? If so, what chemicals were used and how often were they applied? Not known

### **Outdoor sources of contamination:**

Is there any stationary emission source in the vicinity of the building? No

Are there any mobile emission sources (e.g. highway, bus stop, high-traffic area) in the vicinity of the building? Runway and Highway 101

Is there any other information about the structural features of this building, the habits of its occupants or potential sources of chemical contaminants to the indoor air that may be of importance in facilitating the evaluation of the indoor air quality of the building? Building was formerly a Navy gas station. Intermittent occupancy for space and robotic education and research activities in the room between the shop area and the offices. The northern end of the building, which includes several offices, is currently unoccupied by may be leased.

### **Sketch any key features or proposed sampling locations:**

<b>Provided on a separate figure</b>															
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**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 06/24/2011

BUILDING: Building 543

**Owner/Developer/Property Manager**

Contact Name: Ryan Hallum

Address:

Phone: (408) 489-1387

Email: ryan.hallum@bloomenergy.com

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Prefabricated metal building

---

How many occupied stories does the building have? 1

What year was the building constructed? 1973

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor:    Concrete      Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete      Other (specify): \_\_\_\_\_

Moisture:      Dry    Wet    Damp    Other (specify): \_\_\_\_\_

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

Concrete       Carpeted      Tiled       Stone

Cracks      Seams      Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y Describe each, including information on contents:

Floor drains in restrooms

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

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

Outside the building in a separate shed, janitorial cabinet

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**INDOOR AIR QUALITY BUILDING SURVEY**

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) N Describe each:

\_\_\_\_\_

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

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: Not known

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

Describe: \_\_\_\_\_

**Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building?    

How Many? 2

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

2 units (both with economizer and outside air intake)

Also see table attached to this survey.

## INDOOR AIR QUALITY BUILDING SURVEY

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Other (specify and describe): HVAC operates 24 hours/day, seven days/week.

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans      Open windows      Restroom vent fans

Other (specify): Open doors

Who maintains and manages the HVAC system operation? Not known

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends: HVAC system operates 24 hours a day. Additional information is provided in the attached table.

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

Natural gas      Electric      Solar      Other (specify): \_\_\_\_\_

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

Describe: See list of chemicals on next page

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## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	Shed outside of building
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	Shed outside of building
Lubricants	Shed outside of building
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Janitorial cabinet
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	Shed outside of building
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

24-hour operation

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

Was there any recent remodeling or painting done in the building? (Y/N) Y (walls removed starting in 2002)

When and where was the most recent carpeting applied in the building? No carpets

Were glues used to attach the carpeting to the floor slab? (Y/N) \_\_\_\_\_







**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 06/23/2011

BUILDING: Building 554

**Owner/Developer/Property Manager**

Contact Name: Bob Lopez or Diane Farrar

Address:

Phone: Bob: (650) 279-1067; Diane: (650) 604-3934

Email: Bob: r.lopez@nasa.gov; Diane: diane.farrar-1@nasa.gov

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Steel-framed

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How many occupied stories does the building have? 1

What year was the building constructed? 1975

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor:    Concrete      Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete      Other (specify): \_\_\_\_\_

Moisture:      Dry    Wet    Damp    Other (specify): \_\_\_\_\_

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

Concrete       Carpeted       Tiled       Stone

Cracks       Seams      Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y Describe each, including information on contents:

Floor drains in restrooms, janitorial closet, area near restrooms in southern portion of building

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

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

Chemical storage area in northern portion of building, area near restrooms in southern portion of building

**INDOOR AIR QUALITY BUILDING SURVEY**

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Y Describe each:

Utility conduit in open area of southern portion of building

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

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

**Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? Wall heaters

How Many? Not known

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

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## INDOOR AIR QUALITY BUILDING SURVEY

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Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans            Open windows            Restroom vent fans

Other (specify): \_\_\_\_\_

Who maintains and manages the HVAC system operation?   Not known  

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends:   Units provide heat only – no air conditioning. Southern portion of building is occupied intermittently, about four hours a day and Tuesday evenings.  

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

Natural gas            Electric            Solar    Other (specify):   Steam heating  

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

Describe:   See list of chemicals on next page  

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## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	Southern portion of building near restrooms, Chemical storage area in northern portion of building
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	Chemical storage area in northern portion of building
Lubricants	Chemical storage area in northern portion of building
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Chemical storage area in northern portion of building
Appliance cleaner	
Furniture/floor polish	Southern portion of building near restrooms, Chemical storage area in northern portion of building
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	Chemical storage area in northern portion of building
Scented trees, wreaths, potpourri, etc.	
Other (specify): <u>Lighter fluid</u>	Chemical storage area in northern portion of building
Other (specify): _____	

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

4 hours each day and Tuesday evenings (southern portion of building); 8:00 AM to 5:00 PM in the northern portion of building



**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 07/01/2011

BUILDING: Building 569

**Owner/Developer/Property Manager**

Contact Name: Janet Song

Address:

Phone: (650) 604-5809

Email: Janet.Y.Song@nasa.gov

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Wood-framed

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How many occupied stories does the building have? 1

What year was the building constructed? 1978

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor: Concrete Other (specify): \_\_\_\_\_

Foundation walls: Poured concrete Other (specify): \_\_\_\_\_

Moisture: Dry Wet Damp Other (specify): \_\_\_\_\_

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

Concrete  Carpeted  Tiled Stone

Cracks Seams Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y Describe each, including information on contents:

Floor drains in restrooms

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

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

Cleaning supplies in kitchen, janitorial closet

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**INDOOR AIR QUALITY BUILDING SURVEY**

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) N Describe each:

\_\_\_\_\_

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

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

Describe: \_\_\_\_\_

Was a vapor barrier installed under the floor slab? (Y/N) \_\_\_\_\_

Describe: Not known \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: Not known \_\_\_\_\_

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

Describe: Not known \_\_\_\_\_

**Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? \_\_\_\_\_

How Many? 2

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

2 units (both with economizer and outside air intake) \_\_\_\_\_

Also see table attached to this survey. \_\_\_\_\_

## INDOOR AIR QUALITY BUILDING SURVEY

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Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans            Open windows            Restroom vent fans

Other (specify): \_\_\_\_\_

Who maintains and manages the HVAC system operation?   IAP  

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends:   Building is typically occupied approximately 20 to 30 hours per week. Additional information is provided in the attached table.  

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

Natural gas            Electric            Solar    Other (specify): \_\_\_\_\_

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

Describe:   See list of chemicals on next page  

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## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	
Lubricants	
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Kitchen, Janitorial closet
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

Daytime; occupied approximately 20 to 30 hours per week

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

Was there any recent remodeling or painting done in the building? (Y/N) N

When and where was the most recent carpeting applied in the building? Not known

Were glues used to attach the carpeting to the floor slab? (Y/N) Not known

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling,







**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 06/24/2011

BUILDING: Building 583A

**Owner/Developer/Property Manager**

Contact Name: Sylvia Murray (onsite) / Janet E. Carson (offsite)

Address: Sylvia: Building 19

Moffett Field, CA

Phone: Janet: (650) 604-2898; Cell: (650) 906-3743

Email: Janet.E.Carson@nasa.gov

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Reinforced concrete

---

How many occupied stories does the building have? 3

What year was the building constructed? 1985

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor:    Concrete      Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete      Other (specify): \_\_\_\_\_

Moisture:      Dry    Wet    Damp    Other (specify): \_\_\_\_\_

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

Concrete       Carpeted       Tiled       Stone

Cracks      Seams      Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y      Describe each, including information on contents:

Shower drains

---

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

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

Cleaning materials with housekeeping

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## INDOOR AIR QUALITY BUILDING SURVEY

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) N Describe each:

Unable to enter utility corridor during site walk

---

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

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: Not known

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

Describe: \_\_\_\_\_

### **Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? Wall units, no outside makeup air

How Many? 74

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

Each room has its own wall unit.

---

## INDOOR AIR QUALITY BUILDING SURVEY

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Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans ✓      Open windows ✓      Restroom vent fans

Other (specify): \_\_\_\_\_

Who maintains and manages the HVAC system operation? Not known

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends: Wall units circulate heat only – no air conditioning.

---

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

Natural gas      Electric      Solar ✓      Other (specify): Steam heating (off in summer)

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

Describe: See list of chemicals on next page

---

## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	
Lubricants	
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Housekeeping
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

Evening to morning, every day (building is a hotel)

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

Was there any recent remodeling or painting done in the building? (Y/N) Not known

When and where was the most recent carpeting applied in the building? Not known

Were glues used to attach the carpeting to the floor slab? (Y/N) Not known

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling,



## INDOOR AIR QUALITY BUILDING SURVEY

DATE: 06/24/2011

BUILDING: Building 583B

### Owner/Developer/Property Manager

Contact Name: Sylvia Murray (onsite) / Janet E. Carson (offsite)

Address: Sylvia: Building 19

Moffett Field, CA

Phone: Janet: (650) 604-2898; Cell: (650) 906-3743

Email: Janet.E.Carson@nasa.gov

### Tenant

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Reinforced concrete

---

How many occupied stories does the building have? 3

What year was the building constructed? 1985

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor:    Concrete      Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete      Other (specify): \_\_\_\_\_

Moisture:      Dry    Wet    Damp    Other (specify): \_\_\_\_\_

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

Concrete      Carpeted       Tiled       Stone

Cracks      Seams      Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y      Describe each, including information on contents:

Shower drains

---

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

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

Cleaning materials with housekeeping

---

## INDOOR AIR QUALITY BUILDING SURVEY

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) N Describe each:

Unable to enter utility corridor during site walk

---

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

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: Not known

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

Describe: \_\_\_\_\_

### **Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? Wall units, no outside makeup air

How Many? 74

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

Each room has its own wall unit.

---

## INDOOR AIR QUALITY BUILDING SURVEY

---

Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans       Open windows       Restroom vent fans

Other (specify): \_\_\_\_\_

Who maintains and manages the HVAC system operation? Not known

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends: Wall units circulate heat only – no air conditioning.

---

---

---

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

Natural gas      Electric      Solar       Other (specify): Steam heating (off in summer)

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

Describe: See list of chemicals on next page

---

## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	
Lubricants	
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Housekeeping carts (office is in Building 583A)
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

Evening to morning, every day (building is a hotel)

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

Was there any recent remodeling or painting done in the building? (Y/N) Not known

When and where was the most recent carpeting applied in the building? Not known

Were glues used to attach the carpeting to the floor slab? (Y/N) Not known

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling,



**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 06/23/2011

BUILDING: Building 583C

**Owner/Developer/Property Manager**

Contact Name: Bob Lopez

Address:

Phone: (650) 279-1067

Email: r.lopez@nasa.gov

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Reinforced concrete

---

How many occupied stories does the building have? 1

What year was the building constructed? 1985

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor:    Concrete      Other (specify): \_\_\_\_\_

Foundation walls:    Poured concrete      Other (specify): \_\_\_\_\_

Moisture:      Dry    Wet    Damp    Other (specify): \_\_\_\_\_

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

Concrete       Carpeted       Tiled       Stone

Cracks      Seams      Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y      Describe each, including information on contents :

Restroom floor drains

---

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

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

Janitorial room, restroom, equipment area

---

**INDOOR AIR QUALITY BUILDING SURVEY**

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Y Describe each:

Sink in janitorial room

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

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

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

Describe: Not known

**Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building?     

How Many? 3

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

3 units (all with outside air intakes, 2 units with economizers)

Also see table attached to this survey.

## INDOOR AIR QUALITY BUILDING SURVEY

---

Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans      Open windows      Restroom vent fans

Other (specify): Open doors, exhaust fan

Who maintains and manages the HVAC system operation? Not known

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends: Typical hours of occupancy are 8 AM to 10 PM. Additional information is provided in the attached table.

---

---

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

Natural gas      Electric      Solar       Other (specify): \_\_\_\_\_

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

Describe: See list of chemicals on next page

---

## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	Janitorial room (flux remover)
Lubricants	
Air fresheners	Restroom
Oven cleaners	
Carpet/upholstery cleaners	Janitorial room
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Janitorial room, Restroom
Appliance cleaner	Equipment area
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

8 AM to 10 PM

---

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

Was there any recent remodeling or painting done in the building? (Y/N) Not known

When and where was the most recent carpeting applied in the building? Not known

Were glues used to attach the carpeting to the floor slab? (Y/N) Not known

Are there any pressed wood products in the building (e.g. hardwood plywood wall paneling,







## INDOOR AIR QUALITY BUILDING SURVEY

DATE: 06/24/2011

BUILDING: Building 596

### Owner/Developer/Property Manager

Contact Name: Shirley T. Berthold

Address:

Phone:

Email: Shirley.Berthold@nasa.gov

### Tenant

Contact Name: Dennis Wingo

Address:

Phone: (310) 403-1346

Email: wingod@skycorpinc.com

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Wood-framed

---

How many occupied stories does the building have? 1

What year was the building constructed? 1985

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor: Concrete Other (specify): \_\_\_\_\_

Foundation walls: Poured concrete Other (specify): \_\_\_\_\_

Moisture: Dry Wet Damp Other (specify): \_\_\_\_\_

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

Concrete  Carpeted Tiled  Stone

Cracks Seams Other (specify): \_\_\_\_\_

Are drains or sumps present? (Y/N) Y Describe each, including information on contents :

Previously McDonald's restaurant building. Several floor drains noted; some drains are sealed.

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

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

Janitorial closet, former kitchen area

---

## INDOOR AIR QUALITY BUILDING SURVEY

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Y Describe each:

Water piping and electrical conduits

---

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

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: Not known

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

Describe: \_\_\_\_\_

### **Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? \_\_\_\_\_

How Many? 4

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

4 units (all with outside air intakes and economizers); one unit above the rear of the building is not operational. Also see table attached to this survey.

---

**INDOOR AIR QUALITY BUILDING SURVEY**

Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans      Open windows      Restroom vent fans

Other (specify): Exhaust fan \_\_\_\_\_

Who maintains and manages the HVAC system operation? Not known

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends: Typical hours of occupancy are 8 AM to 5 PM.  
Additional information is provided in the attached table.

\_\_\_\_\_

\_\_\_\_\_

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

Natural gas      Electric      Solar      Other (specify): \_\_\_\_\_

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

Describe: See list of chemicals on next page

\_\_\_\_\_

## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	Former kitchen area
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	Former kitchen area
Lubricants	Former kitchen area
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Janitorial closet
Appliance cleaner	
Furniture/floor polish	Former kitchen area
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	Former kitchen area
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

8 AM to 5 PM

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

Was there any recent remodeling or painting done in the building? (Y/N) N

When and where was the most recent carpeting applied in the building? No carpets

Were glues 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,

## INDOOR AIR QUALITY BUILDING SURVEY

particleboard, fiberboard)? (Y/N) Y

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

Has the building been treated with any insecticides/pesticides? If so, what chemicals were used and how often were they applied? Not known

### **Outdoor sources of contamination:**

Is there any stationary emission source in the vicinity of the building? No

Are there any mobile emission sources (e.g. highway, bus stop, high-traffic area) in the vicinity of the building? Runway and Highway 101

Is there any other information about the structural features of this building, the habits of its occupants or potential sources of chemical contaminants to the indoor air that may be of importance in facilitating the evaluation of the indoor air quality of the building? Appears to be an old film converting facility – hundreds of old film containers. Photos taken during site walk are for internal use only and will not be submitted publicly. Two to three workers in building during each visit.

### **Sketch any key features or proposed sampling locations:**

<b>Provided on a separate figure</b>																			
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**INDOOR AIR QUALITY BUILDING SURVEY**

DATE: 07/01/2011

BUILDING: Building 944

**Owner/Developer/Property Manager**

Contact Name: Steve Frankel

Address:

Phone: (650) 604-4214

Email: steve.frankel@nasa.gov

**Tenant**

Contact Name: See above

Address:

Phone:

Email:

## INDOOR AIR QUALITY BUILDING SURVEY

### Building Construction Characteristics:

General description of building construction materials: Wood-framed

---

How many occupied stories does the building have? 1

What year was the building constructed? 1941

What type of basement does the building have? (Check all that apply)

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? (Check all that apply)

Basement floor: Concrete Other (specify): \_\_\_\_\_

Foundation walls: Poured concrete Other (specify): \_\_\_\_\_

Moisture: Dry Wet Damp Other (specify): \_\_\_\_\_

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

Concrete  Carpeted Tiled  Stone

Cracks Seams Other (specify): Hardwood

Are drains or sumps present? (Y/N) N Describe each, including information on contents:

---

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

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

Cleaning supplies in kitchen under sink, janitorial cabinet

---

## INDOOR AIR QUALITY BUILDING SURVEY

Are plumbing pipes or utility conduits present that penetrate the floor slab? (Y/N) Y Describe each:

Fire water riser

---

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

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

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

Describe: \_\_\_\_\_

### **Heating, Ventilation and Air Conditioning Systems (HVAC):**

Were HVAC as-built drawings for the facility obtained? (Y/N) N

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

If not, what type of HVAC system is used in this building? \_\_\_\_\_

How Many? 2

Describe, and delineate HVAC zones in the facility and corresponding rooftop HVAC air inlets:

2 units (both with economizer and outside air intake). 100% outside air at all times. The unit closer to the building rear was not operational. Also see table attached to this survey.

---

## INDOOR AIR QUALITY BUILDING SURVEY

Other (specify and describe): \_\_\_\_\_

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

What other type of mechanical ventilation systems are present and/or currently operating in the building?

Mechanical fans      Open windows      Restroom vent fans

Other (specify):  Exhaust fans, fan coil unit

Who maintains and manages the HVAC system operation?  NASA

Describe the control sequencing and operation of the HVAC system with respect to hours of operation, the intake of outside air, minimums, maximums, relative percentage outside air, differences between day and evening operation on weekdays and weekends:  Building is typically occupied daily approximately 1 to 6 hours per day (1 to 4.5 hours at a time). HVAC system operates only when building is occupied. Additional information is provided in the attached table.

---

---

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

Natural gas       Electric      Solar      Other (specify): \_\_\_\_\_

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

Describe:  See list of chemicals on next page

## INDOOR AIR QUALITY BUILDING SURVEY

### Sources of Chemical Contaminants:

Which of these items are present in the building? (Check all that apply)

Potential chemical source	Location of Source
Lacquers, paints or paint thinners	
Gas-powered equipment	
Gasoline storage cans	
Cleaning solvents	
Lubricants	
Air fresheners	
Oven cleaners	
Carpet/upholstery cleaners	
Hairspray	
Nail polish/polish remover	
Bathroom cleaner	Kitchen, Janitorial cabinet
Appliance cleaner	
Furniture/floor polish	
Moth balls	
Fuel tank	
Wood stove	
Fireplace	
Perfume/colognes	
Photographic darkroom chemicals	
Glues	
Scented trees, wreaths, potpourri, etc.	
Other (specify): _____	
Other (specify): _____	

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

Daily, approximately 1 to 6 hours per day (1 to 4.5 hours at a time)

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

Was there any recent remodeling or painting done in the building? (Y/N) N

When and where was the most recent carpeting applied in the building? No carpets

Were glues 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,

## INDOOR AIR QUALITY BUILDING SURVEY

particleboard, fiberboard)? (Y/N) Y

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

Has the building been treated with any insecticides/pesticides? If so, what chemicals were used and how often were they applied? Outside perimeter only

### **Outdoor sources of contamination:**

Is there any stationary emission source in the vicinity of the building? No

Are there any mobile emission sources (e.g. highway, bus stop, high-traffic area) in the vicinity of the building? Runway and Highway 101

Is there any other information about the structural features of this building, the habits of its occupants or potential sources of chemical contaminants to the indoor air that may be of importance in facilitating the evaluation of the indoor air quality of the building? Only the southern portion of the building is used by different clubs throughout the week.

### **Sketch any key features or proposed sampling locations:**

<b>Provided on a separate figure</b>																			
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## **APPENDIX B**

### **Photographs**

**(Not provided in this email version due to file size. Full report is being forwarded on CD).**

**APPENDIX C**

**Laboratory Reports**

**(Not provided in this email version due to file size. Full report is being forwarded on CD).**

## **APPENDIX D**

### **Data Usability Summary Reports**

**Data Usability Summary Report (DUSR)**  
**MEW Moffett Field Bldg 503**  
**Analytical Laboratory: TestAmerica, Inc. - Los Angeles, CA**  
**Sample Delivery Group # LUG0159**

Analytical results for the project samples were reviewed to evaluate the data usability. Data was assessed in accordance with guidance from the following Federal and/or State guidance documents:

- USEPA National Functional Guidelines for Organic Data Review (EPA 540-R-08-01) and/or  
USEPA National Functional Guidelines for Low Concentration Organic Data Review (EPA 540-R-00-006)

and method protocol criteria where applicable as prescribed by "Test Methods for Evaluating Solid Waste", SW846, Update III, 1996, or Standard Methods for the Examination of Water and Wastewater, Eds 18-20.

This DUSR pertains to the following samples:

Sample ID
503AMB-1-071211
503AMB-2-071211

Project Samples were analyzed according to the following analytical methods:

	Parameter	Analytical Method	Holding Time Criteria
1.	VOCs	EPA TO-15	30 days

The following items/criteria applicable to the analysis of project samples and associated QA/QC procedures were reviewed.

- Holding Times
- Project-specific Reporting Limits
- Blank Sample Analysis
- System Monitoring Compound Recoveries
- Laboratory Control Samples, Matrix Spike/Matrix Spike Duplicate Recoveries
- Sample Data Reporting Format
- Data Qualifiers
- Summary

#### **Preservation and Holding Times**

Maximum allowable holding times, measured from the time of sample collection to the time of sample preparation or analysis, were met for each project sample analyzed as part of this sample delivery group. No qualification of the data is recommended.

#### **Project-specific Reporting Limits**

The reporting limits for the samples within this Sample Delivery Group (SDG) met or exceeded the minimum reporting limit requirements specified by the Project-specific Quality Assurance Project Plan (QAPP). No qualification of the data is recommended.

#### **Blank Sample Analysis**

In accordance with cited USEPA guidelines, positive sample results should be reported unless the concentration of the compound in the project sample is less than or equal to 10 times (10X) the amount in any blank for metals and the common organic laboratory contaminants (methylene chloride, acetone, 2-butanone, cyclohexane, and phthalate esters), or 5 times (5X) the amount for other target compounds. Target analytes were not detected in associated blank samples (trip, equipment, method) prepared and analyzed concurrently with the project samples. No qualification of the data is recommended.

### **System Monitoring Compound Recoveries**

System monitoring/surrogate compounds are added to each sample prior to analysis of organic parameters to confirm the efficiency of the sample preparation procedure. The calculated recovery for each surrogate compound was evaluated to confirm the accuracy of the reported results. The calculated recovery of these compounds fell within the laboratory specific quality control criteria. No qualification of the data is recommended.

### **Laboratory Control Samples, Matrix Spike/Matrix Spike Duplicate Recoveries**

Analytical precision and accuracy was evaluated based on the laboratory control and matrix spike sample analyses performed concurrently with the project samples. For matrix spike samples, after the addition of a known amount of each target analyte to the sample matrix, the sample was analyzed to confirm the ability to identify these compounds within the sample matrix. For LCS analyses, after the addition of a known amount of each target analyte into laboratory reagent water, the sample was analyzed to confirm the ability of the analytical system to accurately quantify the compounds. The reported recovery of MS/MSD and LCS analyses fell within the laboratory QA acceptance criteria. No qualification of the data is recommended.

### **Sample Data Reporting Format**

The sample data are presented using USEPA Contract Laboratory Protocol (CLP) format or equivalent. The data package has been reviewed for completeness and found to contain each required sample result and associated QA/QC report form. The reporting format is complete and compliant with the objectives of the project. No qualification of the data is recommended.

### **Data Qualifiers**

Samples that contain results between the MDL and RL were flagged as estimated, "J", by the laboratory. The data user should be aware that there is a possibility of false positive or mis-identification at the quantitation levels. The laboratory also qualified results when target analytes were detected in the associated method/preparation blank sample. Based on a spot check of the data qualifiers used, these flags appeared to be applied to the reported results in accordance with EPA guidance.

### **Summary**

The results presented in each report were found to be compliant with the data quality objectives for the project and usable. Based on our review, the usability of the data is 100%, with the few exceptions noted above.

\\sjc\Common\36067\_STC\_MEW\_VI\004\_Air\_Sampling\Deliverables\Moffett Field 2011\Building\_503\Data Validation\{LUG0159-DV\_KRM.xls} Date: 8/1/2011

**Data Usability Summary Report (DUSR)**  
**MEW Moffett Field Bldg 583C**  
**Analytical Laboratory: TestAmerica, Inc. - LA, CA**  
**Sample Delivery Group # LUG0164**

Analytical results for the project samples were reviewed to evaluate the data usability. Data was assessed in accordance with guidance from the following Federal and/or State guidance documents:

- USEPA National Functional Guidelines for Organic Data Review (EPA 540-R-08-01) and/or  
 USEPA National Functional Guidelines for Low Concentration Organic Data Review (EPA 540-R-00-006)

and method protocol criteria where applicable as prescribed by "Test Methods for Evaluating Solid Waste", SW846, Update III, 1996, or Standard Methods for the Examination of Water and Wastewater, Eds 18-20.

This DUSR pertains to the following samples:

Sample ID
583CAMB-1-071111
583CAMB-2-071111
583CAMB-3-071111
583CHVAC-1-071111

Project Samples were analyzed according to the following analytical methods:

Parameter	Analytical Method	Holding Time Criteria
1. VOCs	EPA TO-15	30 days

The following items/criteria applicable to the analysis of project samples and associated QA/QC procedures were reviewed.

- Holding Times
- Project-specific Reporting Limits
- Initial Calibration Procedures
- Continuing Calibration Procedures
- Blank Sample Analysis
- System Monitoring Compound Recoveries
- Laboratory Control Samples, Matrix Spike/Matrix Spike Duplicate Recoveries
- Internal Standard Recoveries
- Target Compound Identification
- Sample Data Reporting Format
- Data Qualifiers
- Summary

**Preservation and Holding Times**

Maximum allowable holding times, measured from the time of sample collection to the time of sample preparation or analysis, were met for each project sample analyzed as part of this sample delivery group. No qualification of the data is recommended.

**Project-specific Reporting Limits**

The reporting limits for the samples within this Sample Delivery Group (SDG) met or exceeded the minimum reporting limit requirements specified by the Project-specific Quality Assurance Project Plan (QAPP). No qualification of the data is recommended.

**Initial Calibration Procedures**

Initial instrument calibration procedures for the analysis of project samples were consistent with the guidelines prescribed by EPA protocols. No Qualification of the data is recommended.

### **Continuing Calibration Procedures**

Continuing calibration verification (CCV) procedures for the analysis of project samples were consistent with the guidelines prescribed by EPA protocols. No Qualification of the data is recommended.

### **Blank Sample Analysis**

In accordance with cited USEPA guidelines, positive sample results should be reported unless the concentration of the compound in the project sample is less than or equal to 10 times (10X) the amount in any blank for metals and the common organic laboratory contaminants (methylene chloride, acetone, 2-butanone, cyclohexane, and phthalate esters), or 5 times (5X) the amount for other target compounds. Target analytes were not detected in associated blank samples (trip, equipment, method) prepared and analyzed concurrently with the project samples. No qualification of the data is recommended.

### **System Monitoring Compound Recoveries**

System monitoring/surrogate compounds are added to each sample prior to analysis of organic parameters to confirm the efficiency of the sample preparation procedure. The calculated recovery for each surrogate compound was evaluated to confirm the accuracy of the reported results. The calculated recovery of these compounds fell within the laboratory specific quality control criteria. No qualification of the data is recommended.

### **Laboratory Control Samples, Matrix Spike/Matrix Spike Duplicate Recoveries**

Analytical precision and accuracy was evaluated based on the laboratory control and matrix spike sample analyses performed concurrently with the project samples. For matrix spike samples, after the addition of a known amount of each target analyte to the sample matrix, the sample was analyzed to confirm the ability to identify these compounds within the sample matrix. For LCS analyses, after the addition of a known amount of each target analyte into laboratory reagent water, the sample was analyzed to confirm the ability of the analytical system to accurately quantify the compounds. The reported recovery of MS/MSD and LCS analyses fell within the laboratory QA acceptance criteria. No qualification of the data is recommended.

### **Internal Standard Recoveries**

Internal Standard compounds were added to each sample matrix prior to the analysis of organic parameters to quantify the amount of the target compounds detected within each sample. The calculated response of each IS compound fell within the QA/QC criteria of +100% and – 50% of the corresponding CCV standard. No qualification of the data is recommended.

### **Target Compound Identification**

GC/MS qualitative analysis for organic parameters was performed to remove mis-identifications of the target compounds. The relative retention times (RRT) of all reported target compounds were within +/- 0.06 RRT units of the associated calibration standard RRT, and all ions present in the reference standard spectrum at a relative intensity greater than 10 percent were also present in the sample spectrum. No qualification of the data is recommended.

### **Sample Data Reporting Format**

The sample data are presented using USEPA Contract Laboratory Protocol (CLP) format or equivalent. The data package has been reviewed for completeness and found to contain each required sample result and associated QA/QC report form. The reporting format is complete and compliant with the objectives of the project. No qualification of the data is recommended.

## **Data Qualifiers**

Samples that contain results between the MDL and RL were flagged as estimated, "J", by the laboratory. The data user should be aware that there is a possibility of false positive or mis-identification at the quantitation levels. The laboratory also qualified results when target analytes were detected in the associated method/preparation blank sample. Based on a spot check of the data qualifiers used, these flags appeared to be applied to the reported results in accordance with EPA guidance.

## **Summary**

The results presented in each report were found to be compliant with the data quality objectives for the project and usable. Based on our review, the usability of the data is 100%, with the few exceptions noted above.

\\sjc\common\36067\_STC\_MEW\_VI\004\_Air\_Sampling\Deliverables\Moffett Field 2011\Building\_583C\Data Validation\LUG0164-DV\_KRM.xls Date: 8/2/2011

**Data Usability Summary Report (DUSR)**  
**MEW Moffett Field Bldg 596**  
**Analytical Laboratory: TestAmerica, Inc. - LA, CA**  
**Sample Delivery Group # LUG0165**

Analytical results for the project samples were reviewed to evaluate the data usability. Data was assessed in accordance with guidance from the following Federal and/or State guidance documents:

- USEPA National Functional Guidelines for Organic Data Review (EPA 540-R-08-01) and/or  
USEPA National Functional Guidelines for Low Concentration Organic Data Review (EPA 540-R-00-006)

and method protocol criteria where applicable as prescribed by "Test Methods for Evaluating Solid Waste", SW846, Update III, 1996, or Standard Methods for the Examination of Water and Wastewater, Eds 18-20.

This DUSR pertains to the following samples:

Sample ID
596AMB-1-071211
596AMB-2-071211
596HVAC-1-071211

Project Samples were analyzed according to the following analytical methods:

Parameter	Analytical Method	Holding Time Criteria
1. VOCs	EPA TO-15	30 days

The following items/criteria applicable to the analysis of project samples and associated QA/QC procedures were reviewed.

- Holding Times
- Project-specific Reporting Limits
- Blank Sample Analysis
- System Monitoring Compound Recoveries
- Laboratory Control Samples, Matrix Spike/Matrix Spike Duplicate Recoveries
- Sample Data Reporting Format
- Data Qualifiers
- Summary

#### **Preservation and Holding Times**

Maximum allowable holding times, measured from the time of sample collection to the time of sample preparation or analysis, were met for each project sample analyzed as part of this sample delivery group. No qualification of the data is recommended.

#### **Project-specific Reporting Limits**

The reporting limits for the samples within this Sample Delivery Group (SDG) met or exceeded the minimum reporting limit requirements specified by the Project-specific Quality Assurance Project Plan (QAPP). No qualification of the data is recommended.

#### **Blank Sample Analysis**

In accordance with cited USEPA guidelines, positive sample results should be reported unless the concentration of the compound in the project sample is less than or equal to 10 times (10X) the amount in any blank for metals and the common organic laboratory contaminants (methylene chloride, acetone, 2-butanone, cyclohexane, and phthalate esters), or 5 times (5X) the amount for other target compounds. Target analytes were not detected in associated blank samples (trip, equipment, method) prepared and analyzed concurrently with the project samples. No qualification of the data is recommended.

### **System Monitoring Compound Recoveries**

System monitoring/surrogate compounds are added to each sample prior to analysis of organic parameters to confirm the efficiency of the sample preparation procedure. The calculated recovery for each surrogate compound was evaluated to confirm the accuracy of the reported results. The calculated recovery of these compounds fell within the laboratory specific quality control criteria. No qualification of the data is recommended.

### **Laboratory Control Samples, Matrix Spike/Matrix Spike Duplicate Recoveries**

Analytical precision and accuracy was evaluated based on the laboratory control and matrix spike sample analyses performed concurrently with the project samples. For matrix spike samples, after the addition of a known amount of each target analyte to the sample matrix, the sample was analyzed to confirm the ability to identify these compounds within the sample matrix. For LCS analyses, after the addition of a known amount of each target analyte into laboratory reagent water, the sample was analyzed to confirm the ability of the analytical system to accurately quantify the compounds. The reported recovery of MS/MSD and LCS analyses fell within the laboratory QA acceptance criteria. No qualification of the data is recommended.

### **Sample Data Reporting Format**

The sample data are presented using USEPA Contract Laboratory Protocol (CLP) format or equivalent. The data package has been reviewed for completeness and found to contain each required sample result and associated QA/QC report form. The reporting format is complete and compliant with the objectives of the project. No qualification of the data is recommended.

### **Data Qualifiers**

Samples that contain results between the MDL and RL were flagged as estimated, "J", by the laboratory. The data user should be aware that there is a possibility of false positive or mis-identification at the quantitation levels. The laboratory also qualified results when target analytes were detected in the associated method/preparation blank sample. Based on a spot check of the data qualifiers used, these flags appeared to be applied to the reported results in accordance with EPA guidance.

### **Summary**

The results presented in each report were found to be compliant with the data quality objectives for the project and usable. Based on our review, the usability of the data is 100%, with the few exceptions noted above.

\\sjc\Common\36067\_STC\_MEW\_VI\004\_Air\_Sampling\Deliverables\Moffett Field 2011\Building\_596\Data Validation\{LUG0165-DV\_KRM.xls} Date: 8/1/2011

**Data Usability Summary Report (DUSR)**  
**MEW Moffett Field Bldg 569**  
**Analytical Laboratory: TestAmerica, Inc. - LA, CA**  
**Sample Delivery Group # LUG0176**

Analytical results for the project samples were reviewed to evaluate the data usability. Data was assessed in accordance with guidance from the following Federal and/or State guidance documents:

- USEPA National Functional Guidelines for Organic Data Review (EPA 540-R-08-01) and/or  
USEPA National Functional Guidelines for Low Concentration Organic Data Review (EPA 540-R-00-006)

and method protocol criteria where applicable as prescribed by "Test Methods for Evaluating Solid Waste", SW846, Update III, 1996, or Standard Methods for the Examination of Water and Wastewater, Eds 18-20.

This DUSR pertains to the following samples:

Sample ID
569AMB-1-071411
569AMB-2-071411
569OUT-1-071411

Project Samples were analyzed according to the following analytical methods:

Parameter	Analytical Method	Holding Time Criteria
1. VOCs	EPA TO-15	30 days

The following items/criteria applicable to the analysis of project samples and associated QA/QC procedures were reviewed.

- Holding Times
- Project-specific Reporting Limits
- Blank Sample Analysis
- System Monitoring Compound Recoveries
- Laboratory Control Samples, Matrix Spike/Matrix Spike Duplicate Recoveries
- Sample Data Reporting Format
- Data Qualifiers
- Summary

#### **Preservation and Holding Times**

Maximum allowable holding times, measured from the time of sample collection to the time of sample preparation or analysis, were met for each project sample analyzed as part of this sample delivery group. No qualification of the data is recommended.

#### **Project-specific Reporting Limits**

The reporting limits for the samples within this Sample Delivery Group (SDG) met or exceeded the minimum reporting limit requirements specified by the Project-specific Quality Assurance Project Plan (QAPP). No qualification of the data is recommended.

#### **Blank Sample Analysis**

In accordance with cited USEPA guidelines, positive sample results should be reported unless the concentration of the compound in the project sample is less than or equal to 10 times (10X) the amount in any blank for metals and the common organic laboratory contaminants (methylene chloride, acetone, 2-butanone, cyclohexane, and phthalate esters), or 5 times (5X) the amount for other target compounds. Target analytes were not detected in associated blank samples (trip, equipment, method) prepared and analyzed concurrently with the project samples. No qualification of the data is recommended.

### **System Monitoring Compound Recoveries**

System monitoring/surrogate compounds are added to each sample prior to analysis of organic parameters to confirm the efficiency of the sample preparation procedure. The calculated recovery for each surrogate compound was evaluated to confirm the accuracy of the reported results. The calculated recovery of these compounds fell within the laboratory specific quality control criteria. No qualification of the data is recommended.

### **Laboratory Control Samples, Matrix Spike/Matrix Spike Duplicate Recoveries**

Analytical precision and accuracy was evaluated based on the laboratory control and matrix spike sample analyses performed concurrently with the project samples. For matrix spike samples, after the addition of a known amount of each target analyte to the sample matrix, the sample was analyzed to confirm the ability to identify these compounds within the sample matrix. For LCS analyses, after the addition of a known amount of each target analyte into laboratory reagent water, the sample was analyzed to confirm the ability of the analytical system to accurately quantify the compounds. The reported recovery of MS/MSD and LCS analyses fell within the laboratory QA acceptance criteria. No qualification of the data is recommended.

### **Sample Data Reporting Format**

The sample data are presented using USEPA Contract Laboratory Protocol (CLP) format or equivalent. The data package has been reviewed for completeness and found to contain each required sample result and associated QA/QC report form. The reporting format is complete and compliant with the objectives of the project. No qualification of the data is recommended.

### **Data Qualifiers**

Samples that contain results between the MDL and RL were flagged as estimated, "J", by the laboratory. The data user should be aware that there is a possibility of false positive or mis-identification at the quantitation levels. The laboratory also qualified results when target analytes were detected in the associated method/preparation blank sample. Based on a spot check of the data qualifiers used, these flags appeared to be applied to the reported results in accordance with EPA guidance.

### **Summary**

The results presented in each report were found to be compliant with the data quality objectives for the project and usable. Based on our review, the usability of the data is 100%, with the few exceptions noted above.

\\sjc\common\36067\_STC\_MEW\_VI\004\_Air\_Sampling\Deliverables\Moffett Field 2011\Building\_569\Data Validation\[\LUG0176-DV\_KRM.xlsr Date: 8/2/2011