STATE OF TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF UNDERGROUND STORAGE TANKS

TECHNICAL GUIDANCE DOCUMENT - 007

EFFECTIVE DATE - JANUARY 1, 1994
REVISED DATE - JULY 1, 2010

RE: MONITORING AT UST SITES

I. General Guidance

A. Purpose

The purpose of this Technical Guidance Document (TGD) is to assist the regulated community in determining the requirements for periodic monitoring and reporting at UST sites.

B. Fund Eligibility/Coverage

An eligible owner or operator conducting UST corrective actions is entitled to coverage of reasonable costs from the Tennessee Petroleum Underground Storage Tank Fund, subject to rule 1200-1-15-.09(10)(a), which states:

> Upon confirmation of a release in accordance with rule 1200-1-15-.05(3) or after a release from the UST system is identified in any other manner, owners and/or operators or petroleum site owners shall comply with the requirements of rule 1200-1-15-.06 as necessary to investigate the release, characterize the site and control any hazards posed by the release in order to stabilize the site, prevent significant risk to human health and safety, and/or continuing damage to the environment.

Therefore, failure to comply with the requirements of this TGD may result in the loss of Fund coverage.

C. Applicability

This document supersedes all previously issued TGD-007 versions. All work associated with this TGD shall be performed in accordance with the applicable sections of the Environmental Assessment Guidelines (EAG). Unless directed to do otherwise by the Division, this document is to be used only for sites that have been approved for either risk monitoring or closure monitoring and does not apply to sites with an approved Corrective Action Plan (CAP).

Corrective Action Monitoring shall be performed in accordance with the current CAP Guidelines and an approved CAP. Refer to the CAP Guidelines for specific information related to corrective action monitoring.

Rule 1200-1-15-.06(1)(b)1(i) requires one (1) working day notice of routine field activity by owners/operators.

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II. Definitions

Closure Monitoring – A monitoring event performed to determine whether soil and/or ground water contaminant concentrations remain below the applicable cleanup level(s) [Risk-Based Clean-up Levels (RBCLs) or Site Specific Clean-up Levels (SSCLs)] for the duration of closure monitoring. If contaminant concentrations are detected above the applicable cleanup level(s) at any time during closure monitoring, then additional activities associated with corrective action may be required. Closure Monitoring shall only be performed after Division approval and shall be in accordance with a schedule established by the Division.

Corrective Action Monitoring - A monitoring event performed while a site is undergoing active remediation under an approved CAP. Corrective Action Monitoring shall be performed in accordance with the current CAP Guidelines which contain specific information related to Corrective Action Monitoring.

Known Contamination - All sampling locations where analytical results document contamination above the applicable cleanup levels or where free product has been observed.

Receptor Monitoring – A monitoring event consisting of a field survey to determine if any significant changes have occurred to any existing receptors or whether new receptors have been identified since the last reporting period.

Risk Monitoring – A monitoring event performed at the direction of the Division for sites that are not approved under the current case prioritization plan to move forward with corrective action. The schedule for monitoring will be established in Division correspondence.

III. Types of Monitoring

A. Water Monitoring

Unless otherwise directed by the Division, water monitoring shall consist of the following activities in sequence:

1. Drinking Water

   Sampling all drinking water supplies for all applicable chemicals of concern (COCs) (private and/or public) as approved by the Division.

2. Ground Water

   a. Obtaining water and free product level measurements from all monitoring wells;

   b. Obtaining free product level measurements from any release detection wells, if applicable; and,

c. Sampling all monitoring wells for applicable COCs as approved by the Division.

3. Surface Water

Sampling all surface water for applicable COCs (springs, ponds, creeks, etc.) as approved by the Division.

B. Soil Monitoring

Unless directed to do otherwise by the Division, soil monitoring shall consist of the installation of one (1) boring in the location where the highest level of known contamination was identified in soil through previous site assessment activities. Soil samples shall be analyzed for all applicable COCs.

Soil monitoring shall be performed every two (2) years or in accordance with a Division schedule, until the soil contaminant concentrations are below the applicable cleanup levels or the Division requires additional activities.

C. Vapor Monitoring

Unless directed to do otherwise by the Division, vapor monitoring shall consist of collecting vapor readings with a properly calibrated organic vapor detector (OVD) of all subsurface structures (i.e. basements, utility vaults, sewers, etc.) within 300 feet of known contamination. All structures which have been previously impacted by petroleum vapors shall also be monitored.

D. Receptor Monitoring

Unless directed to do otherwise by the Division, a limited field survey of receptors shall be conducted to monitor receptor status and/or usage. The field survey shall be conducted within one-tenth (0.1) mile radius of known contamination for above ground and underground structures and one-half (0.5) mile radius for drinking water supplies. A Water Use and Receptor Survey Sheet shall **only** be completed if a new receptor is identified. Receptor Monitoring shall include, but not be limited to:

1. Existing receptors

Determine if any significant changes have occurred to any existing receptors by conducting a receptor (field) survey. For example, if during the previous Exposure Assessment (ExA) the on-site structure was determined to be commercial use but now an individual(s) resides there, then commercial use would change to residential use.

2. Newly discovered receptor(s)

Determine if any new receptors exist that have not been previously identified. For example, the installation of a new drinking water supply or the construction of a new residential or commercial structure.

a. If a new drinking water supply is identified, then provide an 8.5 x 11 color topographic map with the site location indicated. The map shall depict the location of all drinking water supplies (wells and springs) within a one-half (0.5) mile radius of the UST site. The topographic map shall depict the one-tenth (0.1) and one-half (0.5) mile radii from the UST site.

b. If a new residential or commercial structure is identified, then provide a scaled receptor map of the area depicting the nearest current off-site receptors for each applicable pathway. Draw an arrow to each receptor from the monitoring well with the highest benzene concentration. The distance shall be provided in feet. If benzene concentrations are below laboratory analytical detection limits, then draw the arrow from the monitoring well with the highest COC concentration based on the following order: toluene, ethylbenzene, xylenes, MtBE, naphthalene, PAHs.

Appendices

The Monitoring Workbook is to be included in the Monitoring Report and is available from the Division's website for download: www.state.tn.us/environment/ust

IV. Monitoring Reports

Unless directed to do otherwise by the Division, monitoring reports shall be prepared and submitted within forty-five (45) days of completion of each monitoring event and shall cover site activities and events since the previous monitoring report. Each section of the monitoring report shall be prepared and assembled in the order presented within these guidelines and each page, including all appendices, shall be numbered consecutively through the entire report. Text shall be provided explaining the associated tables, figures and maps. The preparer shall assemble the information in each section to provide a comprehensive final document. Each section and subsection heading shall be clearly printed in the report. A table of contents shall be provided listing the page numbers and/or location of all sections, maps, tables, figures and appendices.

Unless otherwise specified, all tables, figures and maps shall be in the appropriate sections, not in appendices. All maps shall be drawn on 8.5 x 11 or 11 x 17 inch paper and contain at a minimum, the UST Facility Identification Number, the date the map was drawn, a north arrow, a legend, a scale bar, a vertical scale, if applicable, and a figure number. Additionally, each scaled site map shall depict the location of the tank(s), product and vent line(s), dispensers, buildings, subsurface structures, underground and overhead utilities, soil borings and monitoring wells. Identify the release point, if known. Former tank pits shall be indicated with a dashed line.

Monitoring Report Cover Page

Date of Monitoring Report:

Type of Monitoring Report:

- ☐ Risk Monitoring Report (RMR)
- ☐ Closure Monitoring Report (CMR)

Dates of Monitoring Period (from/to)**:**

UST Facility Identification Number:

UST Facility Name:

UST Facility Address:

Case Number:

Name of the Person Assuming Responsibility (PAR) (This is the individual such as the tank owner, tank operator, property owner, or a specific representative of the business authorized to act on behalf of that business):

Name of the Corrective Action Contractor (CAC) company and individual(s) who prepared the monitoring report including applicable license/registration type and number:

A. Monitoring Summary and Results

Provide the most current information in accordance with the requirements set forth below:

1. Summary

   Provide a general update discussion of the site for this monitoring period, including but not limited to, changes at the site and contaminant concentration trends for soil and/or water, if applicable.

2. Applicable RBCLs or SSCLs

   Provide a table "Applicable Cleanup Levels for Chemicals of Concern", located in the "Monitoring Workbook", for soil and ground water that includes the following:

   a. The applicable RBCLs or the applicable SSCLs for each COC [in parts per million (ppm)] in soil and ground water as determined in the ExA;
   b. The soil and ground water concentrations for each COC identified during the last comprehensive monitoring event; and
   c. Identify which COCs have exceeded the applicable RBCLs or SSCLs by shading the appropriate box.

3. Results

   a. Soil analytical results

      If no soil contamination exists above the applicable RBCLs or SSCLs, then the report shall state that this section is not applicable. If soil sampling is applicable, but was not required for this reporting period, then provide the date of the next scheduled soil sampling event. For all monitoring reports that require soil samples, include the following:

      i. Provide soil analytical results from all events in the "Soil Analytical Results Table" located in the "Monitoring Workbook" for the applicable COCs. A summary of any new soil investigation activities shall be included with the report. A detailed boring log shall be prepared in accordance with TGD-006 for each new boring and included in an appendix.

      ii. All original laboratory analysis and chain of custody sheets for this monitoring period shall be provided in an appendix. All laboratory analysis sheets shall include the following:

         (a) UST Facility Identification Number;
         (b) Boring number or location of additional sampling points;
         (c) Date sample was collected;

(d) Date sample was analyzed;
(e) Parameter analyzed (i.e., the appropriate COCs);
(f) Analytical method;
(g) Detection limit;
(h) Dilution factor;
(i) Unit of measurement (ppm); and
(j) Authorized laboratory signature - the signature page shall indicate the number of pages within the laboratory report

b. Potentiometric data

i. Provide water level data for all sampling events in the "Potentiometric Data Table" located in the "Monitoring Workbook". All measurements shall be recorded to 0.01 feet including the depth of the well.

ii. Provide two (2) scaled site maps including potentiometric data collected during the current and previous monitoring events. If multiple aquifers were investigated and sufficient data is generated, then potentiometric maps shall be included for each aquifer. Each map shall also include an arrow depicting the interpreted direction(s) of ground water flow.

c. Free product data

Provide a description of the method for management and disposal of the free product.

d. Water analytical results

If no ground water contamination exists above the applicable RBCLs or SSCLs, then the report shall state that this section is not applicable, unless water receptors (i.e. drinking water supplies or surface water bodies) are being monitored as directed by the Division. For all monitoring reports that require water samples, include the following:

i. Tables

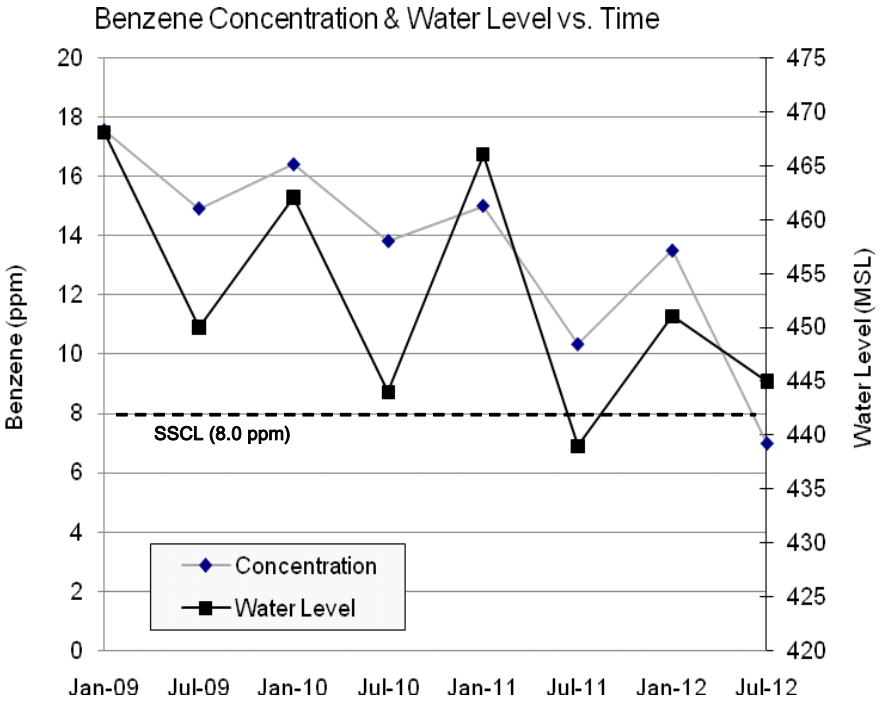
(a) Provide water analytical results from all events in the "Water Analytical Results Table" located in the "Monitoring Workbook" for the applicable COCs, including all ground water, drinking water supply, and surface water analytical results. A summary of any new water investigation activities shall be included with the report.

(b) Provide all original laboratory analysis and chain of custody sheets for this monitoring period in an appendix. All laboratory analysis sheets shall include the following:

(1) UST Facility Identification Number;
(2) Monitoring well number or location of additional sampling points;
(3) Date sample was collected;
(4) Date sample was analyzed;
(5) Parameter analyzed (i.e., the appropriate COCs);
(6) Analytical method;
(7) Detection limit;
(8) Dilution factor;
(9) Unit of measurement (ppm); and
(10) Authorized laboratory signature - the signature page shall indicate the number of pages within the laboratory report

ii. Graphs

Provide a graph for each well sampled during the monitoring event showing ground water contaminant concentrations for all applicable COCs detected above the applicable RBCLs or SSCLs and ground water levels versus time. A dashed line shall indicate the applicable cleanup level for RBCLs or SSCLs. Only one (1) COC shall be shown on any one (1) graph. Graphs shall indicate the information as shown in the example:



iii. Maps

Provide a separate, plan view scaled site map showing the horizontal extent and most recent concentration for each COC that exceeds the applicable RBCL or SSCL **in more than one (1) well**. All contaminant plumes shall be defined to the applicable RBCL or SSCL. The horizontal extent and thickness (in feet) of any free product shall be depicted on each map.

e. Vapor monitoring results

i. Provide a description of all vapor monitoring of above ground and/or subsurface structures (i.e., basements, utility vaults, sewers, etc.) that have been previously impacted by petroleum vapors. Any new petroleum vapor impacts shall also be discussed. Provide all vapor monitoring data collected during the monitoring period in the "Vapor Monitoring Results Table" located in the "Monitoring Workbook".

ii. Provide a scaled site map depicting and labeling the locations of the vapor monitoring points of all subsurface structures (i.e. basements, utility vaults, sewers, etc.) within 300 feet of known contamination above the applicable RBCL or SSCL. Indicate the 300 foot line with a dashed line.

f. Receptor monitoring results

Risk to human health, safety and/or the environment may have changed as a result of the discovery of new receptors or the elimination of existing receptors to such an extent that a new ExA may be required by the Division. Provide a discussion of the receptor survey conducted during this monitoring event. Complete a Water Use and Receptor Survey Sheet located in the current EAG for each change in status of a drinking water supply, above ground structure and/or underground structure identified and submit in an appendix.

B. Additional Information and Recommendations

Provide a discussion of any additional information and/or recommendations concerning the site monitoring activities and/or site data. For example, a monitoring well has been paved over or has sustained damage.

Appendices

List applicable appendices for each report submitted.

Signature Page

A signature page, as shown below shall be attached to the monitoring report. The page shall be signed by the owner/operator (or authorized representative within the organization) and either a registered professional geologist under the Tennessee Geologist Act (*T.C.A. §62-36-101 et seq*.) or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects, and Interior Designers Law and Rules (*T.C.A. §62-2-101 et seq*.).

We, the undersigned, certify under penalty of law, including but not limited to penalties for perjury, that the information contained in this report including any attachments, is true, accurate and complete to the best of our knowledge, information, and belief. We are aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for intentional misrepresentations.

_____	_____	
Owner/Operator (Print name)	Signature	Date
	_____	
	Title (Print)	
_____	_____	
P.G. or P.E. (Print name)	Signature	Date
	_____	
Stamp/seal	Tennessee Registration #	

Note: Each of the above signatures shall be notarized separately with the following statement.

STATE OF _____ COUNTY OF _____

Sworn to and subscribed before me by _____on this date

_____. My commission expires _____.

_____	_____	
Notary Public (Print name)	Signature	Date

Stamp/Seal