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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

DATE: MAR 0 4 2009

SUBJECT: VIP Cleaners Site Final Report

FROM: Diane Salkie
DESA/HWSB

TO: Andrew Confortini, On-Scene Coordinator
ERRD/Removal Action Branch

Attached please find the December 2008, vapor intrusion sampling report for the VIP Cleaners site in Morristown, Morris County, New Jersey. If you have any questions, please contact me at (732) 321-4423.

Attachment

Please make 2 copies.
Andy C
3/9/09 ED

REGION II FORM 1320-1 (9/85)

SUPERFUND SUPPORT TEAM

SAMPLING REPORT

for the

VAPOR INTRUSION INVESTIGATION

at the

VIP CLEANERS SITE

in MORRISTOWN, MORRIS COUNTY, NEW JERSEY

Participating Personnel:	United States Environmental Protection Agency Diane Salkie, Environmental Scientist Joseph Hudek, Superfund Support Team Leader Pat Sheridan, Project Quality Assurance Officer
Report Prepared by:	Diane Salkie, Environmental Scientist
Date Prepared:	February 12, 2009
Approved for the Director by :	Robert Runyon, Chief, Hazardous Waste Support Branch

TABLE OF CONTENTS

1.0 BACKGROUND....1

2.0 SAMPLING PROCEDURES....2

3.0 DESCRIPTION OF EVENTS....2

4.0 RESULTS....3

5.0 CONCLUSION....4

TABLES

TABLE 1: Air Sample Results....5

TABLE 2: PCE and TCE Result Comparison....6

APPENDICES

APPENDIX A:	Site Map
APPENDIX B:	Quality Assurance Project Plan
APPENDIX C:	Air Data Package
APPENDIX D:	VIP Cleaners Trip Report, December 10, 2008
APPENDIX E:	Sample location drawings
APPENDIX F:	U.S. EPA Region III. *Risk-Based Concentration Table*. Mid-Atlantic Risk Assessment. Updated September 12, 2008

1.0 BACKGROUND

The VIP Cleaners site (site) is located at 89 Morris Street in Morristown, New Jersey. The site consists of a dry-cleaning facility and a plume of contaminated ground water. The facility was utilized for dry cleaning services by Caroline Laundry from the early 1940s until 1970, by VIP Cleaners from 1989 until 1996, by Milano French Cleaners from 1996 until 2000 and by New Image Cleaners and Tailoring from 2000 until the present. The former and current operators have used and continue to use chlorinated solvents, including tetrachloroethene (PCE) for dry cleaning operations at the facility. A map of the site location can be found as Appendix A.

The entire on-site building was occupied by the original owner, Caroline Laundry, whom performed common laundering as well as dry cleaning operations. Once they ceased operations, the building was divided for lease in 1970 to the aforementioned dry cleaners, a camera store, a lawnmower repair shop, auto repair shops, a computer store, hair salons, an auto detailing shop, a florist/garden center, a taxi and limousine service, an insurance sales office, a fish market, fitness facilities and a photography studio. The dry cleaning operations since 1989 have occupied the northern portion of the building only.

In February 1992, the property owner removed a 7000 gallon underground storage tank (UST) and its contents which was #6 heating oil. The tank had been located along the western side of the on-site building. The presence of a petroleum sheen on the ground water was found during the UST excavation. This prompted the New Jersey Department of Environmental Protection (NJDEP) to require the owner to install and sample a monitoring well at the location of the former UST. In September 1992, the property owner installed monitoring well, MW-1 adjacent to the former UST location.

Ground water samples were collected from MW-1 by the property owner in September 1992 and by NJDEP in June 1994. Both samples indicated the presence of PCE and some of its breakdown products, trichloroethene (TCE) and 1,2-dichloroethylene (DCE) at concentrations ranging from 58 to 300 μg/L. The depth to ground water in MW-1 was measured at 4 feet below ground surface in 1994 and the screen is located at 12 to 22 feet below ground surface.

There appears to be no further investigative work at the site between 1994 and 2005. In 2005, the U.S. Environmental Protection Agency (EPA)'s Region II Pre-Remedial Program requested a status update from NJDEP. EPA obtained permission from NJDEP to undertake an Expanded Site Inspection at the site. In November and December of 2005, EPA's Site Assessment Team (SAT) contractor employed a direct-push drilling method to collect soil and ground water samples at and in the vicinity of the site. This investigation revealed that contamination exists in the immediate vicinity of the on-site building and has migrated beneath at least one nearby property. The highest concentration of PCE was 18,000 μg/kg in the soil and 19,000 μg/L in the ground water. In addition,

the SAT contractor collected soil gas samples from the vicinity of the on-site building and beyond the site borders. Two of the eleven soil gas samples collected revealed PCE at 37.2 and 23.4 $\mu g/m^3$. The two soil gas samples were located in close proximity to the north end of the on-site building.

Based upon the unknown extent of the plume, the shallow depth to groundwater, the concentrations of chemicals in the groundwater and soil gas, and the location of businesses and residences in the vicinity of the site, the EPA performed a vapor intrusion investigation. Based on the results, a sub-slab ventilation system was installed in the main building to remediate the tetrachloroethene (PCE) contamination in the sub-slab and indoor air. The Division of Environmental Science and Assessment (DESA), Hazardous Waste Support Branch (HWSB), Superfund Support Team (SST) was requested by the Environmental Remedial and Response Division (ERRD) in 2007 to collect sub-slab and indoor air collection from the main, on-site building with the system in place and functioning. The sampling event concluded that the system is functioning properly. Due to construction in the north portion of the builidng which houses the dry cleaner, samples were not collected. This sampling event will fill in this data gap.

2.0 SAMPLING PROCEDURES

The sampling procedures were in accordance with the guidelines set forth in the Quality Assurance Project Plan (QAPP) which is located in Appendix B.

3.0 DESCRIPTION OF EVENTS

A sampling team consisting of two (2) members from the U.S. EPA, DESA, HWSB, SST began on December 04, 2008. Since the 2007 sampling event, the north portion of the building has been reconstructed. The dry cleaner is still present in a small portion of the north side of the building including the north side of the former empty office. The dry cleaner does not perform any dry cleaning operations in house, they accept and distribute clothing only. There are still bags used in the dry cleaning process present, so indoor air was not collected from this location. The area extending from the north end of the building to Edible Arrangements is now one unit that is still being constructed for future rental. There are only two sub-slab ports remaining in this area, the former south side of the empty office, EO2 and the west side of 89 Morris or 89Morris-1.

Over the twenty four hour period from December 04 - 05, 2008, sub-slab samples were collected into six liter SUMMA™ canisters from these two ports. Two indoor air samples were also collected from the indoor air space near the ports. One ambient air sample was collected from the west side of 89 Morris Avenue. One duplicate indoor air sample was collected from the air space near port, 89Morris-1 by placing two canisters in close proximity and opening them simultaneously. A sketch of the sample locations can be found in Appendix E. The sample collection information can be found in the Trip Report in Appendix D.

On December 05, 2008, the canister samples were closed, the final pressures were recorded and the canisters were sent to Atmospheric Analysis and Consulting Inc. (AAC) laboratory for volatile organic compound (VOC) analysis. The trip report with shipment information can be found as Appendix D. The pressure is recorded before and after the sample collection and ideally should begin at -30 inches of mercury and end at -5 inches of mercury. There was an issue with sample collected from the port, EO-2 where the final pressure read -21 inches of mercury. This may be due to clogging in the port itself or a problem with the canister and may increase the sample's reporting limit

All air samples were analyzed by AAC for a sub-set of VOCs: trichloroethene, tetrachloroethene, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride and chloroethane. The samples were analyzed according to U.S. EPA Compendium Method *TO-15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specialty-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* from the *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air* which can be found as Appendix C of the quality assurance project plan which can be found as Appendix B of this document. The indoor air, trip blank and ambient air samples were analyzed for VOCs by the selective ion mode of TO-15 while the sub-slab samples were analyzed by the scan mode.

4.0 RESULTS

A field duplicate indoor air samples was collected by placing two canisters next to each other in the indoor air space near the port EO-2. As can be seen from Table 1 on page 5, the results are comparable. There were no qualifiers assigned to the data by either the laboratory or the data validators. Therefore, all air results are acceptable and usable. The ambient air sample was collected to remove the possibility of cross-contamination from the outside atmosphere. There were no VOCs detected in the ambient air sample. The Quality Assurance/ Quality Control information can be found in the CLP Data Assessments in Appendix C.

As a guidance, the air sample results were compared to the U.S. EPA Region III *Risk Based Concentration (RBC) Table for Residential Air,* updated September 12, 2008, which can be found as Appendix F. The indoor air results were compared to the residential air *RBC* values directly, while the soil gas samples were compared to the residential air *RBC* number times an attenuation factor of ten. The action levels for tetrachloroethene (PCE) and trichloroethene (TCE) are not derived from the RBCs, but were created by Region II risk assessors. The PCE action level is 100 $\mu g/m^3$ for sub-slab and 10 $\mu g/m^3$ for indoor air samples. PCE was detected in every sample collected during this sampling event, however, only exceeded the Region III *RBCs* in the sub-slab sample collected from the port 89Morris-1 which is located in the southwest portion of the new storefront area. These results can be seen on Table 1 on page 5 and in the raw data in Appendix C.

The action level for TCE is 5.0 $\mu g/m^3$ for sub-slab samples and 0.5 $\mu g/m^3$ for indoor air samples. Once again the southwest port showed TCE above the Region III RBCs. None of the other samples detected TCE. Table 1 on page 5 reports all of the sample results which can also be found in Appendix C. The sample reporting limits are also shown on Table 1. As previously discussed, the reporting limit for compounds from the sub-slab port, EO-2 were increased due to a minimized sample amount. Table 2 on page 6 shows a comparison of sample results from this round of samples next to previous sample rounds. The levels appear to be decreasing over the last two years.

5.0 CONCLUSION:

Due to previous PCE and TCE contamination found in the indoor air and sub-slab samples at the main, on-site building a ventilation treatment system was installed. The EPA collected a follow-up round of sampling in the north end of the building where a new storefront is being constructed to determine the effectiveness of the system. Table 1 on page 5 summarizes the sub-slab and indoor air results and Table 2 on page 6 compares the PCE and TCE results during various sampling rounds. There is a large reduction in contamination which caused the indoor air results to reach levels below their action limits and the sub-slab levels are decreasing. Therefore, the ventilation system is performing adequately.

TABLE 1 AIR SAMPLE SUMMARY							
Sample Location	**Sample Type**	**Sample Number**	**Organic Compounds & Concentrations ($\mu g/m^3$)**			**Sample Reporting Limits ($\mu g/m^3$)**	**US EPA Region 3 RBCs for Residential Air ($\mu g/m^3$) 10^{-5}**
			Compounds	**Conc**	**QC**		
SE port – former EO-2	Sub-Slab	B5875	Tetrachloroethene	21.6		6.3 – 16.6	100
Near the SE port	Indoor Air	B5876	Tetrachloroethene	2.83		0.17 – 0.44	10
Lower level port – former 89Morris-1	Sub-Slab	B5877	cis-1,2-Dichloroethene Trichloroethene Tetrachloroethene	30.3 101 10,600		1.9 – 4.0 (251 for PCE)	5.0 100
Near the lower level port	Indoor Air	B5878	Tetrachloroethene	2.15		0.20 – 0.53	10
Near the lower level port	Indoor Air Duplicate	B5879	Tetrachloroethene	2.09		0.17 – 0.44	10
West of 89 Morris Street	Ambient Air	B5880	Non-detect			0.22 – 0.58	

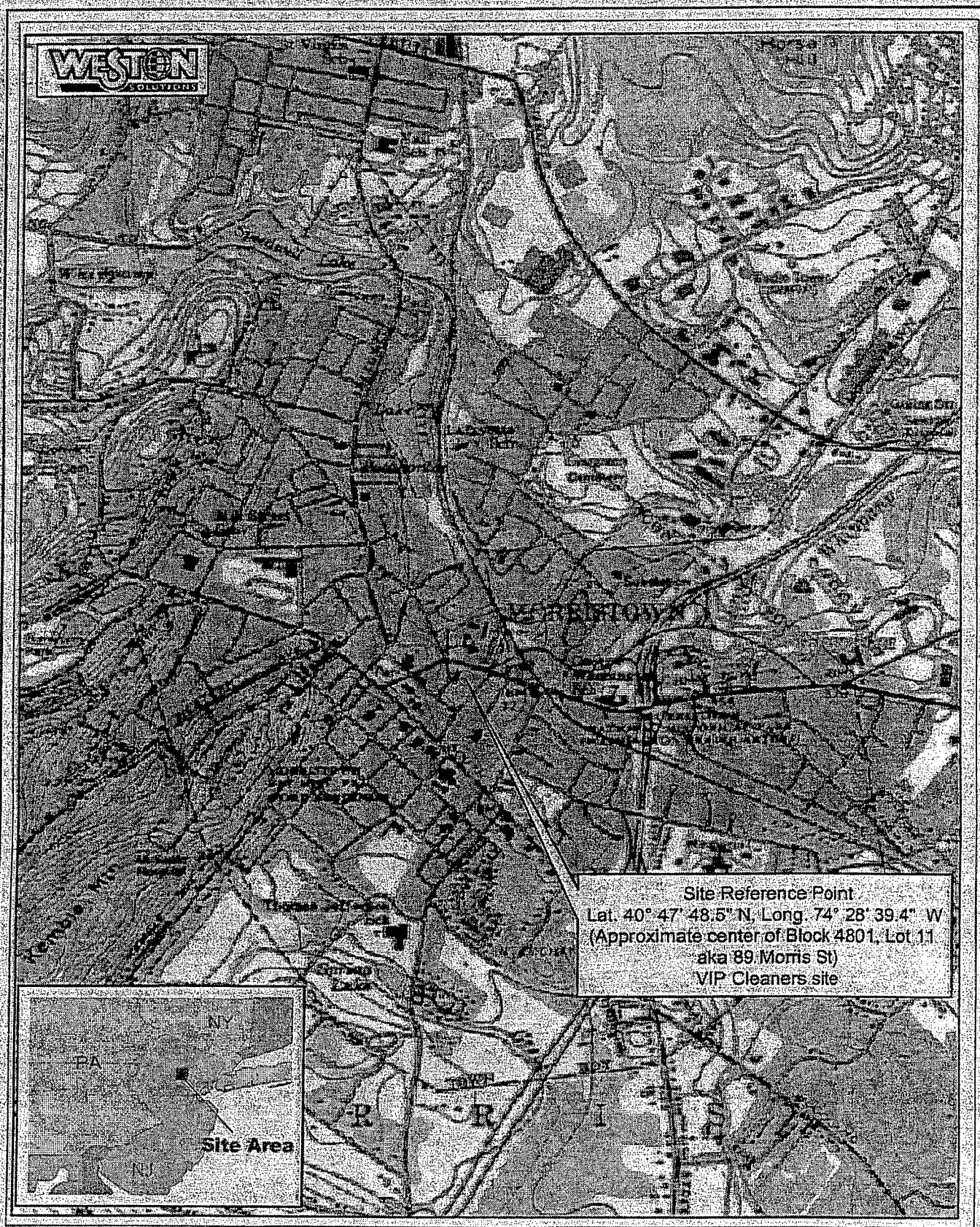
1- U.S. EPA Region III. *Risk-Based Concentration Table Residential Air ug/m³*. Mid-Atlantic Risk Assessment. Updated September 12, 2008 except for TCE and PCE which were derived from U.S. EPA Region II risk assessors

TABLE 2 – PCE AND TCE RESULT COMPARISON ($\mu g/m^3$)						
PCE Results	**MAY 2006**		**JULY 2007**		**DECEMBER 2008**	
	Sub-slab	**Indoor Air**	**Sub-slab**	**Indoor Air**	**Sub-slab**	**Indoor Air**
Empty Office N	3000	59	----	----	----	----
Empty Office S	3400		62	----	21.6	2.83
89 Morris W	42,000	----	----	----	10,600	2.15
89 Morris E	470	----	----	----	----	----
89 Morris N	690	----	----	----	----	----
EPA Action Level	100	10	100	10	100	10
TCE Results	**MAY 2006**		**JULY 2007**		**DECEMBER 2008**	
	Sub-slab	**Indoor Air**	**Sub-slab**	**Indoor Air**	**Sub-slab**	**Indoor Air**
Empty Office N	8.7	0.4	----	----	----	----
Empty Office S	120		2.2	----	ND	ND
89 Morris W	730	----	----	----	101	ND
89 Morris E	14	----	----	----	----	----
89 Morris N	4.1	----	----	----	----	----
EPA Action Level	5.0	0.5	5.0	0.5	5.0	0.5

ND - Non-detect
"---" - Not sampled

APPENDIX A

SITE MAP



SOURCE: USGS 7.5 Minute Series (Topographic) Quadrangles: Morristown NJ, 1954, photorevised 1981

N W E S

750 0 750 1,500

Graphic Scale In Feet

DATE: 03/13/06

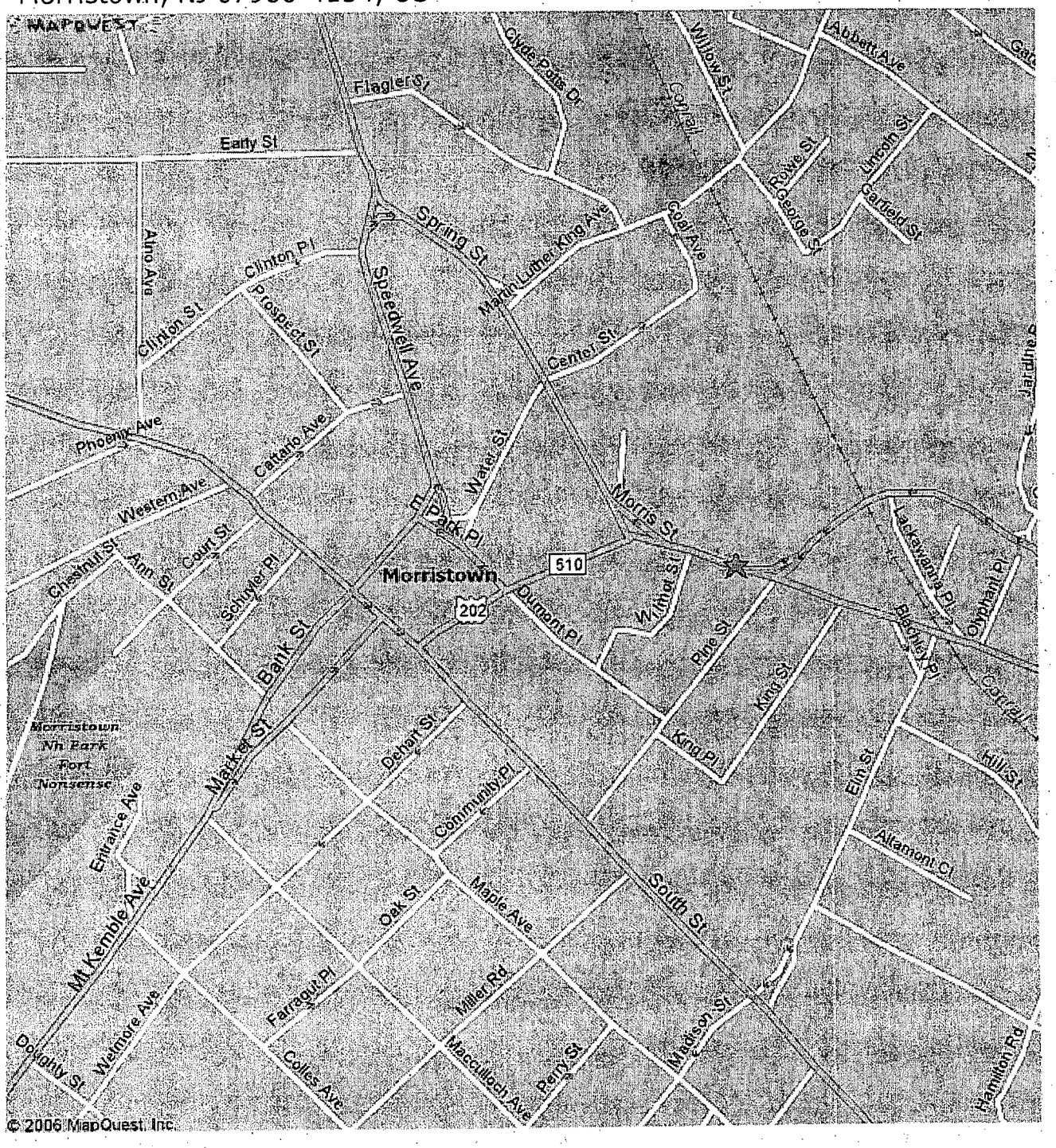
Figure 1
Site Location Map
VIP Cleaners
Morristown, Morris County, New Jersey

...\SA1 2\VIP Cleaners (010)\GIS\02914_VIP_Figure1.mxd

MAPQUEST

89 Morris St

Morristown, NJ 07960-4154, US



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APPENDIX B

QUALITY ASSURANCE PROJECT PLAN

FOR THE

VIP CLEAERS SITE

UNIFORM FEDERAL POLICY
QUALITY ASSURANCE PROJECT PLAN
FOR

VIP Cleaners Site

November 24, 2008

REVISION 1

Document Control Number: VIPUFPQAPP-11-2008

Prepared by:

11/24/08

Diane Salkie — Date
Project Manager
EPA/DESA/HWSB/SST

Approved by:

11/24/08

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QA Officer
EPA/DESA/HWSB/SST

TABLE OF CONTENTS

1.0 Introduction.....1

2.0 Project Organization.....2

3.0 Project Quality Objectives.....2

4.0 Project Overview.....2

5.0 Sampling.....3

6.0 Analysis.....4

7.0 Documentation.....4

8.0 Assessment.....5

9.0 Data Usability.....5

1.0 Introduction

1.1 Site Description and History

The VIP Cleaners site (site) is located at 89 Morris Street in Morristown, New Jersey. The site consists of a former dry-cleaning facility and a plume of contaminated ground water. The facility was utilized for dry cleaning services by Caroline Laundry from the early 1940s until 1970, by VIP Cleaners from 1989 until 1996, by Milano French Cleaners from 1996 until 2000 and by New Image Cleaners and Tailoring from 2000 until the present. The former and current operators have used chlorinated solvents, including tetrachloroethene (PCE) for dry cleaning operations at the facility.

The original owner, Caroline Laundry, performed common laundering as well as dry cleaning operations in which they occupied the entire on-site building. Once they ceased operations, the building was divided for lease in 1970 to the aforementioned dry cleaners, a camera store, a lawnmower repair shop, auto repair shops, a computer store, hair salons, an auto detailing shop, a florist/garden center, a taxi and limousine service, an insurance sales office, a fish market, fitness facilities and a photography studio. The dry cleaning operations since 1989 have occupied the northern portion of the building only.

In February 1992, the property owner removed a 7000 gallon underground storage tank (UST) and its contents which was #6 heating oil. The tank had been located along the western side of the on-site building. The presence of a petroleum sheen on the ground water was found during the UST excavation. This prompted the New Jersey Department of Environmental Protection (NJDEP) to require the owner to install and sample a monitoring well at the location of the former UST. In September 1992, the property owner installed monitoring well, MW-1 adjacent to the former UST location.

Ground water samples were collected from MW-1 by the property owner in September 1992 and by NJDEP in June 1994. Both samples indicated the presence of PCE and some of its breakdown products, trichloroethylene (TCE) and 1,2-dichloroethene (DCE) at concentrations ranging from 58 to 300 μg/L. The depth to ground water in MW-1, was measured at 4 feet below ground surface in 1994 and the screen is located at 12 to 22 feet below ground surface.

In 2005, the U.S. Environmental Protection Agency (EPA)'s Region II Pre-Remedial Program requested a status update from NJDEP. EPA obtained permission from NJDEP to undertake an Expanded Site Inspection at the site. In November and December of 2005, EPA's Site Assessment Team (SAT) contractor employed a direct-push drilling method to collect soil and ground water samples at and in the vicinity of the site. This investigation revealed that contamination exists in the immediate vicinity of the on-site building and has migrated beneath at least one nearby property. The highest concentration of PCE was 18,000 μg/kg in the soil and 19,000 μg/L in the ground water. In addition, the SAT contractor collected soil gas samples from the vicinity of the on-site building and beyond the site borders. Two of the eleven soil gas samples collected revealed PCE at 37.2 and 23.4 $\mu g/m^3$. The two soil gas samples were located in close

proximity to the north end of the on-site building. A map of the site can be seen in Attachment 2.
See Worksheet #10 of Attachment 1.

1.2 Problem Definition

The original objective of this study was to assess the potential for residential/ occupational indoor air exposure to VOCs in the main business at the former VIP Cleaners site. Sub-slab and indoor air samples were collected in the building and were compared to health based levels of concern. Based on these results, a vapor intrusion mitigation system was installed in the main building with nine storefronts. In July, 2007, the EPA collected sub-slab and indoor air samples from the building to verify the effectiveness of the mitigation system. The front of the building was under construction and therefore not sampled in July 2007. The purpose of this sampling event is to collect sub-slab and indoor air samples from the former dry cleaner side of the building to ensure proper performance of the system and fill in the data gap.
See Worksheet #10 of Attachment 1.

2.0 Project Organization

2.1 Personnel

Diane Salkie, US EPA R2, DESA/HWSB/SST: Project Leader
, US EPA R2, DESA/HWSB/SST: Sampling Assistant
Andrew Confortini, US EPA R2, ERRD/RAB/RAS: OSC
See Worksheets # 5, 6, 7 and 8 of Attachment 1.

3.0 Project Quality Objectives

3.1 Data Usability

In July 2007, the EPA collected sub-slab and indoor air samples from the building to verify the effectiveness of the mitigation system. The front of the building was under construction and therefore not sampled. The purpose of this sampling event is to collect sub-slab and indoor air samples from the former dry cleaner side of the building to ensure proper performance of the system. The data will be used to determine if the mitigation system needs is working properly and to ensure the health of future tenants.
See Worksheets #11 and 12 of Attachment 1.

4.0 Project Overview

4.1 Tasks

Two sub-slab samples will be collected over 24 hours from 89Morris-1 and EO-2 ports which were installed in July 2007. Two indoor air samples will be collected over 24 hours from the breathing space near sample ports, 89-Morris-1 and EO-2. One field

duplicate sample will be collected with one of the indoor air samples. One ambient air sample will be collected from the outside of the main building. One field blank sample will accompany all of the air samples for quality control (QC). The sub-slab samples will be collected according to the sampling portion of REAC standard operating procedure (SOP) *2082: Construction and Installation of Permanent Sub-slab Soil Gas Wells*, March 2004 which can be found as Attachment 3. The indoor air samples will be collected according to EPA/DESA/HWSB/SST SOP: *SST-8 Indoor Air Sampling with SUMMA Canisters* Rev 4, November 2008 which can be found as Attachment 4. The sub-slab samples will be analyzed for a sub-set of VOCs: trichloroethene, tetrachloroethene, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride, chloroethane by TO-15, scan method. Five indoor air samples and QC samples will be analyzed for trichloroethene, tetrachloroethene, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride and chloroethane by TO-15 SIM. The sample results will be compared to the U.S. EPA Region III *Risk-Based Concentration Table, Residential Air,* Mid-Atlantic Risk Assessment, updated July 07, 2008 which can be found as Attachment 5. The Residential Air RBC for indoor air will be used as the 10^{-6} risk level, while the 10^{-6} risk level for sub-slab soil gas is 10 times the RBCs for Residential Air.
See Worksheets # 14 and 15 of Attachment 1.

4.2 Schedule

The QAPP is scheduled for completion on November 17, 2008 with comments expected on November 24, 2008. A site reconnaissance was performed on November 3, 2008, where only two sub-slab ports remain in the newly constructed former dry cleaner, 89Morris-1 and EO-2. The sampling is scheduled for December 4 – 5, 2008. The trip report will be completed within one week after the sampling is complete. The preliminary laboratory data is expected 7 days after the laboratory receives the canisters and the final laboratory data is expected after another 7 days. The validated data package is expected on January 15, 2008 and the final report will be complete within two weeks of that date.
See Worksheet # 16 of Attachment 1.

5.0 Sampling

5.1 Sampling Tasks

Due to construction in July 2007, samples were not collected from the front or north side of 89 Morris Avenue, the home of the dry cleaner, New Images. The construction partitioned off a small area at the very north end of the building which is currently being used as a storefront for New Images, with no dry cleaning being performed on site. The remaining northern portion of the dry cleaner including empty office 2, is being refurbished for a new tenant. The sampling event will consist of the collection of two sub-slab samples over 24 hours from 89Morris-1 and EO-2 ports which were installed in July 2007. Two indoor air samples collected over 24 hours from the breathing space near

sample ports, 89-Morris-1 and EO-2. One field duplicate sample collected with one of the indoor air samples. One ambient air sample collected from the outside of the main building. One field blank sample will accompany all of the air samples. A sketch of the port locations can be found in Attachment 2. The sub-slab samples will be collected according to the sampling portion of REAC standard operating procedure (SOP) *2082: Construction and Installation of Permanent Sub-slab Soil Gas Wells*, March 2004 which can be found as Attachment 3. The indoor air samples will be collected according to EPA/DESA/ HWSB/SST SOP: *SST-8 Indoor Air Sampling with SUMMA Canisters* Rev 4, November 2008 which can be found as Attachment 4. All samples will be collected in certified clean 6 liter SUMMA™ canisters. A photo-ionization detector (PID) will be used to screen the sample locations for cross-contaminants.
See Worksheets #18, 19, 20 and 21 of Attachment 1.

5.2 Quality Control

An indoor air field duplicate sample will be collected with one of the indoor air samples. A field blank sample will accompany the field samples and a method blank sample will be analyzed by the laboratory. An ambient air sample will be collected from outside of 89 Morris Avenue.
See Worksheet #28 of Attachment 1.

6.0 Analysis

6.1 Analytical Task

The samples will be analyzed by a National Non-RAS Laboratory for a sub-set of VOCs: trichloroethene, tetrachloroethene, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride, chloroethane by US EPA Method *TO-15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specialty-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)*. The sub-slab samples will be analyzed according the TO-15 SCAN method while the indoor air and QC samples will be analyzed by TO-15 SIM.
See Worksheet #19, 23, 24 and 25 of Attachment 1.

7.0 Documentation

7.1 Sample Documentation and Custody

A SUMMA™ Sampling Work Sheet, Chain of Custody and the field notebook will be completed for each sample collected. All field and sample documents will be legibly written in indelible ink. Any corrections or revisions will be made by lining through the original entry and initialing the change. The SUMMA™ Sampling Work Sheet records the sample location, canister and orifice numbers, sampling period, initial and final sample time and pressure and comments. The Chain of Custody is a record of the sample location, sample canister and valve numbers and time and date of the sample. The field

notebook will be used by field personnel to record all aspects of sample collection and handling, visual observations, and field measurements. The field notebook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed. The samples will be shipped in boxes sealed with custody seals via Federal Express Overnight. Examples of the forms can be found as Attachment 6
See Worksheets # 14, 26 and 27 of Attachment 1.

7.2 Project Documentation

An electronic copy of the preliminary data will be sent through, the EPA R2 RSCC, to the project leader and OSC within one week of sample collection. A hard copy of the data will follow within one more week. The data will be validated by EPA/DESA/ HWSB/HWSS or ESAT within one month according to U.S. EPA Region II SOP *HW-31: Volatile Organic Analysis of Ambient Air in Canister by Method TO-15,* April 2006. The Project Leader is responsible for completing the final report within two of receipt of the validated data.
See Worksheet #33 of Attachment 1.

8.0 Assessment

8.1 Assessment Findings

No audits of assessments will be performed during this sampling event.
See Worksheets #31 and 32 of Attachment 1.

9.0 Data Usability

The measure of replicate precision is the absolute value of the difference between replicate measurements of the sample divided by the average value and expressed as a percentage as follows:

$$\text{Percent difference} = \frac{|X_1 - X_2|}{X} \times 100$$

where: X_1 - First measurement value
X_2 - Second Measurement value
X - Average of the two values

Factors that affected the precision of the measurement are: molecular weight, water solubility, polarizability, etc. A primary influence is the concentration level of the compound. A replicate precision value of 25 percent can be achieved for each of the target compounds. For more information, refer to Compendium Method *TO-15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specialty-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* which can be found as Appendix B.

A measurement of analytical accuracy is the degree of agreement with audit standards. It is defined as the difference between the nominal concentration of the audit compound

and the measured value divided by the audit value and expressed as a percentage as follows:

$$\text{Audit Accuracy, \%} = \frac{\text{Spiked Value - Observed Value}}{\text{Spiked Value}} \times 100$$

For more information, refer to Compendium Method *TO-15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specialty-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* which can be found as Appendix B. As per Method TO-15, the performance criteria for audit accuracy should be within 30 percent for concentrations normally expected within contaminated ambient air.

See Worksheets # 34, 35, 36 and 37 of Attachment 1.

ATTACHMENT 1
QAPP WORKSHEETS

TABLE OF CONTENTS

Worksheet	Title
QAPP Worksheet #1	Title and Approval Page
QAPP Worksheet #2	QAPP Identifying Information
QAPP Worksheet #3	Distribution List
QAPP Worksheet #4	Project Personnel Sign-Off Sheet
QAPP Worksheet #5	Project Organizational Chart
QAPP Worksheet #6	Communication Pathways
QAPP Worksheet #7	Personnel Responsibilities and Qualifications Table
QAPP Worksheet #8	Special Personnel Training Requirements Table
QAPP Worksheet #9	Project Scoping Session Participants Sheet
QAPP Worksheet #10	Problem Definition
QAPP Worksheet #11	Project Quality Objectives/Systematic Planning Process Statements
QAPP Worksheet #12	Measurement Performance Criteria Table
QAPP Worksheet #13	Secondary Data Criteria and Limitations Table
QAPP Worksheet #14	Summary of Project Tasks
QAPP Worksheet #15	Reference Limits and Evaluation Table
QAPP Worksheet #16	Project Schedule/Timeline Table
QAPP Worksheet #17	Sampling Design and Rationale
QAPP Worksheet #18	Sampling Locations and Methods/SOP Requirements Table
QAPP Worksheet #19	Analytical SOP Requirements Table
QAPP Worksheet #20	Field Quality Control Sample Summary Table
QAPP Worksheet #21	Project Sampling SOP References Table
QAPP Worksheet #22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table
QAPP Worksheet #23	Analytical SOP References Table
QAPP Worksheet #24	Analytical Instrument Calibration Table
QAPP Worksheet #25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table
QAPP Worksheet #26	Sample Handling System
QAPP Worksheet #27	Sample Custody Requirements
QAPP Worksheet #28	QC Samples Table
QAPP Worksheet #29	Project Documents and Records Table
QAPP Worksheet #30	Analytical Services Table
QAPP Worksheet #31	Planned Project Assessments Table
QAPP Worksheet #32	Assessment Findings and Corrective Response Actions
QAPP Worksheet #33	QA Management Reports Table
QAPP Worksheet #34	Verification (Step I) Process Table
QAPP Worksheet #35	Validation (Steps IIa and IIb) Process Table

QAPP Worksheet #36 Sampling and Analysis Validation (Steps IIa and IIb) Summary Table
QAPP Worksheet #37 Usability Assessment

CROSSWALK

The following table provides a "cross-walk" between the QAPP elements outlined in the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP Manual), the necessary information, and the location of the information within the text document and corresponding QAPP Worksheet. Any QAPP elements and required information that are not applicable to the project are circled.

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
Project Management and Objectives			
2.1 Title and Approval Page	- Title and Approval Page	Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	TOC Approval Page	2
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	Approval Page	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications - Special Personnel Training Requirements	2	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Planning Session Documentation (including Data Needs tables) - Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background - Site Maps (historical and present)	1	9 10

CROSSWALK

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
Project Management and Objectives			
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific PQOs - Measurement Performance Criteria	3	11 12
2.7 Secondary Data Evaluation	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations	1 2	13
2.8 Project Overview and Schedule 2.8.1 Project Overview 2.8.2 Project Schedule	- Summary of Project Tasks - Reference Limits and Evaluation - Project Schedule/Timeline	4	14 15 16
Measurement/Data Acquisition			
3.1 Sampling Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures 3.1.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.5 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	- Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/SOP Requirements - Analytical Methods/SOP Requirements - Field Quality Control Sample Summary - Sampling SOPs - Project Sampling SOP References - Field Equipment Calibration, Maintenance, Testing, and Inspection	5	17 18 19 20 21 22
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration Procedures 3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures 3.2.4 Analytical Supply Inspection and Acceptance Procedures	- Analytical SOPs - Analytical SOP References - Analytical Instrument Calibration - Analytical Instrument and Equipment Maintenance, Testing, and Inspection	6	23 24 25

CROSSWALK

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Section	Crosswalk to QAPP Worksheet No.
Measurement/Data Acquisition			
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	- Sample Collection Documentation Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody Form and Seal	7	27 26
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	- QC Samples - Screening/Confirmatory Analysis Decision Tree	5	28
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records - Analytical Services - Data Management SOPs	6	29 30
Assessment/Oversight			
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments - Audit Checklists - Assessment Findings and Corrective - Action Responses	8	31 32
4.2 QA Management Reports	- QA Management Reports		33
4.3 Final Project Report	- Final Report(s)		33
Data Review			
5.1 Overview		9	NA
5.2 Data Review Steps 5.2.1 Step I: Verification 5.2.2 Step II: Validation 5.2.2.1 Step IIa Validation Activities 5.2.2.2 Step IIb Validation Activities 5.2.3 Step III: Usability Assessment 5.2.3.1 Data Limitations and Actions from Usability Assessment 5.2.3.2 Activities	- Verification (Step I) Process - Validation (Steps IIa and IIb) Process - Validation (Steps IIa and IIb) Summary - Usability Assessment	9	34 35 36 37

QAPP Worksheet #1
Title and Approval Page

Title: Quality Assurance Project Plan
Site Name/Project Name: VIP Cleaners
Site Location: Morristown, NJ
Revision Number: 1
Revision Date: 11/24/2008

Lead Organization

U.S. Environmental Protection Agency, Region II

Preparer's Name and Organizational Affiliation
Preparer's Address, Telephone Number, and E-mail Address

Diane Salkie
U.S. EPA Region II
2890 Woodbridge Ave.
Edison, NJ 08837
732-321-4423
salkie.diane@epa.gov

Preparation Date (Day/Month/Year)

November, 17 2008

Project Officer: Diane Salkie

US EPA/DESA/HWSB/SST

Signature

11/24/08
Date

QA Officer: Patricia Sheridan

US EPA/DESA/HWSB/SST

Signature

Date

Document Control Number: VIPUFPQAPP-11-2008

QAPP Worksheet #2
QAPP Identifying Information

Site Name/Project Name: VIP Cleaners
Site Location: Morristown, NJ
Operable Unit: 00
Title: UFP Quality Assurance Project Plan
Revision Number: 0
Revision Date:

1. **Identify guidance used to prepare QAPP:** Uniform Federal Policy for Quality Assurance Project Plans

2. **Identify regulatory program:** EPA Region 2

3. **Identify approval entity:** EPA Region 2

4. **Indicate whether the QAPP is a generic or a project-specific QAPP. (circle one)**

5. **List dates of scoping sessions that were held:** No scoping sessions held

6. **List dates and titles of QAPP documents written for previous site work, if applicable:**

QAPP for the Vapor Intrusion Investigation at the VIP Cleaners Site April 19, 2006

7. **List organizational partners (stakeholders) and connection with lead organization:**

None

8. **List data users:**

EPA Region 2 (see Worksheet #4 for individuals)

9. **If any required QAPP elements and required information are not applicable to the project, then provide an explanation for their exclusion below:**

None

10. **Document Control Number:**

VIPUFPQAPP-11-2008

QAPP Worksheet #3
Distribution List

[List those entities to whom copies of the approved QAPP, subsequent QAPP revisions, addenda, and amendments are sent]

QAPP Recipient	Title	Organization	Telephone Number	Fax Number	E-mail Address	Document Control Number
Andrew Confortini	On-scene Coordinator	EPA, Region 2	(732) 906-6827 C: (908) 420-4455		confortini.andrew@epa.gov	VIP-UFPQAPP-11-2008
Patricia Sheridan	QA Officer	EPA, Region 2	(732) 321-6780	(732) 906-6824	sheridan.patricia@epa.gov	
Diane Salkie	Project Officer	EPA, Region 2	(732) 321-4423	(732) 906-6824	salkie.diane@epa.gov	

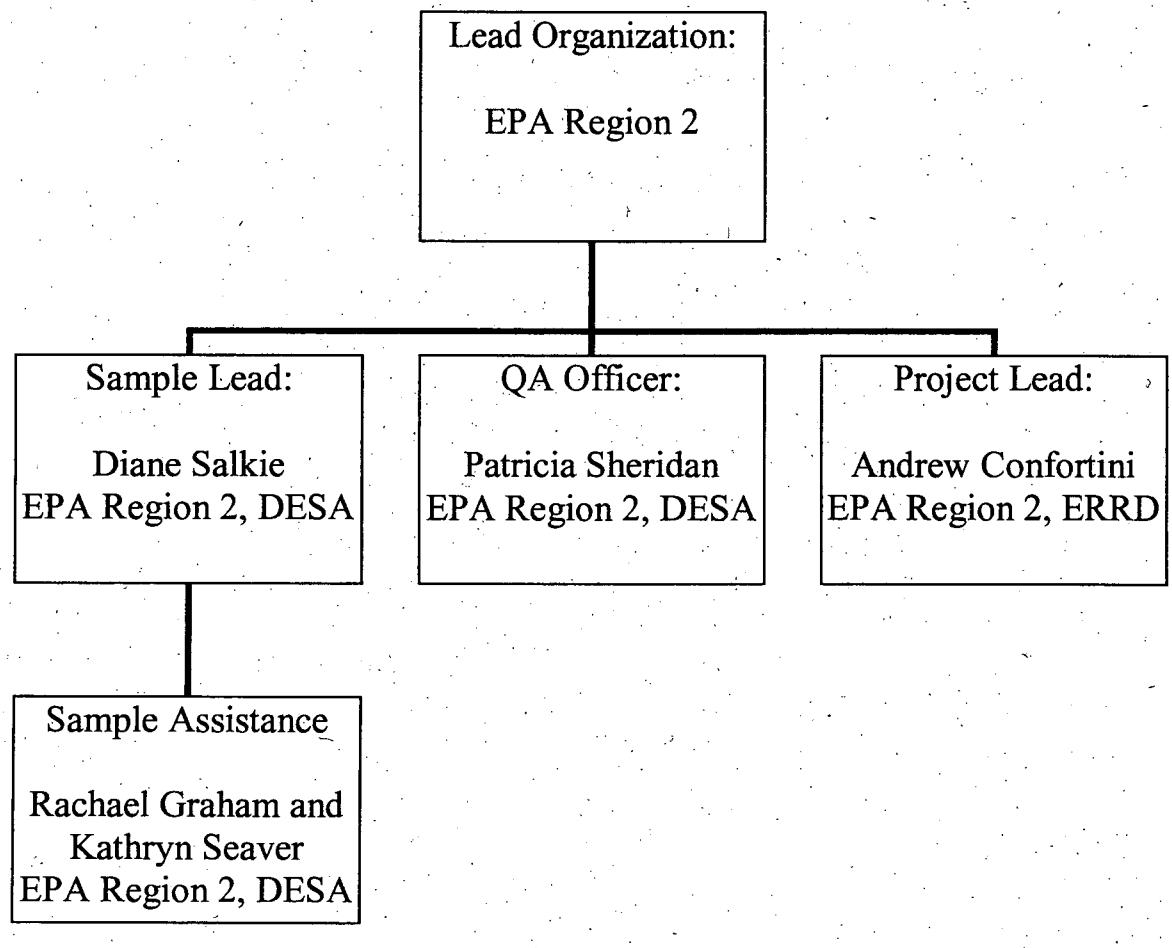
QAPP Worksheet #4
Project Personnel Sign-Off Sheet

[Have copies of this form signed by key project personnel from each organization to indicate that they have read the applicable sections of the QAPP and will perform the tasks as described; add additional sheets as required. Ask each organization to forward signed sheets to the central project file.]

Organization: EPA Region 2

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Andrew Confortini	On-scene Coordinator	(732) 906-6827		
Patricia Sheridan	QA Officer	(732) 321-6780		
Diane Salkie	Project Manager	(732) 321-4423		
Rachael Graham	Sample assistance	(732) 321-4438		
Kathryn Seaver	Sample assistance	(732) 9036-6800		

QAPP Worksheet #5
Project Organizational Chart



QAPP Worksheet #6
Communication Pathways

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Sampling request	Sampling Project Manager	Andrew Confortini	(732) 906-6827	All technical, QA and decision-making matters in regard to the project (verbal, written or electronic)
Laboratory request	Non-RAS RSCC	Jennifer Feranda	(732) 321-6687	Completes Task Order and requests laboratory
Adjustments to QAPP	Quality Assurance Officer	Patricia Sheridan	(732) 321-6870	QAPP approval dialogue

QAPP Worksheet #7
Personnel Responsibilities and Qualifications Table

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Diane Salkie	Sampling Project Manager	EPA/DESA/HWSB/SST	Implementing and executing the technical, QA and health and safety during sampling event	BS in Environmental Science, Rutgers University, 10 years sample experience
Rachael Graham	Sampling Assistance	EPA/DESA/HWSB	Sample activities and management	BS in Environmental Science, Rutgers University,
Kathryn Seaver	Sampling Assistance	EPA/DESA/HWSB	Sample activities and management	BS in Environmental Science, MS in Marine and Atmospheric Science Stony Brook University
Andrew Confortini	On-Scene Coordinator	EPA/ERRD/RAB	All project coordination, direction and decision making	

QAPP Worksheet #8
Special Personnel Training Requirements Table

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
[Specify location of training records and certificates for samplers]						
Air Sampling	40 hr. HAZWPER	Tetra Tech NUS, Inc.	Varies	All field personnel	Environmental Scientists	EPA R2, Edison, NJ, Building 10

QAPP Worksheet #9
Project Scoping Session Participants Sheet

Site Name/Project Name: VIP Cleaners
Site Location: Morristown, NJ
Operable Unit: 00

Date of Session: N/A
Scoping Session Purpose: To discuss questions, comments and assumptions regarding technical issues involved with the project

Name	Title	Affiliation	Phone #	E-mail Address	Project Role

Comments/Decisions: No Scoping Sessions were held

Action Items:

Consensus Decisions:

QAPP Worksheet #10
Problem Definition

PROBLEM DEFINITION

The original objective of this study was to assess the potential for residential/ occupational indoor air exposure to VOCs in the main business at the former VIP Cleaners site. Sub-slab and indoor air samples were collected in the building and were compared to health based levels of concern. Based on these results, a vapor intrusion mitigation system was installed in the main building with seven storefronts, two empty storefronts and the former dry cleaner. In July 2007, the EPA collected sub-slab and indoor air samples from the building to verify the effectiveness of the treatment system. The front of the building, which houses the former dry cleaner and empty offices, was under construction and therefore not sampled in July 2007. The purpose of this sampling event is to collect sub-slab and indoor air samples from the former dry cleaner side of the building to ensure proper performance of the ventillation system and fill in data gaps.

SITE HISTORY/CONDITIONS

Site Location and Description

The VIP Cleaners site is located at 89 Morris Street in Morristown, New Jersey. The site consists of a former dry-cleaning facility and a plume of contaminated ground water. The facility was utilized for dry cleaning services by Caroline Laundry from the early 1940s until 1970, by VIP Cleaners from 1989 until 1996, by Milano French Cleaners from 1996 until 2000 and by New Image Cleaners and Tailoring from 2000 until 2007. The current owner, New Image, does not perform any dry cleaning activities on site, however, the store is used to transport and hold dry cleaned clothing. New Image utilizes a portion of the front side of the store including one empty office, the remaining area is being refurbished and will be leased to a new business. The former and current operators have used and continue to use chlorinated solvents, including tetrachloroethene (PCE) for dry cleaning operations at the facility.

Site History

Ground water samples were collected from MW-1 by the property owner in September 1992 and by NJDEP in June 1994. Both samples indicated the presence of PCE and some of its breakdown products, trichloroethene (TCE) and 1,2-dichloroethene (DCE) at concentrations ranging from 58 to 300 μg/L. The depth to ground water in MW-1 was measured at 4 feet below ground surface in 1994 and the screen is located at 12 to 22 feet below ground surface.

Based upon the unknown extent of the plume, the shallow depth to groundwater, the concentrations of chemicals in the groundwater and soil gas, and the location of current businesses in the main former dry cleaner building, the EPA determined that there was a need to assess the vapor intrusion pathway. To initiate the investigation, the U.S. EPA personnel installed sub-slab ports in the on-site building a then collected sub-slab air samples and collected indoor air samples. These results caused the installation of a ventillation system.

QAPP Worksheet #10
Problem Definition

PROJECT DECISION STATEMENTS

1. If the sampling reveals indoor air contamination, then the mitigation system may require adjustment.
2. If the sampling does not reveal indoor air contamination, the site will be closed.
3. Sub-slab samples will also be collected to assess the current level of contamination in the sub-slab soil gas.

QAPP Worksheet #11
Project Quality Objectives/Systematic Planning Process Statements

Overall project objectives include:

- Verify the effectiveness of the building mitigation system
- Volatile organic compounds: trichloroethene, tetrachloroethene, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride, and chloroethane will be analyzed in sub-slab air, indoor air and ambient air
- To protect health of potential new tenants of former dry cleaning building

Who will use the data?

Data will be used by EPA Region 2 ERRD to determine the effectiveness of the ventillation system.

What will the data be used for?

To determine if the mitigatoin system is working properly. To ensure the health of future tenants.

What types of data are needed?

- EPA will sample for a sub-set of TO-15 VOCs in air seen above
- A photo-ionizatio detector (PID) will be used to screen the indoor air
- EPA will collect sub-slab and indoor air samples

How "good" do the data need to be in order to support the environmental decision?

Precision for indoor air duplicate must be $\leq$ 20 % RPD, laboratory replicate precision must be ±25%, laboratory accuracy must be between 70 and 130% or the Laboratory Audit Standard which is ± 30%. The field blank and method blank require no analyte to be greater than the quantitation limit. See Worksheet #12.

How much data are needed?

Two sub-slab samples will be collected from the ports (EO-2 and 89Morris-1) in the north side of the building; two indoor air samples will be collected near the sub-slab samples; one indoor air duplicate sample and one ambient air sample.

QAPP Worksheet #11
Project Quality Objectives/Systematic Planning Process Statements

Where, when, and how should the data be collected/generated?

Two sub-slab samples collected over 24 hours from 89Morris-1 and EO-2 ports which were installed in July 2007. Two indoor air samples collected over 24 hours from the breathing space near sample ports, 89-Morris-1 and EO-2. One field duplicate sample collected with one of the indoor air samples. One ambient air sample collected from the outside of the main building. One field blank sample will accompany all of the air samples The samples will be collected over twenty four hours on December 4 – 5, 2008, depending on availability of the custodian. The sub-slab samples will be collected according to the sampling portion of REAC standard operating procedure (SOP) *2082: Construction and Installation of Permanent Sub-slab Soil Gas Wells*, March 2004 which can be found as Attachment 3. The indoor air samples will be collected according to EPA/DESA/HWSB/SST SOP: *SST-8 Indoor Air Sampling with SUMMA Canisters* Rev 4, November 2008 which can be found as Attachment 4.

Who will collect and generate the data?

EPA Region II DESA/HWSB/SST

How will the data be reported?

The laboratory will submit both a hard copy and electronic copy of analytical results. Hard copy data packages shall contain a Table of contents or CLP equivalent DC-2 Form. Data package should be paginated for easy cross reference between the table of contents and relevant portions of the data. Data packages shall be submitted, per the CLP DC-2 form, with data grouped together per sample (i.e., related forms, raw data, etc), with additional information, such as canister certifications, included toward the end of the package. Electronic data shall be submitted in the Modified Region 2 Electronic Data Deliverables (EDD) format.

How will the data be archived?
A copy of the complete data package will be maintained with the project files at the Federal Records Center in Kansas City, Missouri for a period of thirty years.

QAPP Worksheet #12
Measurement Performance Criteria Table

(UFP-QAPP Manual Section 2.6.2)

Complete this worksheet for each matrix, analytical group, and concentration level. Identify the data quality indicators (DQI), measurement performance criteria (MPC) and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems. Use additional worksheets if necessary. If MPC for specific DQI vary within an analytical parameter, i.e., MPC are analyte-specific, then provide analyte-specific MPC on an additional worksheet.

Matrix	Gas
Analytical Group	Volatile Organics
Concentration Level	Low (ppv)

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SST-8 and 2082	TO-15 Scan	Precision (field)	≤ 20 % RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL*	Field Blank	S & A
		Precision (laboratory)	± 25 % RPD	Laboratory Replicate Sample	A
		Accuracy (laboratory)	70-130 %R or ± 30%	Laboratory Audit Standard	A
		Accuracy (laboratory)	No analyte > CRQL*	Method Blank	A

*USEPA Region 2 SOP No. 31/VOA Analysis in Ambient Air in Canister by Method TO-15 - Blank Type Criteria Table

QAPP Worksheet #12
Measurement Performance Criteria Table

(UFP-QAPP Manual Section 2.6.2)

Complete this worksheet for each matrix, analytical group, and concentration level. Identify the data quality indicators (DQI), measurement performance criteria (MPC) and QC sample and/or activity used to assess the measurement performance for both the sampling and analytical measurement systems. Use additional worksheets if necessary. If MPC for specific DQI vary within an analytical parameter, i.e., MPC are analyte-specific, then provide analyte-specific MPC on an additional worksheet.

Matrix	Gas
Analytical Group	Volatile Organics
Concentration Level	Low (ppv)

Sampling Procedure	Analytical Method/SOP	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
SST-8 and 2082	TO-15 SIM	Precision (field)	≤ 20 % RPD	Field Duplicate	S & A
		Accuracy (field)	No analyte > CRQL	Field Blank	S & A
		Precision (laboratory)	± 25% RPD	Laboratory Replicate Sample	A
		Accuracy (laboratory)	70-130 %R or ± 30%	Laboratory Audit Standard	A
		Accuracy (laboratory)	No analyte > CRQL*	Method Blank	A

*USEPA Region 2 SOP No. 31/VOA Analysis in Ambient Air in Canister by Method TO-15 - Blank Type Criteria Table

QAPP Worksheet #13
Secondary Data Criteria and Limitations Table

Secondary Data (in $\mu g/m^3$)	Data Source (Originating Organization, Report Title, and Date)	Data Generator(s) (Originating Org., Data Types, Data Generation/ Collection Dates)	How Data May Be Used (if deemed usable during data assessment stage)	Limitations on Data Use
Sub-slab EO-2: TCE = 120, PCE = 3400 on 3/07 TCE = 2.2, PCE = 62 on 7/07 Indoor air (empty office): TCE = 0.4, PCE = 59 on 3/07 Not sampled in July Sub-slab 89Morris-1: TCE = 7900 PCE = 43,000 on 3/07 Not sampled in July Indoor air (89 Morris): Not sampled	EPA DESA/HWSB/SST VIP Air Report July 2007 EPA DESA/HSWB/SST VIP Air Report March 2007	EPA DESA/HWSB/SST March and July 2007	March 2007: determine if there is a complete vapor intrusion pathway. July 2007: determine if the ventillation system is operating properly	Additional sampling is necessary to fill in the data gap from the font of the building which was under construction

QAPP Worksheet #14
Summary of Project Tasks

Sampling Tasks:

Two sub-slab samples collected over 24 hours from 89Morris-1 and EO-2 ports which were installed in July 2007. Two indoor air samples collected over 24 hours from the breathing space near sample ports, 89-Morris-1 and EO-2. One field duplicate sample collected with one of the indoor air samples. One ambient air sample collected from the outside of the main building. One field blank sample will accompany all of the air samples. The sub-slab samples will be collected according to the sampling portion of REAC standard operating procedure (SOP) *2082: Construction and Installation of Permanent Sub-slab Soil Gas Wells*, March 2004 which can be found as Attachment 3. The indoor air samples will be collected according to EPA/DESA/HWSB/SST SOP: *SST-8 Indoor Air Sampling with SUMMA Canisters* Rev 4, November 2008 which can be found as Attachment 4.

Analysis Tasks:

The two sub-slab samples will be analyzed for trichloroethene, tetrachloroethene, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride and chloroethane by TO-15, SCAN method. Two indoor air samples, one field duplicate indoor air sample, one field blank sample and one ambient air sample will be analyzed for trichloroethene, tetrachloroethene, 1,1-dichloroethene, 1,1-dichloroethane, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloroethane, 1,1,1-trichloroethane, vinyl chloride and chloroethane by TO-15 SIM method.

Quality Control Tasks:

One field duplicate indoor air sample, one ambient air sample and one field blank sample will be collected for QC.

Data Management Tasks:

The data collected for the sampling activities will be organized, analyzed, and summarized in a final project report that will be submitted to the OSC according to the Project Schedule. The report will be prepared by the project officer and include appropriate data quality assessment. Standard methods and references will be used as guidelines for data reduction and reporting. The software, Scribe™ will be used to complete the Chain of Custody Records, organize the sampling information and incorporate the data into usable tables.

QAPP Worksheet #14
Summary of Project Tasks

Documentation and Records:

A SUMMA™ Sampling Work Sheet, Chain of Custody and the field notebook will be completed for each sample collected. All field and sample documents will be legibly written in indelible ink. Any corrections or revisions will be made by lining through the original entry and initialing the change. The SUMMA™ Sampling Work Sheet records the sample location, sampling period, initial and final sample time and pressure and comments. The Chain of Custody is a record of the sample location, sample canister and valve numbers and time and date of the sample. The field notebook will be used by field personnel to record all aspects of sample collection and handling, visual observations, and field measurements. The field notebook is a descriptive notebook detailing site activities and observations so that an accurate, factual account of field procedures may be reconstructed

Assessment/Audit Tasks:

No performance audit of field operations is anticipated at this time. If conducted, performance and systems audits will be in accordance with the U.S. EPA Region 2, SST SOP #01, Performing Oversight of CERCLA Field Operations, Revision 0, April 2000.

Data Review Tasks:

All CLP data will be validated by USEPA Region 2 DESA/HWSB/HWSS in accordance with .S. EPA Region II SOP *HW-31: Volatile Organic Analysis of Ambient Air in Canister by Method TO-15,* April 2006.

QAPP Worksheet #15
Reference Limits and Evaluation Table

Matrix: Air
Analytical Group: Volatile Organic Compounds
Concentration Level: Low (Scan and SIM)

Analyte	CAS Number	U.S. EPA Reg. 3 Risk Based Conc. Ambient Air*				Laboratory Required Reporting Limit via Analytical Method TO-15[1]			
		Scan (Soil Gas)		SIM (Indoor Air)		Scan (Soil Gas)		SIM (Indoor Air)	
		ppbv	μ/m^3	ppbv	μ/m^3	ppbv	μ/m^3	ppbv	μ/m^3
Chloroethane	75-00-3					0.5	1.32	0.07	0.18
1,1-Dichloroethane	75-34-3	3.71 - 371	15 - 1500	0.37 – 37	1.5 - 15	0.5	2.02	0.07	0.28
1,2-Dichloroethane	107-06-2	0.23 – 23	0.94 – 94	0.023 – 2.3	0.094 – 9.4	0.5	2.02	0.07	0.28
1,1-Dichloroethene	75-35-4	529.6 – 529,600	2100 – 2.1×10^6	52.96 – 52,960	210 – 21,000	0.5	2.02	0.07	0.28
cis-1,2-Dichloroethene	156-59-2					0.5	1.98	0.07	0.28
trans-1,2-Dichloroethene	156-60-5	158.9 – 158,900	630 – 630,000	15.89 – 15.890	63 – 63,000	0.5	1.98	0.07	0.28
Tetrachloroethene**	127-18-4	1.5 - 1500	10 – 1000	0.15 - 150	1.0 - 100	0.5	3.39	0.07	0.47
1,1,1-Trichloroethane	71-55-6	9529.31 – 9.5×10^6	52,000 – 5.2×10^7	952.93 – 952,930	5200 – 5.2×10^6	0.5	2.73	0.07	0.38
Trichloroethene **	79-01-6	0.09 – 9.0	0.5 - 50	0.009 – 0.9	0.05 – 5.0	0.5	2.69	0.07	0.38
Vinyl Chloride	75-01-4	0.63 - 630	1.6 - 160	0.063 - 63	0.16 - 16	0.5	1.28	0.07	0.18

* EPA Region 3 RBCs dated 7/7/2008 which can be found as Attachment 5, is used as 10^{-6} risk numbers for indoor air. Sub-slab risk numbers are multiplied by an attenuation factor of 10.
** EPA Region 2 risk assessors have derived the following risk based concentrations for TCE and PCE.
1 – U.S. EPA Compendium Method *TO-15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specialty-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* MDL for SCAN is 0.5 ppbv (Section 1.2), but laboratories are able to achieve lower MDLs through SIM method (Table 4).

QAPP Worksheet #16
Project Schedule/Timeline Table

Activities	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date(s) of Initiation	Anticipated Date of Completion		
Preparation of QAPP	EPA/DESA/SST	11/13/2008	11/17/2008	QAPP	11/20/2008
Preparation of Health and Safety Plan	EPA/DESA/SST	11/17/2008	11/24/2008	HASP	N/A
Procurement of Equipment	EPA/DESA/SST	11/17/2008	11/17/2008	N/A	
Laboratory Request	EPA/DESA/SST	11/6/2008	11/6/2008	non-RAS Request Form	N/A
Field Reconnaissance/Access	EPA/DESA/SST	11/3/2008	N/A	N/A	N/A
Collection of Field Samples	EPA/DESA/SST	12/4/2008	12/5/2008	N/A	N/A
Electronic Laboratory Package Received	EPA/DESA/HWSB	12/11/2008	N/A	Unvalidated data package	12/11/2008
Hard Copy Laboratory Package Received	EPA/DESA/HWSB	12/18/2008	N/A	Unvalidated data package	12/18/2008
Validation of Laboratory Results	ESAT or EPA/DESA/HWSB	1/15/2008	N/A	Validated data Packages	1/15/2008
Data Evaluation/ Preparation of Final Report	EPA/DESA/SST	1/15/2008	1/29/2008	Final Report	1/29/2008

QAPP Worksheet #17
Sampling Design and Rationale

EPA will collect approximately 2 sub-slab air samples from ports: EO-2 and 89Morris-1, 2 indoor air samples near ports EO-2 and 89Morris-1, one field duplicate sample, one ambient air sample and one field blank sample. The sub-slab samples will be analyzed by chosen, National Non-RAS Laboratory for TO-15 Scan, while all other samples will be analyzed for TO-15 SIM. Sketches of the building can be found as Attachment 2. The sub-slab samples will be collected according to the sampling portion of REAC standard operating procedure (SOP) *2082: Construction and Installation of Permanent Sub-slab Soil Gas Wells*, March 2004 which can be found as Attachment 3. The indoor air samples will be collected according to EPA/DESA/HWSB/SST SOP: *SST-8 Indoor Air Sampling with SUMMA Canisters* Rev 4, November 2008 which can be found as Attachement 4. Refer to Worksheet #21.

QAPP Worksheet #18
Sampling Locations and Methods/SOP Requirements Table

Matrix	Sampling Location(s)	Depth (units)	Analytical Group(s)	Concentration Level	No. of Samples (identify field duplicates)	Sampling SOP Reference	Rationale for Sampling Location
Soil Gas	EO-2 and 89Morris-1	N/A	Select VOCs	Low - Scan	2	2082	New storefront to be leased
Indoor Air	Near EO-2 and 89Morris-1	N/A	Select VOCs	Low - SIM	2 plus field duplicate	SST-8	New storefront to be leased
Ambient Air	Outside 89 Morris Ave	N/A	Select VOCs	Low - SIM	2 plus field duplicate	SST-8	Quality control

QAPP Worksheet #19
Analytical SOP Requirements Table

Matrix	No. of Samples	Analytical Group [Lab Assignment]	Concentration Level	Analytical and Preparation Method/SOP Reference	Sample Volume	Containers (number, size, and type)	Preservation Requirements	Maximum Holding Time (preparation/ analysis)
Sub-slab Air	2	National Non-RAS Laboratory	Low	TO-15 scan	6 L	SUMMA™ canister	NA	30 days
Indoor Air	2 plus 1 duplicate	National Non-RAS Laboratory	Low – SIM	TO-15 SIM	6 L	SUMMA™ canister	NA	30 days
Ambient Air	1	National Non-RAS Laboratory	Low - SIM	TO-15 SIM	6 L	SUMMA™ canister	NA	30 days
Field blank	1	National Non-RAS Laboratory	Low - SIM	TO-15 SIM	6 L	SUMMA™ canister	NA	30 days

QAPP Worksheet #20
Field Quality Control Sample Summary Table

Matrix	Analytical Group	Concentration Level	Analytical and Preparation SOP Reference	No. of Sampling Locations	No. of Field Duplicate Pairs	No. of Extra Volume Laboratory QC	No. of Equipment Blanks	No. of Field Blanks	No of PE Samples
Air	Sub-slab Air	Low	TO-15 scan	2	---	N/A	N/A	1	N/A
	Indoor Air	Low	TO-15 SIM	2	1	N/A	N/A	1	N/A
	Ambient Air	Low	TO-15 SIM	1	---	N/A	N/A	N/A	N/A

QAPP Worksheet #21
Project Sampling SOP References Table

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Y/N)	Comments
2082	Construction and Installation of Permanent Sub-slab Soil Gas Wells	EPA/ERT Contract: REAC	SUMMA Canisters with pressure gauge, wrench, Teflon tubing, pump	N	
SST-08	Indoor Air Sampling with SUMMA Canisters Rev 4 November 2008	EPA/DESA/HWSB/SST	SUMMA Canisters with pressure gauge, wrench	N	

QAPP Worksheet #22
Field Equipment Calibration, Maintenance, Testing, and Inspection Table

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
PID	NA	Check/replace battery	NA	Prior to day's activities; anytime anomaly suspected	+/- 5 ppm	Replace battery; replace probe	EPA SST	SST-6 See Attachment 7

QAPP Worksheet #23
Analytical SOP References Table

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)*
TO-15	Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)	Definitive	Gases	GC/MS	National Non-RAS Laboratory	N

QAPP Worksheet #24
Analytical Instrument Calibration Table

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
GC/MS	See TO-15	Initial calibration: upon award of the contract, whenever the laboratory takes corrective action which may change or affect the initial calibration criteria (e.g., ion source cleaning or repair, column replacement, etc.), or if the continuing calibration acceptance criteria have not been met. Continuing calibration: Following initial calibration verification, once every 12 hours, end of run. GC/MS Tuning with 4-Bromoflurobenzene (BFB): Beginning of each 12 hour period during which standards and samples are analyzed. Retention Time Evaluation: each analysis.	Initial calibration/ Continuing calibration: relative response factor (RRF) greater than or equal to minimum acceptable response factor listed in Table 5 of procedure; %RSD must be less than or equal to value listed in Table 5 of procedure. GC/MS Tuning: See ion abundance table in TO-15. Retention Time Evaluation: +/- 0.50 minute of the internal standard retention time in the associated calibration check verification	Initial calibration: inspect system for problems (e.g., clean ion source, change the column, service the purge and trap device), correct problem, re-calibrate. Continuing calibration: inspect system, recalibrate the instrument, reanalyze samples. GC/MS Tuning: inspect the system, identify problem. MS tune criteria must be met before calibration Retention time evaluation: re-calibrate and verify, re-analyze samples back to the last good calibration check verification	National Non-RAS Laboratory GC/MS Technician	TO-15

QAPP Worksheet #25
Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing/Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GC/MS	See TO-15; as per instrument manufacturer's recommendations	See TO-15; as per instrument manufacturer's recommendations	See TO-15; as per instrument manufacturer's recommendations	Acceptable re-calibration; see TO-15	Inspect the system, correct problem, re-calibrate and/or reanalyze samples.	National Non-RAS Laboratory GC/MS Technician	TO-15

QAPP Worksheet #26
Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): EPA DESA HWSB SST
Sample Packaging (Personnel/Organization): EPA DESA HWSB SST
Coordination of Shipment (Personnel/Organization): EPA DESA HWSB SST and HWSS
Type of Shipment/Carrier: Federal Express
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodian, EPA National Non-RAS Laboratory
Sample Custody and Storage (Personnel/Organization): Sample Custodian, National Non-RAS Laboratory
Sample Preparation (Personnel/Organization): Sample Technicians, National Non-RAS Laboratory
Sample Determinative Analysis (Personnel/Organization): Sample Technicians, National Non-RAS Laboratory
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be shipped within24 hours of collection and arrive at laboratory within 24 hours (1 day) of sample shipment
Sample Extract/Digestate Storage (No. of days from extraction/digestion): As per analytical methodology; see Worksheet #19
SAMPLE DISPOSAL
Personnel/Organization: Sample Technicians, National Non-RAS Laboratory
Number of Days from Analysis: Until analysis and QA/QC checks are completed; as per analytical methodology; see Worksheet #19.

QAPP Worksheet #27
Sample Custody Requirements

Sample Identification Procedures: Each sample will be labeled with the site identification code: location-SS for sub-slab and IA for indoor air. Each sample will also be labeled with a CLP assigned number. Depending on the type of sample, additional information such as depth, sampling round, date, etc. will be added. Examples : EO-2-SS and EO-2-IA
Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Each sample will be individually identified and labeled after collection, then sealed with custody seals and enclosed a box. The sample information will be recorded on chain-of-custody (COC) forms, and the samples shipped to the appropriate laboratory via overnight delivery service or courier. Scribe™ will be used for field documentation. Refer to the U.S. EPA OSWER 9240.0-44, EPA 540-R-07-06 *Contract Laboratory Program Guidance for Field Samplers*, dated July 2007
Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): A sample custodian at the laboratory will accept custody of the shipped samples, and check them for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the laboratory manager for corrective action. The sample custodian will relinquish custody to the appropriate department for analysis. At this time, no samples will be archived at the laboratory.

QAPP Worksheet #28
QC Samples Table

(UFP-QAPP Manual Section 3.4)
Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limit exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

Matrix	Air
Analytical Group	Volatile Compounds
Concentration Level	Low
Sampling SOP(s)	2082
Analytical Method/SOP Reference	TO-15 (Scan)
Sampler's Name	Diane Salkie
Field Sampling Organization	US EPA/DESA/HWSB/SST
Analytical Organization	National Non-RAS Laboratory
No. of Sample Locations	2

Lab QC Sample:	Frequency / Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Method Blank	1 per ≤ 20 samples	No analyte > CRQL	Suspend analysis unit source recertified	National Non-RAS Laboratory Technician	Accuracy	No analyte > CRQL
Laboratory Replicate Sample	1 per ≤20 samples	± 25%RPD	± 25%RPD	National Non-RAS Laboratory Technician	Precision	± 25%RPD
Laboratory Audit Standard Sample	1 per ≤20 samples	±30% R	Flag outliers	National Non-RAS Laboratory Technician	Accuracy	±30% R

QAPP Worksheet #28
QC Samples Table

(UFP-QAPP Manual Section 3.4)
Complete a separate worksheet for each sampling technique, analytical method/SOP, matrix, analytical group, and concentration level. If method/SOP QC acceptance limit exceed the measurement performance criteria, the data obtained may be unusable for making project decisions.

Matrix	Gas
Analytical Group	Volatile Compounds
Concentration Level	Low
Sampling SOP(s)	SST-8
Analytical Method/SOP Reference	TO-15 SIM
Sampler's Name	Diane Salkie
Field Sampling Organization	US EPA/DESA/HWSB/SST
Analytical Organization	National Non-RAS Laboratory
No. of Sample Locations	2 plus field duplicate

Lab QC Sample:	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Laboratory Method Blank	1 per ≤ 20 samples	No analyte > ½ CRQL	Suspend analysis unit source recertified	National Non-RAS Laboratory Technician	Accuracy	No analyte > ½ CRQL
Laboratory Replicate Sample	1 per ≤20 samples	± 25%RPD	± 25%RPD	National Non-RAS Laboratory Technician	Precision	± 25%RPD
Laboratory Control Sample	1 per ≤20 samples	± 30%R	Flag outliers	National Non-RAS Laboratory Technician	Accuracy	± 30%R

QAPP Worksheet #29
Project Documents and Records Table

Sample Collection Documents and Records	Analysis Documents and Records	Data Assessment Documents and Records	Other
• Site and field logbooks • COC forms • Field Data Sheets. • SUMMA™ Sampling Work Sheet	• Sample receipt logs • Internal and external COC forms • Equipment calibration logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Telephone/email logs • Corrective action documentation	• Data validation reports • Field inspection checklist(s) • Laboratory Audit checklist (if performed) • Review forms for electronic entry of data into database • Corrective action documentation	

QAPP Worksheet #30
Analytical Services Table

Matrix	Analytical Group	Concentration Level	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
Soil Gas	TO-15 Scan VOCs	Low	TO-15	7 days preliminary 10 days hard copy	National Non-RAS Laboratory	NA
Indoor Air	TO-15 SIM VOCs	Low	TO-15	7 days preliminary 10 days hard copy	National Non-RAS Laboratory	NA

QAPP Worksheet #31
Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Actions
Laboratory Technical Systems/ Performance Audits	Annual	External	Regulatory Agency	Regulatory Agency	National Non-RAS Laboratory	National Non-RAS Laboratory	EPA or other Regulatory Agency
Performance Evaluation Samples	N/A	External	Regulatory Agency	Regulatory Agency	National Non-RAS Laboratory	National Non-RAS Laboratory	EPA or other Regulatory Agency
On-Site Field Inspection	Annual	Internal	EPA	EPA/DESA/HWSS	EPA/DESA/HWSS	EPA/DESA/HWSS	EPA/DESA/HWSS

QAPP Worksheet #32
Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response	Timeframe for Response
Project Readiness Review	Checklist or logbook entry	Project leader, Diane Salkie, EPA	Immediately to within 24 hours of review	Checklist or logbook entry	Project leader , Diane Salkie, EPA	Immediately to within 24 hours of review
Field Observations/ Deviations from Work Plan	Logbook	Project leader, Diane Salkie	Immediately to within 24 hours of deviation	Logbook	Project leader , Diane Salkie, EPA	Immediately to within 24 hours of deviation
Laboratory Technical Systems/ Performance Audits	Written Report	National Non-RAS Laboratory	30 days	Letter	National Non-RAS Laboratory	14 days
On-Site Field Inspection	Written Report	OSC, Andrew Confortini, EPA	7 calendar days after completion of the audit	Letter/Internal Memorandum	OSC, Andrew Confortini	To be identified in the cover letter of the report

QAPP Worksheet #33
QA Management Reports Table

Type of Report	Frequency (daily, weekly, monthly, quarterly, annually, etc.)	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation	Report Recipient(s)
National Non-RAS Laboratory (unvalidated)	As performed	7 days	National Non-RAS Laboratory	Adly Michael, RSCC, EPA Region 2 and Project leader , Diane Salkie, EPA
National Non-RAS Laboratory (validated)	As performed	14 days	EPA Region 2	Project leader, Diane Salkie, EPA
Laboratory Technical Systems/ Performance Audits	Annual	Unknown	EPA or other Regulatory Agency	National Non-RAS Laboratory
Performance Evaluation Samples	N/A	Unknown	EPA or other Regulatory Agency	National Non-RAS Laboratory
On-Site Field Inspection	Annual	7 calendar days after completion of the inspection	EPA/DESA/HWSB/HWSS	Project leader , Diane Salkie, EPA
Corrective Action Request	As required per field change	Three days after identification of need for field change	Project leader, Diane Salkie, EPA	EPA OSC, Andrew Confortini
Final Report	As performed	2 weeks after receipt of EPA approval of data package	Project leader, Diane Salkie, EPA	EPA OSC, Andrew Confortini

QAPP Worksheet #34
Verification (Step I) Process Table

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Site/field logbooks	Field notes will be prepared daily by the EPA Sample Leader and will be complete, appropriate, legible and pertinent. Upon completion of field work, logbooks will be placed in the project files.	I	Project leader, Diane Salkie, EPA
Chains of custody	COC forms will be reviewed against the samples packed in the specific cooler prior to shipment. The reviewer will initial the form. An original COC will be sent with the samples to the laboratory, while copies are retained for (1) the Sampling Trip Report and (2) the project files.	I	Project leader, Diane Salkie, EPA
Sampling Trip Reports	Trip Reports s will be prepared for each week of field sampling Information in the report will be reviewed against the COC forms, and potential discrepancies will be discussed with field personnel to verify locations, dates, etc.	I	Project leader, Diane Salkie, EPA
Laboratory analytical data package	Data packages will be reviewed/verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	I	National Non-RAS Laboratory
Laboratory analytical data package	Data packages will be reviewed as to content and sample information upon receipt by EPA.	I	Project leader, Diane Salkie, EPA
Final Sample Report	The project data results will be compiled in a sample report for the project. Entries will be reviewed/verified against hardcopy information.	I	Project leader, Diane Salkie, EPA

QAPP Worksheet #35
Validation (Steps IIa and IIb) Process Table

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs	Ensure that the sampling methods/procedures outlined in QAPP were followed, and that any deviations were noted/approved.	Project leader, Diane Salkie, EPA
IIb	SOPs	Determine potential impacts from noted/approved deviations, in regard to PQOs.	Project leader, Diane Salkie, EPA
IIa	Chains of custody	Examine COC forms against QAPP and laboratory contract requirements (e.g., analytical methods, sample identification, etc.).	ESAT Data Validation Personnel, EPA Region 2
IIa	Laboratory data package	Examine packages against QAPP and laboratory contract requirements, and against COC forms (e.g., holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	ESAT Data Validation Personnel, EPA Region 2
IIb	Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to PQOs. Examples include PQLs and QC sample limits (precision/accuracy).	ESAT Data Validation Personnel, EPA Region 2 Project leader, Diane Salkie, EPA
IIb	Field duplicates	Compare results of field duplicate (or replicate) analyses with RPD criteria	Project leader, Diane Salkie, EPA

QAPP Worksheet #36
Validation (Steps IIa and IIb) Summary Table

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa / IIb	Air	VOCs	Low	Validating Volatile Organic Analysis of Ambient Air in canister by Method TO-15 October 2006	ESAT Data Validation Personnel, EPA Region 2 Data Validation Personnel

QAPP Worksheet #37
Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

The measure of replicate precision is the absolute value of the difference between replicate measurements of the sample divided by the average value and expressed as a percentage as follows:

$$\text{Percent difference} = \frac{|X_1 - X_2|}{X} \times 100$$

where: X_1 - First measurement value
X_2 - Second Measurement value
X - Average of the two values

Factors that affected the precision of the measurement are: molecular weight, water solubility, polarizability, etc. A primary influence is the concentration level of the compound. A replicate precision value of 25 percent can be achieved for each of the target compounds. For more information, refer to Compendium Method *TO-15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specialty-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* which can be found as Appendix B.

A measurement of analytical accuracy is the degree of agreement with audit standards. It is defined as the difference between the nominal concentration of the audit compound and the measured value divided by the audit value and expressed as a percentage as follows:

$$\text{Audit Accuracy, \%} = \frac{\text{Spiked Value - Observed Value}}{\text{Spiked Value}} \text{ X } 100$$

For more information, refer to Compendium Method *TO-15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specialty-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)* which can be found as Appendix B. As per Method TO-15, the performance criteria for audit accuracy should be within 30 percent for concentrations normally expected within contaminated ambient air.

QAPP Worksheet #37
Usability Assessment

The TO-15 method must meet the following method performance criteria:

The performance criteria for a system to qualify under this method are as follows:

- All technical criteria for the analysis of samples, standards and quality control samples
- Establish the CRQL ≤0.5 ppbv for SCAN analysis, CRQL ≤0.05 ppbv for selected SIM analysis
- MDL concentration determined must be less than or equal to the 0.2 ppbv using SCAN mode of analysis.
- Routinely meet the clean canister criteria for all SUMMA Canisters.
- Mass spectra of each target compound must meet the qualitative identification criteria
- Audit accuracy ≤30% for all target compounds

The method blank should not contain any target analyte at a concentration greater than the CRQL and should not contain additional compounds with elution characteristics and mass spectral features that would interfere with identification and measurement of a method analyte. If the blanks do not meet the technical acceptance criteria, the analyst should consider the analytical system to be out of control. It is the responsibility of the analyst to ensure that contaminants in solvents, reagents, glassware, and other sample storage and processing hardware that lead to discrete artifacts and/or elevated baselines in gas chromatograms be eliminated. If contamination is a problem, the source of the contamination must be investigated and appropriate corrective measures need to be taken and documented before further sample analysis proceeds. If an analyte in the blank is found to be out of control (i.e., contaminated) and the analyte is also found in associated samples, those sample results should be "flagged" as possibly contaminated. Field blank samples are to be treated the same as method blank samples

QAPP Worksheet #37
Usability Assessment

Describe the evaluative procedures used to assess overall measurement error associated with the project:

Precision for indoor air duplicate must be ≤ 20 % RPD, laboratory replicate precision must be ±25%, laboratory accuracy must be between 70 and 130% or the Laboratory Audit Standard which is ± 30%. The field blank, requires no analyte to be greater than the quantitation limit while the method blank requires no analyte to be greater than half the quantitation limit. See Worksheet #12.

Identify the personnel responsible for performing the usability assessment:

Diane Salkie, Project Leader, EPA/DESA/HWSB/SST

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

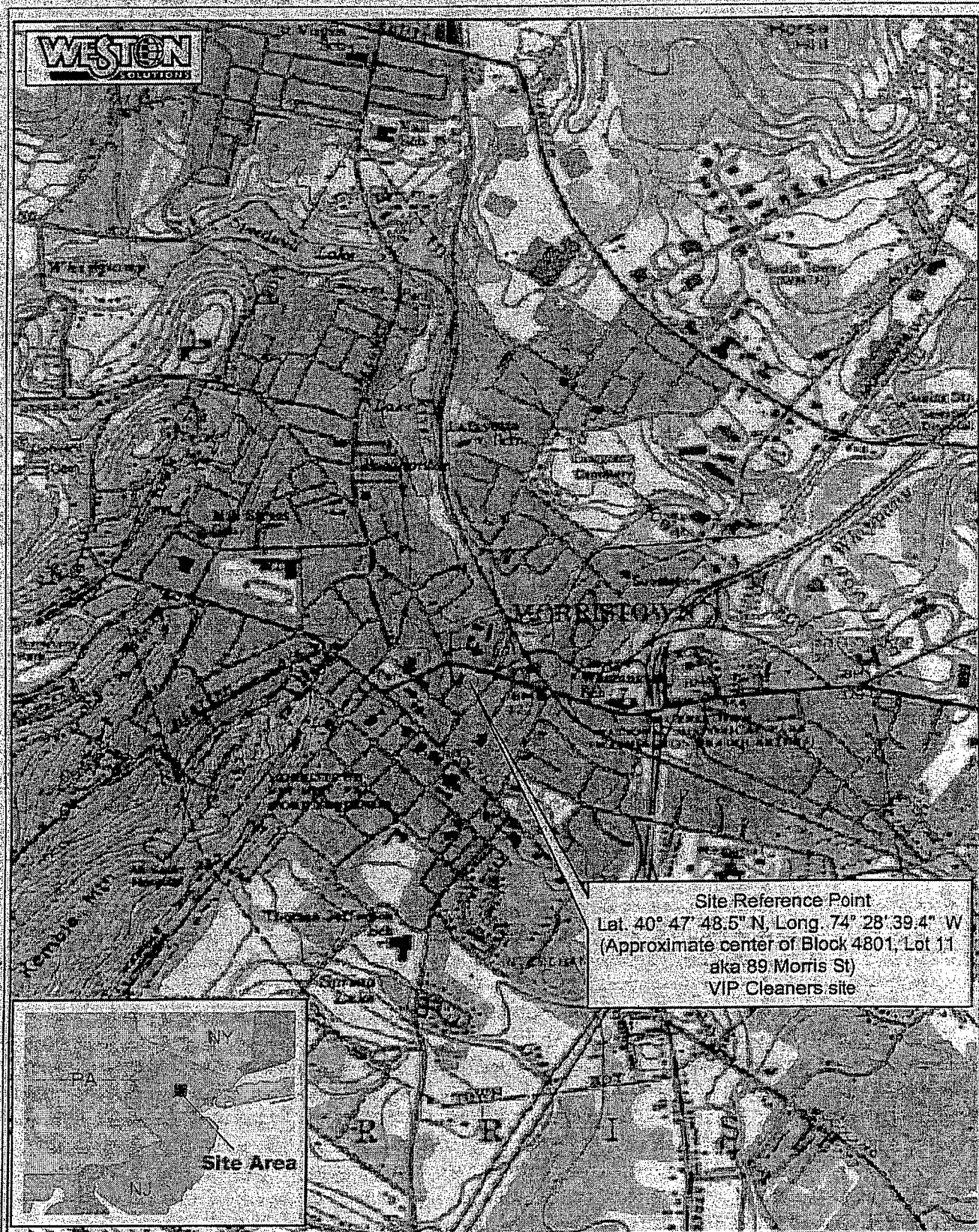
A final report will be generated by the Project Leader based on the final, validated data package. The data will be validated by the EPA/DESA/HWSB/HWSS or their contractor, ESAT in accordance with U.S. EPA Region II SOP *HW-31: Volatile Organic Analysis of Ambient Air in Canister by Method TO-15,* April 2006. The final validated data package includes a Data Assessment usability statement explaining any qualifiers that were added to the data. The Project Leader will incorporate the Data Assessment into sampling procedures and occurrence in the final report.

Discuss the impacts of any qualified data, any deviations from original plan or sampling procedures, whether the project objectives were met, etc.

Data qualified as estimated with a "J" is considered usable, data qualified with an "R" is not usable and may need to be resampled. Deviations will be added after the sampling event is complete.

ATTACHMENT 2

SITE MAPS



SOURCE: USGS 7.5 Minute Series
(Topographic) Quadrangles:
Morristown NJ, 1954, photorevised 1981

DATE: 03/13/06

N W E S

750 0 750 1,500

Graphic Scale in Feet

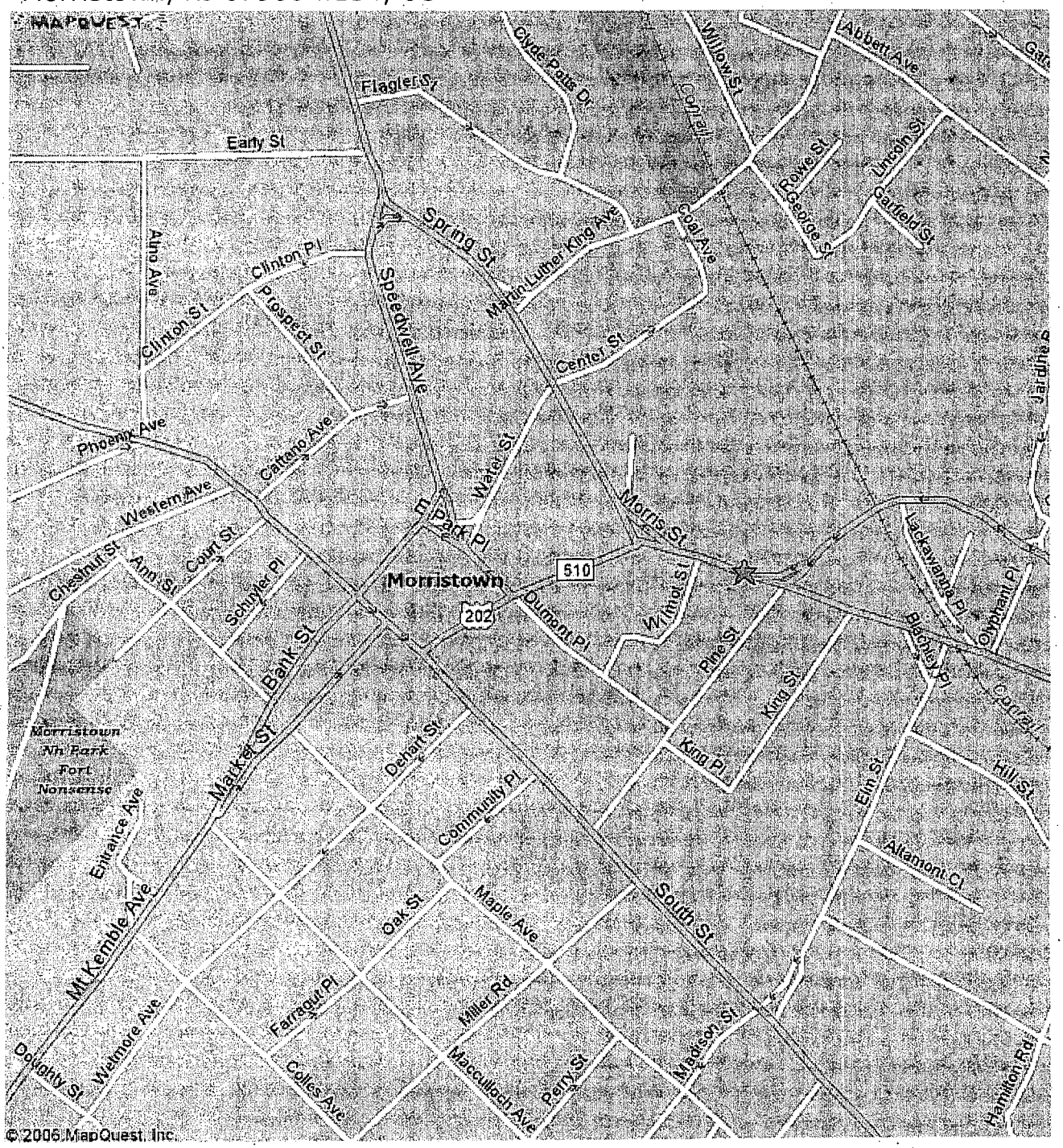
Figure 1
Site Location Map
VIP Cleaners
Morristown, Morris County, New Jersey

L:/SAT 2/VIP Cleaners (013)/GIS/02914_VIP_Figure1.mxd

MAPQUEST.

89 Morris St

Morristown, NJ 07960-4154, US



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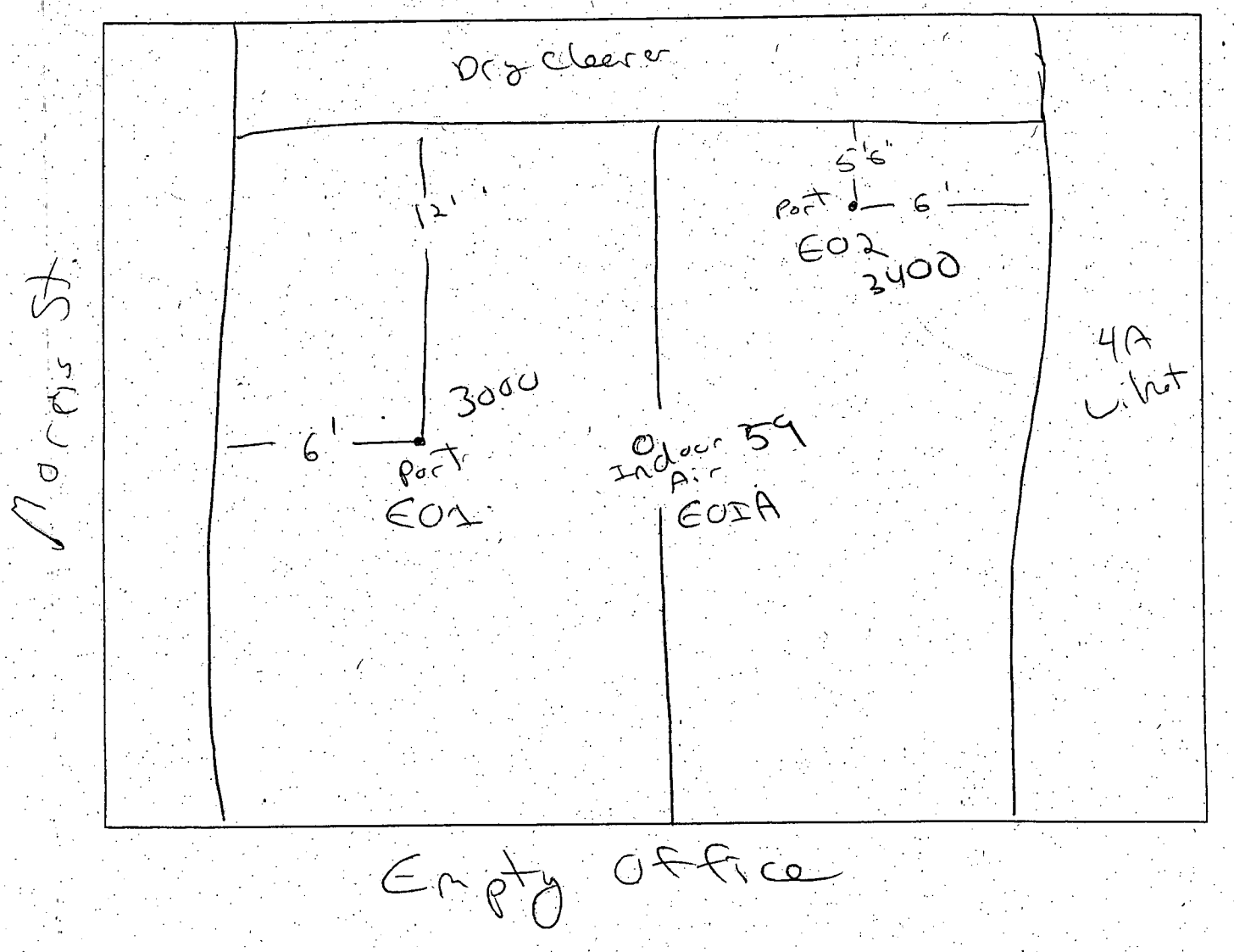
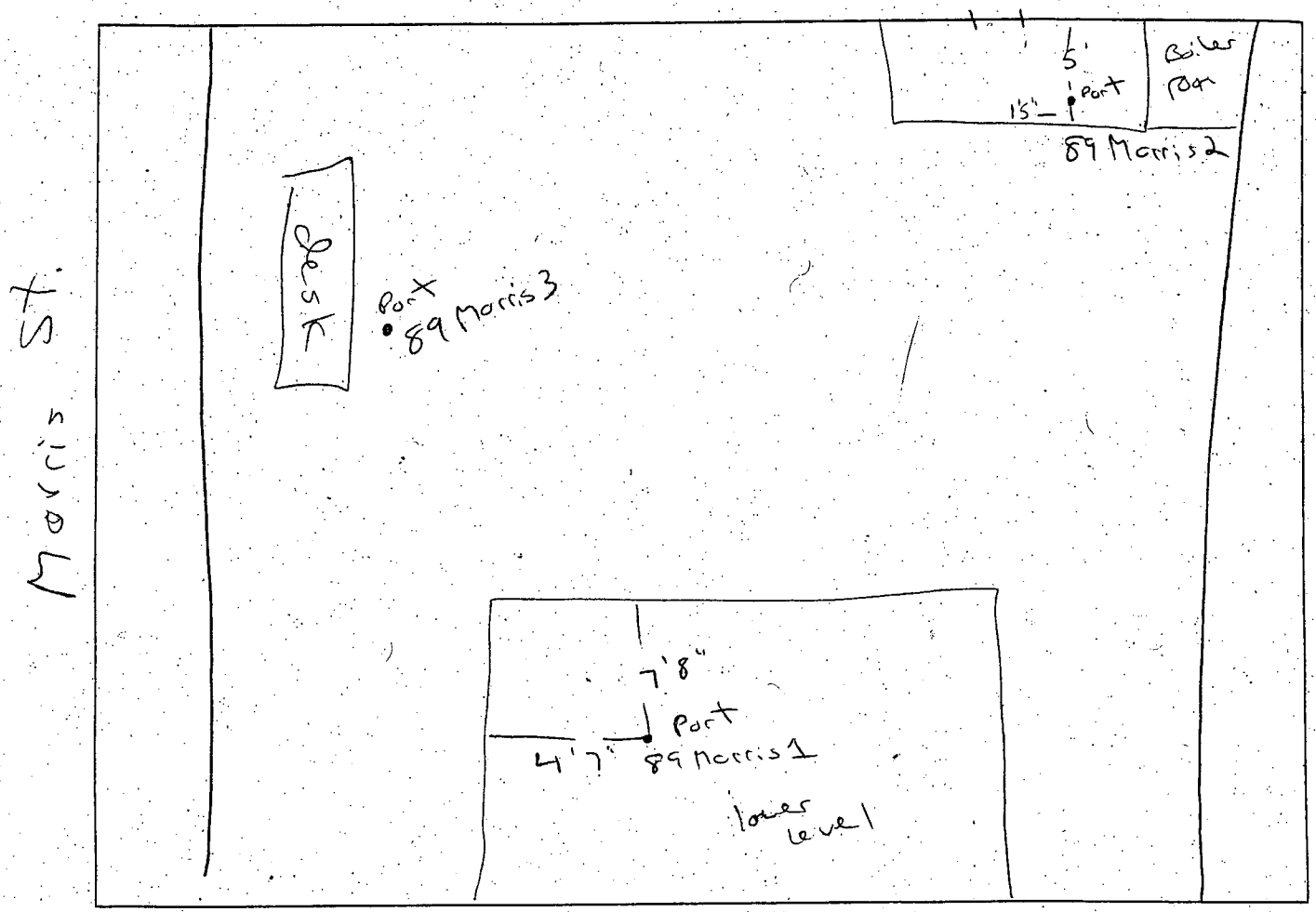
This map is informational only. No representation is made or warranty given as to its content. User assumes all risk of use. MapQuest and its suppliers assume no responsibility for any loss or delay resulting from such use.

Provide Drawing of Sample Location(s) in Building



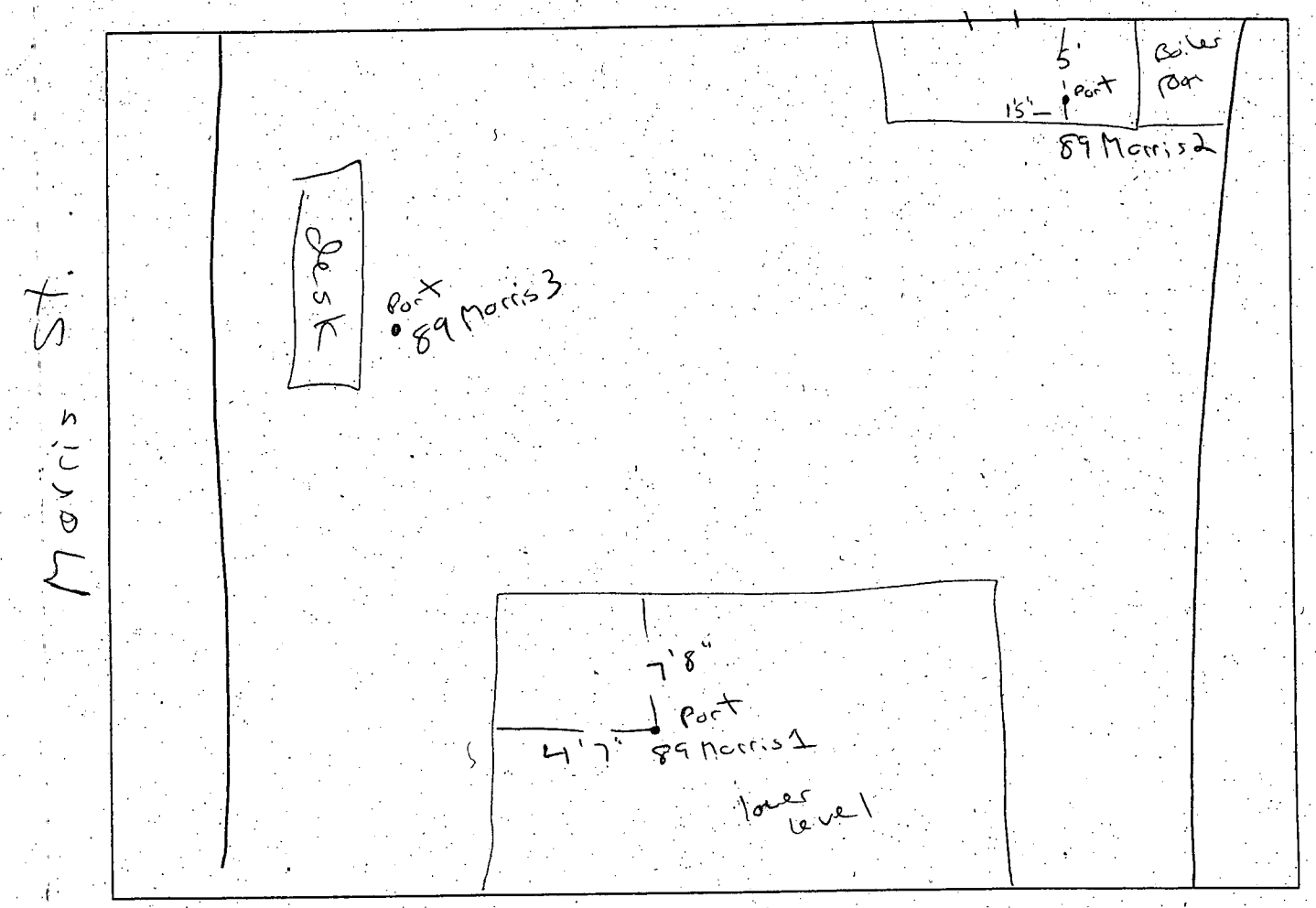
Provide Drawing of Sample Location(s) in Building



89 Morris St.

(New Image Cleaners + Tailoring)

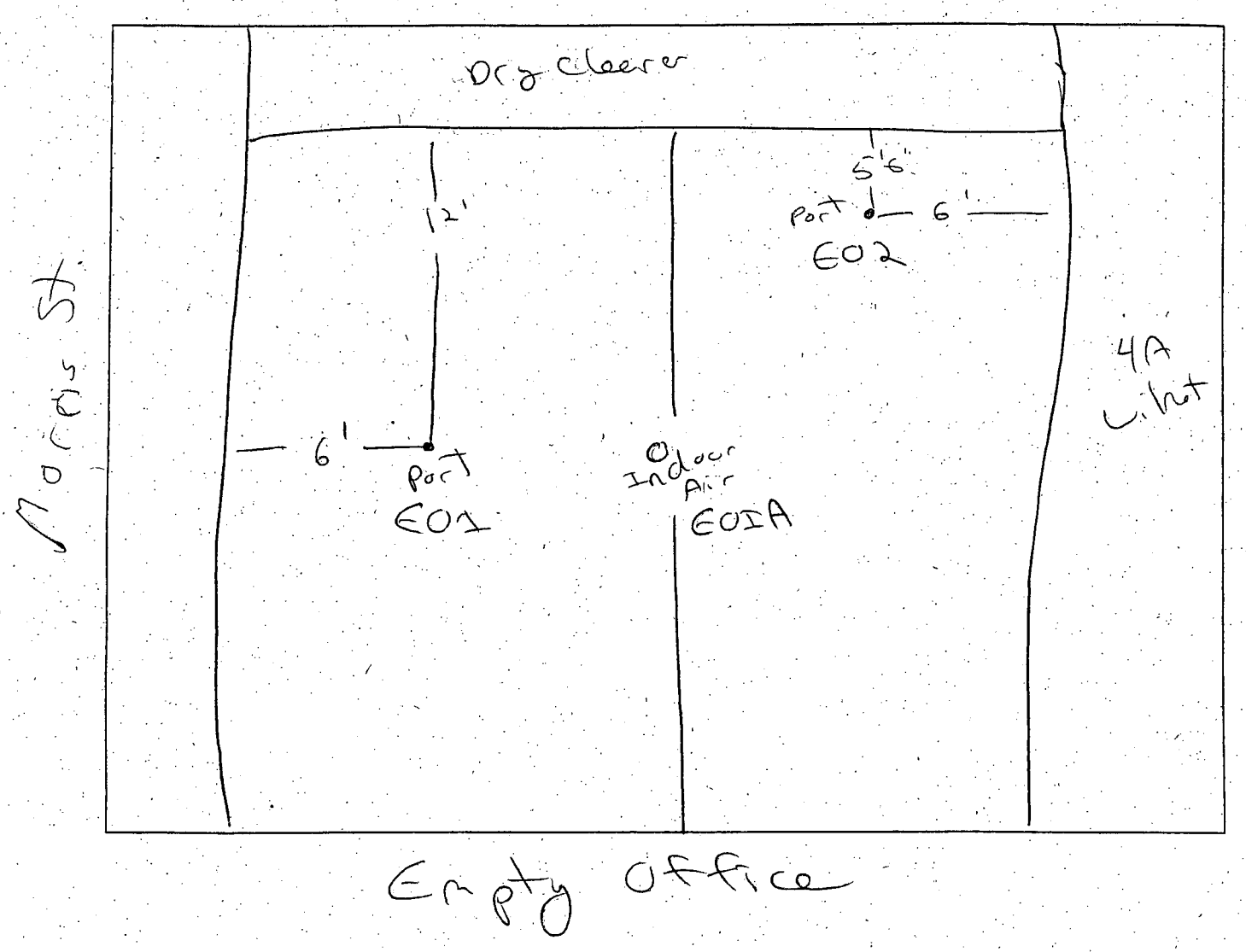
Provide Drawing of Sample Location(s) in Building



89 Morris St.

(New Image Cleaners & Tailoring)

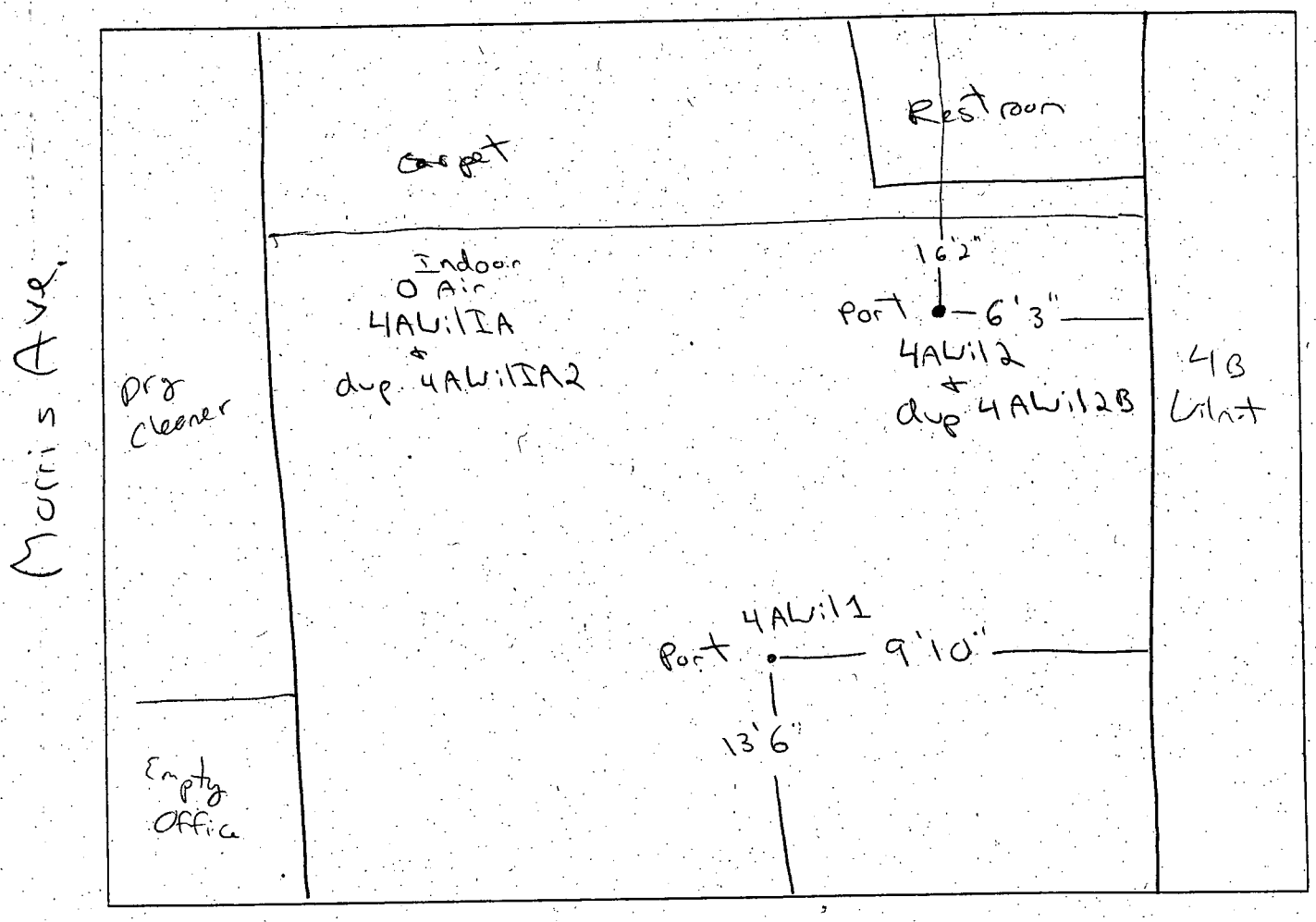
Provide Drawing of Sample Location(s) in Building



N

Not to Scale

Provide Drawing of Sample Location(s) in Building

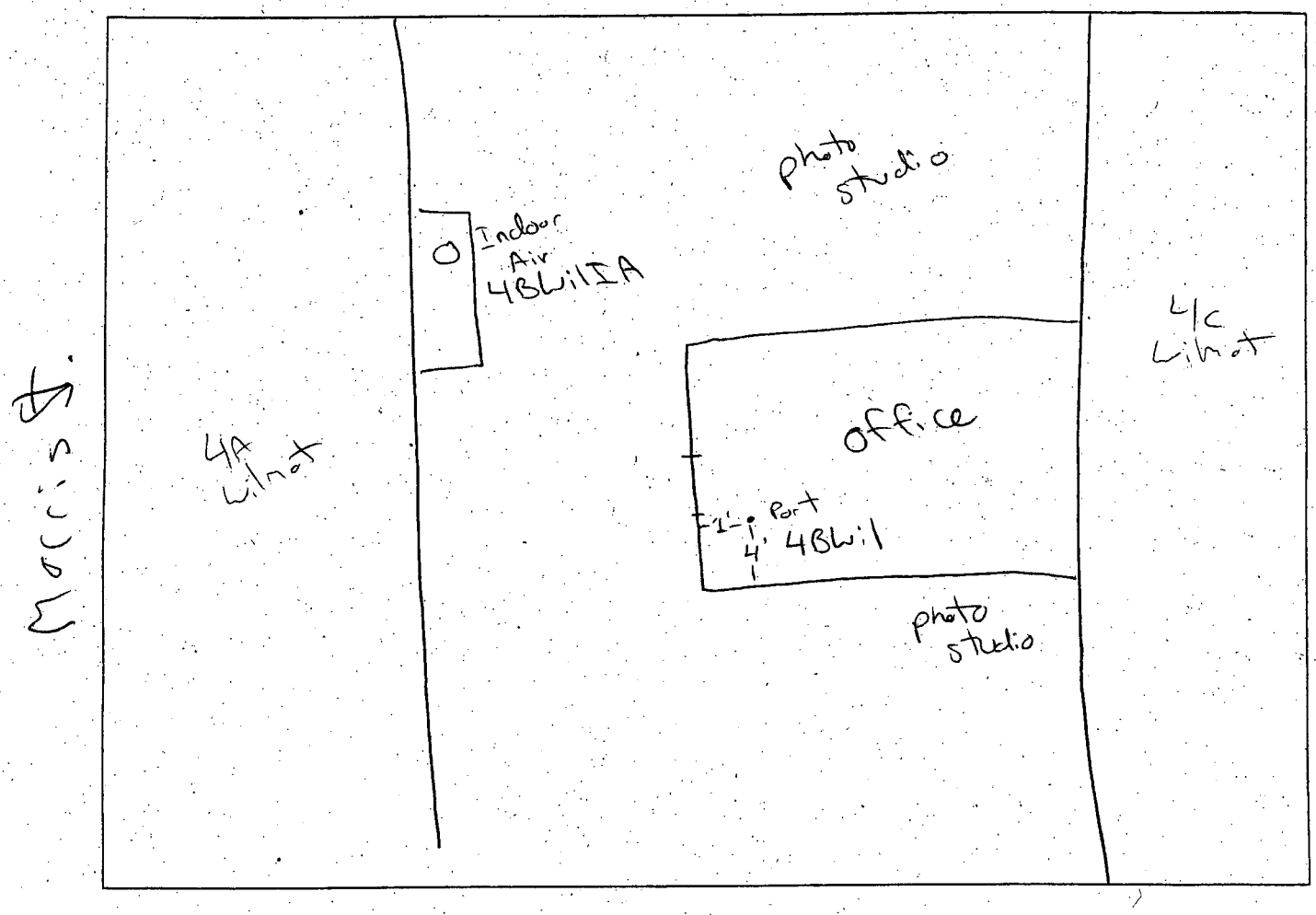


4A Wilmot St.
(former kid fit)

N

Not to Scale

Provide Drawing of Sample Location(s) in Building

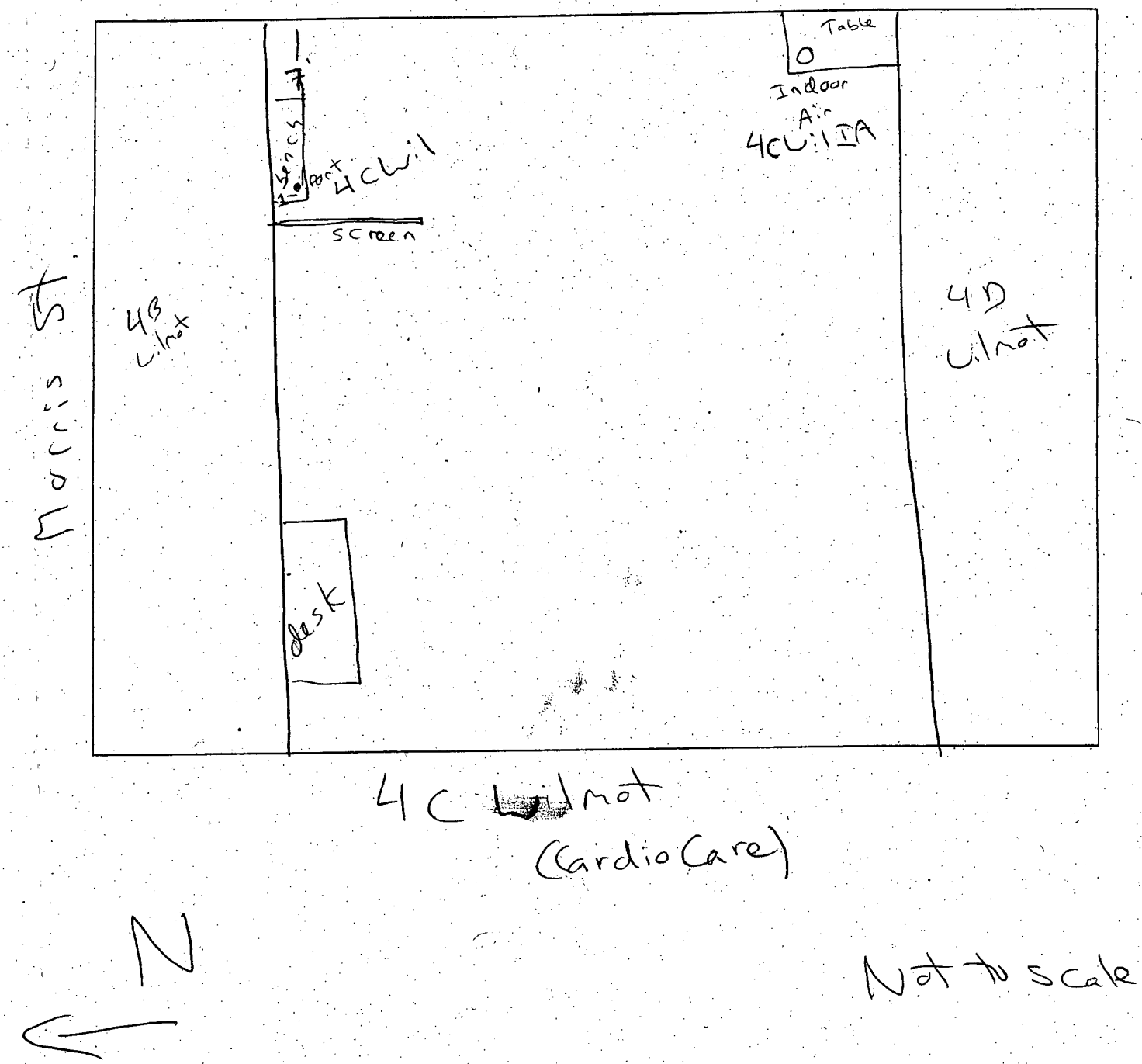


4B Wilmot St.
Elite Photography

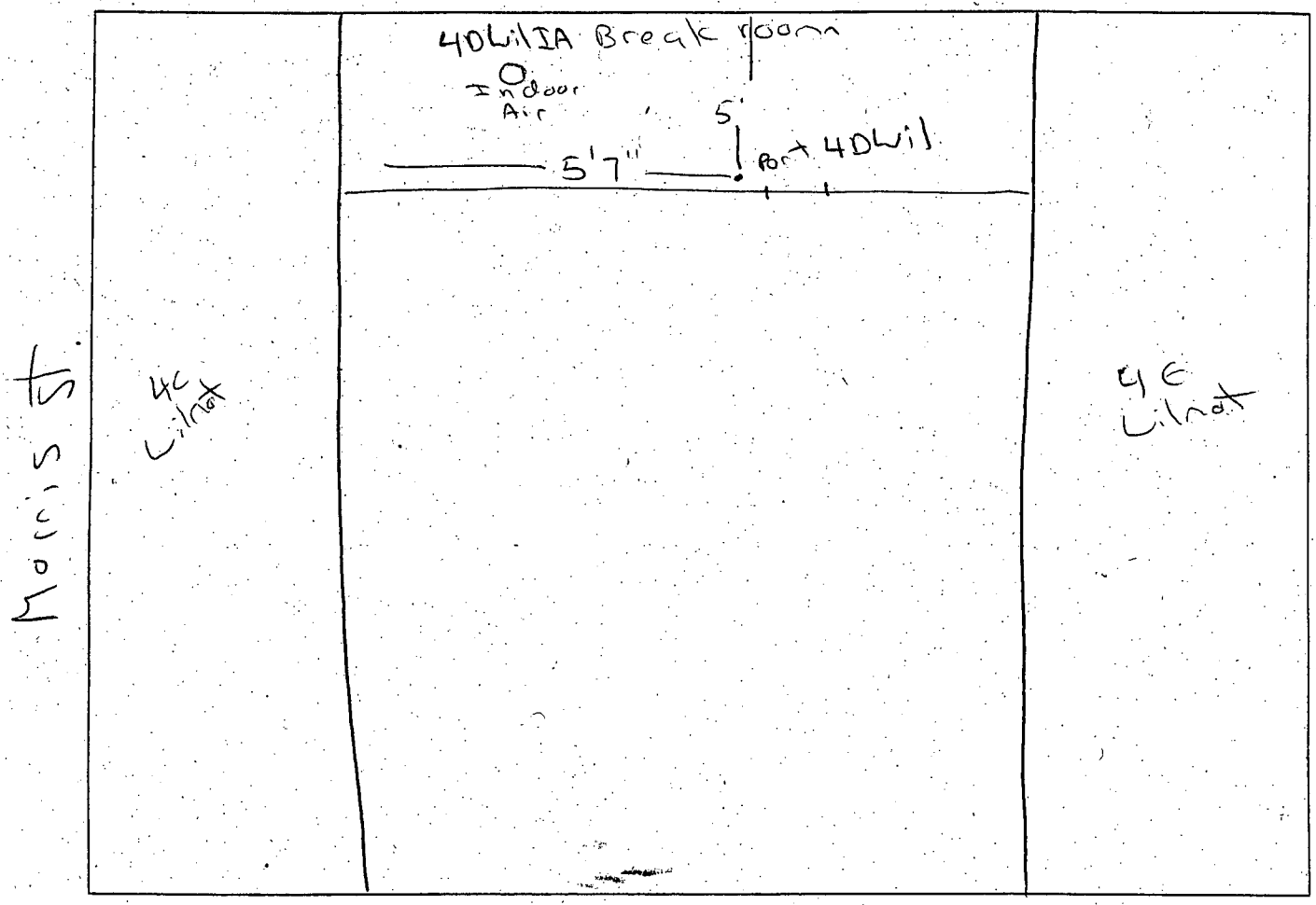
N

Not to scale

Provide Drawing of Sample Location(s) in Building



Provide Drawing of Sample Location(s) in Building

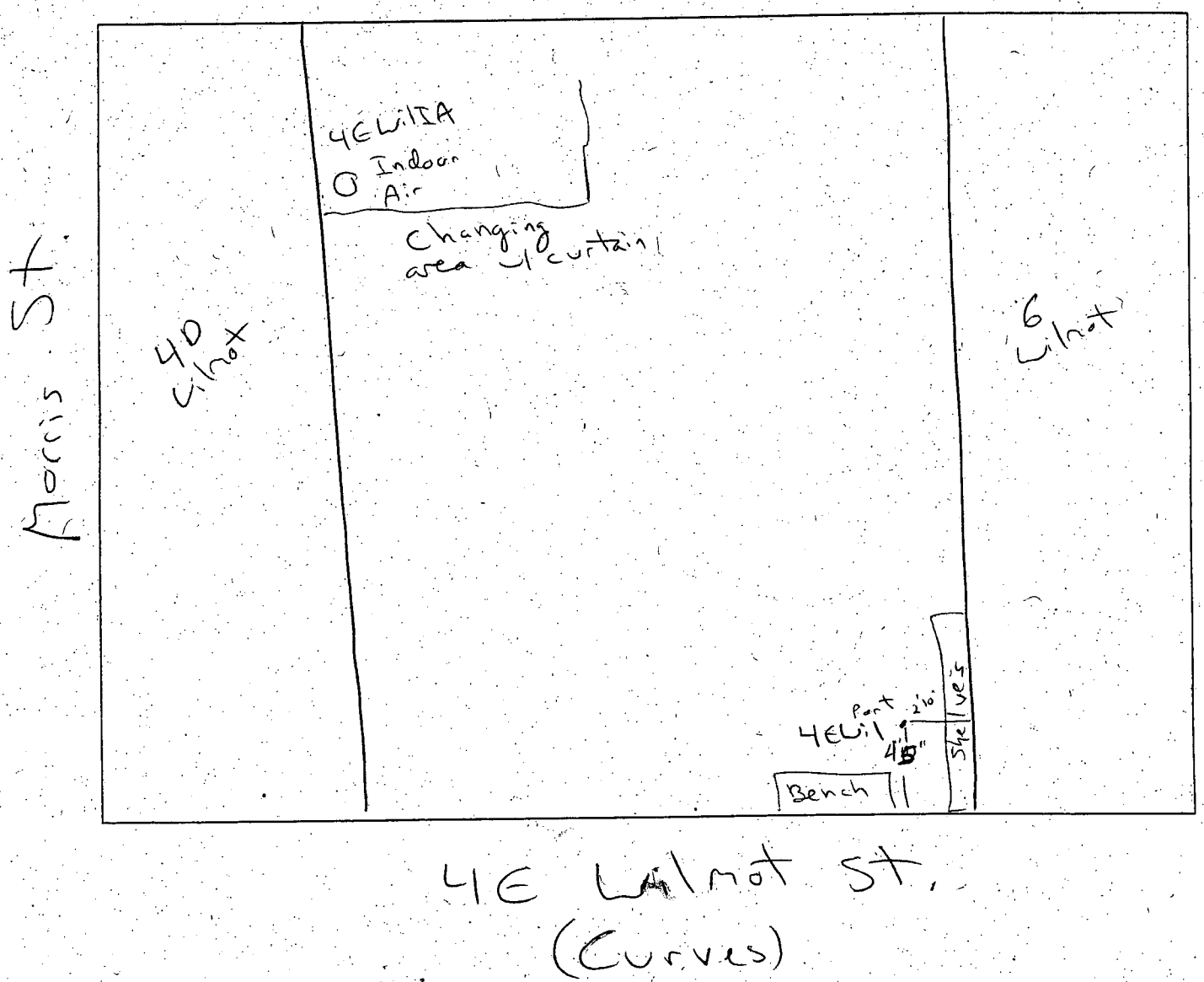


4 D Wilmot St.
(Amici Hair Design)

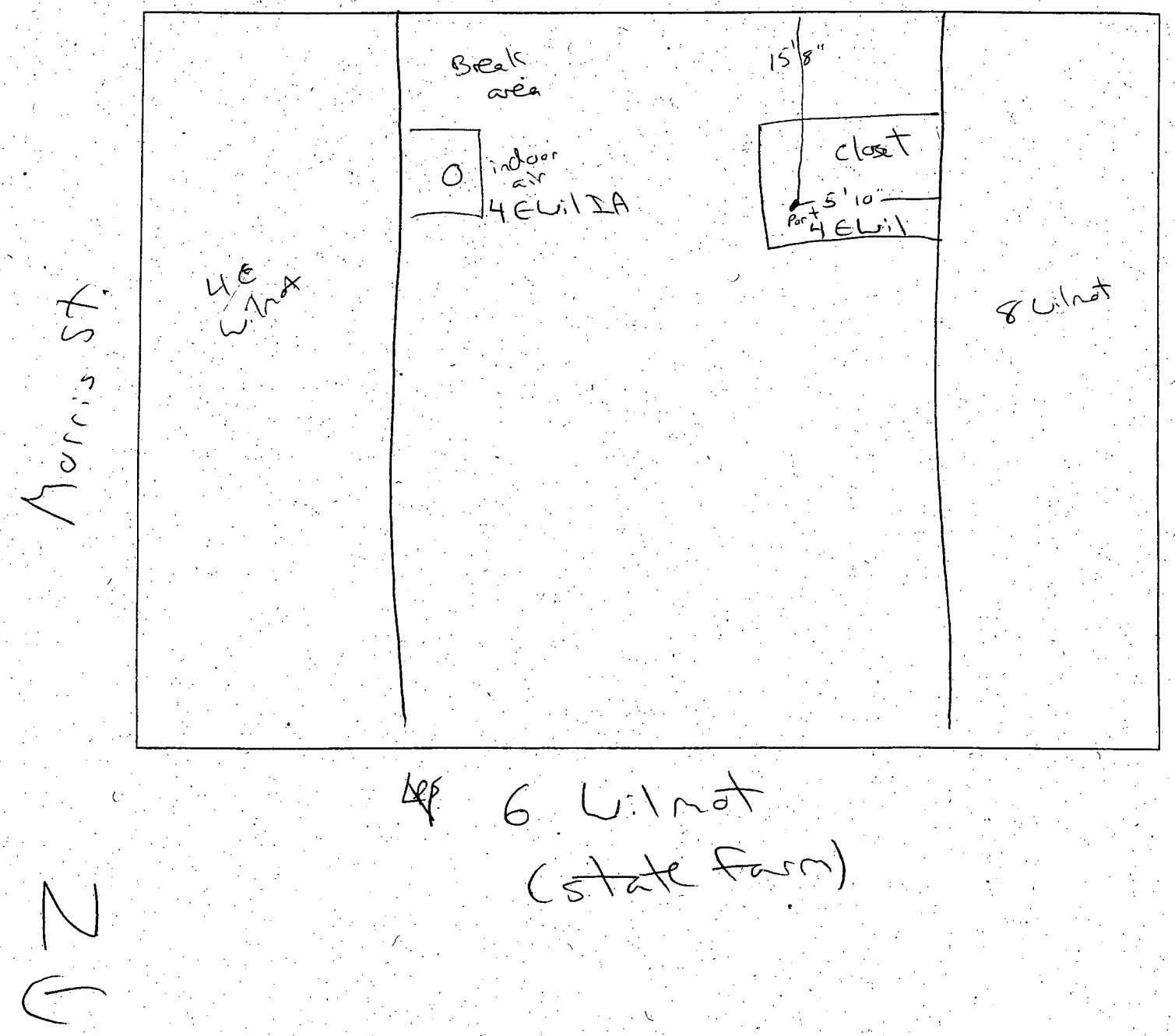
N

Not to scale

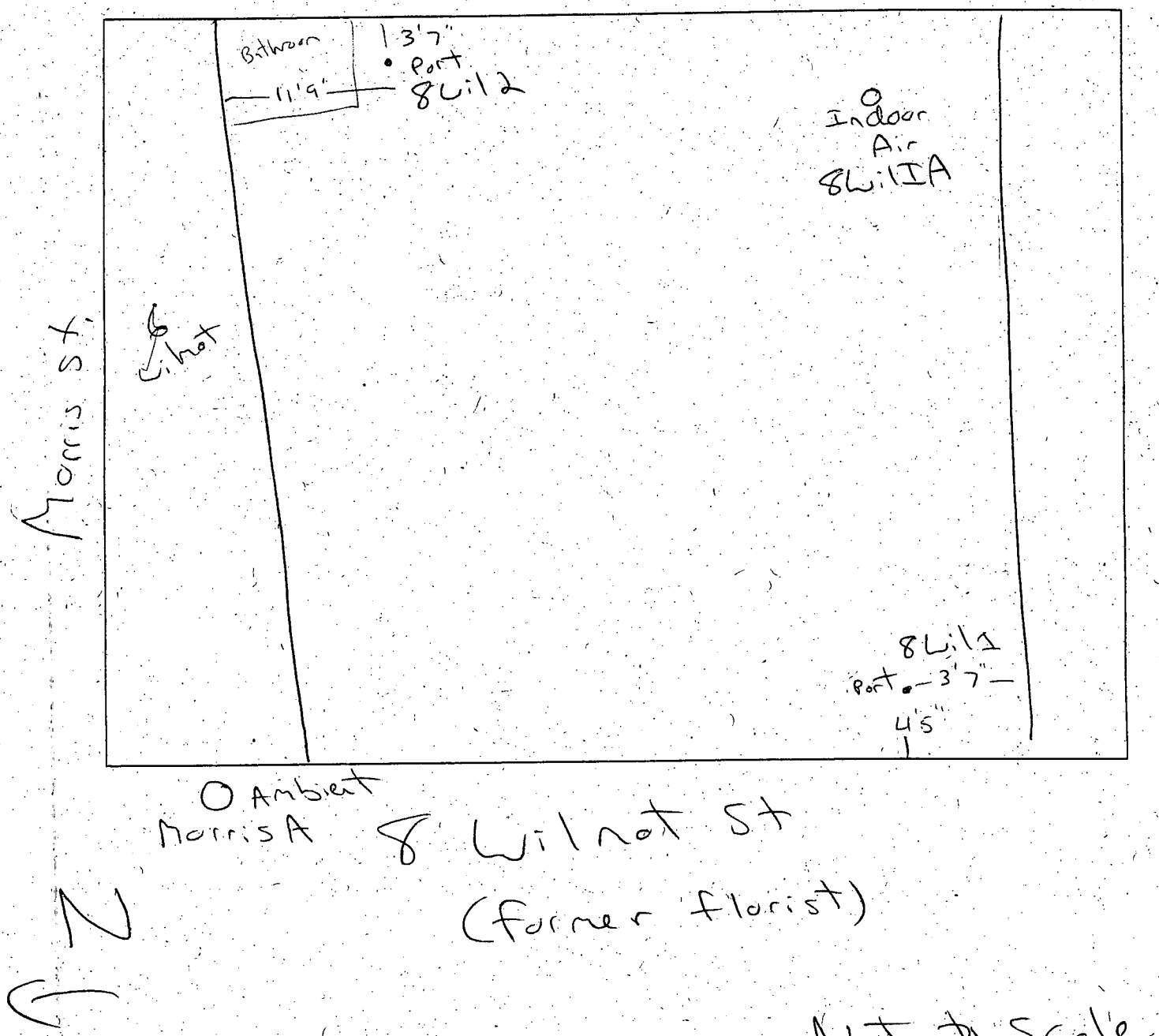
Provide Drawing of Sample Location(s) in Building



Provide Drawing of Sample Location(s) in Building



Provide Drawing of Sample Location(s) in Building



ATTACHMENT 3

Response Engineering and Analytical Contract (REAC)

Standard Operating Procedure 2082: Construction and Installation of Permanent Sub-Slab Soil Gas Wells

March 2004

ATTACHMENT 4

U.S. EPA Division of Environmental Science and Assessment. Hazardous Waste Support Branch. Superfund Contract Support Team.

Standard Operating Procedure (SOP) SCST-8 Indoor Air Sampling with SUMMA Canisters Rev.4

Edison, NJ
November 2008

ATTACHMENT 5

U.S. EPA Region III

Risk-Based Concentration Table. **Mid-Atlantic Risk Assessment**

Updated July 7, 2008

ATTACHMENT 6

Example Questionnaire, Example SUMMA Work Sheet, Example Chain of Custody record

ATTACHMENT 7

U.S. EPA Division of Environmental Science and Assessment. Hazardous Waste Support Branch. Superfund Contract Support Team.

SST-6 Photo-Ionization Detector Standard Operating Procedure

Edison, NJ
September 2006

APPENDIX C

AIR DATA PACKAGE

RECORD OF COMMUNICATION

REGIONAL SAMPLE CONTROL CENTER

TDF# HWSS

DATE: 01/15/09
SUBJECT: CLP Data Package for Quality Assurance Review
FROM: Hazardous Waste Support Section (HWSS)/RSCC
TO: HWSS ESAT-TOPO

Attached is the following Non-RAS Data Package to be reviewed for Quality Assurance

SITE: VIP Cleaners **CASE #: 08-0007**

SDG#: 080782 **SAMPLER: US EPA**

		#SAMPLES	MATRIX
PROJ. CODE: RS	**SITE SPILL #: 02XN**		
LAB: AAC	**OPERABLE UNIT: 01**	**2 SCAN**	**AIR**
TURN-AROUND-TIME: 7 day		**4 SIM**	**AIR**

CERCLIS ID # : N/A **FRACTION:** VOCs

Contaminant(s) of Concern (If known)

REGION II RSCC DATA TRANSFER LOG

Relinquished By		Received By	
Signature	**Date/Time**	**Signature**	**Date/Time**
Adly Michael	1/15/09 3:35 pm	[illegible]	1/15/09 3:35
[illegible]	1/26/09 9:00 Am	Robert [illegible]	1/26/09 9:00 Am

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organic Analysis

CASE No.: 08-0007
LABORATORY: AAC
SAMPLES: 6 Air
SAMPLER: USEPA

WO No.: 080782
SITE: VIP Cleaners
ANALYSIS: Full Scan (2)
Modified TO-15 SIM (4)

DATA ASSESSMENT

The current SOP HW-31 (Revision 4) December 2006, USEPA Region II Data Validation SOP for Statement of Work TO-15 for evaluating organic Ambient Air in Canisters have been applied.

All data are valid and acceptable except those analytes rejected "R"(unusable). Due to the detection of QC problems, some analytes may have the "J" (estimated), "N"(presumptive evidence for the presence of the material), "U" (non-detect) or "JN" (presumptive evidence for the presence of the material at an estimated value) flag. All action is detailed on the attached sheets.

The "R" flag means that the associated value is unusable. In other words, significant data bias is evident and the reported analyte concentration is unreliable.

Reviewer's Signature: Russell Arnone

Date: 01/22/2009

CLP DATA ASSESSMENT

SDG# 080782

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes shown due to excessive holding time.

No problems found for this qualification.

2. Leak Test Evaluation:

All canisters are leak tested prior to each sampling use. The initial pressure is measured, the canister valve is closed, and the final pressure is checked after 24 hours. If acceptable, the pressure should not vary more than 13.8 kPa (2 psig) over the 24-hour period.

No problems found for this qualification.

3. Canister Certification:

Canister certification involves two procedures: Blank Analysis and blank spike Analysis. The canister is "Certified" if target analytes are < 0.2 ppv. For the spiked canister, the acceptable % difference for any target compound at a nominal 10-ppv concentration in humidified zero air is <30%.

No problems found for this qualification.

4. Laboratory Control/Lab Control Duplicate Recovery: (LCS/LCSD)

The LCS/LCS Duplicate data is generated to determine the long-term precision and accuracy of the analytical method. The LCS/LCS Duplicate may be used in conjunction with other QC criteria for additional qualification of data. The LCS is analyzed once per 24-hour analytical sequence and concurrently with the samples in the SDG.

No problems found for this qualification.

5. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, field, or rinse blanks are prepared to identify any contamination that may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Field and rinse blanks measure cross-contamination of samples throughout field operations. If the concentration of the analyte is less than or equal five times (5X) the method blank concentration, the analytes are qualified as non-detects, "U". The following analytes in the sample shown were

qualified with "U" for these reasons:

A) Method blank contamination:

No problems found for this qualification.

B) Field or rinse blank contamination:

None.

C) Tics "R" rejected

None.

6. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is (BFB) Bromofluorobenzene.

If the mass calibration is in error, all associated data will be classified as unusable "R".

No problems.

7. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance.
Percent RSD must be ≤ 30% for all Target analytes. %D must be ≤ 30% for all Target analytes. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ". If %RSD and %D grossly exceed QC criteria, non-detects data may be qualified "R".

No problems found for this qualification.

8. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity

CLP DATA ASSESSMENT

and response are stable during every experimental run. The internal standard area count must not vary by more than 40% from the most recent valid calibration standard area. The retention time of the internal standard must not vary more than 20 seconds from the latest daily (24-hour) calibration standard. If the area count is greater the 40% range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated "J", and all non-detects are not flagged. If the area count is less than the 40% range of the associated standard, all of the positive results for compounds quantitated with that IS are qualified as estimated "J", and all non-detects are qualified as unusable "UJ". If the area count is < 25%, flag all non-detects as unusable "R".

If an internal standard retention time varies by more than 20 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

No problems found for this qualification.

9. COMPOUND IDENTIFICATION:

A) Air Volatile Samples:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within 0.06 RRT units of the standard compound and have ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

No problems.

10 CONTRACT PROBLEMS NON-COMPLIANCE:

No problems.

11. FIELD DOCUMENTATION:
No problems.

12. OTHER PROBLEMS

SIM
Initial calibration response factor % relative standard deviation ≤ 30% which meets TO-15 QC criteria. Normally individual and average RRF are ≥ 0.05. SIM RRF are ≤ 0.05. Using professional judgment, these values are satisfactory.

13. This package contains reextractions, reanalyses or dilutions. Upon reviewing the QA results, the following Form 1(s) are identified not to be used. None

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JAN 14 2009
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Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT	Environmental Protection Agency	DATE SHIPPED	12/05/2008
PROJECT NO	080782	DATE RECEIVED	12/08/2008
MATRIX	AIR	DATE REPORTED	12/19/2008
UNITS	PPB (v/v)	COC NUMBER	08-0007-12/05/08-0001

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID	000483			Sample Reporting Limit (SRL) (MRLxDF's)	000531			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	080782-36279				080782-36281				
Sampling Date/Time	12/04/2008 11:44 AM				12/04/2008 11:47 AM				
Analysis Date/Time	12/10/2008 12:29 PM				12/10/2008 04:23 PM				
QC Batch	MS03_121008				MS03_121008				
Can Dilution Factor	1.48				4.90				
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Vinyl Chloride	<SRL	U	1.0	0.7	<SRL	U	1.0	2.4	0.5
Chloroethane	<SRL	U	1.0	0.7	<SRL	U	1.0	2.4	0.5
1,1-Dichloroethylene	<SRL	U	1.0	0.7	<SRL	U	1.0	2.4	0.5
t-1,2-Dichloroethylene	<SRL	U	1.0	0.7	<SRL	U	1.0	2.4	0.5
1,1-Dichloroethane	<SRL	U	1.0	0.7	<SRL	U	1.0	2.4	0.5
cis-1,2- Dichloroethene	7.7		1.0	0.7	<SRL	U	1.0	2.4	0.5
1,2-Dichloroethane	<SRL	U	1.0	0.7	<SRL	U	1.0	2.4	0.5
1,1,1-Trichloroethane	<SRL	U	1.0	0.7	<SRL	U	1.0	2.4	0.5
Trichloroethene	18.9		1.0	0.7	<SRL	U	1.0	2.4	0.5
Tetrachloroethylene	1560		50	37	3.2		1.0	2.4	0.5
BFB-Surrogate Std. % Recovery	102%				98%				70-130%

U - Compound was analyzed for, but was not detected at or above the SRL.

Marcus Hueppe
Laboratory Manager

1534 Eastman Avenue • Suite A • Ventura, California 93003 (805) 650-1642 • FAX (805) 650-1644

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AAC ID	080782-36279				080782-36281				
Sampling Date/Time	12/04/2008 11:44 AM				12/04/2008 11:47 AM				
Analysis Date/Time	12/10/2008 12:29 PM				12/10/2008 04:23 PM				
QC Batch	MS03 121008				MS03 121008				
Can Dilution Factor	1.48				4.90				
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Vinyl Chloride	<SRL	U	1.0	1.9	<SRL	U	1.0	6.3	1.3
Chloroethane	<SRL	U	1.0	2.0	<SRL	U	1.0	6.5	1.3
1,1-Dichloroethylene	<SRL	U	1.0	2.9	<SRL	U	1.0	9.6	2.0
t-1,2-Dichloroethylene	<SRL	U	1.0	2.9	<SRL	U	1.0	9.7	2.0
1,1-Dichloroethane	<SRL	U	1.0	3.0	<SRL	U	1.0	9.8	2.0
cis-1,2- Dichloroethene	30.3		1.0	2.9	<SRL	U	1.0	9.6	2.0
1,2-Dichloroethane	<SRL	U	1.0	3.0	<SRL	U	1.0	9.8	2.0
1,1,1-Trichloroethane	<SRL	U	1.0	4.0	<SRL	U	1.0	13.4	2.7
Trichloroethene	101		1.0	4.0	<SRL	U	1.0	13.1	2.7
Tetrachloroethylene	10600		50	251	21.6		1.0	16.6	3.4
BFB Surrogate Std. % Recovery	102%				98%				70-130%

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MATRIX	AIR	DATE REPORTED	12/19/2008
UNITS	PPB (v/v)	COC NUMBER	08-0007-12/05/08-0001

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15 SIM

Client ID	000434			Sample Reporting Limit (SRL) (MRLxDF's)	000450			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	080782-36277				080782-36278				
Sampling Date/Time	12/04/2008 11:44 AM				12/04/2008 11:44 AM				
Analysis Date/Time	12/10/2008 03:16 PM				12/10/2008 04:43 PM				
QC Batch	MS01 121008				MS01 121008				
Can Dilution Factor	1.30				1.56				
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Vinyl Chloride	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
Chloroethane	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
1,1-Dichloroethylene	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
t-1,2-Dichloroethylene	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
1,1-Dichloroethane	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
cis-1,2- Dichloroethene	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
1,2-Dichloroethane	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
1,1,1-Trichloroethane	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
Trichloroethene	<SRL	U	1.0	0.065	<SRL	U	1.0	0.078	0.05
Tetrachloroethylene	0.31		1.0	0.065	0.32		1.0	0.078	0.05
BFB-Surrogate Std. % Recovery	103%				102%				70-130%

U - Compound was analyzed for, but was not detected at or above the SRL.

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Laboratory Analysis Report

CLIENT Environmental Protection Agency
PROJECT NO 080782
MATRIX AIR
UNITS ug/m3

DATE SHIPPED 12/05/2008
DATE RECEIVED 12/08/2008
DATE REPORTED 12/19/2008
COC NUMBER 08-0007-12/05/08-0001

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15 SIM

Client ID	000434			Sample Reporting Limit (SRL) (MRLxDF's)	000450			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	080782-36277				080782-36278				
Sampling Date/Time	12/04/2008 11:44 AM				12/04/2008 11:44 AM				
Analysis Date/Time	12/10/2008 03:16 PM				12/10/2008 04:43 PM				
QC Batch	MS01_121008				MS01_121008				
Can Dilution Factor	1.30				1.56				
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Vinyl Chloride	<SRL	U	1.0	0.17	<SRL	U	1.0	0.20	0.13
Chloroethane	<SRL	U	1.0	0.17	<SRL	U	1.0	0.21	0.13
1,1-Dichloroethylene	<SRL	U	1.0	0.25	<SRL	U	1.0	0.31	0.20
t-1,2-Dichloroethylene	<SRL	U	1.0	0.26	<SRL	U	1.0	0.31	0.20
1,1-Dichloroethane	<SRL	U	1.0	0.26	<SRL	U	1.0	0.31	0.20
cis-1,2- Dichloroethene	<SRL	U	1.0	0.25	<SRL	U	1.0	0.31	0.20
1,2-Dichloroethane	<SRL	U	1.0	0.26	<SRL	U	1.0	0.31	0.20
1,1,1-Trichloroethane	<SRL	U	1.0	0.35	<SRL	U	1.0	0.43	0.27
Trichloroethene	<SRL	U	1.0	0.35	<SRL	U	1.0	0.42	0.27
Tetrachloroethylene	2.09		1.0	0.44	2.15		1.0	0.53	0.34
BFB-Surrogate Std. % Recovery	103%				102%				70-130%

U - Compound was analyzed for, but was not detected at or above the SRL.

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CLIENT	Environmental Protection Agency	DATE SHIPPED	12/05/2008
PROJECT NO	080782	DATE RECEIVED	12/08/2008
MATRIX	AIR	DATE REPORTED	12/19/2008
UNITS	PPB (v/v)	COC NUMBER	08-0007-12/05/08-0001

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15 SIM

Client ID	000498			Sample Reporting Limit (SRL) (MRLxDF's)	000538			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	080782-36280				080782-36282				
Sampling Date/Time	12/04/2008 11:50 AM				12/08/2008 11:45 AM				
Analysis Date/Time	12/10/2008 05:26 PM				12/10/2008 06:10 PM				
QC Batch	MS01_121008				MS01_121008				
Can Dilution Factor	1.71				1.29				
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Vinyl Chloride	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
Chloroethane	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
1,1-Dichloroethylene	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
t-1,2-Dichloroethylene	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
1,1-Dichloroethane	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
cis-1,2- Dichloroethene	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
[illegible]-Dichloroethane	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
1,1,1-Trichloroethane	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
Trichloroethene	<SRL	U	1.0	0.085	<SRL	U	1.0	0.065	0.05
Tetrachloroethylene	<SRL	U	1.0	0.085	0.42		1.0	0.065	0.05
BFB-Surrogate Std. % Recovery	101%				102%				70-130%

U - Compound was analyzed for, but was not detected at or above the SRL.

Marcus Hueppe
Laboratory Manager

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Atmospheric Analysis & Consulting, Inc.

Laboratory Analysis Report

CLIENT: Environmental Protection Agency
PROJECT NO: 080782
MATRIX: AIR
UNITS: ug/m3

DATE SHIPPED: 12/05/2008
DATE RECEIVED: 12/08/2008
DATE REPORTED: 12/19/2008
COC NUMBER: 08-0007-12/05/08-0001

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15 SIM

Client ID	000498			Sample Reporting Limit (SRL) (MRLxDF's)	000538			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	080782-36280				080782-36282				
Sampling Date/Time	12/04/2008 11:50 AM				12/08/2008 11:45 AM				
Analysis Date/Time	12/10/2008 05:26 PM				12/10/2008 06:10 PM				
QC Batch	MS01_121008				MS01_121008				
Can Dilution Factor	1.71				1.29				
	Result	Qualifier	Analysis DF		Result	Qualifier	Analysis DF		
Vinyl Chloride	<SRL	U	1.0	0.22	<SRL	U	1.0	0.17	0.13
Chloroethane	<SRL	U	1.0	0.23	<SRL	U	1.0	0.17	0.13
1,1-Dichloroethylene	<SRL	U	1.0	0.34	<SRL	U	1.0	0.25	0.20
t-1,2-Dichloroethylene	<SRL	U	1.0	0.34	<SRL	U	1.0	0.26	0.20
1,1-Dichloroethane	<SRL	U	1.0	0.34	<SRL	U	1.0	0.26	0.20
cis-1,2- Dichloroethene	<SRL	U	1.0	0.34	<SRL	U	1.0	0.25	0.20
1,2-Dichloroethane	<SRL	U	1.0	0.34	<SRL	U	1.0	0.26	0.20
1,1,1-Trichloroethane	<SRL	U	1.0	0.47	<SRL	U	1.0	0.35	0.27
Trichloroethene	<SRL	U	1.0	0.46	<SRL	U	1.0	0.35	0.27
Tetrachloroethylene	<SRL	U	1.0	0.58	2.83		1.0	0.44	0.34
BFB-Surrogate Std. % Recovery	101%				102%				70-130%

U - Compound was analyzed for, but was not detected at or above the SRL.

Marcus Hueppe
Laboratory Manager

1534 Eastman Avenue • Suite A • Ventura, California 93003 (805) 650-1642 • FAX (805) 650-1644

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HAZ WASTE SUPPORT SEC.

Atmospheric Analysis & Consulting, Inc.

CLIENT : Environmental Protection Agency
PROJECT NUMBER : 08-0007-12/05/08-0001
AAC PROJECT NO. : 080782
REPORT DATE : 12/19/2008

On December 8, 2008, Atmospheric Analysis & Consulting, Inc. received six (6) Six-Liter Summa Canisters for Volatile Organic Compounds analysis by EPA method TO-15. Upon receipt, each sample was assigned a unique Laboratory ID number as follows:

Client ID	Lab ID	Return Pressure (mmHg)
000434	080782-36277	787.2
000450	080782-36278	656.4
000483	080782-36279	686.1
000498	080782-36280	599.1
000531	080782-36281	208.0
000538	080782-36282	788.3

An initial reading of the canister's vacuum was taken and recorded. Subsequently, each canister was brought to positive pressure using UHP-He and the final pressure was recorded.

TO-15 Analysis - Up to a 500 mL aliquot of sample is concentrated, put through a water and CO_2 management system, cryofocused and injected into the GC/MS (Full Scan mode or SIM mode) for analysis following EPA Method TO-15 as specified in the SOW.

Several sampling and documentation errors occurred throughout the sampling process and were described in detail in a letter to the EPA dated 12/16/08 and an official revised COC was received from the EPA on 12/17/08 as well. The electronic submission of the data was provided to the EPA on 12/19/08. No other problems were encountered during preparation and/or analysis of these samples. The test results included in this report meet all requirements of the NELAC Standards and/or AAC SOP# AACI-TO-15.

I certify that this data is technically accurate, complete and in compliance with the terms and conditions of the contract. The Laboratory Director or his designee, as verified by the following signature, has authorized the release of the data contained in this hardcopy data package.

If you have any questions or require further explanation of data results, please contact the undersigned.

Sucha S. Parmar, PhD
Technical Director

This report consists of 186 pages.

ACCREDITED IN ACCORDANCE WITH nelac Certificate #E87837

1534 Eastman Avenue • Suite A • Ventura, California 93003 (805) 650-1642 • FAX (805) 650-1644

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Laboratory Name: Atmospheric Analysis + Consulting, Inc

Laboratory Code: AAC

Case or DAS No.: _____

SDG No./First Sample in SDG: 08D782/B5875
(Lowest EPA Sample Number in first shipment received under SDG.)

Sample Receipt Date: 12/08/2008
MM/DD/YYYY

Last Sample in SDG: B5880
(Highest EPA Sample Number in last shipment of samples received under SDG.)

Sample Receipt Date: 12/08/2008
MM/DD/YYYY

EPA Sample Numbers in the SDG (List in alphanumeric order):

1. B5875
2. B5876
3. B5877
4. B5878
5. B5879
6. B5880
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

Note: There are a maximum of 20 field samples in an SDG.

Comments: _____

Marcus Hueppe
Signature

Lab Manager
Title

Marcus Hueppe
Print Name

12/12/08
Date

Please make copies of this form and complete one form per SDG. FAX the completed form within 3 days of receipt of the last sample received for each SDG to:

Adly Michael, RSCC
USEPA Region 2
DESA-HWSB-HWSS, MS 215
2890 Woodbridge Ave.
Edison, NJ 08837
Fax: (732) 321-6622

Atmospheric Analysis & Consulting, Inc

SAMPLE RECEIPT / LOG-IN REPORT

AAC Project **080782** **Received By: B. Witten**

Sample Receipt Date	Project Desc	Clients ID	Matrix	Sampling Date/Time	Sampled By	Sample #	Analysis Requested
12/8/2008 10:30	EPA 08-007-12/05/08-0001	000434 B5879	Summa Canister	12/4/2008 11:44:00 AM	Client	36277	TO-15 SIM
12/8/2008 10:30	EPA 08-007-12/05/08-0001	000450 B5878	Summa Canister	12/4/2008 11:44:00 AM	Client	36278	TO-15 SIM
12/8/2008 10:30	EPA 08-007-12/05/08-0001	000483 B5877	Summa Canister	12/4/2008 11:44:00 AM	Client	36279	TO-15 SCAN
12/8/2008 10:30	EPA 08-007-12/05/08-0001	000498 B5880	Summa Canister	12/4/2008 11:50:00 AM	Client	36280	TO-15 SIM
12/8/2008 10:30	EPA 08-007-12/05/08-0001	000531 B5875	Summa Canister	12/4/2008 11:47:00 AM	Client	36281	TO-15 SCAN
12/8/2008 10:30	EPA 08-007-12/05/08-0001	000538 B5876	Summa Canister	12/4/2008 11:45:00 AM	Client	36282	TO-15 SIM

TURN AROUND TIME: Normal (10days)

Lab Due Date: 12/15/2008

Total Samples: 6

REMARKS:
Client returned 7 cans and 7 flows.

Atmospheric Analysis & Consulting, Inc

CANISTER PRESSURE LOG

Client: EPA Project No.: 080782

Date: 12/8/2008

Canister #	Sample #	Initial Pressure	Final Pressure
434	36277	787.2	1021.5
450	36278	656.4	1022.8
483	36279	686.1	1014.8
498	36280	599.1	1024.4
531	36281	208.0	1018.3
538	36282	788.3	1020.6

APPENDIX D

VIP CLEANERS SITE

TRIP REPORT

DECEMBER 2008

SAMPLING TRIP REPORT

Site Name: VIP Cleaners
Sampling Dates: December 04 - 05, 2008
CERCLIS ID: NJD982744740

1. Site Location:

   Morristown, New Jersey

2. Sample Descriptions:

   Refer to Table 1 for all sample information.

3. Laboratories Receiving Samples:

Matrix	Sample Type	Laboratory Code	Name and Address of Laboratory
Air Samples in 6 lt. SUMMA™ canisters	VOCs	AAC	Atmospheric Analysis & Consulting Inc. 1534 Eastman Ave. Suite A Ventura, CA 93003

4. **Sample Dispatch Data:**

   On December 04, 2008, two sub-slab samples, two indoor air samples and one indoor air duplicate were collected from the former dry cleaner and empty office space portion of the building at 89 Morris Avenue in Morristown, NJ. The indoor air samples were collected from the indoor air space near the formerly installed sub-slab ports: EO-2 and 89Morris-1. For quality control one ambient air sample was collected from west of the building. All six air samples were shipped via Federal Express to AAC under the following air bill 867113356267 at 1500 on December 04, 2008. Table 1 displays the sampling information such as the initial and final canister pressure, sampling times, dates and the canister numbers. The chain of custody form can be found as Appendix A.

5. **Sampling Personnel:**

Name	Organization	Site Duties
Diane Salkie	USEPA Region II DESA/HWSB Superfund Support Team	Project Manager/Sample Management
Rachael Graham	USEPA Region II DESA/HWSB Superfund Support Team	Field Personnel
Kathryn Seaver	USEPA Region II DESA/MAB Air and Water QA Team	Field Personnel
Pat Sheridan	USEPA Region II DESA/HWSB Superfund Support Team	Quality Assurance Officer

6. **Additional Comments:**

The number of samples includes:

- 2 indoor air samples
- 1 indoor air field duplicate
- 2 sub-slab air samples
- 1 ambient (outdoor) samples

7. **Report Prepared By:** Diane Salkie Date: December 10, 2008

TABLE 1
SAMPLE DESCRIPTIONS
VIP CLEANERS SITE

Address	Sample Location	Sample Type	Sample #	Canister #	Valve #	Pressure		Begin Date	Begin Time	End Date	End Time
						Initial	Final				
New Office space: former empty storefront and dry clearer	SE port	Sub-slab	~~EO-2-SS~~ B5875	000531	000586	-30	-21	12/4/08	1147	12/5/08	1147
	Near the port EO-2	Indoor Air	~~EO-2-IA~~ B5876	000538	000585	-29	0	12/4/08	1145	12/5/08	1145
	Lower floor port on W side	Sub-slab	~~89Morris-1-SS~~ B5877	000483	000580	-29	-4	12/4/08	1144	12/5/08	1144
	Near the port, 89Morris-1	Indoor Air	~~89Morris-1-IA~~ B5878	000450	000584	-29	-5	12/4/08	1144	12/5/08	1144
	Duplicate of 89Morris-1-IA	Indoor Air	89~~Morris-1-IA~~2 B5879	000434	000579	-29	0	12/4/08	1144	12/5/08	1144
	West side of 89 Morris	Ambient Air	~~89Morris-AA~~ B5880	000498	000583	-29	-7	12/4/08	1147	12/5/08	1147

APPENDIX A

CHAIN OF CUSTODY RECORDS

DESA

CHAIN OF CUSTODY RECORD

Site #: 08-0007
Contact Name: Diane Salkie
Contact Phone: 732-321-4423

No: 08-0007-12/05/08-0001

Lab: Atmospheric Analysis & Consulting, Inc.
Lab Phone: 805-650-1642

Lab #	Sample #	Location	Analyses	Matrix	Container	Start Pressure	Stop Pressure	Start_Date	Start_Time	Stop_Date	Stop_Time
	000434	B5879	TO-15 SIM	Air	Summa Canister	-29		12/4/2008	11:44:00 AM	12/5/2008	
	000450	B5878	TO-15 SIM	Air	Summa Canister	-29		12/4/2008	11:44:00 AM	12/5/2008	
	000483	B5877	TO-15 SCAN	Soil Gas	Summa Canister	-29		12/4/2008	11:44:00 AM	12/5/2008	
	000498	B5880	TO-15 SIM	Ambient Air	Summa Canister	-29		12/4/2008	11:50:00 AM	12/5/2008	
	000531	B5875	TO-15 SCAN	Soil Gas	Summa Canister	-30		12/4/2008	11:47:00 AM	12/5/2008	
	000538	B5876	TO-15 SIM	Air	Summa Canister	-29		12/4/2008	11:45:00 AM	12/5/2008	

Special Instructions:

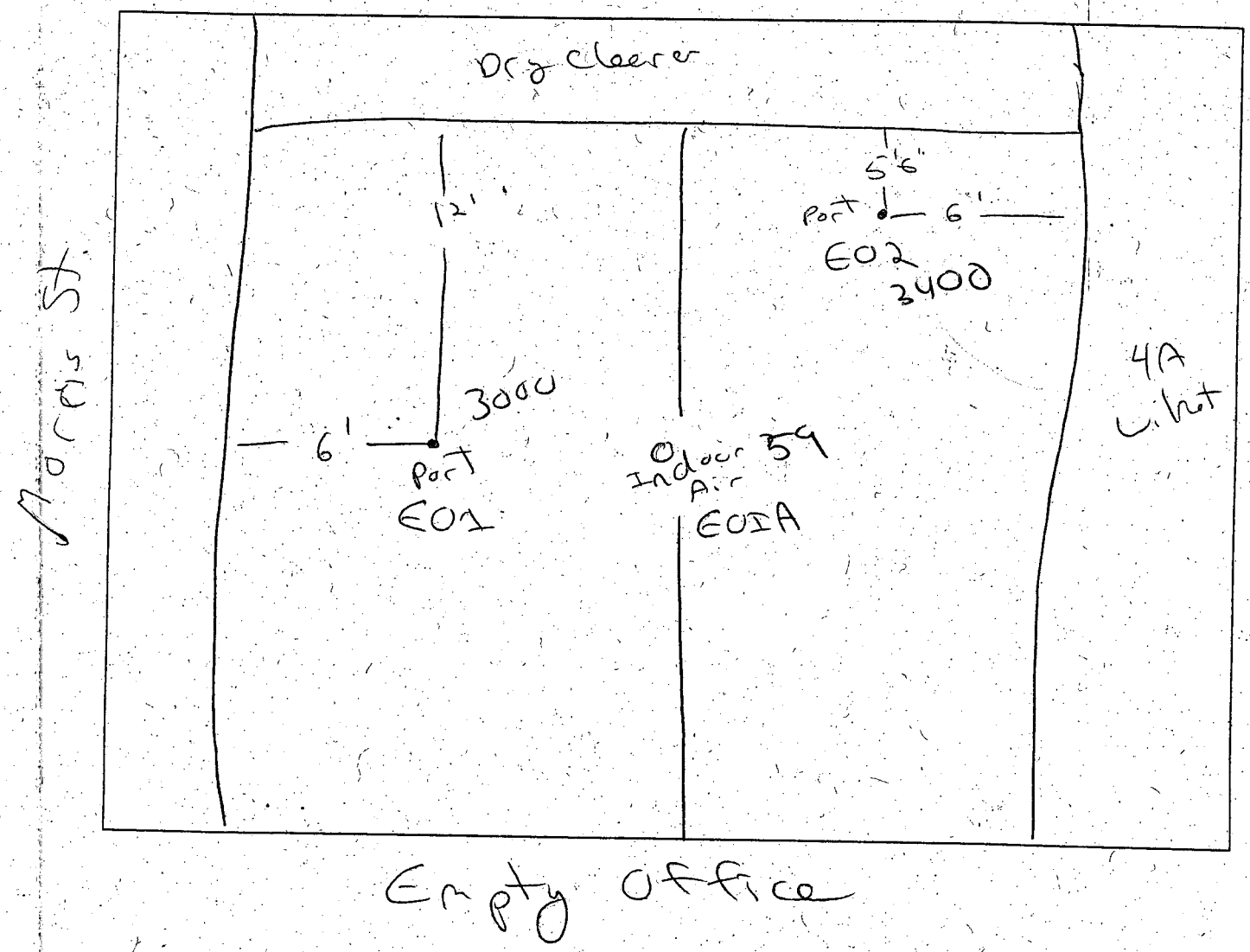
SAMPLES TRANSFERRED FROM
CHAIN OF CUSTODY #

Items/Reason	Relinquished by	Date	Received by	Date	Time	Items/Reason	Relinquished By	Date	Received by	Date	Time

APPENDIX E

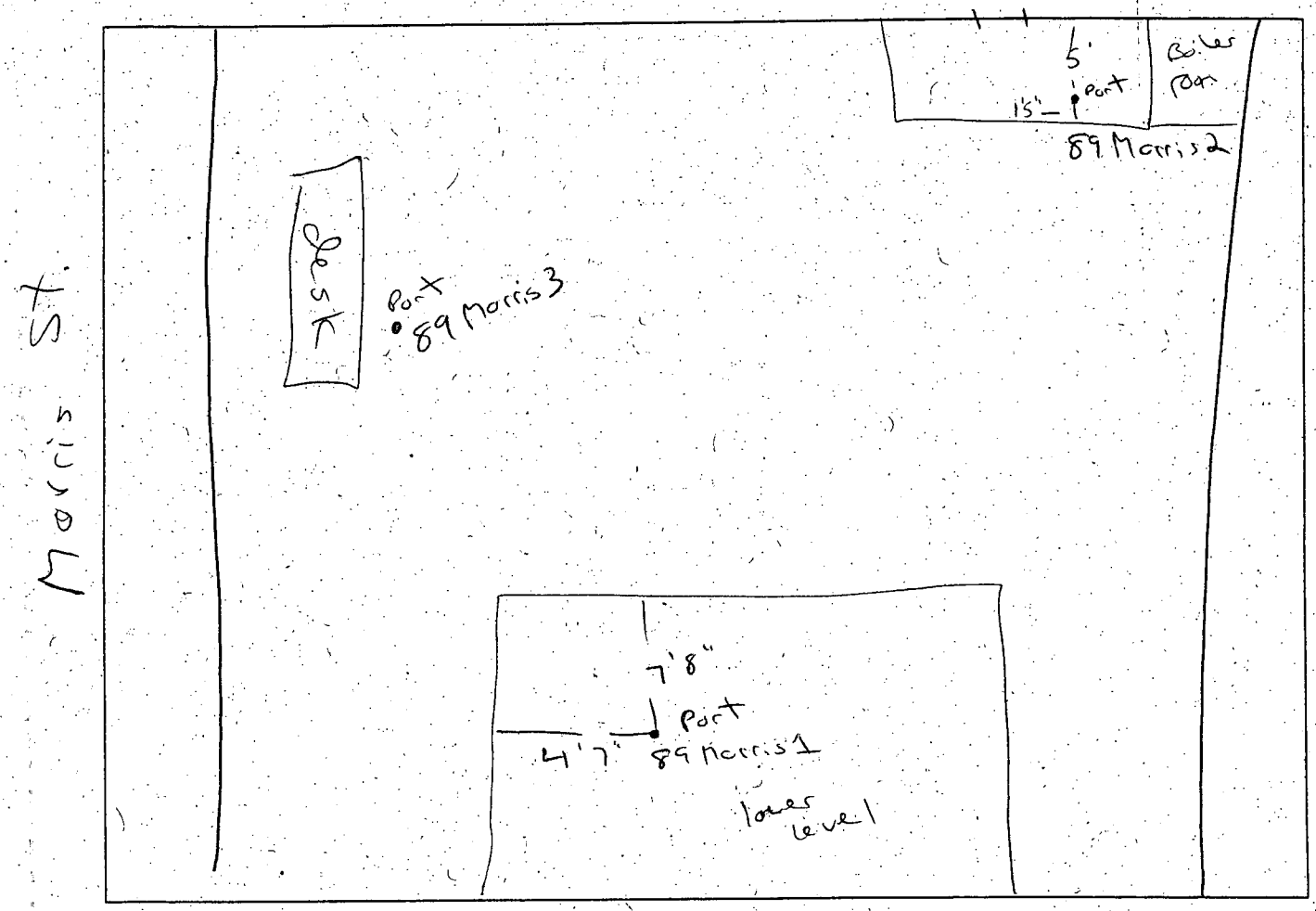
SAMPLE LOCATION DRAWINGS

Provide Drawing of Sample Location(s) in Building



Not to Scale
July 2007

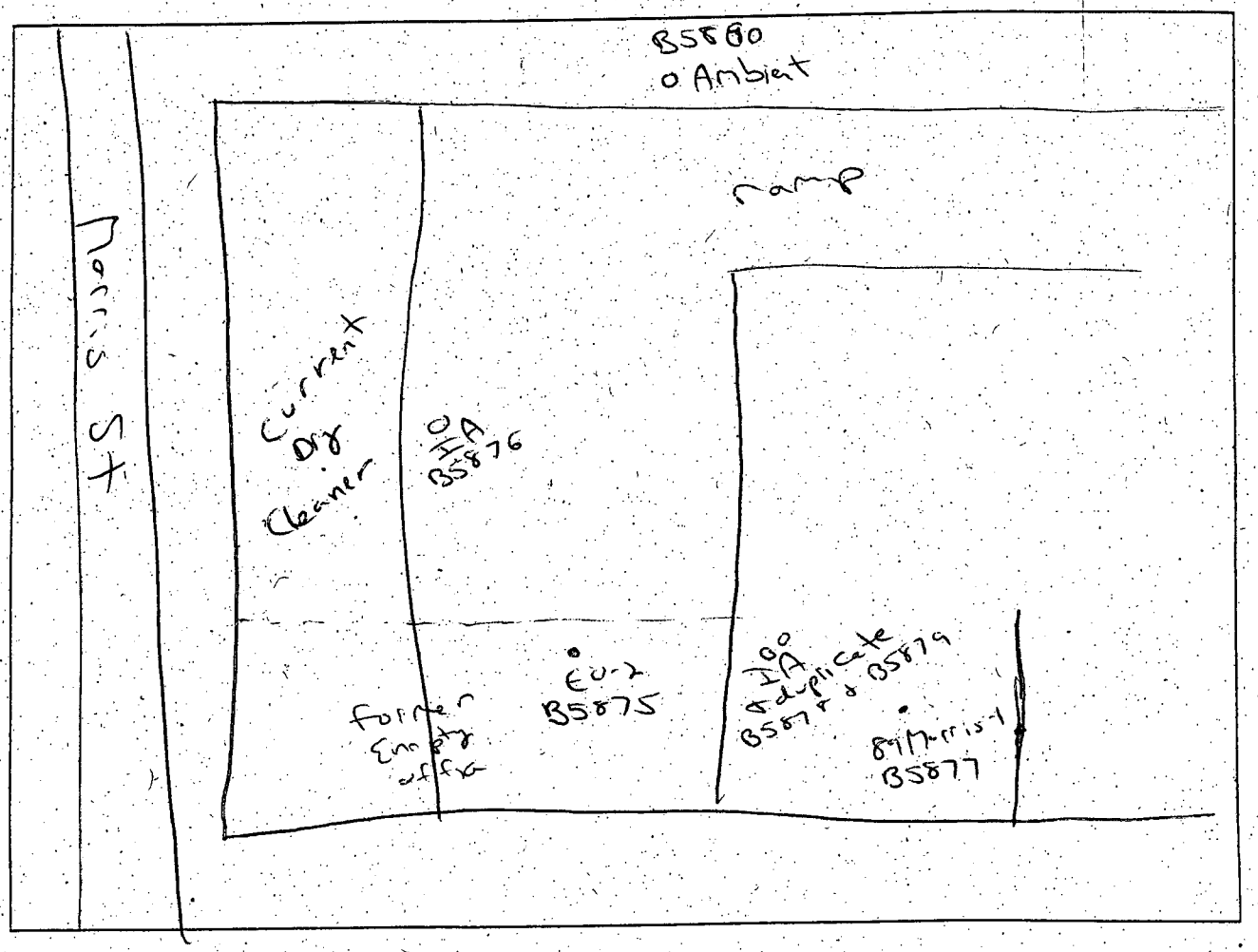
Provide Drawing of Sample Location(s) in Building



89 Morris ST.

N (New Image Cleaners & Tailoring) July 2007

Provide Drawing of Sample Location(s) in Building



Not to Scale
December 2008

N

APPENDIX F

U.S. EPA Region III
***Risk-Based Concentration Table* Mid-Atlantic Risk Assessment**

Updated September 12, 2008

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User's Guide); s = Concentration may exceed Csat (See User's Guide); SSL values are based on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Acephate	30560-19-1	8.7E-03	I			4.0E-03	I					1	0.1		5.8E+01	c**	2.0E+02	c*					7.7E+00	c*		1.9E-03	
Acetaldehyde	75-07-0			2.2E-06	I			9.0E-03	I	V		1		1.1E+05	1.1E+01	c**	5.3E+01	c**	1.1E+00	c**	5.6E+00	c**	2.2E+00	c**		4.5E-04	
Acetochlor	34256-82-1					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		4.0E-01	
Acetone	67-64-1					9.0E-01	I	3.1E+01	A	V		1		1.1E+05	6.1E+04	n	6.1E+05	nms	3.2E+04	n	1.4E+05	n	2.2E+04	n		4.4E+00	
Acetone Cyanohydrin	75-86-5					3.0E-03	P	6.0E-02	P	V		1		1.1E+05	2.0E+02	n	2.1E+03	n	6.3E+01	n	2.6E+02	n	5.8E+01	n		1.2E-02	
Acetonitrile	75-05-8							6.0E-02	I	V		1		1.3E+05	8.7E+02	n	3.7E+03	n	6.3E+01	n	2.6E+02	n	1.3E+02	n		2.6E-02	
Acetophenone	98-86-2					1.0E-01	I			V		1		2.3E+03	7.8E+03	ns	1.0E+05	nms					3.7E+03	n		1.1E+00	
Acrolein	107-02-8					5.0E-04	I	2.0E-05	I	V		1		2.5E+04	1.6E-01	n	6.8E-01	n	2.1E-02	n	8.8E-02	n	4.2E-02	n		8.6E-06	
Acrylamide	79-06-1	4.5E+00	I	1.3E-03	I	2.0E-04	I					1	0.1		1.1E-01	c	3.8E-01	c	1.9E-03	c	9.4E-03	c	1.5E-02	c		3.3E-06	
Acrylic Acid	79-10-7					5.0E-01	I	1.0E-03	I			1	0.1		3.0E+04	n	2.9E+05	nm	1.0E+00	n	4.4E+00	n	1.8E+04	n		3.7E+00	
Acrylonitrile	107-13-1	5.4E-01	I	6.8E-05	I	1.0E-03	H	2.0E-03	I	V		1		1.1E+04	2.4E-01	c*	1.2E+00	c*	3.6E-02	c*	1.8E-01	c*	4.5E-02	c*		9.9E-06	
Adiponitrile	111-69-3							6.0E-03	P			1	0.1		6.5E+06	nm	3.8E+07	nm	6.3E+00	n	2.6E+01	n					
Alachlor	15972-60-8	5.6E-02	C			1.0E-02	I					1	0.1		8.7E+00	c*	3.1E+01	c					1.2E+00	c	2.0E+00	6.8E-04	1.1E-03
ALAR	1596-84-5					1.5E-01	I					1	0.1		9.2E+03	n	9.2E+04	n					5.5E+03	n		1.2E+00	
Aldicarb	116-06-3					1.0E-03	I					1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n		9.7E-03	
Aldicarb Sulfone	1646-88-4					1.0E-03	I					1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n		8.0E-03	
Aldrin	309-00-2	1.7E+01	I	4.9E-03	I	3.0E-05	I					1	0.1		2.9E-02	c*	1.0E-01	c	5.0E-04	c	2.5E-03	c	4.0E-03	c		8.4E-04	
Ally	74223-64-6					2.5E-01	I					1	0.1		1.5E+04	n	1.5E+05	nm					9.1E+03	n		3.1E+00	
Allyl Alcohol	107-18-6					5.0E-03	I	3.0E-04	P			1	0.1		3.1E+02	n	3.1E+03	n	3.1E-01	n	1.3E+00	n	1.8E+02	n		3.7E-02	
Allyl Chloride	107-05-1							1.0E-03	I	V		1		1.5E+03	1.8E+00	n	7.7E+00	n	1.0E+00	n	4.4E+00	n	2.1E+00	n		6.8E-04	
Aluminum	7429-90-5					1.0E+00	P	5.0E-03	P			1			7.7E+04	n	9.9E+05	nm	5.2E+00	n	2.2E+01	n	3.7E+04	n		5.5E+04	
Aluminum Phosphide	20859-73-8					4.0E-04	I					1			3.1E+01	n	4.1E+02	n					1.5E+01	n			
Amdro	67485-29-4					3.0E-04	I					1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		1.4E+04	
Ametryn	834-12-8					9.0E-03	I					1	0.1		5.5E+02	n	5.5E+03	n					3.3E+02	n		3.6E-01	
Aminophenol, m-	591-27-5					8.0E-02	P					1	0.1		4.9E+03	n	4.9E+04	n					2.9E+03	n		1.0E+00	
Aminophenol, p-	123-30-8					2.0E-02	P					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		2.5E-01	
Amitraz	33089-61-1					2.5E-03	I					1	0.1		1.5E+02	n	1.5E+03	n					9.1E+01	n		1.2E+02	
Ammonia	7664-41-7							1.0E-01	I			1			1.4E+08	nm	6.0E+08	nm	1.0E+02	n	4.4E+02	n					
Ammonium Perchlorate	7790-98-9					7.0E-04	I					1			5.5E+01	n	7.2E+02	n					2.6E+01	n			
Ammonium Sulfamate	7773-06-0					2.0E-01	I					1			1.8E+04	n	2.0E+05	nm					7.3E+03	n			
Aniline	62-53-3	5.7E-03	I			7.0E-03	P	1.0E-03	I			1	0.1		8.5E+01	c**	3.0E+02	c*	1.0E+00	n	4.4E+00	n	1.2E+01	c*		3.4E-03	
Antimony (metallic)	7440-36-0					4.0E-04	I					0.15			3.1E+01	n	4.1E+02	n					1.5E+01	n	6.0E+00	6.6E-01	2.7E-01
Antimony Pentoxide	1314-60-9					5.0E-04	H					0.15			3.9E+01	n	5.1E+02	n					1.8E+01	n			
Antimony Potassium Tartrate	11071-15-1					9.0E-04	H					0.15			7.0E+01	n	9.2E+02	n					3.3E+01	n			
Antimony Tetroxide	1332-81-6					4.0E-04	H					0.15			3.1E+01	n	4.1E+02	n					1.5E+01	n			
Antimony Trioxide	1309-64-4					4.0E-04	H	2.0E-04	I			0.15			3.1E+01	n	4.1E+02	n	2.1E-01	n	8.8E-01	n	1.5E+01	n			
Apollo	74115-24-5					1.3E-02	I					1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		6.1E+02	
Aramite	140-57-8	2.5E-02	I	7.1E-06	I	5.0E-02	H					1	0.1		1.9E+01	c	6.9E+01	c	3.4E-01	c	1.7E+00	c	2.7E+00	c		1.1E-01	
Arsenic, Inorganic	7440-38-2	1.5E+00	I	4.3E-03	I	3.0E-04	I	3.0E-05	C			1	0.03		3.9E-01	c*	1.6E+00	c	5.7E-04	c*	2.9E-03	c*	4.5E-02	c	1.0E+01	1.3E-03	2.9E-01
Arsine	7784-42-1							5.0E-05	I			1			7.1E+04	n	3.0E+05	nm	5.2E-02	n	2.2E-01	n					
Assure	76578-14-8					9.0E-03	I					1	0.1		5.5E+02	n	5.5E+03	n					3.3E+02	n		3.6E+00	
Asulam	3337-71-1					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		5.2E-01	
Atrazine	1912-24-9	2.3E-01	C			3.5E-02	I					1	0.1		2.1E+00	c	7.5E+00	c					2.9E-01	c	3.0E+00	1.9E-04	2.0E-03
Avermectin B1	65195-55-3					4.0E-04	I					1	0.1		2.4E+01	n	2.5E+02	n					1.5E+01	n		4.1E-02	
Azobenzene	103-33-3	1.1E-01	I	3.1E-05	I					V		1			4.9E+00	c	2.2E+01	c	7.8E-02	c	4.0E-01	c	1.2E-01	c		5.1E-04	
Barium	7440-39-3					2.0E-01	I	5.0E-04	H			0.07			1.5E+04	n	1.9E+05	nm	5.2E-01	n	2.2E+00	n	7.3E+03	n	2.0E+03	3.0E+02	8.2E+01
Baygon	114-26-1					4.0E-03	I					1	0.1		2.4E+02	n	2.5E+03	n					1.5E+02	n		4.2E-02	
Bayleton	43121-43-3					3.0E-02	I					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		1.2E+01	
Baythroid	68359-37-5					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		3.3E+02	
Benefin	1861-40-1					3.0E-01	I					1	0.1		1.8E+04	n	1.8E+05	nm					1.1E+04	n		2.1E+02	
Benomyl	17804-35-2					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		2.3E+00	
Bentazon	25057-89-0					3.0E-02	I					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		3.0E-01	
Benzaldehyde	100-52-7					1.0E-01	I			V		1		1.9E+03	7.8E+03	ns	1.0E+05	nms					3.7E+03	n		9.7E-01	
Benzene	71-43-2	5.5E-02	I	7.8E-06	I	4.0E-03	I	3.0E-02	I	V		1		2.0E+03	1.1E+00	c*	5.6E+00	c*	3.1E-01	c	1.6E+00	c*	4.1E-01	c	5.0E+00	2.3E-04	2.8E-03
Benzenethiol	108-98-5					1.0E-05	H			V		1		1.4E+03	7.8E-01	n	1.0E+01	n					3.7E-01	n		2.7E-04	
Benzidine	92-87-5	2.3E+02	I	6.7E-02	I	3.0E-03	I				M	1	0.1		5.0E-04	c	7.5E-03	c	1.4E-05	c	1.8E-04	c	9.4E-05	c		5.3E-07	
Benzoic Acid	65-85-0					4.0E+00	I					1	0.1		2.4E+05	nm	2.5E+06	nm					1.5E+05	n		3.3E+01	
Benzotrichloride	98-07-7	1.3E+01	I							V		1		1.6E+02	4.9E-02	c	2.2E-01	c					5.2E-03	c		1.3E-05	
Benzyl Alcohol	100-51-6					5.0E-01	P					1	0.1		3.1E+04	n	3.1E+05	nm					1.8E+04	n		4.2E+00	
Benzyl Chloride	100-44-7	1.7E-01	I			2.0E-03	P	1.0E-03	P	V		1		6.4E+01	3.8E+00	c**	1.7E+01	c**	1.0E+00	n	4.4E+00	n	4.0E-01	c**		4.9E-04	
Beryllium and compounds	7440-41-7			2.4E-03	I	2.0E-03	I	2.0E-05	I			0.007			1.6E+02	n	2.0E+03	n	1.0E-03	c*	5.1E-03	c*	7.3E+01	n	4.0E+00	5.8E+01	3.2E+00
Bidrin	141-66-2					1.0E-04	I					1	0.1		6.1E+00	n	6.2E+01	n					3.7E+00	n		3.4E-03	
Bifenox	42576-02-3					9.0E-03	P					1	0.1		5.5E+02	n	5.5E+03	n					3.3E+02	n		2.6E+00	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User's Guide); s = Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Biphenthrin	82657-04-3					1.5E-02	I					1	0.1		9.2E+02	n	9.2E+03	n					5.5E+02	n		3.5E+03	
Biphenyl, 1,1'-	92-52-4					5.0E-02	I			V		1		2.6E+02	3.9E+03	ns	5.1E+04	ns					1.8E+03	n		2.3E+01	
Bis(2-chloroethoxy)methane	111-91-1					3.0E-03	P					1	0.1		1.8E+02	n	1.8E+03	n					1.1E+02	n		2.3E-02	
Bis(2-chloroethyl)ether	111-44-4	1.1E+00	I	3.3E-04	I					V		1		3.3E+03	1.9E-01	c	9.0E-01	c	7.4E-03	c	3.7E-02	c	1.2E-02	c		2.7E-06	
Bis(2-chloro-1-methylethyl) ether	108-60-1	7.0E-02	H	1.0E-05	H	4.0E-02	I			V		1		5.7E+02	3.5E+00	c	1.7E+01	c	2.4E-01	c	1.2E+00	c	3.2E-01	c		9.0E-05	
Bis(2-ethylhexyl)phthalate	117-81-7	1.4E-02	I			2.0E-02	I					1	0.1		3.5E+01	c*	1.2E+02	c*					4.8E+00	c	6.0E+00	1.6E+00	2.0E+00
Bis(chloromethyl)ether	542-88-1	2.2E+02	I	6.2E-02	I					V		1		2.8E+03	2.7E-04	c	1.3E-03	c	3.9E-05	c	2.0E-04	c	6.2E-05	c		1.3E-08	
Bisphenol A	80-05-7					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		2.7E+02	
Boron And Borates Only	7440-42-8					2.0E-01	I	2.0E-02	H			1			1.6E+04	n	2.0E+05	nm	2.1E+01	n	8.8E+01	n	7.3E+03	n		2.3E+01	
Boron Trifluoride	7637-07-2							7.0E-04	H			1			9.9E+05	nm	4.2E+06	nm	7.3E-01	n	3.1E+00	n					
Bromate	15541-45-4	7.0E-01	I			4.0E-03	I					1			9.1E-01	c	4.1E+00	c					9.6E-02	c	1.0E+01	7.4E-04	7.7E-02
Bromobenzene	108-86-1					2.0E-02	P	1.0E-02	P	V		1		7.7E+02	9.4E+01	n	4.1E+02	n	1.0E+01	n	4.4E+01	n	2.0E+01	n		1.5E-02	
Bromodichloromethane	75-27-4	6.2E-02	I			2.0E-02	I			V		1		9.9E+02	1.0E+01	c	4.6E+01	c					1.1E+00	c		3.0E-04	
Bromoform	75-25-2	7.9E-03	I	1.1E-06	I	2.0E-02	I					1	0.1		6.1E+01	c*	2.2E+02	c*	2.2E+00	c	1.1E+01	c	8.5E+00	c*		2.3E-03	
Bromomethane	74-83-9					1.4E-03	I	5.0E-03	I	V		1		3.6E+03	7.9E+00	n	3.5E+01	n	5.2E+00	n	2.2E+01	n	8.7E+00	n		2.2E-03	
Bromophos	2104-96-3					5.0E-03	H					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		7.7E-01	
Bromoxynil	1689-84-5					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		7.8E-01	
Bromoxynil Octanoate	1689-99-2					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		7.2E+00	
Butadiene, 1,3-	106-99-0			3.0E-05	I			2.0E-03	I	V		1		6.9E+02	7.7E-02	c*	3.9E-01	c*	8.1E-02	c*	4.1E-01	c*	1.6E-01	c*		9.0E-05	
Butanol, N-	71-36-3					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		7.5E-01	
Butyl Benzyl Phthlate	85-68-7	1.9E-03	P			2.0E-01	I					1	0.1		2.6E+02	c*	9.1E+02	c					3.5E+01	c		6.7E-01	
Butylate	2008-41-5					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		2.6E+00	
Butylphthalyl Butylglycolate	85-70-1					1.0E+00	I					1	0.1		6.1E+04	n	6.2E+05	nm					3.7E+04	n		1.1E+03	
Cacodylic Acid	75-60-5					2.0E-02	A					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n			
Cadmium (Diet)	7440-43-9			1.8E-03	I	1.0E-03	I					0.025	0.001		7.0E+01	n	8.1E+02	n									
Cadmium (Water)	7440-43-9			1.8E-03	I	5.0E-04	I					0.05	0.001						1.4E-03	c	6.8E-03	c	1.8E+01	n	5.0E+00	1.4E+00	3.8E-01
Caprolactam	105-60-2					5.0E-01	I					1	0.1		3.1E+04	n	3.1E+05	nm					1.8E+04	n		5.7E+00	
Captafol	2425-06-1	1.5E-01	C	4.3E-05	C	2.0E-03	I					1	0.1		3.2E+00	c*	1.1E+01	c	5.7E-02	c	2.9E-01	c	4.5E-01	c		2.5E-03	
Captan	133-06-2	2.3E-03	C	6.6E-07	C	1.3E-01	I					1	0.1		2.1E+02	c*	7.5E+02	c	3.7E+00	c	1.9E+01	c	2.9E+01	c		5.6E-02	
Carbaryl	63-25-2					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		2.5E+00	
Carbofuran	1563-66-2					5.0E-03	I					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n	4.0E+01	6.2E-02	1.4E-02
Carbon Disulfide	75-15-0					1.0E-01	I	7.0E-01	I	V		1		2.6E+02	6.7E+02	ns	3.0E+03	ns	7.3E+02	n	3.1E+03	n	1.0E+03	n		2.7E-01	
Carbon Tetrachloride	56-23-5	1.3E-01	I	1.5E-05	I	7.0E-04	I	1.9E-01	A	V		1		4.8E+02	2.5E-01	c	1.3E+00	c	1.8E-01	c	8.2E-01	c	2.0E-01	c	5.0E+00	7.9E-05	2.0E-03
Carbosulfan	55285-14-8					1.0E-02	I					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		1.1E+01	
Carboxin	5234-68-4					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		1.3E+00	
Chloral Hydrate	302-17-0					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		7.4E-01	
Chloramben	133-90-4					1.5E-02	I					1	0.1		9.2E+02	n	9.2E+03	n					5.5E+02	n		1.2E-01	
Chloranil	118-75-2	4.0E-01	H									1	0.1		1.2E+00	c	4.3E+00	c					1.7E-01	c		3.7E-05	
Chlordane	12789-03-6	3.5E-01	I	1.0E-04	I	5.0E-04	I	7.0E-04	I			1	0.04		1.6E+00	c*	6.5E+00	c*	2.4E-02	c*	1.2E-01	c*	1.9E-01	c*	2.0E+00	3.3E-02	3.5E-01
Chlordecone (Kepone)	143-50-0	1.6E+01	C	4.6E-03	C							1	0.1		3.0E-02	c	1.1E-01	c	5.3E-04	c	2.7E-03	c	4.2E-03	c		1.5E-04	
Chlorimuron, Ethyl-	90982-32-4					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		2.6E-01	
Chlorine	7782-50-5					1.0E-01	I	1.5E-04	A			1			7.5E+03	n	9.1E+04	n	1.5E-01	n	6.4E-01	n	3.7E+03	n		1.6E+00	
Chlorine Dioxide	10049-04-4					3.0E-02	I	2.0E-04	I			1			2.3E+03	n	3.0E+04	n	2.1E-01	n	8.8E-01	n	1.1E+03	n			
Chlorite (Sodium Salt)	7758-19-2					3.0E-02	I					1			2.3E+03	n	3.1E+04	n					1.1E+03	n			
Chloro-1,1-difluoroethane, 1-	75-68-3							5.0E+01	I	V		1		1.2E+03	5.9E+04	ns	2.5E+05	nms	5.2E+04	n	2.2E+05	n	1.0E+05	n		5.3E+01	
Chloro-1,3-butadiene, 2-	126-99-8					2.0E-02	H	7.0E-03	H	V		1		8.2E+02	8.6E+00	n	3.6E+01	n	7.3E+00	n	3.1E+01	n	1.4E+01	n		7.7E-03	
Chloro-2-methylaniline HCl, 4-	3165-93-3	4.8E-01	H									1	0.1		1.1E+00	c	3.7E+00	c					1.5E-01	c		6.4E-05	
Chloro-2-methylaniline, 4-	95-69-2	2.7E-01	C	7.7E-05	C							1	0.1		1.8E+00	c	6.4E+00	c	3.2E-02	c	1.6E-01	c	2.5E-01	c		1.1E-04	
Chloroacetic Acid	79-11-8					2.0E-03	H					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		1.5E-02	
Chloroacetophenone, 2-	532-27-4							3.0E-05	I			1	0.1		4.3E+04	n	1.8E+05	nm	3.1E-02	n	1.3E-01	n					
Chloroaniline, p-	106-47-8	5.4E-02	P			4.0E-03	I					1	0.1		9.0E+00	c*	3.2E+01	c*					1.2E+00	c		4.3E-04	
Chlorobenzene	108-90-7					2.0E-02	I	5.0E-02	P	V		1		8.6E+02	3.1E+02	n	1.5E+03	ns	5.2E+01	n	2.2E+02	n	9.1E+01	n	1.0E+02	6.8E-02	7.5E-02
Chlorobenzilate	510-15-6	1.1E-01	C	3.1E-05	C	2.0E-02	I					1	0.1		4.4E+00	c	1.6E+01	c	7.8E-02	c	4.0E-01	c	6.1E-01	c		1.7E-03	
Chlorobenzotrifluoride, 4-	98-56-6					3.0E-03	P	3.0E-01	P	V		1		5.5E+02	2.1E+02	n	2.4E+03	ns	3.1E+02	n	1.3E+03	n	9.3E+01	n		3.9E-01	
Chlorobutane, 1-	109-69-3					4.0E-02	P			V		1		7.9E+02	3.1E+03	ns	4.1E+04	ns					1.5E+03	n		6.2E-01	
Chlorodifluoromethane	75-45-6							5.0E+01	I	V		1		1.7E+03	5.3E+04	ns	2.2E+05	nms	5.2E+04	n	2.2E+05	n	1.0E+05	n		4.4E+01	
Chloroform	67-66-3	3.1E-02	C	2.3E-05	I	1.0E-02	I	9.8E-02	A	V		1		2.7E+03	3.0E-01	c	1.5E+00	c	1.1E-01	c	5.3E-01	c	1.9E-01	c		5.5E-05	
Chloromethane	74-87-3	1.3E-02	H	1.8E-06	H			9.0E-02	I	V		1		1.4E+03	1.7E+00	c*	8.4E+00	c*	1.4E+00	c*	6.8E+00	c*	1.8E+00	c		4.6E-04	
Chloronaphthalene, Beta-	91-58-7					8.0E-02	I			V		1		2.1E+02	6.3E+03	ns	8.2E+04	ns					2.9E+03	n		1.8E+01	
Chloronitrobenzene, o-	88-73-3	9.7E-03	P			1.0E-03	P	7.0E-05	P			1	0.1		5.0E+01	c**	1.8E+02	c**	7.3E-02	n	3.1E-01	n	6.9E+00	c**		5.8E-03	
Chloronitrobenzene, p-	100-00-5	6.3E-03	P			1.0E-03	P	6.0E-04	P			1	0.1		6.1E+01	n	2.7E+02	c**	6.3E-01	n	2.6E+00	n	1.1E+01	c**		8.7E-03	
Chlorophenol, 2-	95-57-8					5.0E-03	I			V		1		7.9E+04	3.9E+02	n	5.1E+03	n					1.8E+02	n		2.0E-01	
Chlorothalonil	1897-45-6	3.1E-03	C	8.9E-07	C	1.5E-02	I					1	0.1		1.6E+02	c**	5.6E+02	c*	2.7E+00	c	1.4E+01	c	2.2E+01	c*		1.1E-01	

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Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Chlorotoluene, o-	95-49-8					2.0E-02	I			V		1		1.0E+03	1.6E+03	ns	2.0E+04	ns					7.3E+02	n		8.0E-01	
Chlorotoluene, p-	106-43-4					7.0E-02	P			V		1		2.9E+02	5.5E+03	ns	7.2E+04	ns					2.6E+03	n		2.8E+00	
Chlorpropham	101-21-3					2.0E-01	I					1	0.1		1.2E+04	n	1.2E+05	nm					7.3E+03	n		4.5E+00	
Chlorpyrifos	2921-88-2					3.0E-03	I					1	0.1		1.8E+02	n	1.8E+03	n					1.1E+02	n		1.5E+00	
Chlorpyrifos Methyl	5598-13-0					1.0E-02	H					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		1.5E+00	
Chlorsulfuron	64902-72-3					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		1.2E+00	
Chlorthiophos	60238-56-4					8.0E-04	H					1	0.1		4.9E+01	n	4.9E+02	n					2.9E+01	n		7.8E-01	
Chromium (III) (Insoluble Salts)	16065-83-1					1.5E+00	I					0.013			1.2E+05	nm	1.5E+06	nm					5.5E+04	n		9.9E+07	
Chromium VI (chromic acid mists)	18540-29-9			8.4E-02	I	3.0E-03	I	8.0E-06	I			1							2.9E-05	c	1.5E-04	c	1.1E+02	n		2.1E+00	
Chromium VI (particulates)	18540-29-9			8.4E-02	I	3.0E-03	I	1.0E-04	I			0.025			3.9E+01	c**	2.0E+02	c*	2.9E-05	c	1.5E-04	c					
Chromium, Total (1:6 ratio Cr VI : Cr III)	7440-47-3			1.2E-02	I						M	0.013			2.8E+02	c	1.4E+03	c	2.0E-04	c	1.0E-03	c					
Cobalt	7440-48-4			9.0E-03	P	3.0E-04	P	6.0E-06	P			1			2.3E+01	n	3.0E+02	n	2.7E-04	c*	1.4E-03	c*	1.1E+01	n		4.9E-01	
Coke Oven Emissions	8007-45-2			6.2E-04	I						M	1	0.1						1.5E-03	c	2.0E-02	c					
Copper	7440-50-8					4.0E-02	H					1			3.1E+03	n	4.1E+04	n					1.5E+03	n	1.3E+03	5.1E+01	4.6E+01
Cresol, m-	108-39-4					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		1.9E+00	
Cresol, o-	95-48-7					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		2.0E+00	
Cresol, p-	106-44-5					5.0E-03	H					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		1.9E-01	
Crotonaldehyde, trans-	123-73-9	1.9E+00	H							V		1		2.4E+04	3.4E-01	c	1.5E+00	c					3.5E-02	c		7.4E-06	
Cumene	98-82-8					1.0E-01	I	4.0E-01	I	V		1		3.1E+02	2.2E+03	ns	1.1E+04	ns	4.2E+02	n	1.8E+03	n	6.8E+02	n		1.3E+00	
Cyanazine	21725-46-2	8.4E-01	H			2.0E-03	H					1	0.1		5.8E-01	c	2.1E+00	c					8.0E-02	c		3.6E-05	
Cyclohexane	110-82-7							6.0E+00	I	V		1		1.2E+02	7.2E+03	ns	3.0E+04	ns	6.3E+03	n	2.6E+04	n	1.3E+04	n		1.3E+01	
Cyclohexane, 1,2,3,4,5-pentabromo-6-chloro-	87-84-3	2.3E-02	H									1	0.1		2.1E+01	c	7.5E+01	c					2.9E+00	c		2.0E-02	
Cyclohexanone	108-94-1					5.0E+00	I					1	0.1		3.1E+05	nm	3.1E+06	nm					1.8E+05	n		4.2E+01	
Cyclohexylamine	108-91-8					2.0E-01	I					1	0.1		1.2E+04	n	1.2E+05	nm					7.3E+03	n		2.0E+00	
Cyhalothrin/karate	68085-85-8					5.0E-03	I					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		1.7E+02	
Cypermethrin	52315-07-8					1.0E-02	I					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		7.9E+01	
Cyromazine	66215-27-8					7.5E-03	I					1	0.1		4.6E+02	n	4.6E+03	n					2.7E+02	n		6.6E-02	
Cyanides																											
Calcium Cyanide	592-01-8					4.0E-02	I					1			3.1E+03	n	4.1E+04	n					1.5E+03	n			
Copper Cyanide	544-92-3					5.0E-03	I					1			3.9E+02	n	5.1E+03	n					1.8E+02	n			
Cyanide (CN-)	57-12-5					2.0E-02	I					1			1.6E+03	n	2.0E+04	n					7.3E+02	n	2.0E+02	7.4E+00	2.0E+00
Cyanogen	460-19-5					4.0E-02	I			V		1			3.1E+03	n	4.1E+04	n					1.5E+03	n			
Cyanogen Bromide	506-68-3					9.0E-02	I			V		1			7.0E+03	n	9.2E+04	n					3.3E+03	n			
Cyanogen Chloride	506-77-4					5.0E-02	I			V		1			3.9E+03	n	5.1E+04	n					1.8E+03	n			
Hydrogen Cyanide	74-90-8					2.0E-02	I	3.0E-03	I	V		1			1.6E+03	n	2.0E+04	n	3.1E+00	n	1.3E+01	n	6.2E+00	n			
Potassium Cyanide	151-50-8					5.0E-02	I					1			3.9E+03	n	5.1E+04	n					1.8E+03	n			
Potassium Silver Cyanide	506-61-6					2.0E-01	I					0.04			1.6E+04	n	2.0E+05	nm					7.3E+03	n			
Silver Cyanide	506-64-9					1.0E-01	I					0.04			7.8E+03	n	1.0E+05	nm					3.7E+03	n			
Sodium Cyanide	143-33-9					4.0E-02	I					1			3.1E+03	n	4.1E+04	n					1.5E+03	n			
Thiocyanate	463-56-9					2.0E-04	P			V		1		5.6E+03	1.6E+01	n	2.0E+02	n					7.3E+00	n		1.5E-03	
Zinc Cyanide	557-21-1					5.0E-02	I					1			3.9E+03	n	5.1E+04	n					1.8E+03	n			
Dacthal	1861-32-1					1.0E-02	I					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		2.8E-01	
Dalapon	75-99-0					3.0E-02	I					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n	2.0E+02	2.2E-01	4.1E-02
DDD	72-54-8	2.4E-01	I									1	0.1		2.0E+00	c	7.2E+00	c					2.8E-01	c		8.6E-02	
DDE, p,p'-	72-55-9	3.4E-01	I									1	0.1		1.4E+00	c	5.1E+00	c					2.0E-01	c		6.0E-02	
DDT	50-29-3	3.4E-01	I	9.7E-05	I	5.0E-04	I					1	0.03		1.7E+00	c*	7.0E+00	c*	2.5E-02	c	1.3E-01	c	2.0E-01	c*		8.7E-02	
Decabromodiphenyl ether, 2,2',3,3',4,4',5,5',6,6'- (BDE-209)	1163-19-5	7.0E-04	I			7.0E-03	I					1	0.1		4.3E+02	n	2.5E+03	c**					9.6E+01	c**		7.8E+01	
Demeton	8065-48-3					4.0E-05	I					1	0.1		2.4E+00	n	2.5E+01	n					1.5E+00	n			
Di(2-ethylhexyl)adipate	103-23-1	1.2E-03	I			6.0E-01	I					1	0.1		4.0E+02	c*	1.4E+03	c					5.8E+01	c	4.0E+02	5.5E+00	3.9E+01
Diallate	2303-16-4	6.1E-02	H									1	0.1		8.0E+00	c	2.8E+01	c					1.1E+00	c		2.5E-03	
Diazinon	333-41-5					9.0E-04	H					1	0.1		5.5E+01	n	5.5E+02	n					3.3E+01	n		9.4E-02	
Dibromo-3-chloropropane, 1,2-	96-12-8	8.0E-01	P	6.0E-03	P	2.0E-04	P	2.0E-04	I	V	M	1		1.1E+03	5.6E-03	c	7.3E-02	c	1.6E-04	c	2.0E-03	c	3.2E-04	c	2.0E-01	1.5E-07	9.2E-05
Dibromobenzene, 1,4-	106-37-6					1.0E-02	I					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		3.9E-01	
Dibromochloromethane	124-48-1	8.4E-02	I			2.0E-02	I			V		1	0.1	8.5E+02	5.8E+00	c	2.1E+01	c					8.0E-01	c		2.2E-04	
Dibromoethane, 1,2-	106-93-4	2.0E+00	I	6.0E-04	I	9.0E-03	I	9.0E-03	I	V		1		1.4E+03	3.4E-02	c	1.7E-01	c	4.1E-03	c	2.0E-02	c	6.5E-03	c	5.0E-02	1.9E-08	1.5E-05
Dibromomethane (Methylene Bromide)	74-95-3					1.0E-02	H			V		1		3.0E+03	7.8E+02	n	1.0E+04	ns					3.7E+02	n		9.1E-02	
Dibutyl Phthalate	84-74-2					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		1.1E+01	
Dibutyltin Compounds	NA					3.0E-04	P					1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n			
Dicamba	1918-00-9					3.0E-02	I					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		2.8E-01	
Dichloro-2-butene, 1,4-	764-41-0			2.6E-03	H					V		1		8.1E+02	3.2E-03	c	1.6E-02	c	9.4E-04	c	4.7E-03	c	1.9E-03	c		9.9E-07	
Dichloroacetic Acid	79-43-6	5.0E-02	I			4.0E-03	I					1	0.1		9.7E+00	c*	3.4E+01	c*					1.3E+00	c		2.7E-04	
Dichlorobenzene, 1,2-	95-50-1					9.0E-02	I	2.0E-01	H	V		1		2.2E+02	2.0E+03	ns	1.0E+04	ns	2.1E+02	n	8.8E+02	n	3.7E+02	n	6.0E+02	4.0E-01	6.6E-01
Dichlorobenzene, 1,4-	106-46-7	5.4E-03	C	1.1E-05	C			8.0E-01	I	V		1			2.6E+00	c	1.3E+01	c	2.2E-01	c	1.1E+00	c	4.3E-01	c	7.5E+01	4.6E-04	8.1E-02

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User's Guide); s = Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels												Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Dichlorobenzidine, 3,3'-	91-94-1	4.5E-01	I									1	0.1		1.1E+00	c	3.8E+00	c					1.5E-01	c		2.3E-03	
Dichlorodifluoromethane	75-71-8					2.0E-01	I	2.0E-01	H	V		1		8.5E+02	1.9E+02	n	7.8E+02	n	2.1E+02	n	8.8E+02	n	3.9E+02	n		6.1E-01	
Dichloroethane, 1,1-	75-34-3	5.7E-03	C	1.6E-06	C	2.0E-01	P			V		1		1.8E+03	3.4E+00	c	1.7E+01	c	1.5E+00	c	7.7E+00	c	2.4E+00	c		7.0E-04	
Dichloroethane, 1,2-	107-06-2	9.1E-02	I	2.6E-05	I	2.0E-02	P	2.4E+00	A	V		1		1.9E+03	4.5E-01	c	2.2E+00	c	9.4E-02	c	4.7E-01	c	1.5E-01	c	5.0E+00	4.4E-05	1.5E-03
Dichloroethylene, 1,1-	75-35-4					5.0E-02	I	2.0E-01	I	V		1		1.2E+03	2.5E+02	n	1.1E+03	n	2.1E+02	n	8.8E+02	n	3.4E+02	n	7.0E+00	1.2E-01	2.6E-03
Dichloroethylene, 1,2- (Mixed Isomers)	540-59-0					9.0E-03	H			V		1		1.4E+03	7.0E+02	n	9.2E+03	ns					3.3E+02	n		9.9E-02	
Dichloroethylene, 1,2-cis-	156-59-2					1.0E-02	P			V		1		1.4E+03	7.8E+02	n	1.0E+04	ns					3.7E+02	n	7.0E+01	1.1E-01	2.1E-02
Dichloroethylene, 1,2-trans-	156-60-5					2.0E-02	I	6.0E-02	P	V		1		1.5E+03	1.1E+02	n	5.0E+02	n	6.3E+01	n	2.6E+02	n	1.1E+02	n	1.0E+02	3.4E-02	3.2E-02
Dichlorophenol, 2,4-	120-83-2					3.0E-03	I					1	0.1		1.8E+02	n	1.8E+03	n					1.1E+02	n		1.8E-01	
Dichlorophenoxy Acetic Acid, 2,4-	94-75-7					1.0E-02	I					1	0.05		6.9E+02	n	7.7E+03	n					3.7E+02	n	7.0E+01	9.4E-02	1.8E-02
Dichlorophenoxy)butyric Acid, 4-(2,4-	94-82-6					8.0E-03	I					1	0.1		4.9E+02	n	4.9E+03	n					2.9E+02	n		1.2E-01	
Dichloropropane, 1,2-	78-87-5	3.6E-02	C	1.0E-05	C			4.0E-03	I	V		1		1.5E+03	9.3E-01	c*	4.7E+00	c*	2.4E-01	c*	1.2E+00	c*	3.9E-01	c*	5.0E+00	1.3E-04	1.7E-03
Dichloropropane, 1,3-	142-28-9					2.0E-02	P			V		1		1.6E+03	1.8E+03	n	2.0E+04	ns					7.3E+02	n		2.7E-01	
Dichloropropanol, 2,3-	616-23-9					3.0E-03	I					1	0.1		1.8E+02	n	1.8E+03	n					1.1E+02	n		2.3E-02	
Dichloropropene, 1,3-	542-75-6	1.0E-01	I	4.0E-06	I	3.0E-02	I	2.0E-02	I	V		1		1.7E+03	1.7E+00	c*	6.4E+00	c*	6.1E-01	c*	3.1E+00	c*	4.3E-01	c*		1.6E-04	
Dichlorvos	62-73-7	2.9E-01	I			5.0E-04	I	5.0E-04	I			1	0.1		1.7E+00	c*	5.9E+00	c*	5.2E-01	n	2.2E+00	n	2.3E-01	c*		6.5E-05	
Dicyclopentadiene	77-73-6					8.0E-03	P	7.0E-03	P	V		1		5.9E+02	2.9E+01	n	1.3E+02	n	7.3E+00	n	3.1E+01	n	1.4E+01	n		5.6E-02	
Dieldrin	60-57-1	1.6E+01	I	4.6E-03	I	5.0E-05	I					1	0.1		3.0E-02	c	1.1E-01	c	5.3E-04	c	2.7E-03	c	4.2E-03	c		9.0E-05	
Diesel Engine Exhaust	NA							5.0E-03	I			1	0.1						5.2E+00	n	2.2E+01	n					
Diethyl Phthalate	84-66-2					8.0E-01	I					1	0.1		4.9E+04	n	4.9E+05	nm					2.9E+04	n		1.3E+01	
Diethylene Glycol Monobutyl Ether	112-34-5					1.0E-02	P	2.0E-02	P			1	0.1		6.1E+02	n	6.2E+03	n	2.1E+01	n	8.8E+01	n	3.7E+02	n		8.0E-02	
Diethylene Glycol Monoethyl Ether	111-90-0					6.0E-02	P	3.0E-03	P			1	0.1		3.7E+03	n	3.7E+04	n	3.1E+00	n	1.3E+01	n	2.2E+03	n		4.4E-01	
Diethylformamide	617-84-5					1.0E-03	P					1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n		8.0E-03	
Diethylstilbestrol	56-53-1	3.5E+02	C	1.0E-01	C							1	0.1		1.4E-03	c	4.9E-03	c	2.4E-05	c	1.2E-04	c	1.9E-04	c		2.2E-04	
Difenzoquat	43222-48-6					8.0E-02	I					1	0.1		4.9E+03	n	4.9E+04	n					2.9E+03	n			
Diflubenzuron	35367-38-5					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		1.7E+00	
Difluoroethane, 1,1-	75-37-6							4.0E+01	I	V		1		1.5E+03	5.3E+04	ns	2.2E+05	nms	4.2E+04	n	1.8E+05	n	8.3E+04	n		2.9E+01	
Diisopropyl Ether	108-20-3							4.0E-01	P	V		1		1.8E+03	1.2E+03	n	5.1E+03	ns	4.2E+02	n	1.8E+03	n	8.3E+02	n		1.9E-01	
Diisopropyl Methylphosphonate	1445-75-6					8.0E-02	I			V		1		4.3E+02	6.3E+03	ns	8.2E+04	ns					2.9E+03	n		7.7E-01	
Dimethipin	55290-64-7					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		1.9E-01	
Dimethoate	60-51-5					2.0E-04	I					1	0.1		1.2E+01	n	1.2E+02	n					7.3E+00	n		1.8E-03	
Dimethoxybenzidine, 3,3'-	119-90-4	1.4E-02	H									1	0.1		3.5E+01	c	1.2E+02	c					4.8E+00	c		1.5E-02	
Dimethyl methylphosphonate	756-79-6	1.7E-03	P			6.0E-02	P					1	0.1		2.8E+02	c*	1.0E+03	c*					4.0E+01	c*		8.2E-03	
Dimethylaniline HCl, 2,4-	21436-96-4	5.8E-01	H									1	0.1		8.4E-01	c	3.0E+00	c					1.2E-01	c		5.1E-05	
Dimethylaniline, 2,4-	95-68-1	7.5E-01	H									1	0.1		6.5E-01	c	2.3E+00	c					9.0E-02	c		3.9E-05	
Dimethylaniline, N,N-	121-69-7					2.0E-03	I			V		1		6.2E+02	1.6E+02	n	2.0E+03	ns					7.3E+01	n		2.6E-02	
Dimethylbenzidine, 3,3'-	119-93-7	1.1E+01	P									1	0.1		4.4E-02	c	1.6E-01	c					6.1E-03	c		9.3E-05	
Dimethylformamide	68-12-2					1.0E-01	P	3.0E-02	I			1	0.1		6.1E+03	n	6.2E+04	n	3.1E+01	n	1.3E+02	n	3.7E+03	n		7.5E-01	
Dimethylphenol, 2,4-	105-67-9					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		1.2E+00	
Dimethylphenol, 2,6-	576-26-1					6.0E-04	I					1	0.1		3.7E+01	n	3.7E+02	n					2.2E+01	n		3.6E-02	
Dimethylphenol, 3,4-	95-65-8					1.0E-03	I					1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n		6.0E-02	
Dimethylterephthalate	120-61-6					1.0E-01	I			V		1		6.1E+00	7.6E+03	ns	1.0E+05	nms					3.7E+03	n		1.0E+00	
Dinitro-o-cresol, 4,6-	534-52-1					1.0E-04	P					1	0.1		6.1E+00	n	6.2E+01	n					3.7E+00	n		5.1E-03	
Dinitro-o-cyclohexyl Phenol, 4,6-	131-89-5					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		2.1E+00	
Dinitrobenzene, 1,2-	528-29-0					1.0E-04	P					1	0.1		6.1E+00	n	6.2E+01	n					3.7E+00	n		2.4E-03	
Dinitrobenzene, 1,3-	99-65-0					1.0E-04	I					1	0.1		6.1E+00	n	6.2E+01	n					3.7E+00	n		2.3E-03	
Dinitrobenzene, 1,4-	100-25-4					1.0E-04	P					1	0.1		6.1E+00	n	6.2E+01	n					3.7E+00	n		2.3E-03	
Dinitrophenol, 2,4-	51-28-5					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		6.8E-02	
Dinitrotoluene Mixture, 2,4/2,6-	25321-14-6	6.8E-01	I									1	0.1		7.1E-01	c	2.5E+00	c					9.9E-02	c		9.3E-05	
Dinitrotoluene, 2,4-	121-14-2					2.0E-03	I					1	0.102		1.2E+02	n	1.2E+03	n					7.3E+01	n		6.8E-02	
Dinitrotoluene, 2,6-	606-20-2					1.0E-03	P					1	0.099		6.1E+01	n	6.2E+02	n					3.7E+01	n		3.4E-02	
Dinitrotoluene, 2-Amino-4,6-	35572-78-2					2.0E-03	S					1	0.006		1.5E+02	n	2.0E+03	n					7.3E+01	n		2.9E-02	
Dinitrotoluene, 4-Amino-2,6-	19406-51-0					2.0E-03	S					1	0.009		1.5E+02	n	1.9E+03	n					7.3E+01	n		2.9E-02	
Dinoseb	88-85-7					1.0E-03	I					1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n	7.0E+00	2.7E-01	5.1E-02
Dioxane, 1,4-	123-91-1	1.1E-02	I					3.6E+00	A			1	0.1		4.4E+01	c	1.6E+02	c	3.8E+03	n	1.6E+04	n	6.1E+00	c		1.2E-03	
Diphenamid	957-51-7					3.0E-02	I					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		3.4E+01	
Diphenyl Sulfone	127-63-9					3.0E-03	P					1	0.1		1.8E+02	n	1.8E+03	n					1.1E+02	n		6.6E-01	
Diphenylamine	122-39-4					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		3.6E+00	
Diphenylhydrazine, 1,2-	122-66-7	8.0E-01	I	2.2E-04	I							1	0.1		6.1E-01	c	2.2E+00	c	1.1E-02	c	5.6E-02	c	8.4E-02	c		6.0E-04	
Diquat	85-00-7					2.2E-03	I					1	0.1		1.3E+02	n	1.4E+03	n					6.0E+01	n	2.0E+01	3.3E-01	6.1E-02
Direct Black 38	1937-37-7	7.4E+00	C	2.1E-03	C							1	0.1		6.6E-02	c	2.3E-01	c	1.2E-03	c	5.8E-03	c	9.1E-03	c		1.4E+00	
Direct Blue 6	2602-46-2	7.4E+00	C	2.1E-03	C							1	0.1		6.6E-02	c	2.3E-01	c	1.2E-03	c	5.8E-03	c	9.1E-03	c		4.0E+00	
Direct Brown 95	16071-86-6	6.7E+00	C	1.9E-03	C							1	0.1		7.2E-02	c	2.6E-01	c	1.3E-03	c	6.5E-03	c	1.0E-02	c			

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Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Disulfoton	298-04-4					4.0E-05	I					1	0.1		2.4E+00	n	2.5E+01	n					1.5E+00	n		2.7E-03	
Dithiane, 1,4-	505-29-3					1.0E-02	I					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		1.9E-01	
Diuron	330-54-1					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		3.4E-02	
Dodine	2439-10-3					4.0E-03	I					1	0.1		2.4E+02	n	2.5E+03	n					1.5E+02	n		4.5E+00	
Dioxins																											
Hexachlorodibenzo-p-dioxin	34465-46-8	1.3E+04	W	3.8E+00	W							1	0.03		4.5E-05	c	1.8E-04	c	6.4E-07	c	3.2E-06	c	5.2E-08	c		4.3E-08	
Hexachlorodibenzo-p-dioxin, Mixture	NA	6.2E+03	I	1.3E+00	I							1	0.03		9.4E-05	c	3.9E-04	c	1.9E-06	c	9.4E-06	c	1.1E-05	c		9.0E-06	
HpCDD, 2,3,7,8-	37871-00-4	1.3E+03	W	3.8E-01	W							1	0.03		4.5E-04	c	1.8E-03	c	6.4E-06	c	3.2E-05	c	5.2E-05	c		7.3E-05	
OCDD	3268-87-9	3.9E+01	W	1.1E-02	W							1	0.03		1.5E-02	c	6.1E-02	c	2.1E-04	c	1.1E-03	c	1.7E-03	c		4.1E-03	
PeCDD, 2,3,7,8-	36088-22-9	1.3E+05	W	3.8E+01	W							1	0.03		4.5E-06	c	1.8E-05	c	6.4E-08	c	3.2E-07	c	5.2E-07	c		2.7E-07	
TCDD, 2,3,7,8-	1746-01-6	1.3E+05	C	3.8E+01	C	1.0E-09	A					1	0.03		4.5E-06	c*	1.8E-05	c*	6.4E-08	c	3.2E-07	c	5.2E-07	c*	3.0E-05	1.5E-07	8.8E-06
Endosulfan	115-29-7					6.0E-03	I					1	0.1		3.7E+02	n	3.7E+03	n					2.2E+02	n		9.7E+00	
Endothall	145-73-3					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n	1.0E+02	1.6E-01	2.2E-02
Endrin	72-20-8					3.0E-04	I					1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n	2.0E+00	2.3E-01	4.3E-02
Epichlorohydrin	106-89-8	9.9E-03	I	1.2E-06	I	6.0E-03	P	1.0E-03	I	V		1		8.4E+03	1.8E+01	n	7.7E+01	n	1.0E+00	n	4.4E+00	n	2.1E+00	n		4.3E-04	
Epoxybutane, 1,2-	106-88-7							2.0E-02	I	V		1		1.2E+04	1.5E+02	n	6.4E+02	n	2.1E+01	n	8.8E+01	n	4.2E+01	n		8.7E-03	
EPTC	759-94-4					2.5E-02	I			V		1		6.2E+02	2.0E+03	ns	2.6E+04	ns					9.1E+02	n		6.5E-01	
Ethephon	16672-87-0					5.0E-03	I					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		3.8E-02	
Ethion	563-12-2					5.0E-04	I					1	0.1		3.1E+01	n	3.1E+02	n					1.8E+01	n		4.8E-01	
Ethoxyethanol Acetate, 2-	111-15-9					3.0E-01	H					1	0.1		1.8E+04	n	1.8E+05	nm					1.1E+04	n		2.2E+00	
Ethoxyethanol, 2-	110-80-5					4.0E-01	H	2.0E-01	I			1	0.1		2.4E+04	n	2.5E+05	nm	2.1E+02	n	8.8E+02	n	1.5E+04	n		2.9E+00	
Ethyl Acetate	141-78-6					9.0E-01	I			V		1		1.1E+04	7.0E+04	ns	9.2E+05	nms					3.3E+04	n		7.0E+00	
Ethyl Acrylate	140-88-5	4.8E-02	H							V		1		2.6E+03	1.3E+01	c	6.0E+01	c					1.4E+00	c		3.2E-04	
Ethyl Chloride	75-00-3							1.0E+01	I	V		1		2.2E+03	1.5E+04	ns	6.2E+04	ns	1.0E+04	n	4.4E+04	n	2.1E+04	n		6.0E+00	
Ethyl Ether	60-29-7					2.0E-01	I			V		1		6.2E+03	1.6E+04	ns	2.0E+05	nms					7.3E+03	n		1.6E+00	
Ethyl Methacrylate	97-63-2					9.0E-02	H			V		1		1.2E+03	7.0E+03	ns	9.2E+04	ns					3.3E+03	n		7.9E-01	
Ethyl-p-nitrophenyl Phosphonate	2104-64-5					1.0E-05	I					1	0.1		6.1E-01	n	6.2E+00	n					3.7E-01	n		8.7E-03	
Ethylbenzene	100-41-4	1.1E-02	C	2.5E-06	C	1.0E-01	I	1.0E+00	I	V		1		5.5E+02	5.7E+00	c	2.9E+01	c	9.7E-01	c	4.9E+00	c	1.5E+00	c	7.0E+02	1.9E-03	8.9E-01
Ethylene Cyanohydrin	109-78-4					3.0E-02	P					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		2.2E-01	
Ethylene Diamine	107-15-3					9.0E-02	P					1	0.1		5.5E+03	n	5.5E+04	n					3.3E+03	n		8.2E-01	
Ethylene Glycol	107-21-1					2.0E+00	I	4.0E-01	C			1	0.1		1.2E+05	nm	1.2E+06	nm	4.2E+02	n	1.8E+03	n	7.3E+04	n		1.5E+01	
Ethylene Glycol Monobutyl Ether	111-76-2					5.0E-01	I	1.3E+01	I			1	0.1		3.1E+04	n	3.1E+05	nm	1.4E+04	n	5.7E+04	n	1.8E+04	n		3.7E+00	
Ethylene Oxide	75-21-8	3.1E-01	C	8.8E-05	C					V		1		1.1E+05	1.6E-01	c	8.0E-01	c	2.8E-02	c	1.4E-01	c	4.4E-02	c		9.0E-06	
Ethylene Thiourea	96-45-7	4.5E-02	C	1.3E-05	C	8.0E-05	I					1	0.1		4.9E+00	n	3.8E+01	c**	1.9E-01	c	8.4E-01	c	1.5E+00	c**		3.2E-04	
Ethylphthalyl Ethyl Glycolate	84-72-0					3.0E+00	I					1	0.1		1.8E+05	nm	1.8E+06	nm					1.1E+05	n		3.0E+02	
Express	101200-48-0					8.0E-03	I					1	0.1		4.9E+02	n	4.9E+03	n					2.9E+02	n		1.1E-01	
Fenamiphos	22224-92-6					2.5E-04	I					1	0.1		1.5E+01	n	1.5E+02	n					9.1E+00	n		5.9E-03	
Fenpropathrin	39515-41-8					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		5.4E+01	
Fluometuron	2164-17-2					1.3E-02	I					1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		4.4E-01	
Fluorine (Soluble Fluoride)	7782-41-4					6.0E-02	I					1			4.7E+03	n	6.1E+04	n					2.2E+03	n	4.0E+03	3.3E+02	6.0E+02
Fluridone	59756-60-4					8.0E-02	I					1	0.1		4.9E+03	n	4.9E+04	n					2.9E+03	n		6.5E+02	
Flurprimidol	56425-91-3					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		1.4E+00	
Flutolanil	66332-96-5					6.0E-02	I					1	0.1		3.7E+03	n	3.7E+04	n					2.2E+03	n		2.4E+01	
Fluvalinate	69409-94-5					1.0E-02	I					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		5.3E+02	
Folpet	133-07-3	3.5E-03	I			1.0E-01	I					1	0.1		1.4E+02	c*	4.9E+02	c					1.9E+01	c		9.4E-03	
Formasafen	72178-02-0	1.9E-01	I									1	0.1		2.6E+00	c	9.1E+00	c					3.5E-01	c		7.9E-03	
Fonofos	944-22-9					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		1.4E-01	
Formaldehyde	50-00-0			1.3E-05	I	2.0E-01	I	9.8E-03	A			1	0.1		1.2E+04	n	1.2E+05	nm	1.9E-01	c*	9.4E-01	c*	7.3E+03	n		1.5E+00	
Formic Acid	64-18-6					2.0E+00	H	3.0E-03	P			1	0.1		1.2E+05	nm	1.2E+06	nm	3.1E+00	n	1.3E+01	n	7.3E+04	n		1.5E+01	
Fosetyl-AL	39148-24-8					3.0E+00	I					1	0.1		1.8E+05	nm	1.8E+06	nm					1.1E+05	n			
Furazolidone	67-45-8	3.8E+00	H									1	0.1		1.3E-01	c	4.5E-01	c					1.8E-02	c		3.3E-05	
Furfural	98-01-1					3.0E-03	I	5.0E-02	H			1	0.1		1.8E+02	n	1.8E+03	n	5.2E+01	n	2.2E+02	n	1.1E+02	n		2.6E-02	
Furium	531-82-8	1.5E+00	C	4.3E-04	C							1	0.1		3.2E-01	c	1.1E+00	c	5.7E-03	c	2.9E-02	c	4.5E-02	c		5.3E-05	
Furmecyclox	60568-05-0	3.0E-02	I									1	0.1		1.6E+01	c	5.7E+01	c					2.2E+00	c		7.4E-03	
Furans																											
Furan	110-00-9					1.0E-03	I			V		1		6.8E+03	7.8E+01	n	1.0E+03	n					3.7E+01	n		1.5E-02	
HpCDF, 2,3,7,8-	38998-75-3	1.3E+03	W	3.8E-01	W							1	0.1		3.7E-04	c	1.3E-03	c	6.4E-06	c	3.2E-05	c	5.2E-05	c		4.0E-05	
HxCDF, 2,3,7,8-	55684-94-1	1.3E+04	W	3.8E+00	W							1	0.1		3.7E-05	c	1.3E-04	c	6.4E-07	c	3.2E-06	c	5.2E-06	c		2.4E-06	
OCDF	39001-02-0	3.9E+01	W	1.1E-02	W							1	0.1		1.2E-02	c	4.4E-02	c	2.1E-04	c	1.1E-03	c	1.7E-03	c		2.3E-03	
PeCDF, 1,2,3,7,8-	57117-41-6	3.9E+03	W	1.1E+00	W							1	0.1		1.2E-04	c	4.4E-04	c	2.1E-06	c	1.1E-05	c	1.7E-05	c		4.7E-06	
PeCDF, 2,3,4,7,8-	57117-31-4	3.9E+04	W	1.1E+01	W							1	0.1		1.2E-05	c	4.4E-05	c	2.1E-07	c	1.1E-06	c	1.7E-06	c		4.7E-07	
TCDF, 2,3,7,8-	51207-31-9	1.3E+04	W	3.8E+00	W							1	0.1		3.7E-05	c	1.3E-04	c	6.4E-07	c	3.2E-06	c	5.2E-06	c		8.4E-07	
Glufosinate, Ammonium	77182-82-2					4.0E-04	I					1	0.1		2.4E+01	n	2.5E+02	n					1.5E+01	n		4.7E-03	

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Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Glycidyl	765-34-4					4.0E-04	I	1.0E-03	H			1	0.1		2.4E+01	n	2.5E+02	n	1.0E+00	n	4.4E+00	n	1.5E+01	n		2.9E-03	
Glyphosate	1071-83-6					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n	7.0E+02	8.7E-01	1.7E-01
Goal	42874-03-3					3.0E-03	I					1	0.1		1.8E+02	n	1.8E+03	n					1.1E+02	n		1.0E+01	
Haloxyfop, Methyl	69806-40-2					5.0E-05	I					1	0.1		3.1E+00	n	3.1E+01	n					1.8E+00	n		6.5E-02	
Harmony	79277-27-3					1.3E-02	I					1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		1.3E-01	
Heptachlor	76-44-8	4.5E+00	I	1.3E-03	I	5.0E-04	I					1	0.1		1.1E-01	c	3.8E-01	c	1.9E-03	c	9.4E-03	c	1.5E-02	c	4.0E-01	1.6E-03	4.2E-02
Heptachlor Epoxide	1024-57-3	9.1E+00	I	2.6E-03	I	1.3E-05	I					1	0.1		5.3E-02	c*	1.9E-01	c*	9.4E-04	c	4.7E-03	c	7.4E-03	c*	2.0E-01	7.9E-05	2.1E-03
Hexabromobenzene	87-82-1					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		5.1E-01	
Hexachlorobenzene	118-74-1	1.6E+00	I	4.6E-04	I	8.0E-04	I					1	0.1		3.0E-01	c	1.1E+00	c	5.3E-03	c	2.7E-02	c	4.2E-02	c	1.0E+00	2.9E-04	7.0E-03
Hexachlorobutadiene	87-68-3	7.8E-02	I	2.2E-05	I	1.0E-03	P					1	0.1		6.2E+00	c**	2.2E+01	c*	1.1E-01	c	5.6E-01	c	8.6E-01	c*		1.9E-03	
Hexachlorocyclohexane, Alpha-	319-84-6	6.3E+00	I	1.8E-03	I							1	0.1		7.7E-02	c	2.7E-01	c	1.4E-03	c	6.8E-03	c	1.1E-02	c		7.4E-05	
Hexachlorocyclohexane, Beta-	319-85-7	1.8E+00	I	5.3E-04	I							1	0.1		2.7E-01	c	9.6E-01	c	4.6E-03	c	2.3E-02	c	3.7E-02	c		2.6E-04	
Hexachlorocyclohexane, Gamma- (Lindane)	58-89-9	1.1E+00	C	3.1E-04	C	3.0E-04	I					1	0.04		5.2E-01	c*	2.1E+00	c	7.8E-03	c	4.0E-02	c	6.1E-02	c	2.0E-01	4.3E-04	1.4E-03
Hexachlorocyclohexane, Technical	608-73-1	1.8E+00	I	5.1E-04	I							1	0.1		2.7E-01	c	9.6E-01	c	4.6E-03	c	2.4E-02	c	3.7E-02	c		2.6E-04	
Hexachlorocyclopentadiene	77-47-4					6.0E-03	I	2.0E-04	I			1	0.1		3.7E+02	n	3.7E+03	n	2.1E-01	n	8.8E-01	n	2.2E+02	n	5.0E+01	8.0E-01	1.8E-01
Hexachloroethane	67-72-1	1.4E-02	I	4.0E-06	I	1.0E-03	I					1	0.1		3.5E+01	c**	1.2E+02	c**	6.1E-01	c	3.1E+00	c	4.8E+00	c**		3.2E-03	
Hexachlorophene	70-30-4					3.0E-04	I					1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		1.4E+01	
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	1.1E-01	I			3.0E-03	I					1	0.015		5.5E+00	c*	2.4E+01	c					6.1E-01	c		3.6E-04	
Hexamethylene Diisocyanate, 1,6-	822-06-0							1.0E-05	I	V		1		4.1E+03	3.7E+00	n	1.8E+01	n	1.0E-02	n	4.4E-02	n	2.1E-02	n		2.5E-04	
Hexane, N-	110-54-3					6.0E-02	H	7.0E-01	I	V		1		1.4E+02	5.7E+02	ns	2.6E+03	ns	7.3E+02	n	3.1E+03	n	8.8E+02	n		6.2E+00	
Hexanedioic Acid	124-04-9					2.0E+00	P					1	0.1		1.2E+05	nm	1.2E+06	nm					7.3E+04	n		1.8E+01	
Hexazinone	51235-04-2					3.3E-02	I					1	0.1		2.0E+03	n	2.0E+04	n					1.2E+03	n		1.7E+00	
Hydrazine	302-01-2	3.0E+00	I	4.9E-03	I			2.0E-04	C			1			2.1E-01	c	9.5E-01	c	5.0E-04	c	2.5E-03	c	2.2E-02	c			
Hydrazine Sulfate	10034-93-2	3.0E+00	I	4.9E-03	I							1			2.1E-01	c	9.5E-01	c	5.0E-04	c	2.5E-03	c	2.2E-02	c			
Hydrogen Chloride	7647-01-0							2.0E-02	I			1			2.8E+07	nm	1.2E+08	nm	2.1E+01	n	8.8E+01	n					
Hydrogen Sulfide	7783-06-4							2.0E-03	I			1			2.8E+06	nm	1.2E+07	nm	2.1E+00	n	8.8E+00	n					
Hydroquinone	123-31-9	5.6E-02	P			4.0E-02	P					1	0.1		8.7E+00	c	3.1E+01	c					1.2E+00	c		1.3E-03	
Hexabromodiphenyl ether, 2,2',4,4',5,5'- (BDE-153)	68631-49-2					2.0E-04	I								1.6E+01	n	2.0E+02	n					7.3E+00	n			
Imazalil	35554-44-0					1.3E-02	I					1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		1.9E+00	
Imazaquin	81335-37-7					2.5E-01	I					1	0.1		1.5E+04	n	1.5E+05	nm					9.1E+03	n		9.2E+01	
Iprodione	36734-19-7					4.0E-02	I					1	0.1		2.4E+03	n	2.5E+04	n					1.5E+03	n		7.0E-01	
Iron	7439-89-6					7.0E-01	P					1			5.5E+04	n	7.2E+05	nm					2.6E+04	n		6.4E+02	
Isobutyl Alcohol	78-83-1					3.0E-01	I			V		1		9.8E+03	2.3E+04	ns	3.1E+05	nms					1.1E+04	n		2.2E+00	
Isophorone	78-59-1	9.5E-04	I			2.0E-01	I	2.0E+00	C			1	0.1		5.1E+02	c*	1.6E+03	c*	2.1E+03	n	8.8E+03	n	7.1E+01	c		2.2E-02	
Isopropalin	33820-53-0					1.5E-02	I					1	0.1		9.2E+02	n	9.2E+03	n					5.5E+02	n		7.4E+00	
Isopropyl Methyl Phosphonic Acid	1832-54-8					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		7.7E-01	
Isoxaben	82558-50-7					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		1.1E+01	
Kerb	23950-58-5					7.5E-02	I					1	0.1		4.6E+03	n	4.6E+04	n					2.7E+03	n		8.2E+00	
Lactofen	77501-63-4					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		3.7E+00	
Linuron	330-55-2					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		6.8E-02	
Lithium	7439-93-2					2.0E-03	P					1			1.6E+02	n	2.0E+03	n					7.3E+01	n		2.2E+01	
Lithium Perchlorate	7791-03-9					7.0E-04	I					1			5.5E+01	n	7.2E+02	n					2.6E+01	n			
Londax	83055-99-6					2.0E-01	I					1	0.1		1.2E+04	n	1.2E+05	nm					7.3E+03	n		1.9E+00	
Lead Compounds																											
Lead and Compounds	7439-92-1											1			4.0E+02	n	8.0E+02	n							1.5E+01		1.4E+01
Tetraethyl Lead	78-00-2					1.0E-07	I					1	0.1		6.1E-03	n	6.2E-02	n					3.7E-03	n		1.4E-05	
Malathion	121-75-5					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		1.9E-01	
Maleic Anhydride	108-31-6					1.0E-01	I	7.0E-04	C			1	0.1		6.1E+03	n	6.1E+04	n	7.3E-01	n	3.1E+00	n	3.7E+03	n		7.4E-01	
Maleic Hydrazide	123-33-1					5.0E-01	I					1	0.1		3.1E+04	n	3.1E+05	nm					1.8E+04	n		4.0E+00	
Malononitrile	109-77-3					1.0E-04	P					1	0.1		6.1E+00	n	6.2E+01	n					3.7E+00	n		8.4E-04	
Mancozeb	8018-01-7					3.0E-02	H					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		2.4E-01	
Maneb	12427-38-2					5.0E-03	I					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		4.0E-02	
Manganese (Diet)	7439-96-5					1.4E-01	I	5.0E-05	I			1															
Manganese (Water)	7439-96-5					2.4E-02	I	5.0E-05	I			0.04			1.8E+03	n	2.3E+04	n	5.2E-02	n	2.2E-01	n	8.8E+02	n		5.7E+01	
MCPA	94-74-6					5.0E-04	I					1	0.1		3.1E+01	n	3.1E+02	n					1.8E+01	n		4.7E-03	
MCPB	94-81-5					1.0E-02	I					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		1.5E-01	
MCPP	93-65-2					1.0E-03	I					1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n		1.1E-02	
Mephosfolan	950-10-7					9.0E-05	H					1	0.1		5.5E+00	n	5.5E+01	n					3.3E+00	n		3.9E-03	
Mepiquat Chloride	24307-26-4					3.0E-02	I					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		6.0E-01	
Merphos	150-50-5					3.0E-05	I					1	0.1		1.8E+00	n	1.8E+01	n					1.1E+00	n		1.4E-01	
Merphos Oxide	78-48-8					3.0E-05	I					1	0.1		1.8E+00	n	1.8E+01	n					1.1E+00	n		4.4E-03	
Metalaxyl	57837-19-1					6.0E-02	I					1	0.1		3.7E+03	n	3.7E+04	n					2.2E+03	n		5.4E-01	
Methacrylonitrile	126-98-7					1.0E-04	I	7.0E-04	H	V		1		4.5E+03	3.2E+00	n	1.8E+01	n	7.3E-01	n	3.1E+00	n	1.0E+00	n		2.4E-04	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User's Guide); s = Concentration may exceed Csat (See User's Guide); SSL values are based on DAF=1

Contaminant		Toxicity and Chemical-specific Information													Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Methamidophos	10265-92-6					5.0E-05	I					1	0.1		3.1E+00	n	3.1E+01	n					1.8E+00	n		3.8E-04	
Methanol	67-56-1					5.0E-01	I	4.0E+00	C			1	0.1		3.1E+04	n	3.1E+05	nm	4.2E+03	n	1.8E+04	n	1.8E+04	n		3.7E+00	
Methidathion	950-37-8					1.0E-03	I					1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n		8.0E-03	
Methomyl	16752-77-5					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		2.0E-01	
Methoxy-5-nitroaniline, 2-	99-59-2	4.9E-02	C	1.4E-05	C							1	0.1		9.9E+00	c	3.5E+01	c	1.7E-01	c	8.8E-01	c	1.4E+00	c		3.8E-04	
Methoxychlor	72-43-5					5.0E-03	I					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n	4.0E+01	1.6E+01	3.4E+00
Methoxyethanol Acetate, 2-	110-49-6					2.0E-03	H					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		1.5E-02	
Methoxyethanol, 2-	109-86-4					3.0E-03	P	2.0E-02	I			1	0.1		1.8E+02	n	1.8E+03	n	2.1E+01	n	8.8E+01	n	1.1E+02	n		2.2E-02	
Methyl Acetate	79-20-9					1.0E+00	H			V		1		2.9E+04	7.6E+04	ns	1.0E+06	nms					3.7E+04	n		7.6E+00	
Methyl Acrylate	96-33-3					3.0E-02	H			V		1		6.9E+03	2.3E+03	n	3.1E+04	ns					1.1E+03	n		2.3E-01	
Methyl Ethyl Ketone (2-Butanone)	78-93-3					6.0E-01	I	5.0E+00	I	V		1		2.8E+04	2.8E+04	ns	1.9E+05	nms	5.2E+03	n	2.2E+04	n	7.1E+03	n		1.5E+00	
Methyl Isobutyl Ketone (4-methyl-2-pentanone)	108-10-1					8.0E-02	H	3.0E+00	I	V		1		3.2E+03	5.3E+03	ns	5.2E+04	ns	3.1E+03	n	1.3E+04	n	2.0E+03	n		4.4E-01	
Methyl Methacrylate	80-62-6					1.4E+00	I	7.0E-01	I	V		1		2.5E+03	4.7E+03	ns	2.0E+04	ns	7.3E+02	n	3.1E+03	n	1.4E+03	n		3.1E-01	
Methyl Parathion	298-00-0					2.5E-04	I					1	0.1		1.5E+01	n	1.5E+02	n					9.1E+00	n		1.1E-02	
Methyl Styrene (Mixed Isomers)	25013-15-4					6.0E-03	H	4.0E-02	H	V		1		4.5E+02	1.8E+02	n	1.1E+03	ns	4.2E+01	n	1.8E+02	n	6.0E+01	n		1.1E-01	
Methyl tert-Butyl Ether (MTBE)	1634-04-4	1.8E-03	C	2.6E-07	C			3.0E+00	I	V		1		6.9E+03	3.9E+01	c	1.9E+02	c	9.4E+00	c	4.7E+01	c	1.2E+01	c		2.7E-03	
Methyl-5-Nitroaniline, 2-	99-55-8	3.3E-02	H									1	0.1		1.5E+01	c	5.2E+01	c					2.0E+00	c		7.6E-04	
Methylaniline Hydrochloride, 2-	636-21-5	1.3E-01	C	3.7E-05	C							1	0.1		3.7E+00	c	1.3E+01	c	6.6E-02	c	3.3E-01	c	5.2E-01	c		1.8E-04	
Methylarsonic acid	124-58-3					1.0E-02	A			A		1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n			
Methylene Chloride	75-09-2	7.5E-03	I	4.7E-07	I	6.0E-02	I	1.1E+00	A	V		1		3.5E+03	1.1E+01	c	5.4E+01	c	5.2E+00	c	2.6E+01	c	4.6E+00	c	5.0E+00	1.2E-03	1.3E-03
Methylene-bis(2-chloroaniline), 4,4'-	101-14-4	1.0E-01	P	4.3E-04	C	2.0E-03	P				M	1	0.1		1.2E+00	c	1.7E+01	c*	2.2E-03	c	2.9E-02	c	2.2E-01	c		5.9E-03	
Methylene-bis(N,N-dimethyl) Aniline, 4,4'-	101-61-1	4.6E-02	I									1	0.1		1.1E+01	c	3.7E+01	c					1.5E+00	c		4.3E-02	
Methylenebisbenzenamine, 4,4'-	101-77-9	1.6E+00	C	4.6E-04	C							1	0.1		3.0E-01	c	1.1E+00	c	5.3E-03	c	2.7E-02	c	4.2E-02	c		4.2E-04	
Methylenediphenyl Diisocyanate	101-68-8							6.0E-04	I			1	0.1		8.5E+05	nm	3.9E+06	nm	6.3E-01	n	2.6E+00	n					
Methylstyrene, Alpha-	98-83-9					7.0E-02	H			V		1		4.5E+02	5.5E+03	ns	7.2E+04	ns					2.6E+03	n		4.7E+00	
Metolachlor	51218-45-2					1.5E-01	I					1	0.1		9.2E+03	n	9.2E+04	n					5.5E+03	n		4.3E+00	
Metribuzin	21087-64-9					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		2.4E+00	
Mirex	2385-85-5	1.8E+01	C	5.1E-03	C	2.0E-04	I					1	0.1		2.7E-02	c	9.6E-02	c	4.8E-04	c	2.4E-03	c	3.7E-03	c		3.5E-03	
Molinate	2212-67-1					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		5.6E-02	
Molybdenum	7439-98-7					5.0E-03	I					1			3.9E+02	n	5.1E+03	n					1.8E+02	n		3.7E+00	
Monochloramine	10599-90-3					1.0E-01	I					1			7.8E+03	n	1.0E+05	nm					3.7E+03	n			
Monomethylaniline	100-61-8					2.0E-03	P					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		2.4E-02	
Mercury Compounds																											
Mercuric Chloride	7487-94-7					3.0E-04	I					0.07			2.3E+01	n	3.1E+02	n					1.1E+01	n			
Mercuric Sulfide	1344-48-5					3.0E-04	S					1			2.3E+01	n	3.1E+02	n					1.1E+01	n			
Mercury (elemental)	7439-97-6							3.0E-04	I	V		1		3.1E+00	6.7E+00	ns	2.8E+01	ns	3.1E-01	n	1.3E+00	n	6.3E-01	n	2.0E+00	3.3E-02	1.0E-01
Mercury, Inorganic Salts	NA					3.0E-04	I					0.07			2.3E+01	n	3.1E+02	n					1.1E+01	n		5.7E-01	
Methyl Mercury	22967-92-6					1.0E-04	I					1			7.8E+00	n	1.0E+02	n					3.7E+00	n			
Phenylmercuric Acetate	62-38-4					8.0E-05	I					1	0.1		4.9E+00	n	4.9E+01	n					2.9E+00	n		1.6E-03	
N,N'-Diphenyl-1,4-benzenediamine	74-31-7					3.0E-04	P					1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		2.8E+00	
Naled	300-76-5					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		2.9E-02	
Napropamide	15299-99-7					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		8.5E+01	
Nickel Refinery Dust	NA			2.4E-04	I							0.04			1.4E+04	c	6.6E+04	c	1.0E-02	c	5.1E-02	c					
Nickel Soluble Salts	7440-02-0					2.0E-02	I					0.04			1.6E+03	n	2.0E+04	n					7.3E+02	n		4.8E+01	
Nickel Subsulfide	12035-72-2			4.8E-04	I							0.04			6.9E+03	c	3.5E+04	c	5.1E-03	c	2.6E-02	c					
Nitrate	14797-55-8					1.6E+00	I					1			1.3E+05	nm	1.6E+06	nm					5.8E+04	n	1.0E+04		
Nitrite	14797-65-0					1.0E-01	I					1			7.8E+03	n	1.0E+05	nm					3.7E+03	n	1.0E+03		
Nitroaniline, 3-	99-09-2	2.1E-02	P			3.0E-04	P	1.0E-03	P			1	0.1		1.8E+01	n	8.2E+01	c**	1.0E+00	n	4.4E+00	n	3.2E+00	c**		9.7E-04	
Nitroaniline, 4-	100-01-6	2.1E-02	P			3.0E-03	P	4.0E-03	P			1	0.1		2.3E+01	c**	6.2E+01	c*	4.2E+00	n	1.8E+01	n	3.2E+00	c*		9.7E-04	
Nitrobenzene	98-95-3					5.0E-04	I	2.0E-03	H	V		1		2.6E+03	3.1E+01	n	2.8E+02	n	2.1E+00	n	8.8E+00	n	3.4E+00	n		2.0E-03	
Nitrofurantoin	67-20-9					7.0E-02	H					1	0.1		4.3E+03	n	4.3E+04	n					2.6E+03	n		1.9E+00	
Nitrofurazone	59-87-0	1.3E+00	C	3.7E-04	C							1	0.1		3.7E-01	c	1.3E+00	c	6.6E-03	c	3.3E-02	c	5.2E-02	c		4.9E-05	
Nitroglycerin	55-63-0	1.7E-02	P			1.0E-04	P					1	0.1		6.1E+00	n	6.2E+01	n					3.7E+00	n		1.7E-03	
Nitroguanidine	556-88-7					1.0E-01	I					1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		9.2E-01	
Nitromethane	75-52-5			9.0E-06	P			2.0E-02	P	V		1		1.7E+04	4.7E+00	c*	2.4E+01	c*	2.7E-01	c*	1.4E+00	c*	5.4E-01	c*		1.2E-04	
Nitropropane, 2-	79-46-9			2.7E-03	H			2.0E-02	I	V		1		4.3E+03	1.2E-02	c	6.0E-02	c	9.0E-04	c	4.5E-03	c	1.8E-03	c		4.5E-07	
Nitroso-di-N-butylamine, N-	924-16-3	5.4E+00	I	1.6E-03	I					V		1		1.3E+04	9.3E-02	c	4.3E-01	c	1.5E-03	c	7.7E-03	c	2.4E-03	c		6.6E-06	
Nitroso-di-N-propylamine, N-	621-64-7	7.0E+00	I									1	0.1		6.9E-02	c	2.5E-01	c					9.6E-03	c		1.1E-05	
Nitroso-N-ethylurea, N-	759-73-9	2.7E+01	C	7.7E-03	C						M	1	0.1		4.3E-03	c	6.4E-02	c	1.2E-04	c	1.6E-03	c	8.0E-04	c		2.2E-07	
Nitrosodiethanolamine, N-	1116-54-7	2.8E+00	I									1	0.1		1.7E-01	c	6.2E-01	c					2.4E-02	c		4.9E-06	
Nitrosodiethylamine, N-	55-18-5	1.5E+02	I	4.3E-02	I						M	1	0.1		7.7E-04	c	1.1E-02	c	2.2E-05	c	2.9E-04	c	1.4E-04	c		7.0E-08	
Nitrosodimethylamine, N-	62-75-9	5.1E+01	I	1.4E-02	I	8.0E-06	P				M	1	0.1		2.3E-03	c	3.4E-02	c	6.9E-05	c	8.8E-04	c	4.2E-04	c		1.2E-07	
Nitrosodiphenylamine, N-	86-30-6	4.9E-03	I									1	0.1		9.9E+01	c	3.5E+02	c					1.4E+01	c		1.7E-01	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User's Guide); s = Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information													Screening Levels											Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Nitrosomethylethylamine, N-	10595-95-6	2.2E+01	I									1	0.1		2.2E-02	c	7.8E-02	c					3.1E-03	c		1.1E-08	
Nitrosopyrrolidine, N-	930-55-2	2.1E+00	I	6.1E-04	I							1	0.1		2.3E-01	c	8.2E-01	c	4.0E-03	c	2.0E-02	c	3.2E-02	c		1.7E-05	
Nitrotoluene, m-	99-08-1					2.0E-02	P					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		6.0E-01	
Nitrotoluene, o-	88-72-2	2.2E-01	P			9.0E-04	P			V		1		1.3E+03	2.9E+00	c*	1.3E+01	c*					3.1E-01	c		2.5E-04	
Nitrotoluene, p-	99-99-0	1.6E-02	P			4.0E-03	P					1	0.1		3.0E+01	c**	1.1E+02	c*					4.2E+00	c*		3.4E-03	
Norflurazon	27314-13-2					4.0E-02	I					1	0.1		2.4E+03	n	2.5E+04	n					1.5E+03	n		1.7E+01	
Nustar	85509-19-9					7.0E-04	I					1	0.1		4.3E+01	n	4.3E+02	n					2.6E+01	n		9.0E+01	
Octabromodiphenyl Ether	32536-52-0					3.0E-03	I					1	0.1		1.8E+02	n	1.8E+03	n					1.1E+02	n		3.1E+01	
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetra (HMX)	2691-41-0					5.0E-02	I					1	0.006		3.8E+03	n	4.9E+04	n					1.8E+03	n		7.1E+00	
Octamethylpyrophosphoramide	152-16-9					2.0E-03	H					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		1.3E-01	
Oryzalin	19044-88-3					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		4.8E+00	
Oxadiazon	19666-30-9					5.0E-03	I					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		1.3E+00	
Oxamyl	23135-22-0					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n	2.0E+02	2.0E-01	4.4E-02
Paclobutrazol	76738-62-0					1.3E-02	I					1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		1.2E+01	
Paraquat Dichloride	1910-42-5					4.5E-03	I					1	0.1		2.7E+02	n	2.8E+03	n					1.6E+02	n		4.9E-01	
Parathion	56-38-2					6.0E-03	H					1	0.1		3.7E+02	n	3.7E+03	n					2.2E+02	n		8.2E-01	
Pebulate	1114-71-2					5.0E-02	H					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		2.1E+00	
Pendimethalin	40487-42-1					4.0E-02	I					1	0.1		2.4E+03	n	2.5E+04	n					1.5E+03	n		7.9E+00	
Pentabromodiphenyl Ether	32534-81-9					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		4.5E+00	
Pentabromodiphenyl ether, 2,2',4,4',5- (BDE-99)	60348-60-9					1.0E-04	I								7.8E+00	n	1.0E+02	n					3.7E+00	n			
Pentachlorobenzene	608-93-5					8.0E-04	I					1	0.1		4.9E+01	n	4.9E+02	n					2.9E+01	n		1.2E-01	
Pentachloroethane	76-01-7	9.0E-02	P									1	0.1		5.4E+00	c	1.9E+01	c					7.5E-01	c		3.9E-04	
Pentachloronitrobenzene	82-68-8	2.6E-01	H			3.0E-03	I					1	0.1		1.9E+00	c*	6.6E+00	c					2.6E-01	c		1.3E-03	
Pentachlorophenol	87-86-5	1.2E-01	I			3.0E-02	I					1	0.25		3.0E+00	c	9.0E+00	c					5.6E-01	c	1.0E+00	3.9E-03	7.0E-03
Perchlorate and Perchlorate Salts	14797-73-0					7.0E-04	I					1			5.5E+01	n	7.2E+02	n					2.6E+01	n			
Permethrin	52645-53-1					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		6.5E+02	
Phenmedipham	13684-63-4					2.5E-01	I					1	0.1		1.5E+04	n	1.5E+05	nm					9.1E+03	n		6.8E+00	
Phenol	108-95-2					3.0E-01	I	2.0E-01	C			1	0.1		1.8E+04	n	1.8E+05	nm	2.1E+02	n	8.8E+02	n	1.1E+04	n		8.1E+00	
Phenylenediamine, m-	108-45-2					6.0E-03	I					1	0.1		3.7E+02	n	3.7E+03	n					2.2E+02	n		7.6E-02	
Phenylenediamine, o-	95-54-5	4.7E-02	H									1	0.1		1.0E+01	c	3.7E+01	c					1.4E+00	c		5.0E-04	
Phenylenediamine, p-	106-50-3					1.9E-01	H					1	0.1		1.2E+04	n	1.2E+05	nm					6.9E+03	n		2.4E+00	
Phenylphenol, 2-	90-43-7	1.9E-03	H									1	0.1		2.5E+02	c	8.9E+02	c					3.5E+01	c		7.2E-01	
Phorate	298-02-2					2.0E-04	H					1	0.1		1.2E+01	n	1.2E+02	n					7.3E+00	n		7.9E-03	
Phosgene	75-44-5							3.0E-04	I	V		1		8.7E+04	4.0E-01	n	1.7E+00	n	3.1E-01	n	1.3E+00	n					
Phosmet	732-11-6					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		2.1E-01	
Phosphine	7803-51-2					3.0E-04	I	3.0E-04	I			1			2.3E+01	n	3.1E+02	n	3.1E-01	n	1.3E+00	n	1.1E+01	n			
Phosphoric Acid	7664-38-2							1.0E-02	I			1			1.4E+07	nm	6.0E+07	nm	1.0E+01	n	4.4E+01	n					
Phosphorus, White	7723-14-0					2.0E-05	I					1			1.6E+00	n	2.0E+01	n					7.3E-01	n		2.7E-03	
Phthalic Acid, P-	100-21-0					1.0E+00	H					1	0.1		6.1E+04	n	6.2E+05	nm					3.7E+04	n		1.3E+01	
Phthalic Anhydride	85-44-9					2.0E+00	I	2.0E-02	C			1	0.1		1.2E+05	nm	1.2E+06	nm	2.1E+01	n	8.8E+01	n	7.3E+04	n		1.6E+01	
Picloram	1918-02-1					7.0E-02	I					1	0.1		4.3E+03	n	4.3E+04	n					2.6E+03	n	5.0E+02	6.0E-01	1.2E-01
Picramic Acid (2-Amino-4,6-dinitrophenol)	96-91-3					2.0E-03	P					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		2.9E-02	
Pirimiphos, Methyl	29232-93-7					1.0E-02	I					1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		1.7E-01	
Polybrominated Biphenyls	59536-65-1	3.0E+01	C	8.6E-03	C	7.0E-06	H					1	0.1		1.6E-02	c*	5.7E-02	c*	2.8E-04	c	1.4E-03	c	2.2E-03	c			
Polymeric Methylene Diphenyl Diisocyanate (PMDI)	9016-87-9							6.0E-04	I			1	0.1		8.5E+05	nm	3.6E+06	nm	6.3E-01	n	2.6E+00	n					
Potassium Perchlorate	7778-74-7					7.0E-04	I					1			5.5E+01	n	7.2E+02	n					2.6E+01	n			
Prochloraz	67747-09-5	1.5E-01	I			9.0E-03	I					1	0.1		3.2E+00	c	1.1E+01	c					4.5E-01	c		2.5E-03	
Profluralin	26399-36-0					6.0E-03	H					1	0.1		3.7E+02	n	3.7E+03	n					2.2E+02	n		8.0E+00	
Prometon	1610-18-0					1.5E-02	I					1	0.1		9.2E+02	n	9.2E+03	n					5.5E+02	n		2.8E-01	
Prometryn	7287-19-6					4.0E-03	I					1	0.1		2.4E+02	n	2.5E+03	n					1.5E+02	n		2.3E-01	
Propachlor	1918-16-7					1.3E-02	I					1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		3.7E-01	
Propanil	709-98-8					5.0E-03	I					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		1.1E-01	
Propargite	2312-35-8					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		2.0E+02	
Propargyl Alcohol	107-19-7					2.0E-03	I					1	0.1		1.2E+02	n	1.2E+03	n					7.3E+01	n		1.5E-02	
Propazine	139-40-2					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		6.7E-01	
Propham	122-42-9					2.0E-02	I					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		3.3E-01	
Propiconazole	60207-90-1					1.3E-02	I					1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		5.4E+00	
Propylene Glycol	57-55-6					2.0E+01	P					1	0.1		1.2E+06	nm	1.2E+07	nm					7.3E+05	n		1.5E+02	
Propylene Glycol Dinitrate	6423-43-4						A	2.7E-04	A	V		1		1.4E+03	6.0E+01	n	2.5E+02	n	2.8E-01	n	1.2E+00	n	5.7E-01	n		1.9E-04	
Propylene Glycol Monoethyl Ether	1569-02-4					7.0E-01	H					1	0.1		4.3E+04	n	4.3E+05	nm					2.6E+04	n		5.2E+00	
Propylene Glycol Monomethyl Ether	107-98-2					7.0E-01	H	2.0E+00	I			1	0.1		4.3E+04	n	4.3E+05	nm	2.1E+03	n	8.8E+03	n	2.6E+04	n		5.2E+00	
Propylene Oxide	75-56-9	2.4E-01	I	3.7E-06	I			3.0E-02	I	V		1		6.8E+04	1.9E+00	c	6.7E+00	c	6.6E-01	c*	3.3E+00	c*	2.3E-01	c		4.7E-05	
Pursuit	81335-77-5					2.5E-01	I					1	0.1		1.5E+04	n	1.5E+05	nm					9.1E+03	n		2.7E+01	

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Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Pydrin	51630-58-1					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		8.1E+02	
Pyridine	110-86-1					1.0E-03	I			V		1		3.0E+05	7.8E+01	n	1.0E+03	n					3.7E+01	n		9.7E-03	
Polychlorinated Biphenyls (PCBs)																											
Aroclor 1016	12674-11-2	7.0E-02	I	2.0E-05	I	7.0E-05	I					1	0.14		3.9E+00	n	2.1E+01	c**	1.2E-01	c	6.1E-01	c	9.6E-01	c**		5.2E-02	
Aroclor 1221	11104-28-2	2.0E+00	I	5.7E-04	I					V		1	0.14	3.0E+02	1.7E-01	c	6.2E-01	c	4.3E-03	c	2.1E-02	c	6.8E-03	c		1.4E-04	
Aroclor 1232	11141-16-5	2.0E+00	I	5.7E-04	I					V		1	0.14	3.0E+02	1.7E-01	c	6.2E-01	c	4.3E-03	c	2.1E-02	c	6.8E-03	c		1.4E-04	
Aroclor 1242	53469-21-9	2.0E+00	I	5.7E-04	I							1	0.14		2.2E-01	c	7.4E-01	c	4.3E-03	c	2.1E-02	c	3.4E-02	c		3.0E-03	
Aroclor 1248	12672-29-6	2.0E+00	I	5.7E-04	I							1	0.14		2.2E-01	c	7.4E-01	c	4.3E-03	c	2.1E-02	c	3.4E-02	c		3.0E-03	
Aroclor 1254	11097-69-1	2.0E+00	I	5.7E-04	I	2.0E-05	I					1	0.14		2.2E-01	c**	7.4E-01	c*	4.3E-03	c	2.1E-02	c	3.4E-02	c*		5.1E-03	
Aroclor 1260	11096-82-5	2.0E+00	I	5.7E-04	I							1	0.14		2.2E-01	c	7.4E-01	c	4.3E-03	c	2.1E-02	c	3.4E-02	c		1.4E-02	
Heptachlorobiphenyl, 2,2',3,3',4,4',5- (PCB 170)	35065-30-6	1.3E+01	W	3.8E-03	W							1	0.14		3.4E-02	c	1.1E-01	c	6.4E-04	c	3.2E-03	c	5.2E-03	c		2.2E-03	
Heptachlorobiphenyl, 2,2',3,4,4',5,5'- (PCB 180)	35065-29-3	1.3E+00	W	3.8E-04	W							1	0.14		3.4E-01	c	1.1E+00	c	6.4E-03	c	3.2E-02	c	5.2E-02	c		2.1E-02	
Heptachlorobiphenyl, 2,3,3',4,4',5,5'- (PCB 189)	39635-31-9	3.9E+00	W	1.1E-03	W							1	0.14		1.1E-01	c	3.8E-01	c	2.1E-03	c	1.1E-02	c	1.7E-02	c		7.1E-03	
Hexachlorobiphenyl, 2,3',4,4',5,5'- (PCB 167)	52663-72-6	3.9E+00	W	1.1E-03	W							1	0.14		1.1E-01	c	3.8E-01	c	2.1E-03	c	1.1E-02	c	1.7E-02	c		4.2E-03	
Hexachlorobiphenyl, 2,3,3',4,4',5'- (PCB 157)	69782-90-7	3.9E+00	W	1.1E-03	W							1	0.14		1.1E-01	c	3.8E-01	c	2.1E-03	c	1.1E-02	c	1.7E-02	c		4.3E-03	
Hexachlorobiphenyl, 2,3,3',4,4',5- (PCB 156)	38380-08-4	3.9E+00	W	1.1E-03	W							1	0.14		1.1E-01	c	3.8E-01	c	2.1E-03	c	1.1E-02	c	1.7E-02	c		4.3E-03	
Hexachlorobiphenyl, 3,3',4,4',5,5'- (PCB 169)	32774-16-6	3.9E+03	W	1.1E+00	W							1	0.14		1.1E-04	c	3.8E-04	c	2.1E-06	c	1.1E-05	c	1.7E-05	c		4.2E-06	
Pentachlorobiphenyl, 2',3,4,4',5- (PCB 123)	65510-44-3	3.9E+00	W	1.1E-03	W							1	0.14		1.1E-01	c	3.8E-01	c	2.1E-03	c	1.1E-02	c	1.7E-02	c		2.6E-03	
Pentachlorobiphenyl, 2,3',4,4',5- (PCB 118)	31508-00-6	3.9E+00	W	1.1E-03	W							1	0.14		1.1E-01	c	3.8E-01	c	2.1E-03	c	1.1E-02	c	1.7E-02	c		2.6E-03	
Pentachlorobiphenyl, 2,3,3',4,4'- (PCB 105)	32598-14-4	3.9E+00	W	1.1E-03	W							1	0.14		1.1E-01	c	3.8E-01	c	2.1E-03	c	1.1E-02	c	1.7E-02	c		2.6E-03	
Pentachlorobiphenyl, 2,3,4,4',5- (PCB 114)	74472-37-0	3.9E+00	W	1.1E-03	W							1	0.14		1.1E-01	c	3.8E-01	c	2.1E-03	c	1.1E-02	c	1.7E-02	c		2.6E-03	
Pentachlorobiphenyl, 3,3',4,4',5- (PCB 126)	57465-28-8	1.3E+04	W	3.8E+00	W							1	0.14		3.4E-05	c	1.1E-04	c	6.4E-07	c	3.2E-06	c	5.2E-06	c		7.7E-07	
Polychlorinated Biphenyls (high risk)	1336-36-3	2.0E+00	I	5.7E-04	C							1	0.1		2.4E-01	c	8.6E-01	c	4.3E-03	c	2.2E-02	c					
Polychlorinated Biphenyls (low risk)	1336-36-3	4.0E-01	I	1.0E-04	I							1	0.1						2.4E-02	c	1.2E-01	c	1.7E-01	c	5.0E-01	1.5E-02	4.5E-02
Polychlorinated Biphenyls (lowest risk)	1336-36-3	7.0E-02	I									1	0.1														
Tetrachlorobiphenyl, 3,3',4,4'- (PCB 77)	32598-13-3	1.3E+01	W	3.8E-03	W							1	0.14		3.4E-02	c	1.1E-01	c	6.4E-04	c	3.2E-03	c	5.2E-03	c		4.6E-04	
Tetrachlorobiphenyl, 3,4,4',5- (PCB 81)	70362-50-4	3.9E+01	W	1.1E-02	W							1	0.14		1.1E-02	c	3.8E-02	c	2.1E-04	c	1.1E-03	c	1.7E-03	c		1.5E-04	
Polynuclear Aromatic Hydrocarbons (PAHs)																											
Acenaphthene	83-32-9					6.0E-02	I			V		1	0.13		3.4E+03	n	3.3E+04	n					2.2E+03	n		2.7E+01	
Anthracene	120-12-7					3.0E-01	I			V		1	0.13		1.7E+04	n	1.7E+05	nm					1.1E+04	n		4.5E+02	
Benz[a]anthracene	56-55-3	7.3E-01	*	1.1E-04	C						M	1	0.13		1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c		1.4E-02	
Benzo[a]pyrene	50-32-8	7.3E+00	I	1.1E-03	C						M	1	0.13		1.5E-02	c	2.1E-01	c	8.7E-04	c	1.1E-02	c	2.9E-03	c	2.0E-01	4.6E-03	3.1E-01
Benzo[b]fluoranthene	205-99-2	7.3E-01	*	1.1E-04	C						M	1	0.13		1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c		4.7E-02	
Benzo[k]fluoranthene	207-08-9	7.3E-02	*	1.1E-04	C						M	1	0.13		1.5E+00	c	2.1E+01	c	8.7E-03	c	1.1E-01	c	2.9E-01	c		4.6E-01	
Chrysene	218-01-9	7.3E-03	*	1.1E-05	C						M	1	0.13		1.5E+01	c	2.1E+02	c	8.7E-02	c	1.1E+00	c	2.9E+00	c		1.4E+00	
Dibenz[a,h]anthracene	53-70-3	7.3E+00	*	1.2E-03	C						M	1	0.13		1.5E-02	c	2.1E-01	c	8.0E-04	c	1.0E-02	c	2.9E-03	c		1.5E-02	
Fluoranthene	206-44-0					4.0E-02	I					1	0.13		2.3E+03	n	2.2E+04	n					1.5E+03	n		2.1E+02	
Fluorene	86-73-7					4.0E-02	I			V		1	0.13		2.3E+03	n	2.2E+04	n					1.5E+03	n		3.3E+01	
Indeno[1,2,3-cd]pyrene	193-39-5	7.3E-01	*	1.1E-04	C						M	1	0.13		1.5E-01	c	2.1E+00	c	8.7E-03	c	1.1E-01	c	2.9E-02	c		1.8E-01	
Methylnaphthalene, 1-	90-12-0	2.9E-02	P							V		1		4.6E+02	2.2E+01	c	8.9E+01	c					2.3E+00	c		1.5E-02	
Methylnaphthalene, 2-	91-57-6					4.0E-03	I			V		1		4.4E+02	3.1E+02	n	4.1E+03	ns					1.5E+02	n		9.0E-01	
Naphthalene	91-20-3			3.4E-05	C	2.0E-02	I	3.0E-03	I	V		1	0.13		3.9E+00	c*	2.0E+01	c*	7.2E-02	c*	3.6E-01	c*	1.4E-01	c*		5.5E-04	
Pyrene	129-00-0					3.0E-02	I			V		1	0.13		1.7E+03	n	1.7E+04	n					1.1E+03	n		1.5E+02	
Quinalphos	13593-03-8					5.0E-04	I					1	0.1		3.1E+01	n	3.1E+02	n					1.8E+01	n		7.1E-02	
Quinoline	91-22-5	3.0E+00	I									1	0.1		1.6E-01	c	5.7E-01	c					2.2E-02	c		8.7E-05	
Refractory Ceramic Fibers	NA							3.0E-02	A			1			4.3E+07	nm	1.8E+08	nm	3.1E+01	n	1.3E+02	n					
Resmethrin	10453-86-8					3.0E-02	I					1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		9.3E+02	
Ronnel	299-84-3					5.0E-02	H					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		7.7E+00	
Rotenone	83-79-4					4.0E-03	I					1	0.1		2.4E+02	n	2.5E+03	n					1.5E+02	n		1.0E+02	
Savey	78587-05-0					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		7.6E+00	
Selenious Acid	7783-00-8					5.0E-03	I					1			3.9E+02	n	5.1E+03	n					1.8E+02	n			
Selenium	7782-49-2					5.0E-03	I					1			3.9E+02	n	5.1E+03	n					1.8E+02	n	5.0E+01	9.5E-01	2.6E-01
Selenourea	630-10-4					5.0E-03	H					1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n			
Sethoxydim	74051-80-2					9.0E-02	I					1	0.1		5.5E+03	n	5.5E+04	n					3.3E+03	n		1.9E+01	
Silver	7440-22-4					5.0E-03	I					0.04			3.9E+02	n	5.1E+03	n					1.8E+02	n		1.6E+00	
Simazine	122-34-9	1.2E-01	H			5.0E-03	I					1	0.1		4.0E+00	c*	1.4E+01	c					5.6E-01	c	4.0E+00	2.8E-04	2.0E-03
Sodium Acifluorfen	62476-59-9					1.3E-02	I					1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		3.1E+00	
Sodium Azide	26628-22-8					4.0E-03	I					1			3.1E+02	n	4.1E+03	n					1.5E+02	n			
Sodium Diethyldithiocarbamate	148-18-5	2.7E-01	H			3.0E-02	I					1	0.1		1.8E+00	c	6.4E+00	c					2.5E-01	c			
Sodium Fluoroacetate	62-74-8					2.0E-05	I					1	0.1		1.2E+00	n	1.2E+01	n					7.3E-01	n		1.5E-04	
Sodium Metavanadate	13718-26-8					1.0E-03	H					1			7.8E+01	n	1.0E+03	n					3.7E+01	n			
Sodium Perchlorate	7601-89-0					7.0E-04	I					1			5.5E+01	n	7.2E+02	n					2.6E+01	n			
Strofos (Tetrachlorovinphos)	961-11-5	2.4E-02	H			3.0E-02	I					1	0.1		2.0E+01	c*	7.2E+01	c					2.8E+00	c		2.2E-03	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User's Guide); s = Concentration may exceed Csat (See User's Guide); SSL values are bsed on DAF=1

Contaminant		Toxicity and Chemical-specific Information												Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Strontium, Stable	7440-24-6					6.0E-01	I				1			4.7E+04	n	6.1E+05	nm					2.2E+04	n		7.7E+02	
Strychnine	57-24-9					3.0E-04	I				1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		1.4E-01	
Styrene	100-42-5					2.0E-01	I	1.0E+00	I	V	1		1.0E+03	6.5E+03	ns	3.8E+04	ns	1.0E+03	n	4.4E+03	n	1.6E+03	n	1.0E+02	2.0E+00	1.2E-01
Sulfonylbis(4-chlorobenzene), 1,1'-	80-07-9					5.0E-03	P				1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		2.8E+00	
Systhane	88671-89-0					2.5E-02	I				1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		2.1E+02	
TCMTB	21564-17-0					3.0E-02	H				1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		8.3E+00	
Tebuthiuron	34014-18-1					7.0E-02	I				1	0.1		4.3E+03	n	4.3E+04	n					2.6E+03	n		6.3E-01	
Temephos	3383-96-8					2.0E-02	H				1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		2.3E+03	
Terbacil	5902-51-2					1.3E-02	I				1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		1.7E-01	
Terbufos	13071-79-9					2.5E-05	H				1	0.1		1.5E+00	n	1.5E+01	n					9.1E-01	n		2.0E-03	
Terbutryn	886-50-0					1.0E-03	I				1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n		5.4E-02	
Tetrachlorobenzene, 1,2,4,5-	95-94-3					3.0E-04	I				1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		2.8E-02	
Tetrachloroethane, 1,1,1,2-	630-20-6	2.6E-02	I	7.4E-06	I	3.0E-02	I			V	1		7.5E+02	2.0E+00	c	9.6E+00	c	3.3E-01	c	1.7E+00	c	5.2E-01	c		2.1E-04	
Tetrachloroethane, 1,1,2,2-	79-34-5	2.0E-01	I	5.8E-05	I	4.0E-03	P			V	1		2.1E+03	5.9E-01	c	2.9E+00	c	4.2E-02	c	2.1E-01	c	6.7E-02	c		2.8E-05	
Tetrachloroethylene	127-18-4	5.4E-01	C	5.9E-06	C	1.0E-02	I	2.7E-01	A	V	1		1.8E+02	5.7E-01	c	2.7E+00	c	4.1E-01	c	2.1E+00	c	1.1E-01	c	5.0E+00	5.2E-05	2.4E-03
Tetrachlorophenol, 2,3,4,6-	58-90-2					3.0E-02	I				1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		4.6E+00	
Tetrachlorotoluene, p- alpha, alpha, alpha-	5216-25-1	2.0E+01	H								1	0.1		2.4E-02	c	8.6E-02	c					3.4E-03	c		1.4E-05	
Tetraethyl Dithiopyrophosphate	3689-24-5					5.0E-04	I				1	0.1		3.1E+01	n	3.1E+02	n					1.8E+01	n		1.4E-01	
Tetrafluoroethane, 1,1,1,2-	811-97-2							8.0E+01	I	V	1		8.2E+02	1.1E+05	nms	4.7E+05	nms	8.3E+04	n	3.5E+05	n	1.7E+05	n		9.8E+01	
Tetryl (Trinitrophenylmethylnitramine)	479-45-8					4.0E-03	P				1	0.1		2.4E+02	n	2.5E+03	n					1.5E+02	n		6.5E-01	
Thallium (I) Nitrate	10102-45-1					9.0E-05	I				1			7.0E+00	n	9.2E+01	n					3.3E+00	n			
Thallium (Soluble Salts)	7440-28-0					6.5E-05	S				1			5.1E+00	n	6.6E+01	n					2.4E+00	n	2.0E+00	1.7E-01	1.4E-01
Thallium Acetate	563-68-8					9.0E-05	I				1			7.0E+00	n	9.2E+01	n					3.3E+00	n			
Thallium Carbonate	6533-73-9					8.0E-05	I				1			6.3E+00	n	8.2E+01	n					2.9E+00	n			
Thallium Chloride	7791-12-0					8.0E-05	I				1			6.3E+00	n	8.2E+01	n					2.9E+00	n			
Thallium Sulfate	7446-18-6					8.0E-05	I				1			6.3E+00	n	8.2E+01	n					2.9E+00	n			
Thiobencarb	28249-77-6					1.0E-02	I				1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		2.0E+00	
Thiofanox	39196-18-4					3.0E-04	H				1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		4.3E-03	
Thiophanate, Methyl	23564-05-8					8.0E-02	I				1	0.1		4.9E+03	n	4.9E+04	n					2.9E+03	n		6.7E-01	
Thiram	137-26-8					5.0E-03	I				1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		4.0E-02	
Tin	7440-31-5					6.0E-01	H				1			4.7E+04	n	6.1E+05	nm					2.2E+04	n		5.5E+03	
Toluene	108-88-3					8.0E-02	I	5.0E+00	I	V	1		9.3E+02	5.0E+03	ns	4.6E+04	ns	5.2E+03	n	2.2E+04	n	2.3E+03	n	1.0E+03	1.7E+00	7.6E-01
Toluene diisocyanate mixture (TDI)	26471-62-5							7.0E-05	I	V	1		2.1E+03	5.4E+01	n	2.3E+02	n	7.3E-02	n	3.1E-01	n	1.5E-01	n		2.7E-03	
Toluene-2,4-diamine	95-80-7	3.8E+00	C	1.1E-03	C						1	0.1		1.3E-01	c	4.5E-01	c	2.2E-03	c	1.1E-02	c	1.8E-02	c		7.8E-06	
Toluene-2,5-diamine	95-70-5					6.0E-01	H				1	0.1		3.7E+04	n	3.7E+05	nm					2.2E+04	n		9.6E+00	
Toluene-2,6-diamine	823-40-5					3.0E-02	P				1	0.1		1.8E+03	n	1.8E+04	n					1.1E+03	n		4.9E-01	
Toluidine, o- (Methylaniline, 2-)	95-53-4	1.8E-01	C	5.1E-05	C						1	0.1		2.7E+00	c	9.6E+00	c	4.8E-02	c	2.4E-01	c	3.7E-01	c		1.3E-04	
Toluidine, p-	106-49-0	1.9E-01	H								1	0.1		2.6E+00	c	9.1E+00	c					3.5E-01	c		1.2E-04	
Toxaphene	8001-35-2	1.1E+00	I	3.2E-04	I						1	0.1		4.4E-01	c	1.6E+00	c	7.6E-03	c	3.8E-02	c	6.1E-02	c	3.0E+00	1.2E-02	6.0E-01
Tralomethrin	66841-25-6					7.5E-03	I				1	0.1		4.6E+02	n	4.6E+03	n					2.7E+02	n		1.4E+02	
Triallate	2303-17-5					1.3E-02	I				1	0.1		7.9E+02	n	8.0E+03	n					4.7E+02	n		1.7E+00	
Triasulfuron	82097-50-5					1.0E-02	I				1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		3.3E-01	
Tribromobenzene, 1,2,4-	615-54-3					5.0E-03	I				1	0.1		3.1E+02	n	3.1E+03	n					1.8E+02	n		3.0E-01	
Tributyl Phosphate	126-73-8	9.2E-03	P			2.0E-01	P				1	0.1		5.3E+01	c	1.9E+02	c					7.3E+00	c		2.9E-02	
Tributyltin Compounds	NA					3.0E-04	P				1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n			
Tributyltin Oxide	56-35-9					3.0E-04	I				1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		8.2E+02	
Trichloro-1,2,2-trifluoroethane, 1,1,2-	76-13-1					3.0E+01	I	3.0E+01	H	V	1		9.4E+02	4.3E+04	ns	1.8E+05	nms	3.1E+04	n	1.3E+05	n	5.9E+04	n		1.5E+02	
Trichloroaniline HCl, 2,4,6-	33663-50-2	2.9E-02	H								1	0.1		1.7E+01	c	5.9E+01	c					2.3E+00	c		2.2E-03	
Trichloroaniline, 2,4,6-	634-93-5	3.4E-02	H								1	0.1		1.4E+01	c	5.1E+01	c					2.0E+00	c		1.2E-03	
Trichlorobenzene, 1,2,4-	120-82-1	3.6E-03	C			1.0E-02	I	4.0E-03	P	V	1		2.2E+02	8.7E+01	n	4.0E+02	ns	4.2E+00	n	1.8E+01	n	8.2E+00	n	7.0E+01	1.3E-02	1.1E-01
Trichloroethane, 1,1,1-	71-55-6					2.0E+00	I	5.0E+00	I	V	1		6.8E+02	9.0E+03	ns	3.9E+04	ns	5.2E+03	n	2.2E+04	n	9.1E+03	n	2.0E+02	3.3E+00	7.2E-02
Trichloroethane, 1,1,2-	79-00-5	5.7E-02	I	1.6E-05	I	4.0E-03	I			V	1		5.6E+02	1.1E+00	c	5.5E+00	c	1.5E-01	c	7.7E-01	c	2.4E-01	c	5.0E+00	8.2E-05	1.7E-03
Trichloroethylene	79-01-6	1.3E-02	C	2.0E-06	C					V	1		7.5E+02	2.8E+00	c	1.4E+01	c	1.2E+00	c	6.1E+00	c	1.7E+00	c	5.0E+00	6.1E-04	1.9E-03
Trichlorofluoromethane	75-69-4					3.0E-01	I	7.0E-01	H	V	1		1.3E+03	8.0E+02	n	3.4E+03	ns	7.3E+02	n	3.1E+03	n	1.3E+03	n		8.4E-01	
Trichlorophenol, 2,4,5-	95-95-4					1.0E-01	I				1	0.1		6.1E+03	n	6.2E+04	n					3.7E+03	n		9.4E+00	
Trichlorophenol, 2,4,6-	88-06-2	1.1E-02	I	3.1E-06	I	1.0E-03	P				1	0.1		4.4E+01	c**	1.6E+02	c**	7.8E-01	c	4.0E+00	c	6.1E+00	c**		1.6E-02	
Trichlorophenoxy) Propionic Acid, 2(2,4,5-	93-72-1					8.0E-03	I				1	0.1		4.9E+02	n	4.9E+03	n					2.9E+02	n	5.0E+01	1.1E-01	1.8E-02
Trichlorophenoxyacetic Acid, 2,4,5-	93-76-5					1.0E-02	I				1	0.1		6.1E+02	n	6.2E+03	n					3.7E+02	n		1.1E-01	
Trichloropropane, 1,1,2-	598-77-6					5.0E-03	I			V	1		1.4E+03	3.9E+02	n	5.1E+03	ns					1.8E+02	n		7.6E-02	
Trichloropropane, 1,2,3-	96-18-4	7.0E+00	H			6.0E-03	I			V	1		1.6E+03	9.1E-02	c	4.1E-01	c					9.6E-03	c		4.4E-06	
Trichloropropene, 1,2,3-	96-19-5					1.0E-02	P	1.0E-03	P	V	1		3.4E+02	2.7E+00	n	1.2E+01	n	1.0E+00	n	4.4E+00	n	2.1E+00	n		1.1E-03	
Tridiphane	58138-08-2					3.0E-03	I				1	0.1		1.8E+02	n	1.8E+03	n					1.1E+02	n		4.1E-01	
Triethylamine	121-44-8							7.0E-03	I	V	1		5.5E+04	1.7E+02	n	7.1E+02	n	7.3E+00	n	3.1E+01	n	1.5E+01	n		6.1E-03	

Key: I = IRIS; P = PPRTV; A = ATSDR; C = Cal EPA; H = HEAST; W = WHO; S = see user guide Section 5; L = see user guide on lead; M = mutagen; V = volatile; c = cancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; n = noncancer; m = Concentration may exceed ceiling limit (See User's Guide); s = Concentration may exceed Csat (See User's Guide); SSL values are based on DAF=1

Contaminant		Toxicity and Chemical-specific Information													Screening Levels										Protection of Groundwater	
Analyte	CAS No.	SFO (mg/kg-day)$^{-1}$	key	IUR (ug/m^3)$^{-1}$	key	RfDo (mg/kg-day)	key	RfCi (mg/m^3)	key	voc	mutagen	RAGS Part E GIABS	RAGS Part E ABS	Csat mg/kg	Residential Soil mg/kg	key	Industrial Soil mg/kg	key	Residential Air ug/m^3	key	Industrial Air ug/m^3	key	Tapwater ug/L	key	MCL ug/L	Risk-based SSL mg/kg	MCL-based SSL mg/kg
Trifluralin	1582-09-8	7.7E-03	I			7.5E-03	I					1	0.1		6.3E+01	c**	2.2E+02	c*					8.7E+00	c*		1.7E-01	
Trimethyl Phosphate	512-56-1	3.7E-02	H									1	0.1		1.3E+01	c	4.7E+01	c					1.8E+00	c		3.9E-04	
Trimethylbenzene, 1,2,4-	95-63-6							7.0E-03	P	V		1		2.5E+02	6.7E+01	n	2.8E+02	ns	7.3E+00	n	3.1E+01	n	1.5E+01	n		2.4E-02	
Trimethylbenzene, 1,3,5-	108-67-8					5.0E-02	P	6.0E-03	P	V		1		2.1E+02	4.7E+01	n	2.0E+02	n	6.3E+00	n	2.6E+01	n	1.2E+01	n		2.0E-02	
Trinitrobenzene, 1,3,5-	99-35-4					3.0E-02	I					1	0.019		2.2E+03	n	2.7E+04	n					1.1E+03	n		2.6E+00	
Trinitrotoluene, 2,4,6-	118-96-7	3.0E-02	I			5.0E-04	I					1	0.032		1.9E+01	c**	7.9E+01	c**					2.2E+00	c**		8.7E-03	
Triphenylphosphine Oxide	791-28-6					2.0E-02	P					1	0.1		1.2E+03	n	1.2E+04	n					7.3E+02	n		1.5E+00	
Tris(2-chloroethyl)phosphate	115-96-8	1.4E-02	P			3.0E-01	P					1	0.1		3.5E+01	c	1.2E+02	c					4.8E+00	c		3.9E-03	
Tris(2-ethylhexyl)phosphate	78-42-2	3.2E-03	P			1.0E-01	P					1	0.1		1.5E+02	c*	5.4E+02	c					2.1E+01	c		9.6E+01	
Tetrabromodiphenyl ether, 2,2',4,4'- (BDE-47)	5436-43-1					1.0E-04	I								7.8E+00	n	1.0E+02	n					3.7E+00	n			
Tri-n-butyltin	688-73-3					3.0E-04	A					1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		2.8E-01	
Uranium (Soluble Salts)	NA					3.0E-03	I					1			2.3E+02	n	3.1E+03	n					1.1E+02	n		4.9E+01	
Vanadium Pentoxide	1314-62-1			8.3E-03	P	9.0E-03	I	7.0E-06	P			0.026			4.0E+02	c**	2.0E+03	c**	2.9E-04	c*	1.5E-03	c*	3.3E+02	n			
Vanadium Sulfate	36907-42-3					2.0E-02	H					0.026			1.6E+03	n	2.0E+04	n					7.3E+02	n			
Vanadium and Compounds	NA					5.0E-03	S					1			3.9E+02	n	5.2E+03	n					1.8E+02	n		1.8E+02	
Vanadium, Metallic	7440-62-2					7.0E-03	H					0.026			5.5E+02	n	7.2E+03	n					2.6E+02	n		2.6E+02	
Vernolate	1929-77-7					1.0E-03	I					1	0.1		6.1E+01	n	6.2E+02	n					3.7E+01	n		4.2E-02	
Vinclozolin	50471-44-8					2.5E-02	I					1	0.1		1.5E+03	n	1.5E+04	n					9.1E+02	n		7.1E-01	
Vinyl Acetate	108-05-4					1.0E+00	H	2.0E-01	I	V		1		2.8E+03	9.9E+02	n	4.2E+03	ns	2.1E+02	n	8.8E+02	n	4.1E+02	n		8.8E-02	
Vinyl Bromide	593-60-2			3.2E-05	H			3.0E-03	I	V		1		1.7E+03	1.1E-01	c*	5.8E-01	c*	7.6E-02	c*	3.8E-01	c*	1.5E-01	c*		4.4E-05	
Vinyl Chloride	75-01-4	7.2E-01	I	4.4E-06	I	3.0E-03	I	1.0E-01	I	V	M	1		4.0E+03	6.0E-02	c	1.7E+00	c	1.6E-01	c	2.8E+00	c	1.6E-02	c	2.0E+00	5.6E-06	7.0E-04
Warfarin	81-81-2					3.0E-04	I					1	0.1		1.8E+01	n	1.8E+02	n					1.1E+01	n		8.2E-03	
Xylene, Mixture	1330-20-7					2.0E-01	I	1.0E-01	I	V		1		3.0E+02	6.0E+02	ns	2.6E+03	ns	1.0E+02	n	4.4E+02	n	2.0E+02	n	1.0E+04	2.3E-01	1.1E+01
Xylene, P-	106-42-3							7.0E-01	C	V		1		4.5E+02	4.7E+03	ns	2.0E+04	ns	7.3E+02	n	3.1E+03	n	1.5E+03	n		1.6E+00	
Xylene, m-	108-38-3					2.0E+00	H	7.0E-01	C	V		1		4.4E+02	4.5E+03	ns	1.9E+04	ns	7.3E+02	n	3.1E+03	n	1.4E+03	n		1.6E+00	
Xylene, o-	95-47-6					2.0E+00	H	7.0E-01	C	V		1		3.0E+02	5.3E+03	ns	2.3E+04	ns	7.3E+02	n	3.1E+03	n	1.4E+03	n		1.6E+00	
Zinc (Metallic)	7440-66-6					3.0E-01	I					1			2.3E+04	n	3.1E+05	nm					1.1E+04	n		6.8E+02	
Zinc Phosphide	1314-84-7					3.0E-04	I					1			2.3E+01	n	3.1E+02	n					1.1E+01	n			
Zineb	12122-67-7					5.0E-02	I					1	0.1		3.1E+03	n	3.1E+04	n					1.8E+03	n		4.0E-01	