TRC
Customer-Focused Solutions

September 9, 2005

Mr. Gary D. Casper
New York Department of Environmental Conservation
Division of Solid and Hazardous Materials
625 Broadway, 9th Floor
Albany, New York, 12233

Re: Site Investigation Work Plan
Former Star Facility
Mountainville, New York

Dear Mr. Casper:

Enclosed please find the above-referenced Work Plan. The Work Plan has been revised in response to comments which you provided during our telephone conference call on September 7, 2005.

TRC is prepared to begin the field investigation immediately, but will await your approval of the enclosed Work Plan to proceed.

Please do not hesitate to contact me at (212) 221-7822 if you have any questions.

Very truly yours,
TRC ENGINEERS, INC.

David S. Glass, P.E.
Assistant Vice President

cc: N. Panayotou
W. Silveri

RECEIVED
SEP 12 2005
Bureau of Hazardous Waste & Radiation Management
Division of Solid & Hazardous Materials

TRC Engineers, Inc.

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New York State Department of Environmental Conservation
Division of Solid and Hazardous Materials
Bureau of Hazardous Waste and Radiation Management, 9th Floor
625 Broadway, Albany, New York 12233-7258
Phone: (518) 402-8594 • **FAX:** (518) 402-9025
Website: www.dec.state.ny.us

Denise M. Sheehan
Acting Commissioner

September 12, 2005

Mr. Samuel Kaufman
Cornwall Properties, LLC
5 Quickway Road
Monroe, New York 10950

Dear Mr. Kaufman:

Re: Site Investigation Work Plan - September 2005
Former Star Site - Mountainville, New York

The Department has reviewed the above referenced revised work plan. This work plan was submitted by TRC Engineers, Inc. (TRC), in response to the Department's letter to you dated June 30, 2005. Department comments on an original version of the work plan, dated August 2005, were discussed during a conference call with TRC on September 7, 2005. This final work plan satisfactorily addresses the Department's comments, is approved, and should be implemented immediately.

Per your request, we met with and worked directly with TRC staff to develop and finalize this work plan. However, as the Owner/Operator of the above referenced Site, Cornwall Properties, LLC is subject to New York State's Hazardous Waste Management Regulations. Specifically, under NYCRR Part 373-2.6(l), you are responsible for completing all necessary Corrective Measures for past releases at the Site, and for implementing corrective actions as necessary to protect human health and the environment.

The approved work plan specifically addresses potential human exposures via intrusion of subsurface vapors into the former manufacturing plant building and the on-site residence, which is located immediately to its east. Elevated levels of volatile organic compounds (VOCs), resulting from past releases of hazardous wastes, have been identified in the groundwater in proximity to both of these buildings.

The collected data will also provide further characterization of groundwater, soil and soil gas quality near and under the former manufacturing plant. Previous groundwater quality data, obtained from Monitoring Well MW-3, which is located immediately adjacent to the manufacturing building, have documented the presence of VOCs. The sources of these VOCs is/are not known but may be related to past hazardous waste storage and use within the building. Particularly likely is an area associated with the operation of a former solvent still and an oil water separator. This area is immediately upgradient of MW-3, and has been previously identified by the

Department as a Solid Waste Management Unit (SWMU) requiring further investigation. There are several other known areas of environmental concern remaining at this Site. These were outlined in the Department's July 23, 2002 letter to you.

The recent re-occupation of the two subject on-site buildings, has resulted in the potential for direct human exposure via the vapor intrusion pathway. Accordingly, this work plan must be implemented as soon as possible. The approved work schedule provides for field work to begin early next week, and for priority sample data return for the air samples. Please keep me advised of any changes to the schedule. If you have any questions, you can reach me at (518) 402-8594.

Sincerely,

/s/
Gary Casper
Senior Geologist

cc: D. Glass, TRC, Inc.

ecc: K Grzyb, Reg 3
J. Reidy, USEPA Region II
M. Ryan, DER
B. Callaghan, NYSDOH

New York State Department of Environmental Conservation
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Denise M. Sheehan
Acting
Commissioner

MEMORANDUM

TO: Gary Casper, Engineering Geology Section, Bureau of Hazardous Waste & Radiation Management

FROM: John Petiet, Chemistry & Laboratory Services Section, Bureau of Pesticides Management JP

SUBJECT: Site Investigation Work Plan and QAPP for the Former Star Facility, Mountainville, Orange County

DATE: September 6, 2005

I have reviewed the work plan and QAPP, dated, August 2005, for the above-referenced facility. Overall, the work plan is quite though I found a few deficiencies. My specific comments follow:

1. Table 1 of the work plan correctly states that the soil and groundwater samples will be analyzed for TCL VOCs. The reporting limits in Table 1a and 1b of the QAPP are fine, however, the list of compounds is not the list of 48 compounds that are the complete TCL for VOCs. The complete list is attached to this memo. Please correct.

2. There is no specific mention in the work plan if field duplicate samples will be collected and submitted "blind" to the lab. This may be a very useful QC check to perform, especially for the soil gas and groundwater samples. I would request that one sample location be collected in duplicate for these matrices.

3. On page 34 in section 8 of the QAPP, it states, "The laboratory may be required to report tentatively identified compounds (TICs) for the VOC; this will be requested by TRC on an as-needed basis." We believe this investigation warrants the reporting of TICs, if detected.

If you have any questions concerning my comments, please contact me via GroupWise or call me at (518) 402-8804.

Superfund Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)

	Volatiles	CAS Number	Quantitation Limits* Water µg/L	Low Soil µg/Kg	Med Soil µg/Kg	On Column (ng)
1.	Dichlorodifluoromethane	75-71-8	10	10	1200	(50)
2.	Chloromethane	74-87-3	10	10	1200	(50)
3.	Bromomethane	74-83-9	10	10	1200	(50)
4.	Vinyl chloride	75-01-4	10	10	1200	(50)
5.	Chloroethane	75-00-3	10	10	1200	(50)
6.	Trichlorofluoromethane	75-69-4	10	10	1200	(50)
7.	1,1-Dichloroethene	75-35-4	10	10	1200	(50)
8.	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	10	10	1200	(50)
9.	Acetone	67-64-1	10	10	1200	(50)
10.	Carbon Disulfide	75-15-0	10	10	1200	(50)
11.	Methyl Acetate	79-20-9	10	10	1200	(50)
12.	Methylene chloride	75-09-2	10	10	1200	(50)
13.	trans-1,2-Dichloroethene	156-60-5	10	10	1200	(50)
14.	Methyl tert-Butyl Ether	1634-04-4	10	10	1200	(50)
15.	1,1-Dichloroethane	75-35-3	10	10	1200	(50)
16.	cis-1,2-Dichloroethene	156-59-2	10	10	1200	(50)
17.	2-Butanone	78-93-3	10	10	1200	(50)
18.	Chloroform	67-66-3	10	10	1200	(50)
19.	1,1,1-Trichloroethane	71-55-6	10	10	1200	(50)
20.	Cyclohexane	110-82-7	10	10	1200	(50)
21.	Carbon tetrachloride	56-23-5	10	10	1200	(50)
22.	Benzene	71-43-2	10	10	1200	(50)
23.	1,2-Dichloroethane	107-06-2	10	10	1200	(50)
24.	Trichloroethene	79-01-6	10	10	1200	(50)
25.	Methylcyclohexane	108-87-2	10	10	1200	(50)
26.	1,2-Dichloropropane	78-87-5	10	10	1200	(50)
27.	Bromodichloromethane	75-27-4	10	10	1200	(50)
28.	cis-1,3-Dichloropropene	10061-01-5	10	10	1200	(50)
29.	4-Methyl-2-pentanone	108-10-1	10	10	1200	(50)
30.	Toluene	108-88-3	10	10	1200	(50)
31.	trans-1,3-Dichloropropene	10061-02-6	10	10	1200	(50)
32.	1,1,2-Trichloroethane	79-00-5	10	10	1200	(50)
33.	Tetrachloroethene	127-18-4	10	10	1200	(50)
34.	2-Hexanone	591-78-6	10	10	1200	(50)
35.	Dibromochloromethane	124-48-1	10	10	1200	(50)

Superfund Target Compound List (TCL) and
Contract Required Quantitation Limits (CRQL)

	Volatiles (cont.)	CAS Number	Water µg/L	Low Soil µg/Kg	Med Soil µg/Kg	On Column (ng)
			Quantitation Limits*			
36.	1,2-Dibromoethane	106-93-4	10	10	1200	(50)
37.	Chlorobenzene	108-90-7	10	10	1200	(50)
38.	Ethyl Benzene	100-41-4	10	10	1200	(50)
39.	Total Xylenes	1330-20-7	10	10	1200	(50)
40.	Styrene	100-42-5	10	10	1200	(50)
41.	Bromoform	75-25-2	10	10	1200	(50)
42.	Isopropylbenzene	98-82-8	10	10	1200	(50)
43.	1,1,2,2-Tetrachloroethane	79-34-5	10	10	1200	(50)
44.	1,3-Dichlorobenzene	541-73-1	10	10	1200	(50)
45.	1,4-Dichlorobenzene	106-46-7	10	10	1200	(50)
46.	1,2-Dichlorobenzene	95-50-1	10	10	1200	(50)
47.	1,2-Dibromo-3-chloropropane	96-12-8	10	10	1200	(50)
48.	1,2,4-Trichlorobenzene	120-82-1	10	10	1200	(50)

* Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, as required by the protocol, will be higher.

SITE INVESTIGATION WORK PLAN

Former Star Facility
Mountainville, New York

Prepared by:

TRC Engineers, Inc.
1430 Broadway, 10th Floor
New York, New York

TRC Project No. 48715-000S-00101

September 2005

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1.0 INTRODUCTION

The Former Star Facility consists of an approximately 200,000 square foot warehouse and a small residential structure on 37 acres of land in Orange County, in the hamlet of Mountainville, Town of Cornwall, New York (the "Site"). Currently, the Site is primarily used to warehouse various dry goods manufactured elsewhere.

As a result of Site use by a previous occupant, the Site has been listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites. According to the New York State Department of Environmental Conservation (NYSDEC), chlorinated solvents represent the principal contaminants of concern, potentially impacting soil and groundwater at the Site. Recently, NYSDEC has expressed concern that volatile organic compounds (VOCs) in soil and groundwater may pose a potential health risk to building occupants (NYSDEC correspondence to Samuel Kaufman, dated June 30, 2005).

Thus, the overall goal of this Site Investigation (SI) Work Plan will be to collect data to evaluate whether VOCs in sub-slab soil vapor, indoor air, soil and/or groundwater pose a risk to building occupants to the satisfaction of NYSDEC and the New York State Department of Health (NYSDOH). This SI Work Plan has been prepared to satisfy NYSDEC requirements for the Site, and presents methodologies consistent with the February 2005 NYSDOH draft guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (NYSDOH Guidance Document).

TRC will prepare and submit a Site Investigation Report documenting the findings and conclusions of the Site Investigation. If warranted the final report will present a conceptual design for the mitigation of sub-slab vapors and/or recommendations for additional testing to support appropriate remediation for the continued occupancy of the buildings at the Site.

2.0 SITE DESCRIPTION

2.1 Site Location and Surrounding Land Use

The Former Star Facility encompasses approximately 37 acres in Orange County, Mountainville, New York. A slab on grade, single-story warehouse and a small residential structure are located on the property. The property is bounded by the New York State Thruway to the west, Woodbury Creek to the east, Creamery Road to the north, and farmland to the south. Figure 1 shows the Site location.

Currently, the on-site warehouse is utilized to store various dry goods manufactured elsewhere. In general, the surrounding land use can be characterized as a mixture of woodlands, agricultural and rural.

2.2 Site History/Past Use

The following summary of the history and past uses of the Site is based on a review of the Comprehensive RCRA Facility Investigation Work Plan, prepared by Eder Associates, dated January 1995, and available information on the NYSDEC database for Inactive Hazardous Waste Disposal Sites.

The former occupant and owner, the Star Expansion Company (Star), began operations in 1954 and manufactured a broad line of fasteners for residential, commercial and building industries. In 1997, Star filed for bankruptcy and abandoned the Site. The Site was then resold, out of bankruptcy, to Cornwall Properties, LLC.

Past manufacturing activities associated with Star included metal cold forming, die casting, plastic injection molding, heat treating, zinc plating, assembly, and packaging. Off-site supply wells provided water for drinking and manufacturing. An on-site plant treated industrial and sanitary wastewater and discharged directly to Woodbury Creek pursuant to a NYSDEC SPDES permit.

As a result of previous Site use by Star, numerous environmental studies have been conducted between 1985 and 1997. These studies identified elevated levels of VOCs in the soil and groundwater at the Site, and the NYSDEC has indicated that VOCs are presently the primary site contaminants of concern. Based on available information, under a Consent Order with the NYSDEC, Star completed remediation of several areas of the Site, although the nature and extent of this work may not have been fully documented.

3.0 SITE INVESTIGATION SCOPE AND TASKS

Consistent with NYSDEC requirements, the scope of work for this Site Investigation Work Plan (SIWP) includes the following:

- Collection and analysis of sub-slab vapor, indoor air, soil and groundwater samples from three locations in the warehouse,
- Collection and analysis of sub-slab vapor and indoor air samples from one location in the residential home at the site, and
- Repair and redevelopment or (if repair is not practical) replacement of monitoring well MW-3 and collection and analysis of one groundwater sample at this location.

The site-specific sampling techniques and analytical methods to be used for this Site Investigation are presented in the QAPP in Appendix A. The site investigation activities will be performed in accordance with TRC's site-specific Health and Safety Plan (HASP), which is presented in Appendix B. Community air monitoring will be performed during invasive work in accordance with the New York State Department of Health (NYSDOH) generic community air monitoring plan (GCAMP). A copy of the GCAMP is presented in Appendix C.

A summary of the sampling program is presented in Table 1 and each component of the SI is described below. Prior to the sub-slab vapor and indoor air sampling, an inspection for potential sources (e.g., open paint thinner container) of airborne VOCs will be performed. Efforts will be made to eliminate any such sources an ample amount of time prior to sampling

3.1 Task 1 – Sub-slab Vapor Sampling and Analysis

As shown in Figure 2, sub-slab vapor samples will be collected at three locations in the warehouse building and one location in the residential building. The sub-slab vapor sampling will be performed in accordance with the NYSDOH Guidance Document. The sub-slab samples will be collected by drilling an approximately 1½-inch diameter hole through the concrete floor of the warehouse and the basement floor of the residence.

Dedicated polyethylene tubing will be installed no deeper than two inches below the sub-slab, and the annulus between the floor and the tubing will be sealed with modeling clay.

Prior to sample collection the integrity of the seal for each sampling point will be tested using a tracer gas. Helium will be released above the sampling point within a containment vessel (e.g., inverted 5-gallon pail) while the sample tubing is connected to a MARK Model 9822 helium detector.

After the integrity of each sampling point has been verified, one to three volumes of sub-slab vapor will be purged utilizing a 60-milliliter syringe. When purging is complete, sub-slab vapor samples will be collected from each location utilizing separate six-liter Summa® canisters equipped with a regulator to control sample collection flow rate to 0.2 liters per minute or less.

The sub-slab vapor samples as well as a trip blank will be delivered via overnight mail to Air Toxics Ltd. in Folsom, California for analysis for VOCs by United States Environmental Protection Agency (USEPA) Method TO-15.

3.2 Task 2 – Indoor Air Sampling and Analysis

The indoor air samples will be collected at the same locations and time as the sub-slab vapor samples. The indoor air sampling will be performed in accordance with the NYSDOH Guidance Document. Indoor air samples will be collected utilizing six-liter Summa® canisters and allowing them to fill with indoor air. Sample collection flow rate will be controlled, using a regulator, to 0.2 liters per minute or less. The indoor air samples will be collected from approximately 3 to 5 feet above the floor slab in the "breathing zone". The indoor air samples will be delivered via overnight mail to Air Toxics Ltd. for analysis for VOCs by USEPA Method TO-15.

Additionally during sub-slab vapor and indoor air sampling, one outdoor air sample will be collected at an upwind location outside of the building. The outdoor air sampling will be performed in accordance with the NYSDOH Guidance Document. The outdoor air sample will be collected and analyzed as described above for the indoor air samples.

3.3 Task 3 – Soil Sampling and Analysis

As shown in Figure 2, soil sampling will be performed at three locations in the warehouse. A hollow-stem auger drill rig will be utilized to advance soil borings to approximately 10 feet below the groundwater table (the borings will be converted to permanent monitoring wells - see Task 4). Split spoon soil samples will be collected continuously to the bottom of each borehole, screened with a photoionization detector (PID) and inspected for indications of contamination (e.g., staining, odors, etc.). Geologic descriptions of the soil and field screening results will be recorded in field logs.

From each boring, the soil sample collected above the water table that exhibits the highest potential for contamination will be selected for analysis. If there are no indications of contamination in a boring, the sample closest to the water table will be selected for analysis. The soil sample selected from each borehole will be analyzed for Target Compound List (TCL) VOCs.

3.4 Task 4 – Groundwater Investigation

The overall objective of this task will be to characterize groundwater conditions at the three locations of concern in the warehouse and in existing monitoring well MW-3. The locations of the proposed new monitoring wells, as well as MW-3, are shown on Figure 2. Monitoring well MW-3 will be repaired and re-developed, or, if repair is found to be impractical, the existing well will be abandoned and a new replacement well will be installed approximately 10 feet away. The following subsections describe the methods which will be followed for installing and sampling the groundwater monitoring wells.

3.4.1 Groundwater Monitoring Well Construction and Development

Well construction procedures are described in detail in Section 4.4 of the QAPP. Groundwater is expected to be encountered between 10 and 12 feet below ground surface (bgs), based on water table elevation measurements in MW-3. Therefore, groundwater monitoring wells are expected to be approximately 20 feet deep.

To collect representative groundwater samples, previously installed soil borings will be converted into permanent two-inch diameter monitoring wells. Groundwater monitoring wells will be constructed of threaded Schedule 40 PVC well casing and 10-slot well screen. The wells will be screened at a minimum of 2 feet above the water table and 8 feet below the water table, if the depth to water and surface elevation permits. Solid PVC riser with a locking well cap, attached to the well screen and a protective surface casing will be installed and a measuring point will be marked on the north side of each PVC well riser. Clean silica sand, Morie No. 1, or equivalent, will be placed in the annular space around the well to a minimum of one foot above the top of the well screen, two feet being optimal. A two-foot bentonite seal will be placed above the sand pack. Well construction diagrams will be prepared for each well.

Following installation, the groundwater monitoring wells will be developed, using a submersible pump (or equivalent) until the water is reasonably free of turbidity and field readings (pH, conductivity, temperature, and dissolved oxygen) sufficiently stabilize. Fifty nephelometric turbidity units (NTUs) or less will be the turbidity goal, but not an absolute value. The wells will be developed aggressively to remove fines from the formation and sand pack. The wells will be allowed to equilibrate for 7 days prior to sampling. The volume of water removed, the well development time, and field instrument readings will be recorded in the logbook.

3.4.2 Groundwater Sampling

Prior to sampling, when opening each monitoring well, the concentration of ionizable vapors in the headspace will be measured using a PID and water level measurements will be recorded using an electronic oil-water interface probe. The depth to product (if present), depth to water, and the total well depth will be measured from the top of the marked PVC casings. (If measurable product is encountered in any well, a groundwater sample will not be collected for analysis.) The volume of water in the well will be calculated so that an estimate of the time required to purge the well can be made and a minimum of three well volumes are purged.

Before sampling, the wells will be purged utilizing a low-flow peristaltic pump and dedicated polyethylene tubing connected to a flow cell. Very low purging rates are proposed, approximately 100 to 500 milliliters per minute, minimizing suspension of particulate matter in the well. It is anticipated that no more than three well volumes will be purged in order for turbidity to reach a minimum and the other parameters to stabilize. Ideally, pumping rates will be at a rate so that no draw-down of the groundwater level occurs (i.e., pumping rate is less than recharge rate).

Groundwater from each well will be purged until groundwater parameters have stabilized. A turbidity level of 50 NTUs or less is the well purging goal. Other field parameters including temperature, conductivity, pH, and dissolved oxygen (DO) will also be monitored. Field measurements will be recorded during and after purging, and before sampling. Prior to sampling, field parameters should generally be within ±10 percent for two consecutive readings, one minute apart. During purging, TRC will actively monitor and track the volume of water purged and the field parameter readings. Data will be recorded in the field logbook.

Once groundwater conditions have stabilized and groundwater levels have recovered, representative groundwater samples will be collected using the appropriate VOC sampling method described in Section 4.4.4 of the QAPP. Groundwater samples will be analyzed for TCL VOCs.

3.5 Waste Management

Investigation derived wastes (IDW) are waste materials that will be generated during the Site Investigation. The IDW will include soil, groundwater, decontamination liquids, and personnel protective equipment (PPE).

Excess soil from borings converted to permanent monitoring wells, groundwater generated during development and sampling from permanent wells and decontamination liquids from cleaning of sampling equipment will be placed into U.S. Department of Transportation (DOT) - approved drums. These materials will be disposed of at an appropriate off-site disposal facility based on sampling results or, if necessary, waste characterization sampling results. If free of visible contamination, disposable PPE and sampling equipment (scoops, gloves, rope, etc.) will be placed in heavy-duty plastic bags and disposed as municipal solid waste.

3.6 Site Investigation Report

An SI Report will be prepared after the completion of the field activities. The SI Report will present the results of the investigation, including documentation of field activities, notation of any deviations from the work plan, a presentation of the data collected, interpretation of the data, and conclusions and recommendations appropriate to the site. If warranted by the results of the investigations, the final report also will present a conceptual approach for mitigation of sub-slab vapors and/or recommendations for additional testing to support appropriate remediation.

4.0 PROJECT SCHEDULE

Presented below are estimated completion dates for key milestones associated with implementation of the Site Investigation.

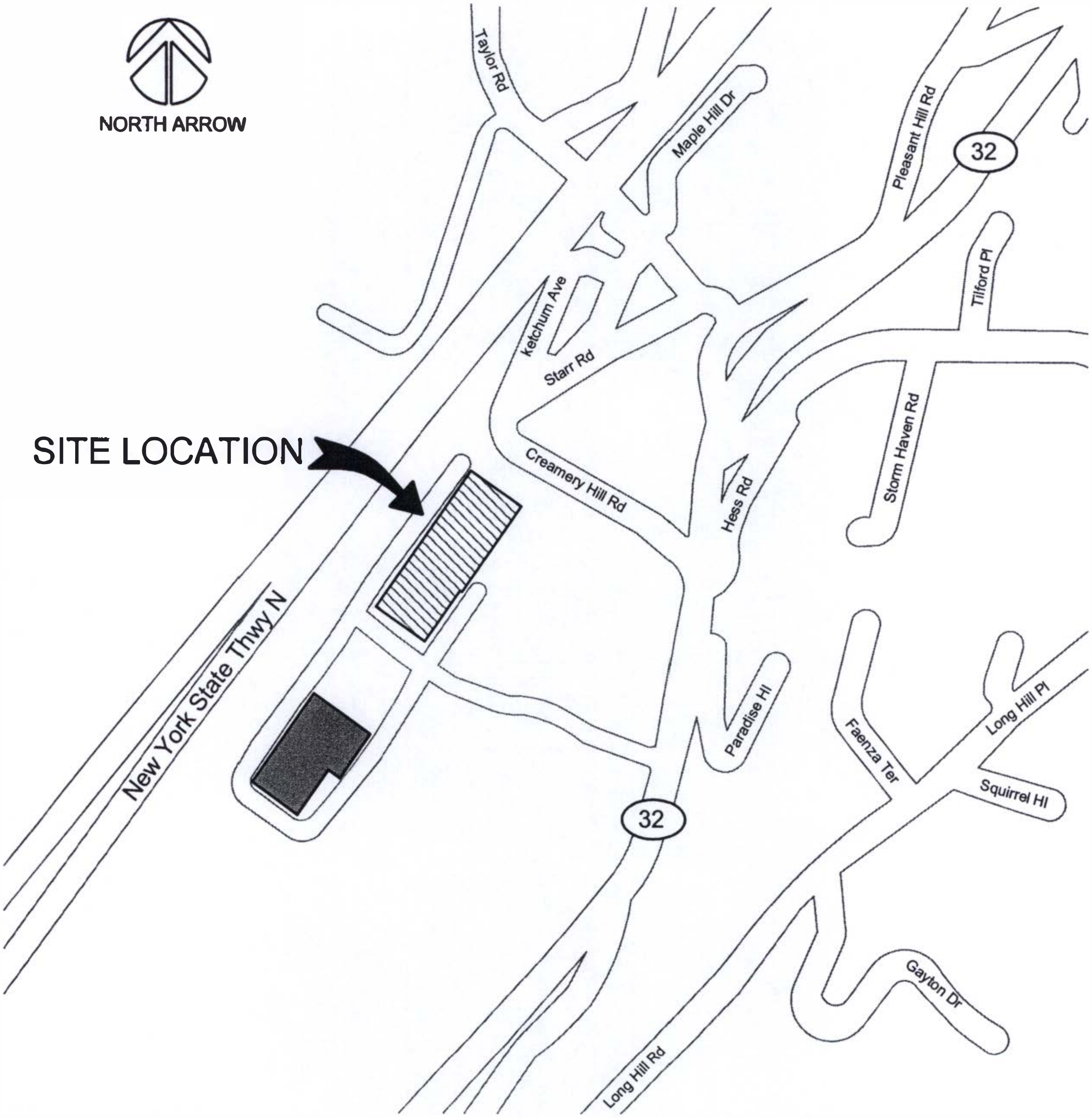
SCHEDULE MILESTONE	ESTIMATED COMPLETION DATE
Submit Work Plan to NYSDEC/ NYSDOH	September 2, 2005
NYSDEC/NYSDOH Approval of Work Plan	September 15, 2005
Complete Field Investigations	October 6, 2005
Laboratory Analysis Completed	October 20, 2005
Submit SI Report to NYSDEC	November 10, 2005

TABLE

TABLE 1
SAMPLING SUMMARY

Program Element	Environmental Media	Sample Type	Equipment	Number of Samples for Analysis	Parameters
Sub-slab Vapor Sampling	Sub-slab Vapor	Discrete sample from sub-slab vapor probe	SUMMA canisters and disposable polyethylene tubing	4	TO-15 VOCs
Indoor Air Sampling	Indoor Air	Discrete sample at each subslab vapor sampling location, plus upwind outdoor air location	SUMMA canisters and disposable polyethylene tubing	5	TO-15 VOCs
Soil Sampling	Soil	Discrete sample, from depth exhibiting highest field contamination or, if no evidence of contamination, sample above groundwater table	Split spoon	3	TCL VOCs
Groundwater Sampling	Groundwater	Water in well after purging well	Disposable polyethylene bailer	4	TCL VOCs
Trip Blanks	Distilled Water	Laboratory-prepared VOA vile	Sample supplied by laboratory	1	TCL VOCs
	Air	Laboratory-prepared Summa canister	Summa canister supplied by laboratory	1	TO-15 VOCs
Equipment Blanks	Distilled Water	Distilled water poured over soil sampling equipment prior to sample collection	Decontaminated split spoon	1	TCL VOCs
Matrix Spike/Matrix Spike Duplicates	Groundwater	Groundwater split sample	Disposable polyethylene bailer	1MS & 1 MSD	TCL VOCs
	Soil	Soil split sample	Split spoon	1MS & 1 MSD	TCL VOCs

FIGURES



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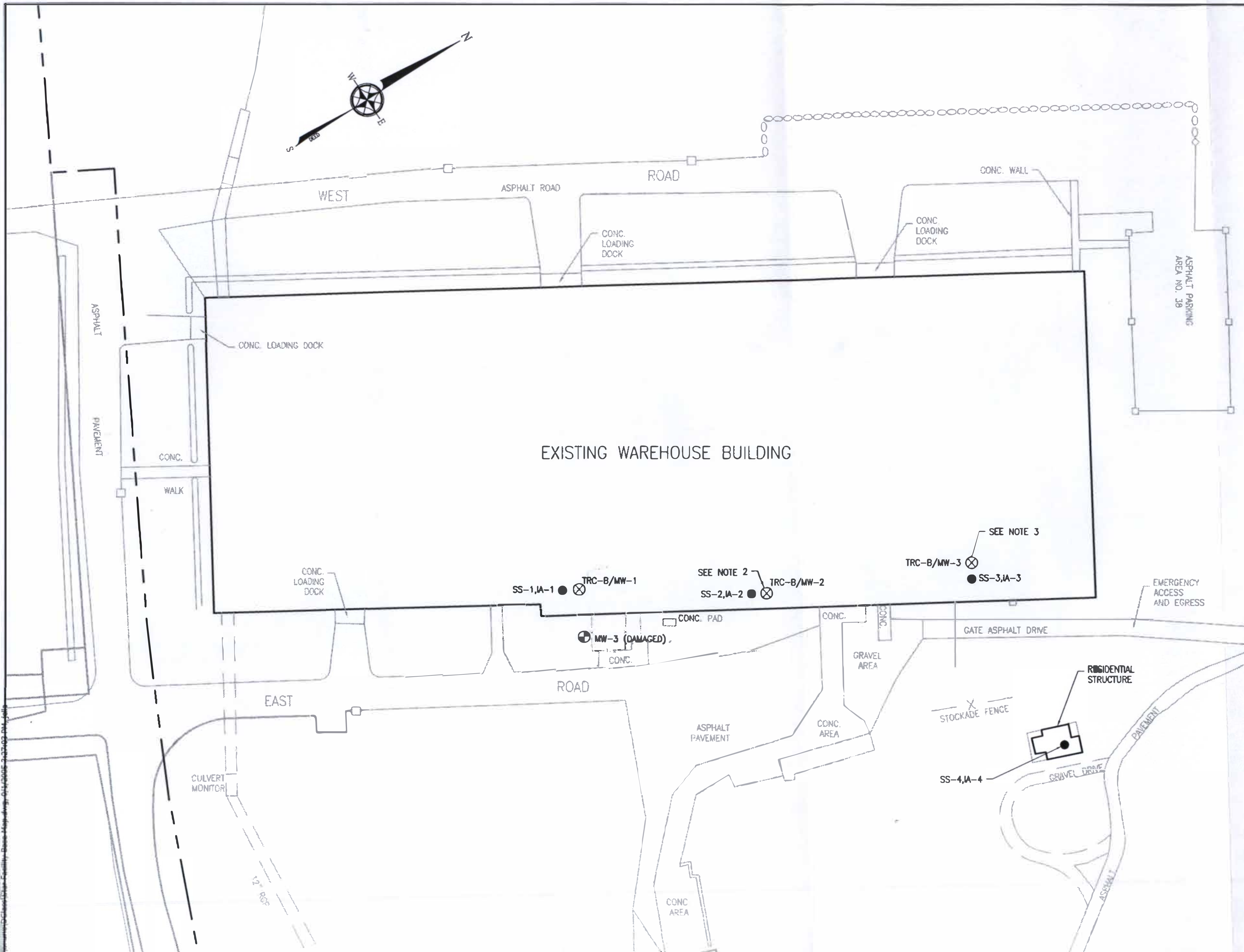
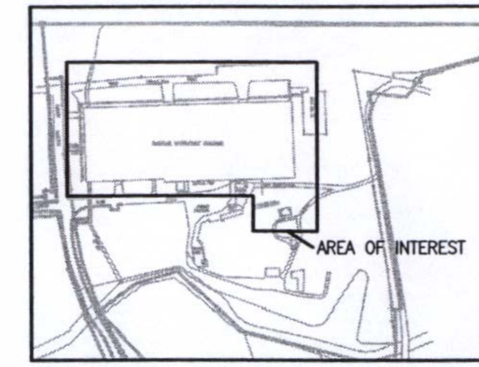
FORMER STAR FACILITY
SITE LOCATION MAP

FIGURE 1

AUGUST 2005

I:\Shane\DGlass\Site Location Map.dwg, 8/29/2005 12:47:25 PM, jella





KEY PLAN

LEGEND

— - —	PROPERTY BOUNDARY
⊗ B/MW-X	PROPOSED TRC SOIL BORING AND GROUNDWATER MONITORING WELL LOCATION
MW-X	EXISTING MONITORING WELL
● SS-X,IA-X	PROPOSED SUB-SLAB VAPOR SAMPLE POINT AND INDOOR AIR SAMPLE POINT

NOTES

1. PROPOSED SAMPLING LOCATIONS SHOWN ARE APPROXIMATE
2. BORING/MONITORING WELL LOCATION TRC-B/MW-2 CORRESPONDS TO THE FORMER AREA OF THE SOLVENT RECOVERY STILL/OIL WATER SEPARATOR
3. BORING/MONITORING WELL LOCATION TRC-B/MW-3 CORRESPONDS TO THE FORMER CONTAINER STORAGE AREA. DUE TO ACCESS CONSTRAINTS IT MAY BE NECESSARY TO RELOCATE THIS BORING & WELL OUTSIDE OF THE BUILDING FOOTPRINT.
4. SITE FIGURE IS BASED UPON SCANNED IMAGE OF A SURVEY MAP PREPARED BY JOHN A. McGLOIN, JULY 25, 1996.

80 0 80 160

SCALE: 1"= 80'
PAPER SIZE: 11" X 17"

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PROPOSED SUBSLAB VAPOR, INDOOR AIR AND SOIL/GROUNDWATER SAMPLING LOCATIONS
FORMER STAR FACILITY
MOUNTAINVILLE, NEW YORK

FIGURE 2

AUGUST 2005

APPENDIX A

QUALITY ASSURANCE PROJECT PLAN (QAPP)

QUALITY ASSURANCE PROJECT PLAN (QAPP)

Former Star Facility
Mountainville, New York

Prepared by:

TRC Engineers, Inc.
1430 Broadway, 10^{th} Floor
New York, New York

TRC Project No. 48715-000S-00101

September 2005

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EXHIBITS

1. INTRODUCTION

This Quality Assurance Project Plan presents the organization, objectives, planned activities, and specific quality assurance/quality control (QA/QC) procedures associated with investigation and, if applicable, remediation Work Plans associated with current building occupancy of the Former Star Facility in Mountainville, New York. Task-specific addenda to this Plan will be provided for future investigations or remediation elements at the Site.

The Plan will describe specific protocols for field sampling, sampling handling and storage, chain-of- custody, laboratory analysis, and data handling and management. Preparation of the Plan was based on EPA Quality Assurance Project Plan (QAPP) guidance documents, including:

- *EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5, March 2001),*
- *Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH February 2005), and*
- *Guidance for Quality Assurance Project Plans (EPA QA/G-5, December 2002).*

Each task-specific Plan addendum will accompany a task-specific work plan that will provide a description of the site and will list the project quality objectives and outline the proposed samples and analytical parameters. The data generated from the analysis of samples will be used to determine the extent of contamination, identify impacted targets, and to compare the results of the remedial actions to site-specific cleanup goals. A list of the potential parameters to be analyzed, including their respective quantitation limits (QLs), and data quality levels (DQLs), is shown in **Tables 1a**, **1b** and **1c**.

2. PROJECT ORGANIZATION AND RESPONSIBILITY

TRC will coordinate and manage the Former Star Facility sampling and analysis program, data reduction, QA/QC, data validation, analysis, and reporting. TRC will direct the sampling activities and coordinate laboratory and drilling activities. The TRC Project QA officer will be Ms. Elizabeth Denly.

Ms. Elizabeth Denly, TRC's QA Chemist, will insure that the QA/QC plan is implemented and will oversee data validation. Ms. Denly will provide oversight and technical support for the sampling and analytical procedures followed in this project. This individual has the broad authority to approve or disapprove project plans, specific analyses, and final reports. The TRC Project QA Officer is independent from the data generation activities. In general, the QA officer will be responsible for reviewing and advising on all QA/QC aspects of this program.

The laboratory for soil and groundwater samples will be Chemtech of Mountainside, New Jersey. Chemtech is a New York State Department of Health ELAP certified laboratory. The laboratory will communicate directly with TRC regarding the analytical results and reporting. Chemtech will be responsible for providing all labels, sample jars, field blank water, trip blanks, shipping coolers, and laboratory documentation.

The laboratory for sub-slab vapor and ambient air samples will be Air Toxic LTD., of Folsom, CA. The laboratory will communicate directly with TRC regarding the analytical results and reporting. Air Toxic will be responsible for providing all 6 liter Summa® canisters, regulators and laboratory documentation.

3. QA OBJECTIVES FOR DATA MANAGEMENT

Analytical data will be provided by the laboratory using the New York State Analytical Services Protocol (ASP) Category B deliverable format.

Analytical measurements will be made so that the results are representative of the media sampled (soil, groundwater, sub-slab vapor and ambient air) and the conditions measured. Data will be reported in consistent dry weight units for solid samples (i.e., µg/kg and/or mg/kg), in µg/L or mg/L for aqueous samples and $\mu g/m^3$ for sub-slab vapor and indoor air samples. **Table 2** presents the proposed samples, sampling and analytical parameters, analytical methods, sample preservation requirements and containers for the Former Star Facility.

Quantitation Limits (QLs) are laboratory-specific and reflect those values achievable by the laboratory performing the analyses. Data Quality Levels (DQLs) are those reporting limits required to meet the objectives of the program (i.e., program action levels, cleanup standards, etc.). Data Quality Objectives (DQOs) define the quality of data and documentation required to support decisions made in the various phases of the data collection activities. The DQOs are dependent on the end uses of the data to be collected and are also expressed in terms of objectives for precision, accuracy, representativeness, completeness, and comparability.

The analytical methods to be used at this site provide the highest level of data quality and can be used for purposes of risk assessment, evaluation of remedial alternatives and verification that cleanup standards have been met. However, in order to ensure that the analytical methodologies are capable of achieving the DQOs, measurement performance criteria have been set for the analytical measurements in terms of accuracy, precision, and completeness.

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting which will provide results that are scientifically valid, and the levels of which are sufficient to meet DQOs. Specific procedures for sampling, chain of custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, and corrective action are described in other sections of this Plan.

Tables 3a, **3b** and **3c** present the precision and accuracy requirements for each parameter to be analyzed. For quantitation limits for parameters associated with soil samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits listed in the TCL/TAGM guidance.

For quantitation limits for parameters associated with groundwater samples, the laboratory will be required to attempt to meet or surpass the parameter-specific limits for groundwater from the Division of Water Technical and Operational Guidance Series (1.1.1), June 1998 (TOGS) Ambient Water Quality Standards and Guidance Values or the TAGM Recommended Groundwater Standards/Criteria. It should be noted that the TOGS standards were first used to develop DQLs for groundwater. When TOGS standards did not exist for an analyte of interest, the TAGM groundwater standards were used. In certain instances, if the TOGS or TAGM criteria are not achievable due to analytical limitations, the laboratory will report the lowest possible quantitation limit (See Table 1b for affected analytes).

For quantitation limits for parameters associated with subslab vapor and indoor air samples, the DQLs correspond to background indoor values established by NYSDOH ("Background Indoor/Outdoor Air Levels of Volatile Organic Compounds in Homes Sampled by the New York State Department of Health, 1989-1996, 1997") or, in the case of methylene chloride, tetrachloroethene and trichloroethene, to established guidance values established by NYSDOH. See Table 1c for compounds, quantitation limits, and applicable DQLs for the subslab vapor and indoor air samples.

The QA objectives are defined as follows:

- ***Accuracy*** is the closeness of agreement between an observed value and an accepted reference value. The difference between the observed value and the reference value includes components of both systematic error (bias) and random error.

  Accuracy in the field is assessed through the adherence to all field instrument calibration procedures, sample handling, preservation, and holding time requirements, and through the collection of equipment blanks prior to the collection of samples for each type of equipment being used (e.g., split spoons, groundwater sampling pumps).

  The laboratory will assess the overall accuracy of their instruments and analytical methods (independent of sample or matrix effects) through the measurement of "standards," materials of accepted reference value. Accuracy will vary from analysis to analysis because of individual sample and matrix effects. In an individual analysis, accuracy will be measured in terms of blank results, the percent recovery (%R) of surrogate compounds in organic analyses, or %R of spiked compounds in matrix spikes (MSs), matrix spike duplicates (MSDs) and/or laboratory control samples (LCSs). This gives an indication of expected recovery for analytes tending to behave chemically like the spiked or surrogate compounds. Tables 3a and 3b summarize the laboratory accuracy requirements.

- ***Precision*** is the agreement among a set of replicate measurements without consideration of the "true" or accurate value: i.e., variability between measurements of the same material for the same analyte. Precision is measured in a variety of ways including statistically, such as calculating variance or standard deviation.

  Precision in the field is assessed through the collection and measurement of field duplicates (one extra sample in addition to the original field sample). Precision will be measured through the calculation of relative percent differences (RPDs). The resulting information will be used to assess sampling and analytical variability. Field duplicate RPDs must be ≤50 for soil samples and ≤30 for aqueous samples. These criteria apply only if the sample and/or duplicate results are >5x the quantitation limit; if both results are ≤5x the quantitation limit, the criterion will be doubled.

  Precision in the laboratory is assessed through the calculation of RPD for duplicate samples. For organic analyses, laboratory precision will be assessed through the analysis of MS/MSD samples and field duplicates. For the inorganic analyses, laboratory precision will be assessed through the analysis of matrix duplicates and field duplicates. MS/MSD samples or matrix duplicates will be performed at a frequency of one per twenty investigative samples per matrix per parameter. **Tables 3a, 3b** and **3c** summarize the laboratory precision requirements.

- ***Completeness*** is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. "Normal conditions" are defined as the conditions expected if the sampling plan was implemented as planned.

  Field completeness is a measure of the amount of (1) valid measurements obtained from all the measurements taken in the project and (2) valid samples collected. The field completeness objective is greater than 90 percent.

  Laboratory completeness is a measure of the amount of valid measurements obtained from all valid samples submitted to the laboratory. The laboratory completeness objective is greater than 95 percent.

- ***Representativeness*** is a qualitative parameter which expresses the degree to which data accurately and precisely represents either a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. To ensure representativeness, the sampling locations have been selected to provide coverage over a wide area and to highlight potential trends in the data.

Representativeness is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed and that proper sampling, sample handling, and sample preservation techniques are used.

Representativeness in the laboratory is ensured by using the proper analytical procedures, appropriate methods, and meeting sample holding times.

- ***Comparability*** expresses the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the Work Plans and QAPP are followed and that proper sampling techniques are used. Maximization of comparability with previous data sets is expected because the sampling design and field protocols are consistent with those previously used.

  Comparability is dependent on the use of recognized EPA or equivalent analytical methods and the reporting of data in standardized units. Laboratory procedures are consistent with those used for previous sampling efforts.

Table 1a
Chemical Parameters, Quantitation Limits and Data Quality Levels for Soil Samples
Former Star Facility

Parameter	QL	DQL[1]
Volatile Organic Compounds (µg/kg) –TCL		
Acetone	5.0	200
Benzene	5.0	60
Bromochloromethane	5.0	NS
Bromodichloromethane	5.0	NS
Bromomethane	5.0	NS
2-Butanone	25	300
Carbon Disulfide	5.0	2,700
Carbon Tetrachloride	5.0	600
Chlorobenzene	5.0	1,700
Chloroethane	5.0	1,900
Chloroform	5.0	300
Chloromethane	5.0	NS
Cyclohexane	5.0	NS
Dibromochloromethane	5.0	NS
1,2-Dibromo-3-chloropropane	5.0	NS
1,2-Dibromomethane	5.0	NS
1,2-Dichlorobenzene	5.0	7,900
1,3-Dichlorobenzene	5.0	1,600
1,4-Dichlorobenzene	5.0	8,500
1,1-Dichloroethane	5.0	200
1,2-Dichloroethane	5.0	100
1,1-Dichloroethene	5.0	400
Trans-1,2-Dichloroethene	5.0	300
1,2-Dichloropropene	5.0	NS
1,3-Dichloropropane	5.0	300
Trans-1,3-Dichloropropene	5.0	NS
Ethylbenzene	5.0	5,500
Freon 113	5.0	6,000
2-Hexanone	5.0	NS
Methyl Acetate	5.0	NS
Methylene chloride	5.0	100
Methylcyclohexane	5.0	NS
4-Methyl-2-pentanone	25	1,000
Styrene	5.0	NS
Tetrachloroethene	5.0	1,400
1,1,1-Trichloroethane	5.0	800
1,1,2,2-Tetrachloroethane	5.0	600
1,2,3-Trichlorobenzene	5.0	NS

Table 1a
Chemical Parameters, Quantitation Limits and Data Quality Levels for Soil Samples
Former Star Facility

Parameter	QL	DQL[1]
1,2,3-Trichloropropane	5.0	400
1,2,4-Trichlorobenzene	5.0	3,400
Toluene	5.0	1,500
Trichloroethene	5.0	700
Trichlorofluoromethane	5.0	NS
Vinyl chloride	5.0	200
Xylenes	5.0	1,200
Isopropylbenzene	5.0	5,000
n-Propylbenzene	5.0	14,000
p-Isopropyltoluene	5.0	11,000
1,2,4-Trimethylbenzene	5.0	13,000
1,3,5-Trimethylbenzene	5.0	3,300
n-Butylbenzene	5.0	18,000
sec-Butylbenzene	5.0	25,000
t-Butylbenzene	5.0	100
MTBE	5.0	120

[1] DQL based on TAGM Recommended Soil Cleanup Objectives (January 24, 1994) unless otherwise specified
**** = Detection limits will vary depending upon matrix interferences and the signal-to-noise ratio for each congener.**
QL=Quantitation Limit
DQL=Data Quality Level
NS=No standard

Table 1b
Chemical Parameters, Quantitation Limits and Data Quality Levels for Groundwater Samples - Former Star Facility

Parameter	QL	DQL[1]
Volatile Organic Compounds (µg/L) –TCL		
Acetone	1.0	50
Benzene	1.0	1
Bromochloromethane	1.0	5
Bromodichloromethane	1.0	50
Bromomethane	1.0	5
2-Butanone	5.0	50
Carbon Disulfide	1.0	50[2]
Carbon Tetrachloride	1.0	5
Chlorobenzene	1.0	5
Chloroethane	1.0	5
Chloroform	1.0	7
Chloromethane	1.0	5
Cyclohexane	1.0	NS
Dibromochloromethane	1.0	50
1,2-Dibromo-3-chloropropane	1.0	0.04
1,2-Dibromomethane	1.0	0.0006
1,2-Dichlorobenzene	1.0	3
1,3-Dichlorobenzene	1.0	3
1,4-Dichlorobenzene	1.0	3
1,1-Dichloroethane	1.0	5
1,2-Dichloroethane	1.0 MDL	0.6
1,1-Dichloroethene	1.0	5
trans-1,2-Dichloroethene	1.0	5
1,2-Dichloropropene	1.0	0.4
1,3-Dichloropropane	1.0	5
Trans-1,3-Dichloropropene	1.0	0.4
Ethylbenzene	1.0	5
Freon 113	1.0	5
2-Hexanone	5.0	50
Methyl Acetate	1.0	NS
Methylene chloride	1.0	5
Methylcyclohexane	1.0	NS
4-Methyl-2-pentanone	5.0	50[2]
Styrene	1.0	5
Tetrachloroethene	1.0	5
1,1,1-Trichloroethane	1.0	5
1,1,2,2-Tetrachloroethane	1.0	5
1,2,3-Trichlorobenzene	1.0	5
1,2,3-Trichloropropane	1.0 MDL	0.04

Table 1b
Chemical Parameters, Quantitation Limits and Data Quality Levels for Groundwater Samples - Former Star Facility

Parameter	QL	DQL[1]
1,2,4-Trichlorobenzene	1.0	5
Toluene	1.0	5
Trichloroethene	1.0	5
Trichlorofluoromethane	1.0	5
Vinyl chloride	1.0	2
Xylenes	2.0	5
Isopropylbenzene	1.0	5
n-Propylbenzene	1.0	5
p-Isopropyltoluene	1.0	5
1,2,4-Trimethylbenzene	1.0	5
1,3,5-Trimethylbenzene	1.0	5
n-Butylbenzene	1.0	5
sec-Butylbenzene	1.0	5
t-Butylbenzene	1.0	5
MTBE	1.0	10

[1] DQL based on TOGS Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (June, 1998) unless otherwise specified
[2] DQL based on TAGM Recommended Groundwater Standards/Criteria (January 24, 1994)
QL=Quantitation Limit
DQL=Data Quality Level
MDL = Method Detection Limit
Highlighted compounds have DQL which are less than the QL.
NS=No standard

Table 1c
Chemical Parameters, Quantitation Limits and Data Quality Levels for Sub-Slab Vapor and Ambient Air (Indoor/Outdoor) - Former Star Facility

Parameter	QL	DQL[1]
TO-15 Low Level Volatile Organic Compounds (µg/m³)		
Acetone	1.2	NL
Benzene	0.32	5
Bromoform	5.2	<5.0
Bromodichloromethane	3.4	<10
Bromomethane	0.39	<1.0
2-Butanone	1.5	NL
1,3-Butadiene	1.1	NL
Carbon Disulfide	1.6	NL
Carbon Tetrachloride	0.64	<3.1
Chlorobenzene	0.47	<2.0
Chloroethane	0.27	NL
Chloromethane	0.21	<1.0
Chloroform	0.50	4.3
alpha-Chlorotoluene	0.53	NL
Cumene	2.5	NL
Cyclohexane	1.7	NL
Dibromochloromethane	4.3	<5.0
Dibromomethane (EDB)	0.78	<1.0
1,2-Dichlorobenzene	0.61	<1.5
1,3-Dichlorobenzene	0.61	<2.0
1,4-Dichlorobenzene	0.61	NL
1,1-Dichloroethane	0.41	<1.0
1,2-Dichloroethane	0.41	<1.5
1,1-Dichloroethene	0.40	<1.0
Cis-1,2-Dichloroethene	0.40	<1.0
trans-1,2-Dichloroethene	2.0	NL
1,3-Dichloropropane	0.47	NL
Cis-1,3-Dichloropropene	0.46	NL
1,4-Dioxane	1.8	NL
Ethanol	0.96	NL
Ethylbenzene	0.44	4.8
4-Ethyltoluene	2.5	NL
Freon 11	0.57	NL
Freon 12	0.50	NL
Freon 113	0.73	NL
Freon 114	0.71	NL
Heptane	2.1	NL
Hexane	1.8	NL
2-Hexanone	2.1	NL

Table 1c
Chemical Parameters, Quantitation Limits and Data Quality Levels for Sub-Slab Vapor and Ambient Air (Indoor/Outdoor) - Former Star Facility

Parameter	QL	DQL[1]
TO-15 Low Level Volatile Organic Compounds (µg/m^3)		
Methylene chloride	0.71	60
Hexachlorobutadiene	5.4	NL
4-Methyl-2-pentanone	2.1	9.5
Methyl tert-butyl ether	1.8	NL
2-Propanol	1.2	NL
Propylbenzene	2.5	NL
Styrene	0.43	<1.0
1,1,2,2-Tetrachloroethane	0.70	<1.5
Tetrachloroethene	0.69	100
Tetrahydrofuran	1.5	NL
Toluene	0.38	25
1,2,4-Trichlorobenzene	3.8	NL
1,1,1-Trichloroethane	0.55	30
1,1,2-Trichloroethane	0.55	<1.0
Trichloroethene	0.55	5
1,2,4-Trimethylbenzene	0.50	7.0
1,3,5-Trimethylbenzene	0.50	<5.0
Vinyl chloride	0.26	<1.0
Xylenes	0.44	5.0

[1] DQL based on NYSDOH Background Database for indoor air
QL=Quantitation Limit
DQL=Data Quality Level
NL=Not listed on the NYSDOH Background Database for indoor air
Compounds that have air guidelines derived by the NYSDOH are highlighted.

Table 2
Analytical Parameters, Methods, Preservation and Container Requirements
Former Star Facility

Sample Matrix	Analytical Parameter	Sample Type[1]	No. of Samples[2]	EPA Analytical Method	Sample Preservation	Holding Time[3]	Sample Container[4,5]
Soil	VOCs (TCL/TAGM)	Grab	TBD	SW-846 Method 8260B	Cool to 4^0 C; no headspace	14 days to analysis	(2) 2-oz. glass jars
Groundwater	VOCs (TCL/TAGM)	Grab	TBD	SW-846 Method 8260B	pH<2 with HCl; Cool to 4^0 C; no headspace	14 days to analysis	(3) 40 mL VOA vials
Sub-Slab Vapor	VOCs	Grab	TBD	TO-15 Low Level 1µg/m^3	Keep out of direct sunlight and away from extreme temperature exposure	30 days to analysis	6 Liter Summa Canister or minican
Ambient Air (Indoor/ Outdoor)	VOCs	Grab	TBD	TO-15 Low Level 1µg/m^3 *	Keep out of direct sunlight and away from extreme temperature exposure	30 days to analysis	6 Liter Summa Canister or minican

[1] For soil samples, a six-inch sampling interval is the preferred sample size; however, sample volume recovery, analytical method requirements, and field conditions can affect the actual sample interval size. For these reasons, the actual sampling interval may change in order to obtain adequate volume.
[2] Actual number of samples may vary depending on field conditions, sample material availability, and field observations
[3] From date of sample collection
[4] I-Chem Series 300 bottles
[5] MS/MSDs require duplicate volume for all parameters for solid matrices; MS/MSDs require triplicate volume for organic parameters for aqueous matrices and duplicate volume for inorganic parameters for aqueous matrices
TBD = To Be Determined
* Trichloroethene (TCE) will be reanalyzed at 0.25µg/m^3 QL if initial detection limit is below the laboratory standard QL of 0.55 ug/m^3 .

Table 3a
Data Quality Objectives: Precision and Accuracy: Soil Samples
Former Star Facility

Parameter	Method	Matrix	Accuracy Control Limits		Accuracy Frequency Requirements	Precision (RPD) Control Limits		Precision Frequency Requirements
VOCs (TCL/TAGM)	SW-846 Method 8260B	Soil	Matrix Spikes	% Recovery	Matrix Spikes: One per 20 per matrix type	MS/MSDs	RPD	MS/MSDs: One per 20 per matrix type
			1,1-Dichloroethene	47-138		1,1-Dichloroethene	22	
			Trichloroethene	51-143		Trichloroethene	18	
			Benzene	51-135		Benzene	17	
			Toluene	51-138		Toluene	18	
			Chlorobenzene	58-135		Chlorobenzene	20	

Recovery criteria for laboratory control samples must be at least as stringent as MS/MSD criteria.
Laboratory control limits are periodically undated. The latest control limits will be utilized at the time of sample analysis.

Table 3b
Data Quality Objectives: Precision and Accuracy: Groundwater Samples
Former Star Facility

Parameter	Method	Matrix	Accuracy Control Limits		Accuracy Frequency Requirements	Precision (RPD) Control Limits		Precision Frequency Requirements
VOCs (TCL/TAGM)	SW-846 Method 8260B	Groundwater	Matrix Spikes	% Recovery	Matrix Spikes: One per 20	MS/MSDs	RPD	MS/MSDs: One per 20
			1,1-Dichloroethene	71-132		1,1-Dichloroethene	16	
			Trichloroethene	79-128		Trichloroethene	12	
			Benzene	61-134		Benzene	11	
			Toluene	60-140		Toluene	11	
			Chlorobenzene	80-120		Chlorobenzene	10	

Recovery criteria for laboratory control samples must be at least as stringent as MS/MSD criteria.
Laboratory control limits are periodically updated. The latest control limits will be utilized at the time of sample analysis.

Table 3c
Data Quality Objectives: Precision and Accuracy: Sub-Slab Vapor and Ambient Air(Indoor/Outdoor) Samples
Former Star Facility

Parameter	Method	Matrix	Accuracy Control Limits	Accuracy Frequency Requirements	Precision (RPD) Control Limits	Precision Frequency Requirements
VOCs	TO-15 Low Level	Vapor/Air	Surrogates % Recovery 1,2-Dichloroethane-d4 70-130 4-Bromofluorobenzene 70-130 Toluene-d8 70-130	Surrogates: All samples, standards, QC samples	≤25% for detections >5x the RL.	10% of the samples

4. SAMPLING PLAN

Environmental sampling for the Former Star Facility project will include soil, groundwater, sub-slab vapor and ambient air. Hollow-stem auger drilling will be the preferred methods for obtaining subsurface soil and groundwater samples; however, other drilling methods including mud rotary and drive and wash may also be used if warranted by site conditions.

4.1. Grab Sampling

Grab soil/solid samples will be collected from the material or interval in question by retrieving a volume for analysis using a clean stainless steel, aluminum, or mild steel scoop, trowel, spoon, or bucket auger. Samples for volatile organics analysis will be placed directly into the sample container.

4.2. Soil Sampling (Hollow-Stem Auger)

Soil samples will be collected continuously utilizing 2-inch-diameter by 2-foot-long split spoon samplers driven ahead of a hollow stem auger. Three-inch-diameter split spoon samplers may also be used. Augers with a minimum inside diameter of 4¼ inches shall be used for drilling where wells are proposed. If soil sampling below the groundwater table is required, augers will be equipped with center plugs and/or inert "knock out" plates to control sub-water table sediments from rising inside the auger flights and hampering collection of representative soil samples.

Each split spoon sample will be screened using a photoionization detector (PID) to detect possible organic vapors. Organic vapor screening will be performed by opening the split spoon, making a small slice in the soil column with a clean knife or sampling tool, inserting the PID probe and pushing the slice closed, and monitoring the soil for approximately 5 to 10 seconds. This procedure will be repeated at intervals along the split spoon soil column at the field geologist's discretion.

The split spoons will be examined for staining, discoloration, odors, and debris indicative of contamination (ash, coal fragments, wood chips, cinders, petroleum staining, etc.). Samples will be selected for analysis, based on PID readings, discoloration, staining, and the field geologist's judgment. Note that due to sample recovery or field conditions, sample intervals other than six inches may be necessary to collect sufficient sample. Samplers will wear phthalate-free gloves such as nitrile (no latex will be used) and will avoid contact of the gloves with the sample. Only clean metal instruments will be allowed to touch the sample.

4.3. Drive and Wash/Mud Rotary

Boring installation will initially be attempted by hollow stem auger method. In the case that hollow stem auger is found to be inadequate, alternate techniques will be evaluated in consultation with NYSDEC. A description of drive and wash/mud rotary technique follows.

Borings will be advanced vertically by driving 4-inch-diameter steel casing with a 300-pound hammer falling freely for 24 inches. The casing will be cleaned with water using a tri-cone roller bit and/or chopping bit. A 2-inch-diameter by 2-foot-long split spoon sampler driven ahead of the tri-cone roller bit and samples will be collected as described in Section 4.2. Any drilling fluids used to advance the drill bit will be contained within a steel trough and re-circulated into the drill hole. Uncontaminated drilling fluids containing drilling mud will be mixed with cement to form a grout that will be used to backfill the borehole where required; otherwise the mud will be pumped into 55-gallon drums for on-site storage and subsequent off-site disposal. In Drive and wash drilling where only potable water will be used as the drilling fluid, the water will be allowed to diffuse into the borehole. Samples will be collected in the same manner as with hollow-stem auger drilling. Where drilling mud is necessary, bentonite and/or Revert® will be used. Every effort will be made to collect samples for soil analysis before the addition of drilling mud. Only bentonite mixed with cement will be used to prepare grout for sealing the borehole.

4.4. Groundwater Sampling (Permanent Well)

Groundwater sampling of permanent monitoring wells is described according to the following distinct phases of this work: well installation/construction, well development, well purging, and well sampling.

4.4.1. Well Installation/Construction

To collect representative groundwater samples, previously installed soil borings will be converted into permanent two-inch diameter monitoring wells. Groundwater monitoring wells will be constructed of threaded two-inch PVC well casing and 0.10-slot well screen, such that the well screen extends approximately 8 feet below the water table. A minimum of two feet of well screen will be installed above the water table, depth to water and surface elevation permitting; however, optimally, two to three feet of well screen will remain above the water table. Clean silica sand, Morie No. 1, or equivalent, shall be placed in the annular space around the well to a minimum of one foot above the top of the well screen, two feet being optimal. The annular space for the filter pack should be between 2 to 4 inches thick. (The 4 ¼ inside diameter hollow stem augers will have to be retracted as the filter pack is installed to yield the required annular space.) A two-foot bentonite seal shall then be placed above the sand pack and moistened with potable water for a minimum of 15 minutes before backfilling the remaining space with a cement-bentonite grout. If warranted by depth, backfilling will be completed using a tremie pipe placed below the surface of the grout. Solid PVC riser, attached to the well screen, will extend approximately to grade. A flush-mount protective casing with a locking water-tight well cap will then be installed for the monitoring wells inside of the warehouse and a measuring point marked on each PVC well riser. MW-3 (or its replacement if necessary) will have a steel stick-up casing. The PVC riser will be extended into the casing for easier accessibility. Well construction diagrams will be prepared for each well.

4.4.2. Well Development

Following installation, the groundwater monitoring wells will be developed, using a two-inch diameter Grundfos submersible pump(s) (or equivalent) until the water is reasonably free of turbidity and field readings (pH, conductivity, temperature, and dissolved oxygen) sufficiently stabilize. Fifty nephelometric turbidity units (NTUs) or less will be the turbidity goal but not an absolute value. The wells will be developed aggressively to remove fines from the formation, sand pack and well trap. The wells will be allowed to equilibrate for, at least, 7 days prior to sampling. The volume of water removed, the well development time, and field instrument readings will be recorded in the logbook.

4.4.3. Well Purging

The objective is to purge monitoring wells until turbidity stabilizes to a level as low as possible and this parameter will be given the greatest weight in determining when groundwater sampling may begin. With this objective in mind, the well purging will be performed using a low-flow pump to avoid entrainment of particulates within the well or from the formation. Groundwater from each well will be purged until groundwater parameters have stabilized and a minimum of three well volumes of groundwater have been removed. A turbidity level of fifty NTUs or less is the well purging goal, but not an absolute value before sampling. Other field parameters including temperature, conductivity, pH, and dissolved oxygen (DO) will also be monitored. As practical, all field measurements will be taken from the flow cell and will be recorded during and after purging, and before sampling. Field parameters should generally be within ±10 percent for two consecutive readings, one minute apart, so that it may be determined when the parameters stabilize.

Upon opening each monitoring well and point, the concentration of VOCs in the headspace will be measured using a PID and water level measurements will be recorded using an electronic oil-water interface probe. The depth to product (if present), depth to water, and the total depth will be measured from the top of the marked PVC casings. Water level and free product (none anticipated) measurements will first be made and the volume of water in the well determined. The volume of water in the well will be calculated so that the number of well volumes purged and an estimate of the time required to purge the well can be made. Before sampling, the wells will be purged utilizing a low-flow peristaltic pump using polyethylene tubing connected to a flow cell. Very low purging rates are proposed, on the order of 100 ml/minute to 500 ml/minute, so as to minimize suspension of particulate matter in the well.

Purging will be done with the pump placed near the top of the water column to insure that all stagnant water in the well is removed, while not stirring sediment that may have accumulated on the bottom of the well. Equipment will be lowered into the well very carefully so as to prevent suspension of bottom sediment and subsequent entrainment onto sampling equipment. Surging will be avoided. Tubing will be replaced between each well. It is anticipated that no more than three well volumes will be purged in order for turbidity to reach a minimum and the other parameters to stabilize. Ideally, pumping rates will be at a rate so that no draw-down of the groundwater level occurs (i.e. pumping rate is less than recharge rate). During purging, TRC will actively monitor and track the volume of water purged and the field parameter readings. Data will be recorded in the field logbook. For example, TRC will record the running total volume purged from each well and note the readings for the corresponding field parameters.

4.4.4. *Well Sampling*

Once groundwater conditions have stabilized and groundwater levels have recovered, samples will be collect with the polyethylene, bottom-filled bailer. All sampling equipment will be cleaned according to the procedures specified in Section 4.8.

The samples will be collected in sample bottles (pre-preserved, if appropriate), placed in iced coolers and removed from light immediately after collection. In addition, all samples bottles must be filled to the top so that no aeration of the samples occurs during transport. All bottles will be filled so as to avoid cascading and aeration of the samples, the goal being to minimize any precipitation of colloidal matter.

4.5. Sub-slab Vapor Sampling

Sub-slab vapor sampling will be performed in accordance to the NYSDOH document titled, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" February 2005. Each Summa® canister will be shipped to the sampling site under a high vacuum (< 1 m Torr) to ensure that the canister remains free of contaminants prior to use. After connecting the Summa® canister to the sub-slab vapor point, a regulator valve on the canister will be opened and the vacuum will slowly draw the sample into the canister over a period of one hour. The samples will not be drawn at greater than 0.2 liters per minute. A small amount of vacuum will be left in the Summa® canister after a sufficient volume of sample has been collected. This vacuum reading will be confirmed by monitoring the laboratory provided regulator and documented in the field log book as well as on the sample chain of custody. Detection limits for most analytes will be less than or equal to 1.0 $\mu g/m^3$. After collecting the vapor sample, the valve will be closed and disconnect from the soil gas probe. The soil-gas samples will be shipped overnight to Air Toxic, LTD., for TO-15 low level analysis.

4.6. Indoor and Outdoor Air Sampling

Indoor/outdoor air sampling will be performed in accordance to the NYSDOH document titled, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" February 2005. Each

Summa® canister will be shipped to the sampling site under a high vacuum (< 1 m Torr) to ensure that the canister remains free of contaminants prior to use. Each Summa® canister will be placed three to five feet above the ground in the breathing zone, a regulator valve on the canister will be opened and the vacuum will slowly draw the sample into the canister over a period of one hour. The samples will not be drawn at greater than 0.2 liters per minute. A small amount of vacuum will be left in the Summa® canister after a sufficient volume of sample has been collected. This vacuum reading will be confirmed by monitoring the laboratory provided regulator and documented in the field log book as well as on the sample chain of custody. Detection limits for most analytes will be less than or equal to 1.0 g/m^3. After collecting the air sample, the valve will be closed. The indoor and outdoor air samples will be shipped overnight to Air Toxic, LTD., for TO-15 low level analysis.

4.7. QC Sample Collection

QC samples will include equipment blanks, trip blanks, and MS/MSDs.

Equipment blanks will consist of distilled water and will be used to check for potential contamination of the equipment which may cause sample contamination. Equipment blanks will be collected by routing the distilled water through the sampling equipment prior to sample collection. Equipment blanks will be submitted to the laboratory at a frequency of one per 20 samples per matrix per type of equipment being used per parameter, with the exception of TCLP parameters, parameters associated with wastewater samples, and grain size analyses.

Trip blanks will consist of distilled water (supplied by the laboratory) and will be used to assess the potential for volatile organic compound contamination of groundwater samples due to contaminant migration during sample shipment and storage. Trip blanks will be transported to the site unopened, stored with the investigative samples, and kept closed until analyzed by the laboratory. Trip blanks will be submitted to the laboratory at a frequency of one per cooler which contains VOC groundwater samples.

MSs and MSDs are two additional aliquots of the same sample submitted for the same parameters as the original sample. However, the additional aliquots are spiked with the compounds of concern. Matrix spikes provide information about the effect of the sample matrix on the measurement methodology. MS/MSDs will be submitted at a frequency of one per 20 investigative samples per matrix for organic parameters. MSs will be submitted at a frequency of one per 20 investigative samples per matrix for inorganic parameters.

Refer to **Table 4** for a summary of QC sample preservation and container requirements.

4.8. Sample Preservation and Containerization

The analytical laboratory will supply the sample containers for the chemical samples. These containers will be cleaned by the manufacturer to meet or exceed all analyte specifications established in the latest U.S. EPA's *Specifications and Guidance for Contaminant-Free Sample Containers*. Certificates of analysis are provided with each bottle lot and maintained on file to document conformance to EPA specifications. The containers will be pre-preserved, where appropriate (See Table 2).

4.9. Equipment Decontamination

4.9.1. Sampling Equipment

Re-usable Teflon®, stainless steel, and aluminum sampling equipment shall be cleaned between each use in the following manner:

- Wash/scrub with a biodegradable degreaser ("Simple Green") if there is oily residue on equipment surface
- Tap water rinse
- Wash and scrub with Alconox and water mixture
- Tap water rinse
- 10 percent HNO_3 rinse for non-dedicated, stainless steel groundwater sampling equipment for metals analysis only (excludes submersible pump and flow cell) and 1 percent HNO_3 rinse for non-dedicated, non-stainless steel equipment.
- Hexane rinse (optional, only if required to remove heavy petroleum coating)
- Distilled/deionized water rinse
- Air dry

Cleaned equipment shall be wrapped in aluminum foil if not used immediately after air-drying.

Groundwater sampling pumps will be cleaned by washing and scrubbing with an Alconox/water mixture, rinsing with tap water and irrigating with deionized water.

Table 4
QC Sample Preservation and Container Requirements
Former Star Facility

Sample Matrix	Analytical Parameter	Sample Type	No. of Samples	EPA Analytical Method	Sample Preservation	Holding Time[1]	Sample Container
Sub-slab Vapor	VOCs	Trip Blank	TBD	TO-15 Low Level	Keep out of direct sunlight and away from extreme temperature exposure	30 days to analysis	Summa canister
Ambient Air (Indoor/ Outdoor)	VOCs	Outdoor sample for background	TBD	TO-15 Low Level	Keep out of direct sunlight and away from extreme temperature exposure	30 days to analysis	Summa canister
Soil	TCL VOCs	Field Blank	TBD	SW-846 Method 8260B	pH<2 with HCl; Cool to 4^0 C; no headspace	14 days to analysis	(2) 40 mL VOA vials
Groundwater	TCL VOCs	Trip Blank	TBD	SW-846 Method 8260B	pH<2 with HCl; Cool to 4^0 C; no headspace	14 days to analysis	(2) 40 mL VOA vials

[1] From date of sample collection
TBD = To Be Determined

5. DOCUMENTATION AND CHAIN-OF-CUSTODY

5.1. Sample Collection Documentation

5.1.1. Field Notes

Field team members will keep a field logbook to document all field activities. Field logbooks will provide the means of recording the chronology of data collection activities performed during the investigation. As such, entries will be described in as much detail as possible so that a particular situation could be reconstructed without reliance on memory.

The logbook will be a bound notebook with water-resistant pages. Logbook entries will be dated, legible, and contain accurate and inclusive documentation of the activity. The title page of each logbook will contain the following:

- Person to whom the logbook is assigned,
- The logbook number,
- Project name and number,
- Site name and location,
- Project start date, and
- End date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, and names of all sampling team members present will be entered. Each page of the logbook will be signed and dated by the person making the entry. All entries will be made in permanent ink, signed, and dated and no erasures or obliterations will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark which is signed and dated by the sampler. The correction shall be written adjacent to the error.

Field activities will be fully documented. Information included in the logbook will include, but may not be limited to the following:

- Chronology of activities, including entry and exit times,
- Names of all people involved in sampling activities,
- Level of personal protection used,
- Any changes made to planned protocol,
- Names of visitors to the site during sampling and reason for their visit,
- Sample location and identification,

- Changes in weather conditions,
- Dates (month/day/year) and times (military) of sample collection,
- Measurement equipment identification (model/manufacturer) and calibration information,
- Sample collection methods and equipment,
- Sample depths,
- Whether grab or composite sample collected,
- How sample composited, if applicable,
- Sample description (color, odor, texture, etc.)
- Sample identification code.
- Tests or analyses to be performed,
- Sample preservation and storage conditions,
- Equipment decontamination procedures,
- QC sample collection,
- Unusual observations,
- Record of photographs,
- Sketches or diagrams, and
- Signature of person recording the information

Field logbooks will be reviewed on a daily basis by the Field Team Leader. Logbooks will be supported by standardized forms.

5.1.2. Chain-of-Custody Records

Sample custody is discussed in detail in Section 5.2 of this Plan. Chain-of-custody records are initiated by the samplers in the field. The field portion of the custody documentation should include: (1) the project name; (2) signatures of samplers; (3) the sample number, date and time of collection, and whether the sample is grab or composite; (4) signatures of individuals involved in sampling; and (5) if applicable, air bill or other shipping number. Sample receipt and log-in procedures at the laboratory are described in Section 5.2.2 of this Plan.

On a regular basis (daily or on such a basis that all holding times will be met), samples will be transferred to the custody of the respective laboratories, via third-party commercial carriers or via laboratory courier service. Sample packaging and shipping procedures, and field chain-of-custody procedures are described in Section 5.2.1 of this Plan.

5.1.3. Sample Labeling

Immediately upon collection, each sample will be labeled with a pre-printed adhesive label, which includes the date and time of collection, sampler's initials, tests to be performed, preservative (if applicable), and a unique identifier. The following identification scheme will be used:

A. The sample ID number will include the soil, soil vapor, indoor air or monitoring well location, along with the sample depth, sample interval, and the depth interval at which it was collected.

Example:

Sample "FST"-B1, 5.0 - 5.5' indicates the sample was taken at the Former Star Facility, boring location B-1, from the 6-inch interval in the spoon beginning at 5.0 feet below grade and ending at 5.5 feet below grade.

Blanks should be spelled out and identify the associated matrix, e.g. Equipment Blank, Soil

MS/MSDs will be noted in the Comments column of the COC.

B. The job number will be the number assigned to the particular site.

Example: FST-B1-5.0 – 5.5'

C. The analysis required will be indicated for each sample.

Example: VOC

D. Date taken will be the date the sample was collected, using the format: MM-DD-YY.

Example: 08-30-05

E. Time will be the time the sample was collected, using military time.

Example: 1335

F. The sampler's name will be printed in the "Sampled By" section.

G. Other information relevant to the sample.

Example: Equipment Blank

An example sample label is presented below:

Job No:	FST-
Client:	TRC
Sample No:	FST-B1-5.0 – 5.5'
Matrix:	Soil
Date Taken:	08-30-05
Time Taken:	14:30
Sampler:	S. Monte
Analysis:	VOC

Job No. ______________________________

Client: ______________________________

Sample Number ______________________________

Date ______________ Sample Time ______________

Sample Matrix ______________________________

Grab or Composite (explain) ______________________________

Preservatives ______________________________

Analyses ______________________________

Sampler Signature______________________________

This sample label contains the authoritative information for the sample. Inconsistencies with other documents will be settled in favor of the vial or container label unless otherwise corrected in writing from the field personnel collecting samples or the TRC Project QA Officer.

5.2. Sample Custody

Custody is one of several factors that are necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files.

A sample or evidence file is considered to be under a person's custody if

- the item is in the actual possession of a person;
- the item is in the view of the person after being in actual possession of the person;
- the item was in the actual physical possession of the person but is locked up to prevent tampering;
- the item is in a designated and identified secure area.

5.2.1. Field Custody Procedures

Samples will be collected following the sampling procedures documented in Section 4.0 of this Plan. Documentation of sample collection is described in Section 5.1 of this Plan. Sample chain-of-custody and packaging procedures are summarized below. These procedures will ensure that the samples will arrive at the laboratory with the chain-of-custody intact.

- The field sampler is personally responsible for the care and custody of the samples until they are transferred or dispatched properly. Field procedures have been designed such that as few people as possible will handle the samples.

- All bottles will be identified by the use of sample labels with sample numbers, sampling locations, date/time of collection, and type of analysis. The sample numbering system is presented in Section 5.1.3 of this Plan.

- Sample labels will be completed for each sample using waterproof ink unless prohibited by weather conditions. For example, a logbook notation would explain that a pencil was used to fill out the sample label because the pen would not function in wet weather.

- Samples will be accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents the transfer of custody of samples from the sampler to another person, to a mobile laboratory, to the permanent laboratory, or to/from a secure storage location.

- All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and copies will be retained by the sampler and placed in the project files.

- Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in and secured to the inside top of each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. The custody seals will be attached to the front right and back left of the cooler and covered with clear plastic tape after being signed by field personnel. The cooler will be strapped shut with strapping tape in at least two locations.

- If the samples are sent by common carrier, the air bill will be used. Air bills will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody forms since the custody forms will be sealed inside the sample cooler and the custody seals will remain intact.

- Samples remain in the custody of the sampler until transfer of custody is completed. This consists of delivery of samples to the laboratory sample custodian, and signature of the laboratory sample custodian on chain-of-custody document as receiving the samples and signature of sampler as relinquishing samples.

5.2.2. Laboratory Custody Procedures

Samples will be received and logged in by a designated sample custodian or his/her designee. Upon sample receipt, the sample custodian will

- Examine the shipping containers to verify that the custody tape is intact,
- Examine all sample containers for damage,
- Determine if the temperature required for the requested testing program has been maintained during shipment and document the temperature on the chain-of-custody records,
- Compare samples received against those listed on the chain-of-custody,
- Verify that sample holding times have not been exceeded,
- Examine all shipping records for accuracy and completeness,
- Determine sample pH (if applicable) and record on chain-of-custody forms,
- Sign and date the chain-of-custody immediately (if shipment is accepted) and attach the air bill,
- Note any problems associated with the coolers and/or samples on the cooler receipt form and notify the Laboratory Project Manager, who will be responsible for contacting the TRC Project QA Officer,
- Attach laboratory sample container labels with unique laboratory identification and test, and
- Place the samples in the proper laboratory storage.

Following receipt, samples will be logged in according to the following procedure:

- The samples will be entered into the laboratory tracking system. At a minimum, the following information will be entered: project name or identification, unique sample numbers (both client and internal laboratory), type of sample, required tests, date and time of laboratory receipt of samples, and field ID provided by field personnel.
- The Laboratory Project Manager will be notified of sample arrival.

- The completed chain-of-custody, air bills, and any additional documentation will be placed in the final evidence file.

6. CALIBRATION PROCEDURES

6.1. Field Instruments

Field instruments will be calibrated according to the manufacturer's specifications. All calibration procedures performed will be documented in the field logbook and will include the date/time of calibration, name of person performing the calibration, reference standard used, temperature at which the readings were taken, and the readings.

6.2. Laboratory Instruments

Calibration procedures for a specific laboratory instrument will consist of initial calibrations, initial calibration verifications, and/or continuing calibration verification. Detailed descriptions of the calibration procedures for a specific laboratory instrument are included in the laboratory's standard operating procedures (SOPs), which describe the calibration procedures, their frequency, acceptance criteria, and the conditions that will require recalibration. These procedures are as required in the respective analytical methodologies (summarized in Table 2 of this Plan). The initial calibration associated with all analyses must contain a low-level calibration standard which is less than or equal to the quantitation limit.

7. SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

No field analyses are anticipated for this program. If site conditions were to warrant field analysis, TRC will prepare an addendum establishing the field analytical procedures. Analyses of all soil, sediment, groundwater, wastewater, and waste classification samples will be performed by Chemtech in Mountainside, New Jersey. **Table 2** summarizes the analytical methods to be used during this investigation.

8. DATA REDUCTION, VALIDATION, AND REPORTING

Appropriate QC measures will be used for generation of reliable data from sampling and analysis activities. Proper collection and organization of accurate information followed by clear and concise reporting of the data is a primary goal in this project. Complete data packages suitable for data validation to support the generation of a Data Usability Summary Report (DUSR) according to NYSDEC requirements will be provided by the analytical laboratory.

For all analyses, the laboratory will report results which are below the laboratory's reporting limit; these results will be qualified as estimated (J) by the laboratory. The laboratory will be required to report tentatively identified compounds (TICs) for the VOC; this will be requested by TRC.

8.1. Data Evaluation/Validation

8.1.1. Field Data Evaluation

Measurements and sample collection information will be transcribed directly into the field logbook or onto standardized forms. If errors are made, results will be legibly crossed out, initialed and dated by the person recording the data, and corrected in a space adjacent to the original (erroneous) entry. Daily reviews of the field records by the Field Team Leader will verify that:

- Logbooks and standardized forms have been filled out completely and that the information recorded accurately reflects the activities that were performed.
- Records are legible and in accordance with good record keeping procedures, i.e., entries are signed and dated, data are not obliterated, changes are initialed, dated, and explained.
- Sample collection, handling, preservation, and storage procedures were conducted in accordance with the protocols described in the Plan, and that any deviations were documented and approved by the appropriate personnel.

8.1.2. Analytical Data Validation

TRC will be responsible for performing an independent validation of the analytical data. Project-specific procedures will be used to validate analytical laboratory data. The basis for the validation will be the USEPA CLP National Functional Guidelines for Organic Data Review (October 1999) and the USEPA CLP National Functional Guidelines for Inorganic Data Review (July 2002), modified to accommodate the criteria in the analytical methods used in this program, and Region II

Standard Operating Procedures (SOPs) for data validation. **Tables 1a**, **1b**, **1c**, **2**, **3a**, **3b**, **3c** and **4** highlight the QC criteria and holding time requirements for all analyses conducted under this program. These criteria will be used to evaluate and qualify the data during validation.

TRC will validate an appropriate number of samples collected for the purpose of characterizing potentially impacted areas to confirm that verifiable data are used to support decision making. Validation will include all technical holding times, as well as QC sample results (blanks, surrogate spikes, laboratory duplicates, MS/MSDs, and LCSs), tunes, internal standards, calibrations, target compound identification, and results calculations.

The overall completeness of the data package will also be evaluated by the data validator. Completeness checks will be administered on all data to determine whether full data deliverables were provided. The reviewer will determine whether all required items are present and request copies of missing deliverables.

Upon completion of the validation, a report will be prepared. This report will summarize the samples reviewed, elements reviewed, any nonconformances with the established criteria, and validation actions. Data qualifiers will be consistent with EPA National Functional Guidelines. This report will be in a format consistent with NYSDEC's DUSR.

8.2. Identification and Treatment of Outliers

Any data point which deviates markedly from others in its set of measurements will be investigated; however, the suspected outlier will be recorded and retained in the data set. One or both of the following tests will be used to identify outliers.

Dixon's test for extreme observations is an easily computed procedure for determining whether a single very large or very small value is consistent with the remaining data. The one-tailed t-test for difference may also be used in this case. It should be noted that these tests are designed for testing a single value. If more than one outlier is suspected in the same data set, other statistical sources may be consulted and the most appropriate test of hypothesis will be used and documented, if warranted.

Since an outlier may result from unique circumstances at the time of sample analysis or data collection, those persons involved in the analysis and data reduction will be consulted. This may provide an experimental reason for the outlier. Further statistical analysis may be performed with and without the outlier to determine its effect on the conclusions. In many cases, two data sets may be reported, one including, and one excluding the outlier.

In summary, every effort will be made to include the outlying values in the reported data. If the value is rejected, it will be identified as an outlier, reported with its data set and its omission noted.

9. INTERNAL QUALITY CONTROL

The subcontracting laboratory Quality Assurance Project Plan will identify the supplemental internal analytical quality control procedures to be used. At a minimum, this will include:

- Matrix spike and/or matrix spike duplicate samples
- Matrix duplicate analyses
- Laboratory control spike samples
- Instrument calibrations
- Instrument tunes for SW-846 8260B analysis
- Method and/or instrument blanks
- Surrogate spikes for organic analyses
- Internal standard spikes for SW-846 8260B analysis
- Detection limit determination and confirmation by analysis of low-level calibration standard

Field quality control samples will include:

- Equipment blanks as outlined in **Table 4**
- Trip blanks as outlined in **Table 4**
- MS/MSDs described in Section 4.6.

10. CORRECTIVE ACTION

The entire sampling program will be under the direction of TRC's Project QA officer. The emphasis in this program is on preventing problems by identifying potential errors, discrepancies, and gaps in the data-collection-laboratory-analysis-interpretation process. Any problems identified will be promptly resolved. Likewise, follow-up corrective action is always an option in the event that preventative corrective actions are not totally effective.

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by other means in the Plan. Corrective actions are likely to be immediate in nature and most often will be implemented by the contracted laboratory analyst or the TRC Program Manager. The corrective action will usually involve recalculation, reanalysis, or resampling.

10.1. Immediate Corrective Action

Corrective action in the field may be needed when the sample network is changed (i.e., more/less samples, sampling locations other than those specified in the Plan), or when sampling procedures and/or field analytical procedures require modification, etc. due to unexpected conditions. The field team may identify the need for corrective action. The Field Team Leader will approve the corrective action and notify the TRC Program Manager. The TRC Program Manager will approve the corrective measure. The Field Team Leader will ensure that the corrective measure is implemented by the field team.

Corrective actions will be implemented and documented in the field record book. Documentation will include:

- A description of the circumstances that initiated the corrective action,
- The action taken in response,
- The final resolution, and
- Any necessary approvals.

No staff member will initiate corrective action without prior communication of findings through the proper channels.

Corrective action in the laboratory may occur prior to, during, and after initial analyses. A number of conditions such as broken sample containers, omissions or discrepancies with chain-of-custody documentation, low/high pH readings, and potentially high concentration samples may be identified during sample log-in or just prior to analysis. Following consultation with laboratory analysts and Laboratory Section Leaders, it may be necessary for the Laboratory QA Manager to approve the implementation of corrective action. The laboratory SOPs specify some conditions during or after analysis that may automatically trigger corrective action or optional procedures. These conditions may include dilution of samples, additional sample extract cleanup, automatic reinjection/reanalysis when certain QC criteria are not met, loss of sample through breakage or spillage, etc.

The analyst may identify the need for corrective action. The Laboratory Section Leader, in consultation with the staff, will approve the required corrective action to be implemented by the laboratory staff. The Laboratory QA Manager will ensure implementation and documentation of the corrective action. If the nonconformance causes project objectives not to be achieved, the TRC Project QA Officer will be notified. The TRC Project QA Officer will notify the TRC Program Manager, who in turn will contact all levels of project management for concurrence with the proposed corrective action.

These corrective actions are performed prior to release of the data from the laboratory. The corrective action will be documented in both the laboratory's corrective action files, and the narrative data report sent from the laboratory to the TRC Program Manager. If the corrective action does not rectify the situation, the laboratory will contact the TRC Program Manager, who will determine the action to be taken and inform the appropriate personnel.

If potential problems are not solved as an immediate corrective action, the contractor will apply formalized long-term corrective action, if necessary.

EXHIBIT A
CURRENT LABORATORY CERTIFICATION

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H.

Expires 12:01 AM April 01, 2006
Issued April 01, 2005

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MS. LINDA FREEMAN
AIR TOXICS LTD
180 BLUE RAVINE ROAD, SUITE B
FOLSOM CA 95630 UNITED STATES

NY Lab Id No: 11291
EPA Lab Code: CA00933

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES AIR AND EMISSIONS All approved analytes are listed below:

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	EPA TO-14A
	EPA TO-15
Hexachlorobutadiene	EPA TO-14A
	EPA TO-15

Purgeable Aromatics

1,2-Dichlorobenzene	EPA TO-14A
	EPA TO-15
1,4-Dichlorobenzene	EPA TO-14A
	EPA TO-15
Benzene	EPA TO-14A
	EPA TO-15
Chlorobenzene	EPA TO-14A
	EPA TO-15
Ethyl benzene	EPA TO-14A
	EPA TO-15
Toluene	EPA TO-14A
	EPA TO-15
Total Xylenes	EPA TO-14A
	EPA TO-15

Purgeable Halocarbons

1,1,2,2-Tetrachloroethane	EPA TO-14A
	EPA TO-15

Purgeable Halocarbons

1,1-Dichloroethane	EPA TO-14A
	EPA TO-15
1,1-Dichloroethene	EPA TO-14A
	EPA TO-15
1,2-Dichloroethane	EPA TO-14A
	EPA TO-15
1,2-Dichloropropane	EPA TO-14A
	EPA TO-15
Carbon tetrachloride	EPA TO-14A
	EPA TO-15
Chlorofonn	EPA TO-14A
	EPA TO-15
Methylene chloride	EPA TO-14A
	EPA TO-15
Tetrachloroethene	EPA TO-14A
	EPA TO-15
Vinyl chloride	EPA TO-14A
	EPA TO-15

Volatile Chlorinated Organics

Benzyl chloride	EPA TO-14A
	EPA TO-15

Serial No.: 25424

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H.

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CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. DIVYAJIT MEHTA
CHEMTECH CONSULTING GROUP
284 SHEFFIELD STREET
MOUNTAINSIDE NJ 07092 United States

NY Lab Id No: 11376
EPA Lab Code:

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved subcategories and/or analytes are listed below:

Volatile Aromatics

m-Xylene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
o-Xylene	EPA 524.2
p-Isopropyltoluene (P-Cymene)	EPA 524.2
p-Xylene	EPA 524.2
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2

Volatile Halocarbons

1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2
1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
2,2-Dichloropropane	EPA 524.2

Volatile Halocarbons

Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2
cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Dichlorodifluoromethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

Serial No.: 24118

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Former Star Facility
Mountainville, New York

Prepared by:

TRC Engineers, Inc.
1430 Broadway, 10th Floor
New York, New York 10018

TRC Project # 48715-000S-00101

September 2005

DISCLAIMER

STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THESE SITES. THE HEALTH AND SAFETY GUIDELINES IN THIS HEALTH AND SAFETY PLAN WERE PREPARED SPECIFICALLY FOR THIS PROJECT AND SHOULD NOT BE USED ON ANY OTHER SITE OR PROJECT WITHOUT PRIOR RESEARCH AND EVALUATION BY TRAINED HEALTH AND SAFETY SPECIALISTS.

TABLE OF CONTENTS

1 SITE-SPECIFIC TRAINING

TRC provides training to all its employees whose work entails potential exposure to toxic chemicals or hazardous environments. The training is taught by experienced professionals and promotes safe work conditions through both classroom and field instruction.

TRC provides the following training to its employees:

1. 40-Hour Hazardous Materials Training
   - Supervisors receive additional training which is geared toward responsibilities and skills in project management.
2. 8-Hour Hazardous Materials Annual Refresher Training
3. Training required under specific OSHA Standards
4. First Aid/CPR

2 MODEL SITE-SPECIFIC SAFETY PLAN

2.1 Introduction

The following is the Health and Safety Plan (HASP) for activities and operations proposed at the Former Star Facility, Mountainville, NY (the "site") by TRC Engineers, Inc. Activities to be performed on-site consist of sub-slab vapor sampling, ambient air sampling, monitoring well installation, soil and groundwater sampling.

The site-specific safety plan was developed from the preliminary site visits as well as historical analytical data and reports. Revisions and/or alterations to this HASP may become necessary as more information becomes available. Any proposed changes to this HASP will be approved by the Health & Safety Coordinator prior to implementation. All on-site personnel are required to read, review and strictly comply with the HASP. It is the responsibility of the Project Manager to ensure that the HASP is implemented and enforced.

2.2 Site History

The subject site is bordered on the north by the Creamery Road, Woodbury Creek and Route 32 to the east, Interstate-87 with undeveloped areas to the west, and on the south by undeveloped areas. Previous site operations included the use and storage of solvents. The previous site operations contributed to elevated VOCs in the soil and groundwater.

2.3 Site Description

The site consists of a 200,000 square foot warehouse, a residential property and the surrounding

37 acres of undeveloped property. The warehouse facility is currently being used for storage of boxed dry goods. Much of the property is open field with some wooded areas near Woodbury Creek.

3 SCOPE OF WORK

An investigation will be conducted at the Site to evaluate the risk that VOCs in soil and groundwater pose to building occupants. The investigation will consist of installing soil borings, converting the borings to permanent monitoring wells, and performing subslab vapor and indoor air sampling within on-site structures.

4 CONTAMINANTS OF CONCERN

Volatile organic compounds (VOCs) in soil and groundwater.

5 KEY PERSONNEL AND EMERGENCY NUMBERS

5.1 Local Services Emergency Telephone Numbers

1. In an emergency, dial 911.

   Local Departments:

   Fire Department 911

   Police Department 911

2. Nearest Hospital: CORNWALL HOSPITAL

   Address: 19 Laurel Ave
   Cornwall, New York
   (845) 534-7711

3. Directions to Hospital:

Directions

1. Start at **[622-632] ROUTE 32, HIGHLAND MILLS** on **RT-32** going toward **LEATHER STOCKING TRL** - go **6.7** mi

2. Turn R on **QUAKER AVE** - go **0.7** mi
3. Bear L on **ELM ST** - go **0.1** mi
4. Turn L on **LAUREL AVE** - go **0.1** mi
5. Arrive at **CORNWALL HOSPITAL**

5.2 TRC Contacts

1. Project Manager
   - Name: David S. Glass
   - Office/Division: Manhattan, NY/Environmental Services
   - Office Telephone: 212-221-7822 ext. 112
2. Certified Industrial Hygienist
   - Name: Edward Gerdts, CIH
   - Office/Division: Manhattan, NY/Management
   - Office Telephone: 212-221-7822 ext. 111
3. Human Resource Manager
   - Name: Shawna Soto
   - Office/Division: Manhattan, NY/Administrative
   - Office Telephone: 212-221-7822 ext. 102

5.3 Level of Protection

The Project Manager will continually evaluate levels of protection to be utilized by on-site personnel, with assistance from the Health & Safety Coordinator and the Industrial Hygienist. The levels of protection may be downgraded or upgraded, as necessary, with approval by the PM.

5.4 Personal Protective Equipment

It is anticipated that only Level D PPE will be required. Level D protection is applicable when no respiratory protection and minimal skin protection is required. Level D can be used in the following circumstances:

- The atmosphere contains no known hazard
- Work functions preclude splashes, immersion, or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

The Level D Recommended Equipment for this site includes:

- Coveralls
- Safety boots/shoes
- Safety glasses or chemical splash goggles: Eye protection will be worn when personnel are exposed to flying debris, chemical vapors or particulates.
- Hard hats: Appropriately rated hard hats will be worn by personnel for protection against overhead hazards.
- Hearing protection: To be worn by all personnel exposed to at least 85 dB of sound during the workday.
- Gloves

If excessive ionizable vapors are detected at or above the action levels (See Section 6.2), workers will cease work in the area until VOC levels decrease for Level D PPE.

6 ON-SITE OPERATION

A truck mounted drilling rig will be utilized to install the three monitoring wells inside the building as well as redevelopment or to install MW-3.

6.1 Chemical Hazards

Chemical hazards are expected to be low. These chemical hazards potentially can include VOCs.

First Aid Procedures for Chemical Exposures:

EYE: If any chemicals come in contact with eyes, immediately wash the eyes with large amounts of water, occasionally lifting lower and upper lids. Get medical attention immediately.

BREATH: If person breathes large amounts of any chemicals, remove person to fresh air. If breathing has stopped, perform artificial respiration. Keep affected person warm and rested. Get medical attention as soon as possible.

SKIN: If any chemicals except those listed below come in contact with the skin, immediately wash skin with soap and water. Get medical attention promptly. If chemical penetrates clothing, immediately remove clothing and wash with soap and water.

Soap should not be used if the following chemicals potentially encountered at the site contact skin or clothing, **water wash only**:

Hydrochloric acid
Nitric acid
Sodium hydroxide
Sulfuric acid

Special attention must be paid to not using soap with these chemicals in particular.

SWALLOW: If any chemicals are swallowed get medical attention immediately

6.2 Air Monitoring Requirements

An organic vapor photoionization detector (PID) will be used to evaluate airborne levels of VOCs during implementation of the work plan. If ionizable vapors are detected at 1.0 ppm or higher, Drager tubes will be utilized to measure airborne concentrations of specific contaminants of concern (see below). The VOC levels will be measured within the breathing zone of workers at each sampling location. Measurements will be taken prior to, during and after sample collection.

OSHA PEL

Chlorinated solvents are the chemicals of concern at this site. Of the chlorinated solvents vinyl chloride has a relatively low OSHA PEL of 1 part per million (ppm) over an 8-hour time-weighted average. Thus, the OSHA PEL for vinyl chloride will be utilized to determine the appropriate respiratory protection.

Respiratory Protection

It is unlikely that respiratory protection will be required during implementation of the work plan If Drager tube measurements indicate that levels of vinyl chloride have reached 0.5 ppm, workers will cease work in the area until levels of vinyl chloride have decreased. If necessary, modifications to work practices will be implemented to reduce or avoid generating elevated levels of vinyl chloride.

6.3 Biological Hazards

No biological hazards are anticipated for any of the tasks.

6.4 Physical Hazards

The physical hazards are anticipated to be low and are outlined in Table A-1 below.

TABLE A-1
PHYSICAL HAZARDS

HAZARD TYPE	KNOWN	POTENTIAL
Heat Stress/Cold Stress	X	
Severe Weather (lightning, snow, sleet)		X
Excessive Noise	X	

HAZARD TYPE	KNOWN	POTENTIAL
Facility Operations (machinery, structures)	X	
Unstable ground (wet areas)		X
Site Operations (drilling, excavation, hand and power tool use, steam cleaning)	X	
Heavy lifting/moving	X	
Hazardous materials use & storage		X
Fire		X
Slips, trips, and falls		X
Cuts, punctures		X

TRC personnel can avoid most of the hazards listed above including hand tools, hazardous materials use, slips, trips and falls, and punctures and cuts by remaining alert and performing safe work practices during all site activities. Other proper work practices are outlined below.

1. To avoid falling objects:
   a. Do not walk or stand under suspended/overhead loads (including scaffolding).
   b. Be aware of falling objects in the work area.
   c. Secure overhead objects.
2. When using hand tools:
   a. Hand tools will meet the manufacturer's safety standards.
   b. Hand tools will not be altered in any way.
   c. Makeshift tools will not be used.
   d. At a minimum, eye protection will be used when working with hand tools.
   e. Wrenches, including adjustable, pipe, end and socket wrenches, will not be used when jaws are sprung to the point that slippage occurs.
   f. Impact tools such as drift pins, wedges and chisels, will be kept free of mushroom heads.
   g. Wooden handles will be free of splinters or cracks and secured tightly to the tool.

3. Overhead Wires:

   If contact is possible (i.e., ladder, equipment, crane lift, etc.) one or more of the following will be done:

   - Power sources will be disconnected by the utility;
   - Power sources will be shielded by the utility; and
   - Object will get no closer than 12' to prevent arcing.

4. Slips, Trips and Falls:

   a. Proper lighting will be maintained at all times.
   b. Walkways will remain clear and unobstructed at all times.
   c. When possible, cords, hose lines, etc., will be raised to reduce or eliminate trip hazards.

Noise

Approved hearing protection will be required in work areas involving heavy equipment, impact tools, drilling, etc. In general, hearing protection should be worn if an individual cannot be heard in a normal speaking voice at a distance of two feet.

6.5 Mechanical Hazards

The mechanical hazards are anticipated to be low and are associated with use of drilling equipment.

6.6 Communication

The TRC team-sampling members shall be equipped with a cellular telephone. If an emergency occurs, and the team members are not in close proximity to each other, communication will occur via telephone.

7 SITE MAPS

7.1 Detailed Site Map

A detailed site map is included in the Site Investigation Work Plan. Included on the map is the following information:

a. Map orientation.

b. Anticipated work area.

7.2 Hospital Route Map

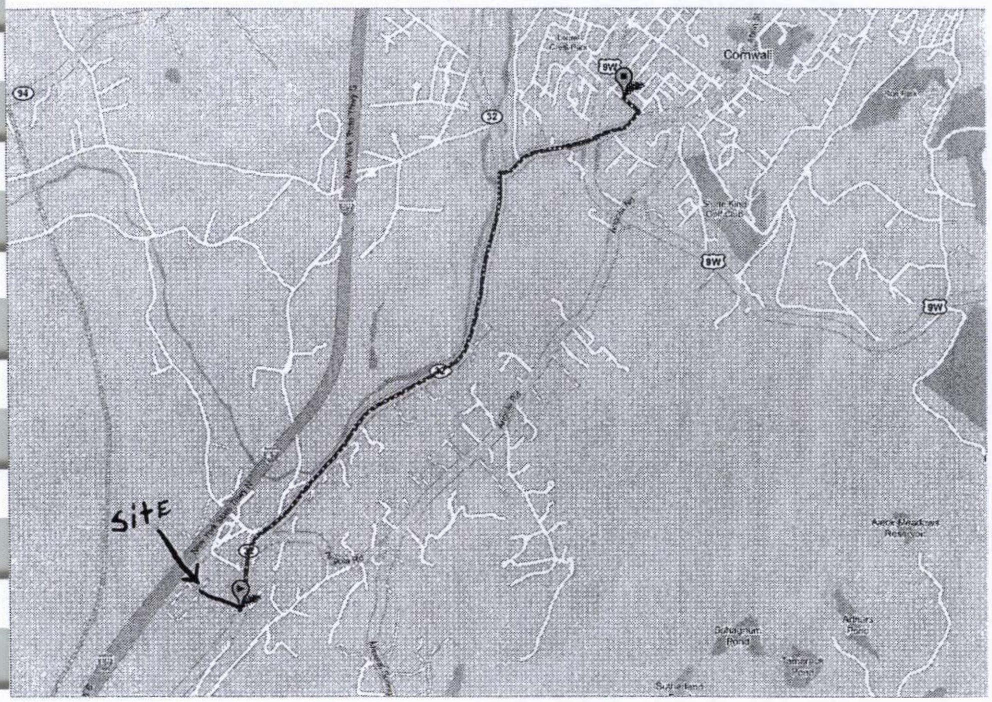
Attached is a photocopy of a map containing the directions to the nearest hospital, with directions from the site to the hospital highlighted. This is the hospital identified under Section 5, Key Personnel and Emergency Numbers

Attachment A
Hospital Route

Directions

Start address **1623 route 32, Highland Mills, NY 10930**

End address **19 LAUREL AVE, Town of cornwall, ny**



Start address:	1623 route 32 Highland Mills, NY 10930
End address:	19 Laurel Ave Cornwall, NY 12518
Distance:	3.6 mi (about 8 mins)

1. Head **north** from **RT-32** - go **2.7 mi**
2. Turn **right** at **Quaker Ave** - go **0.7 mi**
3. Bear **left** at **Elm St** - go **0.1 mi**
4. Turn **left** at **Laurel Ave** - go **0.1 mi**

These directions are for planning purposes only. You may find that construction projects, traffic, or other events may cause road conditions to differ from the map results.

Attachment B
Health and Safety Plan Acceptance

ATTACHMENT B

HEALTH AND SAFETY PLAN ACCEPTANCE

SITE: Former Star Facility Mountainville, NY

I have received a copy of the Health and Safety Plan for this site and have read, understand and will abide by the procedures set forth in this Health and Safety Plan and any amendments to this plan.

Printed Name	Signature	Date

APPENDIX C

NEW YORK STATE DEPARTMENT OF HEALTH GENERIC COMMUNITY AIR MONITORING PLAN

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all <u>ground intrusive</u> activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during <u>non-intrusive</u> activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

<u>VOC Monitoring, Response Levels, and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

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