STATE OF TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF UNDERGROUND STORAGE TANKS

TECHNICAL GUIDANCE DOCUMENT - 004

EFFECTIVE DATE - NOVEMBER 1, 2007

RE: REQUIREMENTS FOR FREE PRODUCT MANAGEMENT

I. General Guidance

In accordance with Rule 1200-1-15-.06(4)(a), the discovery of free product shall be reported to the Division of Underground Storage Tanks (Division) within seventy-two (72) hours using the Hazard Notification Report (HNR) Form. The form may be submitted by facsimile machine or electronic mail.

A. Purpose

The purpose of this Technical Guidance Document (TGD) is to assist the regulated community in understanding and complying with the requirements for free product (Light Nonaqueous Phase Liquid) management specified in Rule 1200-1-15-.06(4).

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 (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 rule 1200-1-15-.06 addressed in this TGD may result in the loss of Fund coverage.

C. Applicability

This revision supercedes all previous versions and policies addressing free product management. Unless directed by the Division to do otherwise, this TGD applies to all sites where new, existing, or intermittent free product is present.

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Attachments

Hazard Notification Report Form
Free Product - Hazard Management Report
Free Product Investigation Plan
Free Product Investigation Report

These report formats and forms are available for download on the Division's website at http://state.tn.us/environment/ust/

II. Definitions

For the purposes of this TGD, the following definitions apply:

A. **Free Product - Hazard Management Report (**FP-HMR**)** – A required report detailing the actions that have been taken to address free product discovered after the submittal of the IRHMR. This report shall only be submitted upon initial discovery of free product or as directed by the Division in accordance with the attached FP-HMR guidelines.

B. **Free Product Investigation Plan** (FPIP) – A detailed plan outlining proposed activities for determining the estimated volume of free product and/or the areal and vertical extent of free product. If free product investigation is required by the Division, then a FPIP shall be submitted.

C. **Free Product Investigation Report (**FPIR**)**– A report required to be submitted as a result of the free product investigation activities approved by the Division.

D. **Free Product Removal Methods** - Equipment used in a well, surface water, or on the surface of the ground, excavation zone, or subsurface structure that is capable of free product removal. The equipment shall be appropriately selected to be cost effective, prevent migration, and maximize recovery based on the anticipated or known quantity of product, type of product released, and the ability of the impacted matrix to yield the product.

E. **Free Product Removal Plan (**FPRP**)** - A plan that may be required by the Division, in lieu of a Corrective Action Plan (CAP), detailing a proposal for implementation of permanent free product removal methods or activities.

F. **Hazard Notification Report** (HNR) – A notification form required by the Division to report the discovery of impacted drinking water, petroleum vapors, free product, and/or other hazards to the Division within seventy-two (72) hours.

G. **Initial Discovery** – Discovery of free product not previously observed in observation, monitoring, or recovery well(s), on surface water, on ground surface, in excavation(s), in a basement, confined space or utility. An increase of free product greater than one (1) foot above previous measurements in any type of well shall be considered an initial discovery and shall be reported to the Division within seventy-two (72) hours.

H. **Initial Response** – Preliminary response activities taken to control the migration of free product associated with recent release(s) or the initial discovery of free product. Initial response activities may include, but not be limited to, the free product abatement and/or removal methods listed in Section III. Free Product Response.

I. **Initial Response and Hazard Management Report** (IRHMR) – A required report detailing the actions that have been taken to address the initial hazards discovered at or in the vicinity of the petroleum site. The IRHMR is due within sixty (60) calendar days after the responsible party has been directed by the Division to begin an investigation. The IRHMR is a one time submittal per release.

J. **Mobile Enhanced Multi-phase Extraction - Corrective Action Technology** (MEME-CAT) - An eight (8) to twenty-four (24) hour high vacuum extraction event on a monitoring and/or recovery well for the purpose of free product removal and to collect corrective action system design criteria.

K. **Mobile Enhanced Multi-phase Extraction - Observation Well** (MEME-OW) - A four (4) to eight (8) hour high vacuum extraction event on an observation well to remove free product and to monitor free product recharge.

L. **Mobile Enhanced Multi-phase Extraction – Surfactant Injection/Extraction** (MEME-SIE) – A combination of surfactant injection with high vacuum extraction events to remove free product and surfactant.

M. **Recurring or Intermittent Free Product –** After initial response activities are completed, free product which returns to previously impacted locations [observation, monitoring, recovery well(s), on surface water, on ground surface, in excavation(s), in a basement, confined space, and/or in utilities] shall be considered recurring or intermittent free product.

III. Free Product Response

Examples which require attempted removal of free product during initial response activities are:

1. A measured free product thickness greater than 0.01 feet of free product in any well; or

2. The presence of free product on a surface body of water; or

3. The presence of free product on the ground; or

4. The presence of free product within a subsurface structure; or

5. The presence of free product within a tankhold or excavation.

Upon discovery of free product, initial response activities shall be initiated as dictated by site conditions and as listed in the table below. An increase of free product greater than one (1) foot above previous measurements in any type of well shall be considered an initial discovery and shall be reported to the Division within seventy-two (72) hours.

Unless directed to do otherwise by the Division, an IRHMR shall be submitted after initiation of initial response activities related to free product. If free product is discovered after the submittal of the IRHMR, then a FP-HMR shall be submitted within thirty (30) days.

Unless directed to do otherwise by the Division, the following activities are approved for implementation after the HNR has been submitted to the Division. **Under emergency conditions, these activities are approved for implementation prior to submittal of the HNR. Emergency conditions apply to impacted drinking water supplies, surface water, ground surface, basement or confined space, or utilities/utility excavation .**

Location of Free Product Occurrence	Initial Response Activity
Drinking Water Supply	Temporary purification system, supply potable water (may include municipal water, if available)
Surface Water	Booms, Pads, Vacuum Truck, Skimmer, Interceptor Trench

Ground Surface	Dry Absorbent Material, Booms, Pads
Basement or confined space	Ventilation, Booms, Pads, Vacuum Truck, Interceptor Trench
Utilities/utility excavation	Utilities/utility excavation
Excavation (UST system)	Booms, Pads, Vacuum Truck, Trash pump
Monitoring, Recovery, Observation Well(s)	MEME-OW, MEME-CAT *
UST System (sumps, remote fills, etc.)	Pads, Vacuum Truck, Dry Absorbent Material
Other	Contact Division staff - Prior approval needed

*All MEME events must be approved by the Division and be conducted in accordance with TGD-016

IV. Free Product Investigation and Free Product Removal Plan

If free product remains after the initial response activity, then the Division may require free product investigation and a detailed plan shall be submitted in accordance with the attached Free Product Investigation Plan (FPIP) guidance. Free product investigation activities may include, but not be limited to, the installation of soil borings and/or ground water monitoring wells. These activities shall be completed in accordance with the current Environmental Assessment Guidelines. **Any investigation of free product without prior Division approval will not be Fund reimbursable.** The findings from the free product investigation shall be documented in the Free Product Investigation Report (FPIR). If a Free Product Removal Plan (FPRP) is required, then it shall include any long-term response activity as listed in the table below based on the site specific impacts.

Location of Free Product Occurrence	**Free Product Removal Plan** Activity**
Drinking Water Supply	Provide municipal water, install a new well, or provide a permanent approved purification system
Monitoring, Recovery Well(s)	High vacuum dual phase treatment system (or MEME-SIE***, if needed)
Surface Water	Site specific
Ground Surface	Excavation
Utilities	Excavation/replacement of utility
Basement and/or confined space	Ventilation
UST System (sumps, remote fills, etc.)	Equipment repair or replacement (costs will not be Fund reimbursable)
Excavation	Overexcavation
Other	Contact Division staff - Prior approval needed

** May be required to be submitted as a CAP

***Required to be submitted as a CAP

V. Reporting Schedule

If a MEME has been conducted as a free product response activity, then a MEME report, completed in accordance with TGD-016, shall be included with any applicable report listed below.

A. In accordance with Rule 1200-1-15-.06(4)(a), a Hazard Notification Report (HNR) form shall be submitted to the Division within seventy-two (72) hours of discovery of free product.

B. In accordance with Rule 1200-1-15-.06(4)(c), an Initial Response and Hazard Management Report (IRHMR) shall be submitted in accordance with a deadline established by the Division. The report shall be prepared in accordance with the IRHMR Guidelines.

C. If free product is initially discovered after the submittal of the IRHMR, then a Free Product - Hazard Management Report (FP-HMR) shall be submitted within thirty (30) days after the discovery of free product. This report shall be completed in accordance with the attached FP-HMR guidance. **Recurrent or intermittent free product will not result in the submittal of additional FP-HMRs unless directed by the Division.**

D. If the Division requires an investigation in response to the discovery of free product in accordance with Rule 1200-1-15-.06(4)(b)3.(ii), then a Free Product Investigation Plan (FPIP) shall be prepared and submitted as a part of that investigation.

E. In accordance with Rule 1200-1-15-.06(4)(b)3.(ii), the Division **may** require and establish a submittal deadline for a Free Product Investigation Report (FPIR). The FPIR shall be prepared and submitted in accordance with the attached FPIR guidance.

F. In accordance with Rule 1200-1-15-.06(4)(b)3.(iii), the Division **may** require and establish a submittal deadline for a Free Product Removal Plan (FPRP). If overexcavation and/or a high vacuum dual phase treatment system is proposed as the long-term response, then a FPRP shall be submitted in accordance with the current Corrective Action Plan (CAP) guidelines. If another long-term response is proposed, then a plan shall include, but not be limited to, the following:

1. Both the long and short term objectives of free product recovery at this site;
2. The design of a free product recovery system or systems;
3. An operation and maintenance (O&M) schedule;
4. Schedules for monitoring and reporting;
5. A list of actionable causes which would result in the re-evaluation of the continued need for and/or redesign and/or termination of the free product recovery system;
6. A schedule and conditions for post termination monitoring; and
7. A cost proposal.

STATE OF TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF UNDERGROUND STORAGE TANKS

FREE PRODUCT – HAZARD MANAGEMENT REPORT

Effective November 1, 2007

Instructions

If free product is discovered after the submittal of the Initial Response Hazard Management Report, then a Free Product-Hazard Management Report (FP-HMR) is due within thirty (30) calendar days after the deadline for the Responsible Party to implement the initial free product response activities in accordance with Technical Guidance Document - 004. The FP-HMR shall contain **all** data gathered during free product response activities. Environmental assessment activities and evaluation of the subsurface investigation shall be directed by a licensed professional geologist under the Tennessee Geologist Licensure Act of 2007 (*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 FP-HMR will not be submitted by the established deadline, then a written request, justifying an extension shall be submitted to the appropriate environmental field office before the established deadline. An extension is not automatic and enforcement actions may be taken to insure prompt compliance with established deadlines. Failure to meet established deadlines may result in the loss of Fund coverage.

Each section of the FP-HMR 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 explained and justified. All maps shall be in appendices as required below. All maps shall be on 8.5 × 11 or 11 × 17 inch paper and include, at a minimum, a North arrow, legend, scale bar and figure number. The FP-HMR guidelines are intended to provide a structured outline. Any information that is not specifically requested but is relevant to the project shall be included. The preparer shall assemble the required information in each section so as to provide a comprehensive document. All pages of the report, including the tables and figures, shall be consecutively numbered.

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.

THIS REPORT IS NOT COMPLETE UNLESS THE FOLLOWING DOCUMENTS ARE ATTACHED TO THE REPORT IN AN APPENDIX:

Attached (Yes/No)

A. Properly Completed Signature Page _____

B. Scaled Site Map _____

Update the site map from the previously submitted report including locations of free product

C. Vicinity Map (include only if free product is present off the UST property**)** _____

D. Disposal Manifests (if applicable**)** _____

E. Free Product Cost Sheet _____

Costs shall not exceed those identified in the current Reimbursement Guidance Document – 001, which is available on the Division's website.

A. Facility and General Information

1. Date of Report: _____
2. Facility ID #: _____
3. Facility Name: _____
4. Facility Address: _____

   _____
5. Corrective Action Contractor (CAC) responsible for free product management:

   _____
6. CAC Address: _____

   _____

7. Subcontractor(s) responsible for free product management:

_____ _____

_____ _____

8. Subcontractor Address: _____

_____

Subcontractor Address: _____

_____

B. Release History

1. Date release confirmed: _____

2. Date release reported to the Division: _____

Method of contact: ☐ Mail ☐ Electronic Mail ☐ Telephone

☐ Facsimile ☐ Other Explain _____

Division personnel contacted: _____

Reported by: _____

3. Type of petroleum released, if known: ☐ Gasoline ☐ Diesel ☐ Kerosene

☐ Waste oil ☐ Aviation fuel ☐ Other Explain _____

4. Source of release: ☐ UST ☐ Line ☐ Dispenser ☐ Sump area

☐ Fill port area ☐ Other Explain _____

5. Date free product discovered: _____

6. Date free product discovery reported to the Division: _____

Method of contact: ☐ Mail ☐ Electronic Mail ☐ Telephone

☐ Facsimile ☐ Other Explain _____

Division personnel contacted: _____

Reported by: _____

7. Location where free product was discovered (mark all that apply):

☐ Drinking water supply
☐ Basement and/or confined space
☐ Surface water
☐ Ground surface
☐ Other Explain _____

☐ Monitoring/recovery/observation well
☐ UST system
☐ Utilities
☐ Excavation

8. Address(es) and telephone number(s), if applicable, of locations where free product was discovered:

_____
_____
_____
_____
_____

9. Provide specific details about the release point, if known (i.e. Tank #2, line leak detector failure, regular unleaded flex connector failure at dispenser #3, etc.): _____

_____
_____
_____
_____

10. Volume of the release: _____ gallons ☐ Known ☐ Estimated

11. Describe actions taken to prevent further release to the environment (i.e. removal of product from tank, repair to or removal of the tank system, etc.) and prevent further migration of the petroleum (i.e. removal of free product, removal of contaminated soil, etc.)_____

_____
_____
_____
_____

C. Free Product Management

1. Date initial free product response activity was initiated: _____

2. Describe the type of initial free product response activity that was initiated: _____

3. Date initial response activity was terminated, if applicable: _____

4. Describe the method and location of disposal for the recovered free product, liquids, soils, pads, booms, etc. (attach disposal manifests in an appendix): _____

5. If applicable, describe the location(s) and/or thickness(es) of any free product that is still present twenty-four (24) hours after the termination of the initial free product removal activities: _____

6. Free Product Removal Table

Complete the following table (an example is provided below). The free product location(s) that are included in the referenced table shall be depicted on the site and/or vicinity map. The referenced map shall be an updated map from the most recently submitted report.

Free Product Location	Date	Product thickness (feet)	Product removed? (Y/N)	Gallons of free product removed during event	Cumulative gallons per location of free product removed	Gallons of water removed during event
MW-1	6-1-07	2.6	Y	2	171	1
MW-1	7-15-07	1.3	Y	9		2
MW-1	8-12-07	1.6	Y (MEME)	150		360
MW-2	6-1-07	0.0	N	0	5	0
MW-2	7-15-07	0.7	Y	5		2
MW-2	8-12-07	0.0	N	0		0
Total gallons of product removed this event:				0		
Total cumulative gallons of product removed to date:					176	
Total gallons of water removed this event:						365

7. If free product was not removed at a location listed in the Free Product Removal table, then explain why the product was not removed: _____

Signature Page

A signature page as shown below shall be attached to the FP-HMR. The page shall be signed by the owner/operator or petroleum site owner (or authorized representative within the organization) and either a licensed professional geologist under the Tennessee Geologist Licensure Act of 2007 (*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 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.

_____ _____

Tank Owner and/or Operator or
Petroleum Site Owner(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

STATE OF TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF UNDERGROUND STORAGE TANKS

FREE PRODUCT INVESTIGATION PLAN

Effective November 1, 2007

If an investigation is required by the Division, in response to the discovery of free product in accordance with Rule 1200-1-15-.06(4)(b)3(ii), then a Free Product Investigation Plan (FPIP) shall be prepared and submitted as a part of the investigation and Technical Guidance Document - 004. Environmental assessment activities and evaluation of the subsurface investigation shall be directed by a licensed professional geologist under the Tennessee Geologist Licensure Act of 2007 (*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 FPIP 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 established deadline. An extension is not automatic and enforcement actions may be taken to insure prompt compliance with established deadlines. Failure to meet established deadlines may result in the loss of Fund coverage.

Each section of the FPIP 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 shall be in appendices as required below. All maps shall be on 8.5 × 11 or 11 × 17 inch paper and include, at a minimum, a North arrow, legend, scale bar and figure number. The FPIP 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 so as to provide a comprehensive document. All pages of the report, including the tables and figures, shall be consecutively numbered.

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.

THIS PLAN IS NOT COMPLETE UNLESS THE FOLLOWING DOCUMENTS ARE ATTACHED TO THE PLAN IN AN APPENDIX:

Attached (Yes/No)

A. Properly Completed Signature Page _____

B. Updated Scaled Site Map _____

-Include current location and thickness of free product
-Include proposed well locations

C. Free Product Removal Table _____

D. Laboratory Analytical Table (soil and ground water) _____

E. Detailed Cost Proposal _____

IF AVAILABLE, ATTACH TO THE PLAN IN AN APPENDIX:

F. Soil Boring Logs _____

G. Monitoring Well Construction Diagrams _____

H. Potentiometric Table _____

I. Potentiometric Map _____

A. Facility and General Information

1. Date of Proposal: _____

2. Facility ID #: _____

3. Facility Name: _____

4. Facility Address: _____

_____

5. Corrective Action Contractor (CAC) responsible for proposal:

_____

6. CAC Address: _____

_____

B. Background Information

1. Provide a description of the geology and hydrology of the site

2. Provide a description of the free product occurrence at the site

C. Number, Type and Location of Monitoring Wells to Determine the Extent of Free Product

To determine the extent of free product, submit a proposal to install up to six (6) monitoring wells on a twenty-five (25) foot square grid pattern extending from the source area. The proposal may adjust the grid pattern distances based on site limitations and shall include a justification for the proposed deviation. These wells are in addition to the four wells installed for the initial release investigation and reported in the Initial Site Characterization Report and shall be installed and sampled in accordance with the current EAG. Product in wells shall be purged in accordance with the current EAG, prior to collection of ground water samples. If the free product plume is not defined to 0.01 feet after these wells are installed, then additional wells may be required by the Division.

D. Cost Proposal

Costs shall not exceed those identified in the current Reimbursement Guidance Document – 001, which is available on the Division's website.

APPENDICES:

Potentiometric Table and Map

Laboratory Analytical Table (soil and ground water)

Free Product Removal Table (an example is listed below)

Free Product Location	Date	Product thickness (feet)	Product removed? (Y/N)	Gallons of free product removed during event	Cumulative gallons per location of free product removed	Gallons of water removed during event
MW-1	6-1-07	2.6	Y	2	171	1
MW-1	7-15-07	1.3	Y	9		2
MW-1	8-12-07	1.6	Y (MEME)	150		360
MW-2	6-1-07	0.0	N	0	5	0
MW-2	7-15-07	0.7	Y	5		2
MW-2	8-12-07	0.0	N	0		0
Total gallons of product removed this event:				0		
Total cumulative gallons of product removed to date:					176	
Total gallons of water removed this event:						365

Signature Page

A signature page, as shown below shall be attached to the FPIP. The page shall be signed by the owner/operator or petroleum site owner (or authorized representative within the organization) and either a licensed professional geologist under the Tennessee Geologist Licensure Act of 2007 (*T.C.A. §62-36-101 et seq*.), or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects and Interior Designer 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 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.

_____ _____

Tank Owner and/or Operator or
Petroleum Site Owner(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

STATE OF TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

DIVISION OF UNDERGROUND STORAGE TANKS

FREE PRODUCT INVESTIGATION REPORT

Effective November 1, 2007

Instructions

The Free Product Investigation Report (FPIR) is due within sixty (60) calendar days of approval of the Free Product Investigation Plan (FPIP). The FPIR shall contain **all** data gathered during implementation of the approved FPIP. **The FPIR includes and updates the information contained in the Initial Site Characterization Report.** Environmental assessment activities and evaluation of the subsurface investigation shall be directed by a licensed professional geologist under the Tennessee Geologist Licensure Act of 2007 (*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 FPIR will not be submitted by the established deadline, then a written request, justifying an extension shall be submitted to the appropriate environmental field office before the established deadline. An extension is not automatic and enforcement actions may be taken to insure prompt compliance with established deadlines. Failure to meet established deadlines may result in the loss of Fund coverage.

Each section of the FPIR 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 shall be in appendices as required below. All maps shall be on 8.5 × 11 or 11 × 17 inch paper and include, at a minimum, a North arrow, legend, scale bar and figure number. The FPIR 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 so as to provide a comprehensive document. All pages of the report, including the tables and figures, shall be consecutively numbered.

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.

THIS PLAN IS NOT COMPLETE UNLESS THE FOLLOWING DOCUMENTS ARE ATTACHED TO THE PLAN IN AN APPENDIX:

		Attached (Yes/No)
A.	**Boring Logs/Monitoring Well Diagrams**	_____
B.	**Laboratory Analytical Table** (soil and ground water)	_____
C.	**Soil Laboratory Analytical Sheets**	_____
D.	**Water Laboratory Analytical Sheets**	_____
E.	**Revised TGD-017 Risk Analysis Report**	_____
F.	**Revised Site Specific Standard Cleanup Levels Request, if applicable (TGD-017)**	_____
G.	**FPIR Cost Sheets**	_____

Costs shall not exceed those identified in the current Reimbursement Guidance Document – 001, which is available on the Division's webpage.

A. Facility and General Information

1. Date of Report: _____
2. Facility ID #: _____
3. Facility Name: _____
4. Facility Address: _____

   _____
5. Corrective Action Contractor (CAC) responsible for the report:

   _____
6. CAC Address: _____

   _____

B. Executive Summary

Provide a 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.

C. Background Information

Provide 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 free product initial response activities; and,

2. A summary of actions taken to define the extent of free product.

D. Site Location

1. Provide a vicinity map of the area depicting all streets, buildings, subsurface structures, utilities, and surface water bodies within one-tenth (0.10) mile radius of the site. The map shall also depict the site location and location(s) of free product.

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, soil borings, monitoring wells, and horizontal extent of free product. 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 inch color topographic map with the site location indicated. This topographic map shall also indicate the location of all drinking water supplies (wells and springs) within a one-half (0.5) mile radius of the UST site and 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 horizontal extent of free product and the nearest current off-site receptors for each applicable pathway. Draw an arrow to each receptor from either the monitoring well with the highest benzene concentration or the monitoring well with free product closest to the receptor. 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 free product and contaminant migration at the site.

E. Soil Investigation

Provide a summary of all soil investigation activities. The summary should include, but not be limited to, the results of the release investigation, closure activities, site check investigation, any interim corrective action, and any location(s) of free product encountered, 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 strike and dip 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 an appendix 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 current 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 site specific cleanup levels as approved by the Division.

b. Provide all laboratory analysis and chain of custody sheets in an appendix 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 concentrations 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.

F. 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, and any location(s) of free product encountered, 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 FPIR 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 free product and ground water at the site and their 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 these features may affect ground water movement at the site. Include in this discussion any evidence of petroleum contamination migrating through karst systems, estimated travel times, evidence of impacted water supply wells, contaminated springs, or evidence of petroleum contamination migrating into nearby streams.

c. Describe the occurrence and movement of surface water at the site and its relationship to free product, soil and ground water contamination.

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 an appendix 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 free product and 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 the 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 an appendix 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;
v. COC (i.e. Benzene, Toluene, Xylenes, Ethylbenzene, MtBE, Naphthalene, and/or PAHs, etc. in accordance with Reference 1 and 2 in the EAG);
vi. 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 an appendix. 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)

ii. Describe the pump test method, used to determine the yield of the impacted aquifer or water supply.

iii. Describe the rationale used for selecting the pump test method.

iv. 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.

G. Applicable Cleanup Levels

Re-evaluate this site using TGD-017 and provide a discussion of the results. Attach the completed TGD-017 Risk Analysis Report results to this report. If site specific standard cleanup levels change, then include a revised site-specific standard request addressed to the Division Director in an appendix.

H. Proposed Additional Monitoring Wells

If the extent of free product is not defined to 0.01 feet, then a proposal to install and sample up to four (4) additional monitoring wells shall be included. The well placement grid (in accordance with the FPIP) used to investigate the extent of free product for the FPIR shall be used in the proposal.

If approval is granted 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.

Signature Page

A signature page, as shown below shall be attached to the FPIR. The page shall be signed by the owner/operator or petroleum site owner (or authorized representative within the organization) and either a licensed professional geologist under the Tennessee Geologist Licensure Act of 2007 (*T.C.A. §62-36-101 et seq*.), or a registered professional engineer under the Tennessee Architects, Engineers, Landscape Architects and Interior Designer 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 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.

_____ _____

Tank Owner and/or Operator or
Petroleum Site Owner(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