

LAUST PROGRAM POLICY & PROCEDURE #36

WATER QUALITY DIVISION

SUBJECT: LAUST REMEDIATION TOTAL PETROLEUM HYDROCARBON STANDARDS

SCOPE: This policy statement is intended to provide total petroleum hydrocarbon (TPH) cleanup objectives that are protective of human health and the environment. These objectives are to be used as part of the decision making process to determine whether or not a site contaminated by a Leaking Aboveground or Underground Storage Tank (LAUST) is clean. This policy is also being implemented within the department's Voluntary Remediation Program for eligible contaminated sites. This policy is not to be used and does not replace cleanup criteria for releases regulated by the Wyoming Oil & Gas Commission.

POLICY: The philosophy and goal of the LAUST corrective action program is to protect human health, safety, welfare, and the environment from soil and/or groundwater pollution caused by leaking aboveground and underground storage tanks. To achieve these goals, the department has implemented a State funded LAUST environmental remediation program managed by the department using pre-qualified engineering consultants and contractors. State rules and regulations have been promulgated that contain program specific environmental restoration standards. It is the policy of the LAUST remediation program to accomplish environmental corrective actions at program eligible LAUST sites to achieve state soil and/or groundwater standards established in Appendix A, Procedures for Establishing Environmental Restoration Standards for Leaking Underground Storage Tank Remediation Actions, Chapter 17, Wyoming Water Quality Rules and Regulations, and updated program policy/guidance documents.

Determination of whether or not a site is clean, can not be based solely on TPH measurements. TPH levels are one of several criteria used to determine whether or not a site is clean. These other criteria may include BETX, naphthalene, fuel oxygenates, and some metals, depending on known or suspected tank contents.

The TPH standards presented in this policy may be modified by the LAUST program in the future. Until revisions are completed to Chapter 17, Wyoming Water Quality Rules & Regulations, Underground Storage Tanks, the TPH standards contained in this policy apply to the AUST/LAUST program, as of the date of this policy.

The updated TPH cleanup objectives continue to incorporate both human health risk assessment component and contaminant fate & transport mechanisms. This policy implements revised soil and groundwater TPH standards which are based on the latest scientific information and exposure criteria developed by the nationally recognized TPH Criteria Working Group during the late 1990s and published in a series of publications, Volumes 1-5, by Amherst Scientific Publishers and the existing Appendix A, Chapter 17, Underground Storage Tanks, Wyoming Water Quality Rules and Regulations.

The TPH cleanup objectives have been updated to base soil and groundwater standards on fraction specific petroleum hydrocarbons, and they are applicable to releases of materials which clearly correspond to one of the following categories:

Gasoline Range Organics (GRO): Includes C₆ through C₁₀ hydrocarbons.

Diesel Range Organics (DRO): Includes C₁₀ through C₃₂ hydrocarbons.

These updated standards continue to require an evaluation of both human health risk assessment and contaminant fate & transport with the final remediation standard determined by the lower of the two criteria.

The Wyoming Drinking Water Equivalent Level (DWEL) groundwater standard for TPH-GRO is 7.3 mg/L, and the TPH-DRO DWEL groundwater standard is 1.1 mg/L. These cleanup levels are based on protection of groundwater to drinking water quality for non-cancer effects using toxicity reference doses from Volume 4, Development of Fraction Specific Reference Doses and Reference Concentrations for TPH, Total Petroleum Hydrocarbon Criteria Working Group Series and Chapter 17, Wyoming Water Quality Rules and Regulations. These updated groundwater standards also incorporate the standard EPA risk assessment constants in the Wyoming DWEL equations.

The soil standard for TPH-GRO ranges from 28 mg/kg to 15,600 mg/kg. The soil standard for TPH-GRO is based on a fate & transport evaluation for protection of groundwater to the TPH-GRO groundwater standard (7.3 mg/L) and depends on two site specific parameters: depth (d) to seasonal high groundwater table from the bottom of the contaminated zone, and the thickness of the contaminated zone (t). The depth (d) to seasonal high groundwater table used in determining the TPH-GRO cleanup level is the average depth encountered at the site. The thickness of the contaminated zone (t) is the average thickness encountered at the site.

The TPH-GRO standard is also protective of human health. The maximum concentration of 15,600 mg/kg is based on the non-cancer effects of oral ingestion of contaminated soil, and it has been calculated based on the human health risk assessment equation contained in Chapter 17 using current EPA constant values. It is theoretically possible to calculate TPH-GRO fate & transport component soil concentrations greater than 15,600 mg/kg for relatively shallow depths to groundwater and thin contaminated soil thicknesses; however, the human health risk assessment component represents the lower of the two criteria and is, therefore, the controlling factor.

Three graphs are attached to this policy that provide a quick reference for determining the acceptable concentration of TPH-GRO in soil. Knowing the depth from the bottom of the contaminated soil zone to the seasonally high groundwater table and the thickness of the contaminated soil zone, the graphs provide the acceptable soil concentration of TPH-GRO for the given parameters for soil concentrations less than 15,600 mg/kg.

The soil standard for TPH-DRO is 2,300 mg/kg. The soil standard for TPH-DRO is based on non-cancer effects of oral ingestion of contaminated soil, and it has been calculated based on the human health risk assessment component equation contained in Chapter 17 using current EPA constant values. The TPH-DRO environmental fate & transport component computation produced TPH soil concentrations greater than 1E06 (pure petroleum product) to protect groundwater quality to the TPH-DRO groundwater standard of 1.1 mg/L. Therefore, because the human health risk assessment component is lower, it controls the TPH-DRO soil standard.