CONTEST

Contaminated Land Proficiency Testing Scheme

Scheme Description

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Record of issue status and modifications

ISSUE	ISSUE DATE	DETAILS	AUTHORISED BY
14	Jan 2017	Addition of a phenol spike solution to sample 3C. New trial sample 27 for LOI Fines under the HMRC Requirements.	R. Sharma
15	Feb 2017	Changed the Phenol spike in group 3C, sample 22 and 23 from 2ml to 1ml	A. McCarthy
16	June 2017	Minor text changes to sample 27	R. Sharma
17	Jan 2018	Minor text changes.	R. Sharma
18	May 2018	Minor text changes to sample 21	R. Sharma
19	Dec 2018	The removal of vinyl chloride from sample 19 and 25. Two new samples added Sample 28 for Soil Texture and Sample 29 for Incinerator Bottom Ash. Website information added to page 3	R. Sharma A. McCarthy
20	Nov 2019	New Sample 30 added for Organophosphorus Pesticides (OPs) in Soil. The list of potential SVOCs (Appendix B) updated for Sample 20, new compounds added include 2-Nitrophenol; 4-Nitroaniline; Aniline; Anthraquinone; Azobenzene & Bromophenyl phenyl ether Removed ‘Standards’ from page 1	R Sharma A McCarthy
21	Sept 2020	Removal of Sample 22. Restructured Sample 25, which will now include BTEX as well a number of new compounds.	R Sharma A McCarthy
22	July 2021	Updated email address and UKAS logo	A Collins
23	Sep 2022	Added PCB (77) in 3C	R. Sharma S. Xystouris
24	July 2023	Added sample 31 for UBM BARGE Method	R. Sharma S. Xystouris

Notes: Where this document has been translated, the English version shall remain the definitive version

Scheme Aims and Organisation
The primary aim of the Contaminated Land Proficiency Testing Scheme (CONTEST) is to enable laboratories performing the analysis of soils to monitor their performance and compare it with that of their peers. CONTEST also aims to provide information to participants on technical issues and methodologies relating to testing of contaminated land.

The CONTEST scheme year operates from January to December. Further information about CONTEST, including test material availability, round despatch dates and reporting deadlines, are available on the current CONTEST application form and on the website www.lgcstandards.com.

The CONTEST scheme operates an advisory group made up of participants, industry experts and regulatory organisations. A list of advisory group members is available from LGC Standards on request. The advisory group meets twice a year and is concerned with all aspects of scheme development, operation and participant performance.

Test Materials
Details of test materials available in CONTEST are given in Appendix A. The test parameters are continually reviewed to ensure they meet the needs of current laboratory testing and regulatory requirements.

Test material batches are tested for homogeneity for at least one test parameter where deemed appropriate. Details of homogeneity tests performed and results are given in the CONTEST Scheme Reports.

Some aspects of the scheme, such as test material production, homogeneity testing and stability assessment, can from time to time be subcontracted. When subcontracting occurs, it is placed with a competent subcontractor and LGC is responsible for this work. The planning of the scheme, the evaluation of performance and the authorisation of the final report will never be subcontracted.

Statistical Analysis
Information on the statistics used in CONTEST can be found in the General Protocol and in the Scheme Report. Methods for determining assigned values and the values for SDPA used for individual samples are given in Appendix A

Methods
Methods are listed in Appendix A and PORTAL. Please select the most appropriate method from the list. If none of the methods are appropriate, then please report your method as ‘Other’ and record a brief description in the Comments Section in PORTAL.

Results and Reports
CONTEST results are returned through our electronic reporting software, PORTAL, full instructions for which are provided by email.

CONTEST reports will be available on the website within 10 working days of round closure. Participants will be emailed a link to the report when it is available.

APPENDIX A - Description of abbreviations used

Assigned Value (AV)

The assigned value may be derived in the following ways:

- From the robust mean (RMean). This is the median of participant results after the removal of test results that are inappropriate for statistical evaluation, e.g. miscalculations, transpositions and other gross errors. Generally, the assigned value will be set using results from all methods, unless the measurement is considered method-dependant, in which case the assigned value will be set by method as illustrated in the report tables.
  For some analytes, where there is a recognised reference method for that type of measurement, this may be used as the assigned value for a particular analyte i.e. it would be applied to results obtained by any method.

  Traceability: Assigned values which are derived from the participant results, or a sub-set of the results are not traceable to an international measurement standard. The uncertainty of assigned values derived in this way is estimated from the participant results, according to ISO 13528.

- From a formulation value (Formulation). This denotes the use of an assigned value derived from sample preparation details, where known and exact quantities of analyte have been used to prepare the sample.

  Traceability: Assigned values calculated from the formulation of the test sample are traceable, via an unbroken metrological traceability chain, to an international measurement standard. The measurement uncertainty of the assigned value is calculated using the contributions from each calibration in the traceability chain.

- From a qualitative formulation (Qual Form). This applies to qualitative tests where the assigned value is simply based on the presence/absence of the analyte in the test material.

  Traceability: Assigned values calculated from the qualitative formulation of the test sample are traceable to a certified reference standard or a microbiological reference strain.

- From expert labs (Expert). The assigned value for the analyte is provided by an ‘expert’ laboratory.

  Traceability: Assigned values provided by an ‘expert’ laboratory may be traceable to an international measurement standard, according to the laboratory and the method used. The uncertainty of measurement for an assigned value produced in this way will be provided by the laboratory undertaking the analysis. Details of traceability and the associated uncertainty will be provided in the report for the scheme/round.

Range

This indicates the concentration range at which the analyte may be present in the test material.

SDPA

SDPA represents the ‘standard deviation for proficiency assessment’ which is used to assess participant performance for the measurement of each analyte. This may be a fixed value (as stated), a percentage (%) of the assigned value or based on the robust standard deviation of the participant measurement results, either across all methods or by method depending on whether the measurement made is method dependent (see assigned value).

Units
This indicates the units used for the assessment of data. These are the units in which participants should report their results. For some analytes in some schemes participants may have a choice of which units to report their results, however, the units stipulated in this scheme description are the default units to which any results reported using allowable alternative results will be converted to.

DP
This indicates the number of decimal places to which participants should report their measurement results.

Group A **Metals**

Sample 1a
Supplied as: 1 x 8mL standard solution

Analyte	AV	Range	SDPA %	Units	DP
Barium	Formulation	2-12.5	5	mg/L	3
Beryllium	Formulation	0.02-0.15	5	mg/L	3
Cadmium	Formulation	0.02-0.2	5	mg/L	3
Chromium	Formulation	2-20	5	mg/L	2
Cobalt	Formulation	0.1-0.8	5	mg/L	3
Copper	Formulation	2-20	5	mg/L	2
Iron	Formulation	5-100	5	mg/L	2
Lead	Formulation	0.5-25	5	mg/L	2
Manganese	Formulation	0.5-15	5	mg/L	2
Molybdenum	Formulation	0.1-0.8	5	mg/L	3
Nickel	Formulation	0.5-2	5	mg/L	2
Thallium	Formulation	0.05-0.08	5	mg/L	4
Tin	Formulation	0.1-1	5	mg/L	4
Vanadium	Formulation	0.5-2	5	mg/L	3
Zinc	Formulation	1-25	5	mg/L	2

Sample 1b
Supplied as: 1 x 8mL standard solution

Analyte	AV	Range	SDPA %	Units	DP
Antimony	Formulation	0.05-0.5	10	mg/L	3
Arsenic	Formulation	0.2-5	10	mg/L	2
Selenium	Formulation	0.01-0.2	10	mg/L	3

Sample 1c
Supplied as: 1 x 8mL standard solution

Analyte	AV	Range	SDPA %	Units	DP
Mercury	Formulation	0.01-0.1	10	mg/L	3

Sample 2
Supplied as: 1 x 60mL solution of soil extract (prepared following ISO 11466 for the extraction of metals)

Analyte	AV	Range	SDPA %	Units	DP
Antimony	RMean	All	12.5	mg/L	3
Arsenic	RMean	All	12.5	mg/L	3
Barium	RMean	All	7.5	mg/L	3
Beryllium	RMean	All	7.5 ;10 if AV <1	mg/L	3
Cadmium	RMean	All	7.5; 10 if AV <1	mg/L	3
Chromium	RMean	All	7.5; 10 if AV <2.5	mg/L	2
Cobalt	RMean	All	7.5	mg/L	2
Copper	RMean	All	7.5	mg/L	2
Iron	RMean	All	7.5	mg/L	2
Lead	RMean	All	7.5	mg/L	2
Manganese	RMean	All	7.5	mg/L	2
Mercury	RMean	All	12.5 ;15 if AV <0.2	mg/L	3
Molybdenum	RMean	All	7.5; 10 if AV <0.1	mg/L	3
Nickel	RMean	All	7.5; 10 if AV <2.5	mg/L	2
Selenium	RMean	All	12.5; 15 if AV <0.2	mg/L	3
Thallium	RMean	All	7.5; 10 if AV <1	mg/L	4
Tin	RMean	All	7.5; 10 if AV <1	mg/L	3
Vanadium	RMean	All	7.5	mg/L	2
Zinc	RMean	All	7.5	mg/L	2

Sample 3a
Supplied as: 1 x approximately 30g prepared soil, ground to pass 200µm sieve

Determinand	AV	Range	SDPA%	Units	DP	Cut-off
Antimony	RMean	All	15	mg/kg	2	0.5
Arsenic	RMean	All	15	mg/kg	2	1
Barium	RMean	All	10	mg/kg	2	10
Beryllium	RMean	All	10	mg/kg	2	0.5
Cadmium	RMean	All	10	mg/kg	2	0.3
Chromium	RMean	All	10	mg/kg	2	10
Cobalt	RMean	All	10	mg/kg	2	10
Copper	RMean	All	10	mg/kg	2	10
Iron	RMean	All	10	mg/kg	0	10
Lead	RMean	All	10	mg/kg	2	10
Manganese	RMean	All	10	mg/kg	2	10

Determinand	AV	Range	SDPA%	Units	DP	Cut-off
Mercury	RMean	All	15	mg/kg	2	0.1
Molybdenum	RMean	All	10	mg/kg	2	1
Nickel	RMean	All	10	mg/kg	2	10
Selenium	RMean	All	15	mg/kg	2	0.3
Thallium	RMean	All	10	mg/kg	3	1
Tin	RMean	All	10	mg/kg	2	1
Vanadium	RMean	All	10	mg/kg	2	10
Zinc	RMean	All	10	mg/kg	2	10
Chromium (VI)	RMean	All	20	mg/kg	2	-

Measurable levels of all analytes may not be present in the soil sample for every round. When the consensus value (RMean) falls below the cut-off levels listed above, a z score is provided for information only and should be interpreted with care.

Sample 13
Supplied as: 1 x 60ml standard solution (containing potassium dichromate and another chromium salt)

Determinand	AV	Range	SDPA%	Units	DP
Chromium (VI)	Formulation	2-40	10	mg/L	2

Group B **Inorganics**

Sample 3b
Supplied as: 1 x approximately 150g prepared soil, ground to pass 200µm sieve

Determinand	AV	Range	SDPA% (fixed)	Units	DP	Cut-off
Ammonia	RMean	All	20	mgN/kg	2	-
Complex Cyanide	RMean	All	20	mgCN/kg	2	2.5
Free Cyanide	RMean	All	20	mgCN/kg	2	2.5
Total Cyanide	RMean	All	20	mgCN/kg	2	25
Dry Matter	RMean	All	(0.75)	%	2	-
Loss on Ignition	RMean	All	10	%	2	-
pH	RMean	All	(0.2)	pH Units	2	-
Thiocyanate	RMean	All	20	mgSCN/kg	2	5
Total sulfate	RMean	All	10	mgSO_4/kg	0	200
Easily liberated sulfide	RMean	All	20	mgS/kg	2	-
Water soluble boron	RMean	All	15	mg/kg	2	0.3
Water soluble chloride	RMean	All	15	mgCl/kg	2	-
Water soluble fluoride	RMean	All	15	mgF/kg	2	-
Water soluble sulfate	RMean	All	10	mgSO_4/kg	1	-
Total Sulfur	RMean	All	10	mgS/kg	2	-

Measurable levels of all analytes may not be present in the soil sample for every round. When the consensus value (RMean) falls below the cut-off levels listed above, a z score is provided for information only and should be interpreted with care.

Sample 6
Supplied as: 1 x 60ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Total cyanide	Formulation	4-15	10	mgCN/L	2

Sample 8
Supplied as: 1 x 60ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Total sulfate	Formulation	100-800	10	mgSO_4/L	2

Sample 10
Supplied as: 1 x 60ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Water soluble boron	Formulation	0.5-2.5	10	mg/L	2

Sample 12
Supplied as: 1 x 60ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Easily liberated sulfide	RMean	10-90	20	mgS/L	2

Sample 16
Supplied as: 1 x 60ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Thiocyanate	Formulation	1-5	10	mgSCN/L	2

Sample 17
Supplied as: 1 x 60ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Total fluoride	Formulation	1-2.5	10	mgF/L	2

Group C **Organics**

Sample 3c
Supplied as: 1 x approximately 70g prepared soil, ground to pass 200µm sieve
1 x 1ml phenol spiking solution

Determinand	AV	Range	SDPA%	Units	DP	Cut-off
Acenaphthene	RMean	All	20	mg/kg	2	0.5
Acenaphthylene	RMean	All	20	mg/kg	2	0.5
Anthracene	RMean	All	20	mg/kg	2	0.5
Benz(a)anthracene	RMean	All	20	mg/kg	2	0.5
Benzo(b)fluoranthene	RMean	All	20	mg/kg	2	0.5
Benzo(k)fluoranthene	RMean	All	20	mg/kg	2	0.5
Benzo(b/k)fluoranthene (sum)	RMean	All	20	mg/kg	2	0.5
Benzo(ghi)perylene	RMean	All	20	mg/kg	2	0.5
Benz(a)pyrene	RMean	All	20	mg/kg	2	0.5
Chrysene	RMean	All	20	mg/kg	2	0.5
Dibenz(ah)anthracene	RMean	All	20	mg/kg	2	0.5
Fluoranthene	RMean	All	20	mg/kg	2	0.5
Fluorene	RMean	All	20	mg/kg	2	0.5
Indeno(123-cd)pyrene	RMean	All	20	mg/kg	2	0.5
Naphthalene	RMean	All	20	mg/kg	2	0.5
Phenanthrene	RMean	All	20	mg/kg	2	0.5
Pyrene	RMean	All	20	mg/kg	2	0.5
Total PAH	RMean	All	20	mg/kg	2	-
Phenols	RMean	All	20	mg/kg	2	-
Cresols	RMean	All	20	mg/kg	2	-
Xylenols	RMean	All	20	mg/kg	2	-
Distillable phenolic substances	RMean	All	20	mg/kg phenol	2	-
PCB (28)	RMean	All	20	mg/kg	4	-
PCB (52)	RMean	All	20	mg/kg	4	-
PCB (77)	RMean	All	20	mg/kg	4	-
PCB (101)	RMean	All	20	mg/kg	4	-
PCB (118)	RMean	All	20	mg/kg	4	-
PCB (138)	RMean	All	20	mg/kg	4	-
PCB (153)	RMean	All	20	mg/kg	4	-
PCB (180)	RMean	All	20	mg/kg	4	-
Elemental sulfur	RMean	All	20	mg/kg	2	-
Total organic carbon	RMean	All	10	mg/kg	1	-
TPH (C_{10}-C_{40} inclusive)	RMean	All	20	mg/kg	0	-
TPH Aliphatic >C_{10}-C_{12}	RMean	All	20	mg/kg	1	-

Determinand	AV	Range	SDPA%	Units	DP	Cut-off
TPH Aliphatic >C_{12} -C_{16}	RMean	All	20	mg/kg	1	-
TPH Aliphatic >C_{16} -C_{21}	RMean	All	20	mg/kg	1	-
TPH Aliphatic >C_{21}-C_{35}	RMean	All	20	mg/kg	1	-
TPH Aliphatic >C_{35}-C_{40}	RMean	All	20	mg/kg	1	-
TPH Aromatic >EC_{10}-EC_{12}	RMean	All	20	mg/kg	1	-
TPH Aromatic >EC_{12}-EC_{16}	RMean	All	20	mg/kg	1	-
TPH Aromatic >EC_{16}-EC_{21}	RMean	All	20	mg/kg	1	-
TPH Aromatic >EC_{21}-EC_{35}	RMean	All	20	mg/kg	1	-
TPH Aromatic >EC_{35}-EC_{40}	RMean	All	20	mg/kg	1	-

Measurable levels of all analytes may not be present in the soil sample for every round. When the consensus values (RMean) of the individual PAHs in this sample fall below 1mg/kg, a z score is provided for information only and should be interpreted with care.

Sample 5
Supplied as: 1 x 2ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Acenaphthene	Formulation	1-4	10	mg/L	3
Acenaphthylene	Formulation	1-4	10	mg/L	3
Anthracene	Formulation	0.2-0.8	10	mg/L	3
Benz(a)anthracene	Formulation	0.2-0.8	10	mg/L	3
Benzo(b)fluoranthene	Formulation	0.4-1.5	10	mg/L	3
Benzo(k)fluoranthene	Formulation	0.4-1.5	10	mg/L	3
Benzo(b/k)fluoranthene (sum)	Formulation	0.8-3.0	10	mg/L	3
Benzo(ghi)perylene	Formulation	0.4-1.5	10	mg/L	3
Benz(a)pyrene	Formulation	0.2-0.8	10	mg/L	3
Chrysene	Formulation	0.2-0.8	10	mg/L	3
Dibenz(ah)anthracene	Formulation	0.4-1.5	10	mg/L	3
Fluoranthene	Formulation	0.4-1.5	10	mg/L	3
Fluorene	Formulation	0.4-1.5	10	mg/L	3
Indeno(123-cd)pyrene	Formulation	0.2-0.8	10	mg/L	3
Naphthalene	Formulation	1-4	10	mg/L	3
Phenanthrene	Formulation	0.2-0.8	10	mg/L	3
Pyrene	Formulation	0.2-0.8	10	mg/L	3

Sample 7a
Supplied as: 1 x 60ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Monohydric phenols	RMean	All	20	mg/L phenol	2

Determinand	AV	Range	SDPA%	Units	DP
(by distillation)					

Sample 7b
Supplied as: 2 x 2ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Total phenols (sum of phenol, cresols and xylenols)	Formulation	All	20	mg/L	2
Total Cresols	Formulation	4-12	20	mg/L	2
Total Xylenols	Formulation	2-6	20	mg/L	2
Phenol	Formulation	3-12	20	mg/L	2

Sample 11
Supplied as: 1 x 2ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
PCB (28)	Formulation	0.2-1	10	mg/L	2
PCB (52)	Formulation	0.2-1	10	mg/L	2
PCB (101)	Formulation	0.2-1	10	mg/L	2
PCB (118)	Formulation	0.2-1	10	mg/L	2
PCB (138)	Formulation	0.2-1	10	mg/L	2
PCB (153)	Formulation	0.2-1	10	mg/L	2
PCB (180)	Formulation	0.2-1	10	mg/L	2

Sample 14a
Supplied as: 1 x 2ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
TPH, Range C_{10} – C_{40} (inclusive)	RMean	5000-15000	10	mg/L	1

Sample 14b
Supplied as: 1 x 2ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
TPH, Aliphatic ≤C_6	RMean	50-200	10	mg/L	2
TPH, Aliphatic >C_6-C_8	RMean	50-200	10	mg/L	2
TPH, Aliphatic >C_8-C_{10}	RMean	50-200	10	mg/L	2
TPH, Aromatic C_6	RMean	50-200	10	mg/L	2
TPH, Aromatic >C_6-C_8	RMean	50-200	10	mg/L	2
TPH, Aromatic >C_8-C_{10}	RMean	50-200	10	mg/L	2

Sample 15
Supplied as: 1 x 2ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
Benzene	Formulation	20-80	10	µg/L	2
Toluene	Formulation	20-80	10	µg/L	2
Ethylbenzene	Formulation	20-80	10	µg/L	2
o-xylene	Formulation	50-150	10	µg/L	2
m + p-Xylenes	Formulation	50-200	10	µg/L	2

Sample 19
Supplied as: 1 x 2ml standard solution

Determinand	AV	Range	SDPA%	Units	DP
1,2,3-trichlorobenzene	Formulation	30-100	10	µg/L	2
1,2,4-trichlorobenzene	Formulation	30-100	10	µg/L	2
2-Chlorotoluene	Formulation	30-80	10	µg/L	2
1,2-Dichloroethane	Formulation	30-80	10	µg/L	2
1,2-Dichloroethene	Formulation	30-80	10	µg/L	2
Dichloromethane	Formulation	30-80	10	µg/L	2
Hexachloro-1,3-butadiene	Formulation	50 - 100	10	µg/L	2
1,1,1,2-Tetrachloroethane	Formulation	30-100	10	µg/L	2
1,1,1-Trichloroethane	Formulation	30-100	10	µg/L	2
Tetrachloromethane	Formulation	<100	10	µg/L	2
Trichloroethene	Formulation	30-100	10	µg/L	2
Trichloromethane	Formulation	30 - 100	10	µg/L	2

Sample 20
Supplied as: 2 x 10mL standard solutions (sample + blank)

Participants are provided with a solution containing six semi volatile organic compounds (SVOCs) for qualitative identification. This sample is designed to test the ability of a laboratory to identify SVOCs in an organic solvent. A list of potential contaminants is provided in Appendix B. In addition, participants will also be provided with a sample blank.

Group D **Leachate**

Sample 18
Supplied as: 1 x approximately 200g prepared soil, ground to pass 200µm sieve

Determinand	AV	Range	SDPA%	Units	DP
Antimony	RMean	All	10	mg/L	4
Arsenic	RMean	All	10	mg/L	4
Barium	RMean	All	10	mg/L	4
Cadmium	RMean	All	10	mg/L	4
Calcium	RMean	All	10	mg/L	2
Chromium	RMean	All	10	mg/L	4
Copper	RMean	All	10	mg/L	4
Iron	RMean	All	10	mg/L	4
Lead	RMean	All	10	mg/L	4
Magnesium	RMean	All	10	mg/L	2
Mercury	RMean	All	10	mg/L	4
Molybdenum	RMean	All	10	mg/L	4
Nickel	RMean	All	10	mg/L	4
Potassium	RMean	All	10	mg/L	2
Selenium	RMean	All	10	mg/L	4
Sodium	RMean	All	10	mg/L	2
Tin	RMean	All	10	mg/L	4
Zinc	RMean	All	10	mg/L	4
Sulfate	RMean	All	10	mgSO_4/L	2
Chloride	RMean	All	10	mgCl/L	2
Fluoride	RMean	All	10	mgF/L	3
Nitrate	RMean	All	10	mgNO_3/L	3
Boron	RMean	All	10	mg/L	3
Chromium (VI)	RMean	All	10	mg/L	4
Phosphate	RMean	All	10	mgP/L	3
Ammonia	RMean	All	10	mgN/L	3

Determinand	AV	Range	SDPA%	Units	DP
Free Cyanide	RMean	All	10	mgCN/L	3
Total Cyanide	RMean	All	10	mgCN/L	2
Thiocyanate	RMean	All	10	mgSCN/L	2
pH	RMean	All	10	pH units	2
Conductivity (20°C)	RMean	All	10	µS/cm	1
COD	RMean	All	10	mgO_2/L	2
TOC/DOC*	RMean	All	10	mg/L	2
Phenol Index	RMean	All	10	mg/L	2

*Total Organic Carbon and Dissolved Organic Carbon are regarded as the same determinand in the leachate sample due to the filtration carried out as part of the analysis procedure.

Measurable levels of all analytes may not be present in the soil sample for every round. When the consensus values (RMean) of the individual metals and inorganics in this sample fall below 0.1mg/L, a z score is provided for information only and should be interpreted with care.

Group E **WAC (Waste Acceptance Criteria)**
(In accordance with EN 12457-2:2002 - 10:1 single stage leaching test)

Sample 21 **Soil for Leaching Tests**
Supplied as: 1 x approximately 200g WAC material

Determinand	AV	Range	SDPA%	Units	DP
Dry Matter Content Ratio	RMean	All	10	%	2
Antimony	RMean	All	10	mg/kg	4
Arsenic	RMean	All	10	mg/kg	4
Barium	RMean	All	10	mg/kg	2
Cadmium	RMean	All	10	mg/kg	4
Chromium	RMean	All	10	mg/kg	3
Copper	RMean	All	10	mg/kg	3
Lead	RMean	All	10	mg/kg	3
Mercury	RMean	All	10	mg/kg	4
Molybdenum	RMean	All	10	mg/kg	3
Nickel	RMean	All	10	mg/kg	3
Selenium	RMean	All	10	mg/kg	3
Zinc	RMean	All	10	mg/kg	2
Sulfate	RMean	All	10	mgSO_4/kg	0
Chloride	RMean	All	10	mgCl/kg	0
Fluoride	RMean	All	10	mgF/kg	2
Phenol Index	RMean	All	10	mg/kg	2
DOC	RMean	All	10	mg/kg	1
Total Dissolved Solids	RMean	All	10	mg/kg	0

Sample 24** **Prepared Leachate**
Supplied as: 1 x approximately 1L leachate material, prepared in accordance with EN 12457-2:2002

Determinand	AV	Range	SDPA%	Units	DP
Antimony	RMean	All	10	mg/L	4
Arsenic	RMean	All	10	mg/L	4
Barium	RMean	All	10	mg/L	2
Cadmium	RMean	All	10	mg/L	4
Chromium	RMean	All	10	mg/L	3
Copper	RMean	All	10	mg/L	3
Lead	RMean	All	10	mg/L	3
Mercury	RMean	All	10	mg/L	4
Molybdenum	RMean	All	10	mg/L	2
Nickel	RMean	All	10	mg/L	3
Selenium	RMean	All	10	mg/L	3
Zinc	RMean	All	10	mg/L	2
Sulfate	RMean	All	10	mgSO_4/L	0
Chloride	RMean	All	10	mgCl/L	0
Fluoride	RMean	All	10	mgF/l	2
Phenol Index	RMean	All	10	mg/L	2
DOC	RMean	All	10	mg/L	1
Total Dissolved Solids	RMean	All	10	mg/L	0

**Please note that these samples are not currently within the scope of LGC's UKAS accreditation.

Other Contest PT samples

Sample 23** **Total Hydrocarbons in Soil**
Supplied as: 1 x 1mL standard solution
1 x 30g soil sample

Determinand	AV	Range	SDPA%	Units	DP
TPH, Aliphatic ≤C_6	RMean	1-50	20	mg/kg	2
TPH, Aliphatic >C_6-C_8	RMean	1-50	20	mg/kg	2
TPH, Aliphatic >C_8-C_{10}	RMean	1-50	20	mg/kg	2
TPH, Aromatic C_6	RMean	1-50	20	mg/kg	2
TPH, Aromatic >C_6-C_8	RMean	1-50	20	mg/kg	2
TPH, Aromatic >C_8-C_{10}	RMean	1-50	20	mg/kg	2

**Please note that these samples are not currently within the scope of LGC's UKAS accreditation.

Sample 25** **VOCs in Soil**
Supplied as: 1 x 1mL standard solution
1 x 30g soil sample

Determinand	CAS Number	AV	Range	SDPA%	Units	DP
Acetonitrile	75-05-8	Formulation	0.02-1	20	mg/kg	2
Benzene	71-43-2	Formulation	0.02-1	20	mg/kg	2
Bromobenzene	108-86-1	Formulation	0.02-1	20	mg/kg	2
Bromochloromethane	74-97-5	Formulation	0.02-1	20	mg/kg	2
Bromodichloromethane	75-27-4	Formulation	0.02-1	20	mg/kg	2
Bromoform	75-25-2	Formulation	0.02-1	20	mg/kg	2
Bromomethane	74-83-9	Formulation	0.02-1	20	mg/kg	2
n-Butylbenzene	104-51-8	Formulation	0.02-1	20	mg/kg	2
sec-Butylbenzene	135-98-8	Formulation	0.02-1	20	mg/kg	2
tert-Butylbenzene	98-06-6	Formulation	0.02-1	20	mg/kg	2
Carbon disulfide	75-15-0	Formulation	0.02-1	20	mg/kg	2
Carbon tetrachloride	56-23-5	Formulation	0.02-1	20	mg/kg	2
Chlorobenzene	108-90-7	Formulation	0.02-1	20	mg/kg	2
Chloroethane	75-00-3	Formulation	0.02-1	20	mg/kg	2
Chloroform	67-66-3	Formulation	0.02-1	20	mg/kg	2
Chloromethane	74-87-3	Formulation	0.02-1	20	mg/kg	2
2-Chlorotoluene	95-49-8	Formulation	0.02-1	20	mg/kg	2
4-Chlorotoluene	106-43-4	Formulation	0.02-1	20	mg/kg	2
cis-1,2-Dichloroethylene	156-59-2	Formulation	0.02-1	20	mg/kg	2
Dibromochloromethane	124-48-1	Formulation	0.02-1	20	mg/kg	2
1,2-Dibromo-3-chloropropane	96-12-8	Formulation	0.02-1	20	mg/kg	2
1,2-Dibromoethane	106-93-4	Formulation	0.02-1	20	mg/kg	2
Dibromomethane	74-95-3	Formulation	0.02-1	20	mg/kg	2
1,2-Dichlorobenzene	95-50-1	Formulation	0.02-1	20	mg/kg	2
1,3-Dichlorobenzene	541-73-1	Formulation	0.02-1	20	mg/kg	2
1,4-Dichlorobenzene	106-46-7	Formulation	0.02-1	20	mg/kg	2
Dichlorodifluoromethane	75-71-8	Formulation	0.02-1	20	mg/kg	2
1,1-Dichloroethane	75-34-3	Formulation	0.02-1	20	mg/kg	2
1,2-Dichloroethane	107-06-2	Formulation	0.02-1	20	mg/kg	2
1,1-Dichloroethylene	75-35-4	Formulation	0.02-1	20	mg/kg	2
trans-1,2-Dichloroethylene	156-60-5	Formulation	0.02-1	20	mg/kg	2
1,2-Dichloropropane	78-87-5	Formulation	0.02-1	20	mg/kg	2
1,3-Dichloropropane	142-28-9	Formulation	0.02-1	20	mg/kg	2
2,2-Dichloropropane	594-20-7	Formulation	0.02-1	20	mg/kg	2
1,1-Dichloropropylene	563-58-6	Formulation	0.02-1	20	mg/kg	2
cis-1,3-Dichloropropylene	10061-01-5	Formulation	0.02-1	20	mg/kg	2
trans-1,3-Dichloropropylene	10061-02-6	Formulation	0.02-1	20	mg/kg	2

Determinand	CAS Number	AV	Range	SDPA%	Units	DP
Ethylbenzene	100-41-4	Formulation	0.02-1	20	mg/kg	2
Hexachlorobutadiene	87-68-3	Formulation	0.02-1	20	mg/kg	2
Hexachloroethane	67-72-1	Formulation	0.02-1	20	mg/kg	2
Isopropylbenzene	98-82-8	Formulation	0.02-1	20	mg/kg	2
4-Isopropyltoluene	99-87-6	Formulation	0.02-1	20	mg/kg	2
Methylene chloride	75-09-2	Formulation	0.02-1	20	mg/kg	2
Methyl t-butyl ether	1634-04-4	Formulation	0.02-1	20	mg/kg	2
m-Xylene	108-38-3	Formulation	0.01-1	20	mg/kg	2
m&p-Xylene	-	Formulation	0.02-2	20	mg/kg	2
Naphthalene	91-20-3	Formulation	0.02-1	20	mg/kg	2
Nitrobenzene	98-95-3	Formulation	0.02-1	20	mg/kg	2
n-Propylbenzene	103-65-1	Formulation	0.02-1	20	mg/kg	2
o-Xylene	95-47-6	Formulation	0.02-1	20	mg/kg	2
p-Xylene	106-42-3	Formulation	0.02-1	20	mg/kg	2
Styrene	100-42-5	Formulation	0.02-1	20	mg/kg	2
1,1,1,2-Tetrachloroethane	630-20-6	Formulation	0.02-1	20	mg/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	Formulation	0.02-1	20	mg/kg	2
Tetrachloroethylene	127-18-4	Formulation	0.02-1	20	mg/kg	2
Toluene	108-88-3	Formulation	0.02-1	20	mg/kg	2
Total Xylenes	1330-20-7	Formulation	0.04-4	20	mg/kg	2
1,2,3-Trichlorobenzene	87-61-6	Formulation	0.02-1	20	mg/kg	2
1,2,4-Trichlorobenzene	120-82-1	Formulation	0.02-1	20	mg/kg	2
1,1,1-Trichloroethane	71-55-6	Formulation	0.02-1	20	mg/kg	2
1,1,2-Trichloroethane	79-00-5	Formulation	0.02-1	20	mg/kg	2
Trichloroethylene	79-01-6	Formulation	0.02-1	20	mg/kg	2
Trichlorofluoromethane	75-69-4	Formulation	0.02-1	20	mg/kg	2
1,2,3-Trichloropropane	96-18-4	Formulation	0.02-1	20	mg/kg	2

**Please note that these samples are not currently within the scope of LGC’s UKAS accreditation.

Sample 26** **Organochlorine Pesticides in Soil**
Supplied as: 1 x 1mL standard solution
1 x 30g soil sample

Determinand	AV	Range	SDPA%	Units	DP
Endrin	Formulation	0.05-5	20	mg/kg	2
Dieldrin	Formulation	0.05-5	20	mg/kg	2
Aldrin	Formulation	0.05-5	20	mg/kg	2
p,p'-DDT	Formulation	0.05-5	20	mg/kg	2
o,p-DDT	Formulation	0.05-5	20	mg/kg	2
p,p'-DDE	Formulation	0.05-5	20	mg/kg	2
p,p'-DDD	Formulation	0.05-5	20	mg/kg	2
Alpha Hexachlorocyclohexane	Formulation	0.05-5	20	mg/kg	2
Beta Hexachlorocyclohexane	Formulation	0.05-5	20	mg/kg	2
Delta Hexachlorocyclohexane	Formulation	0.05-5	20	mg/kg	2
Lindane (Gamma HCH)	Formulation	0.05-5	20	mg/kg	2
Trifluralin	Formulation	0.05-5	20	mg/kg	2
Alpha Endosulphan	Formulation	0.05-5	20	mg/kg	2
Beta Endosulphan	Formulation	0.05-5	20	mg/kg	2
Hexachlorobenzene	Formulation	0.05-5	20	mg/kg	2
Heptachlor	Formulation	0.05-5	20	mg/kg	2
Heptachlor epoxide	Formulation	0.05-5	20	mg/kg	2
Pentachlorobenzene	Formulation	0.05-5	20	mg/kg	2

**Please note that these samples are not currently within the scope of LGC's UKAS accreditation.

Sample 27** **LOI Soil for HMRC Requirements**
Supplied as: 1 x approximately 1kg LOI material

Determinand	AV	Range	SDPA%	Units	DP
Loss on Ignition at 440°C	RMean	5-20	10	%	2

**Please note that this sample is not currently within the scope of LGC's UKAS accreditation.

Sample 28** **Soil Texture**
Supplied as: 1 x 500g soil

The intent of this sample is to test the ability of the laboratories in identifying the type of soil provided i.e. sand, clay, silt. Results returned will be identified as satisfactory or unsatisfactory.
**Please note that this sample is not currently within the scope of LGC's UKAS accreditation.

Sample 29** **Incinerator Bottom Ash**
Supplied as: 1 x approximately 200g IBA material

Determinand	AV	Range	SDPA%	Units	DP
Arsenic	RMean	All	20	mg/kg	3
Barium	RMean	All	20	mg/kg	2
Cadmium	RMean	All	20	mg/kg	4
Copper	RMean	All	20	mg/kg	3
Iron	RMean	All	20	mg/kg	3
Lead	RMean	All	20	mg/kg	3
Magnesium	RMean	All	20	mg/kg	2
Manganese	RMean	All	20	mg/kg	3
Nickel	RMean	All	20	mg/kg	3
Potassium	RMean	All	20	mg/kg	2
Sodium	RMean	All	20	mg/kg	2
Total Chromium	RMean	All	20	mg/kg	2
Zinc	RMean	All	20	mg/kg	2
pH	RMean	All	(0.2)	pH Units	2
Alkali reserve	RMean	All	20	mg/kg	2

**Please note that this sample is not currently within the scope of LGC's UKAS accreditation.

Sample 30** **Organophosphorus Pesticides in Soil**
Supplied as: 1 x 1mL standard solution
1 x 30g soil sample

Determinand	AV	Range	SDPA%	Units	DP
Azinphos-methyl	Formulation	0.05-5	20	mg/kg	2
Azinphos-ethyl	Formulation	0.05-5	20	mg/kg	2
Dichlorvos	Formulation	0.05-5	20	mg/kg	2
Fenitrothion	Formulation	0.05-5	20	mg/kg	2
Malathion	Formulation	0.05-5	20	mg/kg	2
Mevinphos	Formulation	0.05-5	20	mg/kg	2
Chlorfenvinphos	Formulation	0.05-5	20	mg/kg	2
Diazinon	Formulation	0.05-5	20	mg/kg	2
Fenthion	Formulation	0.05-5	20	mg/kg	2
Parathion-ethyl	Formulation	0.05-5	20	mg/kg	2
Parathion-methyl	Formulation	0.05-5	20	mg/kg	2
Chlorpyrifos	Formulation	0.05-5	20	mg/kg	2
Cypermethrin	Formulation	0.05-5	20	mg/kg	2

Sample 31** **UBM BioAccessibility Research Group of Europe (UBM BARGE method)**
Supplied as: 5 g of soil

Determinand	AV	Range	SDPA%	Units	DP
Arsenic	RMean	All	Robust SD	mg/kg	3
Cadmium	RMean	All	Robust SD	mg/kg	3
Lead	RMean	All	Robust SD	mg/kg	3
Antimony	RMean	All	Robust SD	mg/kg	3

(Element concentration to be expressed as mg of bioaccessible contaminant per kg of solid matrix)

**Please note that these samples are not currently within the scope of LGC's UKAS accreditation.

APPENDIX B – Sample 20 potential SVOCs

Chemical	CAS Number
1,2,4,5-Tetrachlorobenzene	95-94-3
1,2,4-Trichlorobenzene	120-82-1
1,3-Dinitrobenzene	99-65-0
2,3,4,6-Tetrachlorophenol	58-90-2
2,4,5-Trichlorophenol	95-95-4
2,4,6-Trichlorophenol	88-06-2
2,4-Dichlorophenol	120-83-2
2,4-Dinitrotoluene	121-14-2
2,6-Dinitrotoluene	606-20-2
2-Acetylaminofluorene	53-96-3
2-Chloronaphthalene	91-58-7
2-Chlorophenol	95-57-8
2-Methylnaphthalene	91-57-6
2-Nitroaniline	88-74-4
3-Methylcholanthrene	56-49-5
2-Nitrophenol	88-75-5
4-Bromophenyl phenyl ether	101-55-3
4-Chloro-3-methylphenol	59-50-7
4-Chlorophenyl phenyl ether	7005-72-3
4-Nitroaniline	100-01-6
4-Nitrophenol	100-02-7
5-Nitro-o-toluidine	99-55-8
Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Acetophenone	98-86-2
Aniline	62-53-3
Anthracene	120-12-7
Anthraquinone	84-65-1
Azobenzene	103-33-3
Benzo(a)anthracene	56-55-3
Benzo(a)pyrene	50-32-8
Benzo(b)fluoranthene	205-99-2
Benzo(g,h,i)perylene	191-24-2
Benzo(k)fluoranthene	207-08-9
Benzyl alcohol	100-51-6
Bis(2-chloroethoxy)methane	111-91-1
Bis(2-chloroethyl)ether	111-44-4
Bis(2-chloroisopropyl)ether	108-60-1
Carbazole	86-74-8

Chemical	CAS Number
Bis(2-ethylhexyl)phthalate	117-81-7
Bromophenyl phenyl ether	101-55-3
Butyl benzyl phthalate	85-68-7
Chrysene	218-01-9
Dibenz(a,h)anthracene	53-70-3
Dibenzofuran	132-64-9
Diethyl phthalate	84-66-2
Dimethyl phthalate	131-11-3
Dimethylaminoazobenzene	60-11-7
Di-n-butyl phthalate	84-74-2
Ethyl methanesulfonate	62-50-0
Fluoranthene	206-44-0
Fluorene	86-73-7
Hexachlorobenzene	118-74-1
Hexachlorobutadiene	87-68-3
Hexachloroethane	67-72-1
Hexachloropropene	1888-71-7
Indeno(1,2,3-cd)pyrene	193-39-5
Isophorone	78-59-1
Isosafrole	120-58-1
m-Cresol	108-39-4
Naphthalene	91-20-3
Nitrobenzene	98-95-3
N-Nitrosodiethylamine	55-18-5
N-Nitrosodi-n-butylamine	924-16-3
N-Nitrosodi-n-propylamine	621-64-7
N-Nitrosomethylethylamine	10595-95-6
N-Nitrosomorpholine	59-89-2
N-Nitrosopiperidine	100-75-4
N-Nitrosopyrrolidine	930-55-2
o-Cresol	95-48-7
p-Cresol	106-44-5
Pentachlorobenzene	608-93-5
Pentachloronitrobenzene	82-68-8
Phenacetin	62-44-2
Phenanthrene	85-01-8
Phenol	108-95-2
Pyrene	129-00-0
Safrole	94-59-7