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Socotec
Geotechnical House
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Deeside
Flintshire
CH5 2NY

Attention: Chris Evans

CERTIFICATE OF ANALYSIS

Date of report Generation: 13 January 2020
Customer: Socotec
Sample Delivery Group (SDG): 191219-119
Your Reference: R9072
Location: UPM Shotton Papr Mill
Report No: 537013

This report has been revised and directly supersedes 536422 in its entirety.

We received 1 sample on Thursday December 19, 2019 and 1 of these samples were scheduled for analysis which was completed on Monday January 13, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG:	191219-119	Client Reference:	R9072	Report Number:	537013
Location:	UPM Shotton Papr Mill	Order Number:	R97843	Superseded Report:	536422

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
21409670	W1 R9072			19/12/2019

Maximum Sample/Coolbox Temperature (°C) :

8.2

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.



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SDG: 191219-119
Location: UPM Shotton Papr Mill

Client Reference: R9072
Order Number: R97843

Report Number: 537013
Superseded Report: 536422

Results Legend

- X Test
- N No Determination Possible

Sample Types -

- S - Soil/Solid
- UNS - Unspecified Solid
- GW - Ground Water
- SW - Surface Water
- LE - Land Leachate
- PL - Prepared Leachate
- PR - Process Water
- SA - Saline Water
- TE - Trade Effluent
- TS - Treated Sewage
- US - Untreated Sewage
- RE - Recreational Water
- DW - Drinking Water Non-regulatory
- UNL - Unspecified Liquid
- SL - Sludge
- G - Gas
- OTH - Other

Lab Sample No(s)	21409670				
Customer Sample Reference	W1 R9072				
AGS Reference					
Depth (m)					
Container	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center;">0.5l glass bottle (ALE227)</td> <td style="width: 25%; text-align: center;">1000ml glass bottle (ALE220)</td> <td style="width: 25%; text-align: center;">HNO3 Filtered (ALE204)</td> <td style="width: 25%; text-align: center;">Vial (ALE297)</td> </tr> </table>	0.5l glass bottle (ALE227)	1000ml glass bottle (ALE220)	HNO3 Filtered (ALE204)	Vial (ALE297)
0.5l glass bottle (ALE227)	1000ml glass bottle (ALE220)	HNO3 Filtered (ALE204)	Vial (ALE297)		
Sample Type	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center;">SW</td> <td style="width: 25%; text-align: center;">SW</td> <td style="width: 25%; text-align: center;">SW</td> <td style="width: 25%; text-align: center;">SW</td> </tr> </table>	SW	SW	SW	SW
SW	SW	SW	SW		

Analyte	All	NDPs: 0 Tests: 1	0.5l glass bottle (ALE227)	1000ml glass bottle (ALE220)	HNO3 Filtered (ALE204)	Vial (ALE297)
4 - Bromodiphenyl ether (BDE-3)(W)*	All	NDPs: 0 Tests: 1	X			
Chloralkanes C10 - C13 by GCMS	All	NDPs: 0 Tests: 1	X			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1			X	
Mercury Dissolved	All	NDPs: 0 Tests: 1			X	
Organotins in Aqueous Samples	All	NDPs: 0 Tests: 1	X			
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 1	X			
Pesticides (Suite I) by GCMS	All	NDPs: 0 Tests: 1	X			
Pesticides (Suite II) by GCMS	All	NDPs: 0 Tests: 1	X			
Pesticides (Suite III) by GCMS	All	NDPs: 0 Tests: 1	X			
Phenols and ethoxylates in Liquids	All	NDPs: 0 Tests: 1	X			
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 1	X			
VOC MS (W)	All	NDPs: 0 Tests: 1				X



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Component	LOD/Units	Method																																																																																																															
4 - Bromodiphenyl Ether (BDE-3)	<0.1 µg/l	SUB	<0.1																																																																																																														
Chloroalkanes (C10-C13)*	<0.4 µg/l	SUB	<0.4																																																																																																														
Cadmium (diss.filt)	<0.08 µg/l	TM152	1.31	#																																																																																																													
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01																																																																																																														
Dibutyl tin	<5 ng/l	TM328	<5																																																																																																														
Tributyl tin	<1 ng/l	TM328	<1																																																																																																														
Tetrabutyl tin	<2 ng/l	TM328	<2																																																																																																														
Triphenyl tin	<1 ng/l	TM328	<1																																																																																																														
Surrogate	%	TM328	91																																																																																																														
Trifluralin	<0.01 µg/l	TM343	<0.01																																																																																																														
alpha-HCH	<0.01 µg/l	TM343	<0.01																																																																																																														
gamma-HCH (Lindane)	<0.01 µg/l	TM343	<0.01																																																																																																														
Heptachlor	<0.01 µg/l	TM343	<0.02																																																																																																														
Aldrin	<0.01 µg/l	TM343	<0.02																																																																																																														
beta-HCH	<0.01 µg/l	TM343	<0.01																																																																																																														
Isodrin	<0.01 µg/l	TM343	<0.01																																																																																																														
delta-HCH	<0.01 µg/l	TM343	<0.01																																																																																																														
Heptachlor epoxide	<0.01 µg/l	TM343	<0.01																																																																																																														
o,p'-DDE	<0.01 µg/l	TM343	<0.01																																																																																																														
Endosulphan I	<0.01 µg/l	TM343	<0.01																																																																																																														
trans-Chlordane	<0.01 µg/l	TM343	<0.01																																																																																																														
cis-Chlordane	<0.01 µg/l	TM343	<0.01																																																																																																														
p,p'-DDE	<0.01 µg/l	TM343	<0.01																																																																																																														
Dieldrin	<0.01 µg/l	TM343	<0.01																																																																																																														
o,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01																																																																																																														
Endrin	<0.01 µg/l	TM343	<0.02																																																																																																														
o,p'-DDT	<0.01 µg/l	TM343	<0.03																																																																																																														
p,p'-DDD (TDE)	<0.01 µg/l	TM343	<0.01																																																																																																														
Endosulphan II	<0.02 µg/l	TM343	<0.02																																																																																																														
p,p'-DDT	<0.01 µg/l	TM343	<0.04																																																																																																														
o,p'-Methoxychlor	<0.01 µg/l	TM343	<0.03																																																																																																														
p,p'-Methoxychlor	<0.01 µg/l	TM343	<0.04																																																																																																														
Endosulphan Sulphate	<0.02 µg/l	TM343	<0.04																																																																																																														



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SDG:	191219-119	Client Reference:	R9072
Location:	UPM Shotton Papr Mill	Order Number:	R97843
		Report Number:	537013
		Superseded Report:	536422

Component	LOD/Units	Method	Customer Sample Ref.	Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received	SDG Ref	Lab Sample No.(s)	AGS Reference
Permethrin I	<0.01 µg/l	TM343	W1 R9072		Surface Water (SW)	19/12/2019	13:45:00	19/12/2019	191219-119	21409670	
Permethrin II	<0.01 µg/l	TM343									
1,3,5-Trichlorobenzene	<0.01 µg/l	TM344									
Hexachlorobutadiene	<0.01 µg/l	TM344									
1,2,4-Trichlorobenzene	<0.01 µg/l	TM344									
1,2,3-Trichlorobenzene	<0.01 µg/l	TM344									
Dichlorvos	<0.01 µg/l	TM344									
Dichlobenil	<0.01 µg/l	TM344									
Mevinphos	<0.01 µg/l	TM344									
Tecnazene	<0.01 µg/l	TM344									
Hexachlorobenzene	<0.01 µg/l	TM344									
Demeton-S-methyl	<0.01 µg/l	TM344									
Phorate	<0.01 µg/l	TM344									
Diazinon	<0.01 µg/l	TM344									
Triallate	<0.01 µg/l	TM344									
Atrazine	<0.01 µg/l	TM344									
Simazine	<0.01 µg/l	TM344									
Disulfoton	<0.01 µg/l	TM344									
Propetamphos	<0.01 µg/l	TM344									
Chlorpyrifos-methyl	<0.01 µg/l	TM344									
Dimethoate	<0.01 µg/l	TM344									
Pirimiphos-methyl	<0.01 µg/l	TM344									
Chlorpyrifos	<0.01 µg/l	TM344									
Methyl Parathion	<0.01 µg/l	TM344									
Malathion	<0.01 µg/l	TM344									
Fenthion	<0.01 µg/l	TM344									
Fenitrothion	<0.01 µg/l	TM344									
Triadimefon	<0.01 µg/l	TM344									
Pendimethalin	<0.01 µg/l	TM344									
Parathion	<0.01 µg/l	TM344									
Chlorfenvinphos	<0.01 µg/l	TM344									
trans-Chlordane	<0.01 µg/l	TM344									



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Client Reference: R9072
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#	ISO17025 accredited.	Customer Sample Ref.	W1 R9072			
Results Legend						
M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. * Subcontracted - refer to subcontractor report for accreditation status. ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery (F) Trigger breach confirmed 1-3*@\$@ Sample deviation (see appendix)						
		Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received
		SDG Ref	Lab Sample No.(s)	AGS Reference		
Component	LOD/Units	Method				
cis-Chlordane	<0.01 µg/l	TM344	<0.01			
Ethion	<0.01 µg/l	TM344	<0.01			
Carbophenothion	<0.01 µg/l	TM344	<0.01			
Triazophos	<0.01 µg/l	TM344	<0.01			
Phosalone	<0.01 µg/l	TM344	<0.01			
Azinphos methyl	<0.02 µg/l	TM344	<0.02			
Azinphos ethyl	<0.02 µg/l	TM344	<0.02			
Etridiazole	<0.01 µg/l	TM345	<0.01			
Pentachlorobenzene	<0.01 µg/l	TM345	<0.01			
Tributylphosphate	<0.01 µg/l	TM345	<0.01			
Propachlor	<0.01 µg/l	TM345	<0.01			
Quintozene (PCNB)	<0.01 µg/l	TM345	<0.01			
Omethoate	<0.01 µg/l	TM345	<0.01			
Propazine	<0.01 µg/l	TM345	<0.01			
Propyzamide	<0.01 µg/l	TM345	<0.01			
Alachlor	<0.01 µg/l	TM345	<0.01			
Prometryn	<0.01 µg/l	TM345	<0.01			
Telodrin	<0.01 µg/l	TM345	<0.01			
Terbutryn	<0.01 µg/l	TM345	<0.01			
Chlorothalonil	<0.01 µg/l	TM345	<0.05			
Etrimphos	<0.01 µg/l	TM345	<0.01			
Metazachlor	<0.01 µg/l	TM345	<0.01			
Cyanazine	<0.01 µg/l	TM345	<0.01			
Trietazine	<0.01 µg/l	TM345	<0.01			
Coumaphos	<0.01 µg/l	TM345	<0.01			
Phosphamidon I	<0.01 µg/l	TM345	<0.01			
Phosphamidon II	<0.01 µg/l	TM345	<0.01			
4-Nonylphenol monoethoxylate (SE)	<0.1 µg/l	TM357	<0.1			
4-Nonylphenol diethoxylate (SE)	<0.1 µg/l	TM357	<0.1			
4-Octylphenol (sum of isomers) (SE)	<0.1 µg/l	TM357	<0.1			
4-Nonylphenol (sum of isomers) (SE)	<0.1 µg/l	TM357	<0.1			



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SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	W1 R9072							
# ISO17025 accredited.										
M mCERTS accredited.										
aq Aqueous / settled sample.										
dis.filt Dissolved / filtered sample.										
tot.unfilt Total / unfiltered sample.										
* Subcontracted - refer to subcontractor report for accreditation status.										
** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery										
(F) Trigger breach confirmed										
1-3*5@ Sample deviation (see appendix)										
Component	LOD/Units	Method	Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received	SDG Ref	Lab Sample No.(s)	AGS Reference
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176		Surface Water (SW)	19/12/2019	13:45:00	19/12/2019	191219-119	21409670	
										<2
										◆ #
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176								<2
										◆ #
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176								<2
										◆ #
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176								<2
										◆ #
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176								<2
										◆ #
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176								<2
										◆ #
2,4-Dichlorophenol (aq)	<1 µg/l	TM176								<2
										◆ #
2,4-Dimethylphenol (aq)	<1 µg/l	TM176								<2
										◆ #
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176								<2
										◆ #
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176								<2
										◆ #
2-Chloronaphthalene (aq)	<1 µg/l	TM176								<2
										◆ #
2-Chlorophenol (aq)	<1 µg/l	TM176								<2
										◆ #
2-Methylnaphthalene (aq)	<1 µg/l	TM176								<2
										◆ #
2-Methylphenol (aq)	<1 µg/l	TM176								<2
										◆ #
2-Nitroaniline (aq)	<1 µg/l	TM176								<2
										◆ #
2-Nitrophenol (aq)	<1 µg/l	TM176								<2
										◆ #
3-Nitroaniline (aq)	<1 µg/l	TM176								<2
										◆ #
4-Bromophenylphenylether (aq)	<1 µg/l	TM176								<2
										◆ #
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176								<2
										◆ #
4-Chloroaniline (aq)	<1 µg/l	TM176								<2
										◆ #
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176								<2
										◆ #
4-Methylphenol (aq)	<1 µg/l	TM176								<2
										◆ #
4-Nitroaniline (aq)	<1 µg/l	TM176								<2
										◆ #
4-Nitrophenol (aq)	<1 µg/l	TM176								<2
										◆ #
Azobenzene (aq)	<1 µg/l	TM176								<2
										◆ #
Acenaphthylene (aq)	<1 µg/l	TM176								<2
										◆ #
Acenaphthene (aq)	<1 µg/l	TM176								<2
										◆ #
Anthracene (aq)	<1 µg/l	TM176								<2
										◆ #
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176								<2
										◆ #
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176								<2
										◆ #
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176								<4
										◆ #
Butylbenzyl phthalate (aq)	<1 µg/l	TM176								<2
										◆ #
Benzo(a)anthracene (aq)	<1 µg/l	TM176								<2
										◆ #



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SVOC MS (W) - Aqueous

#	M	aq	diss.filt	tot.unfilt	-	..	(F)	1-3*5@	Customer Sample Ref.	Depth (m)	Sample Type	Date Sampled	Sample Time	Date Received	SDG Ref	Lab Sample No.(s)	AGS Reference
Results Legend # ISO17025 accredited. M mCERTS accredited. aq Aqueous / settled sample. diss.filt Dissolved / filtered sample. tot.unfilt Total / unfiltered sample. - Subcontracted - refer to subcontractor report for accreditation status. .. % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery. (F) Trigger breach confirmed. 1-3*5@ Sample deviation (see appendix)									W1 R9072								
Component	LOD/Units	Method															
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<2	◆ #													
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<2	◆ #													
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<2	◆ #													
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<2	◆ #													
Carbazole (aq)	<1 µg/l	TM176	<2	◆ #													
Chrysene (aq)	<1 µg/l	TM176	<2	◆ #													
Dibenzofuran (aq)	<1 µg/l	TM176	<2	◆ #													
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<2	◆ #													
Diethyl phthalate (aq)	<1 µg/l	TM176	<2	◆ #													
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<2	◆ #													
Dimethyl phthalate (aq)	<1 µg/l	TM176	<2	◆ #													
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<10	◆ #													
Fluoranthene (aq)	<1 µg/l	TM176	<2	◆ #													
Fluorene (aq)	<1 µg/l	TM176	<2	◆ #													
Hexachlorobenzene (aq)	<1 µg/l	TM176	<2	◆ #													
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<2	◆ #													
Pentachlorophenol (aq)	<1 µg/l	TM176	<2														
Phenol (aq)	<1 µg/l	TM176	<2														
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<2	◆ #													
Hexachloroethane (aq)	<1 µg/l	TM176	<2	◆ #													
Nitrobenzene (aq)	<1 µg/l	TM176	<2	◆ #													
Naphthalene (aq)	<1 µg/l	TM176	<2	◆ #													
Isophorone (aq)	<1 µg/l	TM176	<2	◆ #													
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<2														
Phenanthrene (aq)	<1 µg/l	TM176	<2	◆ #													
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<2	◆ #													
Pyrene (aq)	<1 µg/l	TM176	<2	◆ #													



CERTIFICATE OF ANALYSIS

Validated

SDG:	191219-119	Client Reference:	R9072	Report Number:	537013
Location:	UPM Shotton Papr Mill	Order Number:	R97843	Superseded Report:	536422

VOC MS (W)

#	ISO17025 accredited.	Customer Sample Ref.	W1 R9072			
M	mCERTS accredited.	Depth (m)	Surface Water (SW)			
aq	Aqueous / settled sample.	Sample Type				
dis.filt	Dissolved / filtered sample.	Date Sampled	19/12/2019			
tot.unfilt	Total / unfiltered sample.	Sample Time	13:45:00			
*	Subcontracted - refer to subcontractor report for accreditation status.	Date Received	19/12/2019			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery	SDG Ref	191219-119			
(F)	Trigger breach confirmed	Lab Sample No.(s)	21409670			
1-3*\$@	Sample deviation (see appendix)	AGS Reference				
Component	LOD/Units	Method				
Dibromofluoromethane**	%	TM208	112			
Toluene-d8**	%	TM208	99.7			
4-Bromofluorobenzene**	%	TM208	99.4			
Dichlorodifluoromethane	<1 µg/l	TM208	<1			
Chloromethane	<1 µg/l	TM208	<1	#		
Vinyl chloride	<1 µg/l	TM208	<1	#		
Bromomethane	<1 µg/l	TM208	<1	#		
Chloroethane	<1 µg/l	TM208	<1	#		
Trichlorofluoromethane	<1 µg/l	TM208	<1	#		
1,1-Dichloroethene	<1 µg/l	TM208	<1	#		
Carbon disulphide	<1 µg/l	TM208	<1	#		
Dichloromethane	<3 µg/l	TM208	<3	#		
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	#		
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	#		
1,1-Dichloroethane	<1 µg/l	TM208	<1	#		
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	#		
2,2-Dichloropropane	<1 µg/l	TM208	<1	#		
Bromochloromethane	<1 µg/l	TM208	<1	#		
Chloroform	<1 µg/l	TM208	<1	#		
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	#		
1,1-Dichloropropene	<1 µg/l	TM208	<1	#		
Carbontetrachloride	<1 µg/l	TM208	<1	#		
1,2-Dichloroethane	<1 µg/l	TM208	<1	#		
Benzene	<1 µg/l	TM208	<1	#		
Trichloroethene	<1 µg/l	TM208	<1	#		
1,2-Dichloropropane	<1 µg/l	TM208	<1	#		
Dibromomethane	<1 µg/l	TM208	<1	#		
Bromodichloromethane	<1 µg/l	TM208	<1	#		
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	#		
Toluene	<1 µg/l	TM208	<1	#		
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	#		
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	#		
1,3-Dichloropropane	<1 µg/l	TM208	<1	#		



CERTIFICATE OF ANALYSIS

Validated

SDG:	191219-119	Client Reference:	R9072	Report Number:	537013
Location:	UPM Shotton Papr Mill	Order Number:	R97843	Superseded Report:	536422

VOC MS (W)

Component	LOD/Units	Method	Results	#			
Tetrachloroethene	<1 µg/l	TM208	<1	#			
Dibromochloromethane	<1 µg/l	TM208	<1	#			
1,2-Dibromoethane	<1 µg/l	TM208	<1	#			
Chlorobenzene	<1 µg/l	TM208	<1	#			
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
Ethylbenzene	<1 µg/l	TM208	<1	#			
m,p-Xylene	<1 µg/l	TM208	<1	#			
o-Xylene	<1 µg/l	TM208	<1	#			
Styrene	<1 µg/l	TM208	<1	#			
Bromoform	<1 µg/l	TM208	<1	#			
Isopropylbenzene	<1 µg/l	TM208	<1	#			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	#			
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#			
Bromobenzene	<1 µg/l	TM208	<1	#			
Propylbenzene	<1 µg/l	TM208	<1	#			
2-Chlorotoluene	<1 µg/l	TM208	<1	#			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	#			
4-Chlorotoluene	<1 µg/l	TM208	<1	#			
tert-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	#			
sec-Butylbenzene	<1 µg/l	TM208	<1	#			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	#			
n-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	#			
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#			
Hexachlorobutadiene	<1 µg/l	TM208	<1	#			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#			
Naphthalene	<1 µg/l	TM208	<1	#			
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 191219-119
Location: UPM Shotton Papr Mill

Client Reference: R9072
Order Number: R97843

Report Number: 537013
Superseded Report: 536422

Table of Results - Appendix

Method No	Reference	Description
SUB		Subcontracted Test
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM328		
TM343	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of Selected Pesticides (Suite I) in Liquids by GCMS
TM344	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite II) by GCMS
TM345	EPA 8270D - Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of selected pesticides (Suite III) by GCMS
TM357		Determination of Specific Phenols and their Ethoxylates in Liquids by GC/MS/MS

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

Validated

SDG: 191219-119
Location: UPM Shotton Papr Mill

Client Reference: R9072
Order Number: R97843

Report Number: 537013
Superseded Report: 536422

Test Completion Dates

Lab Sample No(s)	21409670
Customer Sample Ref.	W1 R9072
AGS Ref.	
Depth	
Type	Surface Water

4 - Bromodiphenyl ether (BDE-3)(W)*	13-Jan-2020
Chloralkanes C10 - C13 by GCMS	06-Jan-2020
Dissolved Metals by ICP-MS	31-Dec-2019
Mercury Dissolved	30-Dec-2019
Organotins in Aqueous Samples	22-Dec-2019
PAH Spec MS - Aqueous (W)	30-Dec-2019
Pesticides (Suite I) by GCMS	02-Jan-2020
Pesticides (Suite II) by GCMS	31-Dec-2019
Pesticides (Suite III) by GCMS	06-Jan-2020
Phenols and ethoxylates in Liquids	30-Dec-2019
SVOC MS (W) - Aqueous	03-Jan-2020
VOC MS (W)	27-Dec-2019



CERTIFICATE OF ANALYSIS

Work Order	: PR19E0330	Issue Date	: 06-Jan-2020
Customer	: ALS Life Sciences Ltd	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: ALS Hawarden Reporting	Contact	: Client Service
Address	: Unit 7-8 Hawarden Business Park Manor Road, Hawarden CH5 3US Deeside United Kingdom	Address	: Na Harfe 336/9 Prague 9 - Vysocany 190 00 Czech Republic
E-mail	: euhdnsbconresults@ALSGlobal.com	E-mail	: customer.support@alsglobal.com
Telephone	: ----	Telephone	: +420 226 226 228
Project	: 29509	Page	: 1 of 2
Order number	: 191219-119	Date Samples Received	: 23-Dec-2019
		Quote number	: PR2018ALSAL-GB0004 (CZ-256-18-0022)
Site	: ----	Date of test	: 30-Dec-2019 - 06-Jan-2020
Sampled by	: client	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.

The laboratory declares that the test results relate only to the listed samples. If the section "Sampled by" of the Certificate of analysis states: "Sampled by Customer" then the results relate to the sample as received.

Responsible for accuracy

Testing Laboratory No. 1163
Accredited by CAI according to
CSN EN ISO/IEC 17025:2018

Signatories

Zdeněk Jiráček

Position

Environmental Business Unit
Manager





Analytical Results

Sub-Matrix: SURFACE WATER

				Client sample ID	21413880	----	----		
				Laboratory sample ID	PR19E0330-001	----	----		
				Client sampling date / time	19-Dec-2019 00:00	----	----		
Parameter	Method	LOR	Unit	Result	MU	Result	MU	Result	MU
Chlorinated Hydrocarbons									
Chlorinated Alkanes C10-C13	W-CLAGMS01	0.40	µg/L	<0.40	---	----	---	----	----

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, delivery date in brackets without a time component will be displayed instead. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.

Key: LOR = Limit of reporting; MU = Measurement Uncertainty. The MU does not include sampling uncertainty.

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	Method Descriptions
Location of test performance: Na Harfe 336/9 Prague 9 - Vysocany Czech Republic 190 00	
W-CLAGMS01	CZ_SOP_D06_03_192.A - (CSN EN ISO 12010) Determination of chlorinated alkanes by gas chromatography method with MS/MS detection

A ** symbol preceding any method indicates laboratory or subcontractor non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information. If the report contains subcontracted analysis, those are made in a subcontracted laboratory outside the laboratories ALS Czech Republic, s.r.o.

The calculation methods of summation parameters are available on request in the client service.

Certificate of Analysis

Report No.: 19-89603-1

Issue No.: 1

Date of Issue 10/01/2020

Customer Details: ALS Life Sciences Limited, Unit7-8, Hawarden Business Park, Manor Road, Hawarden, Deeside, Flintshire, CH5 3US

Customer Contact: Tom Hargreaves

Customer Order No.: 191219-119

Customer Reference: 191219-119

Quotation Reference: 191217/06

Description: 1 water sample

Date Received: 23/12/2019

Date Started: 06/01/2020

Date Completed: 08/01/2020

Test Methods: Details available on request (refer to SOP code against relevant result/s)

Notes: None



Approved By: Matthew Hickson, Laboratory Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service.

This certificate shall not be reproduced except in full without the prior written approval of the laboratory.

Observations and interpretations are outside of the scope of UKAS accreditation.

Results reported herein relate only to the items supplied to the laboratory for testing.

Results on an Interim Report are not dry-weight corrected.

Where the laboratory is not responsible for the sampling, results apply to the sample(s) as they were received.

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13 St Martins Way, Bedford, Bedfordshire, MK42 0LF. T +44 1462 480 400

Results Summary

Report No.: 19-89603-1
 Customer Reference: 191219-119
 Customer Order No: 191219-119

Customer Sample No	21413881
Customer Sample ID	W1 R9072
RPS Sample No	425146
Sample Type	WATER
Sampling Date	19/12/2019

Determinand	CAS No	Codes	SOP	Units	RL
4-bromodiphenyl ether (BDE-3)	101-55-3	N	in house	ug/l	0.1
					< 0.10

Deviating Samples

Report No.: 19-89603-1

Customer Reference: 191219-119

Customer Order No.: 191219-119

Our policy on Deviating Samples has been implemented in accordance with UKAS Policy on Deviating Samples (TPS63).

RPS is not responsible for the integrity of samples as received, unless RPS personnel performed the sampling. Samples submitted may be declared to be deviating.

Where applicable the analysis method remains UKAS accredited, however results reported for a deviating sample may be compromised.

Where no sampling date was supplied, samples have been declared to be deviating. If the date can be supplied, results may be reissued if assessed not deviating.

Where the sample container used was unsuitable or broken, the sample is flagged as deviating and re-sampling/re-submission may be required.

RPS No.	Customer No.	Customer ID	Date Sampled	Containers Received	Deviating	Reason for Deviation
425146	21413881		19/12/2019	1 litre green glass bottle	No	

Report No.: 19-89603-1

Key Code	Description
U	UKAS Accredited Test - UKAS accreditation is only implied if the report carries the UKAS logo
F	UKAS Flexible Scope Test
M	MCERTS Accredited Test - MCERTS accreditation is only implied if the report carries the MCERTS logo
N	Not Accredited Test
O	Marine Management Organisation (MMO) Validated
S	Subcontracted to approved laboratory
US	Subcontracted to approved laboratory UKAS Accredited for the test
MS	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
SI	Subcontracted to internal RPS Group laboratory
USI	Subcontracted to internal RPS Group laboratory UKAS Accredited for the test
MSI	Subcontracted to internal RPS Group laboratory MCERTS/UKAS Accredited for the test
I/S (in results)	Insufficient Sample
U/S (in results)	Unsuitable Sample
S/C (in results)	See Comments
ND (in results)	Not Detected
DW (in units)	Results are expressed on a dry weight basis

Sample Type	Sample Retention and Disposal Period
Foodstuff	1 month (if frozen) from the issue date of this report
Waters	2 weeks from the issue date of this report
Other Liquids	1 month from the issue date of this report
Solids / Soils	1 month from the issue date of this report
Sediments	1 month from the issue date of this report

Note: Sample retention may be subject to agreement with the customer for particular projects



CERTIFICATE OF ANALYSIS

SDG: 191219-119	Client Reference: R9072	Report Number: 537013
Location: UPM Shotton Papr Mill	Order Number: R97843	Superseded Report: 536422

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
§	Sampled on date not provided
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples

19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Standing Committee of Analysts, *The Quantification of Asbestos in Soil (2107)*.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.