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NWIRP BETHPAGE
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INDOOR AIR SAMPLING WORK PLAN NWIRP BETHPAGE NY

12/1/2008

TETRA TECH

INDOOR AIR SAMPLING

WORK PLAN

NWIRP BETHPAGE

Bethpage, New York

Naval Facilities Engineering Command
Mid-Atlantic

Contract No. N62472-03-D-0057
Contract Task Order 147

DECEMBER 2008

INDOOR AIR SAMPLING
WORK PLAN
NWIRP Bethpage, New York

NAVAL FACILITIES ENGINEERING COMMAND
MID-ATLANTIC

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command
Mid-Atlantic
9742 Maryland Avenue
Norfolk, Virginia 23511-3095

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December 2008

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LETTER WORK PLAN

INDOOR AIR SAMPLING

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT

BETHPAGE, NEW YORK

1.0 INTRODUCTION

This Work Plan has been prepared for the indoor air sampling activities at properties adjacent to the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, Long Island, New York (Figures 1 and 2). Site 1 was identified as having been impacted by historic releases of chlorinated solvents and was remediated via an air sparging/soil vapor extraction (AS/SVE) system between 1998 and 2002. The treatment and remedial goals were based on protection of groundwater. Soil vapor testing conducted in January 2008 indicated elevated concentrations of VOCs existing along the eastern boundary of Site 1 that may affect the nearby residential neighborhood. Additional off-site soil vapor testing was conducted in October 2008 to evaluate the potential migration of contaminated soil vapor. Evaluation of this data is in progress.

The indoor air sampling activities will include indoor, sub-slab, and outdoor air sampling at residential homes located adjacent to Site 1. Initially, six homes along Eleventh Street and one home on Ninth Street (reference location) will be targeted for indoor air sampling. Testing in these homes is dependent on approval of the homeowners. Air samples will be analyzed for volatile organic compounds (VOCs) via EPA TO-15 method. The fieldwork outlined in this Work Plan is being conducted in accordance with New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 2006).

1.1 SITE HISTORY

The NWIRP-Bethpage was established in 1933. Since its inception, the plant's primary mission has been the research prototyping, testing, design engineering, fabrication, and primary assembly of military aircraft. The facilities at NWIRP-Bethpage included four plants used for assembly and prototype testing; a group of quality control laboratories, two warehouses complexes (north and south), a salvage storage area, water recharge basins, the Industrial Wastewater Treatment Plant, and several smaller support buildings. In 1998, operations ended at the facilities.

Site 1 is located in the middle third of the NWIRP Bethpage facility and is east of Plant No. 3, see Figure 2. The Site occupies approximately four acres, and contains a concrete storage pad and an abandoned cesspool leach field. Historically, this site was also used as a storage area for various types of equipment and heavy materials, including transformers. Site 1 is enclosed by a

six-foot high, chain-link fence. The site is relatively flat, with the eastern portion covered with sandy soils, gravel, grass, and one concrete pad. The western portion of the site is predominantly covered with concrete. A vegetated wind row (pine) and wood fence are present along the eastern edge of the site to reduce community visibility.

1.2 BACKGROUND

In 1985, an Initial Assessment Study (IAS) conducted at the NWIRP Bethpage, NY, identified materials stored at Site 1 the Former Drum Marshaling Area. This storage first took place on a gravel surface over the cesspool field, east of Plant No. 3. Hazardous waste management practices for Northrop Grumman facilities included the staging of drummed wastes include waste halogenated and non-halogenated solvents (Rogers, Golden & Halpern, 1986). Cadmium and cyanide were also stored in Area 2 within Site 1 from the early 1950s through 1974. Reportedly, 200 to 300 drums were stored at each area at any one time within Site 1. In 1978, the collection and marshaling point was moved a few yards south of the original site, to an area on a concrete pad. In 1982, drummed waste storage was relocated to another Drum Marshaling facility located in the Salvage Storage Area, which is not at Site 1. Reportedly, there was no direct evidence of hazardous waste spills at Site 1. An abandoned septic drainage system almost completely underlies the entire area of Site 1.

An AS/SVE system was constructed in 1998 to address VOCs in site soils. The primary volatile compounds of concern, based on distribution and maximum detected concentrations, included trichloroethene (TCE), tetrachlorethene (PCE), 1,1,1- trichloroethane (1,1,1-TCA), 1,2-dichloroethane (1,2-DCA), 1,2-dichloroethene (1,2- DCE), and 1,1-dichloroethene (1,1-DCE). The preliminary remediation goals (PRGs) were established in the Record of Decision (ROD) prepared in May 1995 (NDNFEC/NYSDEC, 1995). The goals were established to control continuing releases of VOCs to groundwater.

In 2001, VOC concentrations in the extracted vapor were measured to estimate the efficiency of the extraction process. Post treatment groundwater sampling was also conducted in 2002. The analytical results above practical quantity limits (PQL) included chloroform in one location at 1.2 micrograms per liter (µg/L); 1,1,1- TCA in two locations at 5.2 and 48 ug/L and PCE at two locations at 18 and 21 ug/L.

The AS/SVE system operated until March 2002, at which time it was shutdown. Approximately 4,500 pounds of VOCs were removed from the soil and groundwater during the operation of the system. Post Operational sampling was performed in 2002 in order to close-out the AS/SVE system at Site 1.

To further determine the effectiveness of the AS/SVE treatment system on VOCs in the subsurface, a post operational soil boring program was conducted in 2002. Forty-one soil borings were advanced to the top of the water table, approximately 65 feet bgs. Soil sample results indicated that VOCs were not detected in the majority of soil boring locations. VOCs exceeding the PRGs were observed in six of the soil boring locations. These VOCs were present at depths ranging from 10 to 64 feet. The presence of VOCs at shallow depths indicated the difficulty of vapor extraction wells to efficiently remove more surficial VOCs. Clay layers observed in the subsurface soil resulted in the potential for inefficiencies at the near surface intervals. Four soil boring locations showed VOCs above the PRGs at depths that were not influenced by the AS/SVE.

Final regulatory guidance for evaluating soil vapor intrusion was issued in October of 2006 by the NYSDOH and identified soil vapor migration and intrusion into buildings as a potential concern. In January 2008, a soil gas investigation determined that continuous soil vapors from Site 1 may be migrating past the Navy fence line (Tetra Tech, 2008). Soil gas samples collected along the eastern border had a maximum TCE and PCE concentration of 180,000 µg/m^3 at 20 feet bgs and 5,300 µg/m^3 at 24 feet bgs in the soils. NYSDEC did not develop any standards, criteria or guidance values for VOC concentrations in subsurface vapors; however, NYSDOH indoor air criteria for TCE and PCE is 5 ug/m^3 and 100 ug/m^3, respectively. It should be noted that concentrations of PCE and TCE observed in soil gas does not correlate to the indoor air concentrations in residential homes. They are many factors that influence the vapor concentrations as they migrate through soil **.**

Chemical concentrations in soil gas samples collected along the southern edge of Site 2 and the northeast corner of Site 1 (BPS1-SG1004, BPS1-SG1005, and BPS1-SG1006) were much lower than concentrations detected along the central and southeast corner of Site 1. Maximum TCE and PCE concentrations in this area were 820 µg/m^3 and 78 µg/m^3, respectively. Additionally, these concentrations were detected at a depth of 46 feet below ground surface (bgs). Shallower samples contained lower concentrations of these chemicals. The highest concentrations of TCE and PCE were generally detected at depths of 20 and 50 feet. However, shallow samples BPS1-SG1001-07 (7 feet bgs) and BPS1-SG1002-08 (8 feet) contained TCE (19,000 µg/m^3 and 3,300 µg/m^3) and PCE (170 µg/m^3 and 1,700 µg/m^3) at concentrations greater than NYSDOH criteria of 5 µg/m^3 and 100 µg/m^3 for indoor air, respectively.

A Phase II soil vapor investigation was conducted off site in the residential neighborhood in October 2008. The results of this investigation are currently being evaluated. A pilot study is

scheduled to be conducted in January 2009 to design an SVE system along the Navy fenceline to address any residual soil vapors that may have migrated east into the residential area.

1.3 OBJECTIVE

The objective of this indoor air sampling is to determine whether potentially contaminated soil vapors migrated offsite and impacted indoor air quality at adjacent residential properties.

1.4 CONCEPTUAL SITE MODEL (CSM)

In January 2008, the Navy collected soil gas samples at the facility fence line, approximately 70 feet from residential housing. Samples were collected at depths of approximately 8, 20, and 45 feet below ground surface (bgs). Data is presented in the draft Site 1 Soil Vapor Investigation (TtNUS, April 2008) and documents findings of TCE at concentrations up to 19,000 micrograms per cubic meter of air ($\mu g/m^3$) at 7 feet bgs, 180,000 $\mu g/m^3$ at 20 feet bgs, and 150,000 $\mu g/m^3$ at 50 feet bgs. For comparison, NYSDOH Indoor Air Quality Criteria for TCE is 5 $\mu g/m^3$ and sub slab guidance for action is 250 $\mu g/m^3$. Based on the distance from the site to the residential housing, lower concentrations of TCE would be expected under the housing area. Other VOCs, including PCE and 1,1,1-TCA, were also detected at concentrations up to 90,000 $\mu g/m^3$ in the soil gas samples.

Given the historic AS/SVE remediation of VOCs in the soil and groundwater at Site 1 and the results of the January 2008 soil vapor testing at the site, residual VOCs might be present in fine grained material that would limit soil vapor diffusion in the unsaturated zone. The recent soil vapor testing also suggests that soil vapor migration from Site 1 could potentially be impacting the adjacent residential area. Further evaluation and delineation of VOC contaminated soil vapor was conducted in October 2008. Validated laboratory results from this investigation are anticipated in January 2009.

1.5 SAMPLING APPROACH

Six residential homes along Eleventh Street, nearest to Site 1, and one home on Ninth Street (reference location) are initially being targeted for indoor air sampling. Homeowners will be contacted and only those homeowners that grant permission and sign access agreements with the Navy will be sampled. Indoor, sub-slab, and outdoor air sampling will be conducted in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 2006). .

The homes targeted for the indoor air sampling are depicted on Figure 3. Prior to sampling, an indoor air quality questionnaire and building inventory form will be completed for each home. The

NYSDOH questionnaire will be used and is presented in Attachment A. The basement floors will be inspected and any penetrations including cracks, drains, utilities, sumps, etc., will be documented in field log books and/or on the questionnaire form.

Each indoor/sub-slab air sample will be collected over a 24 hour time period and analyzed according to United States Environmental Protection Agency (USEPA) Method TO-15 VOCs by an Environmental Laboratory Approval Program (ELAP) certified laboratory (USEPA, 1999). Table 1 presents each of the indoor/sub-slab air sample locations, corresponding sample nomenclature, and analytical method. Outdoor air samples will be collected simultaneously during the indoor and sub-slab air sampling to evaluate the potential influence of outdoor air on indoor air quality. Outdoor air samples will be collected, as necessary, to provide representative air samples from an upwind location. It is anticipated that one outdoor air sample may be collected for every two homes targeted for indoor air sampling. Site specific conditions will be evaluated at the time of sampling and the outdoor air samples will be collected accordingly. Outdoor air samples will also be analyzed via USEPA Method TO-15. A list of anticipated detection limits are presented in Attachment B.

2.0 FIELD ACTIVITIES

The scope of work consists of indoor air and sub-slab air sampling at residential homes along Eleventh Street. Outdoor air sampling will also be conducted simultaneously with the indoor air and sub-slab air samples. The specific activities for this fieldwork and sampling are summarized as follows:

1. Complete questionnaire and home inventory
2. Establish sampling locations
3. Drill and install temporary sub-slab sampling points
4. Collect indoor air, sub-slab, and outdoor air samples
5. Fill and seal sub-slab holes
6. Ship and analyze air samples for TO-15 VOCs

The homes targeted for sampling are presented on Figure 3. Sample nomenclature and analysis are presented in Table 1. Sampling forms to be used during field activities are presented in Attachment A.

After signed access agreements are in place with the homeowners, a field schedule will be developed and homeowners will be contacted to coordinate field sampling activities. Once in the field and prior to sampling, an indoor air quality questionnaire and building inventory form will be completed for each home (see Attachment A). The basement floors will be inspected and any

penetrations including cracks, drains, utilities, sumps, etc., will be documented in field log books and/or on the questionnaire form. Field readings with a photoionization detector (PID) will be used to screen observed areas of concern and suspect odors.

A small diameter hole (0.25 inch) will be drilled into the basement slab and over drilled with a 1.0 inch diameter drill bit to provide annular space for the installation of temporary sampling probes. The temporary probes will be constructed of inert tubing for each of the sub-slab air samples. The tubing will not extend further then 2 inches into the sub-slab material and the probes will be sealed to the surface with clay and/or beeswax. After installation of the probes, one to three volumes of air will be purged prior to collecting samples to ensure a representative sample. Purged air will be contained, screened and released outside the home. Each temporary probe will be removed after the sub-slab air sampling is completed. The probe hole will be abandoned by removing the tubing and surface seal followed by filling and/or patching the resulting hole with a clay seal and bentonite/cement mixture.

Indoor and outdoor air samples will be collected simultaneously with the sub-slab air sampling. Actual sampling locations will be determined in the field based on site specific conditions. Information collected on the indoor air quality questionnaire, building inventory, wind direction, etc. will be used to determine actual placement of indoor air and outdoor air sampling locations. For outdoor air samples, the SUMMA® canister will be positioned at an upwind location (approximately 100 feet) near the associated indoor air sampling locations at a height of approximately 4 ft above grade. The outdoor air sample will be obtained over a twenty-four hour period to be consistent with the indoor/sub-slab air samples. The sampling procedures for indoor, outdoor, and sub-slab air sampling will be conducted in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 2006).

SUMMA® canisters will be utilized for collecting all air samples. The SUMMA® canisters do not require preservation with ice or refrigeration during shipment. SUMMA® canisters will be shipped to the laboratory via overnight carrier (e.g., Federal Express) for analysis.

The field sampling team will maintain an air sampling log sheet and field logbook that summarizes the following information:

a. sample identification
b. date and time of sample collection
c. sampling depth
d. identity of samplers
e. sampling methods and devices (including canister and regulator ID numbers)

f. purge volumes

g. volume of soil vapor or air extracted

h. vacuum before and after samples are collected

i. wind speed and direction (for outdoor air sampling)

j. ambient temperature

k. chain of custody (COC) protocols and records used to track samples from sampling point to analysis

(Air Sample Log Sheet is presented in Attachment B)

Sample labeling information for this sampling event is provided in Table 1 of this Work Plan. All sample containers will be labeled with a unique sample identifier. The sample identification code will consist of up to 15 characters, as described below.

- The first four characters indicate the site from which the sample is to be collected:
  BPS1 (Bethpage Site 1)
- The next two characters indicate the matrix:
  BPS1-AR (Air Sample)
- The next four characters indicate the sampling location:
  BPS1-AR001 (Location 1)
- The next two/three characters indicate the type of the sample:
  BPS1-AR001-SSB (Sub-Slab), IND (Indoor Air), and ODA (Outdoor Air)

Any other pertinent information regarding sample identification will be recorded in the field logbooks or on sample log sheets.

3.0 Reporting

A data summary report will be submitted to include; field procedures, field activities, and sampling results for the soil gas investigation and the indoor air sampling. All samples that will be used to make decisions on appropriate actions to address exposures and environmental contamination will be analyzed by an ELAP certified laboratory. After sample validation, sampling results will be compared to criteria presented in the NYSDOH guidelines (NYSDOH 2006) and screening values presented in the Phase II Soil Vapor Testing Work Plan (September 2008).

4.0 Schedule

Pending approval of this work plan and receipt of Navy approved property access agreements with the individual property owners, the fieldwork will start within approximately 4 to 6 weeks. The proposed indoor/sub-slab air sampling should be completed in approximately one week. After receipt and validation of the analytical data from the indoor air sampling, and with agreement on

the next investigative steps, additional indoor air sampling will be conducted as necessary. Additional indoor air sampling will be based on the results of this indoor air sampling event and the results from the soil gas sampling in the neighborhood. Homeowner permission and signed access agreements with each of the homeowners will be required prior to any additional sampling on private property.

ACRONYMS

1, 1, 1-TCA	1, 1, 1-trichloroethene
1, 1-DCE	1, 1-dichloroethene
1, 2-DCA	1, 2-dichloroethane
1, 2-DCE	1, 2-dichloroethene
AS/SVE	air sparging/soil vapor extraction
bgs	below ground surface
COC	chain of custody
ELAP	Environmental Laboratory Approval Program
IAS	Initial Assessment Study
ml/min	milliliters per minute
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDOH	New York State Department of Health
PCE	tetrachloroethene
PQL	practical quantity limits
PRG	preliminary remediation goals
ROD	Record of Decision
TAL	Target analyte list
TCE	trichloroethene
TCL	Target compound list
VOC	Volatile organic compound
USEPA	United States Environmental Protection Agency
µg/L	micrograms per liter

REFERENCES

Foster Wheeler Environmental Corp., 2003. Final Close-Out Report, Construction of a Soil Vapor Extraction/Air Sparging System at the Naval Weapons Industrial Reserve Plant Bethpage, NY. December.

New York State Department of Health (NYSDOH), 2006. FINAL Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October.

Northern Division Naval Facilities Engineering Command and New York State Department of Environmental Conservation (NDNFEC/NYSDEC), 1995. Record of Decision, Naval Weapons Industrial Reserve Plant, Bethpage, New York Sites 1, 2, 3 NYS Registry: 1-30-003B. May.

Rogers, Golden & Halpern, 1986. Initial Assessment Study of NWIRP Bethpage, NY and NWIRP Calverton, NY. December.

Tetra Tech NUS, Inc., 2008. Site 1 Soil Vapor Investigation. Naval Weapons Industrial Reserve Plant Bethpage. April.

United States Environmental Protection Agency (USEPA), 1999. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition Compendium Method TO-15 Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/ Mass Spectrometry (GC/MS). January.

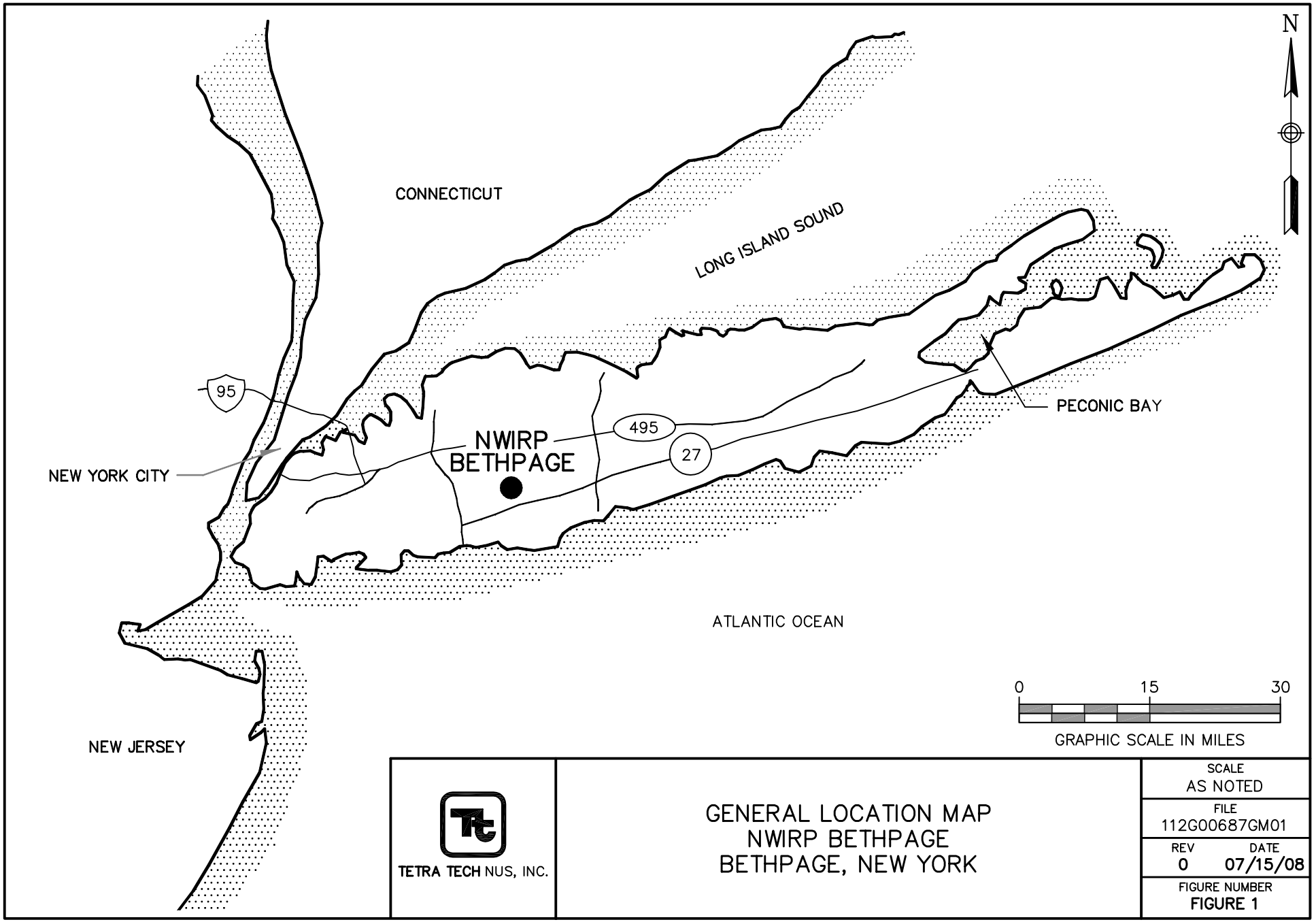
United States Environmental Protection Agency (USEPA), 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). November.

TABLE 1
INDOOR AIR SAMPLING
SITE 1 - FORMER DRUM MARSHALING AREA
NWIRP BETHPAGE, NEW YORK

Sample ID	Residential Home #	Sample Type	Air Sample [2]	Analytical Method [3]
BPS1-AR001-IND	1	Indoor Air	YES	TO-15
BPS1-AR001-SSB		Sub-Slab	YES	TO-15
BPS1-AR001-ODA		Outdoor Air[1]	YES	TO-15
BPS1-AR002-IND	2	Indoor Air	YES	TO-15
BPS1-AR002-SSB		Sub-Slab	YES	TO-15
BPS1-AR002-ODA		Outdoor Air[1]	YES	TO-15
BPS1-AR003-IND	3	Indoor Air	YES	TO-15
BPS1-AR003-SSB		Sub-Slab	YES	TO-15
BPS1-AR003-ODA		Outdoor Air[1]	YES	TO-15
BPS1-AR004-IND	4	Indoor Air	YES	TO-15
BPS1-AR004-SSB		Sub-Slab	YES	TO-15
BPS1-AR004-ODA		Outdoor Air[1]	YES	TO-15
BPS1-AR005-IND	5	Indoor Air	YES	TO-15
BPS1-AR005-SSB		Sub-Slab	YES	TO-15
BPS1-AR005-ODA		Outdoor Air[1]	YES	TO-15
BPS1-AR006-IND	6	Indoor Air	YES	TO-15
BPS1-AR006-SSB		Sub-Slab	YES	TO-15
BPS1-AR006-ODA		Outdoor Air[1]	YES	TO-15
BPS1-AR007-IND	7	Indoor Air	YES	TO-15
BPS1-AR007-SSB		Sub-Slab	YES	TO-15
BPS1-AR007-ODA		Outdoor Air[1]	YES	TO-15

NOTES:
1) Outdoor air samples will be collected as needed to provide representive upwind air samples for each home. (One outdoor air sample may be used for multiple homes and will be dependent on field conditions)
2) Air samples will be collected with 6L Summa cannisters.
3) United States Environmental Protection Agency (USEPA) Method TO-15
(conducted by an Environmental Laboratory Approval Program (ELAP) certified laboratory)

112G00687/0210/112G00687GM02.DWG 07/15/08 MKB

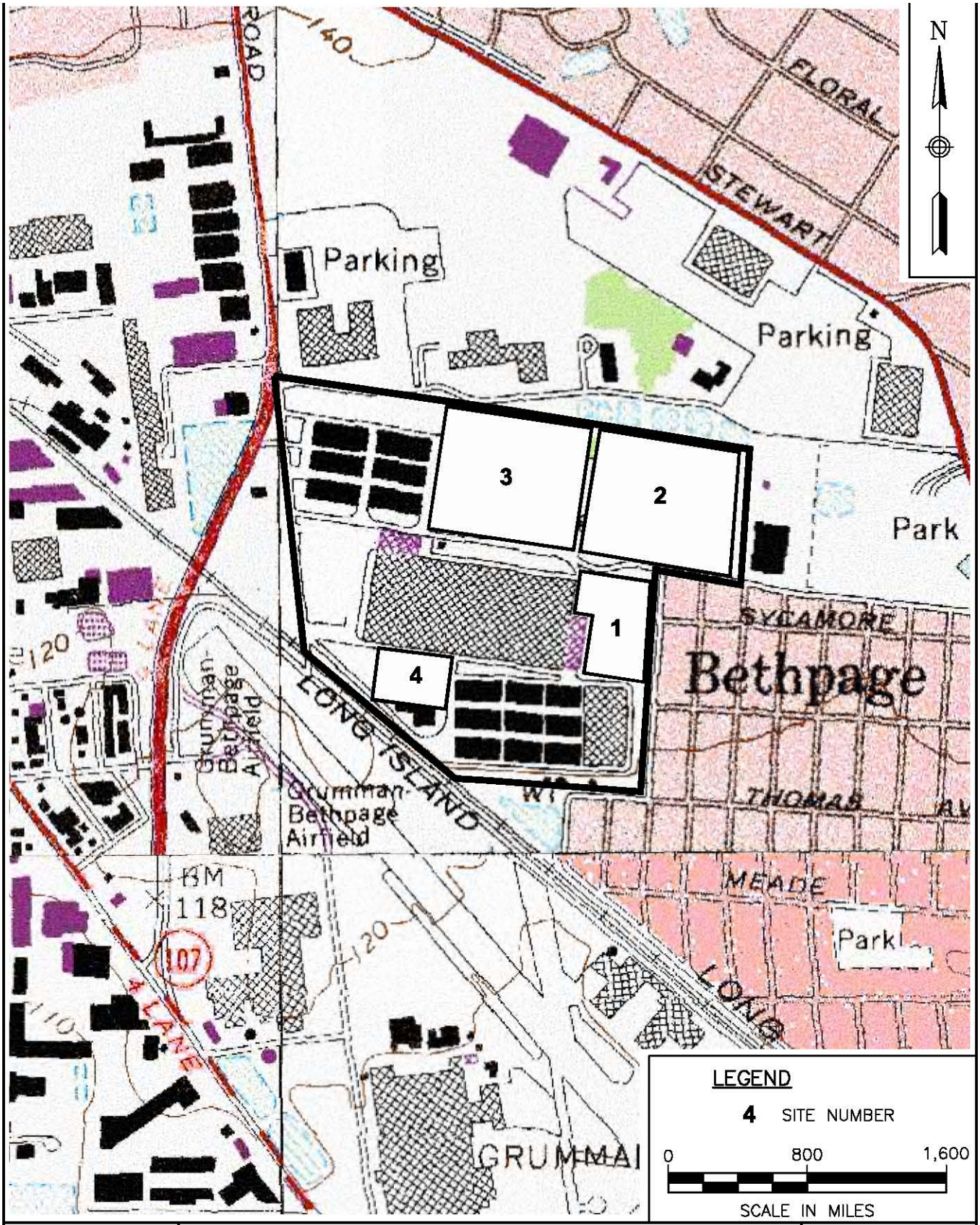


TETRA TECH NUS, INC.

GENERAL LOCATION MAP
NWIRP BETHPAGE
BETHPAGE, NEW YORK

SCALE	AS NOTED
FILE	112G00687GM01
REV	0
DATE	07/15/08
FIGURE NUMBER	FIGURE 1

112G00687/0210/112G00687BM01.DWG 07/15/08 MKB



TETRA TECHNUS, INC.

SITE LOCATION MAP
SITE 1
NWIRP BETHPAGE
BETHPAGE, NEW YORK

SCALE	AS NOTED
FILE	112G00687BM01
REV	0
DATE	07/15/08
FIGURE NUMBER	FIGURE 2

112GN9845/2810/112GN9845GM07.DWG 11/17/08 MKB

BPS1-SG1005
BPS1-SG1006
AOC 35
AOC 30
AOC 23
SETTLING TANK
BPS1-SG1004
SITE 1
BPS1-SG1003
BPSI-SG2004
BPSI-SG2005
SYCAMORE AVENUE
PLANT NO. 3
METAL STORAGE BUILDINGS
SVPM11
SVPM11S
BPS1-SG1002
PAD
BPSI-SG2006
BPSI-SG2003
11TH STREET
BPS1-SG1001
10TH STREET
9TH STREET
BPSI-SG2007
SVPM12
SVPM12S
BPSI-SG2002
PLANT 17 SOUTH
BPSI-SG2008
MAPLE AVENUE
BPSI-SG2001
BPSI-SG2009

N

LEGEND

- SOIL GAS SAMPLE LOCATION (OCTOBER, 2008)
- SOIL GAS SAMPLE LOCATION (JANUARY, 2008)
- SOIL VAPOR PRESSURE MONITORING POINT (SVPM)
- PROPERTY LINE
- FENCE LINE
- SITE BOUNDARY
- AOC BOUNDARY
- PROPOSED INDOOR AIR SAMPLING LOCATION

0 100 200

SCALE IN FEET

TETRA TECH NUS, INC.

INDOOR AIR PROPOSED SAMPLING LOCATIONS SITE 1 NWIRP BETHPAGE BETHPAGE, NEW YORK

FILE	SCALE
112GN9845GM07	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3	0 / 11/17/08

ATTACHMENT A

INDOOR AIR SAMPLING FORMS AND QUESTIONNAIRE

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name _____ Date/Time Prepared _____

Preparer's Affiliation _____ Phone No._____

Purpose of Investigation_____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: _____First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential	School	Commercial/Multi-use
Industrial	Church	Other: _____

If the property is residential, type? (Circle appropriate response)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouses/Condos
Modular	Log Home	Other:_____

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____

Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors_____ Building age_____

Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

_____

_____

_____

Airflow near source

_____

_____

_____

Outdoor air infiltration

_____

_____

_____

Infiltration into air ducts

_____

_____

_____

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

a. Above grade construction:	wood frame	concrete	stone	brick
b. Basement type:	full	crawlspace	slab	other _____
c. Basement floor:	concrete	dirt	stone	other _____
d. Basement floor:	uncovered	covered	covered with _____	
e. Concrete floor:	unsealed	sealed	sealed with _____	
f. Foundation walls:	poured	block	stone	other _____
g. Foundation walls:	unsealed	sealed	sealed with _____	
h. The basement is:	wet	damp	dry	moldy
i. The basement is:	finished	unfinished	partially finished	
j. Sump present?	Y / N			
k. Water in sump?	Y / N / not applicable			

Basement/Lowest level depth below grade: _____(feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

_____

_____

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation	Heat pump	Hot water baseboard	
Space Heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other _____

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: _____

Boiler/furnace located in:	Basement	Outdoors	Main Floor	Other_____
Air conditioning:	Central Air	Window units	Open Windows	None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

_____

_____

_____

_____

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level	**General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**
Basement	_____
1st Floor	_____
2nd Floor	_____
3rd Floor	_____
4th Floor	_____

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. Is there an attached garage? Y / N

b. Does the garage have a separate heating unit? Y / N / NA

c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N / NA Please specify_____

d. Has the building ever had a fire? Y / N When?_____

e. Is a kerosene or unvented gas space heater present? Y / N Where? _____

f. Is there a workshop or hobby/craft area? Y / N Where & Type? _____

g. Is there smoking in the building? Y / N How frequently? _____

h. Have cleaning products been used recently? Y / N When & Type? _____

i. Have cosmetic products been used recently? Y / N When & Type? _____

j. Has painting/staining been done in the last 6 months? Y / N Where & When? _____

k. Is there new carpet, drapes or other textiles? Y / N Where & When? _____

l. Have air fresheners been used recently? Y / N When & Type? _____

m. Is there a kitchen exhaust fan? Y / N If yes, where vented?_____

n. Is there a bathroom exhaust fan? Y / N If yes, where vented?_____

o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / N When & Type?_____

Are there odors in the building? Y / N
If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly) No
Yes, use dry-cleaning infrequently (monthly or less) Unknown
Yes, work at a dry-cleaning service

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply:	Public Water	Drilled Well	Driven Well	Dug Well	Other: _____
Sewage Disposal:	Public Sewer	Septic Tank	Leach Field	Dry Well	Other: _____

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: _____

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

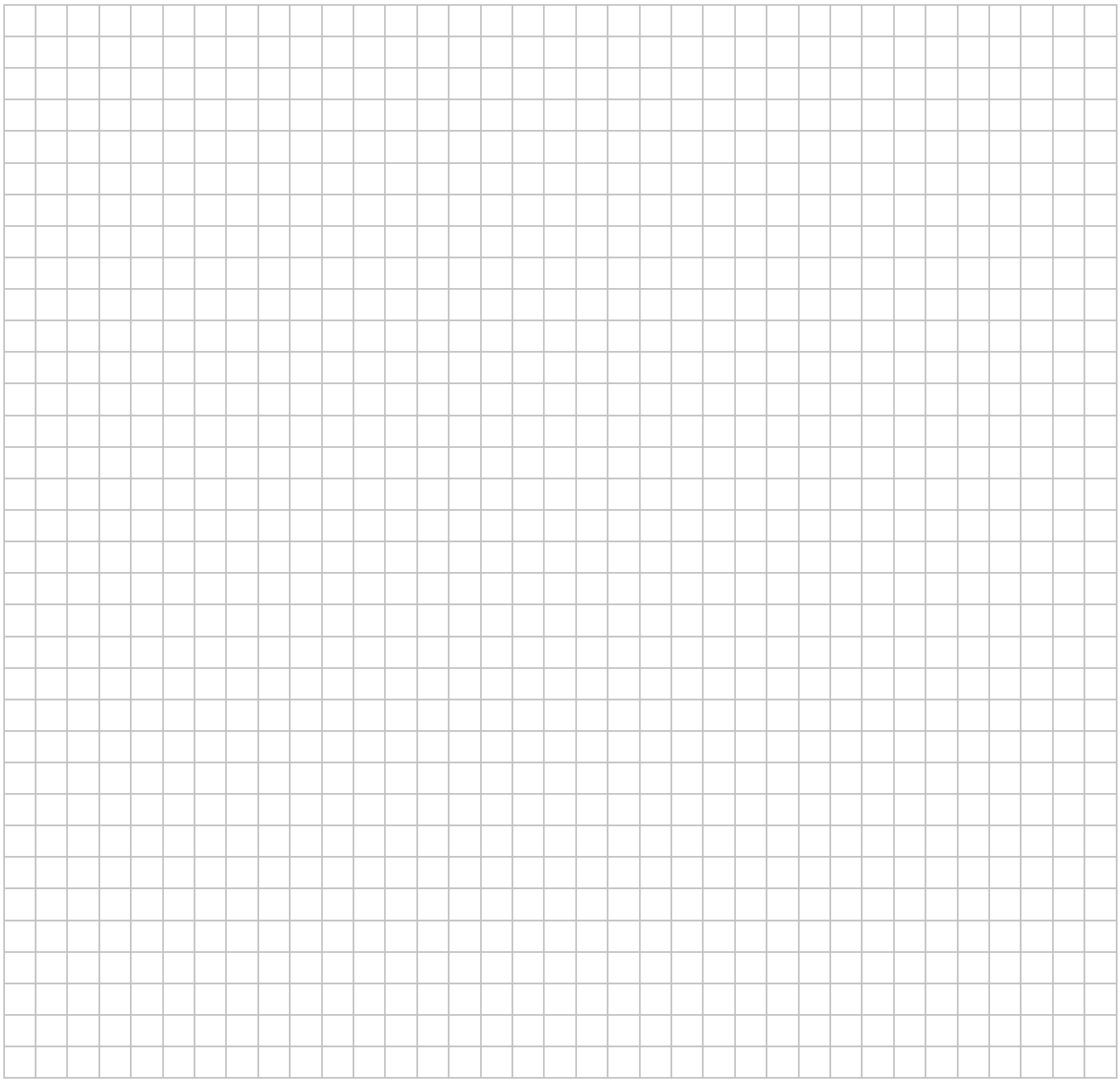
Basement:

First Floor:

12. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.



13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo** Y / N

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**
** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

Tetra Tech NUS, Inc. **AIR SAMPLING LOG SHEET**

Project Site Name: NWIRP Bethpage **Sample ID No.:** _____

Project No.: 112G01687 **Sample Location:** _____

C.O.C. No.: **Sampled By:** _____

SAMPLING DATA:						
Date:	**Wind speed**	**Wind Direction**	**Ambient temperature**	**Barometric Pressure**	**Relative Humidity**	Other
Time:	(Visual)	(S.U.)	(^{0}C)	(^{0}C)	(%)	
Method:						

Summa Canister #	
Filter Type	

Start Time Vacuum		in Hg
End Time Vacuum		in Hg

He check	**Start**	**Stop**	**Reading**
Purge Data	**Start**	**Stop**	

Readings:
Liters/minute
_____ @ _____
_____ @ _____
_____ @ _____

Notes:

PID:

ATTACHMENT B

TO-15 ANALYTE LIST

@Air Toxics LTD.
180 Blue Ravine Road, Suite B Folsom, CA 95630

Method: Modified TO-15-LL (Sp)/SpRLs-NYSDOH (2007)

Compound	Rpt.Limit(ppbv)
1,1,1-Trichloroethane	0.050
Carbon Tetrachloride	0.050
Trichloroethene	0.050
Bromodichloromethane	0.050
1,1,2-Trichloroethane	0.050
Tetrachloroethene	0.050
Dibromochloromethane	0.050
1,2-Dibromoethane (EDB)	0.050
1,1,2,2-Tetrachloroethane	0.050
1,3-Dichlorobenzene	0.050
1,4-Dichlorobenzene	0.050
1,2-Dichlorobenzene	0.050
Freon 12	0.050
Freon 114	0.050
Freon 11	0.050
Freon 113	0.050
Bromoform	0.050
Vinyl Chloride	0.10
1,1-Dichloroethene	0.10
1,1-Dichloroethane	0.10
cis-1,2-Dichloroethene	0.10
Benzene	0.10
1,2-Dichloroethane	0.10
Toluene	0.10
Ethyl Benzene	0.10
m,p-Xylene	0.10
o-Xylene	0.10
trans-1,2-Dichloroethene	0.10
Methyl tert-butyl ether	0.10
Chloromethane	0.10
Bromomethane	0.10
Chloroethane	0.10
Hexane	0.10
2-Butanone (Methyl Ethyl Ketone)	0.10
Chloroform	0.10
Cyclohexane	0.10
1,2-Dichloropropane	0.10
1,4-Dioxane	0.10
cis-1,3-Dichloropropene	0.10
4-Methyl-2-pentanone	0.10
trans-1,3-Dichloropropene	0.10

Reporting limits cited do not take into account sample dilution due to canister pressurization.

Toll Free: 1-800-985-5955 Phone: 1-916-985-1000 Fax: 1-916-985-1020 email: atl@airtoxics.com www.airtoxics.com

Air Toxics LTD.
180 Blue Ravine Road, Suite B Folsom, CA 95630

Method: Modified TO-15-LL (Sp)/SpRLs-NYSDOH (2007)

Chlorobenzene	0.10
Styrene	0.10
1,3,5-Trimethylbenzene	0.10
1,2,4-Trimethylbenzene	0.10
alpha-Chlorotoluene	0.10
2,2,4-Trimethylpentane	0.10
tert-Butyl alcohol	0.50
Methylene Chloride	0.50
Hexachlorobutadiene	0.50
Ethanol	0.50
1,2,4-Trichlorobenzene	0.50

Surrogate	Method Limits
4-Bromofluorobenzene	70-130
1,2-Dichloroethane-d4	70-130
Toluene-d8	70-130

Reporting limits cited do not take into account sample dilution due to canister pressurization.

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