

Tennessee Department of Environment and Conservation
Division of Underground Storage Tanks
Initial Site Characterization Report Guidelines
Part B

Instructions:

The Initial Site Characterization Report (ISCR) is due within one hundred twenty (120) calendar days after the Responsible Party has been directed by the Division to begin an investigation. The ISCR shall contain **all** data gathered during field activities and determine the applicable clean-up levels using Technical Guidance Document (TGD)-017, Risk-based Procedure to Determine Clean-up Levels – Exposure Assessment Report Preparation. If the results of TGD-017 indicate the site is eligible for closure, then the Division will evaluate the site for closure and/or closure monitoring or direct the next course of action. If TGD-017 indicates the site is not eligible for closure, then the owner shall choose one of the options detailed in the Summary, Section III, Eligibility of Site for Risk-based Closure. Environmental assessment activities and the evaluation of the subsurface investigation shall be directed by 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.*).

If the ISCR has not been submitted by the established deadline, then a written request, justifying an extension shall be submitted to the appropriate environmental field office before the deadline. The extension is not automatic and enforcement actions may be taken to insure prompt compliance with established deadlines. Failure to meet established deadlines may place the Responsible Party out of substantial compliance and may result in the loss of fund coverage.

Each section of the ISCR shall be prepared and assembled in the order presented within these guidelines. Text shall be provided explaining the associated tables and maps. All variations from the procedures detailed in the Environmental Assessment Guidelines (EAG) shall be justified. All maps and tables shall be in appropriate sections and not in appendices. All maps shall be on 8.5 x 11 or 11 x 17 inch paper and contain, at a minimum, a north arrow, legend, scale bar, and figure number. These guidelines are intended to provide a structured outline. Any information that is not specifically requested but is relevant to the project shall also be included. The preparer shall assemble the required information in each section to provide a comprehensive final document. All pages of the report, including the tables and figures, shall be consecutively numbered. Each section and subsection heading shall be clearly printed in the report. A table of contents shall be provided listing the location of all sections, maps, tables, and appendices.

All correspondence, reports, laboratory analysis sheets, etc. shall contain the TN UST Facility ID Number. Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

Executive Summary

Provide an Executive Summary describing the findings of the project to date. Include conclusions and interpretations of data derived from implementing the environmental assessment activities. Identify all impacts resulting from the release.

A. Introduction

Give a brief site history emphasizing information that has not been stated in prior reports or information that has been revised based upon new findings. Include the following, at a minimum:

1. A summary of all initial abatement actions taken; and,
2. A summary of actions taken to identify and eliminate the sources of contamination.

B. Site Location

1. Provide a vicinity map of the area depicting all streets, buildings, subsurface structures, utilities, and surface water bodies within one-quarter (0.25) mile of the site. The map shall also depict the site location.
2. Provide a scaled site map depicting the location of tank(s), product and vent line(s), dispenser(s), buildings, subsurface structures, underground (including all vaults) and overhead utilities, closure sampling locations (if applicable), soil borings, and monitoring wells. Indicate former tank systems with dashed lines.
3. Provide a monitoring well location map depicting the distances and angles from monitoring well 4 (MW-4) to the established and documented point on the top of each well casing. All angles shall be from magnetic north.
4. Provide an 8.5 x 11 color topographic map with the site location indicated. Provide a color topographic map showing 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.
5. 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.
6. Provide a description of the local topography and any effects it may have on contaminant migration at the site.

C. Soil Investigation

Provide a summary of all soil investigation activities. This should include, but not be limited to, the results of the release investigation, closure activities, site check investigation, any interim corrective action, etc. Provide a discussion of past releases and/or potential source areas, including tanks, lines, and dispensers.

1. Geology

Provide the following information:

- a. A description of the regional geologic section;
- b. A description of the geologic section at the site;
- c. A description of the soil and/or bedrock lithologies encountered at the site;
- d. A plan view map showing the bedrock contour, if applicable; and,
- e. The dip and strike of the rock formations encountered, if applicable.

2. Soil Boring Results

- a. Describe the methods used to drill and sample all soil borings.
- b. Provide detailed boring logs in Appendix 1 in accordance with Technical Guidance Document - 006 (TGD - 006) Standard Drilling Log.

3. Analytical Results

- a. Provide field screening and soil analytical results from every sampling event (i.e., closure, overexcavation, soil source identification, or other initial abatement activities, site check, etc.) in a table along with the following information, at a minimum:
 - i. Boring number or location of additional sampling points;
 - ii. Date sample was collected;
 - iii. Sample depth (feet);
 - iv. Parameter (i.e., the appropriate COCs in accordance with Reference 1 and 2 in the EAG)
 - v. Field screening results (Parts Per Million, PPM);
 - vi. COC analytical results (report non-detect values as less than detection limits including the actual detection limit);
 - vii. Unit of measurement PPM; and,
 - viii. The cleanup levels as submitted with TGD-017.
- b. Provide all laboratory analysis and chain of custody sheets in Appendix 2 segregated by sampling event and in chronological order. All laboratory analysis sheets shall include the following:
 - i. The TN UST Facility ID Number;
 - ii. Boring number or location of additional sampling points;
 - iii. Date sample was collected;
 - iv. Date sample analyzed;
 - v. Sample depth (feet);
 - vi. Parameter (i.e., the appropriate COCs in accordance with Reference 1 and 2 in the EAG)
 - vii. Dilution Factor;

- viii. COC analytical results (report non-detect values as less than detection limits including the actual detection limit)
- ix. Unit of measurement PPM;
- x. Analytical method; and,
- xi. Original authorized laboratory signature.

Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

4. Soil COC Plume Maps

Provide a contoured, scaled plan view map for each COC depicting the horizontal extent of soil concentration based on the most current soil sampling event, unless directed to do otherwise by the Division. Contour each map to the appropriate maximum contaminant level (MCL) or RBCL of the COC (as provided in Reference 3 in the EAG) except xylenes, which shall be contoured to either the residential or commercial RBCL, whichever is applicable. The COC soil source width parallel to ground water flow direction shall be indicated by an arrow and the width shall be provided in feet. Include the location of tanks, product and vent lines, dispensers, buildings, subsurface structures, underground (including all vaults) and overhead utilities, closure sampling locations (if applicable), soil borings and monitoring wells. Indicate former tank systems with dashed lines. The horizontal extent of any free product shall be depicted. Plume maps are not required for any COC which does not have laboratory analytical results above the laboratory detection limit. No more than three COCs can be included on any one plan view map and a different color shall be used for each COC contoured.

D. Water Investigation

Provide a summary of all activities concerning the surface and ground water investigation. This should include, but not be limited to the results of the release investigation, closure activities, site check investigation, any interim corrective action, etc.

1. Location and Current Use of Ground Water

- a. State the current ground water usage of the impacted ground water (i.e., drinking water supply or non-drinking water supply) at the time of the ISCR preparation.
- b. Discuss the reasonably expected future use of ground water at this site (Note: If the impacted ground water at the site is not currently used as drinking water, then it **is not reasonable** to expect that the ground water at the site will be used as drinking water in the future).

2. Location and Current Use of Surface Waters

- a. Discuss any current use(s) of the surface waters within a one-half (0.5) mile radius of the site (i.e., drinking water supply, recreational, etc.).
- b. Discuss the reasonably expected future use(s) of surface waters near the site (Note: If the impacted surface waters at the site are not currently used as drinking water, then it **is not reasonable** to expect that the surface waters at the site will be used as drinking water in the future).

3. Hydrogeology

- a. Describe the occurrence and movement of ground water at the site and its relationship to both soil and ground water contamination. Include conclusions concerning the relationship of this site to any areas of contamination extending beyond the UST property, if applicable. Discuss the presence of any hydrogeologic barriers that may affect contaminant migration. Include potential or known impact to designated wellhead protection areas and/or nearby drinking water supplies.
- b. If the site is located in an area with carbonate bedrock, or if caves, springs, sinking streams or other karst features exist within a one-half (0.5) mile radius of the site, then provide conclusions concerning how this may effect ground water movement at the site. Include in this discussion any evidence of petroleum migrating through karst systems, estimated travel times, evidence of impacted water supply wells, contaminated springs, or evidence of petroleum migrating into nearby streams.
- c. Describe the occurrence and movement of surface water at the site and its relationship to both soil and ground water contamination. Include conclusions concerning the relationship of this site to any areas of off-site contamination, if applicable.
- d. Describe the occurrence and movement of free product at the site. Include estimated quantities, source(s), pathways of migration, and estimates of travel time, if applicable.
- e. Provide a water level data table for all sampling events containing the following, at a minimum:
 - i. Monitoring well number or sample location ID;
 - ii. Date measured;
 - iii. Top of casing elevation relative to MSL;
 - iv. Top of screen elevation relative to MSL;
 - v. Total depth of well (feet);
 - vi. Bottom of casing elevation relative to MSL;
 - vii. Depth from top of casing to free product (feet);
 - viii. Depth from top of casing to water (feet);
 - ix. Free product thickness (feet);
 - x. Potentiometric surface elevation relative to MSL;
 - xi. Adjusted potentiometric surface elevation relative to MSL; and,
 - xii. Top of screen below potentiometric surface (Y/N).

All previously recorded ground water measurements shall be represented in this table.

- f. Provide two (2) scaled potentiometric maps derived from data collected at least thirty (30) days apart. If multiple aquifers were investigated due to the presence of contamination in a deeper aquifer and sufficient data is generated, then potentiometric maps shall be included for each. These maps shall also include arrow(s) depicting the interpreted direction of ground water flow.
- g. Provide the highest calculated hydraulic gradient (show calculations).
- h. Provide the calculated ground water flow rate(s) in cm/day.

4. Monitoring Well Construction

- a. Describe the monitoring well installation procedures.
- b. Provide all detailed monitoring well diagrams in Appendix 1 in accordance with TGD - 006, Standard Drilling Log.

5. Well Development

Describe the procedures used to develop all monitoring wells. Provide a description of how the development water was managed.

6. Monitoring Well Sampling

Describe the procedures used to sample all monitoring wells including purging, sampling, and chain of custody protocols.

7. Analytical Results

- a. Provide ground water, drinking water, and/or surface water analytical results, from every sampling event (i.e., closure, site check, environmental assessment, etc.) in a table along with following information, at a minimum:
 - i. Monitoring well number or location of additional sampling points (including any water supplies);
 - ii. Date sample was collected;
 - iii. COC (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MtBE, Naphthalene, and/or PAHs, etc. in accordance with Reference 1 and 2 in the EAG);
 - iv. COC analytical results (report non-detect values as less than detection limits including the actual detection limit);
 - v. Unit of measurement PPM; and,
 - vi. The applicable cleanup levels from TGD-017.
- b. Provide all laboratory analysis and chain of custody sheets in Appendix 3 segregated by sampling event and in chronological order. All laboratory analysis sheets shall include the following:
 - i. The TN UST Facility ID Number;
 - ii. Monitoring well number or location of additional sampling points (including any water supplies);
 - iii. Date sample was collected;
 - iv. Date sample analyzed;
 - xiii. COC (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MtBE, Naphthalene, and/or PAHs, etc. in accordance with Reference 1 and 2 in the EAG);
 - viii. COC analytical results (report non-detect values as less than detection limits including the actual detection limit);
 - vii. Dilution factor;
 - viii. Unit of measurement PPM;
 - ix. Analytical method; and,
 - x. Original authorized laboratory signature.

Photostatic copies of the laboratory analysis sheets are not acceptable unless the originals have previously been submitted in another report.

8. Water Use Determination Procedures

Provide the following information to determine and/or update water usage in the area.

- a. State the water use determination
- b. Data from the analytical sampling (if necessary)

Provide a table summarizing all analytical results used to determine if the impacted aquifer or water supply met the primary or secondary drinking water standards. This table shall contain, at a minimum, the actual concentration, the applicable primary or secondary drinking water standard, and the number of the well from which the water sample was taken.

Provide all laboratory analyses and chain of custody sheets in Appendix 3. All laboratory analysis sheets shall include the following:

- i. The TN UST Facility ID Number;
 - ii. Monitoring well number or sample location ID;
 - iii. Date sample was collected;
 - iv. Date sample analyzed;
 - v. Parameter (including, but not limited to iron, manganese, etc.);
 - vi. Parameter results;
 - vii. Unit of measurement PPM;
 - viii. Analytical method; and,
 - ix. Original authorized laboratory signature.
- c. Data from the pump test (prior Division approval required)
 - i. Describe the pump test method, used to determine the yield of the impacted aquifer or water supply.
 - ii. Describe the rationale used for selecting the pump test method.
 - iii. Provide a table summarizing the results of the pump test for each well that was tested. The results shall be reported in gallons per minute (GPM).

9. Ground Water COC Plume Maps

Provide a contoured, scaled plan view map for each COC depicting the horizontal extent of ground water concentration based on the most current ground water sampling event, unless directed to do otherwise by the Division. Contour each map to the MCL or RBCL of the COC (as provided in Reference 3 in the EAG). The COC ground water source width perpendicular to ground water flow direction shall be indicated by an arrow and the width shall be provided in feet. Include the location of tanks, product and vent lines, dispensers, buildings, subsurface structures, underground (including all vaults) utilities, closure sampling locations (if applicable), soil borings and monitoring wells. Indicate former tank systems with dashed lines. The horizontal extent of any free product shall be depicted. Plume maps are not required for any COC which does not have laboratory analytical results above the laboratory detection limit. No more than three COCs can be included on any one plan view map and a different color shall be used for each COC contoured.

E. Applicable Cleanup Levels

Evaluate this site using TGD-017. Include and discuss the Summary Page from TGD-017. Attach the completed TGD-017 Risk Analysis Report results in Appendix 4 including a site-specific standard request addressed to the Director.

F. Proposed Additional Monitoring Wells

If the water usage in the area is determined to be drinking water and TGD-017 determines the site is not eligible for closure, then additional site characterization is one of the options that may be proposed as outlined in TGD-017. If this option is selected, then a proposal to install up to four additional monitoring wells in accordance with the Environmental Assessment Guidelines shall be submitted for approval. The proposal shall include a scaled site map depicting the location of the proposed monitoring wells and a justification for the placement of each additional well including the following:

1. The known COC levels in all previously installed monitoring wells;
2. The estimated rate of COC migration based on site-specific data gathered from all previously installed monitoring wells and/or sample locations;
3. The known ground water flow direction and other factors that could influence the direction of the ground water COC plume migration; and
4. The attenuation rate of COC levels between all previously installed monitoring wells and/or sampling locations.

If approval is given for the installation of additional wells, then the responsibility for locating utilities and obtaining off site property access remains the responsibility of the owner/operator.

G. Assessment Activities Costs

The attached Initial Site Characterization Report Cost Sheet shall be included in Appendix 5 showing the actual costs incurred to date and all estimated costs depending on what additional activities are proposed. Complete the Additional Assessment Activities Cost Estimate Sheet only if additional assessment activities are proposed beyond the ISCR.

H. Appendices

1. Boring Logs/Monitoring Well Diagrams
2. Soil Analytical Results
3. Water Analytical Results
4. Applicable Cleanup Levels (TGD-017)
5. Assessment Activities Costs Sheet

INITIAL SITE CHARACTERIZATION REPORT COST SHEET

Event Category	Estimated Costs		Actual Costs	
	Activity Costs	Report Costs	Activity Costs	Report Costs
Site Check				
Initial Response				
Hazard Management				
Free Product Recovery				
Initial Site Characterization				
Exposure Assessment (TGD-017)				
Monitoring (per event)				
Additional Measures (i.e. soil gas survey)				
Source Removal				
Risk Reduction				
Institutional Controls				
Engineering Controls				
Advanced Risk Modeling				
Corrective Action Plan				

ADDITIONAL ASSESSMENT ACTIVITIES COST ESTIMATE SHEET

Provide a brief description of the tasks included in this estimate. **(Expand this sheet as necessary)**

PROFESSIONAL SERVICES			
Personnel	Hours	Cost Per Hour	Subtotal
1.			
2.			
3.			
4.			
TOTAL:			

ASSOCIATED CHARGES			
Event Category			Subtotal
Drilling			
Excavation			
Trucking			
Surveying			
Analytical	Samples	x	\$/Sample
Rentals (List Below)			
Disposal - Free Product			
Water			
Soil			
Capital Expenditures (List Below)			
Permitting			
Lodging and Per Diem	Days	x	\$
Mileage	Miles	x	\$/mile

Miscellaneous (List Below)	
TOTAL:	

H. Signature Page

A signature page, as shown below, shall be attached to the Initial Site Characterization Report. The page shall be signed by the owner/operator of the UST system (or authorized representative within the organization) and 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 form and on 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 violations.

Owner/Operator (Print name) Signature Date

Title (Print)

P.E. or P.G. (Print name) Signature Date

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