FINAL INDOOR AIR QUALITY INVESTIGATION
BUILDINGS A, B, C, AND VLS
LOCKHEED MARTIN MIDDLE RIVER COMPLEX

2323 Eastern Boulevard
Middle River, Maryland

LOCKHEED MARTIN

Tetra Tech
Environmental Engineers & Scientists
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Final Indoor Air Quality Investigation
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2323 Eastern Boulevard
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LIST OF ACRONYMS

ALSI	Analytical Laboratory Services Incorporated
cc	cubic centimeters
CIH	Certified Industrial Hygienist
COC	Chemicals of Concern
GC/MS	Gas Chromatography/Mass Spectrometry
HVAC	Heating Ventilation and Air Conditioning
IAQ	Indoor Air Quality
ITRC	Interstate Technology and Regulatory Council
J&E	Johnson and Ettinger
MDE	Maryland Department of the Environment
MDLs	Method Detection Limits
MRAS	Middle River Aircraft Systems
MRC	Middle River Complex
MSDS	Material Safety Data Sheets
NAS	National Academy of Sciences
OSHA	Occupational Safety and Health Administration
PCE	Tetrachloroethane
PELs	Permissible Exposure Limits
ppb	parts per billion
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
TCE	trichloroethylene
USEPA	United States Environmental Protection Agency
VCP	Voluntary Cleanup Program
VLS	Vertical Launching System
VOCs	Volatile Organic Compounds

Executive Summary

Two rounds of indoor air quality (IAQ) sampling have been completed for Buildings A, B, and C at Lockheed Martin Corporation's Middle River Complex (MRC) located in Middle River, Maryland. One round of sampling was performed for the Vertical Launching System (VLS) facility and results did not indicate the need for additional sampling. The objective of this investigation was to evaluate whether volatile organic compounds present in sub-slab vapors associated with soil and groundwater chemicals of concern (COCs) at the site might be migrating into indoor air at MRC facilities. This objective was achieved through the performance of a phased scope of work that included site reconnaissance, sampling plan design, performance of sampling and interpretation of analytical data.

Air samples were collected and analyzed using the United States Environmental Protection Agency's (USEPA's) Toxic Organic Method 15 (TO-15). Analysis was conducted for a list of 15 chemicals that were identified as potential COCs for vapor intrusion in the facility-wide characterization currently in progress as part of the Maryland Voluntary Cleanup Program (VCP). Samples were collected from background locations around the perimeter of the MRC and from interior locations at Buildings A, B, C, basement areas, and the VLS. Additionally, samples of sub-slab vapor were collected from previously installed sub-slab vapor sampling points in the Plating Shop of Building A and the basements of Buildings A and C. All collected samples were submitted for analysis to a laboratory accredited in the performance of TO-15 analyses.

The results of the analyses indicated numerous subsurface COCs were detected in background and IAQ samples. Although not an occupational exposure study, the IAQ data were screened against Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) as these are familiar criteria commonly used in the workplace. All detected concentrations were considerably less than applicable OSHA PELs. The IAQ data were also screened against risk-based screening levels that were derived using conservative USEPA default exposure assumptions and toxicity values. The screening level concentrations were derived in accordance with acceptable risk levels described in the Maryland Department of the Environment (MDE) guidance under the VCP.

One COC, trichloroethene (TCE), was compared to a range of risk-based screening values derived from USEPA toxicity criteria currently used by the MDE. The risk-based concentration range contains a lower screening value based on more stringent toxicity criteria for the protection of sensitive sub-populations such as infants, children, and the infirmed which is considered by the MDE in their decision making, and a higher screening value based on a less stringent toxicity value considered protective of the general population including industrial workers. The higher risk-based value is provided to assist in understanding the nature and magnitude of potential risk within the work environment. TCE was consistently detected at concentrations above the lower screening value in Buildings A, B, and C but never above the higher screening value. While TCE was present in the air at different parts of the MRC, it does not appear to present a concern for the long term health of the working population. No analyzed constituents were detected above their applicable screening levels in the VLS. The presence of a COC at or above its risk-based level does not mean a harmful effect will occur, just that there may be an increased risk and further investigation may be warranted.

TCE was detected in the laboratory method blank in seven of 42 IAQ samples collected in December 2006. TCE was also J-qualified in 16 of the December 2006 IAQ samples indicating that it was present in the sample but that the reported concentrations were estimated. No blank contamination was noted in the April 2007 sampling but TCE was J-qualified in 10 of 44 IAQ samples. While there is uncertainty associated with J-flagged data, it still indicates the presence of TCE within indoor air at the MRC.

To evaluate whether chemical contaminants associated with soil and groundwater contamination at the site might be migrating into indoor air, an analysis using multiple lines of evidence was performed. Lines of evidence examined included comparison to background concentrations, the presence of COCs in both sub-slab and IAQ samples, the presence of marker chemicals in IAQ samples, ratios of COCs in sub-slab and IAQ samples, and consideration of building construction and current conditions. There is uncertainty associated with the use of some of the data due to laboratory blank contamination, non-detection, and J-qualification however the data are adequate to reach conclusions regarding potential sub-slab vapor migration. The results of these analyses indicated that the majority of VOCs detected in IAQ samples are most likely not associated with sub-slab vapor intrusion. Migration of sub-slab vapors into indoor air may be occurring in limited locations. The presence of TCE in IAQ samples may be associated with sub-slab vapor migration at the Building A Plating Shop and in Building C Basement since it co-occurred with a marker chemical found only in sub-slab vapor samples. Due to the absence of a known source and variations in results between the December 2006 and April 2007 sampling events, there is uncertainty as to whether TCE detected in the tunnel beneath Building B and in the basement hallways of Buildings B and C is from sub-slab vapor migration. It appears that sub-slab vapor migration is affected by seasonal variations leading to differences in the results between the two sampling events.

Recommendations

While detected concentrations of TCE were below the higher screening value derived to be protective of the general population, it was detected at concentrations greater than the lower screening value derived to be protective of sensitive sub-populations and considered by the MDE in their decision making. Based on a potential relationship between the high concentrations of TCE detected in sub-slab vapor and the TCE detected in indoor air, it is recommended that mitigation be performed at locations where chemicals in subslab vapor are known to be present at high concentrations. The decision to mitigate is based on a proactive approach to take steps to reduce any potential risks to site employees. As there is known subslab contamination and the data provide some evidence that the subslab contamination may be contributing to indoor air concentrations, mitigation is considered appropriate to reduce any contributions to increased potential risk through this pathway. Evaluation of potential remedies to mitigate known areas of subslab VOCs in the Building A Plating Shop and the south end of Building C should be performed and a selected remedy enacted. Additional IAQ sampling should be performed to address areas of uncertainty identified during the two rounds of sampling already completed.

Section 1
Introduction

1.1 GENERAL INTRODUCTION

On behalf of Lockheed Martin Corporation, Tetra Tech has prepared the following indoor air quality (IAQ) report detailing the investigations performed to date to evaluate whether detectable concentrations of soil and groundwater chemicals of concern (COCs) are present in indoor air within specific areas of Lockheed Martin's Middle River Complex (MRC) located in Middle River, Maryland. This document discusses the scope of work performed, the results of the IAQ investigation, conclusions, and recommendations.

1.2 OBJECTIVE

The objective of the IAQ investigation was to evaluate whether VOCs present in sub-slab vapors associated with soil and groundwater contamination at the site might be migrating into indoor air at MRC facilities. Specifically, the investigation was performed to assess the potential presence of specific volatile organic compounds (VOCs) in indoor air within workspace areas of Buildings A, B, and C, and the Vertical Launching System (VLS) facility. All of these areas are located within the active industrial portion of MRC within Tax Block I. The scope of work performed assessed specific VOCs of interest. This included only those VOCs detected in groundwater and soil as documented in the Site Characterization Report (Tetra Tech, 2006a). It was not the objective of this investigation to perform any personnel monitoring as would be conducted during a survey to evaluate compliance with Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs).

1.3 INVESTIGATIVE APPROACH

The IAQ investigation was performed to evaluate whether VOCs present in sub-slab vapors associated with soil and groundwater contamination at the site might be migrating into indoor air at MRC facilities. Key aspects of the investigation included:

- A site reconnaissance performed by Tetra Tech industrial hygienists to identify IAQ and sub-slab sampling locations.
- Developing a site-specific sampling plan based on the information obtained during the site reconnaissance and from reviews of historic information and reports.
- Performing two phases of sampling and analysis using methods designed for the measurement of low concentrations of VOCs in air.
- Preparing a report discussing the investigation and its results.

Relevant guidance used in the development and performance of the investigation includes:

Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway From Groundwater and Soils (Docket ID No. RCRA-2002-0033 Federal Register: November 29, 2002 (Volume 67, Number 230) (USEPA, 2002a).

Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition Compendium Method TO-15 Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), Center for Environmental Research Information Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268 January 1999 (USEPA/625/R-96/010b) (USEPA, 1999).

Voluntary Cleanup Program Guidance Document, Environmental Restoration & Redevelopment Program, Maryland Department of the Environment, March 17, 2006 (MDE, 2006).

Section 2
Site Background

The Lockheed Martin-owned land parcels at the MRC are currently undergoing extensive site characterization studies to support remedial decisions for the Maryland Department of the Environment (MDE) Voluntary Cleanup Program (VCP). The ongoing environmental characterization of the MRC identified subsurface soil and groundwater impacts from VOCs under or in close proximity to occupied workspace (Tetra Tech, 2006a). The potential exists for volatilization of these compounds to migrate into the workspace, if there is a complete pathway from the subsurface into the building. There also is the possibility of other sources impacting indoor air concentrations including indoor air emissions from process chemicals, building materials, and other sources as well as ambient (outdoor) air contributions (i.e., confounding sources).

In February, 2006 Lockheed Martin conducted sub-slab soil vapor sampling in the basement and Plating Shop of Building A and in the southern section of the Building C Basement (Tetra Tech, 2006a). These locations were selected for evaluation due to the presence of VOC contamination in underlying groundwater. The analytical results from the sub-slab vapor sampling investigation as well as other site-specific information were used as input for a human health risk assessment model (Johnson & Ettinger model). The risks estimated by the model were at or below MDE and United States Environmental Protection Agency (USEPA) threshold values. However, because of the uncertainties inherent in modeling, a supplemental IAQ investigation was proposed to confirm the presence or absence of VOC contaminants in indoor air associated with subsurface VOC contamination.

Section 3
Indoor Air Quality Investigation

3.1 SITE RECONNAISANCE

Tetra Tech industrial hygienists performed a site reconnaissance of MRC facilities on August 16, 17, and 18, 2006. Mr. Matt Soltis, Certified Industrial Hygienist (CIH) and Mr. Eric Samuels, project industrial hygienist were accompanied by Mssrs. Michael Martin P.G. and Tony Apanavage P.G. of Tetra Tech's Germantown, Maryland office as well as Lockheed and Middle River Aircraft Systems (MRAS) personnel. The objectives of the site reconnaissance were to:

- Visually confirm background information including potential subsurface, indoor, and outdoor sources of VOCs;
- Identify potential conduits for subsurface vapor migration into indoor air;
- Observe site operations including the use and storage of VOC-containing materials;
- Identify conditions that might affect or interfere with the proposed sampling; and,
- Use the above information to identify sampling locations.

Tetra Tech staff met with Lockheed and MRAS personnel on August 16, 2006 and were provided copies of Material Safety Data Sheets (MSDS) for facility operations and IAQ questionnaire responses. These were reviewed as well as the 2005 SARA 312 chemical usage report. Tetra Tech was also provided with overviews of site operations and specific information regarding current and historic use of VOC-containing materials including volumes, methods of use, and locations of use and storage. No historic industrial hygiene sampling data were available regarding the types and concentrations of airborne VOCs previously investigated at the site.

Based on the information provided, Tetra Tech identified a number of materials used at the MRC that contained COCs of interest including:

- 1,1-Dichloroethane,
- 1,2,4-Trichlorobenzene,

- Benzene,
- Cis-1,2-Dichloroethene,
- Ethylbenzene,
- Toluene,
- Xylenes,
- Trans-1,2-Dichloroethene; and,
- Vinyl Chloride.

Following initial meetings, Tetra Tech was escorted by Lockheed and MRAS personnel on tours of their respective facilities for familiarization with site operations and facility layout. Tetra Tech was provided access to Lockheed and MRAS areas to be investigated and continued un-escorted observations through August 18, 2006.

During the performance of the site reconnaissance, Tetra Tech identified site operations and facility features that might affect the selection of sampling locations. The following conclusions were made regarding sampling location selection:

- Sampling would not be performed in areas that are air-conditioned as the positive pressurization affects (reduces) potential subsurface migration. This included areas such as Bonding Lay-Up, and Bond Clean operations in Building A, D-5, and THAAD Production Area in Building C, and offices throughout the MRC.

- Many areas of solvent usage and storage were identified throughout the MRC. These ranged from small containers of solvents on work benches and in chemical storage cabinets in work areas, applications in paint booths, and rooms dedicated to bulk storage. Sampling would not be performed in areas of high solvent use or storage such as active paint booths or solvent storage areas.

- Based on information provided by MRAS personnel, no chlorinated solvents are used in MRAS operations.

- Sampling would not be performed in locations with active fans that might serve to disperse and dilute potential airborne concentrations of VOCs.

- A number of tiered samples would be collected, as practical, with one sample in a basement location, one at a first floor location, and one at an elevated location to characterize potential stratospheric partitioning although potential employee exposure is anticipated to be limited at elevated locations.

- The three sub-slab sample locations in Building A Plating Shop with the highest detected Trichloroethene (TCE) concentrations from the Site Characterization Study would be re-sampled. An IAQ sample would be co-located between the three sub-slab sample locations.

- The sub-slab sample in Building A Basement would be re-sampled and an IAQ sample co-located with it.

- The two sub-slab samples in Building C Basement with the highest detected TCE concentrations from the Site Characterization Study would be re-sampled. An IAQ sample would be co-located between the two sub-slab sample locations.

- A sample would be collected underneath the training trailer at the VLS.

- Several samples would be reserved for "Targets-of-Opportunity". The actual locations of these samples will be dictated by conditions at the time of sampling and would not be finalized until that time. Examples include the GE Thrust Reverser Assembly area if the B Building hangar doors were closed at the time of sampling or at locations where a new crack or excavation in the foundation is found to be present during the site reconnaissance.

- As practical, sampling would be performed on a cold day when all of the large hangar and bay doors would be closed at the facility.

- Additional sampling might be performed based on the results of the initial investigation.

While areas of the MRC where VOCs were previously detected in sub-slab vapor were evaluated for further characterization, other sections of the facility were considered for sampling to help characterize the extent of any potential subsurface migration. This included areas that were considered potentially susceptible to subsurface vapor migration such as tunnels and other smaller subterranean work spaces that are situated further away from potential subsurface VOC contamination.

The results of the site reconnaissance were used to develop a site specific sampling plan. The Indoor Air Quality Assessment Work Plan for Buildings A, B, C, and VLS (Tetra Tech, 2006b) was finalized in November of 2006. The Work Plan identified proposed sampling locations, sampling and analysis methodologies, quality control, documentation, and reporting requirements. The first sampling event included Buildings A, B, C and the VLS and was initiated the evening of December 11, 2006 and completed the morning of December 12, 2006. The second sampling event was initiated the evening of April 26, 2007 and completed the morning of April 27, 2007. Based on the results of the first sampling event that indicated the absence of COCs in indoor air at the VLS, the second sampling event included only Buildings A, B, and C.

3.2 SAMPLING AND ANALYSIS

3.2.1 Sample Locations

From the information obtained during the site reconnaissance as well as that obtained from reviews of historic information and reports, locations for the collection of IAQ, sub-slab, and background samples were identified. The sampling was performed with the intent of maximizing the potential detection of those contaminants previously identified in subsurface media. Where possible, samples were taken in locations and heights to facilitate human health risk assessment. However, some samples were collected to support other objectives and thus were not collected at breathing zone height or in locations potentially occupied by MRC employees for extended periods of time. Table 3-1 of the Indoor Air Quality Assessment Work Plan (Tetra Tech, 2006b) contains information on the locations originally selected for sampling. Between the site reconnaissance when sampling locations were originally selected and the dates sampling was performed, several changes were noted at the MRC that affected the final locations for several samples. The following observations were made at the time of the initial sampling in December, 2006:

- Sample B-2 was moved from column GM 3 due to the presence of three full flammable storage cabinets. The sample was collected on the top of a cabinet adjacent to the maintenance stockroom cage near column NJ 5.

- Sample B-3 was originally to be collected from a west-central work area in Building B. The sampled location was in an area undergoing renovation and no operations were present at the time of sampling. The sample was collected at column GE 16 where the wood floor had been removed and replaced with concrete.

- Sample B-4 was originally to be collected from an east-central work area in Building B. The sampled location was in an area undergoing renovation and no operations were present at the time of sampling. Sample B-4 was collected on top of shelving at column GB 15 in an area where the wood floor had been removed and the subfloor was exposed. The area was noted to have a creosote-like odor.

- Target of opportunity sample TOO-1 was collected at the central portion of the Thrust Reverser assembly area. The sampler was placed on top of an employee locker. Flammable storage lockers and hazardous waste disposal containers were noted on the floor of the assembly area. The bay doors on the southern end of Building B were open at the beginning of the sampling but were later closed.

- Samples C-2 and C-3 were originally scoped to be collected in open empty storage areas in the east and west-central portions of Building C. At the time of sampling, the designated locations were observed to be used to store bulk containers of spices and foodstuffs. Samples were collected as close to the proposed locations as possible. Sample C-2 was collected from the top of a stack of pallets at column T 12 but sample C-3 was collected east of the proposed location due to no access.

- Sample C-4 was to be collected from an empty storage room located in the south-central portion of Building C. At the time of sampling the selected location was observed to still be empty but renovated with new walls erected and a noticeable odor of fresh paint. Sample C-4 was collected from atop a metal storage rack on the west wall of the renovated space west of the originally proposed location.

- Background samples BCK-1, BCK-3, and BCK-4 were moved from their proposed locations due to access issues. BCK -1 was moved from its proposed location to just east of Building P at the security tower. BCK-3 was moved inside of the fence line to a location northwest of its proposed location. BCK-4 was moved west from the field where it was proposed for placement to the northwest security gate as access could not be gained.

During the second sampling event, an attempt was made to collect samples at the same locations previously sampled in December, 2006 (except for the VLS which was not sampled in April, 2007). The following observations were made at the time of the second round of sampling in April, 2007:

- Sample A-7-2 was not placed on the Plating Shop catwalk as before because access was blocked. The sampler was placed on the west wall of the Plating Shop approximately 12-feet above the floor surface. Samples were collected at these locations to evaluate potential partioning with height. Employee exposures at these locations are expected to be minimal.

- Target of opportunity sample TOO-4 (and its duplicate DUP-2-426-2007) was collected from the top of the lockers located on the aisle adjacent to Tanks C-4 and C-5 in the Plating Shop.

- Target of opportunity sample TOO-5 was collected from the top of the lockers located on the aisle at the southern end of the Plating Shop at the water treatment tanks.

- The area around sample B-1-2 had changed since the previous sampling. The area was enclosed in plastic sheeting and the wooden block floor had been removed exposing a tarry dark-colored staining.

- The area around sample B-2-2 had changed since the previous sampling. The area was empty and no longer used for the storage of tools and equipment. Hazardous waste containers and solvent storage lockers were no longer present.

- Sample B-4-2 was moved to column GC-14 north of the previous sampled location due to activities associated with the "Big Dig" excavation.

- Target of opportunity sample TOO-11 was collected in the corridor at the northwest corner of the Building B Basement.

- Renovations in the area where sample C-4-2 was collected had been completed since the previous sampling and the sample was collected in a room with workstations and associated furniture.

- Sample C-2-2 was collected at column T-10 as the previously sampled location at Column T-12 was not accessible.

- Sample BCK-3-2 was collected further away from facility operations than the previous sampling and was placed at the far southeast corner of D-lot at the pump house.

- Sample BCK-4-2 was collected further away from facility operations than the previous sampling and was located at the northeast corner of the recreation (soccer) field approximately 100 feet from the eastern perimeter.

- Target of opportunity sample TOO-2 was collected in C Basement at Column M-26 near the entrance to Building B tunnel.

- Target of opportunity sample TOO-3 was collected in the northern end of B-tunnel.

- Target of opportunity samples TOO-6 and TOO-7 were collected from the center and eastern side respectively of the "Big Dig" excavation in Building B north of the Thrust Reverser Assembly Area.

- Target of opportunity sample TOO-8 was collected in the C Basement hallway at Column T-11.

- Target of opportunity sample TOO-9 was collected in the C Basement hallway at Column T-6.

- Target of opportunity sample TOO-10 was collected in the B Basement hallway at Column J-6 near the stairwell.

Figures 3-1, 3-2, 3-3, and 3-4 illustrate the final sampling locations for the two sampling events. The samples are identified first by the building where they were collected (i.e. A, B, C, VLS) and then by sequential numbering for those samples collected at the same locations during both sampling events. Sample locations that were moved from their original locations will have a "–2" added to their identifier (i.e. A-1-2). Additional (TOO) samples collected during the second sampling event are shown individually. For sub-slab locations that were re-sampled during both sampling events, the identifier includes the original sample designation followed by "–2" (i.e. SV-13-2). Copies of the field data sheets are included in Appendix A.

3.2.2 IAQ and Sub-Slab Sampling Methods

Sampling was performed in accordance with the methods described in the IAQ Assessment Work Plan (Tetra Tech, 2006b). IAQ and sub-slab sampling were performed using USEPA Method Toxic Organic 15 (TO-15) for the collection and analysis of VOCs (USEPA, 1999). Additionally, sub-slab soil vapor samples were collected in accordance with standard operating procedures developed by the USEPA Environmental Response Team for soil vapor sampling (USEPA, 1996), as well as methodologies developed by the USEPA Office of Research and Development (USEPA, 2004).

The first round of sampling commenced the evening of December 11, 2006 and was completed the morning of December 12, 2006. The second round of sampling commenced the evening of April 26, 2007 and ended the morning of April 27, 2007. As discussed in the Work Plan, sampling was performed at a time when Lockheed and MRAS operations were at their slowest and when the fewest production personnel would be present in order to reduce the potential for VOCs associated with typical site operations impacting samples; and to minimize any potential impositions on site operations and personnel.

3.2.2.1 Collection of IAQ Samples

In accordance with USEPA Method TO-15, individual evacuated Summa canisters were used to collect all IAQ samples. Six-liter Summa canisters equipped with in-line particulate filters and integral regulators were used. The regulators were calibrated by the laboratory that supplied the canisters and flow rates pre-set prior to sampling. All Summa canisters had appropriate documentation certifying them clean (less than 0.2 parts per billion (ppb) volume of targeted compounds) by the laboratory prior to the performance of sampling in accordance with Section 8.4 of the TO-15 methodology (USEPA, 1999). Samples were collected by opening the valve on the canister, allowing outside air to enter the canister at the pre-set flow rate.

3.2.2.2 Collection of Sub-Slab Samples

Six sub-slab soil vapor samples locations previously sampled during the Site Characterization Study (Tetra Tech, 2006a) were re-sampled during both sampling events. Three locations corresponding to the highest sub-slab concentrations of TCE were re-sampled in the Plating Shop in Building A. The sub-slab sample location in the basement of Building A and two locations corresponding to the highest concentrations of TCE in the basement of Building C were also re-sampled. Co-located IAQ samples were collected with these sub-slab samples during both sampling events.

Sub-slab vapor samples were collected through Teflon® tubing attached to the stainless steel vapor probes that were installed in MRC flooring during the Site Characterization Study (Tetra Tech, 2006a). All sub-slab vapor probe locations had been tested for tightness using helium as a tracer gas during the Site Characterization Study (Tetra Tech, 2006). As discussed in the Site Characterization Study, helium was not detected in any sub-slab sample indicating a tight seal at the sampling point. Inspection of the vapor probes during the IAQ sampling events indicated that all seals were unchanged and that construction of the sampling probes had not been compromised.

Prior to sampling, all Teflon® sample tubing was purged to flush out atmospheric air, and to allow subsurface vapors to enter the probes and tubing. Purging was performed by attaching the Teflon® sampling tubing to a low-flow sampling pump set to a flow rate of approximately 200 cubic centimeters (cc) per minute or lower to minimize the potential for mobilizing subsurface vapor and biasing the sample. One to three volumes (i.e. the volume of the sample probe and tube) was purged to ensure that collected samples were representative of sub-slab conditions. Sampling was not performed any sooner than 20 minutes following purging of the sampling train to allow subsurface conditions to equilibrate.

As with the IAQ samples, sampling was performed using USEPA Method TO-15 for the collection and analysis of VOCs (USEPA, 1999). Samples were collected by attaching a certified clean Summa canister to the Teflon® tubing and opening the valve on the canister's flow controller allowing soil vapor to be drawn into the evacuated canister. The controllers were calibrated by the laboratory and shipped to the field. Soil vapor samples were collected at a low flow rate to assure subsurface equilibration and an absence of a high negative pressure that might mobilize subsurface vapor and bias the results.

3.2.2.3 Quality Control

During each sampling event, one in ten samples was collected in duplicate for quality control (QC) purposes. These samples used the same identification scheme as other samples but were not identified as QC samples to the laboratory. After the completion of the investigation, the chemical data was validated in accordance with established USEPA protocols to assess the reliability and accuracy of the data. The chemical data was supplied by the laboratory as hardcopy reports and electronic databases. Data validation memoranda are included with the results in Appendix B.

3.2.2.4 Sample Analysis

As discussed in the Work Plan, the Site Characterization Report (Tetra Tech, 2006a) identified specific target compounds in groundwater and sub-slab vapor samples. All IAQ and sub-slab samples collected were analyzed for the following COCs to focus the characterization on those compounds that may have been historically used and released at the MRC and have a potential to impact IAQ through subsurface migration. The list of COCs analyzed included the following:

Benzene*
Carbon Tetrachloride
Chloroform
Dichlorodifluoromethane
1,1-Dichloroethane
cis-1,2-Dichloroethene*
trans-1,2-Dichloroethene*
Ethylbenzene*
Methyl t-Butyl Ether
Tetrachloroethene
Toluene*

Total Xylenes*
1,2,4-Trichlorobenzene*
Trichloroethene
Vinyl Chloride
*Compounds identified on MRAS, reporting year 2005 SARA 312 chemical usage.

All collected samples were submitted to Analytical Laboratory Services Incorporated (ALSI) located in Middletown, Pennsylvania for analysis using gas chromatography-mass spectroscopy with cryogenic concentration as described in Sections 9 and 10 of USEPA Method TO-15 (USEPA, 1999). ALSI is certified for the performance of USEPA Method TO-15 analysis and meets all quality assurance/quality control (QA/QC) requirements specified in the TO-15 methodology. For the sampling performed on December 11 and 12, 2006, all collected samples were stored at ambient temperatures and couriered to the laboratory on December 12, 2006. For the sampling performed on April 26 and 27, 2007, all samples were stored at ambient temperature and couriered to the laboratory on April 27, 2007. All samples were submitted and analyzed within the specified method holding time. All appropriate chain-of-custody documentation was completed for each sample and is included in Appendix B. A table of method detection limits (MDLs) is included in Appendix B.

The qualification of analytical data during the validation process (i.e., application of U, B, J, UJ, U, L, K, UR, and R qualifiers) was conducted in accordance with the USEPA Functional Guidelines. The attachment of the data qualifiers to analytical results signifies the occurrence of quality control noncompliances that were noted during the course of data validation. The various data qualifiers used are defined, as follows:

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Non-detected results from the laboratory are reported in this manner.

B - This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

L - Indicates that the chemical was detected. However, the associated numerical result is not a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered biased low.

K - Indicates that the chemical was detected. However, the associated numerical result is not a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered biased high.

UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

UL - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be biased low based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

J - Indicates that the chemical was detected. However, the associated numerical result is not a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimated value.

UR - Indicates that the chemical may or may not be present. The nondetected analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies (i.e., holding times missed by a factor of two times the specified time limit, severe calibration noncompliances, and extremely low quality control recoveries).

R - Indicates that the chemical may or may not be present. The positive analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies.

The preceding data qualifiers may be categorized as indicative of major or minor problems. Major problems are defined as issues that result in the rejection of data, qualified with UR and R data validation qualifiers. These data are considered invalid and are not used for risk assessment and decision making purposes. Minor problems are defined as issues resulting in the estimation of data, qualified with U, J, L, K, UL, and UJ data validation qualifiers. Estimated and directional bias qualified analytical results are considered to be suitable for risk assessment and decision making purposes.

No data were rejected following validation of the results from both sampling events. TCE was detected in the laboratory method blank in seven of 42 IAQ samples collected in December 2006. These samples were affected by QA/QC concerns but were not rejected as the result of validation. TCE was also J-qualified in 16 of the December 2006 IAQ samples. No blank contamination was noted in the April 2007 sampling but TCE was J-qualified in 10 of 44 IAQ samples. While there is uncertainty associated with J-flagged data, it still indicates the presence of TCE within the samples.

3.3 DATA ANALYSIS

3.3.1 IAQ Data Analysis

The results of the laboratory analyses are included as part of the data validation reports in Appendix B. The data from the IAQ samples were evaluated based on the locations where the samples were collected. The following sections discuss the IAQ results by sampling event (i.e. December 2006 and April 2007) and area. Results for each area sampled in December 2006 and April 2007 are illustrated in Tables 3-1 through 3–9.

To provide a point of comparison, the IAQ analytical results were compared to risk-based screening values that were derived using default USEPA assumptions for evaluating industrial exposure scenarios (USEPA, 2002b). Spreadsheets that were used to calculate the risk-based screening values and an explanation of the methodology and assumptions used are included in Appendix C. As can be seen in the spreadsheets, the risk-based screening values calculations assumed that the individual is exposed to the calculated concentrations for 8 hours per day, 250 days per year, for 25 years. Clearly for some areas included in this study such as basement corridors and tunnels in Buildings B and C, this exposure period is overly conservative. The resultant screening concentrations are those that correspond to a one-in-one hundred thousand increased incremental lifetime cancer risk (i.e., 1×10^{-5}) and a non-cancer Hazard Index (HI) of 1. The 1×10^{-5} cancer risk threshold and HI of 1 were used based on MDE guidance. The calculated screening values expressed in micrograms per cubic meter ($\mu g/m^3$) were compared to the IAQ sample results expressed in the same units.

As can be seen in Tables 3-1 through 3-9, two screening values (0.9 $\mu g/m^3$ and 18 $\mu g/m^3$) are used for TCE. In 2001, USEPA issued a draft health risk assessment and proposed exposure standards for TCE that identified a range of toxicity criteria for TCE. The lower (concentration) screening value of 0.9 $\mu g/m^3$ corresponds to the more stringent toxicity criterion that USEPA developed for the protection of sensitive sub-populations such as infants, children, and the infirmed and is considered by the MDE in their decision making process. The higher (concentration) screening value of 18 $\mu g/m^3$corresponds to the less stringent toxicity criterion USEPA developed for the protection of the general population including industrial workers. The higher risk-based value is provided to assist in understanding the nature and magnitude of potential risk within the work environment. These toxicity criterion continue to undergo scientific review. A number of scientific issues were raised during the course of these reviews. To help address these issues, an expert panel was convened by the National Academy of Sciences (NAS) Board on Environmental Studies and Toxicology (NAS, 2006). The NAS report encouraged federal agencies to finalize the risk assessment for TCE using new information available since the 2001 document was issued, so that risk management decisions for this chemical can be expedited.

In the absence of a finalized USEPA risk assessment for TCE and in accordance with MDE guidance, the 2001 draft values were used to derive the screening levels and provide consistency within the state regulatory review process.

It should be noted that due to the uncertainty inherent in the risk assessment process including uncertainty in exposure assumptions and toxicity values used in the calculations, exceeding a risk-based screening value does not mean that an unacceptable risk is in fact present. Due to the conservative nature of the assumptions used in risk assessment, potential risks may be overestimated as a protective mechanism.

Although the IAQ investigation was not performed to quantify occupational exposures, OSHA PELs are also included in Tables 3-1 through 3-9 for perspective. OSHA PELs are not applicable for evaluating indoor air quality results when the source of airborne contaminants is subslab vapor as opposed to occupational sources. However, PELs are provided as they are regulatory criteria that most workers who work with or who are potentially exposed to chemicals in the workplace may be familiar with so they provide useful perspective on the concentrations of chemicals detected in the investigation.

The results of the IAQ sampling represent conditions at the time of sampling only. Consequently, the results may not be representative of airborne concentrations of contaminants under different conditions such as those associated with seasonal variations in temperature and barometric pressure as well as changes in the work environment, changes in activities and operations being performed at the MRC, or any changes in the materials being used.

The two sampling events were staggered by a period of approximately four months (December 2006 to April 2007). This was done so sampling could be performed under different ambient conditions. The first sampling event in December 2006 was performed to evaluate winter conditions with colder outside temperatures. The second sampling event in April 2007 was performed when outside temperatures were moderate. During winter months steps are typically taken to reduce infiltration of outside air while during warmer months, steps are typically taken to increase introduction of outside air.

3.3.1.1 Background IAQ Samples

3.3.1.1.1 December 2006

The results of the four background samples collected in December 2006 are contained in Table 3-1. The samples were collected at the northeast, northwest, southeast, and southwest fence line as far from MRC operations as possible to reduce potential influences. Copies of the field data sheets are included in Appendix A. As can be seen in Table 3-1, many COCs were detected in the background samples. Trichloroethene (TCE) was not detected in any background samples but was noted as blank-contaminated in sample BCK-1. All other constituents were detected at concentrations less than their corresponding screening guideline.

Due to the small number of background samples collected, alternate sources of ambient air data for the Middle River, Maryland area were investigated to evaluate whether the collected data were representative of regional background conditions. Mr. Edwin Gluth of the MDE Air and Radiation Management Administration provided Tetra Tech with data from an air monitoring station located in Essex, Maryland approximately 3 miles southwest of the MRC (MDE, 2007). The Essex monitoring station (USEPA monitor ID 240053001) collects data every six days for a 24-hour period. In December 2006, samples were collected on December 1, 7, 13, 19, 25, and 31. Table D-1 in Appendix D provides a comparison between the Essex monitor results and the MRC background samples for those COCs detected in both analyses. While samples were not collected on the same day (the Essex monitor collected data on December 13th, one day after the background samples were collected), the data is still considered useful in evaluating potential regional contributions to background. Averages are provided for both the Essex and MRC results. As can be seen, the majority of COCs detected in the MRC background samples were also detected at the Essex monitor. Concentration differences between samples were typically less than an order of magnitude. The results of the comparison between MRC background sample results and the Essex air monitor data indicate that there appears to be background sources of COCs that may contribute to ambient air concentrations within MRC buildings. While the MRC background results were typically higher than the Essex monitoring station data for those COCs detected at both locations, the presence of the same COCs at both locations indicates possible contributions from sources outside of the MRC.

3.3.1.1.2 April 2007

The results of the four background samples collected during the second sampling event are contained in Table 3-2. Background samples BCK-1-2 and BCK-2-2 were collected from the same locations as their corresponding samples collected during December 2006. As previously discussed in Section 3.2 samples BCK-3-2 and BCK-4-2 were moved to perimeter locations further away from operations. As can be seen in Table 3-2, fewer COCs were detected in the second round of background samples. All constituents were detected at concentrations less than their corresponding screening guideline.

Mr. Edwin Gluth of the MDE Air and Radiation Management Administration was contacted regarding the availability of data from the Essex, Maryland air monitoring station for the time of the second round of sampling (April 26 – 27, 2007). Mr. Gluth indicated that the data had not yet been completely analysed and was not available for release. This information will be incorporated when it becomes available in future Indoor Air Quality Investigation Reports.

3.3.1.2 Building A IAQ Samples

3.3.1.2.1 December 2006

The results of the December 2006 IAQ samples collected in Building A are included in Table 3-3. A total of 11 IAQ samples were collected from interior locations in Building A. Five IAQ samples (A-6, A-7, A-8, A-9, and A-11) were collected in the southwest portion of Building A including in A Basement, the Plating Shop, and adjacent operations. This is an area where VOCs were previously detected in sub-slab vapor. To provide spatial coverage, the remaining IAQ samples were collected around the inside perimeter of Building A and in work areas. Sample A-1 was collected from a telecommunications closet containing a pipe chase that might serve as a conduit for sub-slab vapor.

As illustrated in Table 3-3, the results for TCE were within the range of screening values. TCE exceeded the lower screening level in seven samples. No sample result exceeded the higher TCE screening level. TCE results for samples A4, A-5, and A-11 were B-qualified indicating TCE contamination in the laboratory method blank. All other constituents were below applicable risk-based screening values.

The highest concentrations of TCE were detected in those samples collected in and near the Plating Shop. TCE concentrations in samples A-6, A-7, A-8, and A-9 ranged from 1.3 to 4.2 $\mu g/m^3$. The highest concentration of TCE (4.2 $\mu g/m^3$) was detected in sample A-8 which was collected in the Paint Shop due east of the Plating Shop. The Paint Shop was not operating at the time of sampling and the doors were closed to minimize potential contributions from adjacent locations.

3.3.1.2.2 April 2007

The results of the April 2007 IAQ samples collected in Building A are included in Table 3-4. A total of 12 IAQ samples and two duplicate samples were collected from interior locations in Building A. All samples were collected at the same locations as the previous December 2006 samples except Sample A-7-2 as explained in Section 3.2. Sample A-10-2 was not collected due to sampler failure. Two additional Target of Opportunity samples TOO-4 and TOO-5 were collected in the southern section of the Plating Shop. As can be seen in Table 3-4, fewer COCs were detected in the April 2007 sampling versus December 2006. TCE results were all within the range of screening values. TCE exceeded the lower screening level in five samples (A-6-2, A-7-2, A-8-2, A-9-2, and TOO-4). These samples are all located in the Plating Shop and were the same samples that exceeded the lower screening level in December 2006 (except for TOO-4 which was a new sample location). The highest concentration of TCE (5.6 $\mu g/m^3$) was found in sample A-7-2 that was collected on the west wall of the Plating Shop approximately 12-feet above the floor surface. As previously mentioned, limited exposure of employees would be anticipated at this location. This result was slightly greater than the maximum TCE concentration (4.2 $\mu g/m^3$) that was detected in sample A-8 in December 2006. No sample exceeded the higher TCE screening level or applicable screening levels for any other COC.

3.3.1.3 Building B IAQ Samples

3.3.1.3.1 December 2006

The results of the December 2006 IAQ samples collected in Building B are included in Table 3-5. A total of seven IAQ samples were collected in Building B including one sample in B Basement and one in the tunnel underlying the Thrust Reverser Assembly Area. As can be seen in Table 3-5, all detections of TCE were within the derived risk-based concentration range. Three samples collected in Building B had concentrations of TCE in excess of the lower TCE screening value. No sample exceeded the higher TCE screening level or applicable screening levels for any other COC. Sample B-5 had a TCE result that exceeded the lower TCE screening level, however, it was B-qualified indicating TCE contamination in the laboratory method blank. All other detected constituents had concentrations below their respective screening values. TCE was detected in Building B at concentrations ranging from 0.5 to 1.9 $\mu g/m^3$. The highest concentration of TCE detected in Building B was found in sample B-6 that was collected in the B tunnel underneath the

Thrust Reverser Assembly Area. As discussed in Section 3.3.1 the exposure durations used in the calculation of the screening level are based on a worker occupying the area 8-hours per day for 250 days per year. The duration of exposure in these corridors is much lower.

3.3.1.3.2 April 2007

The results of the April 2007 IAQ samples collected in Building B are included in Table 3-6. A total of 13 IAQ samples and one duplicate sample were collected from interior locations in Building B. All samples were collected at the same locations as the previous December 2006 samples except for Sample B-4-2 as explained in Section 3.2. Five additional Target of Opportunity samples were collected in Building B. These included TOO-6 and TOO-7 collected around the "Big Dig" excavation, TOO-3 collected in B tunnel, and TOO-10 and TOO-11 collected in the basement of Building B. As can be seen in Table 3-6, benzene exceeded its risk-based screening level in one sample (B-1-2) collected along the north wall of Building B in an area where the wood block floor was being removed. No other COC exceeded its applicable risk-based screening level. TCE was not detected at the locations where it was found previously in December 2006.

3.3.1.4 Building C IAQ Samples

3.3.1.4.1 December 2006

The results of the December 2006 IAQ samples collected in Building C are included in Table 3-7. A total of nine samples and two duplicate samples were collected in Building C including two samples in C Basement. As can be seen in Table 3-7, TCE was detected at concentrations within the derived risk-based concentration range. Four samples had TCE concentrations greater than its lower screening value including C-4, C-5, C-6, and C-9. Sample C-9 was B-qualified indicating TCE contamination in the laboratory method blank. TCE was not detected at concentrations that exceeded the higher screening level. All other detected constituents had concentrations below their respective screening values. TCE concentrations ranged from 0.8 to 6.6 $\mu g/m^3$. The highest concentration of TCE was detected in sample C-4 which was collected in a recently renovated storage area (Section 3.2.1). This location was noted to have a very strong odor of fresh paint. There is uncertainty associated with this sample as its duplicate (DUP-4-121106) had differing results for a number of constituents. Field duplicate imprecision was noted for

1,2,4-trichlorobenzene, carbon tetrachloride, dichlorodifluoromethane, methyl-tert-butyl-ether, PCE and TCE in sample pair DUP-4-121106 and C-4.

3.3.1.4.2 April 2007

The results of the April 2007 IAQ samples collected in Building C are included in Table 3-8. A total of 12 IAQ samples and one duplicate sample were collected from interior locations in Building C. All samples were collected at the same locations as the previous December 2006 samples except for Sample C-2-2 as explained in Section 3.2. The results for Sample C-7-2 were rejected due to sampling equipment failure that led to collection of an inadequate volume for analysis. Three additional Target of Opportunity samples were collected in Building C. This included TOO-2 collected in the central portion of Building C Basement (at the exit for B tunnel) and TOO-8 and TOO-9 collected in the north eastern hallways of the Building C Basement. As can be seen in Table 3-8, the results for TCE were within the derived risk-based concentration range. TCE exceeded its lower screening level in two samples including C-1-2 collected in the Building C Basement, and C-5-2 collected at the south end of Building C. No sample exceeded the higher screening level for TCE or applicable screening levels for any other COC. While TCE was detected at fewer locations in April 2007 than in December 2006, the concentrations at the locations where it was detected were higher than in the corresponding earlier samples. Sample C-5 had a TCE concentration of 1.3 $\mu g/m^3$ while C-5-2 had a concentration of 7.2 $\mu g/m^3$, and Sample C-1 had a concentration of 0.8 $\mu g/m^3$ that was B-qualified while Sample C-1-2 had a concentration of 2.3 $\mu g/m^3$. The maximum concentration of TCE (7.2 $\mu g/m^3$) detected in Sample C-5-2 is the highest TCE concentration detected during both rounds of sampling. No personnel were observed in the sampled areas during the period of time the sampling was performed.

3.3.1.5 <u>VLS IAQ Samples</u>

3.3.1.5.1 December 2006

The IAQ sample results for the VLS are included in Table 3-9. A total of eight samples and one duplicate sample were collected at the VLS. As can be seen in Table 3-9, no constituent exceeded its risk-based screening value in any sample. TCE was not detected at the VLS.

3.3.1.5.2 April 2007

Based on the results from the December 2006 sampling event, it was determined that no further sampling in the VLS was indicated. The samples that were previously allocated for sampling in the VLS were reassigned as TOO samples and used to expand the spatial sampling within Buildings A, B, and C.

3.3.2 Sub-Slab Data Analysis

The data from the sub-slab samples were evaluated based on the locations where the samples were collected (i.e., Building A and Building C). Results for each area are illustrated in Tables 3-10 through 3-13.

The results of the sub-slab analyses were not compared to risk-based levels or other criteria as personnel cannot access sub-slab locations; consequently direct exposure to sub-slab contaminant concentrations is not possible. The results of the sub-slab sample analyses were compared with the results of co-located IAQ sample as well as background sample analyses to evaluate similarities between detected compounds.

3.3.2.1 Building A Sub-Slab Samples

3.3.2.1.1 December 2006

A total of five sub-slab samples comprised of four samples and one duplicate sample were collected at Building A. As previously discussed, three sub-slab samples (SV-13-2, SV-14-2, SV-15-2) were collected in the Plating Shop where previous samples identified the highest sub-slab vapor concentrations. Duplicate sample DUP-2-121106 was collected through the same sub-slab sample point as sample SV-13-2. The fifth sub-slab sample in Building A (SV-18-2) was collected in the Building A Basement. The laboratory indicated that the results of SV-18-2 could be biased as moisture detected in the sample may indicate incidental aspiration of groundwater into the sample container. This canister needed to be diluted due to low sample volume attributed to moisture. Table 3-10 contains the sub-slab vapor results for Building A.

As can be seen in Table 3-10, the following chemicals were detected in all three of the sub-slab samples collected in the Plating Shop: 1,1-Dichloroethane, benzene, chloroform, cis-1,2-Dichloroethene, PCE, trans-1,2-Dichloroethene, TCE, and vinyl chloride. Of these compounds, benzene, chloroform, cis-1,2-Dichloroethene, PCE, and TCE were also detected in co-located IAQ samples A-6 and A-7. Benzene and PCE were detected in background samples at concentrations similar to those found in the IAQ samples.

Sample SV-18-2 was collected from the sub-slab sampling point installed in Building A Basement. The results for sample SV-18-02 are included in Table 3-10. The following compounds were reported for sample SV-18-02: 1,1-Dichloroethane, chloroform, cis-1,2-Dichloroethene, methyl-t-Butyl ether, PCE, toluene, trans-1,2-Dichloroethene, TCE, and vinyl chloride. Of these compounds, benzene, cis-1,2-Dichloroethene, methyl-t-Butyl ether, toluene, PCE, and TCE were also detected in the co-located IAQ sample A-9. Benzene, methyl-t-Butyl ether, PCE, and toluene were detected in background samples at concentrations similar to the IAQ samples. Due to previously cited moisture problem with this sample, results may be best used for qualitative comparisons of the presence or absence of particular compounds.

3.3.2.1.2 April 2007

Four sub-slab samples were collected at Building A during the April 2007 sampling event. The previously sampled sub-slab locations were re-sampled and given the designation -3 (i.e. SV-13-3, SV-14-3, SV-15-3 and SV-18-3) because this was the third time these locations had been sampled.

As can be seen in Table 3-11, the following chemicals were detected in all three of the sub-slab samples collected in the Plating Shop: 1,1-Dichloroethane, chloroform, cis-1,2-Dichloroethene, PCE, trans-1,2-Dichloroethene, TCE, and vinyl chloride. Of these compounds, only TCE was detected in co-located IAQ samples A-6-2 A-7-2. The concentration of TCE only increased in one Plating Shop sub-slab sample (SV-15-3) between the December 2006 and April 2007 sampling events.

Table 3-11 also contains the results for the sub-slab sample collected from the Building A Basement (SV-18-3). Only toluene and TCE were found in both the sub-slab sample and the co-located IAQ sample A-9-2. Overall, the concentrations of most COCs increased at this sub-slab sample location between December 2006 and April 2007 but this may be because the December 2006 sample was biased low due to moisture in the sample.

3.3.2.2 Building C Basement Sub-Slab Samples

3.3.2.2.1 December 2006

Two sub-slab samples were collected in the basement of Building C. As previously discussed, sub-slab samples SV-1-2 and SV-4-2 were collected where previous samples identified the highest sub-slab vapor concentrations. Table 3-12 contains the results for these samples.

As can be seen in Table 3-12, the following chemicals were detected in both of the sub-slab samples collected in the Building C Basement: benzene, cis-1,2-Dichloroethene, PCE, trans-1,2-Dichloroethene, TCE, and vinyl chloride. Chloroform and ethylbenzene were reported in sample SV-1-2 but not SV-4-2. Of the compounds reported in the sub-slab samples, benzene, cis-1,2-Dichloroethene, PCE, and TCE were also detected in co-located IAQ samples C-8, or its duplicate DUP-3-121106, and C-9. As previously discussed benzene and PCE were detected in background samples at concentrations similar to the IAQ samples.

3.3.2.2.2 April 2007

The two sub-slab locations in the Building C Basement were re-sampled in April 2007. Table 3-13 contains the results from the re-sampling of these locations. As can be seen in Table 3-13, the following chemicals were detected in both sample SV-1-3 and SV-4-3: cis-1,2-Dichloroethene, PCE, trans-1,2-Dichloroethene, TCE, and vinyl chloride. Benzene, ethyl benzene, and toluene were reported in sample SV-4-3 but not SV-1-3. Of the compounds reported in the sub-slab samples toluene was detected in IAQ samples C-8-2, its duplicate DUP-1-42607, and C-9-2, while TCE was only found in IAQ sample C-8-2. Ethyl benzene was found in sub-slab sample SV-4-3 and IAQ sample C-8-2 and its duplicate DUP-1-42607.

Between the December 2006 and April 2007 sampling events, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, and TCE increased at sub-slab sample location SV-1, while benzene, toluene, trans-1,2-Dichloroethene, and vinyl chloride increased at sub-slab sample location SV-4. All other COCs had decreased concentrations in the Building C Basement sub-slab samples.

3.3.3 Evaluation of Potential Sub-Slab Vapor Migration

To evaluate whether sub-slab vapor intrusion might be occurring at the MRC, a line-of-evidence approach was used as described in the Interstate Technology and Regulatory Council (ITRC) Vapor Intrusion Pathway guidance document (ITRC, 2007). Lines of evidence used to evaluate potential sub-slab vapor intrusion include:

- Comparisons to background concentrations.
- The presence of COCs in both sub-slab and IAQ samples.
- Presence of "marker chemicals" in IAQ samples.
- Building construction and current conditions.
- Ratio of COCs in sub-slab and IAQ samples.
- Comparison of analytical results with modelled results

While no one line of evidence may conclusively indicate that sub-slab vapor intrusion is occurring, the use of multiple lines-of-evidence can strengthen conclusions regarding potential sub-slab vapor intrusion.

3.3.3.1 Comparison to Background

As discussed in past sections, several of the COCs detected in sub-slab vapors were also detected in background and IAQ samples. An evaluation of the background and IAQ data contained in Tables 3-1 through 3-9 shows trends for specific chemicals that may allow them to be identified as coming from background sources either within or outside of the MRC and not from sub-slab sources. Certain chemicals were only detected in either IAQ and/or background samples including xylenes, dichlordifluoromethane, and 1,2,4 trichlorobenzene. Other chemicals detected in IAQ or background samples were found only in a limited number of sub-slab samples or at very low concentrations including carbon tetrachloride and ethylbenzene. Similarities in concentrations between IAQ samples and background samples are apparent in the December 2006 results for compounds such as benzene and PCE throughout the MRC. Benzene and PCE were not detected in the April 2007 background samples and benzene was only detected once and PCE not at all in the April 2007 IAQ samples. Although the data are limited, it appears to indicate that when these chemical are present or absent in background samples, they will be present or absent in IAQ samples. Other compounds demonstrated similar relationships including dichlordifluoromethane, ethylbenzene, and methyl-t-butyl ether. Some compounds detected outdoors in background samples were found at higher concentrations in IAQ samples throughout the facility including toluene and xylenes. Both of these compounds are used at the MRC and most likely represent contributions from interior sources and not sub-slab vapors as only toluene was detected at low concentrations in three sub-slab samples.

The comparison to background indicates that a number of chemicals detected in IAQ samples are most likely associated with background contributions from either ambient (outdoor) air or from MRC operations. This may include 1,2,4 trichlorobenzene, benzene, carbon tetrachloride, ethylbenzene, methyl-t-Butyl ether, PCE, toluene, and xylenes. While a number of these chemicals were detected in sub-slab vapor and contributions from sub-slab vapor may be occurring, it does not appear to be the primary source of these compounds within indoor air at the MRC. According to MRAS personnel, MRAS' facility operations are not a potential source of PCE, carbon tetrachloride, or methyl-t-butyl ether.

3.3.3.2 COCs in IAQ and Sub-Slab Samples

To evaluate COCs identified in both IAQ and sub-slab samples, initial comparisons were performed between the results of the sub-slab samples and their co-located IAQ samples. By comparing the IAQ data in Tables 3-1 through 3-9 with the results of the co-located sub-slab sample analyses illustrated in Tables 3-10 through 3-13, a subset of the COC list was developed of those compounds found in both sample types.

For samples collected during the December 2006 sampling in the Plating Shop, sub-slab samples SV-13-2, DUP-2-121106, SV-14-2, and SV-15-2 were compared to co-located IAQ samples A-6 and A-7. The results of the comparison indicate that benzene, chloroform, cis-1,2-Dichloroethene, PCE, and TCE were detected in all sub-slab and IAQ samples. Ethylbenzene and toluene were only detected in one sub-slab sample (SV-15-2) and the IAQ samples and methyl-t-Butyl ether was detected in two sub-slab samples (SV-14-2 and SV-15-2) and the IAQ samples. For the co-located IAQ and sub-slab sample collected in A Basement (A-9 and SV-18-2), cis-1,2-Dichloroethene, methyl-t-Butyl ether, PCE, toluene, and TCE were detected in both samples.

For samples collected during the April 2007 sampling in the Plating Shop, sub-slab samples SV-13-3, SV-14-3, AND SV-15-3 were compared to co-located IAQ samples A-6-2 and A-7-2. The results of the comparison show that only TCE was detected in all sub-slab and IAQ samples. For the co-located IAQ and sub-slab sample collected in A Basement during the April 2007 sampling (A-9-2 and SV-18-3), toluene and TCE were detected in both samples.

For the co-located IAQ and sub-slab sample collected in C Basement during the December 2006 sampling (C-8 and its duplicate DUP-3-121106, C-9 and SV-1-2 and SV-4-2) benzene, cis-1,2-Dichloroethene, PCE, and TCE were detected in all samples. (cis-1,2-Dichloroethene was found in DUP-3-121106 but not C-8.) Ethylbenzene and toluene were only detected in sub-slab sample SV-4-2 and the IAQ samples.

For the co-located IAQ and sub-slab samples collected during the April 2007 sampling in C Basement (C-8-2, C-9-2 and SV-1-3 and SV-4-3), no compounds were found common to all IAQ and sub-slab samples. Of the compounds reported in the sub-slab samples toluene was detected in IAQ samples C-8-2, its duplicate DUP-1-42607, and C-9-2, while TCE was only found in IAQ sample C-8-2. Ethyl benzene was found in sub-slab sample SV-4-3 and IAQ sample C-8-2 and its duplicate DUP-1-42607.

A review of chemicals detected in both sub-slab vapor samples and co-located IAQ samples results in a subset of the COC list of those chemicals detected in both types of samples. The results of the December 2006 IAQ and sub-slab sampling suggest a stronger relationship than the data collected in April 2007. This may be the result of seasonal variation. The list of compounds found in all sub-slab and co-located IAQ samples collected in December 2006 includes cis-1,2-Dichloroethene, PCE, and TCE. The presence of these chemicals in both sample types may indicate potential sub-slab vapor migration. While not detected in all sub-slab and co-located IAQ samples, the prevalence of benzene and chloroform in the majority of samples may also indicate potential sub-slab vapor migration.

3.3.3.3 Presence of Sub-Slab Vapor Marker Chemicals in IAQ Samples

As discussed in Section 3.3.3.2, the presence of several chemicals in both sub-slab and IAQ samples may indicate potential sub-slab vapor intrusion. To further evaluate this potential, COCs only found in sub-slab vapor, known to be associated with chlorinated solvent degradation, and not present in background samples were used as marker chemicals. The presence of marker chemicals in IAQ samples is a good indication that intrusion is occurring and that the observed constituents are derived from the subsurface. Conversely, the absence of a marker chemical in IAQ samples is a good indicator that little to no contamination is coming from the subsurface suggesting that any air contaminants observed are from background sources (ITRC, 2007). The fact that they are not known to be present (or widely used) at the MRC supports the conclusion of potential sub-slab vapor intrusion when they are detected in IAQ samples. Of the chemicals previously identified in sub-slab samples and IAQ samples, cis-1,2-Dichloroethene meets the criteria for use as a marker chemical. (It should be noted that cis-1,2-Dichloroethene was included on the MRAS 2005 SARA 312 chemical usage list, however, it was not identified on any of the MSDS reviewed or observed during the site reconnaissance or sampling.) Cis-1,2-Dichloroethene was detected at high concentrations in sub-slab vapor consistent with chlorinated solvent degradation. Figure 3-5 illustrates sample locations where TCE and DCE were identified during the December 2006 and April 2007 sampling events at ground level locations, while Figure 3-6 illustrates the same information at basement locations

Table 3-14 illustrates the 10 locations within the MRC where cis-1,2-Dichloroethene was detected during the December 2006 sampling event. Samples A-6, A-7, A-8, A-9, and A-11 were collected in the Plating Shop and adjacent areas. Samples C-9 and DUP-3-121106 were collected in the basement of C Building. These are areas where VOCs were previously detected in sub-slab vapor. Samples B-5, and C-1 were collected from basement hallways, and B-6 was collected from B-tunnel underneath the Thrust Reverser Assembly Area. Being below grade, these areas may be more vulnerable to potential sub-surface intrusion although no sources were identified. The 24 sample locations where TCE was detected are also included on Table 3-14 to evaluate any potential relationship between the presence of cis-1,2-Dichloroethene and the presence of TCE. As can be seen in Table 3-14, cis-1,2-Dichloroethene was not detected everywhere TCE was detected indicating potential background or unknown sources of TCE, but TCE was detected in the majority of locations where cis-1,2-Dichloroethene was found. All locations where cis-1,2-Dichloroethene was found would have been included if the remaining locations were not B-qualified for TCE. The highest concentrations of TCE detected in Building A were in those samples where cis-1,2-Dichloroethene was found (A-6, A-7, A-8, A-9). The same is true for Building B where sample B-6 collected from B-tunnel had the highest cis-1,2-Dichloroethene and TCE concentrations in Building B. Building C did not demonstrate the same relationship but the result for sample location C-4 where the maximum concentration of TCE was detected appears to have been biased high, affected by the painting of the room where it was collected.

A review of the IAQ and sub-slab sample data for the April 2007 sampling event indicates that cis-1,2-Dichloroethene was detected in sub-slab samples but not in any IAQ samples. In fact no chemical that might serve as a marker chemical of sub-slab chlorinated vapor intrusion such as 1,1-Dichloroethane, cis-1,2-Dichloroethene, or trans-1,2-Dichloroethene were found in any IAQ sample collected in April 2007. Overall, TCE was detected less frequently and at lower concentrations in the April 2007 samples. Seasonal variation of ambient weather conditions may be responsible for the decrease in the concentration of TCE and marker chemicals in the April 2007 IAQ samples.

Based on the use of cis-1,2-Dichloroethene and its apparent relationship with TCE, it appears that sub-slab vapor intrusion may be occurring at locations where they are both found and where known sources exist such as the Plating Shop and the Building C Basement. Based on the results of the December 2006 data, sub-slab vapor intrusion appears to possibly be occurring in tunnels beneath the MRC and in subsurface basement hallways of Buildings B and C. It should be noted however that there is uncertainty with this conclusion due to the absence of TCE and/or marker chemicals in IAQ samples collected at these locations during the April 2007 sampling event.

Sub-slab vapor intrusion may be affected by seasonal variations in ambient conditions resulting in lower concentrations of chlorinated COCs and markers of chlorinated COC vapor intrusion as seen in the April 2007 data. With no known major changes in facility operations, it appears that the only differences between the December 2006 and April 2007 sampling events are seasonally-related i.e., associated with changes in ambient weather conditions such as outside temperatures and the operation of the facility in response to these differences. Outside temperatures in December 2006 were colder and steps were taken to reduce outside air infiltration. Outside air temperatures during the April 2007 sampling were warmer and steps were taken to encourage the introduction of outside air. Ambient weather conditions such as temperature and barometric pressure as well as the amount of outside air introduced into the facility may have affected the results between the two sampling events.

3.3.3.4 Ratios of COCs in Sub-Slab and IAQ Samples

An evaluation of ratios of COC concentrations in sub-slab samples and IAQ samples was performed to evaluate potential subsurface vapor intrusion contributions to indoor air and to screen for possible background sources. Ratios of TCE to PCE were calculated for sub-slab samples and compared to ratios of TCE to PCE in IAQ samples. If the ratios are similar, subsurface vapor intrusion may be indicated. Ratios can screen out obvious background sources but will not necessarily confirm vapor intrusion or eliminate the potential for background contributions (ITRC, 2007).

Using the data collected in December 2006 at the Plating Shop, mean concentrations of TCE and PCE in sub-slab samples SV-13-2, DUP-2-121106, SV-14-2, and SV-15-2 and co-located IAQ samples A-6 and A-7 were calculated. The mean concentration of TCE in the sub-slab samples was 266750 $\mu g/m^3$. The mean concentration of PCE in the sub-slab samples was 124.78 $\mu g/m^3$. The corresponding mean concentrations in IAQ samples were 2.35 $\mu g/m^3$ TCE and 0.75 $\mu g/m^3$ PCE. The ratio of TCE to PCE in sub-slab vapor is 2137.8 and in IAQ samples the ratio of TCE to PCE is 3.13.

Using the data collected in April 2007 at the Plating Shop, mean concentrations of TCE and PCE in sub-slab samples SV-13-3, SV-14-3, and SV-15-3 and co-located IAQ samples A-6-2, and A-7-2 were calculated. The mean concentration of TCE in the sub-slab samples was 262000 $\mu g/m^3$. The mean concentration of PCE in the sub-slab samples was 116 $\mu g/m^3$. The corresponding mean concentrations in IAQ samples were 2.33 $\mu g/m^3$ TCE and 1.7 $\mu g/m^3$ PCE. The ratio of TCE to PCE in sub-slab vapor is 2261.8 and in IAQ samples the ratio of TCE to PCE is 1.37.

The ratios indicate that concentrations of TCE are higher than PCE in both sub-slab vapor and indoor air however the difference in the two ratios does not clearly indicate subsurface vapors as the source. The ratios remained relatively unchanged between the two sampling periods. The lower ratio of TCE to PCE in IAQ samples may be due to PCE contributions from background sources and the use of lower J-qualified IAQ data from the December 2006 sampling and using one-half the detection limit for non-detected results in the April 2007 dataset.

A second evaluation was performed where ratios were developed based on a specific compound's mean concentration in sub-slab vapor versus its corresponding IAQ concentration. Table 3-15 illustrates the chemical-specific ratios between sub-slab and IAQ concentrations for both the December 2006 and April 2007 data. As can be seen in Table 3-15, the sub-slab to IAQ ratios for cis-1,2-Dichloroethene and TCE are similar. As previously discussed, sub-slab vapor is the only known source for cis-1,2-Dichloroethene. The similarity of the TCE ratio indicates sub-slab vapor as a likely source. The sub-slab vapor to IAQ ratios for benzene, chloroform, and PCE appear to indicate that background may be the primary source for these compounds although contributions from sub-slab vapors cannot be ruled out. Based on information provided by MRAS personnel, no chlorinated solvents are used in MRAS operations.

Using the data collected in December 2006 in the Building C Basement, the mean concentration of TCE in the sub-slab samples was 23950 $\mu g/m^3$. The mean concentration of PCE in the sub-slab samples was 95.95 $\mu g/m^3$. The corresponding mean concentrations in IAQ samples C-8, DUP-3-121106, and C-9 were 0.77 $\mu g/m^3$ TCE and 1.10 $\mu g/m^3$ PCE. The ratio of TCE to PCE in sub-slab vapor is 249.61 and in IAQ samples the ratio of TCE to PCE is 0.70.

Using the data collected in April 2007 in the Building C Basement, the mean concentration of TCE in the sub-slab samples was 18800 $\mu g/m^3$. The mean concentration of PCE in the sub-slab samples was 84.9 $\mu g/m^3$. The corresponding mean concentrations in IAQ samples C-8-2, DUP-1-42607, and C-9-2 were 1.13 $\mu g/m^3$ TCE and 1.7 $\mu g/m^3$ PCE. The ratio of TCE to PCE in sub-slab vapor is 221.44 and in IAQ samples the ratio of TCE to PCE is 0.67.

These results indicate that even though TCE was present at higher concentrations in sub-slab vapors, the higher concentration of PCE present in indoor air is most likely associated with background sources. Even though the analysis used J-qualified data and one-half the detection limit for non-detected results which contributes uncertainty to the analysis, the ratios remained relatively unchanged between the two sampling periods.

Table 3-15 illustrates the chemical-specific ratios between sub-slab and IAQ concentrations for samples collected in the basement of Building C during both the December 2006 and April 2007 sampling events. As can be seen in Table 3-15, the sub-slab to IAQ ratios for cis 1,2 Dichloroethene and TCE are relatively similar, however, background sources of TCE may account for the difference in the ratios as well as the concentrations of cis-1,2-Dichloroethene in the sub-slab sample. The sub-slab vapor to IAQ ratios for benzene, chloroform, and PCE appear to indicate that background may be the primary source for these compounds although contributions from sub-slab vapors cannot be ruled out. It should be noted that TCE was the only chemical reported as detected in the co-located IAQ samples collected in the Building C Basement in April 2007. The means for benzene, chloroform, cis-1,2-Dichloroethene, and PCE were based on one-half of the reported detection limits as they were reported as non-detected.

The sub-slab vapor and IAQ data from the samples collected in the basement of Building A were not included in the ratio analysis due to the previously discussed moisture and sample dilution considerations for sample SV-18-2 collected in December 2006.

The Interstate Technology and Regulatory Council (ITRC) Vapor Intrusion Pathway guidance document (ITRC, 2007) suggests the following methodology to further evaluate potential sub-slab vapor intrusion based on contaminant ratios. In theory, if a marker chemical is found in the subsurface and indoor air, the indoor air concentrations of other chemicals can be estimated by multiplying the subsurface concentration ratio (nonmarker/marker) by the indoor air concentration of the marker chemical. If the measured indoor air concentrations of the second chemical are greater than that predicted by this method, the additional amounts found in indoor air may be due to background contributions (ITRC, 2007).

Using the mean sub-slab vapor and mean indoor air concentrations from both sampling events in Building A Plating Shop and Building C basement (included in Table 3-15), an analysis of predicted versus measured indoor air concentrations was performed. Table 3-16 shows the results of the analysis. In accordance with the ITRC guidance, ratios were calculated for the mean sub-slab concentrations of benzene, chloroform, TCE, and PCE versus the mean sub-slab concentration of the marker chemical cis 1,2-DCE from each sampling event. These ratios were then multiplied with the corresponding measured mean indoor air concentration of cis 1,2-DCE. It should be noted that cis 1,2-DCE was not detected in the April 2007 IAQ samples so one-half the detection limit was used in the calculation. The resulting predicted indoor air concentrations were then compared to the mean measured indoor air concentrations. As can be seen in Table 3-16, benzene, chloroform, and PCE have measured concentrations that exceed the predicted concentrations by three to four orders of magnitude. This would indicate a source other than sub-slab vapor for these chemicals. TCE had the lowest ratio between measured and predicted concentrations which demonstrates the greatest potential association with sub-slab vapor. The analysis used J-qualified data and one-half the detection limit for non-detected results which introduces a degree of uncertainty into the analysis however, the magnitude of the derived ratios appears to outweigh this uncertainty and supports the conclusions.

3.3.3.5 Building Construction and Current Conditions

Buildings A, B, and C have wood block floors overlaying a compacted dirt sub-floor that most likely dates back to the construction of the original structures. Areas where the original wood block floors have been removed have been replaced with concrete. The wood block floors are most likely permeable and do not appear to represent a significant barrier to potential subsurface vapor intrusion. Multiple utility chases, tunnels, and floor openings are present in Buildings A, B, and C that might serve as conduits for sub-slab vapors. The floor of the Plating Shop is concrete however the Plating Shop has high ceilings with openings around the peak of the roof from windows either left open or broken. The building design may cause a chimney effect potentially enhancing subsurface vapor intrusion. Heat from the plating line may result in increased convection, moving air upward facilitating vapor movement. A large portion of the work areas in Buildings A, B, and C do not have heating ventilation and air conditioning (HVAC) systems. Those locations that do have HVAC systems such as Bonding Lay-Up, and Bond Clean operations in Building A, D-5, and THAAD Production Area in Building C, and offices throughout the MRC are most likely under positive air pressure that will minimize or prevent soil vapor from migrating into conditioned spaces from a subsurface source. Smoke tubes were used during the selection of sampling locations to provide a qualitative indication of air flow and possible pressurization effects. The large bay doors at the south end of Building B are opened based on outside temperatures and may provide dilution through the introduction of large volumes of outside air. The doors to the Building C Basement were open at the time of the site reconnaissance and may also introduce outside air into this work area.

The VLS is of more recent construction and uses more contemporary materials. Floors were observed to be concrete and appear to serve as a better barrier to potential subsurface vapor intrusion. The fabrication, assembly, and storage areas of the VLS did not appear to be receiving conditioned air. Offices at the VLS and the adjacent program building were served by HVAC systems reducing the potential for vapor intrusion.

3.3.3.6 Comparison of Sampling Results and Modeling Results

A comparison of the IAQ analytical results to the concentrations predicted by the Johnson and Ettinger (J&E) model output (Tetra Tech, 2006a) indicates the model underestimated the concentrations of COCs in ambient air. The maximum TCE concentration predicted by the J&E model in the Plating Shop would be 1.24 $\mu g/m^3$ while the maximum concentration measured in sample A-6 in December 2006 was 2.8 $\mu g/m^3$ and the maximum concentration detected in sample A-7-2 collected in April 2007 was 5.6 $\mu g/m^3$. The maximum TCE concentration predicted by the J&E model in the Building A Basement was 0.46 $\mu g/m^3$ while the maximum concentration measured in sample A-9 in December 2006 was 2.7 $\mu g/m^3$, and 2.2 $\mu g/m^3$ in sample A-9-2 from the April 2007 sampling. The maximum TCE concentration predicted by the J&E model in the Building C Basement was 0.05 $\mu g/m^3$ while the maximum concentration measured in sample C-8 in December 2006 was 0.4 $\mu g/m^3$. TCE was also detected in sample C-8-2 collected in the Building C Basement in April 2007 at a concentration of 0.7 $\mu g/m^3$. Typically, risk assessment models such as the J&E model have extremely conservative assumptions built into them that would tend to skew the results towards overestimation (more protective) rather than underestimation. The difference between the predicted and measured concentrations may be the result of uncertainty in the model but may also be associated with background sources of TCE that the J&E model does not account for.

TABLE 3-1

IAQ SAMPLE RESULTS BACKGROUND LOCATIONS DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
BCK-1	1,1-Dichloroethane	4	U	4.00E+05	----	1789
BCK-1	1,2,4-Trichlorobenzene	7.4	U	4.00E+04[N]	----	15
BCK-1	Benzene	2.7	J	3.19E+02	13.2	110
BCK-1	Carbon Tetrachloride	6.3	U	6.29E+04	6.7	639
BCK-1	Chloroform	4.9	U	2.40E+05	4.4	179
BCK-1	cis-1,2-Dichloroethene	4	U	7.90E+05	----	----
BCK-1	Dichlorodifluoromethane	2.1	J	4.95E+06	----	639
BCK-1	Ethylbenzene	1.5	J	4.35E+05	----	3705
BCK-1	Methyl t-Butyl Ether	0.7	J	1.80E+05[A]	----	10948
BCK-1	Tetrachloroethene	1.1	J	6.78E+05	18	1022
BCK-1	Toluene	6.2		7.54E+05	----	17885
BCK-1	Total Xylenes	5.3	J	4.34E+05	----	383
BCK-1	trans-1,2-Dichloroethene	4	U	7.90E+05	----	217
BCK-1	Trichloroethene	1.2	B	5.37E+05	18[1]	128[2]
BCK-1	Trichloroethene	1.2	B	5.37E+05	0.9[1]	128[2]
BCK-1	Vinyl Chloride	2.6	U	2.16E+04	24[3]	358[3]
BCK-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
BCK-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
BCK-2	Benzene	2.8		3.19E+02	13.2	110
BCK-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
BCK-2	Chloroform	2.4	U	2.40E+05	4.4	179
BCK-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
BCK-2	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
BCK-2	Ethylbenzene	1.4	J	4.35E+05	----	3705
BCK-2	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
BCK-2	Tetrachloroethene	0.9	J	6.78E+05	18	1022
BCK-2	Toluene	7.3		7.54E+05	----	17885
BCK-2	Total Xylenes	5	J	4.34E+05	----	383
BCK-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
BCK-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
BCK-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
BCK-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-1

IAQ SAMPLE RESULTS BACKGROUND LOCATIONS DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
BCK-3	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
BCK-3	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
BCK-3	Benzene	2.0		3.19E+02	13.2	110
BCK-3	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
BCK-3	Chloroform	2.4	U	2.40E+05	4.4	179
BCK-3	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
BCK-3	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
BCK-3	Ethylbenzene	1.0	J	4.35E+05	----	3705
BCK-3	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
BCK-3	Tetrachloroethene	0.7	J	6.78E+05	18	1022
BCK-3	Toluene	5.1		7.54E+05	----	17885
BCK-3	Total Xylenes	4.0	J	4.34E+05	----	383
BCK-3	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
BCK-3	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
BCK-3	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
BCK-3	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
BCK-4	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
BCK-4	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
BCK-4	Benzene	2.0		3.19E+02	13.2	110
BCK-4	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
BCK-4	Chloroform	2.4	U	2.40E+05	4.4	179
BCK-4	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
BCK-4	Dichlorodifluoromethane	1.5	J	4.95E+06	----	639
BCK-4	Ethylbenzene	1	J	4.35E+05	----	3705
BCK-4	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
BCK-4	Tetrachloroethene	0.6	J	6.78E+05	18	1022
BCK-4	Toluene	5.1		7.54E+05	----	17885
BCK-4	Total Xylenes	3.7	J	4.34E+05	----	383
BCK-4	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
BCK-4	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
BCK-4	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
BCK-4	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:

U = nondetect
J = estimated
Shaded cells indicate concentration greater than risk-based screening level

ug/m3 = micrograms per cubic meter
ILCR = Incremental lifetime cancer risk.
HI = Hazard Index.

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit
N = National Institute for Occupational Safety and Health Recommended Exposure Limit
A = American Council of Governmental Industrial Hygienists Theshold Limit Value

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-2

IAQ SAMPLE RESULTS BACKGROUND LOCATIONS APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
BCK-1-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
BCK-1-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
BCK-1-2	Benzene	1.6	U	3.19E+02	13.2	110
BCK-1-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
BCK-1-2	Chloroform	2.4	U	2.40E+05	4.4	179
BCK-1-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
BCK-1-2	Dichlorodifluoromethane	1.6	J	4.95E+06	----	639
BCK-1-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
BCK-1-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
BCK-1-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
BCK-1-2	Toluene	0.5	J	7.54E+05	----	17885
BCK-1-2	Total Xylenes	6.5	U	4.34E+05	----	383
BCK-1-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
BCK-1-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
BCK-1-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
BCK-1-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
BCK-2-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
BCK-2-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
BCK-2-2	Benzene	1.6	U	3.19E+02	13.2	110
BCK-2-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
BCK-2-2	Chloroform	2.4	U	2.40E+05	4.4	179
BCK-2-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
BCK-2-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
BCK-2-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
BCK-2-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
BCK-2-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
BCK-2-2	Toluene	0.3	J	7.54E+05	----	17885
BCK-2-2	Total Xylenes	6.5	U	4.34E+05	----	383
BCK-2-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
BCK-2-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
BCK-2-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
BCK-2-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-2

IAQ SAMPLE RESULTS BACKGROUND LOCATIONS APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
BCK-3-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
BCK-3-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
BCK-3-2	Benzene	1.6	U	3.19E+02	13.2	110
BCK-3-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
BCK-3-2	Chloroform	2.4	U	2.40E+05	4.4	179
BCK-3-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
BCK-3-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
BCK-3-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
BCK-3-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
BCK-3-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
BCK-3-2	Toluene	0.3	J	7.54E+05	----	17885
BCK-3-2	Total Xylenes	6.5	U	4.34E+05	----	383
BCK-3-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
BCK-3-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
BCK-3-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
BCK-3-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
BCK-4-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
BCK-4-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
BCK-4-2	Benzene	1.6	U	3.19E+02	13.2	110
BCK-4-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
BCK-4-2	Chloroform	2.4	U	2.40E+05	4.4	179
BCK-4-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
BCK-4-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
BCK-4-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
BCK-4-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
BCK-4-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
BCK-4-2	Toluene	0.3	J	7.54E+05	----	17885
BCK-4-2	Total Xylenes	6.5	U	4.34E+05	----	383
BCK-4-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
BCK-4-2	Trichloroethene	0.5	J	5.37E+05	18[1]	128[2]
BCK-4-2	Trichloroethene	0.5	J	5.37E+05	0.9[1]	128[2]
BCK-4-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:

U = nondetect
J = estimated
Shaded cells indicate concentration greater than risk-based screening level

ug/m3 = micrograms per cubic meter
ILCR = Incremental lifetime cancer risk.
HI = Hazard Index.

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit
N = National Institute for Occupational Safety and Health Recommended Exposure Limit
A = American Council of Governmental Industrial Hygienists Theshold Limit Value

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-3

IAQ SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-1	1,1-Dichloroethane	2.00	U	4.00E+05	----	1789
A-1	1,2,4-Trichlorobenzene	3.70	U	4.00E+04[N]	----	15
A-1	Benzene	2.30		3.19E+02	13.2	110
A-1	Carbon Tetrachloride	0.40	J	6.29E+04	6.7	639
A-1	Chloroform	2.40	U	2.40E+05	4.4	179
A-1	cis-1,2-Dichloroethene	2.00	U	7.90E+05	----	----
A-1	Dichlorodifluoromethane	1.80	J	4.95E+06	----	639
A-1	Ethylbenzene	1.30	J	4.35E+05	----	3705
A-1	Methyl t-Butyl Ether	0.40	J	1.80E+05[A]	----	10948
A-1	Tetrachloroethene	0.70	J	6.78E+05	18	1022
A-1	Toluene	8.30		7.54E+05	----	17885
A-1	Total Xylenes	4.80	J	4.34E+05	----	383
A-1	trans-1,2-Dichloroethene	2.00	U	7.90E+05	----	217
A-1	Trichloroethene	0.60	J	5.37E+05	18[1]	128[2]
A-1	Trichloroethene	0.60	J	5.37E+05	0.9[1]	128[2]
A-1	Vinyl Chloride	1.30	U	2.16E+04	24[3]	358[3]
A-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-2	Benzene	2.2		3.19E+02	13.2	110
A-2	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
A-2	Chloroform	0.5	J	2.40E+05	4.4	179
A-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-2	Dichlorodifluoromethane	1.6	J	4.95E+06	----	639
A-2	Ethylbenzene	1.4	J	4.35E+05	----	3705
A-2	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
A-2	Tetrachloroethene	0.9	J	6.78E+05	18	1022
A-2	Toluene	11.6		7.54E+05	----	17885
A-2	Total Xylenes	5.3	J	4.34E+05	----	383
A-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-2	Trichloroethene	0.9	J	5.37E+05	18[1]	128[2]
A-2	Trichloroethene	0.9	J	5.37E+05	0.9[1]	128[2]
A-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-3

IAQ SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-3	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-3	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-3	Benzene	2.1		3.19E+02	13.2	110
A-3	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-3	Chloroform	0.8	J	2.40E+05	4.4	179
A-3	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-3	Dichlorodifluoromethane	1.5	J	4.95E+06	----	639
A-3	Ethylbenzene	1.4	J	4.35E+05	----	3705
A-3	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
A-3	Tetrachloroethene	0.8	J	6.78E+05	18	1022
A-3	Toluene	13.8		7.54E+05	----	17885
A-3	Total Xylenes	5.5	J	4.34E+05	----	383
A-3	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-3	Trichloroethene	0.9	J	5.37E+05	18[1]	128[2]
A-3	Trichloroethene	0.9	J	5.37E+05	0.9[1]	128[2]
A-3	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-4	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-4	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-4	Benzene	2.5		3.19E+02	13.2	110
A-4	Carbon Tetrachloride	0.6	J	6.29E+04	6.7	639
A-4	Chloroform	0.7	J	2.40E+05	4.4	179
A-4	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-4	Dichlorodifluoromethane	1.8	J	4.95E+06	----	639
A-4	Ethylbenzene	1.9	J	4.35E+05	----	3705
A-4	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
A-4	Tetrachloroethene	0.9	J	6.78E+05	18	1022
A-4	Toluene	14.6		7.54E+05	----	17885
A-4	Total Xylenes	7.3		4.34E+05	----	383
A-4	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-4	Trichloroethene	1.1	B	5.37E+05	18[1]	128[2]
A-4	Trichloroethene	1.1	B	5.37E+05	0.9[1]	128[2]
A-4	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-3

IAQ SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-5	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-5	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-5	Benzene	2.4		3.19E+02	13.2	110
A-5	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
A-5	Chloroform	0.9	J	2.40E+05	4.4	179
A-5	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-5	Dichlorodifluoromethane	1.8	J	4.95E+06	----	639
A-5	Ethylbenzene	1.8	J	4.35E+05	----	3705
A-5	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
A-5	Tetrachloroethene	0.9	J	6.78E+05	18	1022
A-5	Toluene	25.7		7.54E+05	----	17885
A-5	Total Xylenes	7.4		4.34E+05	----	383
A-5	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-5	Trichloroethene	1.1	B	5.37E+05	18[1]	128[2]
A-5	Trichloroethene	1.1	B	5.37E+05	0.9[1]	128[2]
A-5	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-6	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-6	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-6	Benzene	2.1		3.19E+02	13.2	110
A-6	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-6	Chloroform	0.6	J	2.40E+05	4.4	179
A-6	cis-1,2-Dichloroethene	0.3	J	7.90E+05	----	----
A-6	Dichlorodifluoromethane	1.6	J	4.95E+06	----	639
A-6	Ethylbenzene	1.7	J	4.35E+05	----	3705
A-6	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
A-6	Tetrachloroethene	0.7	J	6.78E+05	18	1022
A-6	Toluene	22.8		7.54E+05	----	17885
A-6	Total Xylenes	7.3		4.34E+05	----	383
A-6	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-6	Trichloroethene	2.8		5.37E+05	18[1]	128[2]
A-6	Trichloroethene	2.8		5.37E+05	0.9[1]	128[2]
A-6	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-3

IAQ SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-7	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-7	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-7	Benzene	2.1		3.19E+02	13.2	110
A-7	Carbon Tetrachloride	0.6	J	6.29E+04	6.7	639
A-7	Chloroform	0.5	J	2.40E+05	4.4	179
A-7	cis-1,2-Dichloroethene	0.3	J	7.90E+05	----	----
A-7	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
A-7	Ethylbenzene	1.7	J	4.35E+05	----	3705
A-7	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
A-7	Tetrachloroethene	0.8	J	6.78E+05	18	1022
A-7	Toluene	21.8		7.54E+05	----	17885
A-7	Total Xylenes	7.2		4.34E+05	----	383
A-7	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-7	Trichloroethene	1.9	J	5.37E+05	18[1]	128[2]
A-7	Trichloroethene	1.9	J	5.37E+05	0.9[1]	128[2]
A-7	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-8	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-8	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-8	Benzene	2.1		3.19E+02	13.2	110
A-8	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-8	Chloroform	0.6	J	2.40E+05	4.4	179
A-8	cis-1,2-Dichloroethene	0.8	J	7.90E+05	----	----
A-8	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
A-8	Ethylbenzene	3.4		4.35E+05	----	3705
A-8	Methyl t-Butyl Ether	0.3	J	1.80E+05[A]	----	10948
A-8	Tetrachloroethene	0.8	J	6.78E+05	18	1022
A-8	Toluene	86.7		7.54E+05	----	17885
A-8	Total Xylenes	12.7		4.34E+05	----	383
A-8	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-8	Trichloroethene	4.2		5.37E+05	18[1]	128[2]
A-8	Trichloroethene	4.2		5.37E+05	0.9[1]	128[2]
A-8	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-3

IAQ SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-9	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-9	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-9	Benzene	2.5		3.19E+02	13.2	110
A-9	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-9	Chloroform	2.4	U	2.40E+05	4.4	179
A-9	cis-1,2-Dichloroethene	0.5	J	7.90E+05	----	----
A-9	Dichlorodifluoromethane	1.6	J	4.95E+06	----	639
A-9	Ethylbenzene	1.3	J	4.35E+05	----	3705
A-9	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
A-9	Tetrachloroethene	0.7	J	6.78E+05	18	1022
A-9	Toluene	6.1		7.54E+05	----	17885
A-9	Total Xylenes	4.8	J	4.34E+05	----	383
A-9	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-9	Trichloroethene	2.7		5.37E+05	18[1]	128[2]
A-9	Trichloroethene	2.7		5.37E+05	0.9[1]	128[2]
A-9	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-10	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-10	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-10	Benzene	2.3		3.19E+02	13.2	110
A-10	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-10	Chloroform	2.4	U	2.40E+05	4.4	179
A-10	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-10	Dichlorodifluoromethane	1.5	J	4.95E+06	----	639
A-10	Ethylbenzene	1.7	J	4.35E+05	----	3705
A-10	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
A-10	Tetrachloroethene	0.8	J	6.78E+05	18	1022
A-10	Toluene	16.1		7.54E+05	----	17885
A-10	Total Xylenes	8		4.34E+05	----	383
A-10	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-10	Trichloroethene	0.4	J	5.37E+05	18[1]	128[2]
A-10	Trichloroethene	0.4	J	5.37E+05	0.9[1]	128[2]
A-10	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-3

IAQ SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-11	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-11	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-11	Benzene	2.8		3.19E+02	13.2	110
A-11	Carbon Tetrachloride	0.6	J	6.29E+04	6.7	639
A-11	Chloroform	0.6	J	2.40E+05	4.4	179
A-11	cis-1,2-Dichloroethene	0.7	J	7.90E+05	----	----
A-11	Dichlorodifluoromethane	1.9	J	4.95E+06	----	639
A-11	Ethylbenzene	3		4.35E+05	----	3705
A-11	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
A-11	Tetrachloroethene	1.3	J	6.78E+05	18	1022
A-11	Toluene	41.2		7.54E+05	----	17885
A-11	Total Xylenes	12.4		4.34E+05	----	383
A-11	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-11	Trichloroethene	1.3	B	5.37E+05	18[1]	128[2]
A-11	Trichloroethene	1.3	B	5.37E+05	0.9[1]	128[2]
A-11	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:

U = nondetect
J = estimated
Shaded cells indicate concentration greater than risk-based screening level

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit
N = National Institute for Occupational Safety and Health Recommended Exposure Limit
A = American Council of Governmental Industrial Hygienists Theshold Limit Value

ug/m3 = micrograms per cubic meter
ILCR = Incremental lifetime cancer risk.
HI = Hazard Index.

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-4

IAQ SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-1-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-1-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-1-2	Benzene	1.6	U	3.19E+02	13.2	110
A-1-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-1-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-1-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-1-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
A-1-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
A-1-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-1-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-1-2	Toluene	1.6	J	7.54E+05	----	17885
A-1-2	Total Xylenes	6.5	U	4.34E+05	----	383
A-1-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-1-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
A-1-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
A-1-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-2-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-2-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-2-2	Benzene	1.6	U	3.19E+02	13.2	110
A-2-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-2-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-2-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-2-2	Dichlorodifluoromethane	1.5	J	4.95E+06	----	639
A-2-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
A-2-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-2-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-2-2	Toluene	1.9	J	7.54E+05	----	17885
A-2-2	Total Xylenes	6.5	U	4.34E+05	----	383
A-2-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-2-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
A-2-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
A-2-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-3-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-3-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-3-2	Benzene	1.6	U	3.19E+02	13.2	110
A-3-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639

TABLE 3-4

IAQ SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-3-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-3-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-3-2	Dichlorodifluoromethane	1.4	J	4.95E+06	----	639
A-3-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
A-3-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-3-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-3-2	Toluene	1.9		7.54E+05	----	17885
A-3-2	Total Xylenes	6.5	U	4.34E+05	----	383
A-3-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-3-2	Trichloroethene	0.4	J	5.37E+05	18[1]	128[2]
A-3-2	Trichloroethene	0.4	J	5.37E+05	0.9[1]	128[2]
A-3-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-4-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-4-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-4-2	Benzene	1.6	U	3.19E+02	13.2	110
A-4-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-4-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-4-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-4-2	Dichlorodifluoromethane	1.5	J	4.95E+06	----	639
A-4-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
A-4-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-4-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-4-2	Toluene	2.2		7.54E+05	----	17885
A-4-2	Total Xylenes	6.5	U	4.34E+05	----	383
A-4-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-4-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
A-4-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
A-4-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-5-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-5-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-5-2	Benzene	1.6	U	3.19E+02	13.2	110
A-5-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-5-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-5-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-5-2	Dichlorodifluoromethane	1.5	J	4.95E+06	----	639
A-5-2	Ethylbenzene	0.4	J	4.35E+05	----	3705

TABLE 3-4

IAQ SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-5-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-5-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-5-2	Toluene	27.7		7.54E+05	----	17885
A-5-2	Total Xylenes	1.3	J	4.34E+05	----	383
A-5-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-5-2	Trichloroethene	0.6	J	5.37E+05	18[1]	128[2]
A-5-2	Trichloroethene	0.6	J	5.37E+05	0.9[1]	128[2]
A-5-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
DUP-3-42607	1,1-Dichloroethane	2	U	4.00E+05	----	1789
DUP-3-42607	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
DUP-3-42607	Benzene	1.6	U	3.19E+02	13.2	110
DUP-3-42607	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
DUP-3-42607	Chloroform	2.4	U	2.40E+05	4.4	179
DUP-3-42607	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
DUP-3-42607	Dichlorodifluoromethane	1.4	J	4.95E+06	----	639
DUP-3-42607	Ethylbenzene	0.4	J	4.35E+05	----	3705
DUP-3-42607	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
DUP-3-42607	Tetrachloroethene	3.4	U	6.78E+05	18	1022
DUP-3-42607	Toluene	33		7.54E+05	----	17885
DUP-3-42607	Total Xylenes	1.4	J	4.34E+05	----	383
DUP-3-42607	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
DUP-3-42607	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
DUP-3-42607	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
DUP-3-42607	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-6-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-6-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-6-2	Benzene	1.6	U	3.19E+02	13.2	110
A-6-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-6-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-6-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-6-2	Dichlorodifluoromethane	1.4	J	4.95E+06	----	639
A-6-2	Ethylbenzene	1.4	J	4.35E+05	----	3705
A-6-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-6-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-6-2	Toluene	144		7.54E+05	----	17885
A-6-2	Total Xylenes	8.3		4.34E+05	----	383

TABLE 3-4

IAQ SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-6-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-6-2	Trichloroethene	1.4	J	5.37E+05	18[1]	128[2]
A-6-2	Trichloroethene	1.4	J	5.37E+05	0.9[1]	128[2]
A-6-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-7-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-7-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-7-2	Benzene	1.6	U	3.19E+02	13.2	110
A-7-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-7-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-7-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-7-2	Dichlorodifluoromethane	1.4	J	4.95E+06	----	639
A-7-2	Ethylbenzene	1.8	J	4.35E+05	----	3705
A-7-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-7-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-7-2	Toluene	198		7.54E+05	----	17885
A-7-2	Total Xylenes	10.4		4.34E+05	----	383
A-7-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-7-2	Trichloroethene	5.6		5.37E+05	18[1]	128[2]
A-7-2	Trichloroethene	5.6		5.37E+05	0.9[1]	128[2]
A-7-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-8-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-8-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-8-2	Benzene	1.6	U	3.19E+02	13.2	110
A-8-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-8-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-8-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-8-2	Dichlorodifluoromethane	1.5	J	4.95E+06	----	639
A-8-2	Ethylbenzene	1.1	J	4.35E+05	----	3705
A-8-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-8-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-8-2	Toluene	106		7.54E+05	----	17885
A-8-2	Total Xylenes	6.4	J	4.34E+05	----	383
A-8-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-8-2	Trichloroethene	2.1	J	5.37E+05	18[1]	128[2]
A-8-2	Trichloroethene	2.1	J	5.37E+05	0.9[1]	128[2]
A-8-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-4

IAQ SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
A-9-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-9-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-9-2	Benzene	1.6	U	3.19E+02	13.2	110
A-9-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-9-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-9-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-9-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
A-9-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
A-9-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-9-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-9-2	Toluene	8.8		7.54E+05	----	17885
A-9-2	Total Xylenes	1	J	4.34E+05	----	383
A-9-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-9-2	Trichloroethene	2.2	J	5.37E+05	18[1]	128[2]
A-9-2	Trichloroethene	2.2	J	5.37E+05	0.9[1]	128[2]
A-9-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
A-11-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
A-11-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
A-11-2	Benzene	1.6	U	3.19E+02	13.2	110
A-11-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
A-11-2	Chloroform	2.4	U	2.40E+05	4.4	179
A-11-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
A-11-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
A-11-2	Ethylbenzene	1.9	J	4.35E+05	----	3705
A-11-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
A-11-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
A-11-2	Toluene	64.9		7.54E+05	----	17885
A-11-2	Total Xylenes	8.5		4.34E+05	----	383
A-11-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
A-11-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
A-11-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
A-11-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-4	1,1-Dichloroethane	2	U	4.00E+05	----	1789
TOO-4	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-4	Benzene	1.6	U	3.19E+02	13.2	110
TOO-4	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639

TABLE 3-4

IAQ SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
TOO-4	Chloroform	0.6	J	2.40E+05	4.4	179
TOO-4	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
TOO-4	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-4	Ethylbenzene	2.2		4.35E+05	----	3705
TOO-4	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-4	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-4	Toluene	281		7.54E+05	----	17885
TOO-4	Total Xylenes	12.5		4.34E+05	----	383
TOO-4	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
TOO-4	Trichloroethene	4.9		5.37E+05	18[1]	128[2]
TOO-4	Trichloroethene	4.9		5.37E+05	0.9[1]	128[2]
TOO-4	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
DUP-2-42607	1,1-Dichloroethane	2	U	4.00E+05	----	1789
DUP-2-42607	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
DUP-2-42607	Benzene	1.6	U	3.19E+02	13.2	110
DUP-2-42607	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
DUP-2-42607	Chloroform	2.4	U	2.40E+05	4.4	179
DUP-2-42607	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
DUP-2-42607	Dichlorodifluoromethane	1.4	J	4.95E+06	----	639
DUP-2-42607	Ethylbenzene	1.9	J	4.35E+05	----	3705
DUP-2-42607	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
DUP-2-42607	Tetrachloroethene	3.4	U	6.78E+05	18	1022
DUP-2-42607	Toluene	301		7.54E+05	----	17885
DUP-2-42607	Total Xylenes	11.6		4.34E+05	----	383
DUP-2-42607	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
DUP-2-42607	Trichloroethene	3.8		5.37E+05	18[1]	128[2]
DUP-2-42607	Trichloroethene	3.8		5.37E+05	0.9[1]	128[2]
DUP-2-42607	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-5	1,1-Dichloroethane	2	U	4.00E+05	----	1789
TOO-5	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-5	Benzene	1.6	U	3.19E+02	13.2	110
TOO-5	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-5	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-5	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
TOO-5	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-5	Ethylbenzene	0.5	J	4.35E+05	----	3705

TABLE 3-4

IAQ SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL ug/m3	Carcinogenic (ug/m3) ILCR = 10^{-5}	Noncarcinogenic (ug/m3) HI = 1
TOO-5	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-5	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-5	Toluene	32.3		7.54E+05	----	17885
TOO-5	Total Xylenes	2.4	J	4.34E+05	----	383
TOO-5	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
TOO-5	Trichloroethene	0.7	J	5.37E+05	18[1]	128[2]
TOO-5	Trichloroethene	0.7	J	5.37E+05	0.9[1]	128[2]
TOO-5	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:
U = nondetect
J = estimated
Shaded cells indicate concentration greater than risk-based screening level

ug/m3 = micrograms per cubic meter
ILCR = Incremental lifetime cancer risk.
HI = Hazard Index.

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit
N = National Institute for Occupational Safety and Health Recommended Exposure Limit
A = American Council of Governmental Industrial Hygienists Theshold Limit Value

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-5

IAQ SAMPLE RESULTS BUILDING B DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
B-1	1,1-Dichloroethane	2.00	U	4.00E+05	----	1789
B-1	1,2,4-Trichlorobenzene	3.70	U	4.00E+04[N]	----	15
B-1	Benzene	3.20		3.19E+02	13.2	110
B-1	Carbon Tetrachloride	3.10	U	6.29E+04	6.7	639
B-1	Chloroform	1.10	J	2.40E+05	4.4	179
B-1	cis-1,2-Dichloroethene	2.00	U	7.90E+05	----	----
B-1	Dichlorodifluoromethane	2.60		4.95E+06	----	639
B-1	Ethylbenzene	2.10	J	4.35E+05	----	3705
B-1	Methyl t-Butyl Ether	0.70	J	1.80E+05[A]	----	10948
B-1	Tetrachloroethene	3.40	U	6.78E+05	18	1022
B-1	Toluene	25.40		7.54E+05	----	17885
B-1	Total Xylenes	8.10		4.34E+05	----	383
B-1	trans-1,2-Dichloroethene	2.00	U	7.90E+05	----	217
B-1	Trichloroethene	2.70	U	5.37E+05	18[1]	128[2]
B-1	Trichloroethene	2.70	U	5.37E+05	0.9[1]	128[2]
B-1	Vinyl Chloride	1.30	U	2.16E+04	24[3]	358[3]
B-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
B-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-2	Benzene	3.7		3.19E+02	13.2	110
B-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
B-2	Chloroform	1.1	J	2.40E+05	4.4	179
B-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
B-2	Dichlorodifluoromethane	2.3	J	4.95E+06	----	639
B-2	Ethylbenzene	2.4		4.35E+05	----	3705
B-2	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
B-2	Tetrachloroethene	1.3	J	6.78E+05	18	1022
B-2	Toluene	31.1		7.54E+05	----	17885
B-2	Total Xylenes	9.6		4.34E+05	----	383
B-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
B-2	Trichloroethene	0.7	J	5.37E+05	18[1]	128[2]
B-2	Trichloroethene	0.7	J	5.37E+05	0.9[1]	128[2]

TABLE 3-5

IAQ SAMPLE RESULTS BUILDING B DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
B-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-3	1,1-Dichloroethane	2	U	4.00E+05	----	1789
B-3	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-3	Benzene	2.9		3.19E+02	13.2	110
B-3	Carbon Tetrachloride	0.6	J	6.29E+04	6.7	639
B-3	Chloroform	0.8	J	2.40E+05	4.4	179
B-3	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
B-3	Dichlorodifluoromethane	2	J	4.95E+06	----	639
B-3	Ethylbenzene	1.9	J	4.35E+05	----	3705
B-3	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
B-3	Tetrachloroethene	1.2	J	6.78E+05	18	1022
B-3	Toluene	23.5		7.54E+05	----	17885
B-3	Total Xylenes	7.7		4.34E+05	----	383
B-3	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
B-3	Trichloroethene	0.5	J	5.37E+05	18[1]	128[2]
B-3	Trichloroethene	0.5	J	5.37E+05	0.9[1]	128[2]
B-3	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-4	1,1-Dichloroethane	2	U	4.00E+05	----	1789
B-4	1,2,4-Trichlorobenzene	1.3	J	4.00E+04[N]	----	15
B-4	Benzene	3.5		3.19E+02	13.2	110
B-4	Carbon Tetrachloride	0.7	J	6.29E+04	6.7	639
B-4	Chloroform	0.9	J	2.40E+05	4.4	179
B-4	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
B-4	Dichlorodifluoromethane	1.9	J	4.95E+06	----	639
B-4	Ethylbenzene	2.1	J	4.35E+05	----	3705
B-4	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
B-4	Tetrachloroethene	1.5	J	6.78E+05	18	1022
B-4	Toluene	25.7		7.54E+05	----	17885
B-4	Total Xylenes	8.1		4.34E+05	----	383
B-4	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
B-4	Trichloroethene	0.8	J	5.37E+05	18[1]	128[2]
B-4	Trichloroethene	0.8	J	5.37E+05	0.9[1]	128[2]

TABLE 3-5

IAQ SAMPLE RESULTS BUILDING B DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
B-4	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-5	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
B-5	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-5	Benzene	1.7		3.19E+02	13.2	110
B-5	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
B-5	Chloroform	1.0	J	2.40E+05	4.4	179
B-5	cis-1,2-Dichloroethene	0.3	J	7.90E+05	----	----
B-5	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
B-5	Ethylbenzene	1.2	J	4.35E+05	----	3705
B-5	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
B-5	Tetrachloroethene	0.8	J	6.78E+05	18	1022
B-5	Toluene	19.5		7.54E+05	----	17885
B-5	Total Xylenes	4.6	J	4.34E+05	----	383
B-5	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
B-5	Trichloroethene	1.1	B	5.37E+05	18[1]	128[2]
B-5	Trichloroethene	1.1	B	5.37E+05	0.9[1]	128[2]
B-5	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-6	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
B-6	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-6	Benzene	2.2		3.19E+02	13.2	110
B-6	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
B-6	Chloroform	0.7	J	2.40E+05	4.4	179
B-6	cis-1,2-Dichloroethene	1.0	J	7.90E+05	----	----
B-6	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
B-6	Ethylbenzene	1.3	J	4.35E+05	----	3705
B-6	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
B-6	Tetrachloroethene	1.1	J	6.78E+05	18	1022
B-6	Toluene	14.2		7.54E+05	----	17885
B-6	Total Xylenes	5.3	J	4.34E+05	----	383
B-6	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
B-6	Trichloroethene	1.9	J	5.37E+05	18[1]	128[2]
B-6	Trichloroethene	1.9	J	5.37E+05	0.9[1]	128[2]
B-6	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
T00-1	1,1-Dichloroethane	2	U	4.00E+05	----	1789
T00-1	1,2,4-Trichlorobenzene	1.2	J	4.00E+04[N]	----	15
T00-1	Benzene	2.8		3.19E+02	13.2	110
T00-1	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
T00-1	Chloroform	0.8	J	2.40E+05	4.4	179
T00-1	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
T00-1	Dichlorodifluoromethane	1.3	J	4.95E+06	----	639

TABLE 3-5

IAQ SAMPLE RESULTS BUILDING B DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
T00-1	Ethylbenzene	1.8	J	4.35E+05	----	3705
T00-1	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
T00-1	Tetrachloroethene	1.6	J	6.78E+05	18	1022
T00-1	Toluene	24.5		7.54E+05	----	17885
T00-1	Total Xylenes	7.1		4.34E+05	----	383
T00-1	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
T00-1	Trichloroethene	1	J	5.37E+05	18[1]	128[2]
T00-1	Trichloroethene	1	J	5.37E+05	0.9[1]	128[2]
T00-1	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:

U = nondetect

J = estimated

Shaded cells indicate concentration greater than risk-based screening level

ug/m3 = micrograms per cubic meter

ILCR = Incremental lifetime cancer risk.

HI = Hazard Index.

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit

N = National Institute for Occupational Safety and Health Recommended Exposure Limit

A = American Council of Governmental Industrial Hygienists Theshold Limit Value

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.

2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.

3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-6

IAQ SAMPLE RESULTS BUILDING B APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
B-1-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
B-1-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-1-2	Benzene	16.2		3.19E+02	13.2	110
B-1-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
B-1-2	Chloroform	2.4	U	2.40E+05	4.4	179
B-1-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
B-1-2	Dichlorodifluoromethane	1.5	J	4.95E+06	----	639
B-1-2	Ethylbenzene	59.6		4.35E+05	----	3705
B-1-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
B-1-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
B-1-2	Toluene	28.7		7.54E+05	----	17885
B-1-2	Total Xylenes	297		4.34E+05	----	383
B-1-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
B-1-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
B-1-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
B-1-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-2-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
B-2-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-2-2	Benzene	1.6	U	3.19E+02	13.2	110
B-2-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
B-2-2	Chloroform	2.4	U	2.40E+05	4.4	179
B-2-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
B-2-2	Dichlorodifluoromethane	1.2	J	4.95E+06	----	639
B-2-2	Ethylbenzene	1.0	J	4.35E+05	----	3705
B-2-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
B-2-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
B-2-2	Toluene	7.4		7.54E+05	----	17885
B-2-2	Total Xylenes	4.4	J	4.34E+05	----	383
B-2-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
B-2-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
B-2-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
B-2-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-3-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
B-3-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-3-2	Benzene	1.6	U	3.19E+02	13.2	110
B-3-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
B-3-2	Chloroform	2.4	U	2.40E+05	4.4	179
B-3-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
B-3-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639

TABLE 3-6

IAQ SAMPLE RESULTS BUILDING B APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
B-3-2	Ethylbenzene	0.4	J	4.35E+05	----	3705
B-3-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
B-3-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
B-3-2	Toluene	7.8		7.54E+05	----	17885
B-3-2	Total Xylenes	1.5	J	4.34E+05	----	383
B-3-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
B-3-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
B-3-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
B-3-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-4-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
B-4-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-4-2	Benzene	1.6	U	3.19E+02	13.2	110
B-4-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
B-4-2	Chloroform	2.4	U	2.40E+05	4.4	179
B-4-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
B-4-2	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
B-4-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
B-4-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
B-4-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
B-4-2	Toluene	4.1		7.54E+05	----	17885
B-4-2	Total Xylenes	6.5	U	4.34E+05	----	383
B-4-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
B-4-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
B-4-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
B-4-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-5-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
B-5-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-5-2	Benzene	1.6	U	3.19E+02	13.2	110
B-5-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
B-5-2	Chloroform	2.4	U	2.40E+05	4.4	179
B-5-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
B-5-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
B-5-2	Ethylbenzene	0.5	J	4.35E+05	----	3705
B-5-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
B-5-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
B-5-2	Toluene	3.0		7.54E+05	----	17885
B-5-2	Total Xylenes	2.8	J	4.34E+05	----	383
B-5-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
B-5-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]

TABLE 3-6

IAQ SAMPLE RESULTS BUILDING B APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
B-5-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
B-5-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
DUP-4-42607	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
DUP-4-42607	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
DUP-4-42607	Benzene	1.6	U	3.19E+02	13.2	110
DUP-4-42607	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
DUP-4-42607	Chloroform	2.4	U	2.40E+05	4.4	179
DUP-4-42607	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
DUP-4-42607	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
DUP-4-42607	Ethylbenzene	0.5	J	4.35E+05	----	3705
DUP-4-42607	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
DUP-4-42607	Tetrachloroethene	3.4	U	6.78E+05	18	1022
DUP-4-42607	Toluene	3.0		7.54E+05	----	17885
DUP-4-42607	Total Xylenes	2.8	J	4.34E+05	----	383
DUP-4-42607	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
DUP-4-42607	Trichloroethene	0.5	J	5.37E+05	18[1]	128[2]
DUP-4-42607	Trichloroethene	0.5	J	5.37E+05	0.9[1]	128[2]
DUP-4-42607	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
B-6-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
B-6-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
B-6-2	Benzene	1.6	U	3.19E+02	13.2	110
B-6-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
B-6-2	Chloroform	2.4	U	2.40E+05	4.4	179
B-6-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
B-6-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
B-6-2	Ethylbenzene	0.4	J	4.35E+05	----	3705
B-6-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
B-6-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
B-6-2	Toluene	4.9		7.54E+05	----	17885
B-6-2	Total Xylenes	1.5	J	4.34E+05	----	383
B-6-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
B-6-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
B-6-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
B-6-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-1-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-1-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-1-2	Benzene	1.6	U	3.19E+02	13.2	110
TOO-1-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-1-2	Chloroform	2.4	U	2.40E+05	4.4	179

TABLE 3-6

IAQ SAMPLE RESULTS BUILDING B APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
TOO-1-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-1-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-1-2	Ethylbenzene	0.5	J	4.35E+05	----	3705
TOO-1-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-1-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-1-2	Toluene	10.0		7.54E+05	----	17885
TOO-1-2	Total Xylenes	1.6	J	4.34E+05	----	383
TOO-1-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-1-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
TOO-1-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
TOO-1-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-3	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-3	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-3	Benzene	1.6	U	3.19E+02	13.2	110
TOO-3	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-3	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-3	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-3	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-3	Ethylbenzene	0.4	J	4.35E+05	----	3705
TOO-3	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-3	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-3	Toluene	2.8		7.54E+05	----	17885
TOO-3	Total Xylenes	1.6	J	4.34E+05	----	383
TOO-3	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-3	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
TOO-3	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
TOO-3	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-6	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-6	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-6	Benzene	1.6	U	3.19E+02	13.2	110
TOO-6	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-6	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-6	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-6	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-6	Ethylbenzene	0.6	J	4.35E+05	----	3705
TOO-6	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-6	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-6	Toluene	10.1		7.54E+05	----	17885
TOO-6	Total Xylenes	3.0	J	4.34E+05	----	383

TABLE 3-6

IAQ SAMPLE RESULTS BUILDING B APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
TOO-6	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-6	Trichloroethene	0.3	J	5.37E+05	18[1]	128[2]
TOO-6	Trichloroethene	0.3	J	5.37E+05	0.9[1]	128[2]
TOO-6	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-7	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-7	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-7	Benzene	1.6	U	3.19E+02	13.2	110
TOO-7	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-7	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-7	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-7	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-7	Ethylbenzene	0.4	J	4.35E+05	----	3705
TOO-7	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-7	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-7	Toluene	10.7		7.54E+05	----	17885
TOO-7	Total Xylenes	2.2	J	4.34E+05	----	383
TOO-7	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-7	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
TOO-7	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
TOO-7	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-10	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-10	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-10	Benzene	1.6	U	3.19E+02	13.2	110
TOO-10	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-10	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-10	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-10	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-10	Ethylbenzene	0.6	J	4.35E+05	----	3705
TOO-10	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-10	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-10	Toluene	2.6		7.54E+05	----	17885
TOO-10	Total Xylenes	3.0	J	4.34E+05	----	383
TOO-10	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-10	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
TOO-10	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
TOO-10	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-11	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-11	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-11	Benzene	1.6	U	3.19E+02	13.2	110

TABLE 3-6

IAQ SAMPLE RESULTS BUILDING B APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
TOO-11	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-11	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-11	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-11	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-11	Ethylbenzene	0.5	J	4.35E+05	----	3705
TOO-11	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-11	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-11	Toluene	3.6		7.54E+05	----	17885
TOO-11	Total Xylenes	1.8	J	4.34E+05	----	383
TOO-11	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-11	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
TOO-11	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
TOO-11	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:
U = nondetect
J = estimated
Shaded cells indicate concentration greater than risk-based screening level

ug/m3 = micrograms per cubic meter
ILCR = Incremental lifetime cancer risk.
HI = Hazard Index.

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit
N = National Institute for Occupational Safety and Health Recommended Exposure Limit
A = American Council of Governmental Industrial Hygienists Theshold Limit Value

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-7

IAQ SAMPLE RESULTS BUILDING C DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-1	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-1	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-1	Benzene	2.0		3.19E+02	13.2	110
C-1	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
C-1	Chloroform	0.4	J	2.40E+05	4.4	179
C-1	cis-1,2-Dichloroethene	0.3	J	7.90E+05	----	----
C-1	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
C-1	Ethylbenzene	1.1	J	4.35E+05	----	3705
C-1	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
C-1	Tetrachloroethene	0.8	J	6.78E+05	18	1022
C-1	Toluene	5.0		7.54E+05	----	17885
C-1	Total Xylenes	4.2	J	4.34E+05	----	383
C-1	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-1	Trichloroethene	0.8	B	5.37E+05	18[1]	128[2]
C-1	Trichloroethene	0.8	B	5.37E+05	0.9[1]	128[2]
C-1	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-2	1,1-Dichloroethane	2	U	4.00E+05	----	1789
C-2	1,2,4-Trichlorobenzene	1.5	J	4.00E+04[N]	----	15
C-2	Benzene	2.4		3.19E+02	13.2	110
C-2	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
C-2	Chloroform	0.5	J	2.40E+05	4.4	179
C-2	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
C-2	Dichlorodifluoromethane	1.6	J	4.95E+06	----	639
C-2	Ethylbenzene	1.4	J	4.35E+05	----	3705
C-2	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
C-2	Tetrachloroethene	1.2	J	6.78E+05	18	1022
C-2	Toluene	11.1		7.54E+05	----	17885
C-2	Total Xylenes	5.3	J	4.34E+05	----	383
C-2	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
C-2	Trichloroethene	0.9	J	5.37E+05	18[1]	128[2]
C-2	Trichloroethene	0.9	J	5.37E+05	0.9[1]	128[2]
C-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-7

IAQ SAMPLE RESULTS BUILDING C DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-3	1,1-Dichloroethane	2	U	4.00E+05	----	1789
C-3	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-3	Benzene	2.5		3.19E+02	13.2	110
C-3	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
C-3	Chloroform	0.4	J	2.40E+05	4.4	179
C-3	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
C-3	Dichlorodifluoromethane	1.1	J	4.95E+06	----	639
C-3	Ethylbenzene	1.7	J	4.35E+05	----	3705
C-3	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
C-3	Tetrachloroethene	1.4	J	6.78E+05	18	1022
C-3	Toluene	15		7.54E+05	----	17885
C-3	Total Xylenes	6.3	J	4.34E+05	----	383
C-3	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
C-3	Trichloroethene	0.8	J	5.37E+05	18[1]	128[2]
C-3	Trichloroethene	0.8	J	5.37E+05	0.9[1]	128[2]
C-3	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-4	1,1-Dichloroethane	2	U	4.00E+05	----	1789
C-4	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-4	Benzene	2.4		3.19E+02	13.2	110
C-4	Carbon Tetrachloride	0.4	J	6.29E+04	6.7	639
C-4	Chloroform	2.4	U	2.40E+05	4.4	179
C-4	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
C-4	Dichlorodifluoromethane	1.2	J	4.95E+06	----	639
C-4	Ethylbenzene	1.4	J	4.35E+05	----	3705
C-4	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
C-4	Tetrachloroethene	1.3	J	6.78E+05	18	1022
C-4	Toluene	10.3		7.54E+05	----	17885
C-4	Total Xylenes	5.2	J	4.34E+05	----	383
C-4	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
C-4	Trichloroethene	6.6		5.37E+05	18[1]	128[2]
C-4	Trichloroethene	6.6		5.37E+05	0.9[1]	128[2]
C-4	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-7

IAQ SAMPLE RESULTS BUILDING C DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
DUP-4-121106	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
DUP-4-121106	1,2,4-Trichlorobenzene	1.6	J	4.00E+04[N]	----	15
DUP-4-121106	Benzene	2.5		3.19E+02	13.2	110
DUP-4-121106	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
DUP-4-121106	Chloroform	2.4	U	2.40E+05	4.4	179
DUP-4-121106	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
DUP-4-121106	Dichlorodifluoromethane	2.3	J	4.95E+06	----	639
DUP-4-121106	Ethylbenzene	1.4	J	4.35E+05	----	3705
DUP-4-121106	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
DUP-4-121106	Tetrachloroethene	3.4	U	6.78E+05	18	1022
DUP-4-121106	Toluene	9.8		7.54E+05	----	17885
DUP-4-121106	Total Xylenes	5.6	J	4.34E+05	----	383
DUP-4-121106	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
DUP-4-121106	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
DUP-4-121106	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
DUP-4-121106	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-5	1,1-Dichloroethane	2	U	4.00E+05	----	1789
C-5	1,2,4-Trichlorobenzene	1.2	J	4.00E+04[N]	----	15
C-5	Benzene	2.4		3.19E+02	13.2	110
C-5	Carbon Tetrachloride	0.4	J	6.29E+04	6.7	639
C-5	Chloroform	2.4	U	2.40E+05	4.4	179
C-5	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
C-5	Dichlorodifluoromethane	1.2	J	4.95E+06	----	639
C-5	Ethylbenzene	1.5	J	4.35E+05	----	3705
C-5	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
C-5	Tetrachloroethene	1.2	J	6.78E+05	18	1022
C-5	Toluene	10.9		7.54E+05	----	17885
C-5	Total Xylenes	5.3	J	4.34E+05	----	383
C-5	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
C-5	Trichloroethene	1.3	J	5.37E+05	18[1]	128[2]
C-5	Trichloroethene	1.3	J	5.37E+05	0.9[1]	128[2]
C-5	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-7

IAQ SAMPLE RESULTS BUILDING C DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-6	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-6	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-6	Benzene	2.4		3.19E+02	13.2	110
C-6	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
C-6	Chloroform	2.4	U	2.40E+05	4.4	179
C-6	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-6	Dichlorodifluoromethane	1.3	J	4.95E+06	----	639
C-6	Ethylbenzene	1.3	J	4.35E+05	----	3705
C-6	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
C-6	Tetrachloroethene	1.4	J	6.78E+05	18	1022
C-6	Toluene	9.3		7.54E+05	----	17885
C-6	Total Xylenes	4.7	J	4.34E+05	----	383
C-6	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-6	Trichloroethene	1.1	J	5.37E+05	18[1]	128[2]
C-6	Trichloroethene	1.1	J	5.37E+05	0.9[1]	128[2]
C-6	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-7	1,1-Dichloroethane	2	U	4.00E+05	----	1789
C-7	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-7	Benzene	2		3.19E+02	13.2	110
C-7	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-7	Chloroform	0.4	J	2.40E+05	4.4	179
C-7	cis-1,2-Dichloroethene	2	U	7.90E+05	----	----
C-7	Dichlorodifluoromethane	1.8	J	4.95E+06	----	639
C-7	Ethylbenzene	1.9	J	4.35E+05	----	3705
C-7	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
C-7	Tetrachloroethene	1	J	6.78E+05	18	1022
C-7	Toluene	21.9		7.54E+05	----	17885
C-7	Total Xylenes	7.5		4.34E+05	----	383
C-7	trans-1,2-Dichloroethene	2	U	7.90E+05	----	217
C-7	Trichloroethene	0.5	J	5.37E+05	18[1]	128[2]
C-7	Trichloroethene	0.5	J	5.37E+05	0.9[1]	128[2]
C-7	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-7

IAQ SAMPLE RESULTS BUILDING C DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-8	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-8	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-8	Benzene	2.2		3.19E+02	13.2	110
C-8	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-8	Chloroform	2.4	U	2.40E+05	4.4	179
C-8	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-8	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
C-8	Ethylbenzene	1.1	J	4.35E+05	----	3705
C-8	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
C-8	Tetrachloroethene	1.0	J	6.78E+05	18	1022
C-8	Toluene	7.3		7.54E+05	----	17885
C-8	Total Xylenes	4.5	J	4.34E+05	----	383
C-8	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-8	Trichloroethene	0.4	J	5.37E+05	18[1]	128[2]
C-8	Trichloroethene	0.4	J	5.37E+05	0.9[1]	128[2]
C-8	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
DUP-3-121106	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
DUP-3-121106	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
DUP-3-121106	Benzene	2.3		3.19E+02	13.2	110
DUP-3-121106	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
DUP-3-121106	Chloroform	2.4	J	2.40E+05	4.4	179
DUP-3-121106	cis-1,2-Dichloroethene	0.4	J	7.90E+05	----	----
DUP-3-121106	Dichlorodifluoromethane	1.7	J	4.95E+06	----	639
DUP-3-121106	Ethylbenzene	1.3	J	4.35E+05	----	3705
DUP-3-121106	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
DUP-3-121106	Tetrachloroethene	1.3	J	6.78E+05	18	1022
DUP-3-121106	Toluene	8.7		7.54E+05	----	17885
DUP-3-121106	Total Xylenes	4.8	J	4.34E+05	----	383
DUP-3-121106	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
DUP-3-121106	Trichloroethene	0.9	B	5.37E+05	18[1]	128[2]
DUP-3-121106	Trichloroethene	0.9	B	5.37E+05	0.9[1]	128[2]
DUP-3-121106	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

TABLE 3-7

IAQ SAMPLE RESULTS BUILDING C DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-9	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-9	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-9	Benzene	1.8		3.19E+02	13.2	110
C-9	Carbon Tetrachloride	0.5	J	6.29E+04	6.7	639
C-9	Chloroform	2.4	U	2.40E+05	4.4	179
C-9	cis-1,2-Dichloroethene	0.5	J	7.90E+05	----	----
C-9	Dichlorodifluoromethane	1.4	J	4.95E+06	----	639
C-9	Ethylbenzene	1	J	4.35E+05	----	3705
C-9	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
C-9	Tetrachloroethene	1.0	J	6.78E+05	18	1022
C-9	Toluene	7.4		7.54E+05	----	17885
C-9	Total Xylenes	3.8	J	4.34E+05	----	383
C-9	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-9	Trichloroethene	1.0	B	5.37E+05	18[1]	128[2]
C-9	Trichloroethene	1.0	B	5.37E+05	0.9[1]	128[2]
C-9	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:

U = nondetect
J = estimated
Shaded cells indicate concentration greater than risk-based level

ug/m3 = micrograms per cubic meter
ILCR = Incremental lifetime cancer risk.
HI = Hazard Index.

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit
N = National Institute for Occupational Safety and Health Recommended Exposure Limit
A = American Council of Governmental Industrial Hygienists Theshold Limit Value

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-8

IAQ SAMPLE RESULTS BUILDING C APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-1-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-1-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-1-2	Benzene	1.6	U	3.19E+02	13.2	110
C-1-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-1-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-1-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-1-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-1-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
C-1-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-1-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-1-2	Toluene	1.1	J	7.54E+05	----	17885
C-1-2	Total Xylenes	6.5	U	4.34E+05	----	383
C-1-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-1-2	Trichloroethene	2.3	J	5.37E+05	18[1]	128[2]
C-1-2	Trichloroethene	2.3	J	5.37E+05	0.9[1]	128[2]
C-1-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-2-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-2-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-2-2	Benzene	1.6	U	3.19E+02	13.2	110
C-2-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-2-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-2-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-2-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-2-2	Ethylbenzene	0.3	J	4.35E+05	----	3705
C-2-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-2-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-2-2	Toluene	2.6		7.54E+05	----	17885
C-2-2	Total Xylenes	6.5	U	4.34E+05	----	383
C-2-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-2-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
C-2-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
C-2-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-3-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-3-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-3-2	Benzene	1.6	U	3.19E+02	13.2	110
C-3-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-3-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-3-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-3-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-3-2	Ethylbenzene	0.3	J	4.35E+05	----	3705

TABLE 3-8

IAQ SAMPLE RESULTS BUILDING C APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-3-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-3-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-3-2	Toluene	2.6		7.54E+05	----	17885
C-3-2	Total Xylenes	0.8	J	4.34E+05	----	383
C-3-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-3-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
C-3-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
C-3-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-4-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-4-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-4-2	Benzene	1.6	U	3.19E+02	13.2	110
C-4-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-4-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-4-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-4-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-4-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
C-4-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-4-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-4-2	Toluene	1.3	J	7.54E+05	----	17885
C-4-2	Total Xylenes	6.5	U	4.34E+05	----	383
C-4-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-4-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
C-4-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
C-4-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-5-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-5-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-5-2	Benzene	1.6	U	3.19E+02	13.2	110
C-5-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-5-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-5-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-5-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-5-2	Ethylbenzene	0.9	J	4.35E+05	----	3705
C-5-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-5-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-5-2	Toluene	3.1		7.54E+05	----	17885
C-5-2	Total Xylenes	3.2	J	4.34E+05	----	383
C-5-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-5-2	Trichloroethene	7.2		5.37E+05	18[1]	128[2]
C-5-2	Trichloroethene	7.2		5.37E+05	0.9[1]	128[2]

TABLE 3-8

IAQ SAMPLE RESULTS BUILDING C APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-5-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-6-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-6-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-6-2	Benzene	1.6	U	3.19E+02	13.2	110
C-6-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-6-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-6-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-6-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-6-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
C-6-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-6-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-6-2	Toluene	2.1		7.54E+05	----	17885
C-6-2	Total Xylenes	6.5	U	4.34E+05	----	383
C-6-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-6-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
C-6-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
C-6-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-7-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-7-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-7-2	Benzene	1.6	U	3.19E+02	13.2	110
C-7-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-7-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-7-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-7-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-7-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
C-7-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-7-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-7-2	Toluene	1.9	U	7.54E+05	----	17885
C-7-2	Total Xylenes	6.5	U	4.34E+05	----	383
C-7-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-7-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
C-7-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
C-7-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-8-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-8-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-8-2	Benzene	1.6	U	3.19E+02	13.2	110
C-8-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-8-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-8-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----

TABLE 3-8

IAQ SAMPLE RESULTS BUILDING C APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-8-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-8-2	Ethylbenzene	0.4	J	4.35E+05	----	3705
C-8-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-8-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-8-2	Toluene	62.7		7.54E+05	----	17885
C-8-2	Total Xylenes	2.1	J	4.34E+05	----	383
C-8-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
C-8-2	Trichloroethene	0.7	J	5.37E+05	18[1]	128[2]
C-8-2	Trichloroethene	0.7	J	5.37E+05	0.9[1]	128[2]
C-8-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
DUP-1-42607	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
DUP-1-42607	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
DUP-1-42607	Benzene	1.6	U	3.19E+02	13.2	110
DUP-1-42607	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
DUP-1-42607	Chloroform	2.4	U	2.40E+05	4.4	179
DUP-1-42607	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
DUP-1-42607	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
DUP-1-42607	Ethylbenzene	0.3	J	4.35E+05	----	3705
DUP-1-42607	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
DUP-1-42607	Tetrachloroethene	3.4	U	6.78E+05	18	1022
DUP-1-42607	Toluene	40.6		7.54E+05	----	17885
DUP-1-42607	Total Xylenes	1.1	J	4.34E+05	----	383
DUP-1-42607	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
DUP-1-42607	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
DUP-1-42607	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
DUP-1-42607	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
C-9-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
C-9-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
C-9-2	Benzene	1.6	U	3.19E+02	13.2	110
C-9-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
C-9-2	Chloroform	2.4	U	2.40E+05	4.4	179
C-9-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
C-9-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
C-9-2	Ethylbenzene	0.3	J	4.35E+05	----	3705
C-9-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
C-9-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
C-9-2	Toluene	5.1		7.54E+05	----	17885
C-9-2	Total Xylenes	6.5	U	4.34E+05	----	383
C-9-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217

TABLE 3-8

IAQ SAMPLE RESULTS BUILDING C APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
C-9-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
C-9-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
C-9-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-2	Benzene	1.6	U	3.19E+02	13.2	110
TOO-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-2	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-2	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-2	Ethylbenzene	2.2	U	4.35E+05	----	3705
TOO-2	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-2	Toluene	7.9		7.54E+05	----	17885
TOO-2	Total Xylenes	6.5	U	4.34E+05	----	383
TOO-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
TOO-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
TOO-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-8	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-8	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-8	Benzene	1.6	U	3.19E+02	13.2	110
TOO-8	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
TOO-8	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-8	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-8	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-8	Ethylbenzene	2.2	U	4.35E+05	----	3705
TOO-8	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-8	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-8	Toluene	1.2	J	7.54E+05	----	17885
TOO-8	Total Xylenes	1	J	4.34E+05	----	383
TOO-8	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-8	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
TOO-8	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
TOO-8	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
TOO-9	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
TOO-9	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
TOO-9	Benzene	1.6	U	3.19E+02	13.2	110
TOO-9	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639

TABLE 3-8

IAQ SAMPLE RESULTS BUILDING C APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
TOO-9	Chloroform	2.4	U	2.40E+05	4.4	179
TOO-9	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
TOO-9	Dichlorodifluoromethane	2.5	U	4.95E+06	----	639
TOO-9	Ethylbenzene	2.2	U	4.35E+05	----	3705
TOO-9	Methyl t-Butyl Ether	1.8	U	1.80E+05[A]	----	10948
TOO-9	Tetrachloroethene	3.4	U	6.78E+05	18	1022
TOO-9	Toluene	0.9	J	7.54E+05	----	17885
TOO-9	Total Xylenes	6.5	U	4.34E+05	----	383
TOO-9	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
TOO-9	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
TOO-9	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
TOO-9	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:
U = nondetect
J = estimated
Shaded cells indicate concentration greater than risk-based level

ug/m3 = micrograms per cubic meter
ILCR = Incremental lifetime cancer risk.
HI = Hazard Index.

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit
N = National Institute for Occupational Safety and Health Recommended Exposure Limit
A = American Council of Governmental Industrial Hygienists Theshold Limit Value

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-9

IAQ SAMPLE RESULTS VERTICAL LAUNCH SYSTEMS DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
VLS-1	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
VLS-1	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
VLS-1	Benzene	2.0		3.19E+02	13.2	110
VLS-1	Carbon Tetrachloride	1.0	J	6.29E+04	6.7	639
VLS-1	Chloroform	0.4	J	2.40E+05	4.4	179
VLS-1	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
VLS-1	Dichlorodifluoromethane	2.6		4.95E+06	----	639
VLS-1	Ethylbenzene	1.1	J	4.35E+05	----	3705
VLS-1	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
VLS-1	Tetrachloroethene	3.4	U	6.78E+05	18	1022
VLS-1	Toluene	4.8		7.54E+05	----	17885
VLS-1	Total Xylenes	4.0	J	4.34E+05	----	383
VLS-1	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
VLS-1	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
VLS-1	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
VLS-1	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
VLS-2	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
VLS-2	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
VLS-2	Benzene	2.5		3.19E+02	13.2	110
VLS-2	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
VLS-2	Chloroform	2.4	U	2.40E+05	4.4	179
VLS-2	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
VLS-2	Dichlorodifluoromethane	2.8		4.95E+06	----	639
VLS-2	Ethylbenzene	1.4	J	4.35E+05	----	3705
VLS-2	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
VLS-2	Tetrachloroethene	3.4	U	6.78E+05	18	1022
VLS-2	Toluene	15.3		7.54E+05	----	17885
VLS-2	Total Xylenes	5.7	J	4.34E+05	----	383
VLS-2	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
VLS-2	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
VLS-2	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
VLS-2	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
VLS-3	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
VLS-3	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
VLS-3	Benzene	2.3		3.19E+02	13.2	110
VLS-3	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
VLS-3	Chloroform	2.4	U	2.40E+05	4.4	179
VLS-3	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
VLS-3	Dichlorodifluoromethane	2.4	J	4.95E+06	----	639

TABLE 3-9

IAQ SAMPLE RESULTS VERTICAL LAUNCH SYSTEMS DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
VLS-3	Ethylbenzene	1.2	J	4.35E+05	----	3705
VLS-3	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
VLS-3	Tetrachloroethene	3.4	U	6.78E+05	18	1022
VLS-3	Toluene	13.6		7.54E+05	----	17885
VLS-3	Total Xylenes	4.7	J	4.34E+05	----	383
VLS-3	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
VLS-3	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
VLS-3	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
VLS-3	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
VLS-4	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
VLS-4	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
VLS-4	Benzene	2.3		3.19E+02	13.2	110
VLS-4	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
VLS-4	Chloroform	2.4	U	2.40E+05	4.4	179
VLS-4	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
VLS-4	Dichlorodifluoromethane	2.6		4.95E+06	----	639
VLS-4	Ethylbenzene	1.2	J	4.35E+05	----	3705
VLS-4	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
VLS-4	Tetrachloroethene	3.4	U	6.78E+05	18	1022
VLS-4	Toluene	13.4		7.54E+05	----	17885
VLS-4	Total Xylenes	4.9	J	4.34E+05	----	383
VLS-4	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
VLS-4	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
VLS-4	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
VLS-4	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
VLS-5	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
VLS-5	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
VLS-5	Benzene	2.3		3.19E+02	13.2	110
VLS-5	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
VLS-5	Chloroform	2.4	U	2.40E+05	4.4	179
VLS-5	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
VLS-5	Dichlorodifluoromethane	2.7		4.95E+06	----	639
VLS-5	Ethylbenzene	1.1	J	4.35E+05	----	3705
VLS-5	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
VLS-5	Tetrachloroethene	3.4	U	6.78E+05	18	1022
VLS-5	Toluene	11.1		7.54E+05	----	17885
VLS-5	Total Xylenes	4.6	J	4.34E+05	----	383
VLS-5	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
VLS-5	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]

TABLE 3-9

IAQ SAMPLE RESULTS VERTICAL LAUNCH SYSTEMS DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
VLS-5	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
VLS-5	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
DUP-1-121106	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
DUP-1-121106	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
DUP-1-121106	Benzene	2.2		3.19E+02	13.2	110
DUP-1-121106	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
DUP-1-121106	Chloroform	2.4	U	2.40E+05	4.4	179
DUP-1-121106	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
DUP-1-121106	Dichlorodifluoromethane	2.2	J	4.95E+06	----	639
DUP-1-121106	Ethylbenzene	1.1	J	4.35E+05	----	3705
DUP-1-121106	Methyl t-Butyl Ether	0.5	J	1.80E+05[A]	----	10948
DUP-1-121106	Tetrachloroethene	3.4	U	6.78E+05	18	1022
DUP-1-121106	Toluene	12.1		7.54E+05	----	17885
DUP-1-121106	Total Xylenes	4.5	J	4.34E+05	----	383
DUP-1-121106	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
DUP-1-121106	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
DUP-1-121106	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
DUP-1-121106	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
VLS-6	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
VLS-6	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
VLS-6	Benzene	2.6		3.19E+02	13.2	110
VLS-6	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
VLS-6	Chloroform	2.4	U	2.40E+05	4.4	179
VLS-6	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
VLS-6	Dichlorodifluoromethane	2.5		4.95E+06	----	639
VLS-6	Ethylbenzene	1.3	J	4.35E+05	----	3705
VLS-6	Methyl t-Butyl Ether	0.6	J	1.80E+05[A]	----	10948
VLS-6	Tetrachloroethene	1.1	J	6.78E+05	18	1022
VLS-6	Toluene	14.3		7.54E+05	----	17885
VLS-6	Total Xylenes	5.1	J	4.34E+05	----	383
VLS-6	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
VLS-6	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
VLS-6	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
VLS-6	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
VLS-7	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
VLS-7	1,2,4-Trichlorobenzene	1.4	J	4.00E+04[N]	----	15
VLS-7	Benzene	2.3		3.19E+02	13.2	110
VLS-7	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
VLS-7	Chloroform	2.4	U	2.40E+05	4.4	179

TABLE 3-9

IAQ SAMPLE RESULTS VERTICAL LAUNCH SYSTEMS DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier	OSHA PEL (ug/m^3)	Carcinogenic (ug/m^3) ILCR = 10^{-5}	Noncarcinogenic (ug/m^3) HI = 1
VLS-7	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
VLS-7	Dichlorodifluoromethane	2.9		4.95E+06	----	639
VLS-7	Ethylbenzene	1.0	J	4.35E+05	----	3705
VLS-7	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
VLS-7	Tetrachloroethene	3.4	U	6.78E+05	18	1022
VLS-7	Toluene	6.1		7.54E+05	----	17885
VLS-7	Total Xylenes	3.0	J	4.34E+05	----	383
VLS-7	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
VLS-7	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
VLS-7	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
VLS-7	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]
VLS-8	1,1-Dichloroethane	2.0	U	4.00E+05	----	1789
VLS-8	1,2,4-Trichlorobenzene	3.7	U	4.00E+04[N]	----	15
VLS-8	Benzene	2.3		3.19E+02	13.2	110
VLS-8	Carbon Tetrachloride	3.1	U	6.29E+04	6.7	639
VLS-8	Chloroform	2.4	U	2.40E+05	4.4	179
VLS-8	cis-1,2-Dichloroethene	2.0	U	7.90E+05	----	----
VLS-8	Dichlorodifluoromethane	3.2		4.95E+06	----	639
VLS-8	Ethylbenzene	1.1	J	4.35E+05	----	3705
VLS-8	Methyl t-Butyl Ether	0.4	J	1.80E+05[A]	----	10948
VLS-8	Tetrachloroethene	0.8	J	6.78E+05	18	1022
VLS-8	Toluene	6.6		7.54E+05	----	17885
VLS-8	Total Xylenes	4.3	J	4.34E+05	----	383
VLS-8	trans-1,2-Dichloroethene	2.0	U	7.90E+05	----	217
VLS-8	Trichloroethene	2.7	U	5.37E+05	18[1]	128[2]
VLS-8	Trichloroethene	2.7	U	5.37E+05	0.9[1]	128[2]
VLS-8	Vinyl Chloride	1.3	U	2.16E+04	24[3]	358[3]

Notes:
U = nondetect
J = estimated
Shaded cells indicate concentration greater than risk-based level

ug/m3 = micrograms per cubic meter
ILCR = Incremental lifetime cancer risk.
HI = Hazard Index.

OSHA PEL = Occupational Safety and Health Administration Pemissible Exposure Limit
N = National Institute for Occupational Safety and Health Recommended Exposure Limit
A = American Council of Governmental Industrial Hygienists Theshold Limit Value

1 - Based on USEPA carcinogenic slope factor range presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
2 - Based on USEPA reference concentration presented in External Review Draft for Trichloroethylene Health Risk Assessment: Synthesis and Characterization, 2001.
3 - The target levels for vinyl chloride are based on the toxicity criteria for adult exposures

TABLE 3-10

SUB-SLAB VAPOR SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier
SV-13-2	1,1-Dichloroethane	9080	
SV-13-2	1,2,4-Trichlorobenzene	186	U
SV-13-2	Benzene	81.6	
SV-13-2	Carbon Tetrachloride	157	U
SV-13-2	Chloroform	84.7	J
SV-13-2	cis-1,2-Dichloroethene	242000	
SV-13-2	Dichlorodifluoromethane	124	U
SV-13-2	Ethylbenzene	108	U
SV-13-2	Methyl t-Butyl Ether	90.1	U
SV-13-2	Tetrachloroethene	178	
SV-13-2	Toluene	94.2	U
SV-13-2	Total Xylenes	326	U
SV-13-2	trans-1,2-Dichloroethene	3160	
SV-13-2	Trichloroethene	369000	
SV-13-2	Vinyl Chloride	618	
DUP-2-121106	1,1-Dichloroethane	9360	
DUP-2-121106	1,2,4-Trichlorobenzene	186	U
DUP-2-121106	Benzene	88.3	
DUP-2-121106	Carbon Tetrachloride	157	U
DUP-2-121106	Chloroform	95.6	J
DUP-2-121106	cis-1,2-Dichloroethene	234000	
DUP-2-121106	Dichlorodifluoromethane	124	U
DUP-2-121106	Ethylbenzene	108	U
DUP-2-121106	Methyl t-Butyl Ether	90.1	U
DUP-2-121106	Tetrachloroethene	195	
DUP-2-121106	Toluene	94.2	U
DUP-2-121106	Total Xylenes	326	U
DUP-2-121106	trans-1,2-Dichloroethene	3470	
DUP-2-121106	Trichloroethene	352000	
DUP-2-121106	Vinyl Chloride	701	

TABLE 3-10

SUB-SLAB VAPOR SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier
SV-14-2	1,1-Dichloroethane	3040	
SV-14-2	1,2,4-Trichlorobenzene	74.2	U
SV-14-2	Benzene	8	J
SV-14-2	Carbon Tetrachloride	62.8	U
SV-14-2	Chloroform	107	
SV-14-2	cis-1,2-Dichloroethene	8720	
SV-14-2	Dichlorodifluoromethane	49.4	U
SV-14-2	Ethylbenzene	43.4	U
SV-14-2	Methyl t-Butyl Ether	44.4	
SV-14-2	Tetrachloroethene	71.2	
SV-14-2	Toluene	37.7	U
SV-14-2	Total Xylenes	130	U
SV-14-2	trans-1,2-Dichloroethene	238	
SV-14-2	Trichloroethene	185000	
SV-14-2	Vinyl Chloride	28.4	
SV-15-2	1,1-Dichloroethane	2160	
SV-15-2	1,2,4-Trichlorobenzene	74.2	U
SV-15-2	Benzene	21.7	J
SV-15-2	Carbon Tetrachloride	62.8	U
SV-15-2	Chloroform	67.7	
SV-15-2	cis-1,2-Dichloroethene	83800	
SV-15-2	Dichlorodifluoromethane	49.4	U
SV-15-2	Ethylbenzene	43.4	J
SV-15-2	Methyl t-Butyl Ether	18.8	J
SV-15-2	Tetrachloroethene	54.9	J
SV-15-2	Toluene	16	J
SV-15-2	Total Xylenes	130	U
SV-15-2	trans-1,2-Dichloroethene	1430	
SV-15-2	Trichloroethene	161000	
SV-15-2	Vinyl Chloride	210	

TABLE 3-10

SUB-SLAB VAPOR SAMPLE RESULTS BUILDING A DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier
SV-18-2	1,1-Dichloroethane	1750	
SV-18-2	1,2,4-Trichlorobenzene	18.6	U
SV-18-2	Benzene	8	U
SV-18-2	Carbon Tetrachloride	17.3	
SV-18-2	Chloroform	8.8	J
SV-18-2	cis-1,2-Dichloroethene	6270	
SV-18-2	Dichlorodifluoromethane	12.4	U
SV-18-2	Ethylbenzene	10.8	U
SV-18-2	Methyl t-Butyl Ether	5.3	J
SV-18-2	Tetrachloroethene	91.2	
SV-18-2	Toluene	2.1	J
SV-18-2	Total Xylenes	32.6	U
SV-18-2	trans-1,2-Dichloroethene	113	
SV-18-2	Trichloroethene	162000	
SV-18-2	Vinyl Chloride	91.2	

Notes:
U = nondetect
J = estimated
ug/m3 = micrograms per cubic meter

TABLE 3-11

SUB-SLAB VAPOR SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier
SV-13-3	1,1-Dichloroethane	11000	
SV-13-3	1,2,4-Trichlorobenzene	186	U
SV-13-3	Benzene	79.5	U
SV-13-3	Carbon Tetrachloride	157	U
SV-13-3	Chloroform	64.5	J
SV-13-3	cis-1,2-Dichloroethene	292000	
SV-13-3	Dichlorodifluoromethane	124	U
SV-13-3	Ethylbenzene	108	U
SV-13-3	Methyl t-Butyl Ether	90.1	U
SV-13-3	Tetrachloroethene	166	J
SV-13-3	Toluene	94.2	U
SV-13-3	Total Xylenes	326	U
SV-13-3	trans-1,2-Dichloroethene	4650	
SV-13-3	Trichloroethene	326000	
SV-13-3	Vinyl Chloride	549	
SV-14-3	1,1-Dichloroethane	3560	
SV-14-3	1,2,4-Trichlorobenzene	74.2	U
SV-14-3	Benzene	31.8	U
SV-14-3	Carbon Tetrachloride	62.8	U
SV-14-3	Chloroform	90.8	
SV-14-3	cis-1,2-Dichloroethene	22800	
SV-14-3	Dichlorodifluoromethane	49.4	U
SV-14-3	Ethylbenzene	43.4	U
SV-14-3	Methyl t-Butyl Ether	36.1	U
SV-14-3	Tetrachloroethene	83.0	
SV-14-3	Toluene	37.7	U
SV-14-3	Total Xylenes	130	U
SV-14-3	trans-1,2-Dichloroethene	500	
SV-14-3	Trichloroethene	134000	
SV-14-3	Vinyl Chloride	57.2	
SV-15-3	1,1-Dichloroethane	6010	
SV-15-3	1,2,4-Trichlorobenzene	74.2	U
SV-15-3	Benzene	31.8	U
SV-15-3	Carbon Tetrachloride	62.8	U

TABLE 3-11

SUB-SLAB VAPOR SAMPLE RESULTS BUILDING A APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier
SV-15-3	Chloroform	109	
SV-15-3	cis-1,2-Dichloroethene	167000	
SV-15-3	Dichlorodifluoromethane	49.4	U
SV-15-3	Ethylbenzene	43.4	U
SV-15-3	Methyl t-Butyl Ether	36.1	U
SV-15-3	Tetrachloroethene	98.5	
SV-15-3	Toluene	14.8	J
SV-15-3	Total Xylenes	130	U
SV-15-3	trans-1,2-Dichloroethene	4660	
SV-15-3	Trichloroethene	326000	
SV-15-3	Vinyl Chloride	491	
SV-18-3	1,1-Dichloroethane	78600	
SV-18-3	1,2,4-Trichlorobenzene	186	U
SV-18-3	Benzene	79.5	U
SV-18-3	Carbon Tetrachloride	337	
SV-18-3	Chloroform	316	
SV-18-3	cis-1,2-Dichloroethene	232000	
SV-18-3	Dichlorodifluoromethane	124	U
SV-18-3	Ethylbenzene	108	U
SV-18-3	Methyl t-Butyl Ether	90.1	U
SV-18-3	Tetrachloroethene	4470	
SV-18-3	Toluene	29.6	J
SV-18-3	Total Xylenes	326	U
SV-18-3	trans-1,2-Dichloroethene	4160	
SV-18-3	Trichloroethene	6200000	
SV-18-3	Vinyl Chloride	1850	

Notes:
U = nondetect
J = estimated
ug/m3 = micrograms per cubic meter

TABLE 3-12

SUB-SLAB VAPOR SAMPLE RESULTS BUILDING C DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier
SV-1-2	1,1-Dichloroethane	405	U
SV-1-2	1,2,4-Trichlorobenzene	742	U
SV-1-2	Benzene	62.1	J
SV-1-2	Carbon Tetrachloride	628	U
SV-1-2	Chloroform	488	U
SV-1-2	cis-1,2-Dichloroethene	481000	
SV-1-2	Dichlorodifluoromethane	494	U
SV-1-2	Ethylbenzene	434	U
SV-1-2	Methyl t-Butyl Ether	361	U
SV-1-2	Tetrachloroethene	158	J
SV-1-2	Toluene	377	U
SV-1-2	Total Xylenes	1300	U
SV-1-2	trans-1,2-Dichloroethene	5200	
SV-1-2	Trichloroethene	19600	
SV-1-2	Vinyl Chloride	761	
SV-4-2	1,1-Dichloroethane	20.2	U
SV-4-2	1,2,4-Trichlorobenzene	37.1	U
SV-4-2	Benzene	50.0	
SV-4-2	Carbon Tetrachloride	31.4	U
SV-4-2	Chloroform	7.0	J
SV-4-2	cis-1,2-Dichloroethene	79300	
SV-4-2	Dichlorodifluoromethane	24.7	U
SV-4-2	Ethylbenzene	4.3	J
SV-4-2	Methyl t-Butyl Ether	18.0	U
SV-4-2	Tetrachloroethene	33.9	
SV-4-2	Toluene	51.2	
SV-4-2	Total Xylenes	65.1	U
SV-4-2	trans-1,2-Dichloroethene	661	
SV-4-2	Trichloroethene	28300	
SV-4-2	Vinyl Chloride	381	

Notes:
U = nondetect
J = estimated
ug/m3 = micrograms per cubic meter

TABLE 3-13

SUB-SLAB VAPOR SAMPLE RESULTS BUILDING C APRIL 2007
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier
SV-1-3	1,1-Dichloroethane	405	U
SV-1-3	1,2,4-Trichlorobenzene	742	U
SV-1-3	Benzene	318	U
SV-1-3	Carbon Tetrachloride	628	U
SV-1-3	Chloroform	488	U
SV-1-3	cis-1,2-Dichloroethene	1550000	
SV-1-3	Dichlorodifluoromethane	494	U
SV-1-3	Ethylbenzene	434	U
SV-1-3	Methyl t-Butyl Ether	361	U
SV-1-3	Tetrachloroethene	136	J
SV-1-3	Toluene	377	U
SV-1-3	Total Xylenes	1300	U
SV-1-3	trans-1,2-Dichloroethene	5930	
SV-1-3	Trichloroethene	21100	
SV-1-3	Vinyl Chloride	578	
SV-4-3	1,1-Dichloroethane	20.2	U
SV-4-3	1,2,4-Trichlorobenzene	37.1	U
SV-4-3	Benzene	71.2	
SV-4-3	Carbon Tetrachloride	31.4	U
SV-4-3	Chloroform	24.4	U
SV-4-3	cis-1,2-Dichloroethene	58100	
SV-4-3	Dichlorodifluoromethane	24.7	U
SV-4-3	Ethylbenzene	4.0	J
SV-4-3	Methyl t-Butyl Ether	18.0	U
SV-4-3	Tetrachloroethene	33.8	J
SV-4-3	Toluene	72.1	
SV-4-3	Total Xylenes	65.1	U
SV-4-3	trans-1,2-Dichloroethene	759	
SV-4-3	Trichloroethene	16500	
SV-4-3	Vinyl Chloride	609	

Notes:
U = nondetect
J = estimated
ug/m3 = micrograms per cubic meter

TABLE 3-14

IAQ SAMPLE LOCATIONS WITH CIS-1,2-DICHLOROETHENE AND TCE DECEMBER 2006
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Sample ID	Analyte	Result (ug/m^3)	Qualifier
A-6	cis-1,2-Dichloroethene	0.3	J
A-7	cis-1,2-Dichloroethene	0.3	J
A-8	cis-1,2-Dichloroethene	0.8	J
A-9	cis-1,2-Dichloroethene	0.5	J
A-11	cis-1,2-Dichloroethene	0.7	J
B-5	cis-1,2-Dichloroethene	0.3	J
B-6	cis-1,2-Dichloroethene	1	J
C-1	cis-1,2-Dichloroethene	0.3	J
C-9	cis-1,2-Dichloroethene	0.5	J
DUP-3-121106	cis-1,2-Dichloroethene	0.4	J

Sample ID	Analyte	Result (ug/m^3)	Qualifier
A-1	Trichloroethene	0.60	J
A-2	Trichloroethene	0.9	J
A-3	Trichloroethene	0.9	J
A-4	Trichloroethene	1.1	B
A-5	Trichloroethene	1.1	B
A-6	Trichloroethene	2.8	
A-7	Trichloroethene	1.9	J
A-8	Trichloroethene	4.2	
A-9	Trichloroethene	2.7	
A-10	Trichloroethene	0.4	J
A-11	Trichloroethene	1.3	B
B-2	Trichloroethene	0.7	J
B-3	Trichloroethene	0.5	J
B-4	Trichloroethene	0.8	J
B-5	Trichloroethene	1.1	B
B-6	Trichloroethene	1.9	J
C-1	Trichloroethene	0.8	B
C-2	Trichloroethene	0.9	J
C-3	Trichloroethene	0.8	J
C-4	Trichloroethene	6.6	J
C-5	Trichloroethene	1.3	J
C-6	Trichloroethene	1.1	J
C-7	Trichloroethene	0.5	J
C-8	Trichloroethene	0.4	J
C-9	Trichloroethene	1.0	B
T00-1	Trichloroethene	1	J

Notes:
ug/m3 = micrograms per cubic meter
U = nondetect
J = estimated
B = blank contraminated
Shaded cells indicate marker chemical and TCE detected

TABLE 3-15

CONSTITUENT RATIOS BETWEEN SUB-SLAB SAMPLES AND IAQ SAMPLES
BUILDINGS A AND C
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

PLATING SHOP DECEMBER 2006			
Analyte	SV Mean (ug/m^3)	IAQ Mean (ug/m^3)	IAQ/SV ratio
Benzene	49.9	2.1	4.21E-02
Chloroform	88.75	0.55	6.20E-03
cis-1,2-Dichloroethene	142130	0.3	2.11E-06
Tetrachloroethene	124.78	0.75	6.01E-03
Trichloroethene	266750	2.35	8.81E-06

PLATING SHOP APRIL 2007			
Analyte	SV Mean (ug/m^3)	IAQ Mean (ug/m^3)	IAQ/SV ratio
Benzene	23.85	0.53	2.22E-02
Chloroform	88.1	0.8	9.08E-03
cis-1,2-Dichloroethene	160600	1	6.23E-06
Tetrachloroethene	115.83	1.7	1.47E-02
Trichloroethene	262000	2.33	8.89E-06

C BASEMENT DECEMBER 2006			
Analyte	SV Mean (ug/m^3)	IAQ Mean (ug/m^3)	IAQ/SV ratio
Benzene	56.05	2.1	3.75E-02
Chloroform	88.75	0.55	6.20E-03
cis-1,2-Dichloroethene	280150	0.45	1.61E-06
Tetrachloroethene	95.95	1.1	1.15E-02
Trichloroethene	23950	0.766666667	3.20E-05

C BASEMENT APRIL 2007			
Analyte	SV Mean (ug/m^3)	IAQ Mean (ug/m^3)	IAQ/SV ratio
Benzene	85.6	0.8	9.35E-03
Chloroform	128.1	1.2	9.37E-03
cis-1,2-Dichloroethene	804050	1	1.24E-06
Tetrachloroethene	84.90	1.7	2.00E-02
Trichloroethene	18800	1.133333333	6.03E-05

SV = sub-slab vapor sample
IAQ = indoor air quality sample
ug/m3 = micrograms per cubic meter
Means calculated using one-half the detection limit for non-detected chemicals

0.009755396 0.014676259 0.004920863

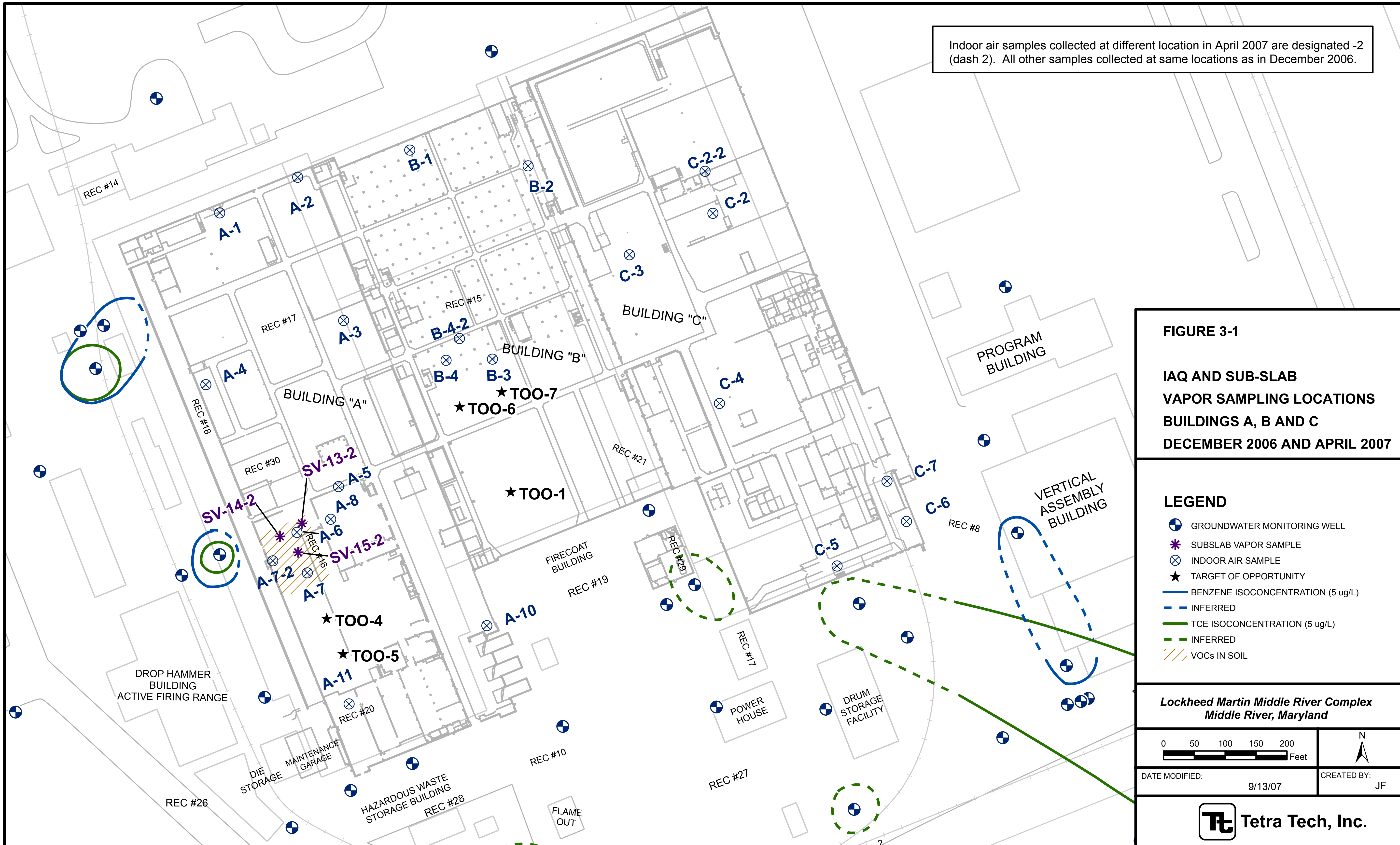
TABLE 3-16

PREDICTED INDOOR AIR CONCENTRATIONS USING SUB-SLAB VAPOR RATIOS
LMC MIDDLE RIVER COMPLEX, MIDDLE RIVER, MARYLAND

Analytes	Predicted Indoor Air Concentrations[1] (ug/m^3)	Actual Indoor Air Concentrations[2] (ug/m^3)	Ratio of Actual to Predicted Concentrations
PLATING SHOP DECEMBER 2006			
Benzene	1.05E-04	2.1	1.99E+04
Chloroform	1.87E-04	0.55	2.94E+03
Tetrachloroethene	2.63E-04	0.75	2.85E+03
Trichloroethene	5.63E-01	2.35	4.17
PLATING SHOP APRIL 2007			
Benzene	9.95E-05	2.1	2.11E+04
Chloroform	3.68E-04	0.55	1.50E+03
Tetrachloroethene	4.83E-04	1.1	2.28E+03
Trichloroethene	1.09E+00	0.77	0.70
C BASEMENT DECEMBER 2006			
Benzene	9.00E-05	0.53	5.89E+03
Chloroform	1.43E-04	0.8	5.61E+03
Tetrachloroethene	1.54E-04	1.13	7.33E+03
Trichloroethene	3.85E-02	2.33	60.57
C BASEMENT APRIL 2007			
Benzene	1.06E-04	0.8	7.51E+03
Chloroform	1.59E-04	1.2	7.53E+03
Tetrachloroethene	1.06E-04	1.7	1.61E+04
Trichloroethene	2.34E-02	1.13	48.47

1 Concentrations estimated using following formula and data from Table 3-15:
Predicted concentration = (mean subslab vapor COC concentration/mean Cis 1,2-Dichloroethene subslab vapor concentration) x (mean Cis 1,2-Dichloroethene indoor air concentration)

2 Mean concentrations from indoor air quality sample data Table 3-15



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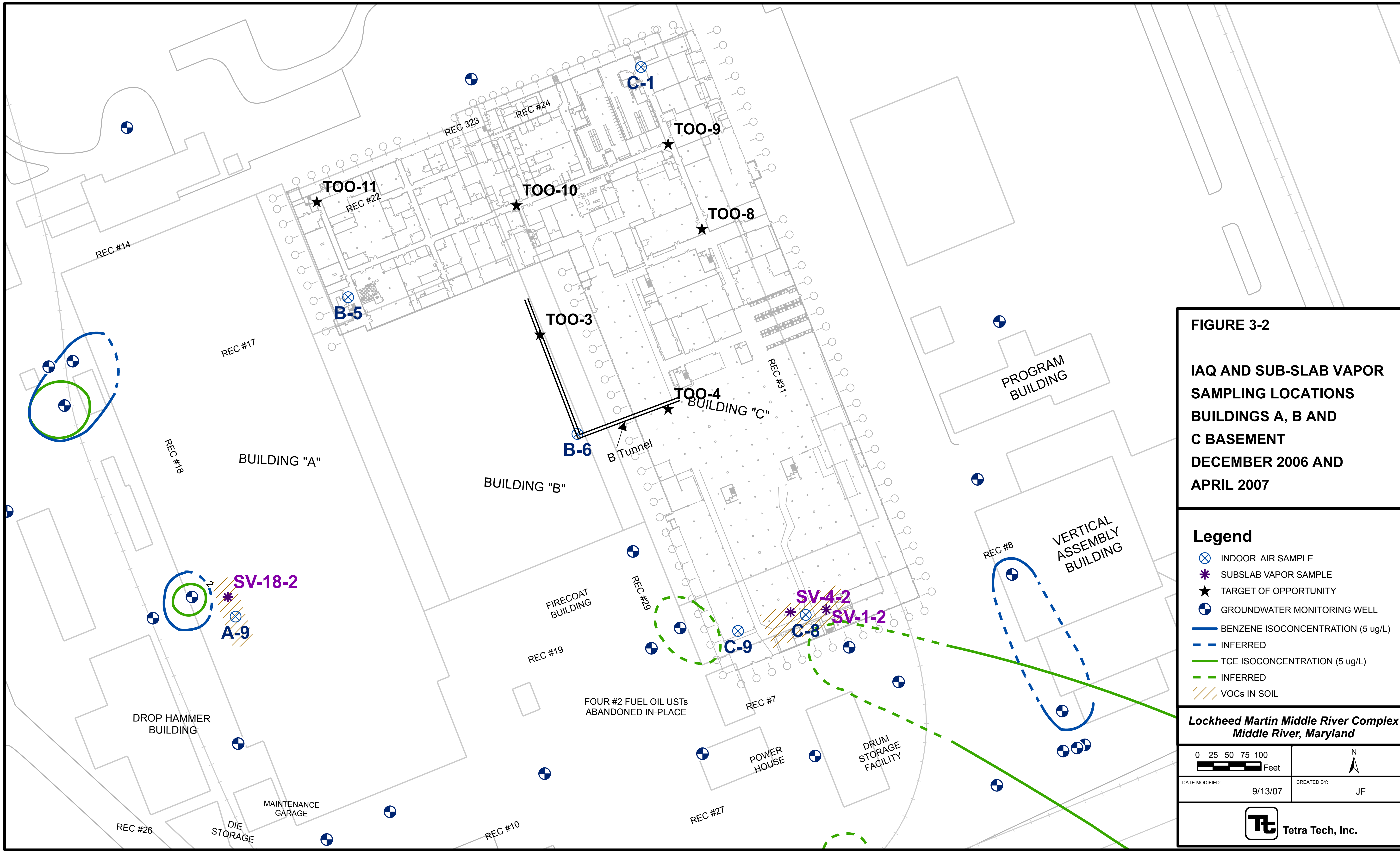

K:\GProject\middle_river\Maps\Middle River Wells_TCE_Benzene_BC_Basement.mxd

FIGURE 3-3

IAQ SAMPLING LOCATIONS
VERTICAL LAUNCH SYSTEMS BUILDING
DECEMBER 2006

Lockheed Martin Middle River Complex
Middle River, Maryland

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FIGURE 3-4

IAQ BACKGROUND SAMPLING LOCATIONS DECEMBER 2006 AND APRIL 2007

LEGEND

BACKGROUND SAMPLING LOCATION

WATER

Lockheed Martin Middle River Complex
Middle River, Maryland

0 100 200 300 400 Feet

N

DATE MODIFIED: 6/12/07

CREATED BY: LR

Tetra Tech, Inc.

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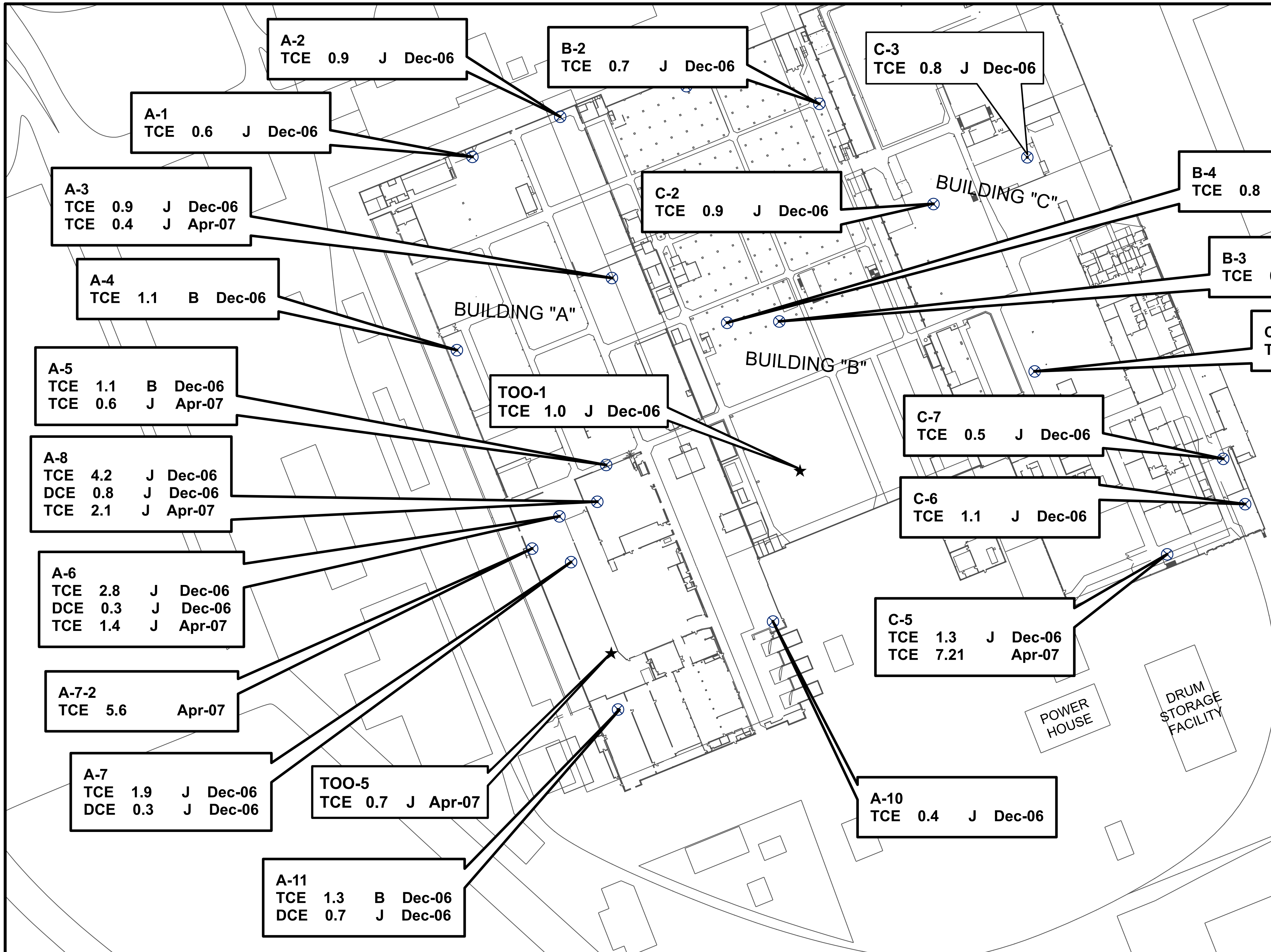

FIGURE 3-5

SAMPLE LOCATIONS WHERE TCE AND DCE WERE DETECTED BUILDINGS A, B AND C DECEMBER 2006 AND APRIL 2007

LEGEND

★ TARGET OF OPPORTUNITY
⊗ INDOOR AIR SAMPLE

Notes:
Concentrations = ug/m3 (micrograms per cubic meter)
U = nondetect
J = estimated
B = blank contaminated

Lockheed Martin Middle River Complex
Middle River, Maryland

0 25 50 75 100 Feet

N

DATE MODIFIED: 9/13/07

CREATED BY: JF

Tetra Tech, Inc.

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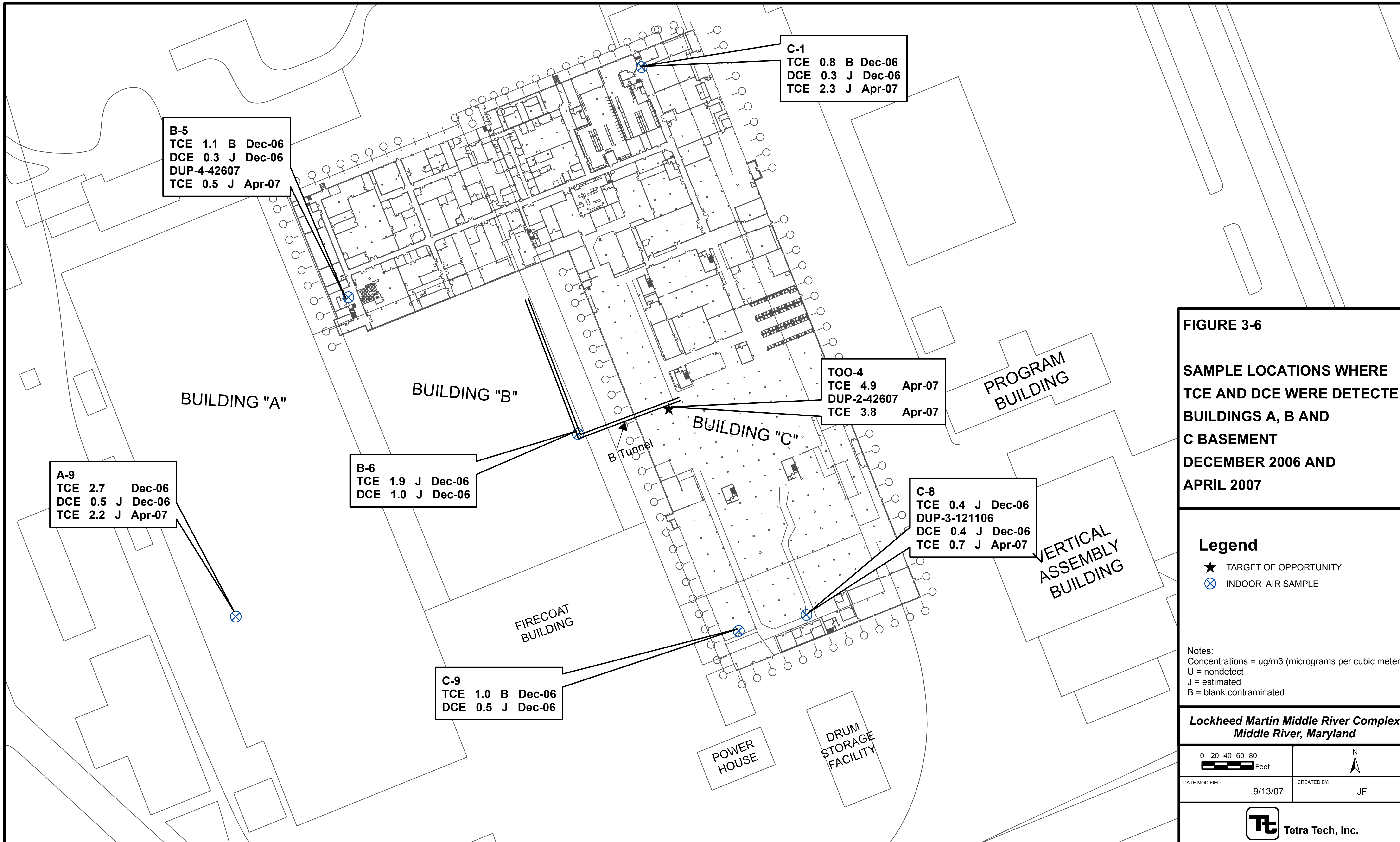

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Section 4
Conclusions and Recommendations

4.1 CONCLUSIONS

Tetra Tech has completed an IAQ survey of Buildings A, B, C, and the VLS located at Lockheed Martin Corporation's Middle River Complex (MRC) located in Middle River, Maryland. The objective of this investigation was to evaluate whether VOCs present in sub-slab vapors associated with soil and groundwater chemicals of concern (COCs) at the site might be migrating into indoor air at MRC facilities. This objective was achieved through the performance of a phased scope of work that included site reconnaissance, sampling plan design, performance of sampling and interpretation of analytical data.

The data set analyzed was comprised of air samples collected during two sampling sessions; the first in December of 2006 and the second in April of 2007. During both sampling events air samples were collected from background locations around the perimeter of the MRC, and from interior locations within Buildings A, B, C. Air samples were only collected from the VLS in December 2006 as the resultant data did not indicate the need for further sampling. Sub-slab vapor samples were collected during both sampling events from previously installed sub-slab vapor sampling points at the MRC. All collected data was validated to assure compliance with applicable method requirements. A number of samples collected in December 2006 did not meet quality assurance quality control requirements due to contamination in laboratory method blanks. TCE was detected in the laboratory method blank in seven of 42 IAQ samples collected in December 2006. These samples were affected by QA/QC concerns but were not rejected as the result of validation. No blank contamination was noted in the April 2007 sampling. Many results were J-qualified in both the December 2006 and April 2007 IAQ samples. J-qualification indicates that the chemical was present in the sample but that the reported concentrations were estimated. While there is uncertainty associated with J-flagged data, it still indicates the presence of the reported chemical within indoor air at the MRC. Two samples were voided in the April 2007 sampling event due to sampler failure that resulted in inadequate sample volume for analysis.

Numerous subsurface COCs were detected in background and IAQ samples. The IAQ data were screened against risk-based screening levels that were derived using conservative default assumptions and toxicity values. TCE was screened against a range of risk-based screening levels with a lower value derived to be protective of sensitive sub-populations and a higher value derived to be protective of the general population. TCE was detected at concentrations within its risk-based concentration range (i.e. above its lower screening value but less than its higher screening level).

The presence of a COC at or above its risk-based level does not mean a harmful effect will occur, just that there may be an increased risk and further investigation may be warranted. For personnel to potentially experience an excess incremental lifetime cancer risk, they would have to be exposed to the derived concentration for eight hours a day, 40 hours a week, 250 days a year, for 25 years. This is considered highly unlikely and may significantly overestimate potential risk.

To evaluate whether chemical contaminants associated with groundwater contamination at the site might be migrating into indoor air, an analysis using multiple lines of evidence was performed. The results of the IAQ survey and supplemental analyses indicated the following:

- Numerous COCs detected in sub-slab vapors were also detected in IAQ and background air samples.
- It appears that several COCs detected in indoor air including 1,2,4 trichlorobenzene, benzene, carbon tetrachloride, ethylbenzene, methyl-t-Butyl ether, PCE, toluene, and xylenes are most likely not associated with subsurface vapor intrusion.
- TCE was detected throughout the MRC during both sampling events at concentrations within the range of its risk-based screening levels. TCE was detected at concentrations greater than its lower screening level but not detected during either sampling event at concentrations in excess of its higher screening level.
- Data from the December 2006 sampling showed Cis-1,2-Dichloroethene, PCE, and TCE detected in all collocated sub-slab vapor and IAQ samples. The presence of these chemicals in both sample types may indicate that subsurface vapor intrusion is potentially

occurring. Data collected during the April 2007 sampling did not demonstrate the same relationship.

- Cis-1,2-Dichloroethene was used as a chemical marker for subsurface vapor intrusion. An association was found between the presence of cis-1,2-Dichloroethene and TCE in the IAQ samples collected in December 2006. Data collected during the April 2007 sampling did not demonstrate the same relationship.

- Based on the December 2006 sampling results, subsurface vapor intrusion appears to be occurring (or to have occurred) at those locations where cis-1,2-Dichloroethene and TCE are present in the same IAQ sample and in sub-slab vapor. This includes the Plating Shop in Building A and in the Building C Basement. Data collected during the April 2007 sampling identified the presence of TCE at these locations but not the marker chemical cis-1,2-Dichloroethene.

- Due to variations in the results between the December 2006 and April 2007 sampling events, there is uncertainty regarding potential subsurface vapor intrusion in the B tunnel and northern hallways of C-Basement. The presence or absence of subsurface vapor COCs and associated chemical markers may be associated with seasonal variation.

- Variations in ambient conditions between the sampling performed in December 2006 and April 2007 may have affected the results. A comparison of the results between December 2006 and April 2007 indicate fewer chemicals were detected in indoor air in April 2007 versus December 2006. With no major changes in facility operations noted, the only known variations are those associated with seasonal changes such as limiting outside air ventilation during colder months and increasing outside air ventilation during warmer months.

- An evaluation of COC ratios between sub-slab vapor data and IAQ data indicated that sub-slab vapor is most likely contributing TCE to air in the Plating Shop. TCE may be associated with sub-slab vapor in the Building C Basement but background sources may also have contributed to IAQ concentrations. J-qualified and non-detected data used in the analysis introduce uncertainty in the analysis however this uncertainty does not appear to be great enough to change the conclusions regarding potential sub-slab migration of TCE. While there may be contributions of benzene, chloroform, and PCE from sub-slab vapor, the primary source of these compounds appears to be background. The ratios remained relatively consistent between the two sampling events in spite of the seasonal variation previously discussed. This may further indicate potential sub-slab vapor intrusion within the Plating Shop and the basement of Building C. Based on information provided by MRAS personnel, no chlorinated solvents are used in MRAS operations which further supports sub-slab vapor as the most likely source for these compounds

- The age and construction of Buildings A, B, and C may facilitate subsurface vapor intrusion. This is not as great a concern at the VLS.

- The J&E model output underestimated TCE concentrations at modelled locations. This may be due to uncertainty in the model or background sources of TCE.

4.2 RECOMMENDATIONS

While detected concentrations of TCE were below the higher screening value derived to be protective of the general population, it was detected at concentrations greater than the lower screening value derived to be protective of sensitive sub-populations and considered by the MDE in their decision making process. Based on a potential relationship between detected concentrations of TCE in sub-slab vapor and TCE in indoor air, it is recommended that mitigation be performed at locations where subslab vapor are known to be present in high concentrations. Evaluation of potential remedies to mitigate known areas of subslab VOCs in the Building A Plating Shop and the south end of Building C should be performed and a selected remedy enacted. Additional IAQ sampling should be performed to address areas of uncertainty identified during the two rounds of sampling already completed.

Section 5
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THESE APPENDICES APPEAR ON CD ONLY

APPENDIX A – FIELD DATA SHEETS

APPENDIX B – DATA VALIDATION REPORTS

APPENDIX C – RISK-BASED SCREENING LEVEL CALCULATION

APPENDIX D – ESSEX, MARYLAND AIR MONITORING DATA