**A-302**

# ATTACHMENT 2
# SAMPLING AND ANALYSIS PLAN

## 1.0 INTRODUCTION

This workplan presents the sampling and analysis procedures for the Post Closure groundwater sampling program at the former Safety-Kleen Systems Inc. (S-K) Service Center in Silver Spring, MD (Figure 1). This workplan is intended to incorporate the objectives and requirements of the Post Closure Permit (Controlled Hazardous Substances Permit Number A-302). This plan is also intended to address Compliance Schedule Conditions III.K.1 and III.K.3.

The former S-K facility functioned as a storage and distribution center for product mineral spirits. The product mineral spirits was distributed to local customers for parts degreasing applications. Spent mineral spirits was later returned to the facility for short term storage and transport to an S-K solvent recycling facility. The facility operated between 1982 and 1996. It is no longer in operation. The site is currently in use as a bank (financial institution).

During operation, product and spent mineral spirits were stored in separate 12,000 gallon underground storage tanks (USTs). The USTs were located east of the main building beneath a cement pad near Tech Road. The mineral spirits tanks were removed in April 1996. Based on field observations and at the request of MDE, additional soil was excavated from the tank basin and removed from the site for disposal. A total of 444 tons of soil was disposed of at an authorized facility. The current site layout, showing the location of the former tank basin and the monitoring well network is shown on Figure 2.

A total of eight (8) monitoring wells have been installed at and adjacent to the Silver Spring facility between 1989 and 1992. Site monitoring wells have been inspected and sampled on a quarterly basis since installation. A soil vapor extraction (SVE) system was in continuous operation at the facility between 1993 and 2004, and was operated on a pulsed basis from July 2004 to July 2005. The SVE system attained asymptotic recovery rates and S-K has proposed to permanently shut the SVE system down. A pattern of ten SVE points were installed to provide an overlapping radius of influence and favorable coverage to address mineral spirits adsorbed to soils within and adjacent to the former UST basin. Monitoring and SVE well locations are shown on Figure 2.

Groundwater quality is influenced by an off-site (up-gradient) source of tetrachloroethene (PCE). Releases from the up-gradient facility are well documented as are releases into and out of the sanitary sewer that wraps around the S-K site on the north, east and south. S-K believes that the off-site source has resulted in the occurrence of PCE in the most up-gradient wells at the former S-K site as well as in other wells in which PCE is the primary constituent detected. PCE is typically only a trace constituent of mineral spirits.

A groundwater remediation system was reportedly in operation at the up-gradient facility from 1998 to 2003. However, S-K understands that the system has been shut down and that the responsible party is evaluating plume stability and alternative risk-based closure strategy.

## 2.0 MONITORING PROGRAM OVERVIEW

The purpose of the Post Closure monitoring program is to evaluate progress of remediation at the site and to document that the cleanup criteria in the permit are met. The monitoring program meets the requirements of Permit Condition III.H.2 because the monitoring program and compliance well network have been established in accordance with standard practice and approved/formalized by MDE in the Post Closure Permit and because the target analyte list has been established using extensive site data, site history information and operator knowledge of constituents permitted and handled at the site.

The nature of the facility-related impacts at the site are well defined. The underground tank system consisted of two underground storage tanks, which handled product mineral spirits and spent mineral spirits, respectively. Minor volumes of other wastes (including dry cleaning solvent) were handled in drums within the container storage area of the building. There were reported mineral spirits releases in 1988 and 1989. There were no reported releases of PCE at the facility.

### 2.1 TARGET ANALYTE LIST

During the October 2003 meeting between MDE and S-K, a three part target analyte list/monitoring program was developed to address the mineral spirits release, other constituents listed in the Part B Permit, and the off-site PCE release. S-K conducted quarterly monitoring under Permit A-302 over the past five years. Based on the monitoring results, only TPH-MS has exceeded the applicable permit clean up objective (CUO). Therefore, S-K has proposed to modify the monitoring program for the remaining target analyte, mineral spirits.

### 2.2 TRIGGER FOR ADDITIONAL CORRECTIVE ACTION

The essential purpose of the monitoring program is to evaluate the stability of the residual TPH-MS in groundwater. There are two triggers based on monitoring results that require S-K to conduct additional corrective action. These are:

1. If the concentration of TPH as mineral spirits in any well exceeds 5,000 ug/L.

2. If a free product phase layer of greater than 0.1 ft is detected in any monitoring well. (It should be noted that the Permit incorrectly indicates 0.1 inches; the smallest layer of product detectable using an interface probe is 0.1 ft).

In accordance with Permit Condition III.D.4, S-K will propose an alternate corrective measure within 10 days of the first occurrence of one of the above.

### 2.4 SUSPENSION OF CORRECTIVE ACTION MONITORING

S-K will suspend corrective action monitoring when the site data indicate that the CUO for TPH-MS has been achieved for three consecutive sampling events. S-K may make a site-specific risk-based demonstration to develop alternative clean up objectives.

## 3.0 FIELD PROCEDURES

Groundwater monitoring activities consist of fluid level monitoring and sampling for groundwater quality on a schedule to be proposed by Safety-Kleen and approved by the MDE. MDE will be notified two weeks prior to each sampling event. A field equipment checklist is included in Appendix A.

Prior to conducting field activities, the existing site-specific Health and Safety Plan will be reviewed and modified, if necessary to address the field tasks and potential hazards with the described scope of work. Upon arrival at the site, field personnel will review the site for potential Health and Safety hazards and will review Health and Safety procedures.

A visual inspection of the wells will be conducted prior to sampling. Any damage to the wellhead or casing, or any items requiring maintenance will be noted in the field sampling record and reported the project manager so that the necessary repairs can be scheduled. Upon arriving at a well location, sampling personnel will check the well for damage and remove the cap. Field personnel will wipe the top of the well casing with a clean cloth or paper towel and take other steps necessary to protect the well and sampling equipment from potential contamination. Field personnel will wear new, sterile gloves during all preparation and sampling activities.

### 3.1 FLUID LEVEL MONITORING

Fluid level monitoring is to be conducted on a schedule to be proposed by Safety-Kleen and approved by the MDE (per Permit Condition III.D.3.e). All wells at the site will be measured within a 24-hour period, to the extent feasible. An electronic interface meter will be used for instantaneous measurement of the depth to groundwater. The electronic tape will be marked at 0.01-foot intervals. The measurement will be made from the premarked (surveyed) measuring point on the well casing. If product is observed in any well, the thickness will be measured with the interface probe, and recorded. Wells with product will not be sampled.

Water level data will be recorded on the water sampling field data form (Appendix A) and will be used to calculate the volume of water in the well. Each measurement will be made to an accuracy of 0.01 feet below the measuring point. Care will be taken to avoid cross contamination of wells by thoroughly cleansing the measuring instrument between wells using a detergent solution wash and distilled water rinse. Also, to prevent cross-contamination, wells will be gauged in sequence from least to most impacted.

### 3.2 WELL PREPARATION PROCEDURES

Wells will be purged prior to sampling. Sampling will not be performed unless approximately 90% of the total water column (or as much of the column as possible in a 24 hour period) has been replaced by formation groundwater. Three casing volumes shall be removed from the wells at a rate so as not to create excessive agitation in the well. Purge volumes will be documented on the field sampling form.

The temperature, pH, and conductivity of the groundwater will be measured periodically (generally every well volume) during purging and recorded on water sampling data forms. Purging will be complete when field parameters have stabilized, three well volumes have been removed from a specific well, or the well is bailed/pumped dry. Field parameters will be considered stabilized when successive measurements meet the following requirements: pH (± 0.1 pH unit), temperature (± degree Celsius), and conductivity (± 10%). The pH, temperature and specific conductance meter will be calibrated at the beginning of each day of use, and its functioning will be checked periodically.

Low-yielding wells will be evacuated to dryness and allowed to recover prior to sampling. A well will not be considered to be bailed dry until less than 10% of the original volume of water remains in the well after purging. Purge water will be containerized and handled by S-K in accordance with all applicable requirements.

### 3.3 GROUNDWATER SAMPLING PROCEDURES

Samples will be collected for analysis of organic constituents within two hours after the well has been evacuated, if practicable. Samples for inorganic analyses may be collected at a later time, but not later than 24 hours after preparation, in an effort to allow minor sediment/turbidity to settle out of the water column. Samples will be collected with either a decontaminated pump and dedicated tubing or a dedicated bailer and dispensed directly into containers provided by the laboratory.

The wells will be sampled in the ascending order of impacts, with the least contaminated well being sampled first. Clean string or rope will be attached to lower the bailer into the wells. Disposable sterile gloves will be worn by the field team when handling the sampling equipment. New or dedicated rope and disposable gloves will be used at each well. Care will be taken to prevent bailers or rope from coming into contact with any contaminated surface.

The containers will be inspected to see that they are the correct type and number and have the correct preservative, if required. The labels will be properly filled out (project identification, well number, date, analysis, sampler initials) and affixed to the containers. Samples will be carefully poured into the containers, avoiding agitation or turbulence, which can result in excessive oxygenation of the samples. Care will be exercised to avoid breakage and prevent contact of any foreign substance with the interior surface of the bottles, vials, or caps. Caps will not be removed until sampling actually occurs.

Water from the first bailer (following field parameter stabilization) will be containerized for VOC analysis. The 40-ml vials for VOCs will be filled slowly and checked to ensure that there are no air bubbles. Subsequent samples will be collected in the following sequence, as necessary; semi-volatile organics, total petroleum hydrocarbons as mineral spirits and metals (both total and dissolved).

Groundwater samples collected for dissolved metals analyses (if necessary) shall be filtered in the field using positive pressure filter equipment within 15 minutes of sampling. The filter shall be 0.45-microns. An in-line filter or pressure filter using inert gas (such as nitrogen) shall be used to filter the sample. The filtering equipment shall be flushed with a minimum of twice the capacity of the filtering device prior to collecting the sample. No filtering is necessary for samples collected for the analysis of total metals.

Samples will be packed on ice in a cooler and the water sampling field data form and chain-of-custody form will be completely filled out. Samples will be shipped overnight to the analytical laboratory. The receiver's signature will be recorded on the chain-of-custody form.

### 3.4 GROUNDWATER SAMPLING EQUIPMENT DECONTAMINATION PROCEDURES

Field personnel will decontaminate sampling equipment between wells and at the end of each day of use. Equipment should be cleaned using the following steps:

- Detergent solution and tap water wash;
- Tap water rinse;
- Distilled/deionized water rinse;
- Air dry;
- The bailers and rope will be stored in clean plastic bags until use.

The detergent will be a standard brand of phosphate-free soap such as Alconox. The detergent must be kept in clean plastic, metal, or glass containers until used. The detergent should be poured directly from the container during use. Tap water may be used from any municipal system. Tap water may be kept in clean containers, hand pressure sprayers, squeeze bottles or applied directly from a hose. Distilled water must be stored in clean glass, stainless steel, or plastic containers that can be closed prior to use. Clean poly-type rope will be used to lower bailers into the wells. The rope will be new or dedicated to a specific well.

### 3.5 GROUNDWATER SAMPLE LABORATORY ANALYSES

Sample containers, preservation methods and holding times to be followed are presented in the following table.

| **Parameter** | **EPA Test Method** | **Volume of Sample Required** | **Preservation** | **Holding Time** |
|---|---|---|---|---|
| Chloride | 9056 | 250 mL poly | $4^oC$ | __ |
| TPH (C7 - C20) and TPH as MS | Modified 8015 A,B | 1 L Amber / wide mouth | HCL and Cool to $4^oC$ | 14 days |
| VOCs | 8260 B | 3x40mL vial | HCL, $4^oC$ | 14 days |
| Metals | 6010B | 500mL poly | HNO3 | 6 months |
| SVOCs | 8270 | 1 L amber glass | $4^oC$ | 14 days |

Per Permit Condition III.C.4, TPH analyses should be conducted so that a single concentration reflecting total TPH in the gasoline, mineral spirits and diesel ranges is reported. In addition TPH-MS should be reported separately to allow for evaluation of the trigger criterion in Condition III.D.4.b of the permit (Section 2.3 of the Groundwater Monitoring Plan).

The laboratory will be requested to follow the SW-846 Method Procedures and corresponding quality control indicated above. The quality control data including matrix spikes/matrix spike duplicates (and/or laboratory control samples and duplicates), surrogate recoveries, lab duplicates and blanks as appropriate to the individual SW-846 method will be included in the laboratory data report. Any data qualification issues will be discussed in the monitoring reports. Per Permit Condition I.G.9a, the laboratory will be requested to include the analyst name on the laboratory data sheet or case narrative as well as the date of analysis, result and SW-846 (or equivalent) method designation.

### 3.6 FIELD SAMPLING DOCUMENTATION

The project will have a dedicated field notebook. Each page of the notebook should be numbered and dated. The entries should be legible and contain accurate and inclusive documentation of an individual's project activities. All aspects of sample collection and handling, as well as visual observations shall be documented in the field notebook. The following is a list of information that should be included in the field notebook:

- name of sampler, and names of other persons onsite, including visitors;
- sample collection equipment;
- field analytical equipment, and equipment used to make physical measurements (e.g., fluid levels) should be identified;
- calculations, results and calibration data for field equipment;
- sampling locations;
- time of sample collection;
- how sample was collected; and
- weather conditions.

In addition, a field/data collection log will be maintained which consists of a site visit form and a sample collection log. The forms will be taken to the field during each sampling episode and will be updated after each sample is collected. An example of the system monitoring check sheet, sample visit forms and data collection log is included in Appendix A.

### 3.7 FIELD QA/QC SAMPLES

One field duplicate will be collected during each monitoring event. A trip and/or field/equipment blank will be submitted for potential analysis as well. The blanks will be analyzed in the event that field contamination of samples is suspected.

### 3.8 MANAGEMENT OF SAMPLING WASTE

All on-site well purge water and decontamination water will be temporarily containerized, labeled and will be picked up and disposed of by S-K.

## 4.0 REPORTING

S-K will report the results of the groundwater sampling in monitoring reports. According to the schedule outlined in Section III.I.3 of the permit, the reports are to be submitted on a schedule to be proposed by Safety-Kleen and approved by the MDE.

The monitoring reports will include:

1. Description of the monitoring procedures and activities implemented during the event, including any deviations/modifications.
2. Compilation of field and laboratory analytical results and QA/QC evaluation of the data (if applicable).
3. Figures showing location of facility, layout of the site and sampling locations.
4. Evaluation of the data, including trend graphs, isoconcentration maps and/or data summary figures, as applicable.
5. As required in Permit Condition III.H.4, S-K will report the estimated groundwater flow rate and direction of each event. Groundwater contour maps with flow direction indications will be presented in the monitoring reports.
6. Presentation of conclusions and proposed modifications to the monitoring or corrective action programs, if applicable.

# APPENDIX A

# GROUNDWATER SAMPLING FIELD FORMS