WORK PLAN

FOR THE COLLECTION OF SOIL VAPOR AND AMBIENT AIR SAMPLES

TNT RED STAR EXPRESS SITE
97 INDUSTRIAL PARK DRIVE
KIRKWOOD
BROOME COUNTY, NEW YORK
NYSDEC SITE #704028

Prepared for:
YRC Enterprise Services, Inc.
10990 Roe Avenue, Mail Stop A605
Overland Park, Kansas 66211

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250.008

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1.0 Introduction

The purpose of this Work Plan is to provide the procedures needed for the collection of air and soil vapor samples to investigate the potential for volatile organic compounds ("VOCs") to enter the trucking terminal building located at 97 Industrial Park Drive in the Town of Kirkwood, New York ("Site") (see Figure 1). The Site is also known as the "TNT Red Star Express Site" on NYSDEC's Inactive Hazardous Waste Site registry, as number #704028.

Leader Professional Services, Inc. ("Leader") has prepared this work plan to document the scope of work, procedures, goals, and reporting responsibilities of this project.

1.1 Background

Between August 1998 and August 2000 Leader completed a Remedial Investigation ("RI") and Feasibility Study ("FS") for the Site to define the nature and extent of contamination. The contamination was originally thought to be the result of a loading dock accident, which spilled approximately 100-gallons of Perchloroethylene ("Perc"). The contaminated soil had been removed as a part of the spill's emergency response action and groundwater monitoring commenced approximately 6 months to 1 year later. The RI delineated the spill-related Perc plume, but also found a second source of contamination originating in the vicinity of an oil/water separator immediately south of the Site's garage. The oil/water separator contributed 1, 1, 1-Trichloroethane, Toluene, Ethyl benzene, and Xylene to the groundwater. The oil/water separator is a part of the facilities at the Site under the responsibility of the Site owner. USF Red Star was only a tenant at the Site.

The soil in the unsaturated zone and in the shallow groundwater zone consists of a dense silt and gravel that gradually changes to sandy silt in the groundwater zone. At a depth of 15 to 25 feet, the silt and clay content increases, forming a confining layer beneath the shallow and deep groundwater zones. The on-Site water table ranges from approximately 8 to 13 feet below the ground surface. Off-site water table levels can range from 9.5 feet below the ground surface at monitoring well PW-3 to 15.2 feet below the ground surface at monitoring well PW-9.

The contamination on-Site is found in the soil and groundwater. The soil contamination only appears to be present in the swale bordering the site to the south where the oil/water separator discharges. Soil contamination is also present in the capillary zone above the water table in the source areas, but is most noticeable in the vicinity of the oil/water separator. Groundwater contamination is represented by two plumes originating from each of the source areas (see Figure 2). Compared to the groundwater results collected for the RI, recent (2005) groundwater contaminant levels indicate a dramatic improvement in water quality. Groundwater quality off the Site is only slightly elevated compared to NYSDEC's groundwater quality criteria.

The area is zoned for industrial use and the Site is used as a trucking terminal for two firms, Overnite and Herlihy Trucking. In addition to the terminal building, there is also a garage on the property, which had been used for repairing trucks. This building is currently vacant and is not being heated. The garage is a sheet metal building, which stands on a concrete floor slab. Drains in the building are connected to an oil/water separator, which is located on the south side of the building. The terminal building is also a sheet metal building that is approximately 460 feet long and approximately 60 feet wide. There are two office areas within the terminal and they are located at the opposite ends of the terminal building. The offices cover approximately 2,300 square feet and the remainder is used as loading dock and warehouse space where packages are swapped between trucks. The terminal building has a concrete slab on grade floor. North of the southernmost office used by Overnite the floor is elevated approximately 4 feet above the outdoor ground surface elevation. The outdoor ground surface at the south end of the building has been raised so employees or customers can have an at grade walk in entrance. The elevated floor allows trucks to back into loading docks without the need of hydraulic ramps to unload items. Both the terminal and garage have utility corridors entering the buildings, and these enter the respective buildings in the vicinity of the building's southeast corners (see Figure 3). Please note on Figure 3, the terminal building is shown with an office in the middle of the terminal, but currently the middle office is located on the north end of the building. There is also a discrepancy in the length of the building between the surveyed length and the plan length.

Off-site properties are also industrially zoned and include: Harris Assembly Group, located south of the Site; Universal Instruments located southwest of the Site; and CAE Electronics located west of the Site. North of the Site is Industrial Park Drive and Interstate 81.

At this time the groundwater contamination is considered to be a potential health risk for both on and off-Site building workers based on the NYSDOH's models and experience. Leader modeled different indoor air risk scenario's using USEPA's vapor intrusion model (Johnson-Ettinger Model) and these results are presented as Appendix A and on Table 1. Table 1 indicates the range of Perc concentrations and groundwater depths used to model the condition and estimate the level of carcinogenic risk. As Table 1 shows, none of the modeled scenarios appear to pose a risk based on the estimated indoor air Perc concentrations. Further, cancer risks for these indoor air Perc concentrations are conservative, because the exposure parameters assume residential risk factors: exposure duration of 30 years, exposure frequency of 350 days per year and an average lifetime of 70 years.

Since the writing of the Record of Decision ("ROD"), the NYSDEC and the NYSDOH have required Yellow Roadway Corporation, which acquired USF Corporation, to investigate the potential for soil vapor to migrate from the source and contaminated groundwater plume into the indoor air of on and off-site buildings.

Off-site properties are not a part of this investigation, but characteristics of at least two of the properties lower their risk of vapor intrusion or make them less likely candidates for investigation.

The CAE Electronics, also known as Raytheon Corporation and Singer Link, is located adjacent to and west of the Site. The property is located at a topographically higher elevation than the Site, adding at least 40 feet of overburden to any potential migration pathway. In addition, Raytheon was a former hazardous waste generator and is also being regulated under the RCRA Corrective Action Program.

Universal Instruments Corporation ("Universal"), also known as Dover Electronics and Special Products Manufacturing, Inc., is located southwest of the Site and is also located at a higher elevation than the Site adding approximately 10 to 30 feet of overburden to a vapor migration pathway. Universal is also a generator of hazardous waste.

Immediately adjacent to the Site to the south is Harris Assembly Group. The company is a manufacturer of wiring harnesses. The groundwater contaminant plume from the Site appears to be near or slightly beneath the northern limit of the building.

2.0 Scope of Work

2.1 Purpose

The purpose of this sampling is to produce data in the following areas: 1) collection of soil vapor data on-site in areas above the known groundwater plume and outside the limits of the plume; 2) collection of sub-slab soil vapor within the terminal building's offices; 3) collection of ambient air samples outside of the terminal building and within the terminal; and, 4) to evaluate the data to determine if soil vapor or sub-slab soil vapor is a hazard in this pre-remedial phase.

Three types of data will be collected: soil vapor, sub-slab soil vapor, and ambient air samples (indoor and outdoor air samples). The sampling locations and procedures to be used in during the collection and analysis of samples are discussed in the following sections.

3.0 Pre-Sampling Inspection

Prior to beginning the sub-slab soil vapor and indoor air sampling, an inspection of the office areas will be completed following the guidelines in the NYSDOH Draft Soil Vapor Intrusion Guidance. The inspection will have three goals: confirm building plans and details; inspect the sampling locations; and to complete a pre-sampling questionnaire and inventory of the items being used and stored in the office areas.

If plans are available, the plans will be reviewed and compared to the actual building conditions. Items of importance include: ensuring that the space being sampled does not have a crawl space or basement; that the space does not share ventilation or a ceiling

crawl space with the adjoining terminal warehouse; and that the tenants understand the building conditions (heating, non-smoking, cleaning) needed during the sampling period. During the building inspection, a portable organic vapor analyzer ("OVA") will be used to document the air quality in the building. In the event that building conditions are different than those portrayed in this Work Plan, the NYSDEC and NYSDOH Project Managers will be notified and consulted on possible solutions.

During the building inspection, sketches, dimensions, and photographs of the office areas and sampling locations will be made. Information regarding the ventilation and heating system will be noted. The inventory of the office spaces will be done using NYSDOH form(s) and any materials or products that contain target chemicals will be temporarily removed from the office area. If target chemicals are found in the warehouse area and are a part of a customer's delivery, an attempt will be made to delay sampling so these materials can leave the warehouse. As a part of the site inventory, an OVA will be used to determine if any of the items found are a source of VOCs. If possible sources of cross contamination are found, the NYSDEC and NYSDOH will be notified so proper corrective actions can be taken. Corrective actions may include removing the source of VOCs, forced ventilation, or postponing the sampling.

4.0 Sampling

Sampling will be completed to collect air or soil vapor samples from the following: outdoor ambient air; indoor air; sub-slab soil vapor; and outdoor soil vapor. Proposed sampling locations and the location of the known groundwater contaminant plumes are shown on Figure 2. All sampling will be completed on the same day and once a Summa canister has started sampling the sampling will continue uninterrupted.

4.1 Outdoor Ambient Air

4.1.1 Sampling Locations

The proposed sampling location for the outdoor ambient air sample will be determined on the day of the sampling and based on the direction of the prevailing wind. The sampling location will be upwind of the terminal building, but also upwind of where vehicles are typically parked.

4.1.2 Sampling Procedures

4.1.2.1 Sampling Equipment

The outdoor ambient air sample will be collected using a Summa canister and a sample train, which will elevate the sample intake to the breathing zone, approximately 3 to 5 feet above the ground surface. The sampling train will consist of clean inert materials composed of food-grade polyethylene tubing and brass or PVC fittings. The sample tubing will be elevated from the ground surface by strapping the tubing to a tripod using plastic electrical tie wraps. The 6-liter Summa canister will use a regulator calibrated by

the laboratory to collect an 8-hour sample at a rate of approximately 0.0125 liters per minute.

4.1.2.2 Sample Collection

Prior to the start of sampling time, weather conditions, temperature, barometric pressure, and wind direction and approximate velocity will be noted. The sampling technician will record the identification number of each canister and assign a canister to each sampling location. The technician will also not have or use permanent markers or use other products containing VOCs during sampling. Ideally, sample collection will start at 9:00 AM and continue uninterrupted to 5:00 PM. During the sample collection period, the sampling technician will inspect the sampling train and gauges several times to ensure the regulator and sampling train are operating properly. When sampling is completed, the regulator will be closed and the time, weather conditions, temperature, barometric pressure, and wind direction and velocity noted. The sample chain of custody will be completed and the canister placed into a shipping container for next day delivery.

4.2 Indoor Ambient Air

4.2.1 Sampling Locations

The indoor ambient air samples will be collected in four locations: one sample in each of the two offices and one sample in each of the two warehouse areas. In general, the office indoor ambient air samples will be collected within a few feet of the sub-slab sample locations and use a sampling train like the one used to collect the outdoor sample. The warehouse samples will be collected in a centralized location within the warehouse area, but not where lift trucks might be parked or where it may interfere with the operation of the warehouse.

4.2.2 Sampling Procedures

4.2.2.1 Sampling Equipment

Each indoor ambient air sample will be collected using a Summa canister and a sample train, which will elevate the sample intake to within the breathing zone, approximately 3 to 5 feet above the ground surface. The sampling train will consist of clean inert materials composed of food-grade polyethylene tubing and brass or PVC fittings. The sample tubing will be elevated from the ground surface by strapping the tubing to a tripod using plastic electrical tie wraps. The 6-liter Summa canister will use a regulator calibrated by the laboratory to collect an 8-hour sample at a rate of approximately 0.0125 liters per minute.

4.2.2.2 Sample Collection

Prior to the start of sampling time, weather conditions, indoor air temperature, barometric pressure, and wind direction and approximate velocity will be noted. The sampling

technician will record the identification number of each canister and assign a canister to each sampling location. The technician will also not have or use permanent markers or use other products containing VOCs during sampling. Ideally, sample collection will start at 9:00 AM and continue uninterrupted to 5:00 PM. During the sample collection period, the sampling technician will inspect the sampling train and gauges several times to ensure the regulator and sampling train are operating properly. When sampling is completed, the regulator will be closed and the time, weather, indoor air temperature, barometric pressure and wind direction and velocity noted. The sample chain of custody will be completed and the canister placed into a shipping container for next day delivery.

4.3 Sub-Slab Soil Vapor

4.3.1 Sampling Locations

A sub-slab soil vapor sample will be collected in each of the office areas in the terminal building. The offices are located on the north and south sides of the terminal building. Samples will be collected as far away as possible from the exterior walls, ventilation system intakes and exhausts, building columns, sub-slab utility corridors, and severe floor slab cracks, because these features may influence the sample results. Ideally, the samples will be collected in the center of the office space.

4.3.2 Sampling Procedures

4.3.2.1 Sampling Equipment

The sub-slab vapor samples will be collected from permanent sampling locations placed through the floor slab and into the sub-slab stone. The samples will be collected using a 6-liter Summa Canister with a laboratory-calibrated regulator with a flow rate of 0.0125 Liters per minute.

The sample location will be built using the following procedure (see Figure 5):

- The sampling locations will be reviewed against existing facility drawings, if available, to determine the location of possible underground utility conduits and pipes.

- The floor tile or carpet will be cut using a utility knife to remove a circular section approximately two-inches in diameter.

- A small diameter (one inch or less) hole will be drilled into the concrete floor to a depth, which extends through the concrete.

- A laboratory grade Teflon or food grade polyethylene tubing will be inserted into the aggregate below the floor so the end of the tubing will extend to approximately one inch above the bottom of the drilled hole in the aggregate. If

needed, sand or glass beads will be added to surround the tubing into the hole to a point just below the concrete floor.

- The remainder of space surrounding the sample tubing above the aggregate or sand will be filled with a cement Bentonite grout mixture. The plug of cement Bentonite will extend approximately half the thickness of the cement floor.

- A brass union with compression fittings on each end will be slipped over the free end of the tubing so that one end of the union can be tightened onto the polyethylene tubing. The opposite end of the union will be used to connect to the Summa canister using a sample-dedicated tube. Additional fittings may be required to increase or decrease the size of the tubing to fit the Summa canister fittings.

- After the cement Bentonite grout has set, the tubing will then be purged to remove trapped debris and to remove any air that has seeped into the hole and tubing. Purging will be done for a period of 5 minutes or until one to three sample volumes have been removed at a rate not to exceed 0.2 liters per minute. After purging, the brass union will be capped and the hole allowed to equilibrate for at least 12 hours before sampling. The building heating and ventilation will remain constant and as close to room temperature (68 to 73 degrees) for the 12-hour period before sampling.

- The location of the sample and dimensions of the sample tube and sample hole will be noted.

4.3.2.2 Sample Collection

Prior to the start of sampling time, weather conditions, indoor air temperature, barometric pressure and wind direction and approximate velocity will be noted. Ideally, sample collection will start at 9:00 AM and continue uninterrupted for 8 hours. During the sample collection period, the sampling technician will inspect the sampling train and gauges several times to ensure the regulator and sampling train are operating properly. Sampling of the sub-slab soil vapor using Summa canisters will use the following procedure:

- The sampling technician will record the identification number of each canister and assign a canister to each sampling location. The technician will also not have or use permanent markers or use other products containing VOCs during sampling.

- At the sampling location, the sampling technician will locate the Summa canister on a level surface and assemble the sampling train (regulator, regulator gauge, particulate filter and the sample tubing), as needed. The sampler will also verify

the air temperature and the condition of the seal. The seal will be repaired as needed.

- The sampling technician will uncap the sample tubing at the brass union and connect the tubing to the Summa canister's regulator. The sampler will record the regulator gauge reading and time on the chain of custody, and open the Summa canister valve to start sampling.

- A photograph of the sample location end of the sampling train will be taken.

- At the completion of the eight-hour sample interval, the technician will record the Summa canister vacuum at the regulator and time, and then close the canister's valve.

- The sampling train will be disassembled and the brass union closed. The sample location will be preserved by sealing under a metal plate. The Summa canisters will be packaged with the chain of custody and shipped to the laboratory. The samples will be shipped overnight so the samples will be received by the laboratory the next day.

4.4 Soil Vapor

4.4.1 Sampling Locations

The soil vapor samples will be collected in the vicinity of the original spill and the oil/water separator. Additional samples will be added along the southern property line. This sampling array (see Figure 2) should delineate the extent of soil vapor contamination and provide an assessment of soil vapor conditions above the contaminated ground water plume.

4.4.2 Sampling Procedures

4.4.2.1 Sampling Equipment

The soil vapor samples will be collected from temporary sampling locations placed into the ground using direct push ("DP") sampling equipment. Sampling locations will be placed in areas where there is pavement, which caps the contaminated area. The property lines are either not paved or the pavement ends within a short distance of the property line. Because of the capping effect the pavement has on any potential vapor rising from the contaminated area, soil vapor probes will be placed approximately 5 feet below the ground surface.

Each sample location will be built using the following procedure:

- A Site utility location survey will be requested from local utilities to identify where utilities enter and cross the property. Utility locations will also be reviewed against existing facility drawings, if available, to determine the location of possible underground utility conduits and pipes.

- A 2-inch diameter DP hole will be advanced through the pavement and into the soil using Geoprobe DP rods or casing. The DP tools will be pulled and a 0.5-foot slotted PVC screen attached to a 0.25-inch outside diameter PVC or polyethylene food grade tubing will be placed into the hole (see Figure 4 for additional construction details).

- The hole will be backfilled with clean quartz sand to a point approximately 6-inches above the top of the vapor well intake. On top of the sand and to the ground surface, the open hole will be backfilled with a grout slurry mixture of 2 to 3 percent Bentonite and Portland cement. The 0.25-inch diameter tubing will extend above the grout approximately 3 feet so it can be accessed for sampling.

- The tubing will then be purged to remove gases trapped in the sand and in the monitoring point during placement. A plug will then be placed into the tubing unless sampling will begin immediately. Purging will be done for a period of 5 minutes or until one to three open space (pore) volumes have been removed at a rate not to exceed 0.2 liters per minute. Ideally, the soil vapor sample point will have a volume of approximately 0.2 liters. After purging the tubing will be plugged.

4.4.2.2 Sample Collection

Prior to the start of sampling time, weather conditions, air temperature, barometric pressure, wind direction and approximate wind velocity will be noted. In addition, each location will be tested to determine if ambient air is infiltrating the sample. A tracer gas consisting of Helium gas will be used to test 10-percent of the total number of sample locations. The tracer test will be conducted using the following steps:

- Sample tubing will be connected to the brass fitting on the in-place sample tubing. The tubing will be of sufficient length to extend beyond a bucket placed over the sample location.

- A ring of hydrated Bentonite clay will be placed around the sample location. The Bentonite ring will act as a seal between the ground and the bucket, which will be used to enclose the sample location and to confine the tracer gas.

- A bucket will be placed over the sample location and a hole placed into the top of the bucket with a diameter equal to the sample tubing. The sample tubing will be placed through the hole and inserted into a sampling pump. The sample pump will be connected to a Helium detector. A second hole will be placed on the side of the bucket near the ground surface. A second tube connected to a Helium gas

cylinder will be threaded through the bucket and placed next to the sample location. The tubing will be taped or sealed to the bucket using Silicone or modeling clay. The Helium will be released into the bucket, the sample pump started and the Helium detector monitored.

- The test will be performed for 10-minutes. If Helium is not detected in the sampled gas, the sub-slab sample will be collected. If Helium is detected, the surface seal and tubing connections will be examined and either repaired or replaced and the tracer test complete again until a successful test is performed.

Prior to sample collection, the time, weather conditions, air temperature, barometric pressure, and wind direction and approximate velocity will be noted. Ideally, sample collection will start at 10:00 AM and continue uninterrupted for 1 hour. During the sample collection period, the sampling technician will inspect the sampling train and gauges several times to ensure the regulator and sampling train are operating properly. Sampling of the soil vapor will follow these procedures:

- The sampling technician will label the Summa canister with a unique sample number and record the sample number in the field notebook. The sampling technician will record the identification number of each canister and assign a canister to each sampling location. The technician will also not have or use permanent markers or use other products containing VOCs during sampling.
- The technician will then connect the Summa canister to the sample tubing. The technician will note the time and open the Summa canister regulator. The laboratory will specify the collection time for the sample flow rate and the desired detection limit needed for the Site. At this time the a 6 liter Summa Canister will be used and the sample will be collected for a period of 1-hour at a flow rate of 0.1 Liters per minute.
- When the sampling is completed the technician will close the regulator noting the time and vacuum, and disconnect the sample canister from the sample tubing. The technician will label the canister with the sample time on the Summa canister and then complete the chain of custody and the field notebook with the sample information.
- The sampling technician will plug the sample tubing and place the Summa canister into the shipping container.
- The samples will be shipped overnight so the laboratory will receive the samples the next day.

5.0 Sample Analysis

Samples will be analyzed for Perc and 1, 1, 1-Trichloroethane the two main contaminants on the Site. All samples will be analyzed for target compound list volatile organic compounds using USEPA TO-15 analytical methods. All samples will be analyzed by a laboratory, which is certified by the New York State Department of Health to complete

the requested analysis. The reporting limits for the air sample contaminants will be 0.2 microgram per cubic meter for all ambient air samples and 5 micrograms per cubic meter for all soil vapor samples. The laboratory will also provide certification that the Summa canisters are clean.

6.0 Quality Assurance and Quality Control Samples

The analyzing laboratory will perform needed quality assurance and quality control ("QA/QC") analyses commensurate with the analytical method (TO-15), the laboratory's certifications and the laboratory's internal QA/QC standards. All QA/QC results will be reported.

7.0 Reporting

A sample report will be prepared once the data has been received and reviewed. The sample report will include a summary of the field activities, a data usability analysis, and a summary of the results. Any changes to the work plan will also be identified and how the problem causing the change was resolved. In addition, how the change may impact the results will be discussed. Data usability will also be discussed. Problems with the sampling and analysis will be reviewed and the possible impact to the data analyzed.

TABLE 1
RESULTS OF JOHNSON ETTINGER MODELING

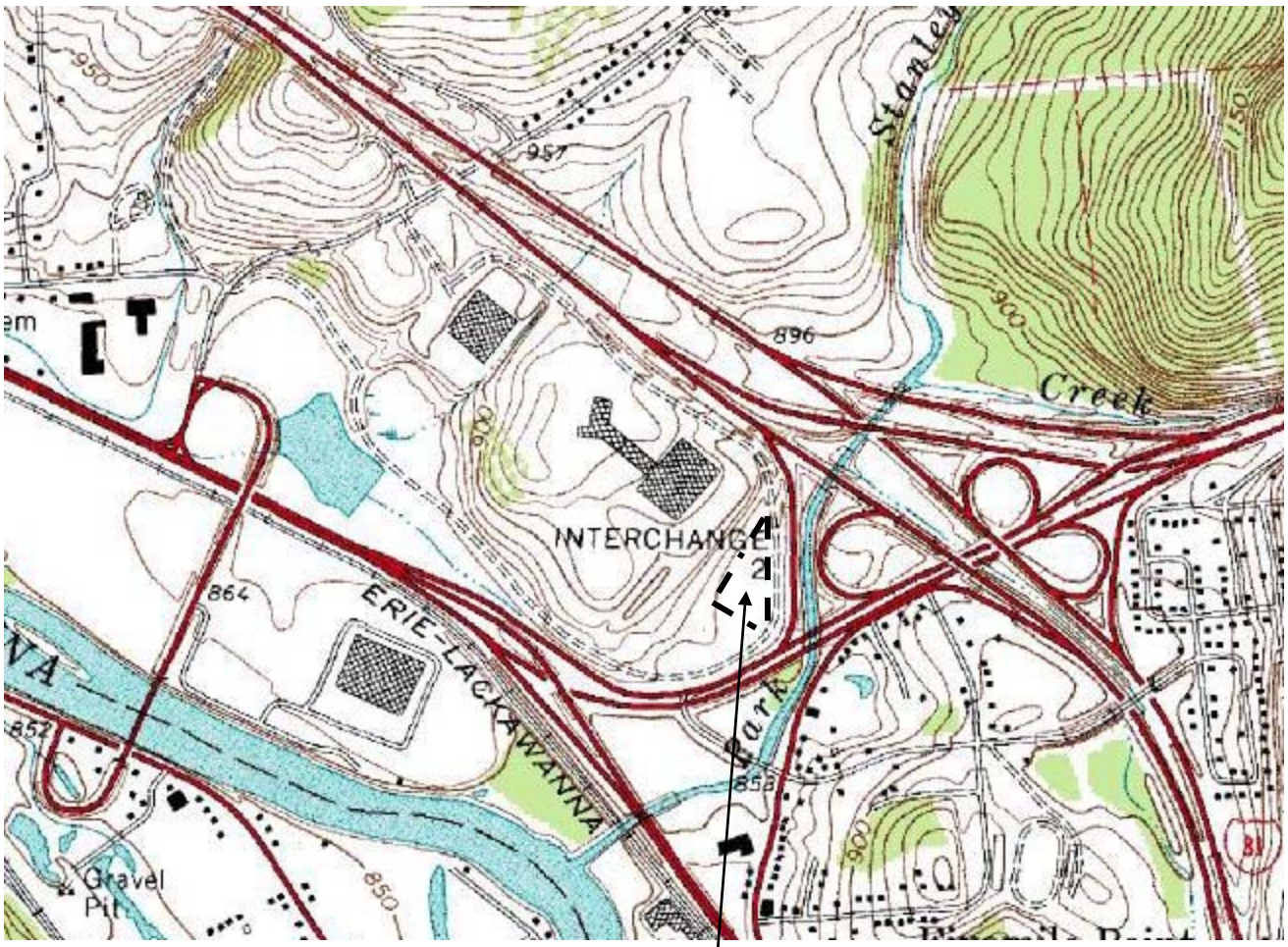
	Monitoring Well MW2	Monitoring Well MW3	Monitoring Well PW1	Monitoring Well PW3	Monitoring Well PW4	Monitoring Well PW7	Monitoring Well PW9
Groundwater Depth[1] in ft.	7	7	9.5	9.5	10	9.5	9.5
Perc[2] Concentration 1999	8	1400	4.4	2.5	2.5	46	15
Ideal Vapor Concentration[3]	0.2576	45.07	0.1403	0.07973	0.07958	1.467	0.4784
Cancer Risk	3.17E-07	5.557 E-05	1.73E-07	9.829E-08	9.811E-08	1.809E-06	5.898E-07
Perc[2] Concentration 2005	8.9	49.0	7.1	Not Sampled	2.5	Not Sampled	Not Sampled
Ideal Vapor Concentration[3]	0.2865	1.578	0.2264	N/A	0.07958	N/A	N/A
Cancer Risk	3.533E-07	1.945E-06	2.792E-07	N/A	9.811E-08	N/A	N/A
TCA[2] Concentration 1999	5	25	2.5	2.5	3500	26	4.2
Ideal Vapor Concentration[3]	0.1879	0.9395	0.09307	0.09307	130.0	0.9679	0.1564
Cancer Risk	8.541E-05	4.27E-04	4.230E-05	4.230E-05	0.05911	4.399E-04	7.107E-05
TCA[2] Concentration 2005	1	.5	.5	Not Sampled	320	Not Sampled	Not Sampled
Ideal Vapor Concentration[3]	0.03758	0.01879	0.01861	N/A	11.89	N/A	N/A
Cancer Risk	1.708E-05	8.541E-06	8.461E-06	N/A	0.005405	N/A	N/A

Notes:

1. Groundwater shallowest measurement from ground surface for the particular well or wells in the general area. Value does not include difference between the ground surface elevation and the floor slab elevation in the terminal.

2. All concentrations shown in units of micrograms per Liter or parts per billion. Where concentrations were reported as less than ("<") or as not detected, the value used is 0.5 the lowest detection limit for the data set used in the model.

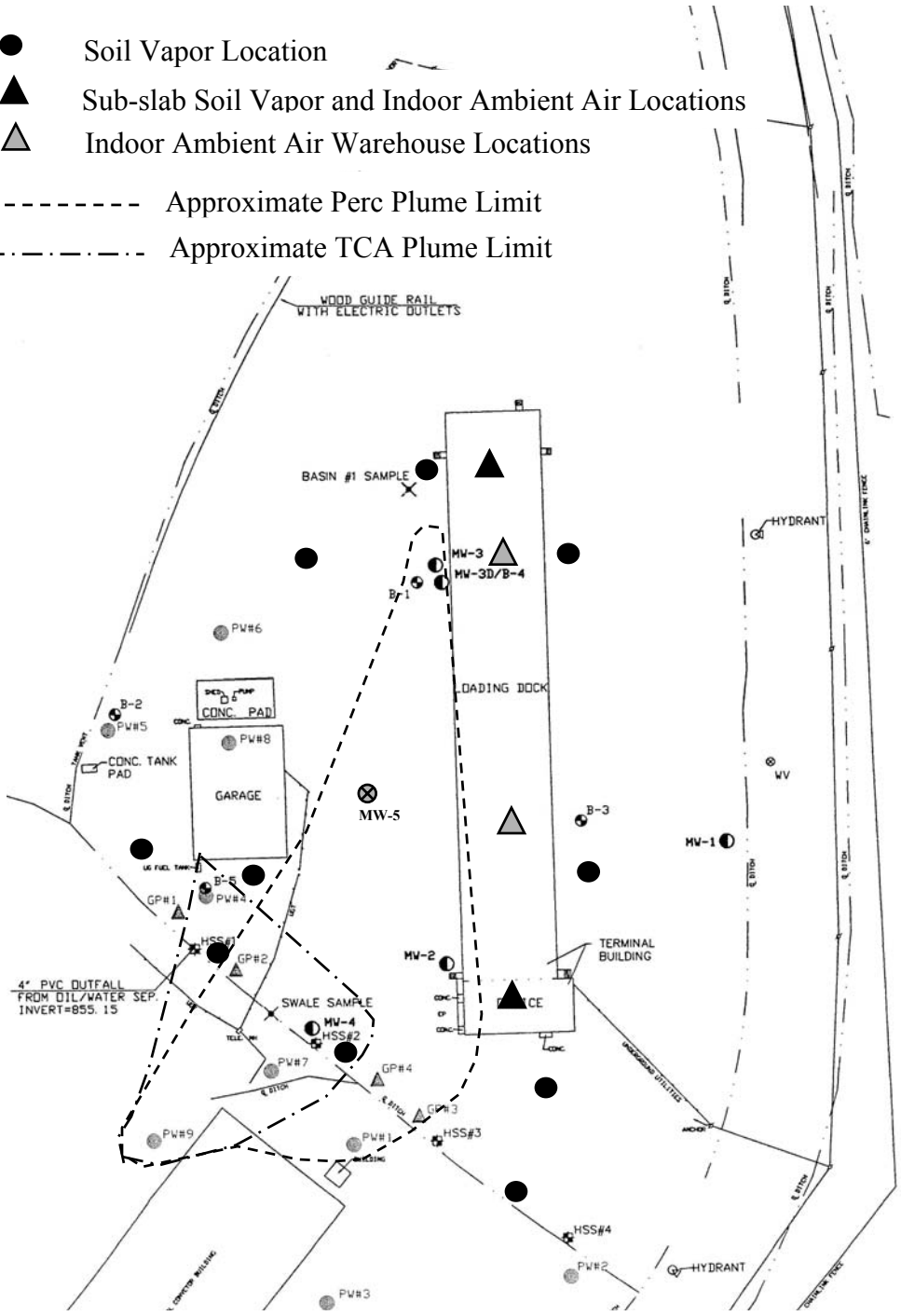
3. All concentrations shown are in units of micrograms per cubic meter.



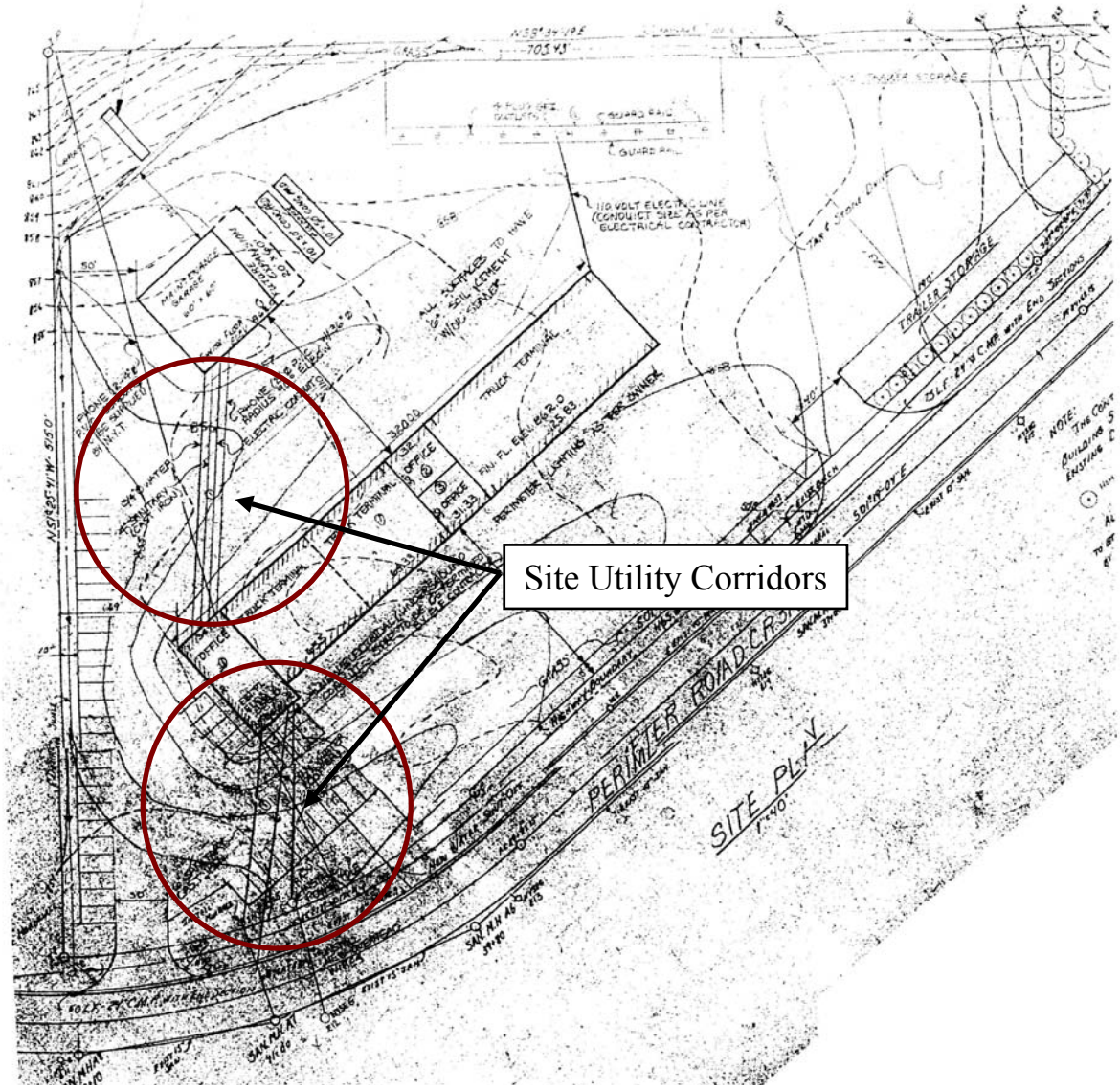
Title: Site Location TNT-Red Star Express Site Kirkwood, NY	LEADER Leader Professional Services, Inc 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Project 250.008 Date 1/06 Scale NTS	Drawn PVS Checked MPR File Name Site Map	Figure 1
Prepared For: Yellow Roadway Corporation Overland Park, Kansas				

Proposed Sampling Locations:

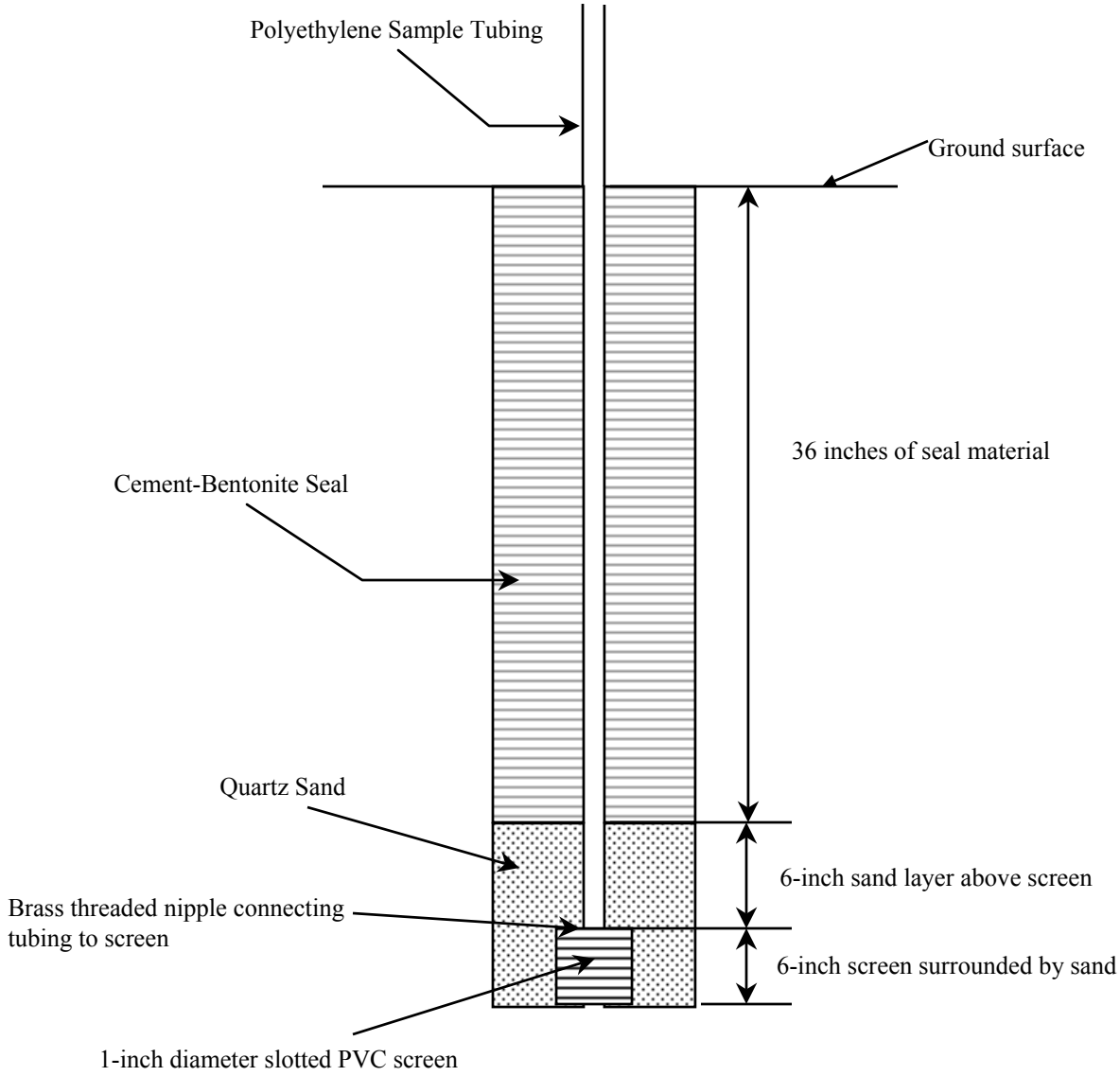
- ● Soil Vapor Location
- ▲ Sub-slab Soil Vapor and Indoor Ambient Air Locations
- △ Indoor Ambient Air Warehouse Locations
- - - - - - - - - Approximate Perc Plume Limit
- —·—·—·— Approximate TCA Plume Limit



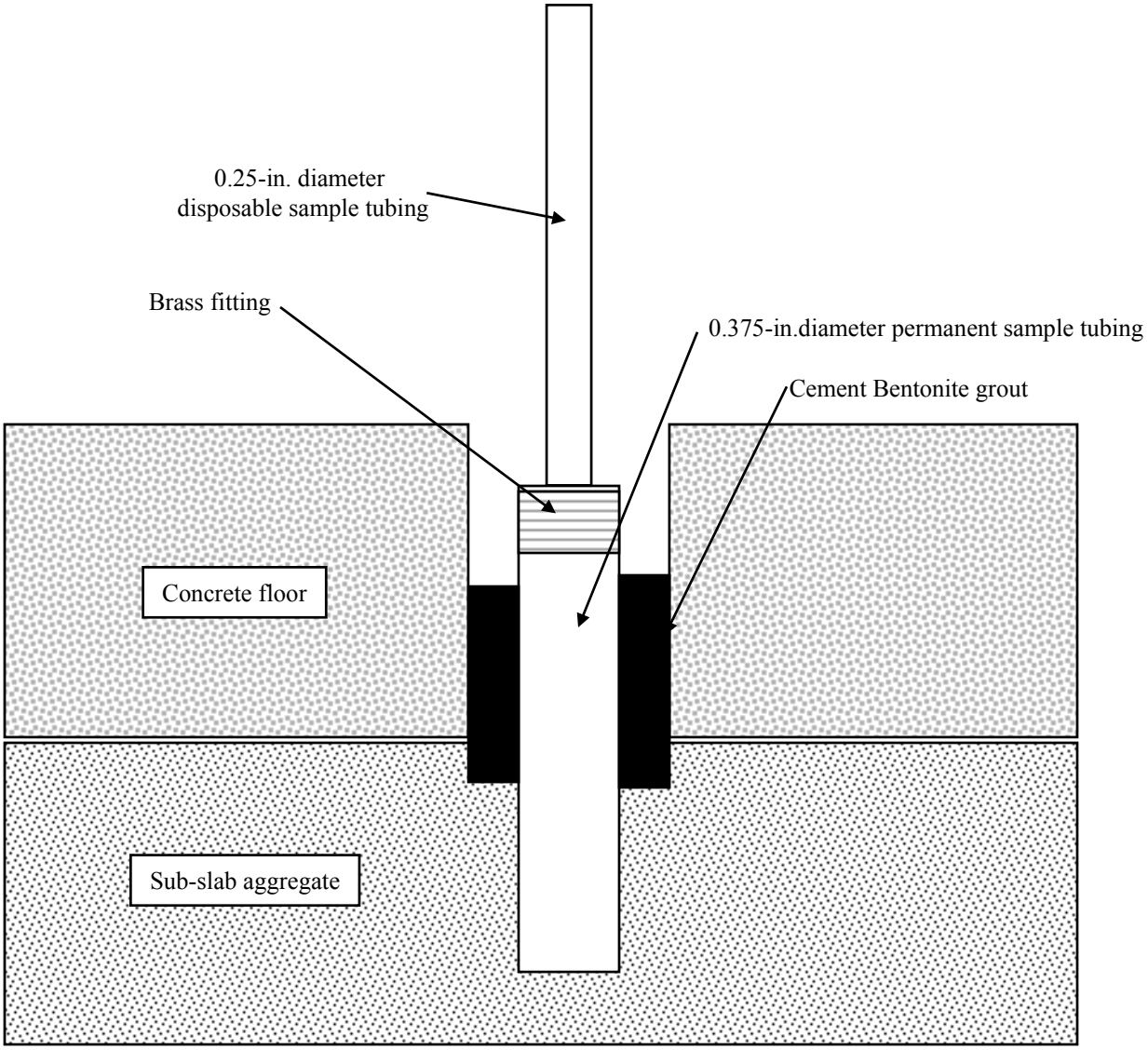
Title: Proposed Soil Vapor Sampling Locations TNT-Red Star Express Site Kirkwood, NY	LEADER Leader Professional Services, Inc 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Project 250.008 Date 12/05 Scale NTS	Drawn PVS Checked MPR File Name Site Map	Figure 2
Prepared For: Yellow Transportation Corporation Overland Park, Kansas				



Title: Site Utility Corridors TNT-Red Star Express Site Kirkwood, NY	LEADER Leader Professional Services, Inc 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Project 250.008 Date 1/06 Scale NTS	Drawn PVS Checked MPR File Name Site Map	Figure 3
Prepared For: Yellow Transportation Corporation Overland Park, Kansas				



Title: Proposed Sampling Point Construction TNT-Red Star Express Site Kirkwood, New York	LEADER Leader Professional Services 271 Marsh Road-Suite 2 Pittsford, New York 14534 (585) 248-2413 FAX (585) 248-2834	Project: 250.008 Date: 1-4-06 Scale: As Shown	Drawn: PVS Checked: MPR File Name:	Figure 4
Prepared For Yellow Transportation Corporation Overland Park, Kansas				



Title: Sub-slab Sampling Schematic
TNT-Red Star Express Site
Kirkwood, NY

Prepared For:
Yellow Transportation Corporation
Overland Park, Kansas

LEADER
Leader Professional Services, Inc
271 Marsh Road-Suite 2
Pittsford, New York 14534
(585) 248-2413
FAX (585) 248-2834

Project 250.008
Date 1/06
Scale NTS

Drawn PVS
Checked MPR
File Name Site Map

Figure 5

APPENDIX A

JOHNSON ETTINGER MODEL

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT Red Star MW-2
Report Date: Thu Dec 22 13:33:03 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 5 [ppb-water]
Depth to ground water table: 7ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25 [hr^{-1}]
Building Mixing Height: 2.44 [m] Building Footprint Area: 100 [m^2]
Subsurface Foundation Area: 106 [m^2] Building Crack Ratio: 0.00038 [unitless]
Foundation Slab Thickness: 0.1 [m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.0003444 [cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009895

[1]Low Indoor Air Prediction: 0.1448 [$\mu g/m^3$] or 0.02655 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 6.580e-5

Best Estimate Indoor Air Prediction: 0.1805 [$\mu g/m^3$] or 0.03311 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 8.205e-5

[2]High Indoor Air Prediction: 0.1879 [$\mu g/m^3$] or 0.03446 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 8.541e-5

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT Red Star MW-2
Report Date: Thu Dec 22 13:33:33 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 1[ppb-water]
Depth to ground water table: 7ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr^{-1}]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m^2]
Subsurface Foundation Area: 106[m^2] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.0003444[cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009895

[1]Low Indoor Air Prediction: 0.02895 [$\mu g/m^3$] or 0.005310 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 1.316e-5

Best Estimate Indoor Air Prediction: 0.03610[$\mu g/m^3$] or 0.006622 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 1.641e-5

[2]High Indoor Air Prediction: 0.03758[$\mu g/m^3$] or 0.006892 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 1.708e-5

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT Red Star MW-3
Report Date: Thu Dec 22 13:32:12 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 0.5 [ppb-water]
Depth to ground water table: 7ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25 [hr^{-1}]
Building Mixing Height: 2.44 [m] Building Footprint Area: 100 [m^2]
Subsurface Foundation Area: 106 [m^2] Building Crack Ratio: 0.00038 [unitless]
Foundation Slab Thickness: 0.1 [m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.0003444 [cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009895

[1]Low Indoor Air Prediction: 0.01448 [$\mu g/m^3$] or 0.002655 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 6.580e-6

Best Estimate Indoor Air Prediction: 0.01805 [$\mu g/m^3$] or 0.003311 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 8.205e-6

[2]High Indoor Air Prediction: 0.01879 [$\mu g/m^3$] or 0.003446 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 8.541e-6

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT Red Star MW-3
Report Date: Thu Dec 22 13:31:27 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 25 [ppb-water]
Depth to ground water table: 7ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25 [hr^{-1}]
Building Mixing Height: 2.44 [m] Building Footprint Area: 100 [m^2]
Subsurface Foundation Area: 106 [m^2] Building Crack Ratio: 0.00038 [unitless]
Foundation Slab Thickness: 0.1 [m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.0003444 [cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009895

[1]Low Indoor Air Prediction: 0.7238 [$\mu g/m^3$] or 0.1327 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 3.290e-4

Best Estimate Indoor Air Prediction: 0.9026 [$\mu g/m^3$] or 0.1655 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 4.103e-4

[2]High Indoor Air Prediction: 0.9395 [$\mu g/m^3$] or 0.1723 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 4.270e-4

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT Red Star PW-1
Report Date: Thu Dec 22 13:34:47 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 0.5[ppb-water]
Depth to ground water table: 9.5ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr^{-1}]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m^2]
Subsurface Foundation Area: 106[m^2] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.000456[cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009657

[1]Low Indoor Air Prediction: 0.01328 [$\mu g/m^3$] or 0.002436 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 6.037e-6

Best Estimate Indoor Air Prediction: 0.01762[$\mu g/m^3$] or 0.003231 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 8.009e-6

[2]High Indoor Air Prediction: 0.01861[$\mu g/m^3$] or 0.003414 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 8.461e-6

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT Red Star PW-1
Report Date: Thu Dec 22 13:35:23 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 2.5[ppb-water]
Depth to ground water table: 9.5ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr^{-1}]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m^2]
Subsurface Foundation Area: 106[m^2] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.000456[cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009657

[1]Low Indoor Air Prediction: 0.06641 [$\mu g/m^3$] or 0.01218 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 3.019e-5

Best Estimate Indoor Air Prediction: 0.08810[$\mu g/m^3$] or 0.01616 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 4.004e-5

[2]High Indoor Air Prediction: 0.09307[$\mu g/m^3$] or 0.01707 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 4.230e-5

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT-Red Star Express PW-3
Report Date: Thu Dec 22 11:13:55 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 2.5[ppb-water]
Depth to ground water table: 9.5ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr^{-1}]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m^2]
Subsurface Foundation Area: 106[m^2] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.000456[cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009657

[1]Low Indoor Air Prediction: 0.06641 [$\mu g/m^3$] or 0.01218 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 3.019e-5

Best Estimate Indoor Air Prediction: 0.08810[$\mu g/m^3$] or 0.01616 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 4.004e-5

[2]High Indoor Air Prediction: 0.09307[$\mu g/m^3$] or 0.01707 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 4.230e-5

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT-Red Star Express PW-4
Report Date: Thu Dec 22 11:06:31 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 3500 [ppb-water]
Depth to ground water table: 10ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25 [hr^{-1}]
Building Mixing Height: 2.44 [m] Building Footprint Area: 100 [m^2]
Subsurface Foundation Area: 106 [m^2] Building Crack Ratio: 0.00038 [unitless]
Foundation Slab Thickness: 0.1 [m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.0004776 [cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009611

[1]Low Indoor Air Prediction: 91.46 [$\mu g/m^3$] or 16.77 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 0.04157

Best Estimate Indoor Air Prediction: 122.7 [$\mu g/m^3$] or 22.51 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 0.05579

[2]High Indoor Air Prediction: 130.0 [$\mu g/m^3$] or 23.85 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 0.05911

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT-Red Star Express PW-4
Report Date: Thu Dec 22 11:07:05 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 320 [ppb-water]
Depth to ground water table: 10ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25 [hr^{-1}]
Building Mixing Height: 2.44 [m] Building Footprint Area: 100 [m^2]
Subsurface Foundation Area: 106 [m^2] Building Crack Ratio: 0.00038 [unitless]
Foundation Slab Thickness: 0.1 [m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.0004776 [cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009611

[1]Low Indoor Air Prediction: 8.362 [$\mu g/m^3$] or 1.534 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 0.003801

Best Estimate Indoor Air Prediction: 11.22 [$\mu g/m^3$] or 2.058 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 0.005101

[2]High Indoor Air Prediction: 11.89 [$\mu g/m^3$] or 2.181 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 0.005405

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT-Red Star Express PW-9
Report Date: Thu Dec 22 11:09:41 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 4.2 [ppb-water]
Depth to ground water table: 9.5ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25 [hr^{-1}]
Building Mixing Height: 2.44 [m] Building Footprint Area: 100 [m^2]
Subsurface Foundation Area: 106 [m^2] Building Crack Ratio: 0.00038 [unitless]
Foundation Slab Thickness: 0.1 [m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.000456 [cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009657

[1]Low Indoor Air Prediction: 0.1116 [$\mu g/m^3$] or 0.02046 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 5.071e-5

Best Estimate Indoor Air Prediction: 0.1480 [$\mu g/m^3$] or 0.02714 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 6.727e-5

[2]High Indoor Air Prediction: 0.1564 [$\mu g/m^3$] or 0.02868 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 7.107e-5

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

INDOOR AIR SIMULATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: TNT-Red Star Express PW-9 7
Report Date: Thu Dec 22 11:11:06 EST 2005
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite_forward.htm
Type of sample: GROUND WATER Concentration = 26[ppb-water]
Depth to ground water table: 9.5ft +/- 1ft
Average soil/ground water temperature: 50F

CHEMICAL PROPERTIES
Chemical of Concern: 1,1,1-Trichloroethane CAS Number: 71556
Molecular Weight: 133.4 [g/mole] Henrys Constant: 0.3648888 [unitless]
Diffusivity in Air: 7.800e-2 [cm^2/sec] Diffusivity in Water: 8.800e-6 [cm^2/sec]
Unit Risk Factor: 0 [$(\mu g/m^3)^{-1}$] Reference Concentration: 2.2 [mg/m^3]

SOIL PROPERTIES
Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375 [m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES
Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr^{-1}]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m^2]
Subsurface Foundation Area: 106[m^2] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS
Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

JOHNSON & ETTINGER SIMULATION RESULTS
Effective Diffusion Coefficient (D^T_{eff}): 0.000456[cm^2/s]
Ground Water to Indoor Air Attenuation Factor (α_{GW}) = 0.00009657

[1]Low Indoor Air Prediction: 0.6907 [$\mu g/m^3$] or 0.1267 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 3.139e-4

Best Estimate Indoor Air Prediction: 0.9162[$\mu g/m^3$] or 0.1680 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 4.165e-4

[2]High Indoor Air Prediction: 0.9679[$\mu g/m^3$] or 0.1775 [ppbv]
Cancer Risk of this concentration: 0. Hazard Risk of this concentration: 4.399e-4

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for the subsurface to indoor-air pathway.

[1]"Low Prediction" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.