

METHOD STATEMENT

Determinand:

The analysis of the Six World Health Organisation (WHO) Polycyclic Aromatic Hydrocarbons.

- Fluoranthene
- Benzo(b)fluoranthene *
- Benzo(k)fluoranthene
- Benzo(a)pyrene * also known as Benzo(def)chrysene
- Benzo(ghi)perylene
- Indeno(123 cd)pyrene *

Matrix:

Sample Type: Raw and Potable waters

Principle of Method:

PAHs are extracted by solvent extraction prior to examination and quantification by HPLC using fluorescence detection. The method is based upon the method for six specific PAHs in water, using High Performance Liquid Chromatography, from the Standing Committee of Analysts booklet 1985.

The concentrations of PAHs in drinking water become important when related to the health effects of these compounds. PAHs are known to leach out of coal tar that was historically used for protection of iron water mains. Some of these compounds are known carcinogens; consequently the World Health Organisation and EEC have set an upper total limit of 200 ng/l for the six PAHs of interest in domestic waters. The six PAHs of interest are:

- Fluoranthene
- Benzo(b)fluoranthene *
- Benzo(k)fluoranthene
- Benzo(a)pyrene * also known as Benzo(def)chrysene
- Benzo(ghi)perylene
- Indeno(123 cd)pyrene *

Substances marked * are known carcinogens.

Note: the maximum permissible concentration for Benzo(a)pyrene in potable waters is 10 ng/l.

Interferences:

Any material, which fluoresces, quenches fluorescence, or has similar chromatographic properties to the specified PAH will interfere in the method.

Performance of Method:

Range of Application:

HPLC2

Compound

Fluoranthene

Benzo(b)fluoranthene

Benzo(k)fluoranthene

Benzo(a)pyrene

Benzo(ghi)perylene

Indeno(123 cd)pyrene

Operational Range

LOD - 160ng/l

LOD - 160ng/l

LOD - 80ng/l

LOD - 160ng/l

LOD - 160ng/l

LOD - 160ng/l

Any extracts giving peak height results above those in the level 4 calibration standard should be diluted onto linear range.



METHOD STATEMENT



Limit of Detection:

WHPLC2

<u>Compound</u>	<u>Limit of Detection (ng/l)</u>
Fluoranthene	0.84
Benzo(b)fluoranthene	0.52
Benzo(k)fluoranthene	0.47
Benzo(a)pyrene	0.22
Benzo(ghi)perylene	0.40
Indeno(123 cd)pyrene	0.48
Sum of 6 PAH	0*
Sum of 4 PAH	0*

Sum of 4 PAH is the summation of Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(ghi)perylene and Indeno(1,2,3-Cd)pyrene.

*DWI guidelines state that individual PAHs not detected are assigned a value of 0 for the purposes of calculating the total PAH values.

Recoveries of Compounds

Compound Mean recovery tap water (medium hardness) spiked to PCV level

WHPLC2

<u>Compound</u>	<u>Recovery (%)</u>	<u>R.S.D (%)</u>
Fluoranthene	96.5	9.6
Benzo(b)fluoranthene	95.8	9.9
Benzo(k)fluoranthene	96.1	9.7
Benzo(a)pyrene	92.1	11.5
Benzo(ghi)perylene	90.9	13.4
Indeno(123 cd)pyrene	96.5	9.6

Uncertainty of Measurement

WHPLC2

<u>Compound</u>	<u>Uncertainty at PCV level %</u>
Fluoranthene	22.4
Benzo(b)fluoranthene	24.0
Benzo(k)fluoranthene	23.4
Benzo(a)pyrene	30.8
Benzo(ghi)pyrene	35.9
Indeno(123 cd)pyrene	22.8

References:

The PAH method from the Standing Committee of Analysts 1985, Method A, p. 9.

