

Schedule of Accreditation

issued by

United Kingdom Accreditation Service

21 - 47 High Street, Feltham, Middlesex, TW13 4UN, UK

 <p>Accredited to ISO/IEC 17025:2005</p>	<h3>Jones Environmental Forensics Ltd</h3> <p>Issue No: 035 Issue date: 22 March 2012</p>	
	<p>Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA</p>	<p>Contact: Mr J Farrell-Jones Tel: +44 (0)1244 833780 Fax: +44 (0)1244 833781 E-Mail: jim@jones-forensics.com Website: www.jones-forensics.com</p>
<p>Testing performed at the above address only</p>		

DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
PETROLEUM and PETROLEUM PRODUCTS	<p><u>Chemical Tests</u></p> <p>C5-C35 fingerprint (qualitative) and banding: >C5-6 >C6-8 >C8-10 >C10-12 >C12-16 >C16-21 >C21-35 >C35</p> <p>Aliphatic/aromatic fractionation and subsequent banding:</p> <p>Aliphatic bands: >C5-C6 >C6-C8 >C8-C10 >C10-C12 >C12-C16 >C16-C21 >C21-C35 >C35+</p> <p>Aromatic bands (equivalent carbon EC): >C6-C8 >C8-C10 >C10-C12 >C12-C16 >C16-C21 >C21-C35 >C35+</p>	In-house method TM001P using GC-FID



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Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
AIR Ambient Air/Soil Vapour	Volatile Organic Compounds: 1,1,1-Trichloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,1-Dichloroethane 1,1-Dichloroethene 1,2,4-Trichlorobenzene 1,2,4-Trimethylbenzene 1,2-Dibromoethane 1,2-Dichlorobenzene 1,2-Dichloroethane 1,2-Dichloropropane 1,3,5-Trimethylbenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene Benzene Bromomethane Carbon Tetrachloride Chlorobenzene Chloroethane Chloroform cis-1,2-Dichloroethene cis-1,3-Dichloropropene Ethylbenzene m&p - Xylenes Methylene Chloride o-Xylene Styrene Tetrachloroethene Toluene trans-1,3-Dichloropropene Trichloroethene Trichlorofluoromethane Trichlorotrifluoroethane Vinyl Chloride	In-house method TM068P using Summa (Silco-can) canisters and GC-MS. Based on USEPA TO15
SOILS	<u>Chemical Tests</u> Elements: Arsenic Barium Cadmium Chromium Cobalt Copper Lead	In-house method TM030S by ICP-OES



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SOILS (cont'd)	<p><u>Chemical Tests</u> (cont'd)</p> <p>Gasoline Range Organics (GRO) and banding: (cont'd)</p> <p>Also aliphatic/aromatic fractionation and subsequent banding: Aliphatic: >C5-C6 >C6-C8 Aromatic (equivalent carbon EC) >C6-C8 >C8-C10</p> <p>Extractable petroleum hydrocarbons (EPH) in the range: C8-C40 Diesel range organics (DRO) C25-C40 range organics - lubricating oil</p> <p>Extractable petroleum hydrocarbons (EPH) in the range: >C8-C40, including banding: >C8-C10 >C10-C12 >C12-C16 >C16-C21 >C21-C35</p> <p>>C8-C10 >C10-C20 >C20-C30 >C30-C40</p> <p>And including aliphatic/aromatic fractionation and subsequent banding: Aliphatic: >C8-C10 >C10-C12 >C12-C16 >C16-C21 >C21-C35 >C35-C40</p>	<p>In-house methods PM005S (orbital shaker) or PM006S (soxhlet extraction) or PM008S (end over end shake) followed by TM005S using GC-FID</p> <p>In house methods PM008S (end over end shake) fractionation by RapidTrace workstation PM016 followed by TM005S using GC-FID</p>



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SOILS (cont'd)	<p><u>Chemical Tests</u> (cont'd)</p> <p>Extractable petroleum hydrocarbons (EPH) in the range: (cont'd)</p> <p>Aromatic (equivalent carbon EC): >C8-C10 >C10-C12 >C12-C16 >C16-C21 >C21-C35 >C35-C40</p> <p>Loss on ignition at 450 °C</p> <p>pH</p> <p>Polychlorinated Biphenyls (PCBs): PCB 28/31 PCB 52 PCB 101 PCB 118 PCB 138 PCB 153 PCB 180 Total PCBs (sum of above)</p> <p>Polychlorinated Biphenyls (PCBs): PCB 28/31 PCB 52 PCB 101 PCB 118 PCB 138 PCB 153 PCB 180 Total PCBs (sum of above)</p>	<p>In-house method TM022S</p> <p>In house method TM019S and In house method TM073 using Metrohm robotic sample processor</p> <p>In-house method TM017S using GC-MS</p> <p>In-house method TM086S using GC-ECD</p>



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SOILS (cont'd)	<p><u>Chemical Tests</u> (cont'd)</p> <p>Polycyclic Aromatic Hydrocarbons (PAHs): Naphthalene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benz(a)anthracene Chrysene Benzo(b/j/k)fluoranthene Benzo(a)pyrene Indeno(123,cd)pyrene Dibenzo(ah)anthracene Benzo(ghi)perylene</p> <p>Solvent Extractable Matter</p> <p>Total Organic Carbon Total Carbon</p> <p>Volatile Organic Compounds: Chloromethane Chloroethane Trichlorofluoromethane 1,1-Dichloroethene Dichloromethane Trans-1,2-Dichloroethene 1,1-Dichloroethane Cis-1,2-Dichloroethene Bromochloromethane Chloroform 1,1,1-Trichloroethane 1,1-Dichloropropene Carbontetrachloride 1,2-Dichloroethane Benzene Trichloroethene 1,2-Dichloropropane Dibromomethane Bromodichloromethane Trans-1,3-Dichloropropene Toluene 1,1,2-Trichloroethane Tetrachloroethene</p>	<p>In-house method TM004S using end over end shake (PM008S) and GC-MS</p> <p>In-house method TM007S</p> <p>In-house method TM021S</p> <p>In-house method TM015S by headspace GC-MS</p>



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SOILS (cont'd)	<u>Chemical Tests (cont'd)</u> Volatile Organic Compounds: (cont'd) 1,3-Dichloropropane Dibromochloromethane 1,2-Dibromoethane Chlorobenzene Ethylbenzene m/p Xylene o Xylene Styrene Bromoform Isopropylbenzene 1,1,2,2 Tetrachloroethane 1,2,3-Trichloropropane Propylbenzene 1,3,5-Trimethylbenzene Tert-Butylbenzene 1,2,4-Trimethylbenzene Sec-Butylbenzene 4-Isopropyltoluene 1,4-Dichlorobenzene 1,3-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene 1,2-Dibromo-3-chloropropane 1,2,4-Trichlorobenzene 1,2,3-Trichlorobenzene MTBE	
SOILS Leachate preparation (10:1)	Aluminium Ammonium Antimony Arsenic Barium Beryllium Boron Cadmium Calcium Chloride Chromium Cobalt Copper Iron Lead Magnesium	PM017S 10:1 leachate preparation based on BS EN 12457



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WATERS (cont'd) Surface water and groundwater (cont'd)	<u>Chemical Tests</u> (cont'd) Volatile Organic Compounds (VOCs): (cont'd) Cis-1,2-Dichloroethene Bromochloromethane Chloroform 1,1,1-Trichloroethane 1,1-Dichloropropene Carbontetrachloride 1,2-Dichloroethane Benzene Trichloroethene 1,2-Dichloropropane Dibromomethane Bromodichloromethane Trans-1,3-Dichloropropene Toluene Cis-1,3-Dichloropropene 1,1,2-Trichloroethane Tetrachloroethene 1,3-Dichloropropane Dibromochloromethane 1,2-Dibromoethane Chlorobenzene 1,1,1,2-Tetrachloroethane Ethylbenzene m/p Xylene o Xylene Styrene Bromoform Isopropylbenzene Bromobenzene 1,2,3-Trichloropropane Propylbenzene 2-Chlorotoluene 1,3,5-Trimethylbenzene 4-Chlorotoluene Tert-Butylbenzene 1,2,4-Trimethylbenzene Sec-Butylbenzene 4-Isopropyltoluene 1,3-Dichlorobenzene 1,4-Dichlorobenzene n-Butylbenzene 1,2-Dichlorobenzene Hexachlorobutadiene MTBE	



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WATERS (cont'd)	<u>Chemical Tests</u> (cont'd)	
Surface water and groundwater (cont'd)	Extractable petroleum hydrocarbons (EPH) in the range: C8-C40 Diesel range organics (DRO) C25-C40 range organics - lubricating oil	In-house method TM005W by GC-FID using solvent extraction (PM009W)
	Phenols Cresols Xylenols	In-house method TM026 using HPLC
	Alkalinity	In-house method TM032W by titration
	pH	In-house method TM019
	Electrical Conductivity at 25 °C	In-house method TM028
Surface water, groundwater and leachate from landfill	Extractable petroleum hydrocarbons (EPH) in the range: C8-C40	In-house method TM005 by GC-FID using stir bar extraction (PM030W)
	Alkalinity	In house method TM075 using robotic sample processor
	pH	In house method TM073 using robotic sample processor
	Electrical Conductivity at 25 °C	In house method TM076 using robotic sample processor
	Biochemical Oxygen Demand (BOD)	In house method TM058 using DO probe and meter
	Polycyclic Aromatic Hydrocarbons (PAHs): Naphthalene Acenaphthene Acenaphthylene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene	In-house method TM004W using stir bar extraction (PM030W) and GC-MS



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<p>WATERS (cont'd)</p> <p>Surface water, groundwater, leachate prepared from soils and leachate from landfill</p>	<p><u>Chemical Tests</u> (cont'd)</p> <p>Elements:</p> <p>Aluminium Antimony Arsenic Barium Cadmium Cobalt Chromium Copper Iron Lead Mercury Manganese Molybdenum Nickel Phosphorus Selenium Thallium Vanadium Zinc</p> <p>Calcium Magnesium Potassium Sodium</p> <p>Mercury</p> <p>Ammonium Chloride Nitrate Nitrite Phosphate Sulphate</p>	<p>PM017S 10:1 leachate preparation based on BS EN 12457</p> <p>In-house method TM 030W using ICP-OES</p> <p>PM017S 10:1 leachate preparation based on BS EN 12457</p> <p>In-house method TM030W using ICP-OES</p> <p>In house method TM061 using CVAFS</p> <p>PM017S 10:1 leachate preparation based on BS EN 12457</p> <p>In-house method TM038 using discrete analyser</p>
<p>Tap water (non regulatory) surface water, groundwater, leachate prepared from soils and leachate from landfill</p>	<p>Cyanide - Total and Free</p>	<p>In-house method TM089W/S by segmented flow analysis</p>



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<p>WATERS (cont'd)</p> <p>Landfill leachate and leachate prepared from soil</p> <p>SOILS</p>	<p><u>Chemical Tests</u> (cont'd)</p> <p>Elements: Boron Beryllium</p> <p>Gasoline Range Organics (GRO) and banding: >C4-C8 >C8-C12 >C5-C6 >C6-C8 >C8-C10 >C10-C12 Total GRO C4-C12 Total GRO C5-C12 Also aliphatic/aromatic fractionation and subsequent banding: Aliphatic: >C5-C6 >C6-C8 Aromatic (equivalent carbon EC) >C6-C8 >C8-C10</p> <p>Extractable petroleum hydrocarbons (EPH) in the range: C8-C40 Diesel range organics (DRO) C25-C40 range organics - lubricating oil</p>	<p>PM017S 10:1 leachate preparation based on BS EN 12457</p> <p>In-house method TM030W using ICP-OES</p> <p>Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - chemical testing of soil</p> <p>In-house method TM 036S using headspace GC-FID</p> <p>In-house methods PM008S (end over end shake) followed by TM005S using GC-FID</p>



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SOILS (cont'd)	<p>Extractable petroleum hydrocarbons (EPH) in the range: >C8-C40, including banding: >C8-C10 >C10-C12 >C12-C16 >C16-C21 >C21-C35</p> <p>>C8-C10 >C10-C20 >C20-C30 >C30-C40</p> <p>And including aliphatic/aromatic fractionation and subsequent banding: Aliphatic: >C8-C10 >C10-C12 >C12-C16 >C16-C21 >C21-C35 >C35-C40</p> <p>Aromatic (equivalent carbon EC): >C8-C10 >C10-C12 >C12-C16 >C16-C21 >C21-C35 >C35-C40</p> <p>Polycyclic Aromatic Hydrocarbons (PAHs): Naphthalene Acenaphthene Fluorene Phenanthrene</p>	<p>Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - chemical testing of soil (cont'd)</p> <p>In house methods PM008S (end over end shake) fractionation by RapidTrace workstation PM016 followed by TM005S using GC-FID</p> <p>In-house method TM004S using end over end shake (PM008S) and GC-MS</p>



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SOILS (cont'd)	<p>Polycyclic Aromatic Hydrocarbons (PAHs): (cont'd)</p> <p>Fluoranthene Chrysene Benzo(b/k)fluoranthene Indeno(123,cd)pyrene</p> <p>Elements Arsenic Barium Cadmium Chromium Cobalt Copper Lead Manganese Mercury Molybdenum Nickel Selenium Zinc</p> <p>Water soluble boron</p> <p>Anions: Chloride Nitrite Sulphate</p> <p>Cyanide - Total</p> <p>pH</p>	<p>Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - chemical testing of soil (cont'd)</p> <p>In-house method TM030S by ICP-OES</p> <p>In-house method TM074 by ICP-OES</p> <p>In-house method TM038 by discrete analyser</p> <p>In-house method TM089W/S by segmented flow analysis</p> <p>In house method TM019S and In house method TM073 using Metrohm robotic sample processor</p>



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SOILS (cont'd)	Volatile Organic Compounds: MTBE Chloroethane Trichlorofluoromethane 1,1-Dichloroethene 1,1 - Dichloroethane Cis-1,2-Dichloroethene 2,2 Dichloropropane Bromochloromethane Chloroform 1,1,1-Trichloroethane Carbon Tetrachloride 1,2-Dichloroethane Benzene Trichloroethene 1,2-Dichloropropane Dibromomethane Bromodichloromethane Toluene 1,1,2-Trichloroethane 1,3,-Dichloropropane Dibromochloromethane Chlorobenzene 1,1,1,2-Tetrachloroethane Ethylbenzene m/p Xylene o Xylene Bromoform 1,1,2,2 Tetrachloroethane 1,2,3-Trichloropropane 1,3- Dichlorobenzene 1,2-Dichlorobenzene	<p>Documented In-House Method to meet the requirements of the Environment Agency MCERTS Performance Standard - chemical testing of soil (cont'd)</p> <p>In-house method TM015S by headspace GC-MS</p>
END		