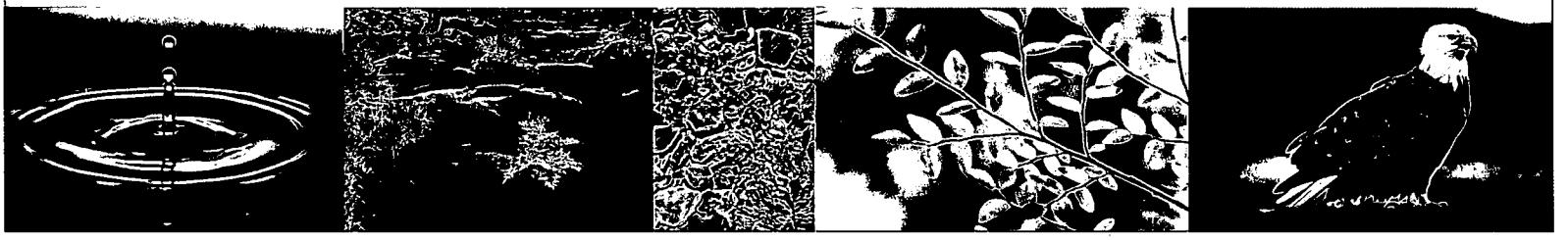
Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

N00164.AR.001182
NSWC CRANE
5090.3a



Rev. 0
01/09

SWMU 16 – Building 146
Indoor Air Quality Sampling Report

Naval Surface Warfare Center Crane
Crane, Indiana

Contract Task Order F271

January 2009

NAVFAC
Naval Facilities Engineering Command
Midwest
201 Decatur Avenue
Building 1A, Code EV
Great Lakes, Illinois 60088

TETRA TECH NUS, Inc.

DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE INDIANA 47522-5001

IN REPLY REFER TO:
5090/S4.7.1
Ser 0592/9029

10 FEB 2009

U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Corrective Action Section LU-9J
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Crane Division, Naval Surface Warfare Center submits the Draft Indoor Air Quality (IAQ) Sampling Report for Building 146, Solid Waste Management Unit (SWMU) 16. One copy is presented for your review as enclosure 1. The permit required Certification Statement is provided as enclosure 2.

If you require any further information, my point of contact is Mr. Thomas J. Brent, PRCR43, at 812-854-6160, email thomas.brent@navy.mil.

Sincerely,

J. M. Hunsicker
J. M. HUNSICKER
Environmental Protection Mgr
By direction of the Commander

Enclosures: 1. SWMU 16 Draft IAQ Sampling Report
2. Certification Statement

Copy to:
ADMINISTRATIVE RECORD
NAVFAC MW (Howard Hickey) (w/o encl)
NAVFAC PRCR4 (w/o encl)
IDEM (Doug Griffin)
TTNUS (Ralph Basinski) (w/o encl)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNATURE

Environmental Protection Mgr
TITLE

02/10/09
DATE

100805/P

INDOOR AIR QUALITY SAMPLING REPORT
SWMU 16 – BUILDING 146

NAVAL SURFACE WARFARE CENTER CRANE
CRANE, INDIANA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Midwest
201 Decatur Avenue
Building 1A, Code EV
Great Lakes, Illinois 60088

Submitted by:
Tetra Tech NUS, Inc.
234 Mall Boulevard, Suite 260
King of Prussia, Pennsylvania 19406

CONTRACT NO. N62467-04-D-0055
CONTRACT TASK ORDER F271

JANUARY 2009

PREPARED UNDER THE DIRECTION OF:

STEVEN H. RUFFING, P.E.
PROJECT MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

APPROVED FOR SUBMISSION BY:

JOHN J. TREPANOWSKI, P.E.
PROGRAM MANAGER
TETRA TECH NUS, INC.
KING OF PRUSSIA, PENNSYLVANIA

TABLE OF CONTENTS

SECTION **PAGE NO.**

ACRONYMS **4**

EXECUTIVE SUMMARY **ES-1**

1.0 INTRODUCTION **1-1**
- 1.1 PURPOSE 1-1
- 1.2 FACILITY DESCRIPTION 1-1
- 1.3 SITE DESCRIPTION AND HISTORY 1-1
- 1.4 PREVIOUS SAMPLING AND ANALYSIS 1-4
- 1.5 REPORT ORGANIZATION 1-6

2.0 FIELD INVESTIGATION **2-1**
- 2.1 OVERVIEW 2-1
- 2.2 MOBILIZATION/DEMOBILIZATION 2-1
- 2.3 SAMPLING ACTIVITIES 2-1
- 2.3.1 Air 2-1
- 2.4 FIELD SAMPLE DOCUMENTATION 2-2
- 2.5 SAMPLE HANDLING, PACKAGING, AND SHIPPING 2-2
- 2.6 QUALITY CONTROL SAMPLES 2-3
- 2.7 SITE MANAGEMENT AND FACILITY SUPPORT 2-3

3.0 DATA PRESENTATION **3-1**
- 3.1 SAMPLE ANALYSIS AND VALIDATION 3-1
- 3.2 SAMPLING RESULTS 3-2

REFERENCES **R-1**

APPENDICES

- **A FIELD DOCUMENTATION**
- **B PHOTOGRAPHS**
- **C ANALYTICAL RESULTS**

TABLES

NUMBER

2-1 Summary of June 2008 Indoor Air Quality Sampling
3-1 Indoor Air Quality Sample Results SWMU 16 Building 146

FIGURES

NUMBER

1-1 Base and Site Location Map
1-2 Aerial Photograph – SWMU 16 Boundary and Building 146
2-1 Locations of Indoor and Outdoor Air Sampling at SWMU 16 Building 146

ACRONYMS

bgs	below ground surface
CLEAN	Comprehensive Long-term Environmental Action Navy
CTO	Contract Task Order
EP	Extraction Procedure
FOL	Field Operations Leader
GC	gas chromatograph
GPS	Global Positioning System
HASP	Health and Safety Plan
HBX	high blast explosive
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IAS	Initial Assessment Study
IDEM	Indiana Department of Environmental Management
Mg/L	milligrams per liter
MS	mass spectroscopy
NAVFAC	Naval Facilities Engineering Command
NSWC	Naval Surface Warfare Center
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RFI	RCRA Facility Investigation
SDG	sample data group
SWMU	Solid Waste Management Unit
TCE	trichloroethylene
TSCA	Toxic Substances Control Act
TNT	2,4,6-trinitrotoluene
TtNUS	Tetra Tech NUS, Inc.
U.S. EPA	United States Environmental Protection Agency
VOCs	volatile organic compounds
VIM	voluntary interim measure

EXECUTIVE SUMMARY

This Executive Summary provides a brief overview of the recent indoor air quality sampling event conducted at Solid Waste Management Unit (SWMU) 16 Building 146. All work was performed for the United States Navy, Naval Facilities Engineering Command (NAVFAC) Midwest by Tetra Tech NUS (TtNUS) under Contract Task Order (CTO) F271 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055.

Most of SWMU 16 is covered with buildings and gravel parking lots, and most grassy areas are located southeast of Building 146. Building 146, which has an area of approximately two-thirds acre, was an explosives fill and pressure washout facility and included three oil-fired, rotary kiln incinerators with fuel storage tanks. During incinerator operation, incinerator ash and slag residue were stored in waste piles adjacent to the incinerator. The incinerators were closed in the early 1990s, and the waste ash piles were removed along with some obviously contaminated soil.

Site operations also included cast loading [melt pouring of 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), and high blast explosive (HBX)] explosives into projectiles, demilitarization and incineration of ammunitions (small caliber ammunition, shotgun shells, fuses, detonators, boosters, tracers, flare candles, and smoke flares), and high-pressure washout. Steam out of Army ammunition and rockets containing TNT and Composition B was reportedly conducted between 1954 and 1956 (Halliburton NUS, 1992).

In 1995, a voluntary interim measure (VIM) was conducted at SWMU 16. The purpose of the VIM was to dispose of sludge contaminated with explosives from the east and west sumps; remove three aboveground storage tanks and associated fuel oil-contaminated soils; clean the sumps; excavate and remove the slag/ash piles; sample the remaining soils; backfill the excavations; and restore the site. The sumps were used for receiving roof drain waters and settling explosives from process wastewaters that were discharged to the environment. The three aboveground storage tanks supplied No. 2 fuel oil for the incinerator kilns. The storage tanks in the eastern and western bays each had an approximate capacity of 2,000 gallons, and the central storage tank feeding the prototype kiln had a 300- to 500-gallon capacity. During the 1995 interim measure, it was discovered that high levels of trichloroethylene (TCE) were entering the east and west sumps through the inlet piping.

From 1996 to 1998, additional VIMs were conducted at SWMU 16. The objective of the 1996 to 1998 interim measures were to sample and treat the water that had drained into the east and west sumps

because this water had elevated levels of TCE; conduct additional soil sampling; repair broken sewer lines; reroute Building 146 roof drains away from the sumps; grout Building 146 floor drains; install sump pumps and new piping from the sumps to the sanitary sewers; and dispose of polychlorinated biphenyl (PCB)-contaminated soil. PCB contamination was discovered during rerouting of some drain lines when trenches were dug through the asphalt cover. The soil/asphalt mixture sample results showed low concentrations of PCBs.

Recent use of SWMU 16 has been intermittent renovation and rework and breakdown of munitions. It is sometimes used for ammunition demilitarization operations.

Volatile Organic Compounds (VOCs) in groundwater can evaporate, and move through the soil, and potentially enter a building through cracks in the foundation and floor, gaps around pipes, or other openings to the surface. The purpose of this investigation; therefore, was to collect air samples within Building 146 to determine if VOCs, more specifically TCE and its degradation by-products, are present within the breathing zone of Building 146.

The field activities were conducted on June 27, 2008. During the field investigation, eight air samplers (plus one duplicate sampler) were set up inside Building 146, and one air sampler was set up outside and upwind of Building 146 along the prevailing wind direction. Section 2.0 provides more detailed information regarding the field sampling plan. Section 3.0 provides the analytical data from this field event.

Analytical results indicate TCE was the only parameter detected. TCE was detected at five sampling locations in Rooms 1 (146ASIN01), 4 (146ASIN04), and 5 (146ASIN05, 146ASIN06, and 146SFD01). The TCE concentrations for samples 146ASIN04 (2.1 ppbv) in Room 4 and 146ASIN05 (1.9 ppbv) in Room 5 were the only detected TCE concentrations that exceed the IDEM 25-year Commercial Chronic Action Level (1.5 ppbv).

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this report is to describe the activities performed during the recent field investigation of Solid Waste Management Unit (SWMU) 16, at the Naval Surface Warfare Center (NSWC) Crane located in Crane, Indiana. The activities associated with this investigation were completed in accordance with the Indoor Air Quality Sampling and Analysis Plan for SWMU 16 – Building 146 (TtNUS, 2008). The activities included the collection of indoor air samples to determine if volatile organic compounds (VOCs) are penetrating the building floor from contaminated groundwater beneath the building. The focus of this field event was to collect air quality samples from the interior of Building 146. This work was performed for the United States Navy, Naval Facilities Engineering Command (NAVFAC) Midwest by Tetra Tech NUS, Inc. (TtNUS) under Contract Task Order (CTO) F271 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) IV Contract Number N62467-04-D-0055. The samples were collected on June 27, 2008.

1.2 FACILITY DESCRIPTION

NSWC Crane is located in the southern portion of Indiana, approximately 75 miles southwest of Indianapolis and 71 miles northwest of Louisville, Kentucky, immediately east of Crane Village and Burns City (see Figure 1-1). NSWC Crane encompasses 62,463 acres (approximately 98 square miles), most of which are located in the northern portion of Martin County. Smaller portions of NSWC Crane are located in Greene, Daviess, and Lawrence Counties. NSWC Crane is located in a rural, sparsely populated area. Most of NSWC Crane is forested, and the surrounding area is wooded or farmed land. NSWC Crane provides material, technical, and logistical support to the Navy for equipment, shipboard weapons systems, and nonexpendable ordnance items. In addition, NSWC Crane supports the Crane Army Ammunition Activity with production, renovation, storage, shipment, demilitarization, and disposal of conventional ammunition.

1.3 SITE DESCRIPTION AND HISTORY

SWMU 16 is located in the north-central portion of NSWC Crane within the Boggs and Turkey Creek Drainage Basin, which is one of the five drainage basins that carry surface water off the installation and eventually drain into the East Fork of the White River and then to the Wabash River to the southwest. The location of SWMU 16 at NSWC Crane is shown in Figure 1-1.

SWMU 16 is approximately 16 acres in size. Building 146 (shown in Figure 1-2) is the largest building at SWMU 16, approximately 2/3 acre in size. Most of SWMU 16 is covered with buildings and gravel parking lots, and most grassy areas are located southeast of Building 146. Although current operations are known, it is likely that unknown operations once occurred at this site because the site is so old. Outfalls from sumps once discharged to swales within the area. The outfalls have since been permanently sealed. Sewer lines to sumps have been rerouted to industrial sources. Down spouts have also been rerouted. There is only one sewer system at Crane and it is a sanitary sewer system.

Building 146 was an explosives fill and pressure washout facility with two large and one prototype, oil-fed rotary kiln incinerators. Three nearby aboveground storage tanks supplied No. 2 fuel oil for the kilns. The storage tanks in the eastern and western bays each had an approximate capacity of 2,000 gallons, and the central storage tank feeding the prototype kiln had a 300- to 500-gallon capacity. Munitions entered the kilns at one end and were exposed to flame combustion, which resulted in the destruction of the energetics (propellants, explosives, pyrotechnics) contained within the munitions to demilitarize them through burning or detonation. Ash and slag residues from the incinerators were piled on the ground. The incinerators were closed in the early 1990s. A decision was made to remove the waste ash piles, and the piles were removed along with some obviously contaminated soil.

Site operations also included cast loading [melt pouring of 2,4,6-trinitrotoluene (TNT), hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), and high blast explosive (HBX) explosives into projectiles]; demilitarization and incineration of ammunitions (small caliber ammunition, shotgun shells, fuses, detonators, boosters, tracers, flare candles, and smoke flares); and demilitarization and high-pressure washout. Steam out of army ammunition and rockets containing TNT and Composition B was reportedly conducted between 1954 and 1956 (Halliburton NUS, 1992). Prior to 1978, the generated wastewater was discharged through a storm drain to a ditch, with ultimate transport to Boggs Creek via Turkey Creek. After 1978, wastewaters generated at Building 146 were transported to the Rockeye Treatment Facility for treatment.

Two sumps located on the eastern and western sides of B146 received discharges from floor drains in B146. These sumps were designed to drain through clay (terra cotta) tile pipes into ditches in the woods. Terra cotta drains are known for leakage potential and may have resulted in the release of contaminants to the subsurface soil. Both sumps were expected to contain explosive-contaminated sludge. However, it was found that the sumps contained significant quantities of TCE, with the west sump having the maximum concentrations. The east sump was piped to the west sump and an air stripper was installed to remediate TCE contamination during 1995 and 1996. The clay tile discharge lines were plugged when the stripper was installed. Shortly after the air stripper was installed, it was found that storm water

draining from the roof of B146 was flowing into the sumps and causing them to overflow. The roof drains were rerouted to separate discharge lines that discharged into ditches. The air stripper was operated until TCE levels were low enough to allow direct discharge of the sumps into the sanitary sewer system. The discharge from the sumps was rerouted to the sanitary sewer system. After the TCE concentrations were low enough to be transferred to the sanitary sewer without treatment by the air stripper, permanent pumps were installed. The TCE source was never found. Groundwater monitoring conducted during the SWMU 16 RFI and subsequent monitored natural attenuation (MNA) sampling indicates that TCE concentrations beneath Building 146 are highest (maximum concentration = 740,000 µg/L) at the northeast end of the building. TCE concentrations for wells located beneath the south end of the building are at least 5 orders of magnitude lower than at the north end.

Major contaminants from Building 146 loading and washout activities were TNT, RDX, HBX, Composition A, Composition B, and ammonium nitrate. HBX is a mixture of RDX, TNT, aluminum, and wax. Composition A contains RDX and beeswax. Composition B is composed of RDX, TNT, and wax. The primary metals of concern associated with the incinerator operations are the heavy metals lead, barium, cadmium, chromium, and mercury. Potential combustion of fuels containing polychlorinated biphenyls (PCBs) and contamination from PCB oxidation products has also been reported (Halliburton NUS, 1992). Polycyclic aromatic hydrocarbons (PAHs) and undetonated explosives have also been detected in ash from the Ammunition Peculiar Equipment (APE-1236) incinerators. The incinerator emissions testing data provide additional information concerning the potential particulate and gaseous releases, particularly those occurring prior to baghouse installation (Halliburton NUS, 1992). Initially, incinerator ash was piled near Building 146; later, ash and residue from burning and baghouse dust were collected and transferred to the storage facility. Ash from Building 146 operations has been reported to be RCRA hazardous waste (Halliburton NUS, 1992). TCE has been detected at high concentrations at the settling basins.

SMWU 16 is intermittently active and is used for renovation and rework and breakdown of munitions. It is sometimes used for ammunition demilitarization operations. Nearby facilities include case filling, case preparation, lunch and locker, and sewage pumping station buildings to the north and fuse and detonator magazines to the south. Magazine and storage buildings are situated east of Building 146, and magazines for fuses, detonators, and high explosives lie east of the SWMU. Both Building 145 (the case filling plant) and Building 148 (the small arms repacking building) housed significant quantities of explosives and smokeless powder.

This Field Report focuses on possible VOC contamination in the air within Building 146.

1.4 PREVIOUS SAMPLING AND ANALYSIS

A 1972 water sample from Building 146 was reported (Halliburton NUS, 1992a) to contain detectable levels of HMX and RDX, but the concentrations were not provided. In 1979, water samples were collected (from the same areas as the sediment samples) near settling basins or sumps where Building 146 floor drains discharge (in the same areas as the surface water samples). None of the water samples contained detectable levels of HMX. The TNT concentration was 0.11 mg/L and RDX was 0.03 mg/L. No measurable concentrations or related detrimental effects were found in Turkey Creek, the ultimate receptor of the Building 146 discharge. Sediment samples collected from drainage ways in the north ditch where the Building 146 drains discharge (Department of the Army, 1980) contained TNT [109 to 383 milligram per kilogram (mg/kg)], RDX (31 to 44 mg/kg), and HMX (1.0 to 10.2 mg/kg).

Quantities of chemicals potentially released at SWMU 16 are unknown. Analytical data for two ash pile samples collected in 1982 shows that the ash from the rotary kiln furnaces was a RCRA hazardous waste. Barium, cadmium, and lead exceeded the Extraction Procedure (EP) Toxicity limits (Halliburton NUS, 1992). Four monitoring wells were installed near Building 146 in July 1983. Soil and groundwater samples were collected and analyzed for metals and selected organic constituents. Based on a comparison of concentrations with average United States soil metal concentrations, the soils around Building 146 contained elevated concentrations of lead (9.3 to 58 mg/kg) and zinc (19 to 280 mg/kg). Groundwater samples around Building 146 exceeded drinking water regulations for lead [0.5 to 0.2 milligram per liter (mg/L)], chromium (0.038 to 0.16 mg/L), nickel (0.16 to 0.55 mg/L), cadmium (0.006 mg/L), mercury (0.0007 to 0.0036 mg/L), and TCE, the only organic chemical detected (2.7 to 27 mg/L). TCE was not detected in soil borings collected from 0 to 5 feet at the same locations.

Surface soil and sediment samples were collected around Building 146 in 1982 and 1985. The 1982 samples exceeded EP Toxicity Limits for cadmium (1.0 mg/L) and lead (5.0 mg/L). These samples contained trace levels of explosives (RDX = 0.013 mg/kg and HMX = 0.022 mg/kg) and high oil and grease content. One of the 1985 samples exceeded the EP Toxicity Limit for lead. None of the 1985 samples contained detectable levels of explosives. However, the detection limits were relatively high (TNT = 3.6 mg/kg, RDX = 5 mg/kg, and HMX = 7.2 mg/kg).

Soil samples were collected from the Building 146 incinerator bays as part of closure activities. Between October and December 1989, 133 soil samples were collected from 34 locations from depths between 0 and 2 feet bgs. The samples were analyzed for metals and PCBs. In March 1990, an additional 16 samples were collected from four locations to represent background conditions. The Indiana Department of Environmental Management (IDEM) determined that quality assurance/quality control (QA/QC) data for

the PCB parameters were inadequate, and six locations were resampled from 0 to 2 feet below ground surface (bgs) (Halliburton NUS, 1992b). The analytical results for samples collected from below the incinerator bays indicated that concentrations of arsenic, cadmium, chromium, selenium, and silver exceeded background levels. Only the concentrations of selenium and silver were considered significant (Halliburton NUS, 1993), but concentrations were not provided. The PCB analytical data indicated that detectable levels of PCBs were not present in Building 146 sampling locations.

Voluntary interim measures were conducted at SWMU 16 in 1995. The objectives of the interim measures were to sample, remove and dispose of sludge contaminated with lead and TCE, respectively, from the east and west sumps; remove three aboveground storage tanks and associated diesel contaminated soils; clean the sumps; excavate and remove the slag/ash piles; sample the remaining soils; backfill; and restore the site. During the interim measures in 1995, it was discovered that high levels of TCE were entering the east and west sumps through the inlet piping.

Additional voluntary interim measures were conducted at SWMU 16 from 1996 to 1998. It was determined that the effluent required treatment prior to discharge. The objective of the 1996 to 1998 interim measures was to sample and treat water that had drained into the east and west sumps containing elevated levels of TCE; conduct additional soil sampling; repair broken sewer piping sections; reroute roof drains on Building 146 away from the sumps and grout floor drains; install sump pumps and new piping from the sumps to the sanitary sewers; and dispose of PCB contaminated soil. During some rerouting of drain lines, trenches were dug through the asphalt cover and into the soil. Samples were collected from the soil/asphalt mixture, and low concentrations of PCBs were detected in the samples.

A RCRA Facility Investigation (RFI) has been conducted at SWMU 16 and included the installation of new groundwater wells near Building 146. Three rounds of RFI monitoring activities were conducted from February through May 2003, October 2003 through January 2004, and July through November 2004. Results from Rounds 1, 2, and 3 indicated that several wells in the Pennsylvania Upper water-bearing Zone (PUZ) contained detectable concentrations of VOCs that were greater than the SVs for human health. TCE, in particular, exhibited the highest concentrations of all VOCs and exceeded the SV in most wells in most sampling rounds. The TCE concentrations were found to be highest on the ridge top near the northern end of Building 146 and decrease in the downgradient directions toward the valleys below. The highest VOC concentration (330,000 µg/L TCE in Round 3) is located in well 16MWT06 near the eastern sump.

Based on the soil and groundwater patterns identified in the RFI, it appears that soil contamination under Building 146 has leached to groundwater and has spread in two directions: toward the east and west in

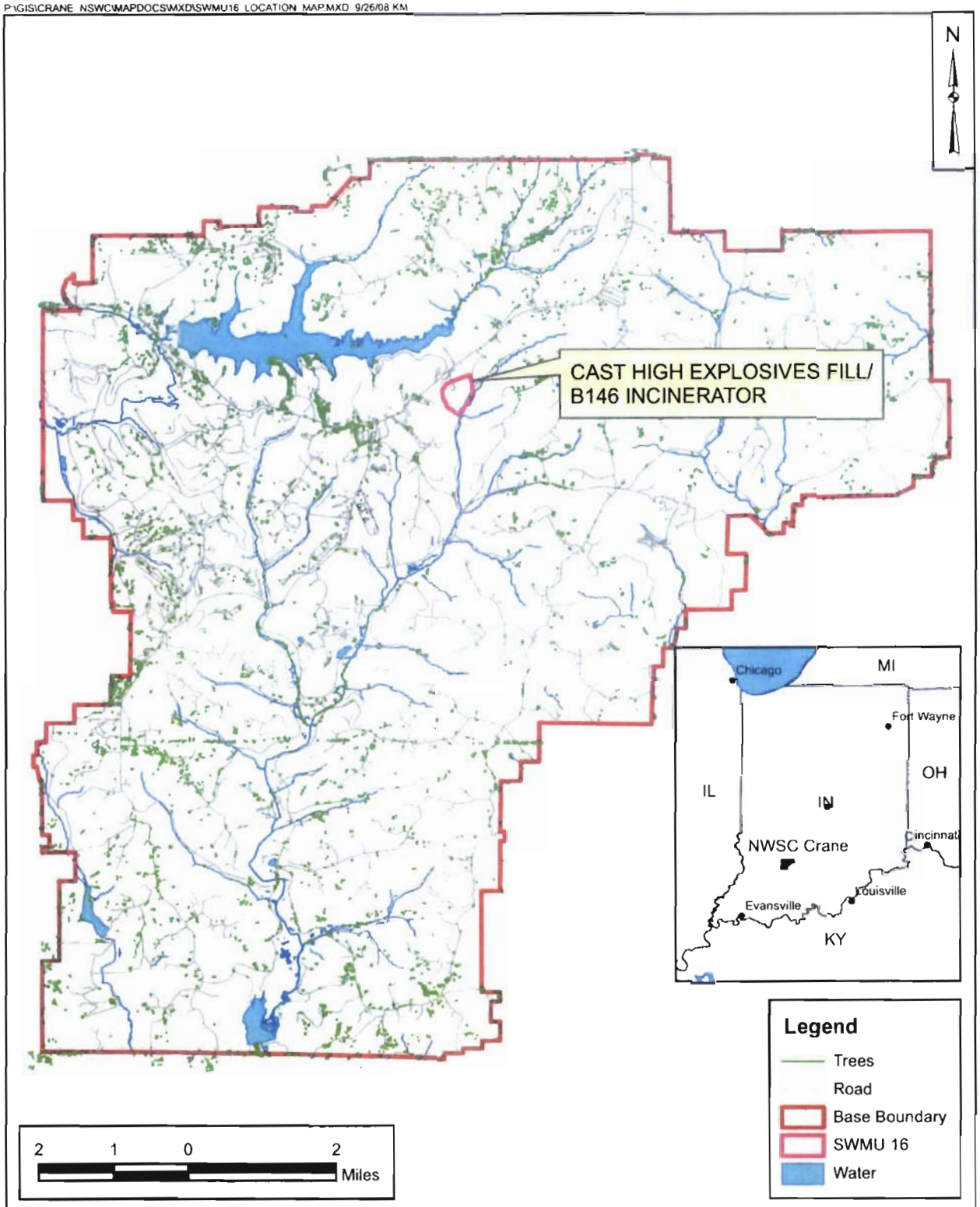
downgradient directions. Some VOC contamination appears to have migrated as far as the southern end of the SWMU, but the VOC concentrations there are much less than those at the northern end of the site. It is also possible that a minor VOC source exists closer to the southern wells and is the source of contamination in those wells. VOCs are not bounded laterally in all directions by wells with concentrations less than detection limits or SVs.

1.5 REPORT ORGANIZATION

The following sections are contained in the remainder of this document:

- Section 2.0 presents the activities associated with this field investigation.
- Section 3.0 presents the data from the samples collected at SWMU 16 during this investigation and compares the results to commercial Indoor Air Action Levels as defined in the IDEM Draft Vapor Intrusion Pilot Program Guidance dated April 26, 2006, Table 3.

P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU16_LOCATION_MAP.MXD 9/26/08 KM



DRAWN BY K. MOORE	DATE 9/26/08	Tetra Tech NUS, Inc.	CONTRACT NUMBER 112G01253
CHECKED BY J. LUCAS	DATE 9/26/08	BASE AND SITE LOCATON MAP SWMU 16 - CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR FIELD REPORT NSWC CRANE CRANE, INDIANA	OWNER NO. CTO 271F
REVISED BY —	DATE —		APPROVED BY — / DATE —
SCALE AS NOTED			FIGURE NO. FIGURE 1-1 / REV 0

DRAWN BY K. MOORE	DATE 9/26/08	Tetra Tech NUS, Inc.	CONTRACT NUMBER 112G01573
CHECKED BY J. LUCAS	DATE 9/26/08	AERIAL PHOTOGRAPH - SWMU 16 BOUNDARY AND BUILDING 146 SWMU 16 - CAST HIGH EXPLOSIVES FILL/B146 INCINERATOR NSWC CRANE CRANE, INDIANA	APPROVED BY — DATE —
REVISED BY —	DATE —		APPROVED BY — DATE —
SCALE AS NOTED			FIGURE NO. FIGURE 1-2 / REV 0

2.0 FIELD INVESTIGATION

This section presents sampling activities, procedures, and documentation utilized during the indoor air quality investigation at Building 146 (June 2008) at NSWC Crane SWMU 16.

2.1 OVERVIEW

Work performed during this field event was conducted in accordance with the procedures and methodologies described in the Indoor Air Quality Sampling and Analysis Plan for SWMU 16 – Building 146 (TtNUS, 2008). Copies of all field forms, records, field logbooks, and photographs associated with this field investigation are provided in Appendices A and B of this document.

2.2 MOBILIZATION/DEMOBILIZATION

Tetra Tech personnel began mobilization activities on June 25, 2008. Field team members reviewed the Sampling and Analysis Plan, associated appendices, and the Health and Safety Plan (HASP) prior to the start of project activities. In addition, the Field Operations Leader (FOL) held a field team orientation meeting prior to the field activities to ensure that personnel were familiar with the scope of the work. Field activities and demobilization from the site occurred over a two-day period (June 26/27, 2008).

2.3 SAMPLING ACTIVITIES

2.3.1 Air

A total of 10 air quality samples (including one field duplicate) were collected at strategic locations within and around Building 146 at SWMU 16 utilizing evacuated 6-liter SUMMA Canisters with filters. Figure 2-1 provides a drawing showing specific locations of the air sampling canisters. Table 2-1 provides a list of the samples collected along with associated sampling data and analyses. The objective of the air sampling was to identify potential sources of contamination, specifically those that may permeate from the groundwater, through the soil, and into the interior sections of the building. Nine samples were collected within Building 146 at eight locations. To ensure air samples were collected at a height that simulates the breathing zone, seven of the samplers were placed on 4-foot wooden stands. One sample and its associated duplicate, was placed directly on the concrete floor of the building near a large crack in the floor. Many chemicals in buildings may originate from sources other than groundwater; therefore, to properly discern potential sources of contamination, a single sample was collected outside of Building 146 approximately 50 feet west (upwind) of the building.

Household cleaning products (e.g., toilet cleaners, window cleaning products, and drain openers), degreasers, and lubricating solvents may contain ingredients that can bias the results of the air sampling by providing false positive detections. Therefore, all of these products were removed from Building 146 at least 48 hours prior to sampling and the building was vented with ambient air to remove the residual vapors from any cleaning products. Building 146 was then closed 24 hours prior to sampling. In an effort to assure that the sampling area did not allow public access over the duration of sampling, a note was posted on the main door of Building 146 restricting access, and all other doors remained locked.

Upon opening each air sampling canister, the initial vacuum ("Hg) and flow rate was logged on the sample log sheet (Appendix A). The sample canister at location 146ASIN05 had an initial low flow rate and was therefore removed from sampling and replaced with an alternate clean canister. Each canister was allowed to sample for approximately 8 hours (see Table 2-1). All sample canisters were observed approximately half way through sampling to determine each canister still had appropriate vacuum. Select photographs of the sample canisters at their respective sample locations are presented in Appendix B.

2.4 FIELD SAMPLE DOCUMENTATION

Sample documentation consisted of the completion of a sample log sheets, sample ID tags, chain-of-custody record, and field logbook. The sample log sheets contain information such as sample date, location, ID, initial and final vacuum, and initial and final flow rate. Any unusual circumstances encountered during sample collection were noted on the forms. Sample log sheets are included in Appendix A of this document. The chain-of-custody record (Appendix A) was used to track each sample from collection to receipt and analysis at the laboratory.

2.5 SAMPLE HANDLING, PACKAGING, AND SHIPPING

All samples were containerized within the sampling canister. The sample containers were then placed in a compartmented cardboard box. The chain-of-custody was placed within one of the sealed shipping boxes. A Federal Express airbill was applied to the shipping box. TtNUS maintained custody of the samples until they were relinquished to Federal Express. The Federal Express tracking number (airbill number) was recorded on the chain-of-custody form, and the sender's copy of the airbill was maintained for shipment tracking, if needed. All samples were shipped to the laboratory for overnight delivery.

2.6 QUALITY CONTROL SAMPLES

A quality assurance/quality control (QA/QC) sample was generated and collected during sampling activities to monitor both field and laboratory procedures. These procedures are detailed in the Sampling and Analysis Plan. The QA/QC sample was comprised of a single field duplicate.

2.7 SITE MANAGEMENT AND FACILITY SUPPORT

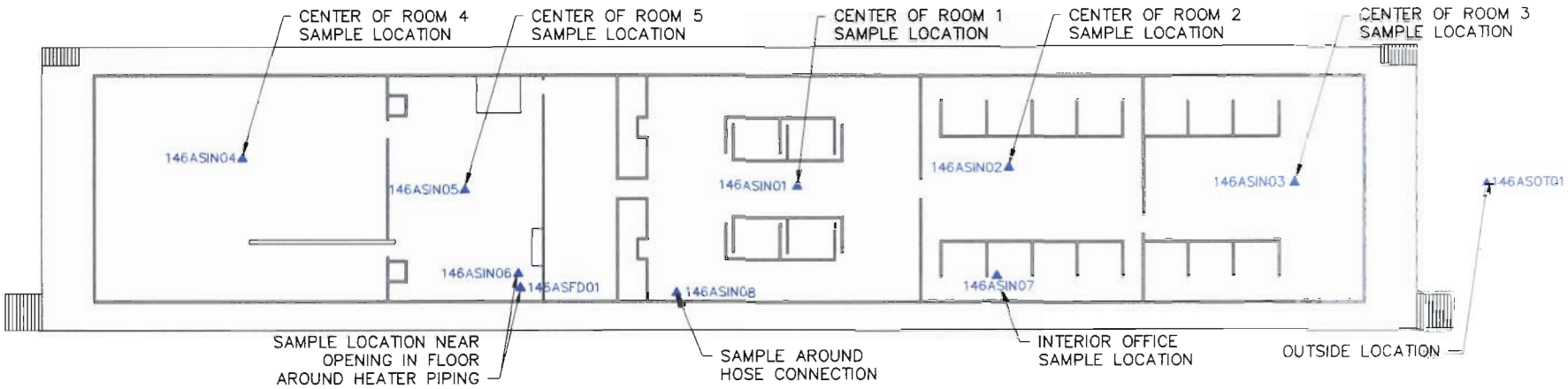
The FOL was designated as the lead in coordinating the activities during the investigation. The FOL was responsible for ensuring that field team members were familiar with the Sampling Plan and the associated HASP. Additionally, the FOL was responsible for all sampling operations, QA/QC, and field documentation requirements.

TABLE 2-1

SUMMARY OF JUNE 2008 INDOOR AIR QUALITY SAMPLING
SWMU 16 - FILED REPORT
NSWC CRANE
CRANE, INDIANA

Sample ID	Sample Date	Canister Vacuum ("Hg)		Canister Flow Rate (ml/min)		Sampling Time			Analyte
		Start	Stop	Start	Stop	Start	Stop	Elapsed	TO-15-VOCs
146ASIN01	6/27/2008	30	7	13.74	4.44	0720	1522	8:02	X
146ASIN02	6/27/2008	30	8	13.00	5.03	0728	1534	8:06	X
146ASIN03	6/27/2008	30	7.4	13.25	4.89	0726	1528	8:02	X
146ASIN04	6/27/2008	30	10	10.44	4.10	0707	1507	8:00	X
146ASIN05	6/27/2008	29	6.3	13.22	5.19	0735	1512	7:37	X
146ASIN06[1]	6/27/2008	30	6.5	12.96	3.37	0716	1516	8:00	X
146ASFD01	6/27/2008	30	8.5	12.88	5.32	0718	1515	7:57	X
146ASIN07	6/27/2008	29	7	12.75	5.19	0730	1536	8:06	X
146ASIN08	6/27/2008	30	6.7	13.25	5.27	0722	1520	7:58	X
146ASOT01	6/27/2008	30	11	12.47	NA	0700	1500	8:00	X

1 - Field duplicate location
"Hg - Inches of mercury
ml/min - milliliters per minute
NA - Unable to detect final flow rate
VOCs - Volatile organic compounds
X - Indicates Parameters were analyzed for this sample



BUILDING 146

TETRA TECH
www.tetratech.com

LOCATIONS OF INDOOR AND OUTDOOR AIR SAMPLING AT SWMU 16, BUILDING 146

SCALE: 1" = 30'
DATE: 9/25/2008

FIGURE 2-1

F:\1573\1573F01.dwg PIT BEN.HOPPE 9/25/2008

3.0 DATA PRESENTATION

This section presents the analytical results of canister sampling activities conducted during the indoor air quality investigation at Building 146 (June 2008) at NSWC Crane SWMU 16. The detected air concentrations are compared to

3.1 SAMPLE ANALYSIS AND VALIDATION

All samples were analyzed in accordance with Modified EPA Method TO-15 – Volatile organic compounds by gas chromatograph (GC)/mass spectrometry (MS) in full scan mode. The method involves concentrating up to 0.2 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes through the GC/MS for analysis.

All laboratory results contained in sample data groups (SDGs) were validated with regard to the following parameters:

- Data Completeness
- Hold Times
- GC/MS Tuning
- Initial and continuing calibration
- Blank results
- Surrogate spike recoveries
- Blank Spike/Blank Spike Duplicate Results
- Detection Limits
- Field Duplicate Results
- Compound Quantification
- Compound Identification

All quality control criteria for these parameters were met. As a result, there were no problems that affected data quality.

3.2 SAMPLING RESULTS

Table 3-1 presents the analytical results for indoor air sampling at SWMU 16, Building 146. As indicated in Table 3-1, TCE was the only parameter detected. TCE was detected at five sampling locations in Rooms 1 (146ASIN01 and 146ASIN08), 4 (146ASIN04), and 5 (146ASIN05, 146ASIN06, and 146SFD01). It is important to note that Sample 146SFD01 is a field duplicate sample. Also shown in Table 3-1 are the IDEM 25-year Commercial Action Levels. The TCE concentrations for samples 146ASIN04 (2.1 ppbv) in Room 4 and 146ASIN05 (1.9 ppbv) in Room 5 were the only detected TCE concentrations that exceed the IDEM 25-year Commercial Chronic Action Level (1.5 ppbv).

TABLE 3-1

INDOOR AIR QUALITY SAMPLING RESULTS
SWMU 16 - BUILDING 146
NSWC CRANE
CRANE, INDIANA

Location Identification Number	Validated Results (ppbv)	Validation Qualifier	IDEM 25-Year Commercial Chronic Action Level[1] (ppbv)
1,1-Dichloroethane (CAS: 75-34-3)			
146ASIN01	0.86	U	180
146ASIN02	0.88	U	180
146ASIN03	0.88	U	180
146ASIN04	0.92	U	180
146ASIN05	0.92	U	180
146ASIN06	0.8	U	180
146ASIN06[2]	0.85	U	180
146ASIN07	0.9	U	180
146ASIN08	0.9	U	180
146ASOT01	1	U	180
1,1-Dichloroethene (CAS: 75-35-4)			
146ASIN01	0.86	U	73
146ASIN02	0.88	U	73
146ASIN03	0.88	U	73
146ASIN04	0.92	U	73
146ASIN05	0.92	U	73
146ASIN06	0.8	U	73
146ASIN06[2]	0.85	U	73
146ASIN07	0.9	U	73
146ASIN08	0.9	U	73
146ASOT01	1	U	73
Chloroethane (CAS: 75-00-3)			
146ASIN01	0.86	U	19
146ASIN02	0.88	U	19
146ASIN03	0.88	U	19
146ASIN04	0.92	U	19
146ASIN05	0.92	U	19
146ASIN06	0.8	U	19
146ASIN06[2]	0.85	U	19
146ASIN07	0.9	U	19
146ASIN08	0.9	U	19
146ASOT01	1	U	19
cis-1,2-Dichloroethene (CAS: 156-59-2)			
146ASIN01	0.86	U	13
146ASIN02	0.88	U	13
146ASIN03	0.88	U	13
146ASIN04	0.92	U	13
146ASIN05	0.92	U	13
146ASIN06	0.8	U	13
146ASIN06[2]	0.85	U	13
146ASIN07	0.9	U	13
146ASIN08	0.9	U	13
146ASOT01	1	U	13

TABLE 3-1

INDOOR AIR QUALITY SAMPLING RESULTS
SWMU 16 - BUILDING 146
NSWC CRANE
CRANE, INDIANA

Location Identification Number	Validated Results (ppbv)	Validation Qualifier	IDEM 25-Year Commercial Chronic Action Level[1] (ppbv)
Trichloroethene (CAS: 79-01-6)			
146ASIN01	0.94		1.5
146ASIN02	0.88	U	1.5
146ASIN03	0.88	U	1.5
146ASIN04	2.1		1.5
146ASIN05	1.9		1.5
146ASIN06[2]	1.35		1.5
146ASIN06	1.4		1.5
146ASIN07	0.9	U	1.5
146ASIN08	0.83	J	1.5
146ASOT01	1	U	1.5
Vinyl Chloride (CAS: 75-01-4)			
146ASIN01	0.86	U	3.5
146ASIN02	0.88	U	3.5
146ASIN03	0.88	U	3.5
146ASIN04	0.92	U	3.5
146ASIN05	0.92	U	3.5
146ASIN06	0.8	U	3.5
146ASIN06[2]	0.85	U	3.5
146ASIN07	0.9	U	3.5
146ASIN08	0.9	U	3.5
146ASOT01	1	U	3.5

Result Exceeds IDEM Action Level

1 - (IDEM, 2006) IDEM Draft Vapor Intrusion Pilot Plant Guidance Appendix VIII, Table 3 (IA Action Levels - Commercial) - 25 year Sub-chronic Action Levels.

2 - Average for original and duplicate sample results.

CASRN - Chemical Abstracts Service Registry Number
IDEM - Indiana Department of Environmental Management
ppbv - per billion by volume
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific detection limit) noted.
J - Indicates that the chemical was detected; however, the associated numerical result is not a precise representation of the concentration that is actually in the sample. The laboratory concentration is considered to be an estimated of the true concentration.

REFERENCES

Department of the Army, 1980. Water Quality Engineering Special Study No. 81-24-8806-80 and Water Quality Biological Study No. 81-24-8807-80, Crane Army Ammunition Activity, Crane Indiana, 4-14 June 1979. U.S. Army Environmental Hygiene Agency, Aberdeen Proving Grounds, Maryland.

Halliburton NUS, 1992a. RFI Phase I, Environmental Monitoring Report, SWMUs 15/06, 14/10, 16/16, NorthDiv, CTO 15, November.

Halliburton NUS, 1992b. RFI Phase II Release Assessment Work Plan for Solid Waste Management Unit #15/06, #14/00, and #16/16, NSWC Crane, Crane, Indiana, NorthDiv, CTO 0078, December.

Halliburton NUS, 1993. RCRA Facility Investigation Phase II Release Assessment Draft Work Plan for Solid Waste Management Units #15/06 #14/00, and #16/16, Naval Surface Warfare Center, Crane Division, Crane, Indiana, May.

Tetra Tech NUS, Inc.(TtNUS), 2008. Indoor Air Quality Sampling and Analysis Plan for SWMU 16 – Building 146, Naval Surface Warfare Center Crane, Crane, Indiana, June.

APPENDIX A

FIELD DOCUMENTATION

0806619

TETRA TECH NUS, INC. CHAIN OF CUSTODY | NUMBER 0193 | PAGE 1 OF 1

0505

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
112G01573	NSWC Crane	Bodinski	412-921-8308	Air Toxics, Ltd.
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
[signature]		Lucas	412-921-8882	180-B Blue Ravine Rd
		CARRIER/WAYBILL NUMBER		CITY, STATE
		Fed Ex / 8616 5831 5842		Folsom, CA 95630

CONTAINER TYPE PLASTIC (P) or GLASS (G): Summa Canister

PRESERVATIVE USED: None

STANDARD TAT ☒
RUSH TAT ☐ ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

	DATE YEAR 2008	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.) Air Sample	COLLECTION METHOD GRAB (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS: Method TO-15		Bellows Vacuum 28.7 in Hg				COMMENTS
01A	6/27	0720	146ASIN01	IN01			AS		1	1		0.5" Hg				
02A		0728	146ASIN02	IN02					1	1		1.0" Hg				
03A		0726	146ASIN03	IN03					1	1		1.0" Hg				
04A		0707	146ASIN04	IN04					1	1		1.0" Hg				
05A		0735	146ASIN05	IN05					1	1		1.0" Hg				
06A		0716	146ASIN06	IN06					1	1		1.0" Hg				Floor
07A		0730	146ASIN07	IN07					1	1		1.5" Hg				
08A		0722	146ASIN08	IN08					1	1		1.5" Hg				
09A		0700	146ASOT01	OT01					1	1		10.5" Hg				outdoor
10A	✓	0000	146ASED01	—			QC		1	1		1.5" Hg				Field Dup.

1. RELINQUISHED BY [signature]	DATE 6-27-08	TIME 1700	1. RECEIVED BY Monica Gregson ATL	DATE 6/30/08	TIME 910
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME

COMMENTS

CUSTODY SEAL INTACT? Y N (NONE) TEMP MA

Fed Ex

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/~~26~~/08 ~~20~~ 27

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 34263
SAMPLE ID: 146ASOT01
OPERATOR: Goeyat / Lusco
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)		
	AMBIENT	MAXIMUM	MINIMUM
START	68		
STOP	75		

VACUUM ("Hg)
CANISTER VACUUM
30
11

	SAMPLING TIMES (MINUTES)	
	LOCAL TIME	ELAPSED TIME METER READING
START	0700	
STOP	1500	

FLOW RATES (ML/MINUTE)
CANISTER FLOW RATE
12.47
NA

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:
Located approximately 40' South of Bldg 146. Moderate rain falling about 5 minutes went through at approx. 1130. Light rain began at 1415-1455.
11:07 17.5 ("Hg)

Photos 1000, 1001 (16)

FIELD TECHNICIAN SIGNATURE

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/~~28~~ 27/08

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 33558
SAMPLE ID: 146 ASIN 08
OPERATOR: Goerdt/Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)		
	AMBIENT	MAXIMUM	MINIMUM
START	68		
STOP	75		

	VACUUM (°Hg)
	CANISTER VACUUM
START	30
STOP	6.7

	SAMPLING TIMES (MINUTES)	
	LOCAL TIME	ELAPSED TIME METER READING
START	0722	
STOP	1520	

	FLOW RATES (ML/MINUTE)
	CANISTER FLOW RATE
START	13.25
STOP	5.27

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:

1116 16.9 "Hg

Photos 991, 992 (JG)

FIELD TECHNICIAN SIGNATURE

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/26/08 27

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 11870
SAMPLE ID: 146 ASIN07
OPERATOR: Gorzy / Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)		
	AMBIENT	MAXIMUM	MINIMUM
START	68		
STOP	75		

VACUUM ("Hg)
CANISTER VACUUM
~~30~~ 29
7.0

	SAMPLING TIMES (MINUTES)	
	LOCAL TIME	ELAPSED TIME METER READING
START	0730	
STOP	1536	

FLOW RATES (ML/MINUTE)
CANISTER FLOW RATE
12.75
5.19

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE:

COMMENTS:

11:12 16.8 "Hg

Phobos 998, 999 (JG)

FIELD TECHNICIAN SIGNATURE

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/~~28~~ 27/08

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 34196
SAMPLE ID: 146ASFD01
OPERATOR: Gorski / Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)		
	AMBIENT	MAXIMUM	MINIMUM
START	68		
STOP	75		

VACUUM ("Hg)
CANISTER VACUUM
30
8.5

	SAMPLING TIMES (MINUTES)	
	LOCAL TIME	ELAPSED TIME METER READING
START	0718	~~12.88~~
STOP	1515	

FLOW RATES (ML/MINUTE)
CANISTER FLOW RATE
12.88
5.32

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:

Location 146ASINO6

1115 17.5 "Hg

Photos 984, 985, 987 (JG)

FIELD TECHNICIAN SIGNATURE

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/~~28~~ 27/08

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 34433
SAMPLE ID: 146 ASIN06
OPERATOR: Gerdt/Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)		
	AMBIENT	MAXIMUM	MINIMUM
START	68		
STOP	75		

VACUUM ("Hg)
CANISTER VACUUM
30 ~~12.96~~
6.5

	SAMPLING TIMES (MINUTES)	
	LOCAL TIME	ELAPSED TIME METER READING
START	0716	
STOP	1516	

FLOW RATES (ML/MINUTE)
CANISTER FLOW RATE
~~30~~ 12.96
3.37

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:

FD location

1115 15.8" Hg

Photos 984, 985, 986 (JG)

FIELD TECHNICIAN SIGNATURE

A17

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/~~26~~27/08

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 33992
SAMPLE ID: 146ASIN05
OPERATOR: Goerdt/Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)		
	AMBIENT	MAXIMUM	MINIMUM
START	68		
STOP	75		

VACUUM ("Hg)
CANISTER VACUUM
29
6.3

	SAMPLING TIMES (MINUTES)	
	LOCAL TIME	ELAPSED TIME METER READING
START	0735	
STOP	1512	

FLOW RATES (ML/MINUTE)
CANISTER FLOW RATE
13.22
~~6.3~~ gps 5.19

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:
This alternate canister was used to replace the original 05 canister due to low initial flow rate
1115 16.5 "Hg

Photos 981, 982, 983 (JG)

FIELD TECHNICIAN SIGNATURE

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/~~28~~/08 27

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 3729
SAMPLE ID: 146ASINO4
OPERATOR: Goerdt/Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)			VACUUM ("Hg)
	AMBIENT	MAXIMUM	MINIMUM	CANISTER VACUUM
START	68			30
STOP	75			10

	SAMPLING TIMES (MINUTES)		FLOW RATES (ML/MINUTE)
	LOCAL TIME	ELAPSED TIME METER READING	CANISTER FLOW RATE
START	0707		10.44
STOP	1507		4.1

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:

Northern most sample.

11:14 18.5 "Hg

Photos 978, 979, 980 (JG)

FIELD TECHNICIAN SIGNATURE

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: ~~6/26/08~~ 27

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 34183
SAMPLE ID: 146ASIN03
OPERATOR: Gerald/Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)			VACUUM ("Hg)
	AMBIENT	MAXIMUM	MINIMUM	CANISTER VACUUM
START	68			30
STOP	75			7.4

	SAMPLING TIMES (MINUTES)		FLOW RATES (ML/MINUTE)
	LOCAL TIME	ELAPSED TIME METER READING	CANISTER FLOW RATE
START	0726		13.25
STOP	1528		4.89

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:
Southernmost inside sample

11:10 17.3 "Hg

Photos 993, 994, 995 (JG)

FIELD TECHNICIAN SIGNATURE

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/26/08
27

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 33775
SAMPLE ID: 146ASIX02
OPERATOR: Goerdt/Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)		
	AMBIENT	MAXIMUM	MINIMUM
START	68		
STOP	75		

VACUUM ("Hg)
CANISTER VACUUM
30
8.0

	SAMPLING TIMES (MINUTES)	
	LOCAL TIME	ELAPSED TIME METER READING
START	0728	
STOP	1534	

FLOW RATES (ML/MINUTE)
CANISTER FLOW RATE
13.09
5.09

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:

1111 17.6 "Hg

Photos 996, 997 (JG)

FIELD TECHNICIAN SIGNATURE

NSWC CRANE SWMU 16 INDOOR AIR QUALITY SAMPLING TASK

METHOD TO-15 CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: SWMU 16 (Building 146)
SITE ADDRESS: NSWC Crane
Crane, Indiana
SAMPLING DATE: 6/26/08 27

SHIPPING DATE: 6-27-08
CANISTER SERIAL NO.: 02327
SAMPLE ID: 146ASIN01
OPERATOR: Goerdt/Lucas
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

	TEMPERATURE (°F)		
	AMBIENT	MAXIMUM	MINIMUM
START	68		
STOP	75		

VACUUM (°Hg)
CANISTER VACUUM
30
7.0

	SAMPLING TIMES (MINUTES)	
	LOCAL TIME	ELAPSED TIME METER READING
START	0720	
STOP	1522	

FLOW RATES (ML/MINUTE)
CANISTER FLOW RATE
13.74
4.44

SAMPLING SYSTEM CERTIFICATION DATE: 6-23-08

QUARTERLY RECERTIFICATION DATE: NA

COMMENTS:

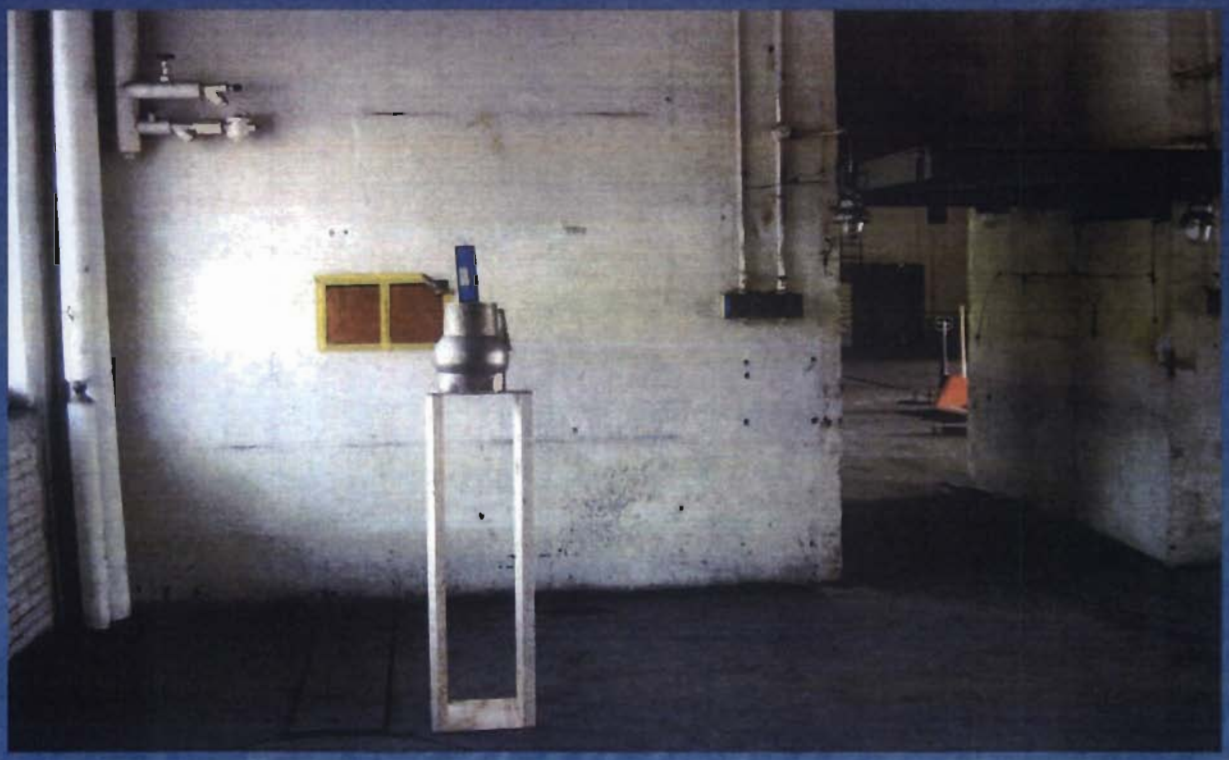
1116 15.9 "Hg

Photos 988, 989, 990

FIELD TECHNICIAN SIGNATURE

APPENDIX B

PHOTOGRAPHS



Air sample location 146ASIN08

Air sample location 146ASOT01

SWMU 16 – Building 146

Air sample location 146ASIN05

Air sample location 146ASIN06 and

146ASFD01 (duplicate)

Air sample location 146ASIN01

APPENDIX C
ANALYTICAL RESULTS

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Air Toxics Ltd. Introduces the Electronic Report

Thank you for choosing Air Toxics Ltd. To better serve our customers, we are providing your report by e-mail. This document is provided in Portable Document Format which can be viewed with Acrobat Reader by Adobe.

This electronic report includes the following:

- Work order Summary;
- Laboratory Narrative;
- Results; and
- Chain of Custody (copy).

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630

(916) 985-1000 .FAX (916) 985-1020
Hours 8:00 A.M to 6:00 P.M. Pacific

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0806619

Work Order Summary

CLIENT:	Mr. Joe Lucas Tetra Tech EC, Inc. Foster Plaza 7 661 Anderson Drive Pittsburgh, PA 15220-2745	**BILL TO:**	Accounts Payable/Pittsburg Tetra Tech EC, Inc. Foster Plaza 7 661 Anderson Drive Pittsburgh, PA 15220-2745
PHONE:	412-921-8882	**P.O. #**	
FAX:	412-921-5888 412-921-4040	**PROJECT #**	112G01573 NSWC Crane
DATE RECEIVED:	06/30/2008	**CONTACT:**	Bryanna Langley
DATE COMPLETED:	07/14/2008		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	146ASIN01	Modified TO-15	6.5 "Hg	5 psi
02A	146ASIN02	Modified TO-15	7.0 "Hg	5 psi
03A	146ASIN03	Modified TO-15	7.0 "Hg	5 psi
04A	146ASIN04	Modified TO-15	8.0 "Hg	5 psi
04AA	146ASIN04 Lab Duplicate	Modified TO-15	8.0 "Hg	5 psi
05A	146ASIN05	Modified TO-15	8.0 "Hg	5 psi
06A	146ASIN06	Modified TO-15	5.0 "Hg	5 psi
07A	146ASIN07	Modified TO-15	7.5 "Hg	5 psi
08A	146ASIN08	Modified TO-15	7.5 "Hg	5 psi
09A	146ASOT01	Modified TO-15	10.5 "Hg	5 psi
10A	146ASFD01	Modified TO-15	7.5 "Hg	5 psi
11A	Lab Blank	Modified TO-15	NA	NA
11B	Lab Blank	Modified TO-15	NA	NA
12A	CCV	Modified TO-15	NA	NA
12B	CCV	Modified TO-15	NA	NA
13A	LCS	Modified TO-15	NA	NA
13B	LCS	Modified TO-15	NA	NA

CERTIFIED BY: Linda L. Freeman DATE: 07/14/08

Laboratory Director

Certfication numbers: CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004
NY NELAP - 11291, UT NELAP - 9166389892, AZ Licensure AZ0719
Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,
Accreditation number: E87680, Effective date: 07/01/07, Expiration date: 06/30/08
Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

LABORATORY NARRATIVE
Modified TO-15
Tetra Tech
Workorder# 0806619

Ten 6 Liter Summa Canister (100% Certified) samples were received on June 30, 2008. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 0.2 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	*TO-15*	*ATL Modifications*
Daily CCV	</= 30% Difference	</= 30% Difference; Compounds exceeding this criterion and associated data are flagged and narrated.
Sample collection media	Summa canister	ATL recommends use of summa canisters to insure data defensibility, but will report results from Tedlar bags at client request
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

As per project specific client request the laboratory has reported estimated values for target compound hits that are below the Reporting Limit but greater than the Method Detection Limit. Concentrations that are below the level at which the canister was certified (0.2 ppbv for compounds reported at 0.5 ppbv and 0.8 ppbv for compounds reported at 2.0 ppbv) may be false positives.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction no performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 146ASIN01

Lab ID#: 0806619-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Trichloroethene	0.86	0.94	4.6	5.0

Client Sample ID: 146ASIN02

Lab ID#: 0806619-02A

No Detections Were Found.

Client Sample ID: 146ASIN03

Lab ID#: 0806619-03A

No Detections Were Found.

Client Sample ID: 146ASIN04

Lab ID#: 0806619-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Trichloroethene	0.92	2.1	4.9	11

Client Sample ID: 146ASIN04 Lab Duplicate

Lab ID#: 0806619-04AA

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Trichloroethene	0.92	2.1	4.9	11

Client Sample ID: 146ASIN05

Lab ID#: 0806619-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Trichloroethene	0.92	1.9	4.9	10

Client Sample ID: 146ASIN06

Lab ID#: 0806619-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: 146ASIN06

Lab ID#: 0806619-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Trichloroethene	0.80	1.4	4.3	7.6

Client Sample ID: 146ASIN07

Lab ID#: 0806619-07A

No Detections Were Found.

Client Sample ID: 146ASIN08

Lab ID#: 0806619-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Trichloroethene	0.90	0.63 J	4.8	4.5 J

Client Sample ID: 146ASOT01

Lab ID#: 0806619-09A

No Detections Were Found.

Client Sample ID: 146ASFD01

Lab ID#: 0806619-10A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Trichloroethene	0.90	1.3	4.8	7.0

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN01

Lab ID#: 0806619-01A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

Filename:	1021140	Date of Collection:	8/27/08
Dil. Factor:	1.74	Date of Analysis:	10/10/08 02:03 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.86	Not Detected	2.2	Not Detected
Chloroethane	0.86	Not Detected	2.2	Not Detected
1,1-Dichloroethene	0.86	Not Detected	3.4	Not Detected
1,1-Dichloroethane	0.86	Not Detected	3.5	Not Detected
cis-1,2-Dichloroethene	0.86	Not Detected	3.4	Not Detected
Trichloroethene	0.86	0.94	4.6	5.0

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	95	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN02

Lab ID#: 0806619-02A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	7071111	Date of Collection:	6/27/08
Dil Factor:	1.75	Date of Analysis:	7/11/08 05:51 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.88	Not Detected	2.2	Not Detected
Chloroethane	0.88	Not Detected	2.3	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.88	Not Detected	3.5	Not Detected
cis-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Trichloroethene	0.88	Not Detected	4.7	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	104	70-130
4-Bromofluorobenzene	96	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN03

Lab ID#: 0806619-03A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	7071112	Date of Collection:	6/27/08
Dil. Factor:	14.4/96	Date of Analysis:	7/11/08 04:18 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.88	Not Detected	2.2	Not Detected
Chloroethane	0.88	Not Detected	2.3	Not Detected
1,1-Dichloroethene	0.88	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.88	Not Detected	3.5	Not Detected
cis-1,2-Dichloroethene	0.88	Not Detected	3.5	Not Detected
Trichloroethene	0.88	Not Detected	4.7	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	97	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN04

Lab ID#: 0806619-04A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	7074114	Date of Collection:	6/27/08
Dil. Factor:	1.85	Date of Analysis:	7/11/08 05:25 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.92	Not Detected	2.3	Not Detected
Chloroethane	0.92	Not Detected	2.4	Not Detected
1,1-Dichloroethene	0.92	Not Detected	3.6	Not Detected
1,1-Dichloroethane	0.92	Not Detected	3.7	Not Detected
cis-1,2-Dichloroethene	0.92	Not Detected	3.6	Not Detected
Trichloroethene	0.92	2.1	4.9	11

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	98	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN04 Lab Duplicate

Lab ID#: 0806619-04AA

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	70711115	Date of Collection:	6/27/08
Dil. Factor:	1.83	Date of Analysis:	7/11/08 06:13 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.92	Not Detected	2.3	Not Detected
Chloroethane	0.92	Not Detected	2.4	Not Detected
1,1-Dichloroethene	0.92	Not Detected	3.6	Not Detected
1,1-Dichloroethane	0.92	Not Detected	3.7	Not Detected
cis-1,2-Dichloroethene	0.92	Not Detected	3.6	Not Detected
Trichloroethene	0.92	2.1	4.9	11

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	98	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN05

Lab ID#: 0806619-05A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	7071113	Date of Collection:	6/27/08
Dil. Factor:	1.85	Date of Analysis:	7/11/08 04:47 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.92	Not Detected	2.3	Not Detected
Chloroethane	0.92	Not Detected	2.4	Not Detected
1,1-Dichloroethene	0.92	Not Detected	3.6	Not Detected
1,1-Dichloroethane	0.92	Not Detected	3.7	Not Detected
cis-1,2-Dichloroethene	0.92	Not Detected	3.6	Not Detected
Trichloroethene	0.92	1.9	4.9	10

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	108	70-130
4-Bromofluorobenzene	98	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN06

Lab ID#: 0806619-06A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	0071106	Date of Collection:	6/27/06
Dil. Factor:	1.61	Date of Analysis:	7/11/06 11:53 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.80	Not Detected	2.0	Not Detected
Chloroethane	0.80	Not Detected	2.1	Not Detected
1,1-Dichloroethene	0.80	Not Detected	3.2	Not Detected
1,1-Dichloroethane	0.80	Not Detected	3.2	Not Detected
cis-1,2-Dichloroethene	0.80	Not Detected	3.2	Not Detected
Trichloroethene	0.80	1.4	4.3	7.6

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	90	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN07

Lab ID#: 0806619-07A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 0071107 Date of Collection: 6/27/08
Dil. Factor: 1.9 Date of Analysis: 7/11/08 12:32 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.90	Not Detected	2.3	Not Detected
Chloroethane	0.90	Not Detected	2.4	Not Detected
1,1-Dichloroethene	0.90	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.90	Not Detected	3.6	Not Detected
cis-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
Trichloroethene	0.90	Not Detected	4.8	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	89	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASIN08

Lab ID#: 0806619-08A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name: 1071108 Date of Collection: 6/27/08
Dil. Factor: 1.79 Date of Analysis: 7/11/08 01:33 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.90	Not Detected	2.3	Not Detected
Chloroethane	0.90	Not Detected	2.4	Not Detected
1,1-Dichloroethene	0.90	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.90	Not Detected	3.6	Not Detected
cis-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
Trichloroethene	0.90	0.83 J	4.8	4.5 J

J = Estimated value.

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	93	70-130
4-Bromofluorobenzene	91	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASOT01

Lab ID#: 0806619-09A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	407 1109	Date of Collection:	6/27/08
Dil Factor:	2.06	Date of Analysis:	7/11/08 02:06 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	1.0	Not Detected	2.6	Not Detected
Chloroethane	1.0	Not Detected	2.7	Not Detected
1,1-Dichloroethene	1.0	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.0	Not Detected	4.2	Not Detected
cis-1,2-Dichloroethene	1.0	Not Detected	4.1	Not Detected
Trichloroethene	1.0	Not Detected	5.5	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	90	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: 146ASFD01

Lab ID#: 0806619-10A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	0711L10	Date of Collection:	6/27/08
Dil. Factor:	4.79	Date of Analysis:	7/11/08 02:43 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.90	Not Detected	2.3	Not Detected
Chloroethane	0.90	Not Detected	2.4	Not Detected
1,1-Dichloroethene	0.90	Not Detected	3.5	Not Detected
1,1-Dichloroethane	0.90	Not Detected	3.6	Not Detected
cis-1,2-Dichloroethene	0.90	Not Detected	3.5	Not Detected
Trichloroethene	0.90	1.3	4.8	7.0

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	95	70-130
4-Bromofluorobenzene	91	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0806619-11A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	t071105	Date of Collection: NA	
Dil. Factor:	1.00	Date of Analysis: 7/11/08 10:57 AM	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	93	70-130
1,2-Dichloroethane-d4	85	70-130
4-Bromofluorobenzene	87	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: Lab Blank

Lab ID#: 0806619-11B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	7071104a	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 7/11/08 10:10 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (uG/m3)	Amount (uG/m3)
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
Chloroethane	0.50	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	98	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: CCV

Lab ID#: 0806619-12A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	0711102	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	7/1/08 09:33 AM

Compound	%Recovery
Vinyl Chloride	100
Chloroethane	101
1,1-Dichloroethene	101
1,1-Dichloroethane	101
cis-1,2-Dichloroethene	101
Trichloroethene	101

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	92	70-130

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: CCV

Lab ID#: 0806619-12B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	TD71102	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	7/11/08 08:18 AM

Compound	%Recovery
Vinyl Chloride	102
Chloroethane	100
1,1-Dichloroethene	101
1,1-Dichloroethane	101
cis-1,2-Dichloroethene	101
Trichloroethene	103

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	101	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0806619-13A

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	10711103	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	7/11/08 09:31 AM

Compound	%Recovery
Vinyl Chloride	100
Chloroethane	98
1,1-Dichloroethene	113
1,1-Dichloroethane	108
cis-1,2-Dichloroethene	104
Trichloroethene	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	90	70-130
4-Bromofluorobenzene	94	70-130

Air Toxics LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

Client Sample ID: LCS

Lab ID#: 0806619-13B

MODIFIED EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	7071103	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	7/11/08 09:21 AM

Compound	%Recovery
Vinyl Chloride	99
Chloroethane	99
1,1-Dichloroethene	112
1,1-Dichloroethane	109
cis-1,2-Dichloroethene	106
Trichloroethene	102

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	100	70-130