RESOLUTION NO. R-15-78

A RESOLUTION TO AUTHORIZE THE MAYOR TO EXECUTE AN "ACCESS TO PROPERTY AGREEMENT – ASSESSMENT" IN FAVOR OF THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT.

BE IT RESOLVED by the Board of Commissioners of the City of Coffeyville, Kansas, that the Mayor be and is hereby authorized to execute an "Access to Property Agreement – Assessment" in favor of the Kansas Department of Health and Environment (KDHE), for purposes of allowing KDHE to conduct assessments and/or subsurface investigation work on the property described in the Agreement.

Adopted this 23rd day of June 2015.

_____
Christopher V. Williams, Mayor

ATTEST:

_____
Cindy Price, City Clerk

Approved as to Form and Legality:

_____
Paul Kritz, City Attorney

2015 Trenching Work Plan

Fiberglass Corp of America (FCA)

2601 North 5th Street, Coffeyville Industrial Park
Coffeyville, Kansas

KDHE Project No. C3-063-03007

Kansas
Department of Health
and Environment

June 9, 2015

Prepared by:

Orphan Sites Program

Tiffini Wells, Project Manager
Doug Doubek, Unit Manager
Bob Jurgens, Section Chief

Kansas Department of Health and Environment
Division of Environment
Bureau of Environmental Remediation
Curtis State Office Building
1000 Jackson Street, Suite 410
Topeka KS, 66612

This work plan was prepared by the Kansas Department of Health & Environment's (KDHE) Orphan Sites Program (OSP). This work plan presents the trenching and soil sampling activities proposed for the above referenced site.

Purpose

Previous investigations conducted at the Fiberglass Corp of America (FCA) Site identified a magnetic anomaly located in the southwest corner of the southern parcel (0632041800001005000) now owned by the City of Coffeyville. In September 1995, the KDHE's Bureau of Environmental Remediation (BER) Site Assessment Program (SAP) conducted a Screening Site Inspection (SSI) which included a magnetometer survey on the southern parcel with grid spacing at 20 feet. The survey results indicated an anomalous trend with a magnetic high corresponding to an area with the highest detections of volatile organic compounds (VOCs) in the groundwater, indicating the potential for buried containers. During the SSI, static water levels were found between 9-11 feet below ground surface (bgs), implying that burial depth would be no greater than 10 feet. In May and June 2007, the SAP conducted an Expanded Site Inspection (ESI)/Preliminary Removal Site Evaluation which included a geophysical survey with an EM-31 terrain conductivity meter and a G-858 cesium magnetometer in the southern parcel. An anomaly was again identified in approximately the same area where the SSI anomaly had been found.

The purpose of conducting trenching activities at the FCA Site is to determine whether or not buried waste is present and causing the magnetic anomaly and the elevated VOC groundwater contamination in the immediate area. Contaminants of concern at the site include, but may not be limited to:

- Tetrachloroethylene (PCE), trichloroethylene (TCE), cis 1,2-dichloroethylene (cis 1,2-DCE), trans 1,2-DCE, vinyl chloride, 1,1-dichloroethylene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and 1,1-dichloroethane (1,2-DCA).

The City of Coffeyville will be redeveloping the site area for the location of a new electrical power plant, with major construction activities to begin in October 2015. An excavator will be used to dig three trenches to an approximate depth of 9-10 feet bgs, from east to west, across the anomaly area. The anomaly area is square in shape and measures approximately 125 feet east to west and 120 feet north to south. Soil samples will be collected from the excavator bucket and analyzed for VOCs. Field management activities described below will be conducted by KDHE/BER OSP personnel and excavation work will be conducted by City of Coffeyville personnel. The tentative KDHE Field team is as follows:

Tiffini Wells (Site Safety Officer)
Environmental Scientist II
Field Manager

All field activities not specifically described herein will be conducted in accordance with the KDHE/BER Quality Management Plan and relevant KDHE/BER Standard Operating Procedures (SOPs), which are found in Attachment IV. The SOPs which pertain to this investigation are as follows:

BER-03	*Collection of Soil Sample for Laboratory Analysis;*
BER-05	*Decontamination of Equipment;*
BER-08	*Characterization and Disposal of Investigation-Derived Waste;*
BER-11	*Evaluation and Validation of Data;*
BER-12	*Collection of Quality Control Samples;*
BER-13	*Headspace Method for Screening Soil Samples for Volatile Organic Compounds;*
BER-18	*Field Safety Protocol;*
BER-19	*Chain of Custody;*
BER-21	*Levels of Protection for Field Work;*
BER-30	*Operation of the Photoionization Detector;*
BER-32	*Acquisition of Location Data Using Global Position System (GPS) General Practice for Hand Held Units;*

In addition, OSP field sampling activities will be conducted in accordance with the Generic Quality Assurance Project Plan (QAPP) for Integrated Site Assessment Activities developed by KDHE. The generic QAPP, dated July 2013, has

been approved by both KDHE and the U.S. Environmental Protection Agency (USEPA). The Health and Safety Plan is provided in Attachment III.

Site Location

The FCA Site is located at 2601 North 5th Street, southwest of the T-intersection of E Street and North 5th Street within the Coffeyville Industrial Park and Airport located along US-Highway 169, located approximately three miles northeast of the City of Coffeyville in Montgomery County in Sections 7 and 18, Township 34 South, Range 17 East (See Attachment I, Figure 1).

The site property is divided into two parcels: the north parcel (0632030700000007000) containing the former FCA facility buildings and the south parcel (0632041800001005000) which is a vacant grassy lot. The site lies on the southwestern edge of the industrial park and consists of four buildings: an office, a warehouse, a fabrication shop, and a sink manufacturing shop. An electric sub-station lies to the northwest of the site. Large, flat grassy areas lie to the west and south of the property. East of the site is the Coffeyville Ind Park-Dixon Industries site (C3-063-72399) located on property currently owned by RSI Home Products Manufacturing Inc. The Coffeyville Municipal Airport lies on the eastern side of the industrial park.

Brief Site History

The U.S. Army constructed the Coffeyville Army Airfield (CAAF) in 1942. The CAAF was used as a basic training facility until its deactivation in 1946. The industrial park now occupies the former airfield.

The FCA began operations in Aug 1971, which consisted of the manufacturing of marble tops, skylights, and fiberglass tubs and shower stalls. In Nov 1982, KDHE's Bureau of Waste Management (BWM) conducted a Resource Conservation and Recovery Act (RCRA) inspection and identified waste acetone (which also contained fiberglass resin) as hazardous waste. In Nov 1988, BWM conducted a RCRA inspection. FCA was instructed to collect waste acetone into closed containers. BWM noted illegal disposal of waste resin, gel coat, fiberglass overspray, and acetone was being dumped on the ground near the SE corner of the fabrication (fab) shop and outside of the south door on the west side of the fab shop. The inspection also noted numerous 55-gallon drums and surface debris in a disposal pit located SW of the fab shop. The FCA stated that the disposal pit was a remnant of a disposal trench from the CAAF.

BWM revisited the site in March 1989 to delineate the extent of the contamination. However, the dumping areas were so cluttered with surface debris that sample collection was not possible. BWM returned after FCA had removed the debris, and several holes were dug around the dumping area located southeast of the fab shop for sample collection. The disposal pit southwest of the fab shop was investigated and more fiberglass debris and paint residue were noted. FCA was unable to account for a credible waste acetone storage and disposal system; and admitted to previously disposed of the waste acetone by dumping it on the ground. In July 1989, BWM was onsite to monitor the soil excavation of the area southeast of the fab shop. Excavation work ceased when groundwater began to drain into the area. In November 1989, BWM visited the site and noted the soil had been stockpiled and covered with plastic sheeting.

In Sept 1992, BWM observed the excavation of contaminated soils from the east side of the disposal pit. Paint wastes, old metal turnings, salt-like materials, and soils colored blue/red/green/yellow were observed. Excavating activities were halted and the excavated soil was covered with plastic sheeting. The site was then referred to KDHE's BER in 1993 for further investigation. In May 1994, BER's SAP conducted a Preliminary Assessment (PA), which concluded that the site had hazardous levels of metals and VOCs in the soils. The contamination appeared to include contamination unrelated to the FCA facility. In Sept 1995, the SAP conducted a SSI. A magnetometer survey was conducted on the southern parcel. An anomalous area was identified that corresponded to the highest VOC detections in groundwater. The SSI indicated former operations by the CAAF and potentially other industrial park businesses prior to the FCA have impacted groundwater. Surface water results indicate that operational practices by Coffeyville Aircraft, Inc. had impacted the surface water. The Coffeyville Aircraft Inc site (C3-063-70119) which was later addressed by KDHE's Voluntary Cleanup Program (VCP). Other sources of VOCs in groundwater were present upgradient of the FCA site near the areas of the former CAAF hangars.

In May and June 2007, the SAP conducted an ESI. A magnetometer survey indicated an anomaly where the SSI anomaly was identified. The ESI results indicated that multiple VOC source areas are affecting the site including the hangars,

sewer lines connected to the hangars, and potentially buried wastes in the southern parcel. In Sept 2008, the SAP conducted a Site Reconnaissance and Evaluation (SRE) at the Coffeyville Ind Park-Dixon Industries site (C3-063-72399) after work at the FCA site revealed VOC contamination near the former Dixon building. The Dixon facility did not appear to be a source area for PCE. Additional work for the Dixon site was not recommended as the upgradient source areas would be further investigated as part of the Coffeyville Industrial Park-South Hangar site (C3-063-72398).

A Phase I & Phase II Brownfields Targeted Assessment (BTA) was completed through KDHE's Brownfields Program in March 2015. Recognized environmental conditions (RECs) and historical RECs (HRECs) were identified at the site including PCE and TCE groundwater contamination, offsite sources of groundwater contamination, the magnetic anomaly, former disposal areas, and waste materials. It was recommended to determine the source of groundwater contamination in the southwest portion of the site.

Geology/Hydrogeology

Two primary soil types have been identified within the site boundaries, namely the Eram-Urban land complex on 2-6 percent slopes; and the Parsons silt loam, nearly level to 1 percent slope. Both soil types belong to the Kenoma-Woodson-Zaar soil association. The majority of the site is underlain by the Parsons silt loam, and the areas around the hangars, runways, and taxiways at the airport as well as disturbed developed areas are underlain by the Eram-Urban land complex.

Permeability is very low in the soil, with high water capacity. Surface runoff is slow. Due to high clay content, shrink-swell potential is high. Historical activity in the industrial park has likely altered native soil types significantly. Quaternary terrace deposits sit atop bedrock of Kansas City Group formations, which are Pennsylvanian-aged shale and limestone sequences. Bedrock is typically found around 30 feet below ground surface. The bedrock acts as a lower confining layer.

The site is located along the gentle uplands along the east flank of the Verdigris River valley. The surficial unconsolidated geologic sequence consists primarily of terraced deposits and alluvium of the Pleistocene age. In the eastern site area, occupied by the airport, colluvial soils formed from weathered bedrock comprise the surficial unconsolidated sequence along the ridges and slopes. The alluvium and terrace deposits range from a thin colluvial mantle of 10 feet or less on the valley edge in the uplands to over 60 feet deep near the river or former river paleochannels. The Verdigris River alluvium and associated terrace deposits contain stratified sands, silts, clays, and occasional basal gravel layers.

Groundwater flow in the area is towards the west-southwest towards Big Hill Creek, which is approximately 1 mile west of the site. Big Hill Creek drains into the Verdigris River approximately 3.5 miles southwest of the site.

Property Access and Utility Clearance

Permission to commence with trenching activities on the property will be obtained from the City of Coffeyville prior to field activities. Permission to access real property will be documented through an access agreement, which will be kept onsite with the work plan for the duration of field activities. The City of Coffeyville will also mark recently surveyed property boundaries prior to field activities.

Utility lines within the areas of investigation will be marked before commencing direct-push activities. A request for utility line locates will be made by KDHE through the Kansas One-Call. Utility clearance documentation will be kept on-site during all field activities. Private utility line clearance will be completed by the City of Coffeyville before commencing direct-push activities.

Work Plan

Trenching

Prior to commencing with any trenching activities, KDHE will ensure that utilities have been properly marked and cleared, both in the public right-of-ways by Kansas One-Call and on the City of Coffeyville's private property by the City's respective utility providers. The City of Coffeyville will mark the proposed water line location. The City of Coffeyville will provide an excavator and its operator to dig three trenches to an approximate depth of 9-10 feet bgs, from east to west, across the anomaly area. The trenches will be spaced approximately 40 feet apart using a measuring wheel. Combined, all three trenches will total approximately 375 linear feet (see Attachment I, Figure 2). The final location, distances, and depths of the trenches may be readjusted by KDHE based on real-time field conditions. The first trench will

be dug through or as close as possible to the proposed water line location, with the subsequent trenches being dug moving northward. A metal plate may be placed over the teeth on the excavator bucket in order to avoid potentially puncturing any buried containers, if present. Once trenching activities have been completed, the excavated soil will be placed back into the trenches and tamped down using the excavator.

Soil Sample Collection

Based on field observations and at KDHE's discretion, soil samples will be collected from the excavator bucket and placed into both a plastic bag and an 8 ounce (oz.) unpreserved glass jars capped with a Teflon lid. The soil sample placed into the plastic one-quart zip lock bags will be filled with equal parts soil and air and analyzed with a PID for VOCs. The soil sample in the plastic bag will be allowed to equilibrate with the ambient air temperature for at least five (5) minutes. The PID will be calibrated, and then the probe will be inserted in a small opening in the plastic bag, and the relative concentration of the VOCs in the headspace of the soil sample will be measured. The initial peak reading will be recorded and should occur within the first 30 seconds.

If the PID detects VOCs in the plastic bag, then the soil sample in the jar will be submitted to the laboratory for VOC analysis. The jar will be placed into a cooler on ice immediately after collection for transportation to the Kansas Health and Environmental Laboratories (KHEL) for VOC analysis. Samples will be compacted into the jar to avoid any open air space within the container that would allow for volatilization to occur. Soil samples will be designated by a "SS" followed by numbers "-1" thru "-X". The number of samples to be collected will be determined in the field by KDHE. It is anticipated that no more than a maximum of ten (10) soil samples will be collected, including a duplicate sample for a total of eleven (11) samples.

Air Monitoring

The ambient air around the trenches will be field screened with a PID to monitor the health and safety of the KDHE and City of Coffeyville personnel. The Occupational Safety and Health Administration (OSHA) has set the Permissible Exposure Limit (PEL) for PCE and TCE at 100 part per million (ppm) for an 8-hour workday over a 40-hour workweek; 200 ppm for 5 minutes in any 3-hour period, with a maximum peak of 300 ppm.

Documentation

Geographic coordinates for the endpoints of the trenches and locations within the trench where soil samples are collected will be obtained using a portable global position system (GPS) in accordance with SOP BER-32. Photographs and field notes will be taken to document trenching activities and soil and site conditions.

Contingencies

- If buried containers are discovered during excavation, the excavation activities will cease immediately and the containers will not be removed or disturbed from the ground. The location(s) of the buried containers will be collected with the portable GPS unit and photographed. KDHE will then contract a consultant certified/licensed to investigate, identify, and properly remove the potentially hazardous waste and impacted soils. The time frame for this proposed work, if necessary, will be arranged as soon as possible to avoid impacting the City of Coffeyville's onsite construction plans in October 2015.

- In the event solid waste or a buried container is removed from the ground or if a buried container is accidently punctured, KDHE will have an over-pack drum present to place the material into. Plastic sheeting will also be placed underneath the over-pack drum to protect the ground surface. The over-pack drum and plastic sheeting will remain onsite until such time that KDHE's consultant aforementioned in the previous bullet point may address the waste.

- If during excavation activities, the PID ambient air reading near the trenches reaches or exceeds 100 ppm, KDHE and the City of Coffeyville personnel will evacuate the area by moving uphill and upwind of the excavation area to allow the air concentrations to dissipate. KDHE will use the PID to continue to monitor the air quality until levels have continuously stayed below the OSHA PEL.

Laboratory Analysis

Soil samples will be sent to KHEL in Topeka, Kansas to be analyzed for VOCs by EPA Analytical Method 8260. Sampling method 8260 has a maximum holding time of 14 calendar days.

Quality Assurance and Quality Control (QA/QC)

Quality assurance will be achieved by performing sampling in agreement with appropriate SOPs in accordance with KDHE's Generic Quality Assurance Project Plan (QAPP). The Site-Specific Quality Assurance (SSQA) Project Plan Addendum is provided in Attachment II.

Soil Samples

Laboratory samples will be labeled and placed in a cooler on ice immediately after collection to keep the temperature at 4° C or less for transporting to the laboratory. Chain of Custody procedures will be followed in accordance with SOP BER-19. All reusable sampling equipment that comes into contact with sampled media will be decontaminated prior to the collection of additional samples in accordance with SOP BER-05. During the sampling event, field QA/QC samples will include one field duplicate. Quality assurance and quality control samples will be analyzed for VOCs by EPA Analytical Method 8260.

PID Calibration

The PID will be calibrated according to the manufacturer's specifications at a minimum frequency of once per day prior to the first sample being analyzed each day. A calibration standard gas should be used that is similar to the contaminants of concern at the site. Periodic calibration verifications will be completed every two (2) hours or every ten (10) samples, employing the standard gas. If at any time the PID results appear erratic or inconsistent with field observations, the unit will be recalibrated. If calibration is difficult to achieve, the unit's map should be checked for dirt or moisture and cleaned as necessary. If site conditions are humid or wet, the unit should be calibrated on a more frequent basis.

Sampling Plan Deviations

Field observations and/or sample screening may suggest the need to revise field activities in order to more accurately characterize the extent of impact. If revisions to this plan are necessary all revised activities will be conducted in accordance with the quality control documents referenced above.

Investigation-Derived Wastes

Investigation-Derived Wastes (IDW) likely to be generated during the trenching activities includes soil piles or berms generated from the trench excavations and personal protective equipment (PPE). IDW will be managed in accordance with SOP BER-08. PPE will be placed into trash bags and taken off-site and properly disposed of in a solid waste receptacle. Once trenching activities have been completed, the excavated soil will be placed back into the trenches and tamped down with the excavator.

Reporting

Following completion of the investigation, a memorandum will be generated. KDHE anticipates the inclusion of the following components in the report:

- Site History
- Field protocols and scope of work
- Direct comparison of soil data to applicable Risk-based Standards for Kansas (RSK) residential and non-residential soil and soil-to-groundwater values and soil saturation
- Deviations from approved work plan
- Recommendations for future actions
- Documentation: Field notes, photographs and photographic log, chain of custody documentation, laboratory analysis reports, GPS data

A copy of the final report will be provided to the City of Coffeyville.

Contacts

- City of Coffeyville
  Deputy Director of Electric Utilities
  Mike Shook
  P.O. Box 1629
  Coffeyville, KS 67337
  Office: (620) 252-6086
  Cell: (620) 688-0519
  Fax: (620) 252-6173
  Email: mshook@coffeyville.com

KDHE Spills 24/7 Hotline
(785) 291-3333

Soil Sample Analysis:

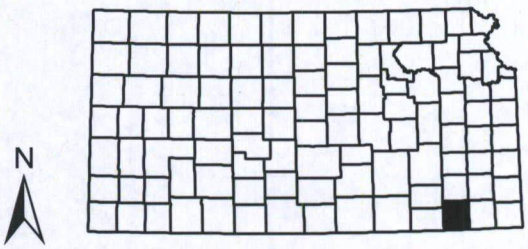
KHEL	Method	Sample Container	Preservation	Maximum Holding Time	Volume
VOCs	8260	Glass jar	Solvent-Rinsed Temp: <4°C	14 days	8 ounces (oz.)

ATTACHMENT I

Figures

Sources: Esri, DeLorme, NAVTEQ, USGS, NRCAN, METI, iPC, TomTom

Montgomery County



Kansas Department of Health and Environment

SITE: Fiberglass Corp of America (FCA) Site Coffeyville, Kansas				
TITLE: Site Location				
PROJECT PHASE:		2015 Trenching		
DRAWN BY:	TW	5/20/15	BASEMAP DATE:	2013
CHECKED BY:	TW	5/20/15	Figure 1	

Legend

- Proposed Trenches
- Former Army Airfield Drainage Utility
- Former Army Airfield Water Line
- Magnetic Anomaly
- City of Coffeyville Property Boundary (Estimated)
- Former Army Airfield Building Locations
- Local Roads
- Present-day Sewer Line (Estimated)

N

0 75 150 300 Feet

Kansas Department of Health and Environment

SITE: Fiberglass Corp of America (FCA) Site Coffeyville, Kansas				
TITLE: Proposed Trench Locations and Site Layout				
PROJECT PHASE:		2015 Trenching		
DRAWN BY:	TW	6/4/15	BASEMAP DATE:	2014
CHECKED BY:	TW	6/4/15	Figure 2	

ATTACHMENT II

Site-Specific Quality Assurance Project Plan (SSQA)

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
BUREAU OF ENVIRONMENTAL REMEDIATION
ORPHAN SITES PROGRAM/
SITE-SPECIFIC QUALITY ASSURANCE PROJECT PLAN ADDENDUM (SSQA)

I. SITE NAME AND LOCATION:

NAME: Fiberglass Corp of America (FCA)

ADDRESS OR OTHER LOCATION IDENTIFIER: Coffeyville Industrial Park, 2601 North 5th Street

CITY: Coffeyville	**COUNTY:** Montgomery	**STATE:** Kansas	**ZIP:** 67337
TELEPHONE: NA		**FAX:** NA	

DIRECTIONS TO SITE: Take US-75 South for 86.1 miles. Turn left onto KS-39 East and continue for 10.5 miles. Turn right to merge onto US-169 South and continue for 41.8 miles. Turn left onto 2800 Road/Angola Road. Turn right onto Old US 169 and continue for 0.9 miles. Turn left onto E Street, and turn right onto North 5th Street.

MAP ATTACHED: Yes

II. PROJECT MANAGEMENT AND PROJECT INFORMATION:

PROJECT MANAGER: Tiffini Wells

PROJECT STAFF (List): KDHE Sampling Team

BRIEF SITE BACKGROUND DISCUSSION: A magnetic anomaly has been identified in the southwest corner of the site. KDHE will oversee trenching activities to determine if buried waste is present.

DISTRIBUTION LIST (Check as appropriate):
- ☒ **Unit Chief:** Doug Doubek
- ☒ **Project Manager:** Tiffini Wells
- ☐ **Project QC Officer (if not Project Manager):**
- ☐ **Technicians (Specify all):**
- ☐ **Other (Specify):**

PROJECT DESCRIPTION: This SSQA supplements the Generic QAPP for Integrated Site Assessment Activities of December, 1999, and includes documentation only for the specific site as indicated above. The SSQA is only intended or needed for sites with on-site sampling activity during integrated site assessment activities.

PROJECT TYPE: **(Other/Combination - describe)**
Trenching
(Note: A PRE may also be incorporated into any SRE, PA, SSI, PA/SSI or SSA in the integrated assessment process if appropriate to integrate preliminary removal considerations. In these situations the PRE is only a project component of the PA, PA/SSI, etc. and is generally incorporated as a form attachment).

Quality Objectives and Criteria for Measurement Data:

Accuracy:	☒ **According to Generic Site Assessment QAPP**	☐ **Identified in attached table**
Representativeness:	☒ **According to Generic Site Assessment QAPP**	☐ **Identified in attached table**
Completeness:*	☒ **According to Generic Site Assessment QAPP**	☐ **Identified in attached table**
Comparability:	☒ **According to Generic Site Assessment QAPP**	☐ **Identified in attached table**

Completeness:
A completeness goal of 80% has been established for this project. However, a site disposition may still be possible from the remaining valid data. Critical sample locations are included in (check one): ☐ **Attached table** ☒ **Location map**
☐ **Specified below:** 2015 Trenching Work Plan

Special Training/Certification Requirements:
☒ **OSHA 40-hour (HAZWOPER)** ☐ **Geoprobe Operator** ☐ **Drill Rig Operator** ☐ **Mobile GC Field Analyst**
☐ **In-Field XRF Operator (must be trained and certified, included in KDHE/BER Radiation License and approved by RPO)**
☒ **Other (specify):** Photoionization Detector (PID)

KDHE/BER SITE-SPECIFIC QAPP ADDENDUM FORM

III. DOCUMENTATION AND RECORDS PROPOSED FOR PROJECT:

(Check appropriate boxes):

- ☐ **Field Analytical Sheets**
- ☒ **Site Maps/Figures**
- ☒ **District Notification Forms**
- ☐ **Other Documentation (Specify):**
- ☒ **Log Book**
- ☒ **Chain-of-Custody**
- ☒ **Utility Clearance Forms**
- ☒ **Photos**
- ☐ **Property Ownership Records**
- ☒ **Health and Safety Plan**

IV. SAMPLING PROCESS DESIGN, METHODS, SAMPLE HANDLING, ETC.:

A. General Sampling Approach (Check appropriate boxes):

- ☐ **Random Sampling**
- ☐ **Stratified Random Sampling**
- ☐ **Transect Sampling**
- ☒ **Search Sampling**
- ☐ **Systematic Random Sampling**
- ☐ **Systematic Grid**

B. Screening/Definitive Sampling (Check appropriate boxes):

- ☐ **Screening without Definitive Confirmation**
- ☐ **Screening With Definitive Confirmation**
  NOTE: Minimum Confirmation Rate of 20% for All Field Analytical Screening Samples Collected
- ☒ **Definitive Sampling**

C. Biased/Judgemental Sampling: ☒ **Yes** ☐ **No** **(If Yes, the following applies):**

The proposed sampling scheme will be judgemental in accordance with EPA's *Guidance for Performing Site Inspections under CERCLA,* EPA/OSWER 9345.1-05, 1992, and *Removal Program Representative Sampling Guidance, Volume 1,* EPA/OSWER 93600.4-10, 1991. Judgemental sampling is the subjective (biased) selection of sampling locations based on available information, visual inspection, and the best professional judgement of the sampler. Soil and ground water sample locations will be selected to detect hazardous substances or pollutants or contaminants near suspected sites. Sample locations depicted in the site sketch are approximate and subject to change based on field conditions and data. The number of samples is approximate and subject to change based on site conditions and suspected source areas or size of impacted areas. The number of samples is a balance between cost and coverage and represents a reasonable attempt to meet study objectives while staying within the budget constraints of typical site assessment activities. Subsurface soil depths are selected to detect suspected subsurface releases and potentially identify source areas. Depth of Geoprobe samples is selected based on suspected depth to ground water and limitations of sampling equipment for conditions at the site. Actual depths may vary in the field based on field conditions encountered.

(If No, explain the alternate sampling rationale and approach):

Sample Methods Requirements (Specify all to be utilized):

Matrix:	KDHE SOPs:	Sampling Equipment Proposed:
Soil	BER-03, BER-05, BER-08, BER-11, BER-12, BER-13 BER-18, BER-19, BER-21, BER-30, BER-32	PID, zip lock plastic bags, 4 oz. glass jars

Sample Handling and Custody Requirements (Check appropriate box):

☒ **In accordance with Generic QAPP and SOPs** ☐ **Other (specify):**

Analytical Methods Requirements (Check appropriate box):

☐ **Identified in Attached Table** ☒ **Identified Below (Describe):** Volatile Organic Compounds (VOCs) by EPA Analytical Method 5030/8260.

Quality Control Requirements (Check appropriate box):

☐ **Not Applicable** ☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

Describe Field QC Samples to be collected: 1 duplicate

KDHE/BER SITE-SPECIFIC QAPP ADDENDUM FORM

Instrument/Equipment Testing, Inspection and Maintenance Requirements (Check appropriate box):

☐ **Not Applicable** ☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

Describe instrument/equipment, etc. proposed for use in this project subject to the above requirements:

Inspection/Acceptance Criteria for Supplies and Consumables (Check appropriate box):

☐ **Not Applicable** ☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

Data Acquisition Requirements (Check appropriate box):

☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

Data Management (Check appropriate box):

☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

Assessment and Response Actions (Check appropriate box):

☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

Corrective Action (Check appropriate box):

☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

Assessment Reporting (Check appropriate box):

☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

V. DATA VALIDATION AND USABILITY:

(Check appropriate box):

☒ **Data review and verification will be performed in by Project Manager or QC officer delegate in accordance with Generic QAPP, with data validation conducted according to BER-11 and Generic QAPP**

☐ **Data review, validation and verification will be performed as follows with data validation conducted according to alternate methods (describe):**

Field analysis utilized? No **(If yes, memorandum, field analytical sheets, etc. from field analyst should be reviewed by Project Manager/Site QC Officer after completion of field analysis).**

VI. RECONCILIATION WITH USER REQUIREMENTS:

☒ **In accordance with Generic QAPP** ☐ **Specific requirements (state):**

KDHE/BER SITE-SPECIFIC QAPP ADDENDUM FORM

VII. SIGNATURES/APPROVAL:

Tiffini Wells

Project Manager Name	Signature	Date

Field Analyst Name	Signature	Date

Field Analyst Name	Signature	Date

Doug Doubek

Unit Chief or Section Chief	Signature	Date

Google

Drive 151 miles, 2 h 36 min

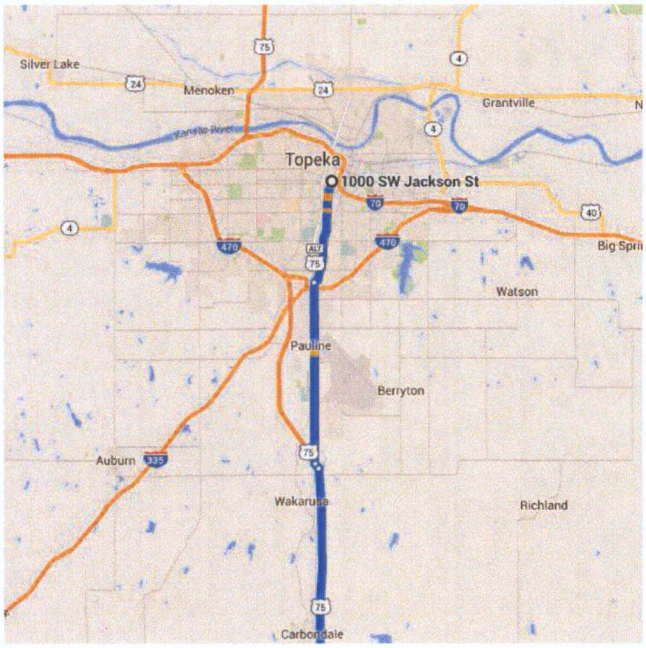
Directions from **1000 SW Jackson St** to **N 5th St**

1000 SW Jackson St

Topeka, KS 66612

Get on **US-75 S** in Williamsport from **S Kansas Ave** and **US-75 ALT S/SW Topeka Blvd**

10.3 mi / 18 min



1. Head **north** on **SW Jackson St** toward **SW 10th Ave**

   240 ft

2. Turn **right** at the 1st cross street onto **SW 10th Ave**

   440 ft

3. Turn **right** at the 1st cross street onto **S Kansas Ave**

   3.7 mi

4. Turn **left** onto **US-75 ALT S/SW Topeka Blvd**

   6.2 mi

5. Turn **left** to merge onto **US-75 S** toward **Lyndon**

   0.2 mi

Follow **US-75 S** to **KS-39 E** in Wilson County

87.0 mi / 1 h 24 min

6. Merge onto **US-75 S**

86.1 mi

7. Continue onto **KS-39 E**

0.9 mi

Get on **US-169 S** in Tioga from **KS-39 E**

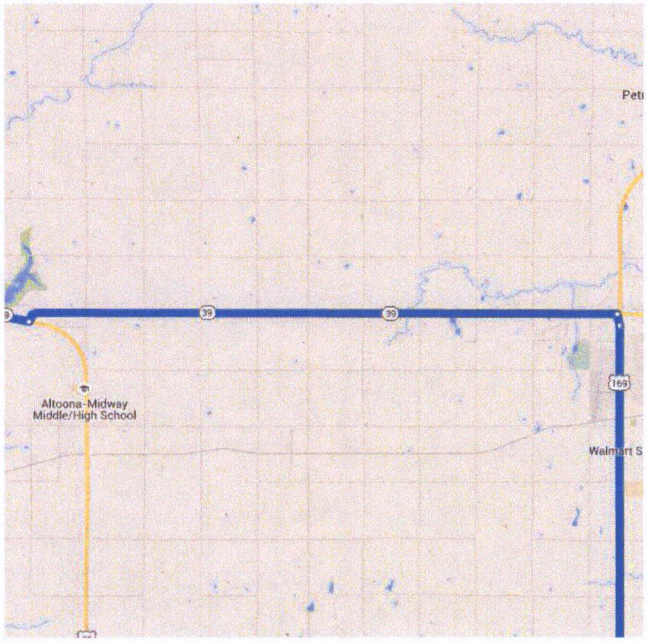
10.7 mi / 10 min

8. Turn **left** to stay on **KS-39 E**

10.5 mi

9. Turn **right** to merge onto **US-169 S** toward **Coffeyville**

0.2 mi



Merge onto **US-169 S**

41.8 mi / 39 min

Take **Old U.S. 169** to **N 5th St**

1.3 mi / 5 min

11. Turn **left** onto **2800 Rd/Angola Rd**

0.2 mi

12. Turn **right** onto **Old U.S. 169**

0.9 mi

13. Turn **left** onto **E St**

0.2 mi

14. Turn **right** onto **N 5th St**

0.1 mi

N 5th St

Liberty, KS 67351

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

ATTACHMENT III

Health and Safety Plan

Kansas
Department of Health
and Environment

Health and Safety Plan

Fiberglass Corp of America (FCA)

2601 North 5th Street, Coffeyville Industrial Park
Coffeyville, Kansas

KDHE Project No. C3-063-03007

Orphan Sites Program
Bureau of Environmental Remediation
Kansas Department of Health & Environment
1000 SW Jackson, Suite 410, Topeka, Kansas

June 4, 2015

This health and safety plan must be read by all persons working at the site. Any health or safety concerns should be brought to the attention of the site safety officer or site manager immediately.

Personnel on Site	**Responsibility**
Tiffini Wells	Site Safety Officer/Field Manager
City of Coffeyville Personnel	Excavator Operator

Project Description/Objectives

The purpose of conducting trenching activities at the FCA Site is to determine whether or not buried waste is present and causing the magnetic anomaly and the elevated volatile organic compound (VOC) groundwater contamination in the immediate area. Contaminants of concern at the site include, but may not be limited to:

- Tetrachloroethylene (PCE), trichloroethylene (TCE), cis 1,2-dichloroethylene (cis 1,2-DCE), trans 1,2-DCE, vinyl chloride, 1,1-dichloroethylene (1,1-DCE), 1,1,1-trichloroethane (1,1,1-TCA), and 1,1-dichloroethane (1,2-DCA).

The City of Coffeyville will be redeveloping the site area for the location of a new electrical power plant, with major construction activities to begin in October 2015. An excavator will be used to dig three trenches to an approximate depth of 9-10 feet bgs, from east to west, across the anomaly area. The anomaly area is square in shape and measures approximately 125 feet east to west and 120 feet north to south. Soil samples will be collected from the excavator bucket and analyzed for VOCs.

Site Description

The FCA Site is located at 2601 North 5th Street, southwest of the T-intersection of E Street and North 5th Street within the Coffeyville Industrial Park and Airport located along US-Highway 169, located approximately three miles northeast of the City of Coffeyville in Montgomery County in Sections 7 and 18, Township 34 South, Range 17 East.

The site property is divided into two parcels: the north parcel (0632030700000007000) containing the former FCA facility buildings and the south parcel (0632041800001005000) which is a vacant grassy lot. The site lies on the southwestern edge of the industrial park and consists of four buildings: an office, a warehouse, a fabrication shop, and a sink manufacturing shop. An electric sub-station lies to the northwest of the site. Large, flat grassy areas lie to the west and south of the property. East of the site is the Coffeyville Ind Park-Dixon Industries site (C3-063-72399) located on property

currently owned by RSI Home Products Manufacturing Inc. The Coffeyville Municipal Airport lies on the eastern side of the industrial park.

Non-Chemical Physical Hazards

Hazards associated with slips, trips, and falls. Temporarily open trenches (confined spaces) with depths to approximately 9-10 feet below the ground surface.

Cold Related Problems

Hypothermia: A loss of body temperature. Results when body temperature falls below 95°F. Hypothermia can occur at any time the ambient temperature is below 70°F.

Prevention: Dress in layers, avoiding cotton close to the skin (absorbs moisture instead of wicking it away). Footwear should also be layered; keep the head covered; drink plenty of water; eat high energy foods (peanuts, beef stick, granola bars, and complex carbohydrates)

Symptoms: Weakness, slowed heart rate, drowsiness, confusion, speaking difficulty, shivering, pale and puffy complexion, trembling on one side of body, muscle stiffness.

First Aid: CALL 911; put blankets, towels, extra clothing on person, cover the head and neck area, move the person to a warm room or vehicle. GRADUALLY warm the victim. Warm liquids are okay to give, but NO HOT LIQUIDS.

Heat Related Problems

Heat Exhaustion: Results from either excessive perspiration or the inadequate replacement of water lost through sweating.

Prevention: Maintain intake of cool liquids throughout the day and evening. Drinking containing caffeine should be avoided. Take frequent work breaks in shaded areas. Wear loose fitting clothing and light colors.

Symptoms: Heavy sweating, weakness, fast pulse, headache, dizziness, nausea, and vomiting.

First Aid: Move person to a cool place; loosen cloth; cool victim with wet towels or cold packs; monitor victim and seek medical attention.

Chemical Hazards

CHEMICAL	EXPOSURE SYMPTOMS	FIRST AID	USES
Tetrachloroethylene (PCE) Trichloroethylene (TCE)	Headaches, drowsiness, dizziness, confusion, unconsciousness, nausea, & difficultly speaking and walking.	Remove person from the source, move to fresh air, see a doctor if symptoms persist.	Dry cleaning and textile processing, a chemical intermediate, and for industrial metal cleaning.

Exposure Potential Low X Medium__ High

Level of Protection

D-The level of protection may be upgraded by the site safety officer or site manager if site conditions change.

Emergency Contacts

Police: 911

Ambulance: 911

Fire: 911

Hospital: (620) 251-1200 Coffeyville Regional Medical Center, 1400 W. 4th Street, Coffeyville, Kansas 67337

Poison Control: 1-800-332-6633

Directions to Hospital (map attached): From the site, head north on N. 5th Street. Turn left onto E Street. Turn left onto Old US-169 and continue for 1.5 miles. Turn left onto US-169 South and continue for 2.9 miles. Turn right onto E. 4th Street and continue for 2.4 miles. The Coffeyville Regional Medical Center at 1400 West 4th Street will be on your right.

Personnel On Site	Signature (Verifying Review of H&S Plan)	Date
Tiffini Wells (KDHE)		

Google

Drive 7.1 miles, 14 min

Directions from **N 5th St** to **Coffeyville Regional Medical Center**

N 5th St

Liberty, KS 67351

1. Head **north** on **N 5th St** toward **E St**

0.1 mi

2. Turn **left** at the 1st cross street onto **E St**

0.2 mi

3. Turn **left** onto **Old U.S. 169**

1.5 mi

4. Turn **left** onto **US-169 S**

2.9 mi

5. Turn **right** onto **E 4th St**

Destination will be on the right

2.4 mi

Coffeyville Regional Medical Center

1400 West 4th Street, Coffeyville, KS 67337

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

ATTACHMENT IV

KDHE Standard Operating Procedures (SOPs)

STANDARD OPERATING PROCEDURE – BER-03

COLLECTION OF SOIL SAMPLES FOR LABORATORY ANALYSIS

Effective Date: February 5, 2000
Revised Date: January 1, 2011

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ATTACHMENT A Soil Sample Data Form

DISCLAIMER:

This Standard Operating Procedure (SOP) was developed based on a compilation of best available information, knowledge, field experience, and general industry practices to provide guidance to KDHE staff in performing the activities defined herein, in a consistent and standardized manner. This document does not contain regulatory or statutory requirements unless specified.

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In general, this document should be used as a reference. Differences may exist between the procedures referenced in this document and what is appropriate under site-specific conditions. This document does not represent an endorsement of practitioners or products mentioned in the document.

1.0 INTRODUCTION

The objective of this Standard Operating Procedure (SOP) is to establish guidelines for the collection of soil samples for fixed laboratory analysis. Please note that this SOP is not applicable for collection of soil samples for field screening purposes (e.g., immunoassay or colorimetric test kits screening, among others) that may have special container and sample processing requirements (refer to KDHE SOP BER-31, *Field-based Colorimetric Analysis*). This SOP is applicable for collection of soil samples from hand auger samplers, slide-hammer samplers, grab samples from stockpiled or land farmed soils, surface samples, and test pit or excavation confirmation samples, among others. To collect soil samples from split-spoon samplers during drilling, please refer to SOP BER-06, *Installation of Monitoring Wells*. To collect soil samples using direct-push technology (DPT) such as a Geoprobe®, please refer to KDHE SOP BER-07, *KDHE Geoprobe Operations*. Additionally, sampling protocol techniques for U.S. Environmental Protection Agency (EPA) Method 5035, *Closed-System Purge-and-Trap and. Extraction for Volatile Organics in Soil and Water Samples*, are not included in this SOP. Collection of soil samples by Method 5035 should follow the appropriate manufacturer or laboratory-specific protocol.

2.0 METHOD SUMMARY

Soil samples may be collected in either a random or biased manner. Random samples can be based on a grid system or statistical methodology. Biased samples can be collected in areas of visible impact, from locations required to meet regulatory compliance or in suspected source areas, among other locations. Soil samples can be collected at the surface, shallow subsurface, or at depth. Commonly, surface sampling refers to the collection of samples at a depth interval of 0 to 12 inches. When samples are collected at depth, the water content should be noted, since generally "soil sampling" is restricted to the unsaturated zone. Certain regulatory agencies may define the depth interval of a surface sample differently, and this must be defined in the work plan/sampling plan. A detailed description of the sampling locations and proposed methods of sample collection should be included in the work plan/sampling plan.

Similar to sediment sample collection, collection of surface soil samples is most efficiently accomplished with the use of a stainless steel trowel or scoop. However, equipment selection will ultimately be determined by the depth of the sample to be collected, surrounding terrain, and accessibility. For samples at greater depths, a bucket auger, power auger, or slide-hammer may be needed to advance the hole to the point of desired sample collection. To collect samples at depths greater than practical with hand equipment, the use of a drill rig with a split spoon sampler or a DPT rig equipped with a soil coring device may be

necessary. In some situations, such as confirmation sampling of excavation sidewalls or floors, sample locations may be accessed with the use of a backhoe.

3.0 MATERIALS/EQUIPMENT

The following materials and equipment may be required. Please note that this is not an exhaustive list of all materials and equipment potentially necessary for all soil sampling events, but is intended as a guideline for items commonly used. Site-specific sampling requirements may dictate the use of additional items not included in the following list. Ensure that ample time is allowed for obtaining necessary sampling apparatus from the analytical laboratory in advance of mobilizing to the field.

a. An approved work plan/sampling plan which outlines soil sampling requirements.

b. Field notebook, field form(s), Kansas One Call tickets/utility clearance checklist, site maps, chain-of-custody forms, and custody seals.

c. Decontamination supplies (including: non-phosphate, laboratory grade detergent, buckets, nylon scrub brushes, potable water, de-ionized or distilled water, regulatory-required reagents, etc.)

d. Stakes or flags

e. Sampling device (e.g., stainless steel hand auger, slide-hammer soil sampler, stainless steel trowel, etc.). Note: Do not use sampling devices plated with chrome or coatings.

f. Disposable sampling gloves (nitrile, latex, among others).

g. Laboratory-supplied sample containers with labels. If needed, sample liners/sleeves for slide hammer or split-spoon sampler (e.g., brass, stainless steel, acetate), polytetrafluoroethylene (PTFE; Teflon®) tape, and plastic caps.

h. Cooler(s) with double-bagged water ice.

i. Plastic sheeting (minimum 6-mil thickness).

j. Black pen and indelible marker.

k. Zip-lock bags and packing material (e.g., bubble wrap or bubble wrap bags or similar cushioning materials).

l. Tape measure.

m. Paper towels.

n. Clear packing tape.

o. Overnight (express) shipment forms (if needed).

p. Trash bags

q. Global Positioning System (GPS) device

r. Digital Camera

s. Photoionization detector (PID), flame ionization detector (FID), or similar organic vapor measuring instrument.

t. Combustible gas indicator (CGI), if necessary

4.0 DECONTAMINATION

All reusable sampling equipment must be thoroughly cleaned and decontaminated before and after each use according to KDHE SOP, BER-05, *Decontamination of Equipment*. Disposable items such as sampling gloves and plastic sheeting will be changed after each use and discarded in an appropriate manner as general trash.

5.0 PROCEDURE

a. Prior to field sampling activities, determine if utility clearance will be required and, if necessary, perform utility clearance and operation of equipment in accordance with the State of Kansas Underground Utility Damage Prevention Act (Kansas Statutes Annotated [K.S.A.] 66-1801 to 66-1816). Ensure that all access agreements (as required) have been signed and executed prior to mobilizing to the sampling location(s).

b. Use flags or other markers to identify sample locations. If needed, adjust proposed sampling locations based on site access, property boundaries, and surface, subsurface, or overhead utilities or other obstructions.

c. Prior to collecting soil samples, ensure that all sampling equipment has been thoroughly cleaned and decontaminated according to KDHE SOP BER-05 referenced above, and that all equipment is free of mechanical defects and is in working order. Be aware of sampling locations where collection of quality assurance/quality control (QA/QC) samples may require additional soil volume to be collected to fulfill QA/QC sampling requirements.

d. Wearing disposable sampling gloves and using a clean, decontaminated sampling device (e.g., stainless steel hand auger, slide-hammer soil sampler, stainless steel trowel, or shovel, among others), clear surface debris (e.g., rocks, vegetation, trash or other obstructions) from the sample location to expose a fresh soil surface for soil sample collection. For collection of deeper soil samples, a shovel, auger, or mechanical excavator

may be used or required to excavate or retrieve soil from the desired sampling depth.

e. Using disposable gloves and a pre-cleaned, stainless steel spatula, scoop, or spoon for each sample, extract the soil sample from the sampler or collect the sample from the surface, stockpiles, or landfarms. Disposable plastic spoons may also be used.

f. Sample parameters should be collected in the following order, based on volatility:

g. Volatile organic compounds (VOCs)

h. Semi-volatile organic compounds (SVOCs), including pesticides, herbicides, total petroleum hydrocarbons – gasoline range organics (TPH-GRO), TPH-diesel range organics (TPH-DRO), and polychlorinated biphenyls (PCBs).

i. Metals.

j. Place the sample in a laboratory-supplied, pre-cleaned sample container. Soil collected for VOC (EPA SW-846 Method 8260B) analysis should be transferred to sample containers with PTFE-lined lids as quickly as possible to avoid loss of volatile contaminants. When using sample sleeves or liners, PTFE film should be placed between the sample and the end caps. If elevated contamination is suspected in any of the samples collected, it is suggested that these samples be placed in a separate cooler than background or other less contaminated soils to reduce the possibility of cross-contamination.

k. Project-specific requirements may dictate that VOC samples be collected for analysis by EPA SW-846 Method 5035. Collection of samples for EPA SW-846 Method 5035 involves the use of specific sampling apparatus (e.g., TerraCore®, EnCore®) in addition to specific containers and preservatives. Follow the manufacturers' and/or laboratory instructions for sample collection and handling for EPA SW_846 Method 5035. Ensure that sufficient volume of soil for dry weight analysis is included with the aliquot for EPA SW-846 Method 5035 analysis.

l. Label the sample container with appropriate information such as client name, site location, sample identification, date and time of collection, sampler's initials, preservative (if any), and analyses requested. Additional project-specific identifiers and/or labeling may also be required.

m. Specific sample homogenization procedures shall be described in the work plan/sampling plan and approved by KDHE in advance of sampling activities. Samples for VOC analysis will not be homogenized unless required or approved by KDHE. To prepare composite soil samples in the field, equal portions of the sample, either by volume or weight, must be collected from selected sampling locations. Discrete sample aliquots must be placed either on a plastic sheet or in an appropriate container, such as an aluminum or stainless steel pan or bowl, in order to homogenize the sample. If placed on a plastic sheet, the sample will be homogenized by quartering the sample by the repeated diagonal folding of the corners. If placed in a pan or bowl, the sample will be homogenized by mixing with an appropriate tool such as a stainless steel spoon. Alternatively to homogenizing in the field, several discrete samples may be submitted to the laboratory for homogenization.

n. After the sample has been collected (homogenized as appropriate) and put into a container, labeled, and logged in detail, place it in a zip-lock bag and store on ice in a cooler at a temperature between 2° and 6°C for shipment to the laboratory.

o. Complete chain-of-custody form(s), accounting for all samples collected.

p. Soil samples should be delivered to the laboratory as soon as practicable. Check the work plan to determine if any analytes require expedited delivery due to short holding times. If necessary, make advance arrangements with the laboratory for after-hours or Saturday delivery.

q. If field-based analysis or field screening are being performed on the soil samples, follow the appropriate SOP: BER 25, *Mobile Laboratory*; BER 27, *Collection of Solid Samples for XRF Analysis*; BER 13, *Headspace Method for Screening Soil Samples for Volatile Organic Vapors*.

r. The field logbook and appropriate forms should include, but not be limited to the following information: site location, sample location, sample depth, sample identification, date and time collected, sampler's name, method of sample collection, number and type of containers, geologic description of material, description of decontamination procedures, and any other pertinent information. Soil should be described using the Unified Soil Classification System (USCS. A site map should be prepared with exact measurements to each sample location should follow-up sampling be necessary. Additionally, photographs of sampling locations should be taken, and a GPS instrument should be used to document sampling locations.

s. Abandon surface soil sampling locations by backfilling with the removed soil material and/or bentonite chips or pellets. If asphalt or concrete coring is required to access subsurface soil, patch or repair as necessary to match the existing surface materials. Thoroughly decontaminate all reusable sampling equipment. Discard any disposable material or waste generated at the site in an appropriate manner. Manage investigative-derived wastes as prescribed by the approved work plan/sampling plan.

6.0 REFERENCES

U.S. Environmental Protection Agency (EPA), Environmental Response Team (ERT). Soil Sampling, SOP No. 2012, Revision 0.0. February 18, 2000.

EPA, ERT. Superfund Program Representative Sampling Guidance, Volume 1 – Soil. Office of Solid Waste and Emergency Response Directive 9360.4-10EPA 540/R-95/141PB96-963207. December 1995.

EPA, Science and Ecosystem Support Division. Soil Sampling. SESDPROC-300-R1. November 1, 2007.

Environmental Standards Inc. March 2009. Standard Operating Procedures for: Soil Sampling for Inorganic Analysis. TVA-KIF-SOP-4. http://www.tva.gov/kingston/sap/TVA-KIF-SOP 04_Soil%20Sampling%20_31%20Mar%2009_.pdf

Triad Environmental Solutions Inc. Sampling and Analysis of Volatile Organic Compounds in Soil Using Direct Push Sampling and Ion Trap Mass Spectrometry. SOP Number- S-08, Revision Number- 2. http://dsd.patc-usa.com/PROMO/DSITMS/Soil%20SOP%20rev2.doc . September 10, 2008.

EPA. Standard Operating Procedures, Soil Sampling. SOP: 2012, Revision: 0.0. http://www.epa.gov/earth1r6/6pd/qa/qadevtools/mod5_sops/soil_sampling/ertsop 2012-soil.pdf. February 18, 2000.

EPA Region 9 Laboratory, Richmond, California. Field Sampling Guidance Document #1205, Soil Sampling. Revision. 2. September 1999. http://www.ecy.wa.gov/programs/eap/qa/docs/QAPPtool/Mod7%20EPA%20SOPs/Soil%20Sampling/Region%209%20Soilsample%20GUI.pdf

ATTACHMENT A

Soil Sample Data Form

Project Name and Code_____

Sample Identification Number_____

Collection Date_____ Collection Time_____

Collector(s)_____

Weather Conditions_____

Sample Location Description

Sample Site Description_____

_____

Latitude_____Longitude_____

Soil Sample Collection Information

Soil Sample Depth_____

Collection Device: Scoop____Split-spoon__Corer_____Other_____

Sample Type: Grab_____Composite_____

Color (Munsell Soil Color Chart Number)_____

Texture (particle size description)_____

Odor_____

QA/QC Samples Collected? (YES or NO and Type)_____

QA/QC Sample ID/Name_____QA/QC Sample ID/Name:_____

Additional Comments_____

_____

_____

_____

STANDARD OPERATING PROCEDURE – BER-05

DECONTAMINATION OF EQUIPMENT

Effective Date: August 14, 2000
Revised Date: January 1, 2011

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In general, this document should be used as a reference. Differences may exist between the procedures referenced in this document and what is appropriate under site-specific conditions. This document does not represent an endorsement of practitioners or products mentioned in the document.

1.0 INTRODUCTION

The objective of this Standard Operating Procedure (SOP) is to establish a consistent process for decontamination of sampling equipment to prevent cross-contamination between sampling locations and events. Preventing cross-contamination in samples is important for reducing the introduction of error into sampling results and for protecting the health and safety of site personnel.

2.0 METHOD SUMMARY

The contamination of equipment requires physical removal by methods such as brushes and high pressure water. This is followed by washing and rinsing the equipment.

3.0 PROCEDURE

1. When applicable, visible contamination should be removed with a metal or nylon brush and/or high pressure water spray.

2. Wash equipment with a non-phosphate detergent solution such as Alconox or an equivalent.

3. Rinse with tap water.

4. Final rinse with deionized/distilled water.

4.0 GENERAL CONSIDERATIONS

1. The use of distilled or deionozed water commonly available from commercial vendors is acceptable for decontamination of sampling equipment. Field blanks may be used to verify the quality of commercially available water.

2. Several procedures can be established to minimize contact with waste and the potential for contamination. For example:

   - Stress work practices that minimize contact with hazardous substances.

   - Use appropriate personal protective equipment (PPE) (e.g. gloves) when handling contaminated equipment; **do not** use contaminated PPE to handle clean equipment.

- Use disposable sampling equipment when appropriate.

3. As part of project planning documentation, develop a decontamination plan before any personnel or equipment enter areas of potential exposure. The equipment decontamination plan may include:

   - The number, location and layout of decontamination stations;
   - Which decontamination apparatuses are required;
   - Methods for disposal of contaminated clothing, disposable equipment and water (can decontamination water be discharged to the ground surface or sanitary sewer, does it need to be treated prior to on-site disposal or disposed off-site).

5.0 SPECIAL CONSIDERATIONS

Sample containers used by KDHE/BER personnel will be decontaminated by the laboratory or vendor from which the containers are obtained.

6.0 GEOPROBE AND DRILL RIG DECONTAMINATION

Specific decontamination procedures are necessary for KDHE's Geoprobe and drill rigs because of the very high frequency of use in KDHE field activities. In general, the following norms apply unless modified by a site-specific work plan. All rods and sampling devices should be visually inspected before use. If visually contaminated, these should not be used. All rods, augers and sampling devices that have been advanced within a contaminated or potentially contaminated site should be decontaminated after use. Decontamination can be done on-site or off-site and should comply with the general instructions above.

Due to the large area required to stage and decontaminate equipment, commercial car washes are frequently utilized for decontamination of Geoprobe rods, drill rig augers and associated sampling devices. Decontamination should be done in a manner compliant with State and local wastewater treatment regulations. The wash facility should be visually inspected before and during decontamination to assure dirt, contaminants, etc. from the facility are not introduced inadvertently during the decontamination process. NOTE: It is important that visible contamination be removed from the probe rods and augers at the site prior decontamination at a car wash. The visible material removed should be treated as Investigative Derived Waste (IDW) in accordance with BER-SOP-08.

If a site is being sampled for constituents frequently occurring in chlorinated water supplies (trichloromethane, trihalomethane compounds, etc.) a rinse blank

sample for volatile organic compounds (VOCs) should be obtained at least once during the decontamination process per site as chlorinated water sources often contain these

constituents, and cross-contamination is a possibility. For sites with other types of contaminants, the site-specific work plan should detail the frequency and type of quality control samples for the decontamination process for Geoprobe and drilling operations.

7.0 REFERENCES

1. United States Environmental Protection Agency (U.S. EPA). Region 4, *Field Equipment Cleaning and Decontamination Operating Procedure.* Document #SESDPROC-205-R1, November 2007.

2. United States Environmental Protection Agency (U.S. EPA) *Sampling Equipment Decontamination,* SOP #2006, August 1994.

STANDARD OPERATING PROCEDURE – BER-08

CHARACTERIZATION AND DISPOSAL OF INVESTIGATION-DERIVED WASTE

Effective Date: August 14, 2000
Revised Date: January 1, 2011

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ATTACHMENT 1 **General Solid IDW Disposal Process Flowchart**

ATTACHMENT 2 **General Liquid IDW Disposal Process Flowchart**

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1.0 INTRODUCTION

The objective of this Standard Operating Procedure (SOP) is to provide general guidelines for management of investigation-derived wastes (IDW) generated during the investigation of potential or actual contaminated sites. These wastes include soil cuttings, drilling muds, purge water, equipment decontamination fluids, disposable personal protective equipment, and other materials. On the basis of project and program requirements, it may be necessary to deviate from the guidelines presented in this SOP. These deviations must be clearly described in associated project planning documentation.

2.0 METHOD SUMMARY

An IDW management strategy or program is a requisite component of project planning documentation. The IDW management strategy must (1) provide safety for on-site personnel, 2) protect human health and the environment, and (3) comply with applicable or relevant and appropriate requirements (ARARs) to the extent practicable. The most important phase of IDW management is planning for waste generation and handling prior to field mobilization. To the extent possible, the IDW management strategy should address IDW minimization, containerization, segregation, characterization, storage, inventory, and identify options for final disposition.

3.0 PROCEDURE

IDW must be characterized at the initial point of generation unless sufficient historical information exists at a particular site or sample location (e.g., a monitoring well where contaminant concentrations have been consistently under applicable threshold levels, etc.). This often necessitates containerization and temporary onsite storage in containers while awaiting sample results. Drums or other containers must be properly labeled (e.g., Waste Awaiting Characterization with contact information provided).

A hazardous waste determination must be made based on the potential listing and toxicity of the IDW. To support waste determinations, IDW samples may be subjected to totals analysis and/or analysis via the toxicity characteristic leaching procedure (TCLP) as per Environmental Protection Agency (EPA) SW-846 Method 1311. The totals analysis results can be used for direct comparison to KDHE's Tier 2 Levels (for solid or liquid IDW), POTW pretreatment standards (for liquid IDW), and maximum concentrations of contaminants for the toxicity characteristic (TCLP threshold levels) as defined in 40 CFR 251.24 (for liquid IDW). Totals analysis for solid IDW can also be used in combination with the Rule of 20 to support comparison to the TCLP threshold levels. The premise behind the Rule of 20 is that during the TCLP analysis, a sample is diluted 20 times. Accordingly, the total concentration results can be compared to the TCLP threshold levels multiplied by 20. If the result is less than 20 times the TCLP

threshold levels for each constituent of concern, then the waste is not a toxicity characteristic hazardous waste. If a solid IDW sample fails the Rule of 20 based on the total waste analysis, it may be a toxicity characteristic hazardous waste and additional samples should be analyzed after TCLP extraction. The TCLP is a leaching procedure that simulates conditions of wastes if they were disposed in a landfill. The TCLP extract is then analyzed by the appropriate methods for the contaminants of concern and those results are compared to the TCLP threshold levels. If it is determined that the IDW is a Resource Conservation and Recovery Act (RCRA) hazardous waste, based on listing or toxicity, RCRA storage, transportation, and disposal requirements become applicable.

The type and frequency of IDW analysis should be discussed in the IDW management strategy on the basis of site-specific information (e.g., amount of waste generated, contaminants of concern, etc.). Use of field analytical technology may be appropriate depending on the contaminants of concern and analytical equipment limitations. If field analysis of IDW is performed, it may also be necessary to submit samples for off-site confirmatory analysis and/or TCLP analysis.

Flow charts depicting the generalized process for managing solid and liquid IDW, including options for disposal, are provided as Attachments 1 and 2. Other options, such as storage of IDW onsite pending implementation of remedial actions, may be appropriate on a site-specific basis.

4.0 GENERAL CONSIDERATIONS

Some general goals for the management of IDW include the following:

- Worker safety;
- Leave the site in no worse condition than existed prior to the investigation;
- Remove wastes that pose an immediate threat to human health or the environment;
- Spread evenly on-site IDW that does not require off-site disposal;
- Minimize the quantity of IDW to the extent practicable;
- Comply with ARARs to the extent practicable; and,
- Consider any potential community concerns regarding on-site disposal of IDW and plan accordingly.

5.0 SPECIAL CONSIDERATIONS

This SOP does not preclude the need for individuals or programs generating wastes to make appropriate waste determinations and to be familiar with relevant federal, state, and local laws, regulations, policies, and guidance, such as *Management of Investigation-Derived Wastes During Site Inspections* (EPA/540/G-91/009) and *Guide to Management of Investigation-Derived Wastes* (EPA Publication 9345.3-03FS). In some cases, it may be necessary to confer with the KDHE-Bureau of Waste Management and/or KDHE-Bureau of Water to determine whether the identified waste management approach will satisfy ARARs.

Note: Sampling of direct-push (Geoprobe or similar units) generates minimal amounts of purge water per sampling location (less than five gallons). Upon approval of the KDHE project manager, purge water not to exceed five gallons per sampling location may be applied on-site from direct push sampling locations only. However, if noticeable contamination (visual or odor) is present in the purge water it should be containerized, characterized, and disposed of in accordance with this policy.

6.0 REFERENCES

1. United States Department of Energy (U.S. DOE), 1999, Memorandum from T. Traceski dated December 20, 1999, Subject – *Management of Remediation Waste Under the Resource Conservation and Recovery Act (RCRA)*, Office of Environmental Policy and Assistance.

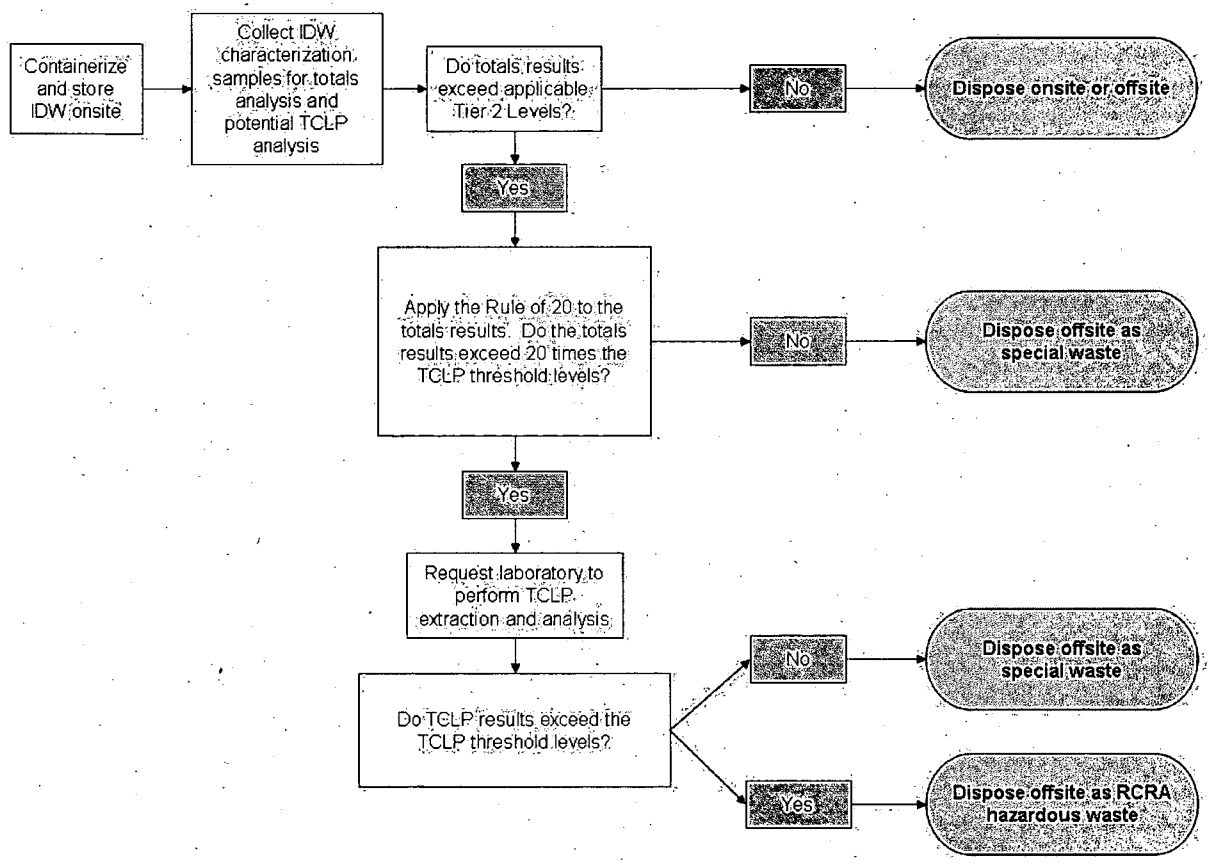
2. United States Environmental Protection Agency (U.S. EPA), 1991, *Management of Investigation-Derived Wastes During Site Inspections* (EPA/540/G-91/009), Office of Emergency and Remedial Response, Washington D.C., May 1991.

3. United States Environmental Protection Agency (U.S. EPA), 1992, *Guide to Management of Investigation-Derived Wastes* (Publication 9345.3-03FS), Office of Solid Waste and Emergency Response, Washington D.C., January 1992.

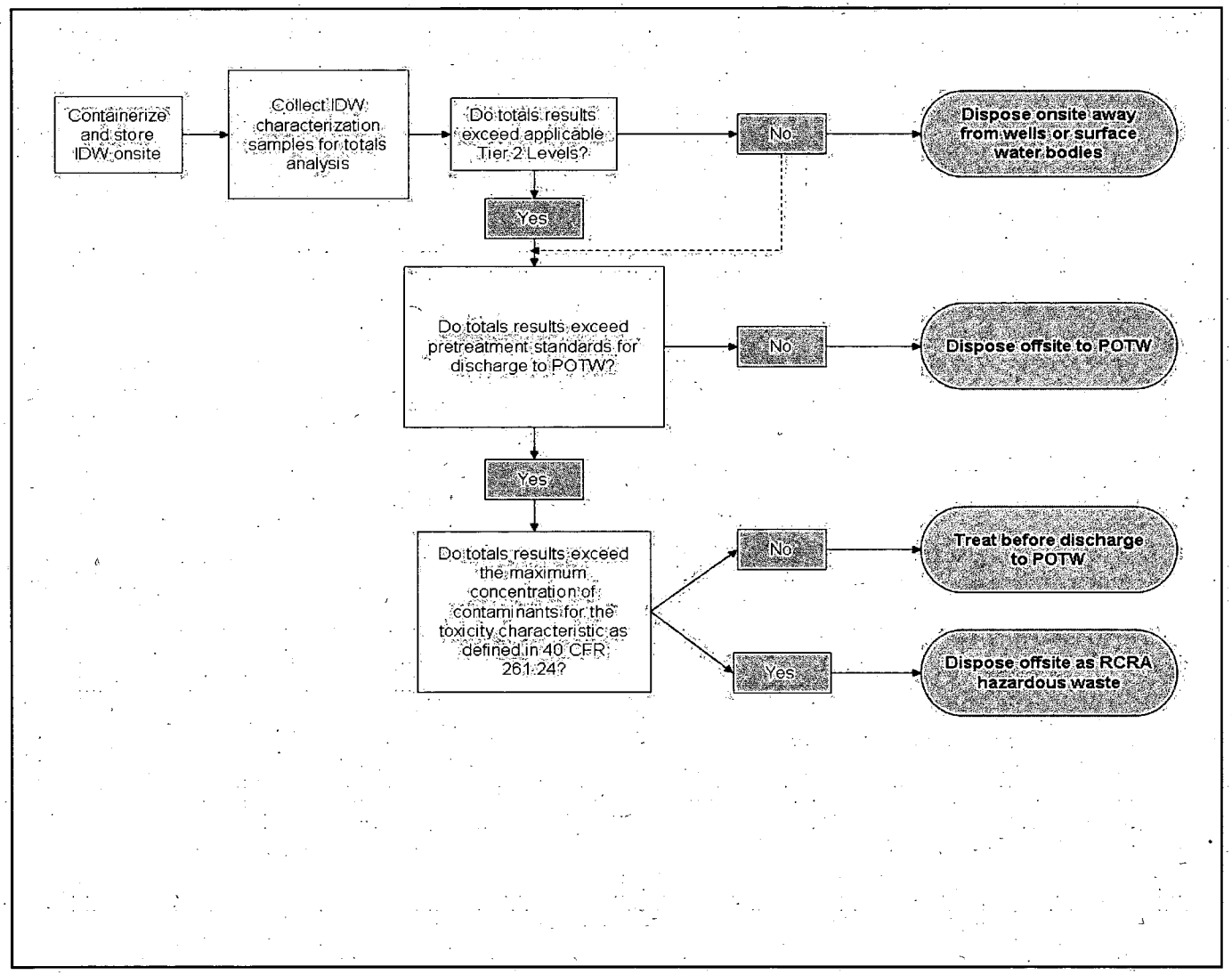
4. United States Environmental Protection Agency (U.S. EPA), 1991, Guide to Discharging Aqueous Wastes to Publicly Owned Treatment Works (Publication 9330.2-13FS), Office of Solid Waste and Emergency Response, Washington D.C., March 1991.

5. Davis, 2001, *Regulated Metals: the Rule of 20*, Pollution Prevention Institute, Small Business Environmental Assistance Program, Kansas State University, Manhattan, Kansas, December 2001.

Attachment 1 – General Strategy for Managing Solid Investigation-Derived Waste



Attachment 2 – General Strategy for Managing Liquid Investigation-Derived Waste



Note: Purge water obtained from direct-push sampling locations only (less than five gallons per location) may be applied on-site at the probe location upon receiving approval from the KDHE project manager. However, if noticeable contamination (visual or odor) is present in the purge water it should be containerized, characterized, and disposed of in accordance with this policy.

STANDARD OPERATING PROCEDURE – BER-11

EVALUATION AND VALIDATION OF DATA

Effective Date: August 14, 2000
Revised Date: January 1, 2011

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DISCLAIMER:

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish the criteria that are followed for documenting and tracking the quality of environmental data generated from field sampling activities. Because valid media-quality data are integral to environmental investigations that characterize site conditions, the quality of the data generated by a field investigation is extremely important to the successful completion of a project. The level of data evaluation and validation required is determined by the project data quality objectives and must be outlined in the site specific or generic Quality Assurance Project Plan (QAPP).

1.2 SCOPE

The environmental investigation process is a three phase cycle that includes: (1) Planning Phase, (2) Implementation Phase, and (3) Assessment Phase. This SOP, which is in the Assessment Phase, is used to evaluate and validate data that was generated during the Implementation Phase. The data is validated based on criteria that are established in the Planning Phase. Data verification is the process for evaluating the completeness, correctness, and conformance / compliance of a specific data set against the method, procedural, or contractual specifications. Data validation is used to determine the quality of a specific data set relative to the end use. It focuses on the project's specifications or needs, designed to meet the needs of the decision makers/data users and should note potentially unacceptable departures from the QA Project Plan.

2.0 DATA EVALUATION AND VALIDATION

The degree of data validation depends on the quality of data needed to meet the data quality objectives for the project, which are specified in the QAPP. Data collected to establish qualitative trends, for example, do not require the same level of validation as data generated to support litigation. Standard data quality attributes that are recognized as important are the Data Quality Indicators. Acceptance criteria placed on the data quality indicators of a given data set are sometimes referred to as measurement quality objectives (MQOs). The Data Quality Indicators (DQIs) are defined in Table 3, EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5. MQOs are usually based on the individual DQIs for each matrix and analyte group or analyte.

2.1 PRECISION

Precision is the degree to which the measurement is reproducible and is to be determined by comparison of laboratory designated duplicates or designated laboratory matrix spike/matrix spike duplicates. Precision will be calculated as the relative percent difference (RPD) of the two measurements. The equation is as follows:

RPD = 100% X [Result 1 - Result 2] / [(Result 1 + Result 2) / 2]

2.2 ACCURACY

Accuracy is the degree of agreement between a measured value and a true or known value. Accuracy is evaluated using matrix spike (MS) recoveries, system monitoring compound spike (surrogate) recoveries, or continuing calibration verification (CCV) recoveries. MS samples are samples into which known concentrations of the target compounds of interest have been added (or "spiked"). Surrogate compounds are compounds that behave in a similar manner as the target compounds but are not target compounds and are added (or "spiked") into each sample prior to extraction and analysis. The samples are analyzed by the appropriate analytical method. The result obtained is compared to the known concentration added and the MS or surrogate percent recovery (%R) is calculated. CCV samples are check standards analyzed at intervals not to exceed 12 hours for organic analyses and every 10 samples for inorganic analyses. When matrix spike samples or surrogate compounds are not possible, CCV sample results are used to determine accuracy. Percent recovery is calculated as follows:

MS %R = 100% X [Spiked Result Conc.- Sample Result Conc.] / Spike Conc.
CCV and surrogate %R = 100% X [Result Conc.) Known/Spiked Conc.]

2.3 METHOD REPORTING LIMITS

Reporting limits will be based upon method quantitation limits. The procedure for determining the method detection limit for a substance is in Appendix B of Part 136 of Title 40 of the Code of Federal Regulations (40 CFR 136 Appendix B). The method quantitation limit is defined as equivalent to the lowest calibration standard analyzed for each analyte or as ten times the method detection limit.

2.4 COMPLETENESS

Completeness is a measure of the amount of valid, usable data obtained from an analytical data set compared to the amount that was planned to be obtained. Completeness takes into account any breakage, laboratory errors, or sampling difficulties.

Completeness = (# of Valid Data Obtained) / (# of Total Planned Data) x 100

2.5 COMPARABILITY

Comparability expresses the confidence with which one data set can be compared to another. Samples from the same media (i.e., soil, water, etc.) will be considered comparable if the procedures for collecting the samples are complied with and consistent, if the units of measurement are the same, and if the reporting limits are comparable. In addition to obtaining samples in accordance with approved procedures and in a consistent manner, comparability is assured through the use of laboratories using established and approved analytical methods and protocols. The laboratory's quality control program is designed to establish consistency in the performance of the analytical process. The program includes traceability of measurements to standardized reference materials to establish comparability with other laboratory results, and internal controls to verify consistency of a given laboratory's performance. Standard reporting units (e.g., mg/kg, µg/L) will be used for reporting the various parameter results. All data will be subjected to strict QA/QC procedures and reported in a consistent manner to allow for comparison across data sets.

2.6 REPRESENTATIVENESS

The representativeness of the data is the degree to which data represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a function of sample collection and analysis techniques. Data are considered representative if the sampling is performed in accordance with the sampling programs defined in the Field Sampling Plan (FSP) and the analyses meet the requirements outlined in this section and the section on quality control procedures.

3.0 PROCEDURE FOR DATA VALIDATION

The person designated to validate the data for a project will review the data using the criteria established in the QAPP. The degree of validation of the data depends

entirely on the quality of data specified in the QAPP. As a minimum, valid data should be supported with evidence that: (1) all field, laboratory, and other procedures used to collect the data are documented so the work can be reproduced by others skilled in the field; (2) all methods and equipment were working properly when the data was collected; and (3) the methods were capable of producing the values reported and that the precision and accuracy or bias of the data are acceptable for the intended use of the data.

To validate the data for a project, the designated person will:

1. Evaluate the quality assurance objectives using the criteria stated in the QAPP. Both field procedures and laboratory procedures will be evaluated.

2. Evaluate field procedures by examining sample collection procedures and sample handling procedures to determine if the QAPP was followed. To evaluate sample handling procedures, methods of sample collection, chain of custody forms, sample preservation, and handling of the samples until received by the laboratory, will be examined.

3. For laboratory procedures on inorganic compounds, the following may be examined during the validation process:

   - Holding times
   - Instrument calibration, including initial and continuing calibration verification
   - Blank(s)
   - Laboratory control sample(s)
   - Inductively Coupled Plasma (ICP) interference check samples
   - Duplicate sample(s)
   - Matrix spike sample(s)
   - Furnace atomic absorption QC
   - ICP serial dilution(s)
   - Sample result verifications
   - Field duplicates

- General data assessment

4. For laboratory procedures on organic compounds, the following may be examined during the validation process:

   - Holding times
   - Gas Chromatograph/Mass Spectrometer (GC/MS) tuning
   - GC calibration, initial and continuing
   - Blanks
   - Surrogate recoveries
   - Matrix spike/matrix spike duplicates
   - Internal standards performances
   - Target Compounds List (TCL) compound identifications
   - Reported detection limits
   - Tentatively identified compounds (TICs)
   - Overall system performance
   - General data assessment

5. The parameters which do not conform to requirements are listed and the data are qualified according to the guidelines listed in the QAPP. The qualified data package is then reviewed and the project data reviewer, the project geochemist and/or the project manager makes a professional judgment concerning the validity of the data package, and its usability for the project.

6. This SOP only includes general guidelines. Additional data quality evaluation/ validation criteria may be established in a QAPP.

4.0 REFERENCES

1. EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, (December 2002).

2. EPA Guidance on Data Quality Indicators (EPA/QA G-5i) (EPA, 2002b).

3. EPA Guidance for QA Project Plans (EPA/QA/R-5) (May 2001).

4. EPA Guidance on Environmental Data Verification and Data Validation (EPA QA/G-8) (EPA/240/R-02/004).

5. EPA Data Quality Assessment: A Reviewer's Guide (EPA QA/G-9R) (EPA/240/B-06/002).

STANDARD OPERATING PROCEDURE – BER-12

COLLECTION OF QUALITY CONTROL SAMPLES

Effective Date: August 31, 2000
Revised Date: January 1, 2011

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DISCLAIMER:

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1.0 PURPOSE

The purpose of this standard operating procedure (SOP) is to explain the quality control (QC) measures taken to ensure the integrity of the samples collected and to establish the guidelines for the collection of QC samples. The objective of the QC program is to ensure that water-quality data of known and reliable quality are developed.

Documentation of representative data is essential to site investigations; therefore, the data must be validated though the performance of QC sampling. Verification performance sampling is necessary to evaluate and identify contradictory or suspect data. The QC sampling requirements must be determined by the project manager. Data validation measures must be specified as part of all environmental investigations.

The laboratory is responsible for the development and implementation of a laboratory QA/QC program. The collection of field QC samples serves primarily as a check to ensure proper field procedures, but can also serve as a mechanism for the laboratory to perform their QA/QC program (such as collecting sufficient sample for the laboratory to perform matrix spike/matrix spike duplicate samples).

2.0 QUALITY CONTROL SAMPLES

Samples collected for laboratory analysis require the use of quality control samples to monitor sampling activities and laboratory performance. Types of quality control samples may include duplicate and/or duplicate split, trip blank, field equipment blank, matrix spike and matrix spike duplicate, and field matrix spike. A discussion pertaining to each quality control sample follows:

2.1 DUPLICATE AND DUPLICATE SPLIT:

Duplicate sample analysis is performed to evaluate the reproducibility of collection procedures. A duplicate sample is called a split sample when it is collected with or turned over to a second party (e.g., consulting firm) for an independent analysis or submitted to two laboratories for the same analysis. Duplicate samples are two physical samples collected simultaneously from the same location under identical conditions. Duplicate samples may be collected for any media and should be collected in accordance with the sample collection procedures identified in each media specific SOP.

In some cases (not volatile organic compounds), water may have to be accumulated in a common container and then decanted slowly into the

sample bottles. The work plan should be referenced for a description of how duplicate samples are to be collected. Additionally, in the case of wells that recover slowly and produce insufficient water to fill all the replicate sample containers, the containers should be filled incrementally and kept on ice in the cooler between filling periods.

2.2 TRIP BLANK:

A trip blank sample is a sample of distilled or de-ionized water prepared in the laboratory prior to sampling, and travels unopened in a common container with the sample bottles. (Note: USEPA uses the phrase "demonstrated analyte free water") It is later opened in the laboratory and analyzed along with field samples for constituent(s) of interest to ascertain whether cross-contamination has occurred during field handling, shipment, or in the laboratory. Trip blanks are primarily used to identify "artificial" contamination of the sample caused by airborne volatile organic compounds (VOCs) but may also be used to check for "artificial" contamination of the sample by a test substance or other analyte(s). One trip blank should accompany each cooler containing water samples that are being submitted for lab analysis.

2.3 EQUIPMENT BLANK:

An equipment blank sample is collected to evaluate decontamination procedures. It is a sample of analyte-free water which has been used to rinse reusable sampling equipment and is collected after completion of decontamination and prior to sampling. One equipment blank should be incorporated into the sampling program for each day's collection of samples and analyzed for the appropriate chemicals of concern. In some situations one equipment blank will be required for each type of sampling procedure (e.g., bailer, soil sampling equipment, etc.).

2.4 FIELD BLANK:

A field blank may be needed where ambient air quality may be poor. This field blank sample would be taken to determine if airborne contaminants interfere with constituent identification or quantification. This field blank sample is a sample bottle that is filled and sealed with "clean" (e.g., distilled/de-ionized/demonstrated analyte free) water in the analytical laboratory, and travels unopened with the sample bottles. It is opened in the field and exposed to the air at a location(s) to check for potential atmospheric interference(s). The field blank is resealed and shipped to the contract laboratory for analysis.

2.5 MATRIX SPIKE AND MATRIX SPIKE DUPLICATE:

Spikes of compounds (e.g., standard compound, test substance, etc.) are added to samples in the laboratory to determine if the matrix is interfering with constituent identification or quantification, as well as a check for systematic errors and lack of sensitivity of analytical equipment. Samples for spikes are collected in the identical manner as for standard analysis, and shipped to the laboratory for spiking. Matrix spike duplicate sample collection and laboratory spiking and analysis are performed to evaluate the reproducibility of matrix spike results. Additional sample volume may have to be collected for the laboratory to perform matrix spike/matrix spike duplicate samples.

3.0 PROCEDURE

1. Implement QC sampling as outlined above, depending on the type of QC sample(s) specified in the work plan.

2. Ensure unbiased handling and analysis of duplicate and blank QC samples by concealing their identity by means of coding so that the analytical laboratory cannot determine which samples are included for QC purposes. Attempt to use a code that will not cause confusion if additional samples are collected or additional monitoring wells are installed. For example, if there are three existing monitoring wells (MW-1, 2 and 3), do not label the QC blank MW-4. If an additional monitoring well were installed, confusion could result.

3. Verify that each sample container is properly placed in the cooler, and that the cooler has sufficient ice (wet ice or blue packs) to preserve the samples for transportation to the analytical laboratory. Consult the site work plan to determine if a particular ice is specified as the preservative for transportation (e.g., the USEPA prefers the use of wet ice because they claim that blue ice will not hold the samples at 4E C).

4. Document the QC samples on the appropriate field form and in the field notebook. On the chain-of-custody form, duplicate and blank QC samples will be labeled using codes, and matrix spike and field matrix spike QC samples will be identified as such.

5. The collection of quality control samples will follow KDHE=s various media specific SOPs:

   - SOP BER-01 for the Collection of Ground Water Samples;
   - SOP BER-2 Collection of Surface Water Samples;
   - SOP BER-3 Collection of Soil Samples for Laboratory Analysis
   - SOP BER-4 Collection of Sediment Samples

4.0 REFERENCES

EPA, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers. USEPA 542-S-02-001, (May 2002)

EPA, Guidance on Environmental Data Verification and Data Validation EPA QA/G-8 (EPA/240/R-02/004) (November 2002)

EPA, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Region 4, (November 2001)

STANDARD OPERATING PROCEDURE – BER-13

HEADSPACE METHOD FOR SCREENING SOIL SAMPLES FOR VOLATILE ORGANIC COMPOUNDS

Effective Date: October 27, 2000
Revised Date: January 1, 2011

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1.0 INTRODUCTION

The purpose of this standard operating procedure (SOP) is to establish guidelines for screening soil samples for volatile organic vapors using a portable photoionization detector (PID) or colorimetric tubes. This SOP is applicable to soil samples collected from a Geoprobe®, split-spoon samplers during drilling, hand auger samples, and grab samples from stockpiled soils or excavations.

2.0 CONSIDERATIONS

The primary objective of field screening of soil samples is to obtain a qualitative understanding of the distribution of volatile organic compounds (VOCs) in soil. The proper design of an organic vapor screening program requires an understanding of site hydrogeology, potential source areas, and potential contaminants of concern. Sample locations and frequency must be fully defined in the work plan. The work plan should outline the type of lamp to be utilized in the PID based on the ionization potentials and response factors of the constituents of concern or the type of color metric tube. The work plan must also clearly describe the heating or equilibration procedures to be employed if they differ from those described in this SOP. Regardless of the specific equilibration procedure employed, it is imperative that each sample be treated identically to allow the photoionization results from different locations to be comparable. Observations such as moisture, soil composition, and organic content should be noted to facilitate interpretation of the data. Every effort should be made to collect a representative portion of soil from the sampling device.

3.0 MATERIALS/EQUIPMENT

The following material may be used:

- Decontamination supplies (including: non-phosphate laboratory grade detergent, buckets, brushes, potable water, distilled water, plastic sheeting, etc.)
- Field notebook, field form(s), maps, chain-of-custody forms
- Sampling device (split-spoon sampler, stainless steel hand auger, stainless steel trowel, etc.)
- Stainless steel spoons or spatulas
- Disposable plastic spoons
- Plastic sheeting

- Aluminum foil
- Mason jars or driller's jars
- Water bath (hot plate, extension cord, water tray, thermometer)
- Photoionization detector with charging unit or colorimetric tube and pump
- Calibration gases with regulator
- Indelible marker
- Masking tape
- Disposable sampling gloves
- Zip lock bags, approximately 1 quart capacity

4.0 DECONTAMINATION

Where possible, thoroughly pre-cleaned and wrapped sampling equipment should be used and dedicated to individual sampling locations. Disposable items such as sampling gloves, aluminum foil, and sample jars will be discarded after each use in an appropriate manner. If only field screening results are to be obtained then split-spoon samples and hand augers may be cleaned with a soap and water wash and potable water rinse or steam cleaning, and a final distilled water rinse. However, if samples are to be collected concurrently for laboratory analytical results, then all reusable sampling equipment must be thoroughly decontaminated according to SOP BER-05 Decontamination of Field Equipment.

5.0 CALIBRATION

The PID must be calibrated according to the manufacturer's specifications at a minimum frequency of once per day prior to the first sample analyzed each day. A calibration standard gas should be employed which is similar to the compounds of concern expected at the site.

In addition, periodic calibration verifications (e.g., every 2 hours or every ten samples) employing the standard gas must be conducted. The time, date, and calibration procedure must be clearly documented in the field notebook and the calibration log. If at any time the photoionization results appear erratic or inconsistent with field observations, then the unit must be re-calibrated. If calibration is difficult to achieve, then the unit's lamp should be checked for dirt or moisture and cleaned, as necessary. During humid or wet conditions, the unit

should be calibrated on a more frequent basis as determined by field personnel. If colorimetric tubes are used, the brand and type of pumps and tubes must be documented in the field notebook. The expiration date, batch number of the tubes and the methods utilized must be documented.

6.0 PROCEDURE

1. Extract the soil sample from the sampler, quickly measure the recovery, and separate the waste from the true sample by using a dedicated, stainless steel spatula. Where allowed by regulatory agency(ies), disposable plastic spoons may be used.

2. Place the sample in a pre-cleaned glass jar (as quickly as possible to avoid loss of VOCs) filling the jar half full. Place an aluminum foil seal between the glass and metal cap and screw tight. Zip lock bags may be used as an alternative to glass jars for sample containers. The bags should be approximately one quart capacity, and should be filled with approximately equal volumes of soil sample and air space.

3. Label jars or bags with the boring number, depth of sample, date and time of collection. In addition, the field personnel will ensure the following: samples are taken at appropriate depths, unrepresentative portions of the sample are discarded properly; all sampling equipment is decontaminated properly between use; and the driller uses proper methods during sample collection and does not use oil or grease on tools entering the borehole.

4. Log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, organic content, and layering).

5. If the ambient temperature during the sampling event exceeds 70° F, the sample may be allowed to equilibrate at ambient temperature for at least five minutes. If the ambient temperature is less than 70° F, the sample temperature should be elevated by placing the sample under gentle heat for at least five minutes. The heater or defroster of a vehicle may be used to heat the sample for the equilibration process. Alternatively, a water bath may be used to heat and stabilize the temperature of the samples. The water bath should bring the temperature of the sample to at least 70° F but no more than 100° F for at least two minutes.

6. If a PID is to be used, ensure that it has been calibrated and that the calibration information is documented in the field book. Pierce the aluminum foil seal with the probe from the PID or colorimetric tube or insert the probe or tube into a small opening in the zip lock bag, and measure the relative concentration of VOCs in the headspace of the soil

sample. The initial (peak) reading must be recorded. The work plan should specify a time period in which the initial peak reading should occur (e.g.: the first 30 seconds).

7. Record the instrument reading in the field notebook, on an appropriate field form, and on the base map, if appropriate.

8. If only field screening results are to be obtained, then reusable sampling devices may be cleaned with a soap and water wash and a potable water rinse. The sampler will then be rinsed with distilled water, assembled and placed on plastic sheeting for reuse. A more rigorous decontamination procedure is required when samples are also being collected for laboratory analysis. Refer to SOP BER-03 for collection of soil samples for laboratory analysis for additional information.

7.0 REFERENCES

Enviro-Equipment, Inc. October 5, 2007. "Accurate Information for Field Soil Screening Procedures, Are your field Soil Screening Procedures Providing You with Practical and Accurate Information?" http://enviroequipment.blogspot.com/2007/10/accurate-information-for-field-soil.html

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STANDARD OPERATING PROCEDURE – BER-18

FIELD SAFETY PROTOCOL

Effective Date: October 29, 2000
Revised Date: January 1, 2011

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1.0 INTRODUCTION

This document was developed primarily for unknown hazardous substance sites where a site-specific health and safety plan (HASP) may be required. This document should not be applicable to sites where routine operations such as monitoring, inspecting or overseeing are conducted. A general HASP may be used for these types of operations.

The handling and sampling of contaminated materials (i.e. hazardous substances, hazardous waste, soil, groundwater) always poses a certain degree of hazard. The objective of this document is to serve as a guideline for the safety of Kansas Department of Health and Environment\Bureau of Environmental Remediation (KDHE\BER) personnel while conducting field activities. This document does not replace a generic or site-specific HASP which should be completed for all site investigations. Program Managers may elect to develop a generic site HASP for programs that conduct similar/routine events. This document does not serve as a Standard Operating Procedure (SOP) for emergency response. Emergency response encompasses an enormous amount of variables specific to emergency response situations. Emergency response documents should be consulted for further details.

2.0 REQUIREMENTS FOR FIELD PERSONNEL

Before entering any potentially hazardous waste site or collecting any hazardous samples, BER personnel must have completed a 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course and be enrolled in a medical monitoring program. Employees are expected to attend a yearly 8-hour HAZWOPER refresher course to maintain their certification.

3.0 RESPONSIBILITY OF PROJECT MANAGER/ ONSITE COORDINATOR

During on-site investigations involving the sampling or handling of hazardous waste, safety precautions must be paramount to all other considerations. Due to the variety of chemicals and their varied toxicities, exposure prevention must be a high priority of the project manager. Despite thorough preparation, a field team may not have adequate knowledge of site conditions. It is impossible to anticipate every hazard that could arise. The project manager or on-site coordinator should consult all available information prior to the field activity to review potential hazards and safety precautions.

In all considerations related to safety, the project manager or on-site coordinator is responsible for overseeing the collection and organization of site data in order to properly assess the hazard potential, and in implementing the generic or site-specific HASP.

4.0 RESPONSIBILITY OF THE SITE SAFETY OFFICER

Some sites will have a separate designated Site Safety Officer (SSO) who will most often generate and supervise the execution of the generic or site-specific HASP. For most sites, the project manager or on-site coordinator will be the SSO. Additional responsibilities may include:

- ensuring all team members are familiar with the site safety plan including the route from the site to the chosen medical facility before any site activities begin;
- conducting site safety briefings and documenting all on-site safety concerns and situations;
- maintaining safety equipment in good condition and proper working order;
- confirming safety equipment is used in accordance with the manufacturer's instructions and bureau SOPs; and
- ensuring team members refrain from activities that would create additional hazards (e.g. smoking, eating on site).

5.0 TYPES OF EXPOSURE TO HAZARDOUS WASTE

In order to ensure the safety of the field team, the project manager and health and safety officer must protect field team staff from exposure to hazardous materials. The purpose of the following information is to provide some basic insight into the manner by which harmful materials may enter the body. The four basic types of exposure are inhalation, skin absorption, ingestion, and eye contact.

5.1 INHALATION

Breathing gas vapor, mist, fumes or dust is a common accidental form of exposure and this route of entry may be a cause of systemic illness. The inhalation hazard depends on a number of factors: the chance that the chemical encountered will leak into the air; the concentration present in the air; the volatility of the chemical at ambient temperature; the inherent toxicity of the chemical; and the length of time the chemical is breathed.

The field team should take the following precautions when entering a site with unknown hazards and/or when sampling from containers, including wells, where the contents pose an inhalation hazard:

- Approach the area, well, or container from an upwind position.
- Sample only in well ventilated areas.
- Use the appropriate respirator based on chemical toxicity and on-site monitoring data.
- When needed, use a suitable air monitoring instrument to screen the well/area for volatile vapors.

5.2 SKIN ABSORPTION

Certain chemicals have the capacity to penetrate unbroken skin (including highly absorbent eye tissue) and are picked up by the blood stream and distributed throughout the body. A combination of gloves, boots, hats, coveralls and proper respirator should be worn to protect against skin exposure and absorption. BER staff must wear personal protective equipment (PPE) and clothing in accordance with SOP-21 to minimize exposure. In addition to donning proper safety clothing and equipment, the following precautions should be used in inspecting sites which may contain materials hazardous by skin absorption:

- Ensure all skin areas are protected during site work.
- Carefully wipe all residue off sample containers after sample collection.
- After completing the investigation, use proper procedures for removing contaminated clothing while still at the site.
- Bag contaminated rags and other disposable items, such as gloves, for proper disposal avoiding skin contact. Gloves should be the last piece of personal protective gear to be removed.
- Wash the hands and facial area before leaving the site or as soon as possible after leaving the site.

The eyes may be harmed by absorbing chemicals in either the liquid or vapor form. Irritant effects vary in degree from mild to severe. Some chemicals have the ability to injure the eye to some degree with surface contact. Eye tissue is also highly absorbent and can not only be damaged but can provide a direct path to the blood stream. The generic or site-specific HASP will describe precautions that should be taken upon entering a site where a contaminant in gas, vapor or liquid form may come into contact with the

eyes.

5.3 INGESTION

Toxic amounts of hazardous material may be transferred to the mouth when drinking or eating. Therefore, these activities should never occur during or after investigations until decontamination procedures have been completed. Furthermore, liquids should not be pipetted or siphoned by mouth under any circumstances.

5.4 INJECTION

BER personnel may be exposed to hazardous chemicals through injection or entry through broken skin. Employees shall be careful to recognize any hazards which may pierce the skin, allowing chemicals to enter the body through a wound. This is of particular concern at abandoned facilities and landfills.

6.0 INITIAL HAZARD ASSESSMENT

In conducting investigations of potential hazardous waste sites a detailed hazard assessment must be done before a site specific safety plan can be generated. The procedures outlined below should be followed to varying degrees for all BER sites where BER personnel will actually be on the site. The hazard assessment will be used to determine whether to enter a potentially hazardous waste site and to determine the appropriate level of protective equipment to be worn when entering the site.

In order to minimize the potential of exposure to a hazardous substance, precautions should be considered in the planning stages and observed during the field activity for any site work. The degree to which these following precautions are executed is dependant on site specific variables including site/contaminant history and potential exposure risk:

- Prior to on-site arrival, a thorough file/historical review must be completed to examine former as well as current practices conducted at the property including information on known or suspected use of chemicals. The review should include information available from outside sources including local libraries, historical societies, and interviews, etc.

- Employees shall review available toxicological information (Condensed Chemical Dictionary, Pesticide Handbook, etc.) to evaluate exposure risks.

- After reviewing the available environmental and toxicological information, protective clothing shall be selected in accordance with BER SOP 21, Levels of Protection for Field Work.

(KDHE/BER employees should not be exposed to Level A or Level B conditions. If unplanned Level A or Level B conditions are encountered in the field, KDHE employees will withdraw immediately and contact a qualified contractor to complete the task.)

An air monitoring program, using a photoionization detector (PID) or similar detector, should be part of all field operations when the potential for atmospheric contamination is present. After a background ambient air measurement is recorded, continual surveillance using direct-reading instruments is needed to detect any changes in air quality. If contaminants are detected above the pre-determined acceptable levels in the HASP, KDHE employees should withdraw immediately and reevaluate the necessary level of respiratory protection.

Before allowing entrance to the site, the project manager should determine if there is an imminent or potential breathing or skin contact hazard and/or risk to health and safety. In such cases, entry is totally unadvisable, and the project manager should withdraw from the area and contact his/her supervisor. If explosivity meter readings exceed 10% of the lower explosive limit (LEL), BER personnel are to withdraw from the site. If warranted, the fire department and supervisor should be notified.

7.0 EMERGENCY TREATMENT

Before entering a site, it is recommended the project manager and field team know the locations and emergency telephone numbers of the nearest medical facility, ambulance service, fire department, police department and poison control centers. (It should be considered during emergency planning that in some remote areas of the state, cell phone service is not reliable.) This information, including a map with the directions to the hospital, shall be included in the HASP. In case of any emergency, appropriate assistance should be called immediately and the appropriate emergency treatment conducted.

KDHE/BER personnel who frequently perform field activities should be trained in basic first aid. A first aid kit with a first aid manual should accompany each KDHE vehicle. The purpose of emergency treatment is to prevent further damage until professional treatment is obtained. Employees will always notify or have someone else notify emergency medical professionals immediately in case of a medical emergency.

First aid procedures for contamination or poisoning by hazardous materials consist of removing, diluting or slowing the movement of the poison. Some knowledge of the hazardous material combined with prompt treatment is essential in reducing the poison's concentration. Accidents such as a fall or heat stroke could also require emergency treatment. For these measures and other emergency information, consult the on-site first aid manual.

8.0 SAFETY EQUIPMENT

Safety equipment may be either associated with the site or assigned to the individual employees.

8.1 FIRST AID KITS

First aid kits should be available on every KDHE site and can be found in each vehicle. The first aid kit should have an accompanying manual. These kits are for basic first aid problems and are not intended to substitute for professional medical care. BER personnel should periodically inspect the kits and restock supplies as needed.

8.2 RESPIRATORY PROTECTION

KDHE will issue respirators to BER employees with a potential for exposure to contaminants through inhalation. Use and care of respirators is described in BER SOP 22, Half/Full-Mask Respirator.

8.3 PERSONAL EQUIPMENT

All field personnel are required to wear steel-toed safety boots on site and be issued a hard hat and safety glasses. The need for a hard hat and safety glasses should be addressed in the site specific safety plan, as well as the need for hearing protection, traffic vests, and other personal items.

9.0 VEHICLE SAFETY

All vehicles used for field activities will be kept in sound/safe mechanical condition and contain the following safety items:

- first aid kit (with manual)
- flashlight
- road hazard kit (emergency flares, triangles, battery jumper cables)

Vehicles should be inspected for the presence of these supplies before departing the

office. While on site, if the vehicle is positioned in such a way as to present a traffic hazard to the vehicle, passing vehicles or persons working around the vehicle, traffic cones will be set to redirect traffic around the work zone.

10.0 REFERENCES

OSHA 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER)
(e)(3)(i) - Initial Training
(e)(8) - Refresher Training

EPA 40 CFR 311—WORKER PROTECTION

STANDARD OPERATING PROCEDURE - BER-19

CHAIN OF CUSTODY

Effective Date: October 15, 2000
Revised Date: January 1, 2011

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1.0 INTRODUCTION AND OVERVIEW OF CHAIN OF CUSTODY PROCEDURE

This SOP documents the protocol used in the transfer of environmental samples to another person or an analytical laboratory. This SOP is intended to facilitate consistency among staff members, serve as a reference and training tool, and provide a formal written record of the method used to transfer custody of a sample in an environmental monitoring program.

Due to the evidentiary nature of samples collected for investigations, the possession of samples must be traceable from the time the samples are collected until they have been introduced as evidence in legal proceedings. After collecting the samples and labeling the appropriate sample containers, all samples shall be maintained under chain of custody procedures. Each person involved with collecting the samples must know chain of custody procedures.

2.0 CHAIN OF CUSTODY PROCEDURES

To maintain and document sample possession, the following chain of custody procedure should be followed.

2.1 CRITERIA FOR SAMPLE CUSTODY

A sample is under custody if:

1. It is in the sampler's actual possession; or
2. It is in the sampler's view, after being in his/her physical possession; or
3. It was in the sampler's physical possession and then he/she locked it up to prevent tampering; or
4. It is in a designated and identified secured area.

2.2 FIELD CUSTODY CONSIDERATIONS

1. The number of persons handling the samples should be as few as possible.
2. The person who collected the samples in the field is responsible for the care and custody of the samples until they have been transferred or properly relinquished.

2.3 TRANSFER OF CUSTODY AND SHIPMENT

1. Samples must be accompanied by a sample submission form that contains a custody record. Sample submission forms are specific to the laboratory where the samples will be submitted for analysis. Hence, the specified sample submission form for Division of Health and Environmental Laboratory (DHEL) analysis, KDHE outside contractor laboratory analysis, or in-field analysis should be used. The custody record on the sample submission form documents the transfer of custody for the samples from the person collecting the sample to another person or to a permanent laboratory. In transferring the possession of samples, the person relinquishing the samples and the person receiving them will sign and date the sample submission form.

2. All packages containing samples should be accompanied with sample submission forms identifying their contents. The original form should accompany the shipment, and a copy should be retained for permanent documentation by the person currently in custody of the samples.

3. If samples are shipped by a common carrier, a bill of lading should be used. Receipts for bills of lading should be retained for permanent documentation by the person currently in custody of the samples.

STANDARD OPERATING PROCEDURE – BER-21

LEVELS OF PROTECTION FOR FIELD WORK

Effective Date: August 14, 2000
Revised Date: January 1, 2011

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1.0 INTRODUCTION

BER staff must wear personal protective equipment (PPE) when field activities involve known or suspected atmospheric contamination, when vapors, gases, or particulates may be generated, or when direct contact with skin-affecting substances may occur. Respirators can protect lungs, the gastrointestinal tract, and eyes against air toxicants. Chemical resistant clothing can protect the skin from contact with skin destructive and absorbable chemicals. Good personal hygiene can limit or prevent ingestion of material.

Equipment to protect the body against contact with known or anticipated chemical hazards has been divided into four categories according to the degree of protection afforded. All of the clothing or equipment listed for each layer of protection might not be worn all of the time. The specific equipment to be worn for each level will need to be determined by the site safety officer (SSO) and project manager, and will be included in the site Health and Safety Plan (HASP). Examples of equipment used and selection criteria for each level will be given in Section 2. The following are brief descriptions of the levels of protection:

Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed. KDHE employees should not be exposed to Level A conditions. **If Level A conditions are encountered in the field, KDHE employees will withdraw immediately and contact a qualified contractor to complete the task.**

Level B: Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies and appropriate personnel protection utilized. KDHE employees should not be exposed to Level B conditions. **If Level B conditions are encountered in the field, KDHE employees will withdraw immediately and contact a qualified contractor to complete the task.**

Level C: Should be selected when the type(s) of airborne substance(s) is known, the concentration(s) is measured, and the criteria for using air--purifying respirators are met.

Level D: Should not be worn on any site with respiratory or skin hazards. Level D is primarily a work uniform providing minimal protection.

The Level of Protection selected should be based primarily on:

Type(s) and measured concentration(s) of the chemical substance(s) in the ambient atmosphere and its toxicity.

Potential or measured exposure to substances in air, splashes of liquids, or other direct contact with material due to work being performed.

In situations where the type(s) of chemical(s), concentration(s), and possibilities of contact are not known, the appropriate Level of Protection must be selected based on professional experience and judgment until the hazards can be better characterized.

While PPE reduces the potential for contact with harmful substances, ensuring the health and safety of response personnel also requires safe work practices, decontamination, site entry protocols, and other safety considerations.

2.0 LEVELS OF PROTECTION

Each of the four levels of PPE has specific equipment and selection criteria. BER personnel will use the information below when selecting appropriate PPE levels. **Levels A and B are not further discussed in this SOP because if conditions are encountered in the field that would require Levels A or B the KDHE employee is required to withdraw immediately and contact a qualified contractor to complete the task.**

2.1 LEVEL C PROTECTION

Examples of Level C PPE include:

- Full-face or half-face, air-purifying respirator with the appropriate canister or cartridges (MSHA/NIOSH approved)
- Chemical-resistant clothing (coveralls; hooded, two-piece chemical splash suit; chemical-resistant hood and apron; disposable chemical-resistant coveralls)
- Coveralls (cotton)
- Gloves (outer), chemical-resistant
- Gloves (inner), chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank

- Boots (outer), chemical-resistant (disposable)
- Hard Hat (face shield)
- 2-way radio communications (intrinsically safe)

Level C may be selected if all of the following criteria are met:

- Measured air concentrations of identified substances will be reduced by the respirator to at or below the substance's exposure limit, and the concentration is within the service limit of the canister or cartridges.
- Atmospheric contaminant concentrations do not exceed IDLH levels.
- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect the small area of skin left unprotected by chemical-resistant clothing.
- Job functions have been determined not to require self-contained breathing apparatus.
- Total vapor readings register between background and 5 ppm above background on instruments such as a PID or OVA.
- KDHE personnel will periodically monitor concentrations of hazardous constituents in the air to ensure Level C remains appropriate.

2.2 LEVEL D PROTECTION

Examples of Level D PPE include:

- Coveralls
- Gloves
- Boots/shoes, leather or chemical-resistant, steel toe and shank - Boots (outer), chemical-resistant (disposable) - Safety glasses or chemical splash goggles
- Hard hat (face shield)

KDHE personnel may select Level D if the following conditions are met:

- No hazardous air pollutants have been detected.
- Work functions preclude splashes, immersion, or potential for unexpected inhalation of any chemicals.

3.0 PROTECTIVE EQUIPMENT

Provided below are brief descriptions of PPE used by KDHE personnel. This is not a comprehensive index, but rather a list of the more commonly used equipment.

Respirators (half-face or full-face) - use full day, or if breakthrough occurs, or until situation no longer warrants respiratory protection. Respirators should be cleaned according to manufacturer's specifications after each use.

Appropriate canisters or cartridges for respirators should be selected according to need and manufacturer's specifications.

Suits (listing from least protective to most)

Tyvek (uncoated) paper-like suit. Strictly for keeping clean. Properly dispose of after use.

Polyethylene coated tyvek - use while chemical sampling, i.e., solvents, pesticides, etc.

Saran covered tyvek - use for chemical sampling. Somewhat sturdier than the polyethylene coated tyvek.

Heavy duty yellow suit - all uses - clean with soap/water or steam and reuse. Use bleach on boots, suits, shoes, and clothes to remove pesticides.

Gloves (listing from least protective to most)

Disposable nitrile surgical type gloves - for keeping clean or for collecting soil and water samples. May be used as an inner glove for additional protection when using two layers of gloves.

Long green rubber (nitrile) - Use as outer glove. Good chemical resistance.

Thick black, long (neoprene) - good for all uses. Clean and reuse.

Cotton liners - use under gloves when possible.

Visor/Hard Hat - Use during well or tank sampling where there is a danger of splashing.

Goggles & Safety Glasses - Use when eye protection is needed, or when using half face mask. Use common sense approach.

Boots - Rubber/Neoprene. Good for all uses. Use protective covers over boots.

Boot Protective Covers – Disposable rubber, PVC and vinyl protective covers are available to use over Level D footwear.

4.0 DECONTAMINATION AND DISPOSAL

In leaving a contaminated site, appropriate procedures must be carried out for decontamination and for safe packing of protective clothing, safe packing of disposable gear, and transfer of equipment, gear, and samples from the "contaminated" area to the "clean" area. Sequences of these actions will depend on the situation and must be worked out in advance. Disposition of wash water must be determined and planned for in advance.

Reusable protective clothing and equipment should be decontaminated with soap and water at the site and allowed to dry if possible. Face shields, goggles, respirators, rubber gloves (non-disposable), and rubber boots should also be washed between uses. If decontamination cannot be done at the site, the protective clothing and gear should be placed in plastic bags or isolated from "clean" clothing and equipment until it is decontaminated. All disposable items should be sealed in plastic bags and disposed of according to the degree of contamination.

5.0 REFERENCES

Title 29 Code of Federal Regulations Part 1910 – Occupational Safety and Health Standards

STANDARD OPERATING PROCEDURE – BER-30

OPERATION OF THE PHOTOIONIZATION DETECTOR

Effective Date: August 14, 2000
Revised Date: January 1, 2011

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ATTACHMENT 1 eV Ionization Potentials

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1.0 INTRODUCTION

The purpose of this standard operating procedure (SOP) is to describe the procedure for operating a Photoionization Detector (PID) for air monitoring, site entry and field screening. The PID is a portable vapor/gas detector used for a variety of volatile organic and inorganic chemical compounds. The PID measures the total concentration of volatile organic compounds (VOCs). The PID is non-specific and cannot distinguish between individual compounds. The displayed reading represents the total concentration of all detectable VOCs in parts per million (ppm).

2.0 METHOD SUMMARY

The PID is a general survey instrument capable of detecting and measuring real-time concentrations of many organic and inorganic vapors in the air. The PID is similar in application to a flame ionization detector (FID) but the PID is incapable of detecting low molecular weight hydrocarbons such as methane and ethane. The user must select the appropriate instrument capable of detecting the compounds of concern.

The PID employs the principle of photoionization to detect organic and inorganic vapors with ionization potentials less than or equal to the ionization potential provided by the UV lamp. Photoionization occurs when a molecule absorbs a photon of sufficient energy to release an electron and form a positive ion. This will occur when the ionization potential of the molecule is less than the energy provided by the UV lamp. The PID employs a sealed UV light source that emits photons with an energy level high enough to ionize many trace organic and inorganic compounds but not sufficient to ionize the major components of air. Several UV lamps are available for the PID producing different eV ionization potentials. Attachment 1 includes a list of chemicals and their eV ionization potentials. Gases with an ionization potential less than the potential of the UV lamp will be ionized and measured by the PID. Gases with an ionization potential greater than the potential of the lamp will not be detected.

Though the PID can be calibrated to a particular compound, usually isobutylene, the PID cannot distinguish between detectable compounds in a mixture of vapors and indicates an integrated response to the mixture.

3.0 WARNING AND SAFETY CONSIDERATIONS

1. The instrument is intrinsically safe; however, certain procedures such as changing the battery pack and calibration of the instrument must not be preformed in locations where flammable concentrations of gases or vapors may exist.

2. Certain toxic compounds may have ionization potentials greater than the UV lamp and cannot be detected with a PID.

3. The calibration gas is in a compressed gas cylinder and must be handled with care.

4. When calibrating the PID, adequate ventilation must be provided to prevent threshold limit values (TLV) from being exceeded.

5. Exposure of the instrument to prolonged intense sunlight, excessive heat, or excessive moisture may result in erroneous readings.

6. Exposure of the instrument to wet or humid environments may result in erroneous readings.

7. Do not use the instrument where liquids can inadvertently be drawn into the probe.

4.0 EQUIPMENT LIST

1. Spare battery pack (fully charged)
2. Sample tubing
3. In line filters
4. Calibration regulator
5. Calibration gas
6. AC adapter
7. PID

These items are stored in the carrying case, however it is the responsibility of the user to check to make sure that all items are present, and that the batteries are fully charged prior to going to the field.

5.0 CALIBRATION

The instrument is normally calibrated using a calibration gas cylinder of isobutylene at 100 ppm. The instrument can be calibrated with a particular

compound of interest or a response may be programmed into the instrument if the response factor of a compound of interest is known. The instrument can store calibration information for different calibration gases. Refer to the manufacturer's instrument manual for detailed instructions pertaining to calibration using response factors and calibration gases other than isobutylene.

6.0 OPERATION

Once the instrument is calibrated, it is ready to sample. The reading displayed is the total VOCs being detected by the PID. If the power to the instrument is shut off, the instrument will need to be re-calibrated prior to use. The pump can be shut off between readings to extend battery life. The probe assembly of the PID should be positioned close to the area to be monitored as the low sampling rate only allows for localized readings. Under no circumstances should the probe tip be immersed in liquid. The PID survey should be conducted at a moderately slow rate of speed and the intake probe slowly swept from side to side. There may be a three to five second delay in the read-out depending upon the instrument pump and sensitivity to the vapor. During drilling and probing activities, PID monitoring should be performed at regular intervals at the borehole, and breathing zone. The PID should be periodically checked against the calibration standard after approximately 20 samples or at any time readings are suspected to be inaccurate. The PID may provide artificially high readings for a short time following highly contaminated samples. All readings should be recorded in the site logbook. At the end of the day, the outside of the PID should be carefully cleaned of any visible dirt with a damp disposable towel.

Accurate results depend on the operator being completely familiar with the manufacturer's operator's manual. The instructions in the operator's manual should be explicitly followed in order to obtain accurate results. For more detailed instruction and other applications of the PID such as using response factors, data logging, direct printing of data, and downloading data to a computer, refer to the manufacturer's operator's manual.

7.0 MAINTENANCE

7.1 BATTERY CHARGING

A fully charged battery pack powers the instrument for approximately 8 hours. When the low battery indicator is displayed, approximately 30 minutes of operation time is left. The instrument will shut itself off before the battery pack becomes critically low. The battery pack is recharged by either using an AC adapter or an off line charger. To charge the battery pack using the AC adapter, plug the AC adapter into the jack located on the back of the instrument, then plug the AC adapter into an AC outlet. The red LED indicates that the battery is being charged, and the green

LED indicates that the battery is fully charged and ready for use. To charge the battery pack using the off line charger, the battery pack is removed from the instrument and plugged into the charger until the green LED is lit, indicating that the battery is fully charged.

7.2 MAINTENANCE OF THE UV LAMP

1. To replace the UV lamp: turn off the instrument, remove the lamp housing cover with the multi-tool, tilt the instrument slightly, and remove the lamp. **Do not touch the wire grid inside the detector cell. Use a gentle jet of compressed air to blow out any dust or dirt in the detector cell.** Without touching the lamp window, place the new lamp into the lampholder. Replace the old O-ring and lamp spring with the ones supplied with the replacement lamp. Replace the lamp housing cover being careful not to over tighten.

2. To clean the film that builds up on the window of the lamp: Remove the lamp and make sure that it is at room temperature. Dab a cotton swab that has been damped with methanol into the cleaning compound from the cleaning kit. For approximately one minute, gently rub the cleaning compound onto the lamp window using a circular motion. Wipe the window and lamp with a dry, lint free tissue, removing all the cleaning compound and methanol. Replace the lamp into the instrument. Never use methanol to clean the eV Lamp. To clean the e V lamp use the cleaning compound on a dry cotton swab.

7.3 TO REPLACE THE SAMPLE INLET FILTER

Turn off the instrument; unscrew the filter housing from the detector housing, being careful not to lose the O-ring seal; remove the old filter; place the new filter in the filter housing with the polypropylene mesh side facing the instrument; and replace the filter housing.

8.0 REFERENCES

SOP #2114: Photoionization Detector (PID) HNU, U.S. Environmental Protection Agency - Environmental Response Team, 1994

SOP 5: Field Measurements of Organic Vapors, California Department of Toxic Substances Control, 2008

Field Screening Methods Catalog, U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, 1988

ATTACHMENT 1: Ionization Potentials (IP eV)

Compound	IP (eV)	GC	PID	FID	Compound	IP (eV)	GC	PID	FID
Acetaldehyde	*10.21*	*X*	*X*	*X*	*3-Bromopropene*	*9.70*	*X*	*X*	*X*
Acetic Acid	*10.37*		*X*	*X*	*2-Bromothiophene*	*8.63*	*X*	*X*	*X*
Acetone	*9.69*	*X*	*X*	*X*	*o-Bromotoluene*	*8.79*	*X*	*X*	*X*
*Acetonitrile**	*12.20*	*X*		*X*	*m-Bromotoluene*	*8.81*	*X*	*X*	*X*
*Acetylene**	*11.41*	*X*	*X*	*X*	*p-Bromotoluene*	*8.67*	*X*	*X*	*X*
Acetylene Dichloride	*9.80*	*X*		*X*	*1,3-Butadene*	*9.07*	*X*	*X*	*X*
Acetylene Tetrabromide	*n.p.*		*X*	*X*	*2,3-Butadione*	*9.23*	*X*	*X*	*X*
Acrolein	*10.10*	*X*	*X*	*X*	*n-Butanal*	*9.83*	*X*	*X*	*X*
Acrylonitrile	*10.91*	*X*	*X*	*X*	*2-Butanal*	*9.73*	*X*	*X*	*X*
Allene	*9.83*	*X*	*X*	*X*	*n-Butane*	*10.63*	*X*	*X*	*X*
Allyl Alcohol	*9.67*	*X*	*X*	*X*	*2-Butanone*	*9.53*	*X*	*X*	*X*
Allyl Chloride	*10.20*	*X*	*X*	*X*	*iso-Butanol*	*10.47*	*X*	*X*	*X*
Aminoethanol	*9.87*	*X*	*X*	*X*	*sec-Butanol*	*10.23*	*X*	*X*	*X*
2-Aminopyridine	*8.34*		*X*	*X*	*tert-Butanol*	*10.25*	*X*	*X*	*X*
Ammonia	*10.15*	*X*	*X*		*1-Butene*	*9.58*	*X*	*X*	*X*
n-Amyl Acetate	*n.p.*	*X*	*X*	*X*	*cis-2-Butene*	*9.13*	*X*	*X*	*X*
sec-Amyl Acetate	*n.p.*	*X*	*X*	*X*	*trans-2-Butene*	*9.13*	*X*	*X*	*X*
Aniline	*7.70*		*X*	*X*	*n-Butyl Acetate*	*10.01*	*X*	*X*	*X*
Arsine	*9.89*	*X*	*X*		*sec-Butyl Acetate*	*9.91*	*X*	*X*	*X*
Benzaldehyde	*9.53*	*X*	*X*	*X*	*t-Butyl Acetate*	*9.90*	*X*	*X*	*X*
Benzene	*9.25*	*X*	*X*	*X*	*n-Butyl Alcohol*	*10.04*	*X*	*X*	*X*
Benzenethiol	*8.33*	*X*	*X*	*X*	*n-Butylmine*	*8.71*		*X*	*X*
Benzyl Chloride	*9.14*	*X*	*X*	*X*	*i-Butylmine*	*8.70*		*X*	*X*
Bromobenzene	*8.98*	*X*	*X*	*X*	*s-Butylamine*	*8.70*		*X*	*X*
1-Bromobutane	*10.13*	*X*	*X*	*X*	*t-Butylamine*	*8.64*		*X*	*X*
2-Bromobutane	*9.98*	*X*	*X*	*X*	*n-Butylbenzene*	*8.69*	*X*	*X*	*X*
1-Bromobuanone	*9.54*	*X*	*X*	*X*	*i-Butylbenzene*	*8.68*	*X*	*X*	*X*
1-Bromo-2-chloroethane	*10.63*	*X*	*X*	*X*	*t-Butylbenzene*	*8.68*	*X*	*X*	*X*
Bromochloromethane	*10.77*	*X*		*X*	*Butyl Cellosolve®*	*8.68*	*X*	*X*	*X*
Bromodichloromethane	*10.59*	*X*	*X*	*X*	*i-Butyl Ethanoate*	*9.95*	*X*	*X*	*X*
1-Bromo-3-chloropropane	*n.p.*	*X*	*X*	*X*	*n-Butyl Mercaptan*	*9.15*	*X*	*X*	*X*
Bromoethane	*10.28*	*X*	*X*	*X*	*t-Butyl Mercaptan*	*9.03*	*X*	*X*	*X*
Bromoethene	*9.80*	*X*	*X*	*X*	*iso-Butyl Mercaptan*	*9.12*	*X*	*X*	*X*
Bromoform	*10.48*	*X*	*X*	*X*	*i-Butyl Methanoate*	*10.46*	*X*	*X*	*X*
1-Bromo-3-hexone	*9.26*	*X*	*X*	*X*	*p-tert-Butyltoluene*	*8.35*	*X*	*X*	*X*
Bromomethane(Methyl Bromide)	*10.53*	*X*	*X*	*X*	*1-Butyne*	*10.18*	*X*	*X*	*X*
Bromomethyl Ethyl Ether	*10.08*	*X*	*X*	*X*	*2-Butyne*	*9.85*	*X*	*X*	*X*
1-Bromo-2-methylpropane	*10.09*	*X*	*X*	*X*	*n-Butyraldehyde*	*9.86*	*X*	*X*	*X*
2-Bromo-2-methylpropane	*9.89*	*X*	*X*	*X*	*Carbon Disulfide*	*10.13*	*X*	*X*	

Compound	IP (eV)	GC	PID	FID	Compound	IP (eV)	GC	PID	FID
1-Bromopentane	*10.10*	*X*	*X*	*X*	*Carbon Tetrachloride**	*11.28*	*X*	*X*	*X*
1-Bromopropane	*10.18*	*X*	*X*	*X*	*Cellosolve Acetate*	*n.p.*	*X*	*X*	*X*
2-Bromopropane	*10.08*	*X*	*X*	*X*	*Chloroacetaldehyde*	*10.16*	*X*	*X*	*X*
1-Bromopropene	*9.30*	*X*	*X*	*X*	*Chlorobenzene*	*9.07*	*X*	*X*	*X*
2-Bromopropene	*10.06*	*X*	*X*	*X*	*Chlorobromomethane*	*10.77*	*X*		*X*
1-Chloro-2-bromoethane	*10.63*	*X*	*X*	*X*	*1,3-Dibromobutane*	*n.p.*	*X*	*X*	*X*
1-Chlorobutane	*10.67*	*X*	*X*	*X*	*1,4-Dibromobutane*	*n.p.*	*X*	*X*	*X*
2-Chlorobutane	*10.65*	*X*	*X*	*X*	*Dibromochloromethane*	*10.59*	*X*	*X*	*X*
1-Chlorobutanone	*9.54*	*X*	*X*	*X*	*Dibromochloropropane*	*n.p.*	*X*	*X*	*X*
1-Chloro-2,3-epoxypropane	*10.60*	*X*	*X*	*X*	*1,1-Dibromoethane*	*10.19*	*X*	*X*	*X*
Chloroethane(Ethyl Chloride)	*10.97*	*X*		*X*	*Dibromomethane*	*10.49*	*X*	*X*	*X*
Chloroethene(Vinyl Chloride)	*10.00*	*X*	*X*	*X*	*1,2-Dibromopropane*	*10.26*	*X*	*X*	*X*
2-Chloroethoxythene	*10.61*	*X*	*X*	*X*	*2,2-Dibromopropane*	*n.p.*	*X*	*X*	*X*
1-Chloro-2-fluorobenzene	*9.16*	*X*	*X*	*X*	*Dibutylamine*	*7.69*		*X*	*X*
1-Chloro-3-fluorobenzene	*9.21*	*X*	*X*	*X*	*1,2-Dichlorobenzene*	*9.07*	*X*	*X*	*X*
cis-1-Chloro-2-fluoroethene	*9.87*	*X*	*X*	*X*	*1,3-Dichlorobutane**	*n.p.*	*X*	*X*	*X*
trans-1-Chloro-2-fluoroethene	*9.87*	*X*	*X*	*X*	*1,4-Dichlorobutane**	*n.p.*	*X*	*X*	*X*
*Chloroform**	*11.37*	*X*	*X*	*X*	*cis-1,4-Dichloro-2-butene*	*n.p.*	*X*	*X*	*X*
o-Chloroiodobenzene	*8.35*	*X*	*X*	*X*	*2,2-Dichlorobutane**	*n.p.*	*X*	*X*	*X*
Chloromethylethyl Ether	*10.08*	*X*	*X*	*X*	*2,3-Dichlorobutane**	*n.p.*	*X*	*X*	*X*
Chloromethylmethyl Ether	*10.25*	*X*	*X*	*X*	*3,4-Dichlorobutane**	*n.p.*	*X*	*X*	*X*
1-Chloro-2-methylpropane	*10.66*	*X*	*X*	*X*	*1,1-Dichloroethane**	*11.06*	*X*	*X*	*X*
Chloroprene	*8.83*	*X*	*X*	*X*	*1,2 Dichloroethane (Ethylene Dichloride)**	*11.04*	*X*	*X*	*X*
*1-Chloropropane**	*10.82*	*X*	*X*	*X*	*cis-1,2-Dichloroethene*	*9.65*	*X*	*X*	*X*
*2-Chloropropane**	*10.78*	*X*	*X*	*X*	*trans-1,2-Dichloroethene*	*9.66*	*X*	*X*	*X*
3-Chloroproene	*10.04*	*X*	*X*	*X*	*1,1-Dichloroethene*	*10.00*	*X*	*X*	*X*
p-Chlorostyrene	*n.p.*	*X*	*X*	*X*	*Dichloroethyl Ether*	*n.p.*	*X*	*X*	*X*
2-Chlorothiophene	*8.68*	*X*	*X*	*X*	*Dichloromethane (Methylene Chloride)**	*11.35*	*X*	*X*	*X*
o-Chlorotoluene	*8.83*	*X*	*X*	*X*	*1,2-Dichloropropane**	*10.87*	*X*	*X*	*X*
m-Chlorotoluene	*8.83*	*X*	*X*	*X*	*1,3-Dichloropropane**	*10.85*	*X*	*X*	*X*
p-Chlorotoluene	*8.70*	*X*	*X*	*X*	*1,1-Dichloropropanone*	*9.71*	*X*	*X*	*X*
o-Cresol	*8.48*		*X*	*X*	*2,3-Dichloropropene*	*9.82*	*X*	*X*	*X*
m-Cresol	*8.48*		*X*	*X*	*Dicyclopentadiene*	*7.74*	*X*	*X*	*X*
p-Cresol	*8.48*		*X*	*X*	*Diethoxymethane*	*9.70*	*X*	*X*	*X*
Cumene (i-Propyl Benzene)	*8.75*	*X*	*X*	*X*	*Diethylamine*	*8.01*		*X*	*X*
Crotonaldehyde	*9.73*	*X*	*X*	*X*	*Diethylaminoethanol*	*8.58*		*X*	*X*
*Cyanoethene**	*10.91*	*X*	*X*	*X*	*Diethyl Ether*	*9.53*	*X*	*X*	*X*
*Cyanogen Bromide**	*10.91*	*X*	*X*		*Diethyl Ketone*	*9.32*	*X*	*X*	*X*

Compound	IP (eV)	GC	PID	FID	Compound	IP (eV)	GC	PID	FID
3-Cyanopropene	*10.39*	*X*	*X*	*X*	*Diethyl Sulfide*	*8.43*	*X*	*X*	*X*
Cyclobutane	*10.50*	*X*	*X*	*X*	*1,2-Difluorobenzene*	*9.31*	*X*	*X*	*X*
Cyclohexane	*9.98*	*X*	*X*	*X*	*1,4-Difluorobenzene*	*9.15*	*X*	*X*	*X*
Cyclohexanol	*10.00*	*X*	*X*	*X*	*Difluorodibromomethane**	*11.18*	*X*		*X*
Cyclohexanone	*9.14*	*X*	*X*	*X*	*Difluoromethylbenzene*	*9.45*	*X*	*X*	*X*
Cyclohexene	*8.95*	*X*	*X*	*X*	*Diiodomethane*	*9.34*	*X*	*X*	*X*
Cyclo-octatetraene	*7.99*	*X*	*X*	*X*	*Diisobutyl Ketone*	*9.04*	*X*	*X*	*X*
Cyclopentadiene	*8.55*	*X*	*X*	*X*	*Diisopropylamine*	*7.73*		*X*	*X*
Cyclopentane	*10.52*	*X*	*X*	*X*	*1,1-Dimethozyethane*	*9.65*	*X*	*X*	*X*
Cyclopentanone	*9.26*	*X*	*X*	*X*	*Dimethozymethane*	*10.00*	*X*	*X*	*X*
Cyclopentene	*9.01*	*X*	*X*	*X*	*Dimethylamine*	*8.24*		*X*	*X*
Cyclopropane	*10.06*	*X*	*X*	*X*	*Dimethylaniline*	*7.13*		*X*	*X*
2-Decanone	*9.40*	*X*	*X*	*X*	*2,3-Dimethylbutadiene*	*8.72*	*X*	*X*	*X*
Diacetone Alcohol	*n.p.*	*X*	*X*	*X*	*2,2-Dimethylbutane*	*10.06*	*X*	*X*	*X*
2,2-Dimethylbutan-3-one	*9.18*	*X*	*X*	*X*	*mono-Fluorobenzene*	*9.20*	*X*	*X*	*X*
2,3-Dimethylbutane	*10.02*	*X*	*X*	*X*	*mono-Fluoroethene*	*10.37*	*X*	*X*	*X*
2,3-Dimethyl-2-butene	*8.30*	*X*	*X*	*X*	*mono-Fluoromethanal*	*11.40*	*X*	*X*	*X*
3,3-Dimethylbutanone	*9.17*	*X*	*X*	*X*	*Fluorotribromomethane*	*10.67*	*X*	*X*	*X*
Dimethyl Disulfide	*8.46*	*X*	*X*	*X*	*o–Fluorotoluene*	*8.92*	*X*	*X*	*X*
Dimethyl Ether	*10.00*	*X*	*X*	*X*	*m-Fluorotoluene*	*8.92*	*X*	*X*	*X*
Dimethylformamide	*9.45*		*X*	*X*	*p-Fluorotoluene*	*8.79*	*X*	*X*	*X*
3,5-Dimethyl-4-heptanone	*9.04*	*X*	*X*	*X*	*Formaldehyde*	*10.88*	*X*		
1,1-Dimethylhydrazine	*8.88*		*X*	*X*	*Freon 11 (Fluorotrichloromethane)*	*11.77*	*X*		*X*
2,2-dimethyl-3-pentanone	*8.98*	*X*	*X*	*X*	*Freon 12 (Dichlorodifluoromethane)*	*12.91*	*X*		*X*
2,2-Dimethylpropane	*10.35*	*X*	*X*	*X*	*Freon 13 (Chlorotrifluoromethane)*	*12.91*	*X*		*X*
Dimethyl Sulfide	*8.69*	*X*	*X*	*X*	*Freon 13 B-1 (Bromotrifluoromethane)*	*12.08*	*X*		*X*
Di-n-propyl Disulfide	*8.27*	*X*	*X*	*X*	*Freon 14 (Carbon Tetrafluoride)*	*16.25*	*X*		*X*
Di-n-propyl Ether	*9.27*	*X*	*X*	*X*	*Freon 21 (Dichlorofluoromethane)*	*12.00*	*X*		*X*
Di-i-propyl Ether	*9.20*	*X*	*X*	*X*	*Freon 22 (Chlorodifluoromethane)*	*12.45*	*X*		*X*
Di-n-propylamine	*7.84*		*X*	*X*	*Freon 113 (1,2-Dichlorotrifluoroethane)*	*11.78*	*X*		*X*
Di-n-propyl Sulfide	*8.30*	*X*	*X*	*X*	*Furan*	*8.89*	*X*	*X*	*X*
1,4-Dioxane	*9.41*	*X*		*X*	*Furfuryl Alcohol*	*n.p.*	*X*	*X*	*X*
Epichlorohydrin	*10.60*	*X*	*X*	*X*	*furfural*	*9.21*	*X*	*X*	*X*
*Ethane**	*11.65*	*X*	*X*	*X*	*n-Heptane*	*10.07*	*X*	*X*	*X*
Ethanol	*10.62*	*X*	*X*	*X*	*2-Heptanone*	*9.33*	*X*	*X*	*X*
Ethanolamine	*9.87*		*X*	*X*	*4-Heptanone*	*9.12*	*X*	*X*	*X*

Compound	IP (eV)	GC	PID	FID	Compound	IP (eV)	GC	PID	FID
Ethanethiol (Ethyl Mercaptan)	*9.29*	*X*	*X*	*X*	*n-Hexane*	*10.18*	*X*	*X*	*X*
Ethene(Ethylene)	*10.52*	*X*	*X*	*X*	*Hexanone*	*n.p.*	*X*	*X*	*X*
Ethyl Acetate	*10.11*	*X*	*X*	*X*	*2-Heanone*	*9.44*	*X*	*X*	*X*
Ethyl Acrylate	*n.p.*	*X*	*X*	*X*	*1-Hexene*	*9.46*	*X*	*X*	*X*
Ethylamine	*8.86*		*X*	*X*	*sec-Hexyl Acetate*	*n.p.*		*X*	*X*
Ethyl Amyl Ketone	*9.10*	*X*	*X*	*X*	*Hydrazine*	*n.p.*	*X*	*X*	*X*
Ethylbenzene	*8.76*	*X*	*X*	*X*	*Hydrogen Selenide*	*9.88*	*X*	*X*	
Ethyl Bromide	*10.29*	*X*	*X*	*X*	*Hydrogen Sulfide*	*10.46*	*X*	*X*	
Ethyl Butyl Ketone	*9.02*	*X*	*X*	*X*	*Hydrogen Telluride*	*9.14*	*X*	*X*	
Ethyl Chloride	*11.01*	*X*		*X*	*Iodobenzene*	*8.73*	*X*	*X*	*X*
Ethyl Chloroacetate	*10.20*	*X*	*X*	*X*	*1-Iodobutane*	*9.21*	*X*	*X*	*X*
Ethyl Ethanoate	*10.10*	*X*	*X*	*X*	*2-Iodobutane*	*9.09*	*X*	*X*	*X*
Ethyl Ether	*9.41*	*X*	*X*	*X*	*Iodoethane (Ethyl Iodide)*	*9.33*	*X*	*X*	*X*
Ethyl Disulfide	*8.27*	*X*	*X*	*X*	*Iodomethane (Methyl Iodide)*	*9.54*	*X*	*X*	*X*
Ethylene Chlorohydrin	*10.90*	*X*	*X*	*X*	*1-Iodo-2-methylpropane*	*9.18*	*X*	*X*	*X*
Ethylene Dibromide (EDB)	*10.37*	*X*	*X*	*X*	*1-Iodo-2-methylpropane*	*9.02*	*X*	*X*	*X*
Ethylene Oxide	*10.56*	*X*	*X*	*X*	*1-Iodopentane*	*9.19*	*X*	*X*	*X*
Ethyl Formate	*10.61*	*X*	*X*	*X*	*1-Iodopropane*	*9.26*	*X*	*X*	*X*
Ethyl Iodide	*9.33*	*X*	*X*	*X*	*2-Iodopropane*	*9.17*	*X*	*X*	*X*
Ethyl Mercaptan	*9.29*	*X*	*X*	*X*	*o-Iodotoluene*	*8.62*		*X*	*X*
Ethyl Methanoate	*10.61*	*X*	*X*	*X*	*m-Iodotoluene*	*8.61*		*X*	*X*
Ethyl Isothiocyanate	*9.14*	*X*	*X*	*X*	*p-Iodotoluene*	*8.50*		*X*	*X*
Ethyl Methyl Sulfide	*8.55*	*X*	*X*	*X*	*Isoamyl Acetate*	*9.90*	*X*	*X*	*X*
Ethyl Propanoate	*10.00*	*X*	*X*	*X*	*Isoamyl Alcohol*	*10.16*	*X*	*X*	*X*
Ethyl Trichloroacetate	*10.44*	*X*	*X*	*X*	*Isobutane*	*10.57*	*X*	*X*	*X*
Isobutylamine	*8.70*		*X*	*X*	*Methyl Isobutyl Ketone(MIBK)*	*9.30*	*X*	*X*	*X*
Isobutyl Acetate	*9.97*	*X*	*X*	*X*	*Methyl Isobutyrate*	*9.98*	*X*	*X*	*X*
Isobutyl Alcohol	*10.47*	*X*	*X*	*X*	*Methyl Isocyanate*	*10.67*		*X*	*X*
Isobutyl Formate	*10.46*	*X*	*X*	*X*	*1-Methyl-4-isopropylbenzene*	*n.p.*	*X*	*X*	*X*
Isobutylene	*9.43*	*X*	*X*	*X*	*Methyl Isopropyl Ketone*	*9.32*	*X*	*X*	*X*
Isobutyraldehyde	*9.74*	*X*	*X*	*X*	*Methyl Mercaptan (Methanethiol)*	*9.44*	*X*	*X*	*X*
Isopentane	*10.32*	*X*	*X*	*X*	*Methyl Methacrylate*	*9.74*	*X*	*X*	*X*
Isoprene	*8.85*	*X*	*X*	*X*	*Methyl Methanoate*	*10.82*	*X*		*X*
Isoprooyl Acetate	*9.99*	*X*	*X*	*X*	*2-Methylpentane*	*10.12*	*X*	*X*	*X*
Isopropyl Alcohol	*10.16*	*X*	*X*	*X*	*3-Methylpentane*	*10.08*	*X*	*X*	*X*
Isopropylamine	*8.72*		*X*	*X*	*2-Methylpropane*	*10.56*	*X*	*X*	*X*
Isopropylbenzene	*8.75*	*X*	*X*	*X*	*2-Methylpropanal*	*9.74*	*X*	*X*	*X*
Isopropyl Ether	*9.20*	*X*	*X*	*X*	*2-Methyl-2-propanol*	*9.70*	*X*	*X*	*X*
Isovaleraldehyde	*9.71*	*X*	*X*	*X*	*2-Methylpropene*	*9.23*	*X*	*X*	*X*

Compound	IP (eV)	GC	PID	FID	Compound	IP (eV)	GC	PID	FID
Ketene	9.61	X	X	X	*Methyl n-propyl Ketone*	9.39	X	X	X
Mesitylene	8.40	X	X	X	*Methyl Styrene*	8.35	X	X	X
Mesityl Oxide	9.08	X	X	X	*Monomethyl Hydrazine*	8.00	X	X	X
Methane	12.98	X		X	*Naphthalene*	8.10	X	X	X
*Methanol**	10.85	X		X	*Nitric Oxide*	9.25	X	X	
Methyl Acetate	10.27	X	X	X	*Nitrobenzene*	9.92		X	X
Methyl Acrylate	10.72	X		X	*p-Nitrochlorobenzene*	9.96		X	X
Methylamine	8.87		X	X	*n-Nonane*	10.21	X	X	X
Methyl Bromide (Bromomethane)	10.53	X	X	X	*5-Nonanone*	9.10	X	X	X
2-Methyl-1,3-butadiene	8.85	X	X	X	*n-Octane*	10.24	X	X	X
2-Methylbutanal	9.71	X	X	X	*3-Octanone*	9.19	X	X	X
2-Methylbutane	10.31	X	X	X	*4-Octanone*	9.10	X	X	X
2-Methyl-1-butene	9.12	X	X	X	*1-Octene*	9.52	X	X	X
3-Methyl-1-butene	9.51	X	X	X	*n-Pentane*	10.53	X	X	X
3-Methyl-2-butene	8.67	X	X	X	*cis-1,3-Pentadiene*	8.59	X	X	X
Methyl tert-Butyl Ether	9.41	X	X	X	*trans-1,3-Pentadiene*	8.56	X	X	X
Methyl n-Butyl Ketone	9.34	X	X	X	*n-Pentanal*	9.82	X	X	X
Methyl Butyrate	10.07	X	X	X	*2,4-Pentanedione*	8.87	X	X	X
Methyl Cellosolve	n.p.	X	X	X	*2-Pentanone*	9.39	X	X	X
Methyl Cellosolve Acetate	n.p.	X	X	X	*3-Pentanone*	9.32	X	X	X
Methyl Chloroacetate	10.35	X	X	X	*1-Pentene*	9.50	X	X	X
*Methylchloroform (1,1,1-TCA)**	11.25	X	X	X	*Perfluoro-2-butene**	11.25	X		X
Methylcyclohexane	9.85	X	X	X	*Perfluoro-1-heptene*	10.48	X	X	X
Methylcyclohexanol	9.80	X	X	X	*n-Perfluoropropyl Iodide*	10.36		X	X
Methlcyclohexanone	9.05	X	X	X	*n-Perfluoropropyl-iodomethane*	9.96	X	X	X
4-Methylcyclohexene	8.91	X	X	X	*n-Perfluoropropyl-methyl Ketone*	10.58	X	X	X
Methylcyclopropane	9.52	X	X	X	*Phenol*	8.69		X	X
Methyl Dichloroacetate	10.44	X	X	X	*Phenyl Ether*	8.09	X	X	X
Methyl Ethanoate	10.27	X	X	X	*Phenyl Isocyanate*	8.77	X	X	X
Methyl Ethyl Ketone (MEK)	9.53	X	X	X	*Phosphine*	9.96	X	X	
Methyl Ethyl Sulfide	8.55	X	X	X	*Pinene*	8.07	X	X	X
2-Methyl Furan	8.39	X	X	X	*Propadiene*	10.19	X	X	X
Methyl Iodide	9.54	X	X	X	*n-Propanal*	9.95	X	X	X
*Propane**	11.07	X	X	X	*1,2,3-Trichloropropane*	n.p.	X	X	X
1-Propanethiol	9.20	X	X	X	*Triethylamine*	7.50	X	X	X
n-Propanol	10.51	X	X	X	*1,2,4-Trifluorobenzene*	9.37	X	X	X
Propanone	9.69	X	X	X	*1,3,5-Trifluorobenzene*	9.32	X	X	X
Propene	9.73	X	X	X	*Trifluoroethene*	10.14	X	X	X

Compound	IP (eV)	GC	PID	FID	Compound	IP (eV)	GC	PID	FID
Prop-1-ene-2-ol	*8.20*	*X*	*X*	*X*	*1,1,1-Trifluoro-2-iodoethane*	*10.10*	*X*	*X*	*X*
Prop-2-ene-1-ol	*9.67*	*X*	*X*	*X*	*Trifluoroiodomethane*	*10.40*	*X*	*X*	*X*
Propionaldehyde	*9.98*	*X*	*X*	*X*	*Trifluoromethylbenzene*	*9.68*	*X*	*X*	*X*
n-Propyl Acetate	*10.04*	*X*	*X*	*X*	*Trifluoromethylcyclohexane*	*10.46*	*X*	*X*	*X*
n-Propyl Alcohol	*10.20*	*X*	*X*	*X*	*1,1,1-Trifluoropropene*	*10.90*	*X*	*X*	*X*
n-Propylamine	*8.78*		*X*	*X*	*Trimethylamine*	*7.82*	*X*	*X*	*X*
n-Propylbenzene	*8.72*	*X*	*X*	*X*	*2,2,4-Trimethyl Pentane*	*9.86*	*X*	*X*	*X*
Propylene	*9.73*	*X*	*X*	*X*	*2,2,4-Trimethyl-3-pentanone*	*8.82*	*X*	*X*	*X*
Propylene Dichloride	*10.87*	*X*	*X*	*X*	*n-Valeraldehyde*	*9.82*	*X*	*X*	*X*
Propylene Imine	*8.76*	*X*	*X*	*X*	*Vinyl Acetate*	*9.19*	*X*	*X*	*X*
Propylene Oxide	*10.22*	*X*	*X*	*X*	*Vinyl Bromide*	*9.80*	*X*	*X*	*X*
n-Propyl Ether	*9.27*	*X*	*X*	*X*	*Vinyl Chloride (Chloroethene)*	*10.00*	*X*	*X*	*X*
n-Propyl Formate	*10.54*	*X*	*X*	*X*	*4-Vinylcyclohexene*	*8.93*	*X*	*X*	*X*
Propyne	*10.36*	*X*	*X*	*X*	*Vinyl Ethanoate*	*9.19*	*X*	*X*	*X*
Pyridine	*9.32*		*X*	*X*	*Vinyl Fluoride*	*10.37*	*X*	*X*	*X*
Styrene	*8.47*	*X*	*X*	*X*	*Vinylidene Chloride (1,1-DCE)*	*10.00*	*X*	*X*	*X*
Tetrabromoethane	*n.p.*	*X*	*X*	*X*	*Vinyl Methyl Ether*	*8.93*	*X*	*X*	*X*
Tetrachloroethylene (PCE)	*9.32*	*X*	*X*	*X*	*o-Vinyl Toluene*	*8.20*		*X*	*X*
1,1,1,2-Tetrachloropropane	*n.p.*	*X*	*X*	*X*	*o-Xylene*	*8.56*	*X*	*X*	*X*
1,1,2,2-Tetrachloropropane	*11.10*	*X*	*X*	*X*	*m-Xylene*	*8.56*	*X*	*X*	*X*
Tetrafluoroethene	*10.12*	*X*	*X*	*X*	*p-Xylene*	*8.45*	*X*	*X*	*X*
Tetrahydrofuran	*9.54*	*X*	*X*	*X*	*2,4-Xylidine*	*7.65*		*X*	*X*
1,1,1,2-Tetrachloropropane	*n.p.*	*X*	*X*	*X*	*Trichloroethylene (TCE)*	*9.45*	*X*	*X*	*X*
*1,1,2-Trichloroethane**	*11.00*	*X*	*X*	*X*	*Trichloromethyl Ethyl Ether*	*10.08*	*X*	*X*	*X*

** The sensitivity of these compounds are enhanced using an 11 eV lamp instead of the standard 10.6 eV lamp.*

n.p. - not published

ACCESS TO PROPERTY AGREEMENT - ASSESSMENT

Kansas Department of Health and Environment (hereinafter referred to as "KDHE") hereby enters into the following Access to Property Agreement with

City of Coffeyville
(Property Owner(s))

(hereinafter referred to as "Owner") regarding access to subject property more specifically described as:

Parcel ID: 0632041800001005000 located in the NE ¼ of NW ¼ of NE ¼ of Section 18, Township 34 S, Range 17 East, Montgomery County, Kansas.

And / Or

With an address of 2601 North 5th Street (Coffeyville Industrial Park), Coffeyville, Kansas.
(Street Address) (City)

The terms of this Access to Property Agreement are as follows:

1. The Owner of the above described property grants access to KDHE, its employees, agents, assigns, or contractors for the terms and conditions of the work set forth below.

2. The KDHE, its employees, agents, assigns, or contractors shall conduct assessments and/or subsurface investigation work on the subject property which may include reviewing information, inspecting the premises, examining and gathering data, boring and/or drilling holes, collecting soil, water, and air samples, and other actions related to environmental investigations which are determined by KDHE to be necessary (See 2015 Trenching Work Plan).

3. KDHE assures the owner that prior to termination of this Access to Property Agreement, all materials and equipment shall be removed from the subject property and the property restored, as nearly as reasonable possible, to the condition it was in at the time this Access to Property Agreement was executed.

4. KDHE, its employees, agents, assigns, or contractors shall comply with all city, county, state, and federal laws, statutes, regulations, and ordinances that may affect or pertain to the environmental activities conducted on the subject property.

5. Other than the activities specified above, no further access to or use of the subject property shall be permitted except upon written consent of the parties, which consent shall not be unreasonably withheld.

6. By signing this Access to Property Agreement, KDHE hereby represents and warrants that its contractor have adequate insurance or other financial assurances to protect and safeguard the Owner and personal and real property in accordance with the terms of this Access to Property Agreement.

7. KDHE will be solely responsible for the proper disposal of all investigative derived wastes created during KDHE's assessment and/or investigation activities.

8. KDHE will not be liable for any act or omission of its employees, agents, assigns, or contractors beyond that liability granted by the Kansas Tort Claims Act, K.S.A. 75-6101 et seq.

9. The parties signing below warrant that they have authority to enter into the Access to Property Agreement. The owner specifically warrants that s/he is owner in fee simple of the subject property.

_____ Date _____
Property Owner

_____ Date _____
Property Owner

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT

_____ Date_____

_____
Title