

**PETROLEUM STORAGE TANK RELEASE TRUST FUND**

**LIMITED KANSAS RISK-BASED  
CORRECTIVE ACTION**

**REPORT FORMAT**

**VERSION 3**



**Kansas Department of Health and Environment  
Bureau of Environmental Remediation  
Storage Tank Section  
1000 SW Jackson, Suite 410  
Topeka, KS 66612-1367**

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All work will be performed in accordance with the most recent LSA RFP and Kansas Risk-Based Corrective Action (KRBCA) Manual. Both documents are available upon request or at <http://www.kdheks.gov/tanks/>.

Limited KRBCA reports will be submitted according to the KRBCA Report Format, not according to Section 4.5, Final Report, Assessment Phase, of the LSA RFP.

## **SECTION 1.0 FIELD WORK PLAN SUBMITTALS**

Submit two copies of the Field Work Plan Worksheet, maps and Site Conceptual Exposure Models. The Field Work Plan Worksheet is included in Attachment A. The Field Work Plan shall contain all requested information. Additional information should be included as needed. Refer to Section 4.2 of the LSA RFP for specifications.

## **SECTION 2.0 LIMITED KANSAS RISK-BASED CORRECTIVE ACTION REPORTS**

2.1 A Limited KRBCA Report will be completed for each facility. Each Limited KRBCA Report will be a summary of all work performed and gathered during activities conducted under the KRBCA phase and previous assessments.

The Vendor will submit one copy of the Final Report for each site within 120 days after the contract between the O/O and Vendor has been signed by all parties. Incomplete final reports will be returned without review. The submittal deadline will not be considered to have been met until a complete report demonstrating that the investigation goals have been met is received by KDHE.

Upon approval of the final report, one electronic copy, in Adobe format (.pdf), must be submitted to KDHE on a CD. KDHE may also request electronic files in original format at no additional cost. The final report must contain a sleeve for storage of the CD.

2.2 One copy of the Final Report will be submitted to the respective O/O. The Vendor may wait until the Final Report has been reviewed and approved by KDHE before providing the O/O with a copy. If the Vendor provides the O/O with a copy prior to approval of the report, copies of any and all revisions and/or addenda must also be provided to the O/O.

2.3 Each Final Report will be bound and include a cover page with the following information: report title; KDHE site name; site address; KDHE project code; KDHE Facility I.D. number; section, township, and range to four quarters; report date; and the name of the person who prepared the report. The cover page must be stamped and signed by a Kansas Licensed Geologist or Licensed Professional.

Each Final Report will include a table of contents with the following information:

- 1) Section titles for sections 1-6,
- 2) Titles and page numbers for tables 2.1-2.9,
- 3) Titles for figures 1- 8,
- 4) Titles for each appendix in Section 6.0, Documentation.

Each Final Report will include labeled tabs for each Section title and each appendix (see below).

- 2.4 Report will include a signature page to be signed by a Trained Professional with a certificate on file with KDHE verifying the completion of a Risk-Based Corrective Action (RBCA) program conducted by an American Society of Testing and Materials (ASTM) certified trainer. The signature page is included in Attachment C.

## **SECTION 3.0 FINAL REPORT FORMAT**

Reports will include all information outlined below in the format and order described. Figures, tables and appendices not applicable to the site should be so noted in the Table of Contents. Do not change the item numbers designated below. Items within tables that may not be applicable, such as Light Non-Aqueous Phase Liquid (LNAPL) thickness, should be stated in the table to be “Not Applicable”.

### **Section 1.0 Site Summary**

The site summary section will include the following information:

#### **1.1 General Summary**

- 1) Include a detailed summary of all past and present work performed at the site.
- 2) Identify any nuisance conditions associated with the release(s) from the site.
- 3) Determine if any drinking water wells or surface waters have been impacted by a release from the site.
- 4) State if public water is being supplied to the site and surrounding areas.

#### **1.2 Regional Geology**

- 1) Review local and regional geologic and/or hydrogeologic maps, nearby site assessments and/or investigation reports and any other pertinent publications.
- 2) Identify any aquifers and/or surface water bodies serving as sources of drinking water for the area.
- 3) Identify and evaluate the use and/or potential use of the uppermost groundwater zone and/or impacted groundwater zones within 1/4 mile of the source of the release at the facility.

#### **1.3 Land Use**

- 1) Investigate and describe past, current, and potential future uses of the site.
- 2) Identify potential source areas, migration pathways, and receptors.
- 3) Indicate and describe all subsurface structures that are potential or current receptors of contaminated media.
- 4) Determine past and current uses of adjacent properties to identify other potential sources of Chemicals of Concern.
- 5) If an offsite receptor is identified, assess the past, current and potential future land use. Future land use assumptions should be based on current use, existing zoning, and development trends of adjacent properties.
- 6) Document any ordinances preventing or influencing the future installation of water wells at the site or in the surrounding area such as groundwater protection areas.
- 7) Identify the current predominant land use of the area as residential, commercial, recreational, agricultural, or undeveloped.
- 8) Identify sensitive receptors, such as surface water bodies, wildlife sanctuaries, and wetlands.

#### **1.4 Source History**

- 1) Locate current and/or former tank systems and other potential sources such as spills or overfill incidents, both on and offsite.
- 2) Investigate and summarize any previous assessment work, such as tank removal data, previous site assessments, release investigations and/or remediation activities that may have been conducted onsite and on adjacent properties. Refer to Section 7.3.2 of ASTM Practice E1527, Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process for guidance.

#### **Section 2.0 Field Work Tables**

Tables must be labeled with KDHE site name, KDHE project code and the numbers and titles provided below. Number each page of tables. Include in the table a column or row for each numbered item requested. Do not reference or include in this section, any discussion, tables, maps, photographs, drilling logs, or other documents included in this report. Abbreviations or material referenced from other publications must be explained at the bottom of the table.

##### **Table 2.1 Summary of Work Completed**

Include the following information for work completed during the KRBCA scope of work:

- 1) total number of plugged borings,
- 2) total number of monitoring wells completed,
- 3) total footage drilled,
- 4) total monitoring well footage,
- 5) total boring footage plugged,
- 6) total number of groundwater samples analyzed by laboratory,
- 7) total number of soil samples analyzed by laboratory,
- 8) total number of LNAPL samples analyzed by laboratory,

Samples collected for saturated and unsaturated zone tests, properties and data included in Tables 2.7 and 2.8 and samples analyzed for offsite waste disposal must not be included in the total number of soil samples analyzed by laboratory.

##### **Table 2.2 Water Well Information**

Include the following information for all wells located within a 1/4-mile radius of the site:

- 1) the well owner's name,
- 2) the section, township and range of the well location to three quarters, or to four quarters for wells sampled or located during the investigation, or used as a public water supply,
- 3) the use; select the use from those found in Section 7 of the WWC-5 form that best describes the use of the well,
- 4) the distance between the well and contaminant plume; give an approximate distance if the well location is known to only three quarters,
- 5) the location of the well relative to the contaminant plume and groundwater flow direction.

The search for this information must include at least the following: 1) a water well records search conducted through the Kansas Geological Survey, 2) a discussion with city and/or county personnel concerning the location of public and private water supplies for the area, and 3) a ground or house-to-house reconnaissance of the area within the contaminant plume(s) and a 500 foot radius surrounding the source of contamination. PWS wells must be designated with the same numbers assigned by the city, water district, or other well owner.

### **Table 2.3 Monitoring Well Completion Information**

Include the following information for each well installed or sampled:

- 1) boring and/or monitoring ID number assigned by the consultant,
- 2) well ID number from KDHE numbered well lock,
- 3) the surveyed elevation of the well's vertical datum control point (survey pin or permanent mark on flush mount rim),
- 4) the surveyed elevation of the top of well casing,
- 5) the depth to groundwater below top of well casing in feet prior to development/purging,
- 6) the depth to groundwater below top of well casing in feet prior to sampling,
- 7) static groundwater elevation prior to purging (or development if wells are sampled the same day as development and the wells are not purged),
- 8) static groundwater elevation prior to sampling,
- 9) total depth of well,
- 10) the date static water level was measured prior to development/purge,
- 11) the thickness of the LNAPL (if applicable).

Groundwater levels must be measured under static conditions within the same 24-hour period.

### **Table 2.4 Soil Field Screening and Laboratory Results**

Include the following results for each field sample, including those not submitted for laboratory analysis, and each laboratory sample collected from a boring:

- 1) boring and/or monitoring well ID number assigned by consultant,
- 2) the interval at which each sample was collected,
- 3) the field screening results in parts per million (ppm),
- 4) the concentration of each chemical of concern in parts per million (ppm) determined by laboratory analysis; state the petroleum product(s) identified\*,
- 5) the date each sample was collected,
- 6) the EPA test method and laboratory analytical sample detection limit for each analyte in each laboratory sample,
- 7) the field instrument used for each field screening sample,
- 8) the Tier 2 Risk-Based Screening Level for each chemical of concern for both soil and soil to groundwater pathway for both residential and nonresidential scenarios.

\*Constituents are Benzene, Toluene, Ethylbenzene, Total Xylenes, 1,2 Dichloroethane (1,2 DCA), Methyl Tertbutyl Ether (MtBE), Naphthalene, Ethylene Dibromide (EDB), Low-Range Hydrocarbons (LRH), Mid-Range Hydrocarbons (MRH), and High-Range Hydrocarbons (HRH).

### **Table 2.5A Groundwater Analytical Results**

Present all results for each sample point. Private wells and PWS wells must be designated consistently throughout the report. Include the following information for each groundwater and LNAPL laboratory sample:

- 1) well ID number (see Table 2.3),
- 2) the concentration of each constituent, in parts per billion (ppb)\*,
- 3) the product(s) identified, or approximate % of each product if a mixture, for any LNAPL sample(s),
- 4) the volume, in gallons, of water removed from each well during well development,
- 5) the volume, in gallons, of water purged from the well prior to sampling,
- 6) the date the well was purged,
- 7) the date each sample was collected,
- 8) the EPA test method and analytical sample detection limit for each analyte in each sample,
- 9) Tier 2 Risk-Based Screening Levels for each chemical of concern for groundwater pathway for both residential and nonresidential scenarios.

\*Constituents are Total BTEX, Benzene, Toluene, Ethylbenzene, Total Xylenes, 1,2 Dichloroethane (1,2 DCA), Methyl Tertbutyl Ether (MtBE), Naphthalene, Ethylene Dibromide (EDB), LRH, MRH, and HRH. The highest Naphthalene or EDB detected from the two sampling methods must be reported in Table 2.5. If the Naphthalene or EDB is ND, report the lowest detection limit.

### **Table 2.5B Groundwater Analytical Results**

Present all results for each sample point from Full VOC Scan and Full PAH Scan. Include the following information for each groundwater laboratory sample:

- 1) well ID number (see Table 2.3),
- 2) the concentration of each constituent, in parts per billion (ppb)\*,
- 3) the date each sample was collected,
- 4) the EPA test method and analytical sample detection limit for each analyte in each sample,
- 5) Tier 2 Risk-Based Screening Levels for each chemical of concern for groundwater pathway for both residential and nonresidential scenarios.

\*Only list the constituents that have a detection from these scans. For the remaining constituents, add a footnote to the table indicating they are ND.

### **Table 2.6 Waste Handling Results**

Include the following information for wastes handled:

- 1) the type of waste (soil or water) generated,
- 2) the quantity of waste generated for each type of waste,
- 3) the storage and disposal methods used for each type of waste,
- 4) results of any field analysis of wastes conducted during onsite treatment,
- 5) results of any laboratory analysis of wastes,
- 6) specific location where wastes were disposed or discharged.

For Tables 2.7 and 2.8, identify source(s) of information for values included in the tables that were not calculated or acquired during this scope of work. Include information from the Site Investigation Report and/or the Limited Site Investigation report if geotechnical data is not requested in the scope of work or if the geotechnical samples were unable to be collected. If geotechnical data is not available for the site, use published values for the lithology encountered at the site.

### **Table 2.7 Unsaturated Zone Hydrologic Tests and Properties**

Include the following information for each unsaturated zone hydrologic test conducted:

- 1) the well and/or boring ID number (see Table 2.3),
- 2) the depth at which each sample was collected, including interval,
- 3) the analysis method name and number,
- 4) the sample collection method,
- 5) the lithologic description of each sample,
- 6) estimated porosity ( $\text{cm}^3/\text{cm}^3$ ),
- 7) gravimetric water content ( $\text{g}/\text{cm}^3$ ) (ASTM Method D2216),
- 8) volumetric water content ( $\text{cm}^3/\text{cm}^3$ ) (Calculation from ASTM Method D2216),
- 9) dry bulk density ( $\text{g}/\text{cm}^3$ ) (ASTM Method D2937),
- 10) specific gravity ( $\text{g}/\text{cm}^3$ ) (ASTM Method D854),
- 11) organic matter (% organic matter) (ASTM Method D2974),
- 12) total organic carbon (% organic carbon) (ASTM Method D2974).

### **Table 2.8 Saturated Zone Hydrologic Data**

Include the following information for each monitoring well used for the saturated zone tests:

- 1) the monitoring well or boring ID number (see Table 2.3),
- 2) the depth at which each sample was collected, including interval,
- 3) the analysis method name and number (ASTM, EPA) for the Grain Size Analyses and/or the Permeameter tests,
- 4) the hydraulic conductivity value in centimeters per second (cm/sec) determined for each test,
- 5) hydraulic gradient (ft/ft) (show calculations),
- 6) known or estimated yield of uppermost aquifer within a 24-hour period (provide source),
- 7) area specific annual rainfall in inches per year (provide source).

### **Table 2.9 Point of Demonstration (POD) and Point of Exposure (POE)**

- 1) State the location, distance from source and justification of the point of demonstration. (POD is the furthest downgradient onsite well)
- 2) State the location, distance from source and justification of the point of exposure. (POE is the nearest downgradient property boundary)

## **Section 3.0 Maps**

All maps must be drawn to scale and labeled with the titles provided, KDHE site name, and KDHE project code. Do not reference or include in this section any discussion, tables, photographs, drilling logs, or other documents included in this or any other report. Maps are required to be single-sided.



The scale for figures 3 through 5 must be approximately 1" = 50' for smaller sites and 1" = 100' for larger sites. The scale for figures 4 and 5 may be adjusted to enlarge the area of the plume if the plume is small, provided that sufficient site features are shown to identify the area mapped. Maps should be 8 1/2" x 11" or 11" x 17" whenever possible. If warranted, the KDHE Project Manager must be contacted for approval to use a scale or figure size other than specified herein. Include a north arrow, scale, and legend on all maps. Legends must include only those items that occur at the site.

Figures 3 through 6 must include wells and borings, with ID numbers, and only those labels necessary to describe information requested for that specific map. Private and PWS wells must be designated consistently throughout the report.

### **Figure 1      General Site Location**

A map adapted from a USGS 7.5-minute quadrangle, depicting the site location and a one-mile radius of the site. The one-mile radius must be clearly marked. Highlight or mark the location of the site. Contours and other information must be clear and legible.

### **Figure 2      Area Base Map**

Two area base maps will be included in the report. The maps will be enlarged such that the facility is located at or near the center of the map. Figure 2.1 will depict the site and a minimum 350-foot radius around the source(s) of contamination. Figure 2.2 will depict the site and a minimum 500-foot radius around the source(s) of contamination or the complete area of the investigation, whichever is greater. Figure 2.1 will have an approximate scale of 1" = 100'. Figure 2.2 will have an approximate scale of 1" = 125'. Maps should be on 8 1/2" x 11" or 11" x 17" paper.

The following must be included on both maps:

- 1) soil borings and wells,
- 2) roads, property boundaries and buildings,
- 3) identify the general use (residential, park, undeveloped, industrial, commercial, etc.) of properties in this area,
- 4) business names,
- 5) property owner's name,
- 6) locations or former locations of all tanks, lines, buildings, driveways, and other fixed objects on the facility property,
- 7) locations of all underground utility trenches within 100 feet of the contaminant plume(s) and all utilities or subsurface structures reported in the private property locates. State the type and depth of each utility service,
- 8) basements (a door to door search for basements must be made within a 500-foot radius of the source of contamination). Make a note on the map if no basements are located,
- 9) properties where access has been denied, including property owner's name and date of denial.

### **Figure 3 Groundwater Flow Map**

A map, adapted from Figure 2, representing the exact location of the site benchmark(s) and each well relative to the site benchmark. Label each well with the well ID, the elevation of each well (casing), static groundwater elevation prior to development/purge, labeled equipotential contours encompassing all water measurement points, and arrow(s) indicating predominant flow paths and direction. Use all points (except anomalous points) measured for the investigation when contouring. Anomalous data points must be noted on the map. All wells with LNAPL will not be adjusted for static water level. LNAPL wells will be considered anomalous. Show flow line used for calculating hydraulic gradient.

### **Figure 4 Soil Contamination Maps**

Use Figure 2 as the template, figures will have an approximate scale of 1" = 50' or larger. These figures will be enlarged to clearly indicate the location of all wells/borings from which analytical soil samples were collected. The estimated areal extent of soil contamination, above the capillary fringe, must be outlined down to non-detect (ND) levels, for all soil contamination maps outlined below.

Use the highest soil laboratory analysis from above the capillary fringe in each boring. Develop isocontours if the contaminant distribution is suitable. Label sample points with the boring/well ID number, the concentration in ppm, and the interval at which each sample was collected. Label isoconcentration lines with the concentration in ppm. If the contaminant being mapped was detected in less than three sampling locations, submit a map showing the sample points labeled with the concentration in ppm but do not contour. If the constituent being mapped was not detected in any boring, omit map.

- 4.1 Benzene in Soils
- 4.2 Naphthalene in Soils
- 4.3 LRH in Soils
- 4.4 MRH in Soils
- 4.5 HRH in Soils

### **Figure 5 Groundwater Isoconcentration Maps**

Develop, down to non-detect (ND) levels, all groundwater isoconcentration maps outlined below. Use Figure 2 as the template, and show all monitoring wells and sampling points, with ID numbers, sampled during the investigation. Label sample points and isoconcentration lines with the concentration in ppb. If the contaminant being mapped was detected in less than three sampling locations, submit a map showing the sample points labeled with the concentration in ppb but do not contour. Sample points shall be labeled with concentration in ppb. If the constituent being mapped was not detected in any well, submit a map showing all sample points labeled as above with the concentrations labeled as ND.

- 5.1 Total BTEX in wells
- 5.2 Benzene in wells
- 5.3 1,2 DCA in wells
- 5.4 MtBE in wells
- 5.5 Naphthalene in wells
- 5.6 EDB in wells
- 5.7 LRH in wells
- 5.8 MRH in wells
- 5.9 HRH in wells

## **Figure 6 Groundwater Composite Historical Contamination Maps**

This should be a historic combination of maps indicating snapshots of the following groundwater contaminant plumes.

- 6.1 Benzene
- 6.2 Naphthalene

These should be, at a minimum, 3" x 4" reductions of the isoconcentration maps similar to Figure 5 maps and placed on 11" x 17" paper. Each page will include six reduced maps. Submit one page per constituent. The first map will be the initial concentrations or earliest concentrations available. The final map will be the analytical results obtained from this Limited KRBCA scope of work. The maps between the initial map and final map will be the four most recent analytical results. The sampling data and date will be clearly labeled on each reduced map.

## **Figure 7 Wells within ¼ Mile\***

The map will be enlarged such that the facility is located at or near the center of the map. The map will have a scale of approximately 1" = 300' and be on an 11" x 17" page. All wells will be clearly marked and labeled as to the current use (eg: industrial, public drinking supply, monitoring, etc.). For properties with multiple wells, indicate the number of wells in each category located on the property.

If the contaminant plume is expected to extend beyond ¼ mile from the facility, the map (scale) will be modified to include all wells potentially impacted by the release. Well descriptions may appear on an attached table. Generalized groundwater flow direction will be clearly indicated.

## **Figure 8 Land Use within ¼ mile\***

Map will clearly indicate current land uses within a ¼ mile radius of the facility. The map will have a scale of approximately 1" = 300' and be on an 11" x 17" page. The facility will be at or near the center of the map. If the contaminant plume is expected to extend a distance greater than ¼ mile, the scale of the map will be changed to include the areas potentially affected. At a minimum, the maps must include either residential or nonresidential. If a sensitive receptor such as a subsurface structure, school or hospital is present within this area, that structure must be indicated on the map.

\*Maps must be CAD drawings or enhanced versions of the most recent aerial photographs of the specified area. Locations and names of all major streets must be included on the maps. Topographic maps will not be accepted.

## **Section 4.0 Drilling Logs**

Include schematics for each boring drilled and each monitoring well installed during the investigation. At a minimum, the following information must be included on each log:

- 1) KDHE site name and KDHE project code,
- 2) the boring and monitoring well ID number,
- 3) the date the drilling was conducted,
- 4) the names of the Driller and Geologist,
- 5) the drilling method/type of drill rig, soil sampling equipment, and field screening analysis equipment used,
- 6) borehole and casing diameters,
- 7) field screening results plotted at the depth measured,
- 8) a continuous soil profile will be developed with detailed lithologic descriptions using the Unified Soil Classification System (USCS). The detailed lithological descriptions must correspond to the depths measured during drilling. The profile will also include the color, texture, sorting, size and shape of grains, and any other pertinent information,
- 9) observations such as fracturing or solution cavities, organic content, staining, odor, moisture changes (dry, moist, saturated), and any other pertinent features,
- 10) a monitoring well construction diagram that accurately depicts the depth of the screen, blank casing, filter pack, bentonite seal, grout seal, well-head completion, and the surveyed elevations of the top of the casing and the permanent datum control point on the pad or flush mount rim,
- 11) for plugged borings, plugging material and interval of each material,
- 12) depth the saturated zone was encountered during drilling and elevation of static water level prior to development/purge,
- 13) indicate where laboratory and hydrologic samples were collected, including interval.

The monitoring well construction diagram and the corresponding drilling log must be shown on the same page and be drawn at the same vertical scale. Logs must be typed and have the same appropriate scale. Do not use abbreviations. Do not reference or include in this section any discussion, tables, photographs, maps, or other documents included in this or any other report.

## **Section 5.0 Photographs**

All photographs shall be color print or color copies. Photographs should be taken from an appropriate distance and angle for the subject to be clearly visible and identifiable. Do not reference or include in this section any discussion, tables, drilling logs, maps, or other documents that are included in this report. Each photograph shall illustrate the spatial relationships of the various components at the site. Each photograph shall include a description of the scene, the direction the picture was taken from, and the date of the photograph.

Photographs must be current and reflect the property condition at the time drilling operations were completed.

Include at a minimum the following photographs, two photographs per page.

- 1) Two photographs of the entire facility from two distinctively different directions.
- 2) Two photographs identifying the current and/or former tank basin(s), above ground tank location(s), or other system components that were identified as the source(s) or potential source(s) of contamination. Outline the aerial extent of the tank basin(s) and line trench(es). Identify in the description any LNAPL recovery or remediation system components.
- 3) If applicable, photographs of two different monitoring wells completed by the Vendor as part of this investigation. Include the well number in the description. One of the photographs will have the cast iron cap removed to show the lockable waterproof cap and KDHE numbered well lock. If only one monitoring well is installed, the two required photographs can be of the same monitoring well.
- 4) Two photographs showing the scarified soils onsite.

## **Section 6.0 Documentation**

Include all information requested in the following format. Do not reference or include in this section any discussion, tables, photographs, maps, or other documents that are included in this report or any other report.

### **Appendix 1 Unsaturated Zone Hydrologic Data**

Include all raw data (laboratory test data, sieve analysis results, grain size distribution plots, etc.) and calculations used to determine the unsaturated zone hydrologic characteristics. Identify the variables and provide the calculated or assigned values. Include all information submitted by the laboratory on sheets provided by the laboratory and the chain of custody forms.

### **Appendix 2 Saturated Zone Hydrologic Data**

Include all raw data (plots of graphical analyses, laboratory test data, sieve analysis results, grain size distribution plots, etc.) and calculations used to determine the saturated zone characteristics. Identify the variables and provide the calculated or assigned values. If values are calculated by a computer program, include a copy of the computer output and state the program used. Include chain of custody forms.

### **Appendix 3 Laboratory Data**

Include all analytical laboratory reports and Chain of Custody documents. Reporting limits for all samples must be the Practical Quantitation Limit (PQL) for that sample. Reporting limits set at the Maximum Concentration Limit (MCL) is not acceptable. Include results of LNAPL analyses (including laboratory chromatographs) if LNAPL samples were collected. All lab reports must include the following QA/QC data for all samples:

- Calibration check against the true value or initial calibration every 20 samples. This should be a mid-range calibration.
- Surrogate % recovery for each soil and water sample.
- Matrix spike and duplicate for each constituent every 20 samples or each run, whichever is more frequent.
- Method blank and duplicate for each extraction.
- Trip blank for each shipping container containing groundwater samples submitted for VOC analysis.

## **Appendix 4 Field Notes**

Field notes must be signed by the individual who performed the work described therein. Each page must be signed as the notes are being taken. Include copies of the following:

- 1) all drilling logs, soil sampling notes, and monitoring well completion notes, drill logs will include a clear indication of where the saturated zone was encountered during drilling,
- 2) groundwater sampling notes recording, for each well sampled, the water depth and total depth; the volume, in gallons, of water removed for well development and the volume, in gallons, of water purged before sampling; the name, address, and telephone number of the well owner and the site tenant if any private wells are sampled,
- 3) any and all other field notes recorded during the investigation,
- 4) field notes must include the daily chronological events. This includes, time of day each boring/well was initiated, completed, developed/purged, sampled, static water level measured, triangulation calculations and all pertinent information relevant to the assessment. Field notes must not include a general summary of methods and procedures used during the assessment.

## **Appendix 5 Reports, Access Agreements, Lien Releases and Monitoring Well Information**

Include copies of the following:

- 1) the RLS surveyor's report,
- 2) the Kansas Geological Survey water well search report. Designate wells within 1/4 mile of contaminant plume,
- 3) Domestic Well Contact Form,
- 4) all signed access agreements,
- 5) copy of the wastewater disposal waiver letter from the Bureau of Water,
- 6) copy of the site specific Bureau of Water waiver to install flush mount wells (refer to <http://www.kdheks.gov/waterwell/download/WWP-5.pdf> for requirements),
- 7) all signed lien releases,
- 8) include a copy of the KDHE Water Well Record (form WWC-5) for each monitoring well installed,
- 9) list of current and previous business names and property uses (commercial, industrial, residential, etc.) of the facility and whether fuel was dispensed at the facility by previous owners,
- 10) list of current and previous owners of the facility with current address(es) including the dates of ownership for each owner,
- 11) documentation of property record search used to complete list of previous or current business names, owners and property use must be included. Refer to Section 7.3.2 of ASTM Practice E1527, Standard Practice for Environmental Site Assessments: Phase 1 Environmental Site Assessment Process for guidance.
- 12) documentation of each private locate showing all subsurface structures.

## **Appendix 6 Off-Site Waste Handling Documentation**

Provide documentation of how wastes removed from the site were handled and/or treated, including the authorization for wastewater disposal, waste manifests, invoices, etc.

**ATTACHMENT A**  
**FIELD WORK PLAN WORKSHEET**





**5) Laboratory Analytical**

Soil Samples	Collection Equipment	_____
	Analytical Methods	_____
Water Samples	Collection Equipment	_____
	Analytical Methods	_____
	Laboratory to Conduct Analysis	_____

**6) Waste Handling Procedures** (Briefly describe how soil and water waste will be handled, treated, or disposed of.)

Soil \_\_\_\_\_

Water \_\_\_\_\_

**7) Decontamination** (Briefly describe decontamination equipment, methods and procedures to be employed.)

\_\_\_\_\_

\_\_\_\_\_

**III. Site Maps and Photos**

Note: All maps and aerial photos must include a scale, north arrow and legend.

- 1) Attach a copy of a U.S.G.S. 7.5 minute quadrangle, scale 1:24,000, which depicts the general site location and the 1 mile radius area surrounding the site. The site must be highlighted or outlined for delineation.
- 2) Prepare and submit with this worksheet **three site maps**. The first site map will be a detailed site map with a scale of 1" = 50'. The second site map will depict the site including a minimum 350' radius from the release with an approximate scale of 1" = 100'. The third site map will depict the site including a minimum 500' radius from the release with an approximate scale of 1"=100'. These maps must be representative of current property conditions at the time the workplan was completed. If an aerial photo is used along with the CAD drawing, it must be of good visual quality. All three maps must contain the following information for the radius required:
  - A. The general use of surrounding properties: i.e., residential, industrial, business (indicate what type - fast food, service stations, etc.).
  - B. All property owners' names.
  - C. Property boundaries, buildings, driveways, other fixed objects (trees, fences, steep inclines, etc.), and street names. Identify all buildings.
  - D. Tanks, lines, and pump islands, currently or formerly located at the site.
  - E. General locations and depths/heights of all utilities/overhead lines on and adjacent to the site from visual survey of site.
  - F. Proposed boring and monitoring well locations as listed on the SSI sheet. Borings and wells must be labeled and numbered. Include existing wells within 500' from the source. All wells should be designated in accordance with previous reports if available.
  - G. Accessible easements within the specified area.
  - H. Arrow depicting groundwater flow direction.
  - I. Site name and KDHE Project Code.
  - J. Borings used for the collection of hydrologic samples should be clearly indicated.
- 3) Include the most recent aerial photo available. The aerial photo will depict the site including a minimum 500' radius from the release with an approximate scale of 1"=100'. The aerial photo must be an original print, a high quality color copy of an original print, or a blue line. Prominent features (buildings, storage tanks, pump islands, existing wells, etc.) should be denoted on the aerial photograph.
- 4) Include current photographs as stated in 4.2.1 under Section 4.0, Deliverables in the LSA RFP.
- 5) Site conceptual exposure model. Refer to Attachment B of the Report Format.

**IV. Field Personnel / Health and Safety Plan**

List below the consultant's personnel and any subcontracting firms that will be involved in the investigation. Indicate each individual's name and position title from section 1.4 of the LSA RFP Rev. 14 (attach an additional sheet if necessary). If resumes documenting education, experience, and safety training certification have not been provided with the original bid package for all those listed, submit this information with this worksheet.

Name	Position / Title	Name	Position / Title
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Indicate whether a Health and Safety Plan has been prepared for this scope of work (must be available during field work):

\_\_\_\_\_ Yes                      \_\_\_\_\_ No

Site visit conducted by: \_\_\_\_\_

Work plan preparation completed by: \_\_\_\_\_

**ATTACHMENT B**

**Site Conceptual Exposure Models**

### SITE CONCEPTUAL EXPOSURE MODEL Current Conditions

Current Onsite	Surficial Soils	Subsurface Soils	Groundwater	
Receptor	Outdoor Inhalation of Vapors & Particulates, Dermal Contact and/or Accidental Ingestion	Indoor Inhalation of Vapor Emissions	Indoor Inhalation of Vapor Emissions	Provide Justification
Resident Child				
Resident Adult				
Commercial Worker				
Construction Worker		NA	NA	

Current Offsite	Surficial Soils	Subsurface Soils	Groundwater	
Receptor	Outdoor Inhalation of Vapors & Particulates, Dermal Contact and/or Accidental Ingestion	Indoor Inhalation of Vapor Emissions	Indoor Inhalation of Vapor Emissions	Provide Justification
Resident Child				
Resident Adult				
Commercial Worker				
Construction Worker		NA	NA	

Place a mark in the box if the exposure pathway is complete for each receptor and provide justification.

Provide justification for incomplete pathways.

Surficial soils = 0 - 1' below ground surface for Resident Child, Resident Adult, and Commercial Worker.

Surficial soils = 0 - 10' below ground surface for Construction Worker. Construction Worker pathway is not complete for subsurface soils and groundwater.

Subsurface soils = 1' to the top of the capillary fringe for the Resident Child, Resident Adult, and Commercial Worker.

Groundwater is complete if static water level is less than 25 feet below ground surface or if LNAPL is present.

## SITE CONCEPTUAL EXPOSURE MODEL Future Conditions

Future Onsite	Surficial Soils	Subsurface Soils	Groundwater	
Receptor	Outdoor Inhalation of Vapors & Particulates, Dermal Contact and/or Accidental Ingestion	Indoor Inhalation of Vapor Emissions	Indoor Inhalation of Vapor Emissions	Provide Justification
Resident Child				
Resident Adult				
Commercial Worker				
Construction Worker		NA	NA	

Future Offsite	Surficial Soils	Subsurface Soils	Groundwater	
Receptor	Outdoor Inhalation of Vapors & Particulates, Dermal Contact and/or Accidental Ingestion	Indoor Inhalation of Vapor Emissions	Indoor Inhalation of Vapor Emissions	Provide Justification
Resident Child				
Resident Adult				
Commercial Worker				
Construction Worker		NA	NA	

Place a mark in the box if the exposure pathway is complete for each receptor and provide justification.

Provide justification for incomplete pathways.

Surficial soils = 0 - 1' below ground surface for Resident Child, Resident Adult, and Commercial Worker.

Surficial soils = 0 - 10' below ground surface for Construction Worker. Construction Worker pathway is not complete for subsurface soils and groundwater.

Subsurface soils = 1' to the top of the capillary fringe for the Resident Child, Resident Adult, and Commercial Worker.

Groundwater is complete if static water level is less than 25 feet below ground surface or if LNAPL is present.

**ATTACHMENT C**

**Limited Kansas Risk-Based Corrective Action  
Signature Sheet**

**Kansas Department of Health and Environment  
Storage Tank Program  
Limited Kansas Risk-Based Corrective Action  
Signature Sheet**

KDHE Site Name: \_\_\_\_\_

KDHE Project Code: \_\_\_\_\_

Facility Address: \_\_\_\_\_

Facility I.D.: \_\_\_\_\_

Printed Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Signature must have certificate on file with KDHE verifying the completion of a Risked Based Corrective Action (RBCA) program conducted by an ASTM (American Society of Testing and Materials) certified trainer.

**EXHIBIT 1**  
**SITE SPECIFIC INFORMATION**

**EXHIBIT 2**  
**PROJECT BID PROPOSAL SHEETS**