

# DEPARTMENT OF ENVIRONMENTAL QUALITY

## Water Division

629 East Main Street Richmond, Virginia 23219

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### MEMORANDUM

**Subject:** Guidance Memorandum No. 96-002  
O&G/TPH Limits for Certain Effluents

**To:** Regional Directors

**From:** Larry G. Lawson, P.E. 

**Date:** April 9, 1996

**Copies:** Regional Permit Managers, Martin Ferguson, Dale Phillips

#### **Background:**

Historically, we have put Oil and Grease (O&G) limits in the VPDES permits for many facilities that handle petroleum products or where contamination by petroleum products is of concern to us (truck terminals, oil storage, gas pipelines, discharges from oil/water separators, etc.). The limits are often based on judgement and typically range from 10 to 30 mg/l O&G. Our judgement is often based on and in accordance with one or more effluent guidelines that EPA has promulgated for similar facilities or industries. Such limits are based on our water quality standards at VR680-21-01.2.B. and section 402(a)(1)(B) of the federal Clean Water Act.

Some of our permits have both O&G and Total Petroleum Hydrocarbon (TPH) limits applied to an outfall (also different limits for different outfalls with similar expected characteristics) and this has raised questions as well as requests for only one type limit in a permit to control the discharge of oily wastes.

An O&G limit has appeared in many effluent guidelines; dairy products, metal finishing, some electric plants and petroleum refining to name a few.

#### **Laboratory Analysis:**

According to Standard Methods, oil and grease is composed of "fatty matter from animal and vegetable sources and hydrocarbons of petroleum origin." Both O&G and TPH are tested for according to very similar general protocols. The only difference is that a TPH sample is mixed with silica gel and an O&G sample is not. This mixing step removes polar materials (typically, fatty materials that are not petroleum based) and allows the separation of oily wastes having different origins, e.g. animal/vegetable or petroleum sources. Other than this silica gel step the methods are identical. The general laboratory protocol is currently\*:

- A sample is obtained that may contain O&G or TPH.
- The sample is mixed with an immiscible solvent (currently freon  $C_2Cl_3F_3$ ).
- any O&G/TPH present becomes dissolved in the freon.
- Freon and water are immiscible and are physically separated.
- The separated freon is analyzed.
- There are two analytical methods to determine the amount of oily materials dissolved in the freon and either can be used to determine O&G or TPH:

#### **Gravimetric:**

O&G - The freon is boiled off @ 70°C and the amount of residual material is determined by weight and reported as

O&G. This is the EPA method.

TPH - The freon is mixed with silica gel. The gel is removed by filtration and the freon is boiled off at 70°C. The amount of residual material is determined by weight and reported as TPH.

**Photometric:**

O&G - The separated freon fraction is analyzed directly by a spectrophotometer and results are reported as O&G

TPH - The separated freon fraction is mixed with silica gel and the gel is removed by filtration. The freon is then analyzed by a spectrophotometer and the results are reported as TPH.

\* Freon is the currently used solvent in the O&G and/or TPH analysis. However, since freon is believed to be dangerous to the environment, other solvents are being evaluated and modifications to the method may be expected. This guidance applies only to freon based analyses.

**Discussion of analyses:**

The solvent boil off during the gravimetric protocol will result in the loss of materials having boiling points less than about 70°C. For samples containing very light volatile materials the different methods may yield significantly different results.

The silica gel filtration step in the TPH analysis will remove non-petroleum fatty materials. It can be expected that O&G and TPH analyses will provide significantly different results for certain wastes, e.g. domestic and food preparation waste that contain significant amounts of fatty materials that have an animal and/or vegetable origin.

The photometric method should provide O&G or TPH results that are approximately equal for wastes that contain primarily heavier petroleum based hydrocarbons and that are not expected to contain significant amounts of non-petroleum fatty materials, e.g. tank farm runoff, tank bottoms, parking lots, vehicle repair facilities, etc.

**Recommendations:**

1. If O&G limits are part of any minimum effluent requirements as promulgated by EPA, they must be included in the permit as O&G and the appropriate method specified in accordance with 40 CFR § 136.
2. If TPH limits are part of any minimum effluent requirements as promulgated by EPA, they must be included in the permit as TPH and the appropriate method specified in accordance with 40 CFR § 136.
3. Where O&G (or TPH) limits are not part of any minimum effluent requirements promulgated by EPA then the limits may be specified as either O&G or TPH:
  - a. The need for and value of O&G or TPH limits should be determined according to the judgement of the permit writer on a case by case basis.
  - b. For facilities that can reasonably be expected to discharge only petroleum based hydrocarbons, limits may be expressed as either O&G or TPH at the discretion of the permit writer.

A one to one correspondence between O&G and TPH should be assumed for the purpose of determining the numerical value for a limit or for converting limits from one specification to the other.

- c. The photometric method (Standard Methods, 17th ed., analysis: 5520 F) should be specified for the TPH analysis to avoid the potential loss of light hydrocarbons. Note: the use of this method must be specified in the permit as it is not contained in 40 CFR § 136.
- d. For facilities that can reasonably be expected to discharge significant fatty materials that are not petroleum based (e.g. food processors and POTWs), the limits should be expressed as O&G.

Either the gravimetric or Photometric method may be used in this case and should provide similar results.

If you have questions or need assistance with this guidance please contact Dale Phillips.

#### **D I S C L A I M E R**

**This document provides technical and procedural guidance to the permit staff for O&G/TPH limits in VPDES permits. This document is guidance only. It does not establish a binding norm and is not finally determinative of the issues addressed. Agency decisions in any particular case will be made by applying the State Water Control Law and the implementation regulations on the basis of the site specific facts when permits are issued.**