

Risk-Based Levels for Total Petroleum Hydrocarbons (TPH)

Total petroleum hydrocarbons (TPH) are typically defined as carbon chains in the range of C6 through C35. Products containing TPH include a wide variety of mixtures that may contain hundreds to thousands of hydrocarbon compounds including aliphatic (straight carbon chain) and aromatic (carbon ring) compounds.

This guidance is specific to the analysis and development of cleanup levels for TPH. Cleanups of refined product spills fall under DEQ's Diesel and Gasoline Spills guidance.

Since individual chemicals and metals have specific toxicity information, TPH can be addressed once any underlying chemicals and metals have been screened out or are also being fully evaluated.

If cleanup levels other than Tier 1 or Tier 2 Residential levels are used, DEQ's Risk Team should be contacted prior to initiating a cleanup under this guidance. The Team may be reached at **(405) 702-5100**.

TPH Ranges

DEQ defines three ranges of TPH, although there is often an overlap between the ranges from each individual source (e.g., refined gasoline or diesel).

Gasoline range	(GRO) >C6-C12
Diesel range	(DRO) >C13-C28
Lube oil range	>C28-C35

In the past, TPH was reported as a single overall number. Currently, analyses are generally reported as total TPH along with the individual ranges.

Analytical Methods¹

To ensure consistent data quality, DEQ requires analyses to be performed at laboratories accredited by the State Environmental Laboratory's accreditation program, or equivalent. DEQ-accredited labs may be found at <https://go.usa.gov/xdQWq>. For all analyses, ensure that the selected laboratory is able to reach adequate quantitation limits.

DEQ recommends Texas Commission on Environmental Quality (TCEQ) Method 1005 for preliminary characterization of soil and groundwater. Other methods that cover similar ranges may be used; however, use of methods other than TCEQ Method 1005 should be discussed with the Risk Team prior to use. All TCEQ



¹ Texas Commission on Environmental Quality (TCEQ) analytical methods discussed in this guidance may be found at <https://www.tceq.texas.gov/remediation/analysis.html>.

Method 1005 TPH analyses should be conducted without the use of a silica gel or similar cleanup method. .

Cleanup Levels

DEQ uses three Tiers for TPH cleanup levels, based upon either protection of groundwater or the relative toxicity of the hydrocarbon ranges. All three Tiers assume other priority pollutants have been evaluated. If other contaminants are present, you will need to contact DEQ's Risk Team to discuss the correct approach for evaluating total risk present at the site.

Tier 1 is a generic cleanup level applicable to residential scenarios and is based on protection of groundwater.

Tier 2 represents cleanup levels for each of the three TPH ranges for both residential and industrial scenarios. Levels are based on the relative toxicity of the hydrocarbon ranges.

Tier 3 is a site-specific scenario using TCEQ Method 1006 to determine which aliphatic or aromatic fractions are present.

The following Tables identify the cleanup levels under Tier 1 and Tier 2.

Tier 1

Tier 1 Generic Cleanup Levels	Ground water	Soil
RESIDENTIAL	*1.0 mg/L	*50 mg/kg

Tier 2

Generic Cleanup Levels	Ground water (mg/L)	Soil (mg/kg)	
RESIDENTIAL	*1.0	GRO (C6-C12) DRO	500
		(C12-28) Lube Oil	400
		(>C28-35)	1,800
INDUSTRIAL	*1.0	GRO (C6-C12) DRO	2,500
		(C12-28) Lube Oil	2,610
		(>C28-35)	23,000

*Total of all the ranges.

Tier 3, site-specific, cleanup levels are determined in consultation with the Risk Team as follows.

1. Prior to developing Tier 3 site-specific cleanup levels, contact the Risk Team for approval of all assumptions and inputs made for site-specific determinations.
2. Complete initial TPH analyses using TCEQ Method 1005, without use of a silica gel or similar cleanup method.
3. From the Method 1005 results, identify samples with greater impacts. For those samples, use TCEQ Method 1006 to determine the specific fractions of TPH present, including aliphatic and aromatic.
4. Consult with the Risk Team to determine appropriate Tier 3 cleanup levels.

Risk-Based Cleanups

Tier 2 and 3 cleanups are considered risk-based and may require a deed notice and installation of groundwater monitoring wells for investigation and monitoring. Since dilution and attenuation vary depending on soil type, site lithology, and other site-specific parameters, coordination with the Risk Team will be needed to ensure the cleanup level is protective of groundwater.

Disposal

Soils excavated from the remediation site may be disposed at any facility authorized to accept non-hazardous industrial waste. A list of those facilities and the level of TPH they are authorized to accept may be found at <https://tinyurl.com/y4fb7nkb>.