



**AMG RESOURCES
LIMITED**

**Permit number
EPR/BM2381IQ**

2020 Annual Review
Report Number 2125r1v1d0121

Commissioned by
AMG Resources Limited
Nevill's Dock
Llanelli
Carmarthenshire
SA15 2HD

Prepared by
Geotechnology Ltd
Ty Coed
Cefn-yr-Allt
Aberdulaish
SA10 8HE

January 2021

Table of Contents

1 INTRODUCTION	1
2 PERMIT RETURNS	2
2.1 Energy Usage	2
2.2 Raw Material	2
2.3 Waste	2
2.4 Air Emissions	2
3 GROUNDWATER MONITORING	3
3.1 Monitoring Network	3
3.2 Monitoring Programme	3
3.3 Groundwater Levels	3
3.4 Groundwater Quality	3
4 CONCLUSIONS	4

List of Appendices

1. NRW Returns
2. Groundwater Monitoring Certificates
3. Time Series Plots of Groundwater Monitoring Results

1 INTRODUCTION

Each year, AMG Resources Limited (AMG) are required to undertake a report on the performance of the activities over the previous year and report to Natural Resources Wales by 31 January each year.

Condition 4.2.2. of AMG's Environmental Permit (EPR/BM2381IQ) states:

"A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 January (or other date agreed in writing by Natural Resources Wales) each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of the data."

This report provides a review of the data gathered during 2020 and has been compiled on behalf of AMG by Geotechnology Ltd.

2 PERMIT RETURNS

The Permit provides template forms for capturing data required by NRW. These have been completed by AMG and are provided in Appendix 1.

2.1 Energy Usage

The site consumed 727 MWh of electricity during 2020. This is higher than the 2019 figure but lower than the 957 MWh consumed in 2018. This is reflective of the changes that have occurred at the site.

2.2 Raw Material

No raw materials were consumed at the installation in 2020.

2.3 Waste

No waste was removed from the Installation in 2020.

2.4 Air Emissions

There continues to be no emissions to air from emission points A1, A2 and A3 to report due to the boiler being decommissioned on 29 April 2015.

3 GROUNDWATER MONITORING

3.1 Monitoring Network

The monitoring network comprises a series of shallow boreholes that have been monitored for over a decade.

3.2 Monitoring Programme

During 2020, the groundwater wells have been monitored at least 6 monthly. If sufficient water has been found to be present, samples have been collected for testing at UKAS accredited ALS based in Chester. The original laboratory certificates are provided in Appendix 2.

G1 – sampled in May, August and December 2020.

G2 – not possible to collect samples during 2020 due to surface flooding on one occasion and insufficient groundwater on another occasion.

G3 - Geotechnology understands that sampling from this position is no longer required.

G4 – not possible to sample in 2020 due to below ground blockage.

G5 - sampled in May and December 2020.

G6 – sampled in December 2020 as insufficient water present in May.

At all of the wells, there is often very little groundwater present making collection of representative samples difficult. Improvements to the headworks are also required.

3.3 Groundwater Levels

Groundwater is typically 2-4m below ground level and typically varies by less than 1m between seasons and years. This data is presented in Appendix 3. Groundwater is typically highest at positions G4, G5 and G7.

3.4 Groundwater Quality

Temporal variation of selected parameters is presented in Appendix 3. The analysis reveals long-term improvements in groundwater quality, particularly in terms of several trace metals.

The groundwater at G5 and G2 is characterised by a strongly alkaline pH (pH 9.5 – 10.5) whilst the other wells contain groundwater with pH between approximately pH 7 and 8. The more alkaline groundwater tends to be more mineralised.

In recent years, most trace metals have been present at declining and low concentrations. Tin continues to be detectable at several positions and during 2020 Arsenic, Chromium, Iron, Lead, Mercury, Nickel and Zinc were detected. The levels observed are similar to levels observed previously with some concentrations above Environmental Quality Standards. The highest concentrations tend to be found at G5 and G7.

Hydrocarbons were also found at G6, as noted previously.

4 CONCLUSIONS

The AMG site at Llanelli is currently not used for the activities detailed in the Installation Permit. This is reflected in the annual returns. During 2021, AMG intends to surrender the Permit and focus resources on the existing Standard Rules Permit. An initial appraisal of the groundwater data suggests that groundwater quality has not deteriorated from that detected at the time of Permit issue but this aspect will be reviewed in more detail as part of the surrender application.

AMG RESOURCES

**Permit number
EPR/BM2381IQ**

**2020 Annual
Review**

**Appendix 1
NRW Returns**

Report Number 2125r1v1d0121

Permit Number: BM3381IQ

Operator: AMG Resources Ltd

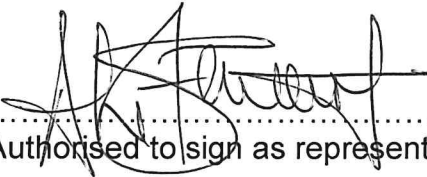
Facility: AMG Resources Ltd

Form Number: Air1 / 13/06/20

Reporting of emissions to air for the period from 01/02/2020 to 31/12/2020

Emission Point	Substance / Parameter	Emission		Reference Period	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Uncertainty ^[4]
		Limit Value						
A2	Particulate Matter	5 mg/m ³	Continuous		n/a	BS EN 13284-1		
	Copper, lead, zinc and their compounds taken together (as metal)	2.0 mg/m ³			n/a	BS EN 13284-1		
	Cadmium, arsenic, nickel and their compounds taken together (as elements)	0.2 mg/m ³			n/a	-		
	Tin and its compounds (as Sn)	2.0 mg/m ³			n/a	-		
	Dioxins (ITEQ)	0.1 ng/m ³			n/a	-		
A3	Particulate matter	5 mg/m ³	Continuous		n/a	BS EN 13284-1		
A3	Oxides of Nitrogen	200 mg/m ³			n/a	-		

- [1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Where the emission limit value is expressed as a range, the result is given as the 'minimum – maximum' measured values.
- [2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with Natural Resources Wales is used, then the appropriate identifier is given. In other cases the principal technique is stated, for example gas chromatography.
- [3] For non-continuous measurements the date and time of the sample that produced the result is given. For continuous measurements the percentage of the process operating time covered by the result is given.
- [4] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated.

Signed 
(Authorised to sign as representative of Operator)

Date. 13 . 01 . 21 .

Permit Number: BM3381IQ

Operator: AMG Resources Limited

Facility: AMG Resources Ltd

Form Number: Water1 / 13/06/20

Reporting of emissions to water (other than to sewer) and land for the period from 01/02/2020 to 31/12/2020

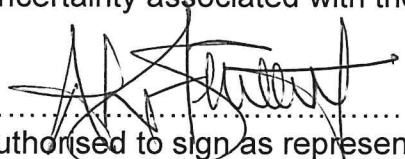
Emission Point	Substance / Parameter	Emission		Reference Period	Result ^[1]	Test Method ^[2]	Sample Date and Times ^[3]	Uncertainty ^[4]
		Limit Value						
W1	Total Oxidised Nitrogen (TON) as N mg l-1	3 mg/l			n/a			

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Where the emission limit value is expressed as a range, the result is given as the 'minimum – maximum' measured values.

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with Natural Resources Wales is used, then the appropriate identifier is given. In other cases the principal technique is stated, for example gas chromatography.

[3] For non-continuous measurements the date and time of the sample that produced the result is given. For continuous measurements the percentage of the process operating time covered by the result is given.

[4] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated.

Signed 
(Authorised to sign as representative of Operator)

Date 13.01.21

Permit Number: BM3381IQ Operator: AMG Resources Ltd]

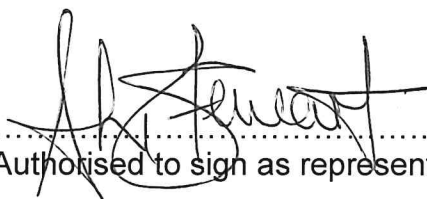
Facility: AMG Resources Ltd Form Number: Energy1 / 13/06/20

Reporting of Energy Usage for the year 2020

Energy Source	Energy Usage		Specific Usage (MWh/unit output)
	Quantity	Primary Energy (MWh)	
Electricity *	MWh	303.2 x 2.4 = 727.68 Mwh	
Natural Gas	MWh	0 (Boiler decommissioned 29.04.2015)	
Gas Oil	tonnes	0	
Recovered Fuel Oil	tonnes	0	
TOTAL	-		

* Conversion factor for delivered electricity to primary energy = 2.4

Operator's comments :

Signed 
(Authorised to sign as representative of Operator)

Date... 13.01.21

Permit Number: BM3381IQ

Operator: AMG Resources Ltd

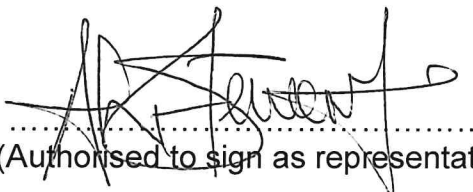
Facility: AMG Resources Ltd

Form Number: Performance1 / 13/06/20

Reporting of other performance indicators for the period 01/02/2020 to 31/12/2020

Parameter	Units
Total raw material used	0 tonnes

Operator's comments :

Signed 
(Authorised to sign as representative of Operator)

Date... 13 . 01 . 21 .

AMG RESOURCES

**Permit number
EPR/BM2381IQ**

**2020 Annual
Review**

**Appendix 2
Groundwater
Monitoring Certificates**

Report Number 2125r1v1d0121



Geotechnology
5 Cefn-yr-Allt
Aberdulais
Neath
West Glamorgan
SA10 8HE

Attention: Ben Rees

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

CERTIFICATE OF ANALYSIS

Date of report Generation:	27 March 2020
Customer:	Geotechnology
Sample Delivery Group (SDG):	200320-35
Your Reference:	Llanelli
Location:	Nevills Dock
Report No:	547702

We received 1 sample on Friday March 20, 2020 and 1 of these samples were scheduled for analysis which was completed on Friday March 27, 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:	200320-35	Client Reference:	Llanelli	Report Number:	547702
Location:	Nevills Dock	Order Number:		Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
21926135	S1			18/03/2020

Maximum Sample/Coolbox Temperature (°C) :

6.4

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.



CERTIFICATE OF ANALYSIS

Validated

SDG: 200320-35
Location: Nevills Dock

Client Reference: Llanelli
Order Number:

Report Number: 547702
Superseded Report:

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)

21926135

Customer Sample Reference

S1

AGS Reference

Depth (m)

Container

HNO3 Filtered (ALE204)
H2SO4 (ALE244)
250ml BOD (ALE212)
0.5l glass bottle (ALE227)

Sample Type

SW SW SW SW

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 1

X

Anions by Kone (w)

All

NDPs: 0
Tests: 1

X

BOD True Total

All

NDPs: 0
Tests: 1

X

Conductivity (at 20 deg.C)

All

NDPs: 0
Tests: 1

X

Dissolved Metals by ICP-MS

All

NDPs: 0
Tests: 1

X

EPH (DRO) (C10-C40) Aqueous (W)

All

NDPs: 0
Tests: 1

X

GRO by GC-FID (W)

All

NDPs: 0
Tests: 1

X

Mercury Dissolved

All

NDPs: 0
Tests: 1

X

Oil, Grease or Solids Visible

All

NDPs: 0
Tests: 1

X

pH Value

All

NDPs: 0
Tests: 1

X

Suspended Solids

All

NDPs: 0
Tests: 1

X

Total EPH (aq)

All

NDPs: 0
Tests: 1

X



CERTIFICATE OF ANALYSIS

Validated

SDG: 200320-35
Location: Nevills Dock

Client Reference: Llanelli
Order Number:

Report Number: 547702
Superseded Report:

Results Legend		Customer Sample Ref.	S1					
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 18/03/2020 20/03/2020 200320-35 21926135					
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)							
Component	LOD/Units	Method						
Oil or Grease, Visible		PM095	Absent					
Visible Solids		PM095	Present					
Suspended solids, Total	<2 mg/l	TM022	396	#				
BOD, unfiltered	<1 mg/l	TM045	>224	#				
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	0.895	#				
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.769	#				
Aluminium (diss.filt)	<10 µg/l	TM152	156	#				
Arsenic (diss.filt)	<0.5 µg/l	TM152	1.56	#				
Barium (diss.filt)	<0.2 µg/l	TM152	33	#				
Beryllium (diss.filt)	<0.1 µg/l	TM152	<0.1	#				
Boron (diss.filt)	<10 µg/l	TM152	165	#				
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	#				
Chromium (diss.filt)	<1 µg/l	TM152	3.15	#				
Copper (diss.filt)	<0.3 µg/l	TM152	26.9	#				
Lead (diss.filt)	<0.2 µg/l	TM152	3.4	#				
Nickel (diss.filt)	<0.4 µg/l	TM152	24.3	#				
Selenium (diss.filt)	<1 µg/l	TM152	<1	#				
Vanadium (diss.filt)	<1 µg/l	TM152	<1	#				
Zinc (diss.filt)	<1 µg/l	TM152	125	#				
Tin (Diss.Filt)	<1 µg/l	TM152	103	#				
Iron (Dis.Filt)	<0.019 mg/l	TM152	1.25	#				
EPH Range >C10 - C40 (aq)	<100 µg/l	TM172	53200	#				
Total EPH (C6-C40) (aq)	<100 µg/l	TM172	53200					
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01					
Chloride	<2 mg/l	TM184	86.8	#				
pH	<1 pH Units	TM256	7.39	#				



CERTIFICATE OF ANALYSIS

Validated

SDG: 200320-35
Location: Nevills Dock

Client Reference: Llanelli
Order Number:

Report Number: 547702
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
PM095	Standard Methods for the examination of waters and wastewaters 16th Edition, APHA, Washington DC, USA. ISBN 0-87553-131-8.	Preparation of Water Samples for Analysis
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH 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
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter

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: 200320-35
Location: Nevills Dock

Client Reference: Llanelli
Order Number:

Report Number: 547702
Superseded Report:

Test Completion Dates

Lab Sample No(s) 21926135
Customer Sample Ref. S1
AGS Ref.
Depth
Type Surface Water

Ammoniacal Nitrogen	25-Mar-2020
Anions by Kone (w)	21-Mar-2020
BOD True Total	26-Mar-2020
Conductivity (at 20 deg.C)	24-Mar-2020
Dissolved Metals by ICP-MS	24-Mar-2020
EPH (DRO) (C10-C40) Aqueous (W)	27-Mar-2020
GRO by GC-FID (W)	27-Mar-2020
Mercury Dissolved	23-Mar-2020
Oil, Grease or Solids Visible	20-Mar-2020
pH Value	24-Mar-2020
Suspended Solids	26-Mar-2020
Total EPH (aq)	27-Mar-2020



CERTIFICATE OF ANALYSIS

SDG:	200320-35	Client Reference:	Llanelli	Report Number:	547702
Location:	Nevills Dock	Order Number:		Superseded Report:	

Appendix

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.

General

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.



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

AMG Resources Ltd
Nevill's Dock
Llanelli
SA15 2HD

Attention: AMG Accounts

CERTIFICATE OF ANALYSIS

Date of report Generation: 27 August 2020
Customer: AMG Resources Ltd
Sample Delivery Group (SDG): 200815-10
Your Reference:
Location: Nevills Dock
Report No: 564855

We received 2 samples on Saturday August 15, 2020 and 2 of these samples were scheduled for analysis which was completed on Thursday August 27, 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: 200815-10
Location: Nevills Dock

Client Reference:
Order Number:

Report Number: 564855
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22661601	BH1			12/08/2020
22661600	RUNOFF			12/08/2020

Maximum Sample/Coolbox Temperature (°C) :

17.0

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.



CERTIFICATE OF ANALYSIS

Validated

SDG: 200815-10
Location: Nevills Dock

Client Reference:
Order Number:

Report Number: 564855
Superseded Report:

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)

22661601

22661600

Customer Sample Reference

BH1

RUNOFF

AGS Reference

Depth (m)

Container

0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	Vial (ALE297)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)
GW	GW	GW	GW	GW	SW	SW	SW	SW

Sample Type

Alkalinity as CaCO ₃	All	NDPs: 0 Tests: 1	X									
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 2		X						X		
Anions by Kone (w)	All	NDPs: 0 Tests: 2	X						X			
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 2	X						X			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2			X						X	
EPH (DRO) (C10-C40) Aqueous (W)	All	NDPs: 0 Tests: 2	X						X			
GRO by GC-FID (W)	All	NDPs: 0 Tests: 2					X	X				
Mercury Dissolved	All	NDPs: 0 Tests: 2			X						X	
pH Value	All	NDPs: 0 Tests: 2	X						X			
Suspended Solids	All	NDPs: 0 Tests: 2	X						X			
Total EPH (aq)	All	NDPs: 0 Tests: 2	X						X			



CERTIFICATE OF ANALYSIS

Validated

SDG: 200815-10
Location: Nevills Dock

Client Reference:
Order Number:

Report Number: 564855
Superseded Report:

Results Legend			Customer Sample Ref.	BH1	RUNOFF			
#	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)							
Component	LOD/Units	Method						
Suspended solids, Total	<2 mg/l	TM022	52.1	76.1				
			#	#				
Alkalinity, Total as CaCO3	<2 mg/l	TM043	670					
			#					
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	0.362				
			#	#				
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	1.22	0.63				
			#	#				
Aluminium (diss.filt)	<10 µg/l	TM152	<10					
			#					
Arsenic (diss.filt)	<0.5 µg/l	TM152	51.2	1.36				
			#	#				
Boron (diss.filt)	<10 µg/l	TM152	201	176				
			#	#				
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	0.0824				
			#	#				
Chromium (diss.filt)	<1 µg/l	TM152	<1	<1				
			#	#				
Copper (diss.filt)	<0.3 µg/l	TM152	10.2	5.36				
			#	#				
Lead (diss.filt)	<0.2 µg/l	TM152	0.285	1.21				
			#	#				
Manganese (diss.filt)	<3 µg/l	TM152	114					
			#					
Nickel (diss.filt)	<0.4 µg/l	TM152	3.95	20.4				
			#	#				
Selenium (diss.filt)	<1 µg/l	TM152	<1					
			#					
Zinc (diss.filt)	<1 µg/l	TM152	6.93	84.2				
			#	#				
Tin (Diss.Filt)	<1 µg/l	TM152	5.07					
			#					
Sodium (Dis.Filt)	<0.076 mg/l	TM152	310					
			#					
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	11.3					
			#					
Potassium (Dis.Filt)	<0.2 mg/l	TM152	14.5					
			#					
Calcium (Dis.Filt)	<0.2 mg/l	TM152	63.2	37.6				
			#	#				
Iron (Dis.Filt)	<0.019 mg/l	TM152	0.236	3.35				
			#	#				
EPH Range >C10 - C40 (aq)	<100 µg/l	TM172	247	7620				
			#	#				
Total EPH (C6-C40) (aq)	<100 µg/l	TM172	247	7620				
Mercury (diss.filt)	<0.01 µg/l	TM183	0.0156	0.0124				
			#					
Sulphate	<2 mg/l	TM184	59.1	2.8				
			#	#				
Chloride	<2 mg/l	TM184	35.6					
			#					
Nitrate as NO3	<0.3 mg/l	TM184	2.56	<0.3				
				@				
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	0.595	<0.1				
			#	#				
pH	<1 pH Units	TM256	7.64	7.39				
			#	#				



CERTIFICATE OF ANALYSIS

Validated

SDG:	200815-10	Client Reference:	Report Number:	564855
Location:	Nevills Dock	Order Number:	Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH 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
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter

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: 200815-10
Location: Nevills Dock

Client Reference:
Order Number:

Report Number: 564855
Superseded Report:

Test Completion Dates

Lab Sample No(s)	22661601	22661600
Customer Sample Ref.	BH1	RUNOFF
AGS Ref.		
Depth		
Type	Ground Water	Surface Water

Alkalinity as CaCO ₃	21-Aug-2020	
Ammoniacal Nitrogen	18-Aug-2020	18-Aug-2020
Anions by Kone (w)	22-Aug-2020	23-Aug-2020
Conductivity (at 20 deg.C)	20-Aug-2020	20-Aug-2020
Dissolved Metals by ICP-MS	21-Aug-2020	21-Aug-2020
EPH (DRO) (C10-C40) Aqueous (W)	19-Aug-2020	19-Aug-2020
GRO by GC-FID (W)	24-Aug-2020	24-Aug-2020
Mercury Dissolved	27-Aug-2020	27-Aug-2020
Nitrite by Kone (w)	19-Aug-2020	20-Aug-2020
pH Value	19-Aug-2020	19-Aug-2020
Suspended Solids	19-Aug-2020	20-Aug-2020
Total EPH (aq)	24-Aug-2020	24-Aug-2020



CERTIFICATE OF ANALYSIS

SDG:	200815-10	Client Reference:	Report Number:	564855
Location:	Nevills Dock	Order Number:	Superseded Report:	

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* (2017).

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.



AMG Resources Ltd
Nevill's Dock
Llanelli
SA15 2HD

Attention: Ben Rees

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

CERTIFICATE OF ANALYSIS

Date of report Generation: 28 August 2020
Customer: AMG Resources Ltd
Sample Delivery Group (SDG): 200821-56
Your Reference:
Location: AMG Llanelli
Report No: 565023

We received 1 sample on Friday August 21, 2020 and 1 of these samples were scheduled for analysis which was completed on Friday August 28, 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: 200821-56
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 565023
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
22695677	RUNOFF			19/08/2020

Maximum Sample/Coolbox Temperature (°C) :

17

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.



CERTIFICATE OF ANALYSIS

Validated

SDG: 200821-56
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 565023
Superseded Report:

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)

22695677

Customer Sample Reference

RUNOFF

AGS Reference

Depth (m)

Container

Vial (ALE297)
NaOH (ALE245)
H2SO4 (ALE244)
500ml Plastic (ALE208)
0.5l glass bottle (ALE227)

Sample Type

SW SW SW SW SW

Ammoniacal Nitrogen

All

NDPs: 0
Tests: 1

X

Anions by Kone (w)

All

NDPs: 0
Tests: 1

X

Fats Oils and Greases.

All

NDPs: 0
Tests: 1

X

Nitrite by Kone (w)

All

NDPs: 0
Tests: 1

X

Suspended Solids

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



CERTIFICATE OF ANALYSIS

Validated

SDG: 200821-56
Location: AMG LlanelliClient Reference:
Order Number:Report Number: 565023
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample Ref.	RUNOFF				
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 19/08/2020 08:40:00 21/08/2020 200821-56 22695677				
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)							
Component	LOD/Units	Method						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176		<50	#			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176		<50	#			
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176		<50	#			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176		<50	#			
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176		<50	#			
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176		<50	#			
2,4-Dichlorophenol (aq)	<1 µg/l	TM176		<50	#			
2,4-Dimethylphenol (aq)	<1 µg/l	TM176		<50	#			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176		<50	#			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176		<50	#			
2-Chloronaphthalene (aq)	<1 µg/l	TM176		<50	#			
2-Chlorophenol (aq)	<1 µg/l	TM176		<50	#			
2-Methylnaphthalene (aq)	<1 µg/l	TM176		<50	#			
2-Methylphenol (aq)	<1 µg/l	TM176		<50	#			
2-Nitroaniline (aq)	<1 µg/l	TM176		<50	#			
2-Nitrophenol (aq)	<1 µg/l	TM176		<50	#			
3-Nitroaniline (aq)	<1 µg/l	TM176		<50	#			
4-Bromophenylphenylether (aq)	<1 µg/l	TM176		<50	#			
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176		<50	#			
4-Chloroaniline (aq)	<1 µg/l	TM176		<50	#			
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176		<50	#			
4-Methylphenol (aq)	<1 µg/l	TM176		96.1	#			
4-Nitroaniline (aq)	<1 µg/l	TM176		<50	#			
4-Nitrophenol (aq)	<1 µg/l	TM176		<50	#			
Azobenzene (aq)	<1 µg/l	TM176		<50	#			
Acenaphthylene (aq)	<1 µg/l	TM176		<50	#			
Acenaphthene (aq)	<1 µg/l	TM176		<50	#			
Anthracene (aq)	<1 µg/l	TM176		<50	#			
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176		<50	#			
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176		<50	#			
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176		<100	#			
Butylbenzyl phthalate (aq)	<1 µg/l	TM176		<50	#			
Benzo(a)anthracene (aq)	<1 µg/l	TM176		<50	#			



CERTIFICATE OF ANALYSIS

Validated

SDG: 200821-56
Location: AMG LlanelliClient Reference:
Order Number:Report Number: 565023
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	RUNOFF					
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 19/08/2020 08:40:00 21/08/2020 200821-56 22695677					
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)							
Component	LOD/Units	Method						
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<50	#				
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<50	#				
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<50	#				
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<50	#				
Carbazole (aq)	<1 µg/l	TM176	<50	#				
Chrysene (aq)	<1 µg/l	TM176	<50	#				
Dibenzofuran (aq)	<1 µg/l	TM176	<50	#				
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<50	#				
Diethyl phthalate (aq)	<1 µg/l	TM176	<50	#				
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<50	#				
Dimethyl phthalate (aq)	<1 µg/l	TM176	<50	#				
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<250	#				
Fluoranthene (aq)	<1 µg/l	TM176	<50	#				
Fluorene (aq)	<1 µg/l	TM176	<50	#				
Hexachlorobenzene (aq)	<1 µg/l	TM176	<50	#				
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<50	#				
Pentachlorophenol (aq)	<1 µg/l	TM176	<50					
Phenol (aq)	<1 µg/l	TM176	65.6					
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<50	#				
Hexachloroethane (aq)	<1 µg/l	TM176	<50	#				
Nitrobenzene (aq)	<1 µg/l	TM176	<50	#				
Naphthalene (aq)	<1 µg/l	TM176	<50	#				
Isophorone (aq)	<1 µg/l	TM176	<50	#				
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<50					
Phenanthrene (aq)	<1 µg/l	TM176	<50	#				
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<50	#				
Pyrene (aq)	<1 µg/l	TM176	<50	#				



CERTIFICATE OF ANALYSIS

Validated

SDG: 200821-56
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 565023
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample Ref.	RUNOFF				
#	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)							
			Depth (m)	Surface Water (SW)				
			Sample Type	19/08/2020				
			Date Sampled	08:40:00				
			Sample Time	21/08/2020				
			Date Received	200821-56				
			SDG Ref	22695677				
			Lab Sample No.(s)					
			AGS Reference					
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM208	119					
Toluene-d8**	%	TM208	99.5					
4-Bromofluorobenzene**	%	TM208	93.7					
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	1.27	#				
Dichloromethane	<3 µg/l	TM208	19.9	#				
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	15.1	#				
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: 200821-56
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 565023
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	RUNOFF				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Surface Water (SW) 19/08/2020 08:40:00 21/08/2020 200821-56 22695677				
M	mCERTS accredited.						
sq	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+§@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Tetrachloroethene	<1 µg/l	TM208	5.25	#			
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	1.52	#			
m,p-Xylene	<1 µg/l	TM208	4.61	#			
o-Xylene	<1 µg/l	TM208	1.78	#			
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	#			
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1				



CERTIFICATE OF ANALYSIS

Validated

SDG: 200821-56
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 565023
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM383		Gravimetric Determination of Fats, Oils and Greases in Liquids by Cyclohexane Extraction

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: 200821-56
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 565023
Superseded Report:

Test Completion Dates

Lab Sample No(s) 22695677
Customer Sample Ref. RUNOFF
AGS Ref.
Depth
Type Surface Water

Ammoniacal Nitrogen	28-Aug-2020
Anions by Kone (w)	27-Aug-2020
Fats Oils and Greases.	25-Aug-2020
Nitrite by Kone (w)	24-Aug-2020
Suspended Solids	26-Aug-2020
SVOC MS (W) - Aqueous	27-Aug-2020
VOC MS (W)	28-Aug-2020



CERTIFICATE OF ANALYSIS

SDG:	200821-56	Client Reference:	Report Number:	565023
Location:	AMG Llanelli	Order Number:	Superseded Report:	

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* (2017).

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.



Geotechnology
5 Cefn-yr-Allt
Aberdulais
Neath
West Glamorgan
SA10 8HE

Attention: Ben Rees

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

CERTIFICATE OF ANALYSIS

Date of report Generation:	24 December 2020
Customer:	Geotechnology
Sample Delivery Group (SDG):	201216-18
Your Reference:	
Location:	AMG Llanelli
Report No:	581468

We received 5 samples on Wednesday December 16, 2020 and 4 of these samples were scheduled for analysis which was completed on Thursday December 24, 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: 201216-18
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 581468
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23438964	BH1			14/12/2020
23438969	BH2			14/12/2020
23438965	BH5			14/12/2020
23438967	BH6			14/12/2020
23438968	YARD SW			14/12/2020

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



CERTIFICATE OF ANALYSIS

Validated

SDG:	201216-18	Client Reference:	Report Number:	581468
Location:	AMG Llanelli	Order Number:	Superseded Report:	

Notification of NDPs (No determination possible)

Date Received : 16/12/2020 07:48:09

Sample No	Customer Sample Ref.	Depth (m)	Test	Comment
23438968	YARD SW		Mercury Dissolved	Insufficient Sample
23438968	YARD SW		Dissolved Metals by ICP-MS	Insufficient Sample



CERTIFICATE OF ANALYSIS

Validated

SDG: 201216-18
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 581468
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH 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
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM235	The Determination of Hydrocarbon Oils in Waters by Solvent Extraction, Infra red Absorption and Gravimetry 1983, HMSO, London	Determination of Total Petroleum Hydrocarbons (TPH) in Waters By Infra-Red Spectroscopy
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter

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: 201216-18
Location: AMG Llanelli

Client Reference:
Order Number:

Report Number: 581468
Superseded Report:

Test Completion Dates

Lab Sample No(s)	23438964	23438965	23438967	23438968
Customer Sample Ref.	BH1	BH5	BH6	YARD SW
AGS Ref.				
Depth				
Type	Ground Water	Ground Water	Ground Water	Surface Water
Ammoniacal Nitrogen	23-Dec-2020	22-Dec-2020	23-Dec-2020	23-Dec-2020
Anions by Kone (w)	24-Dec-2020	19-Dec-2020	24-Dec-2020	24-Dec-2020
Conductivity (at 20 deg.C)	17-Dec-2020	18-Dec-2020	18-Dec-2020	17-Dec-2020
Dissolved Metals by ICP-MS	22-Dec-2020	22-Dec-2020	22-Dec-2020	
EPH (DRO) (C10-C40) Aqueous (W)	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020
GRO by GC-FID (W)	18-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020
Mercury Dissolved	24-Dec-2020	24-Dec-2020	24-Dec-2020	
Nitrite by Kone (w)	17-Dec-2020	17-Dec-2020	17-Dec-2020	17-Dec-2020
pH Value	17-Dec-2020	16-Dec-2020	17-Dec-2020	17-Dec-2020
Suspended Solids	21-Dec-2020	21-Dec-2020	21-Dec-2020	21-Dec-2020
Total EPH (aq)	19-Dec-2020	18-Dec-2020	18-Dec-2020	18-Dec-2020
TPH by IR Oils and Greases				22-Dec-2020



CERTIFICATE OF ANALYSIS

SDG:	201216-18	Client Reference:	Report Number:	581468
Location:	AMG Llanelli	Order Number:	Superseded Report:	

Appendix

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.

General

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
4	Matrix interference
◆	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

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 asbestos present is not determined unless specifically requested.

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* (2017).

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.

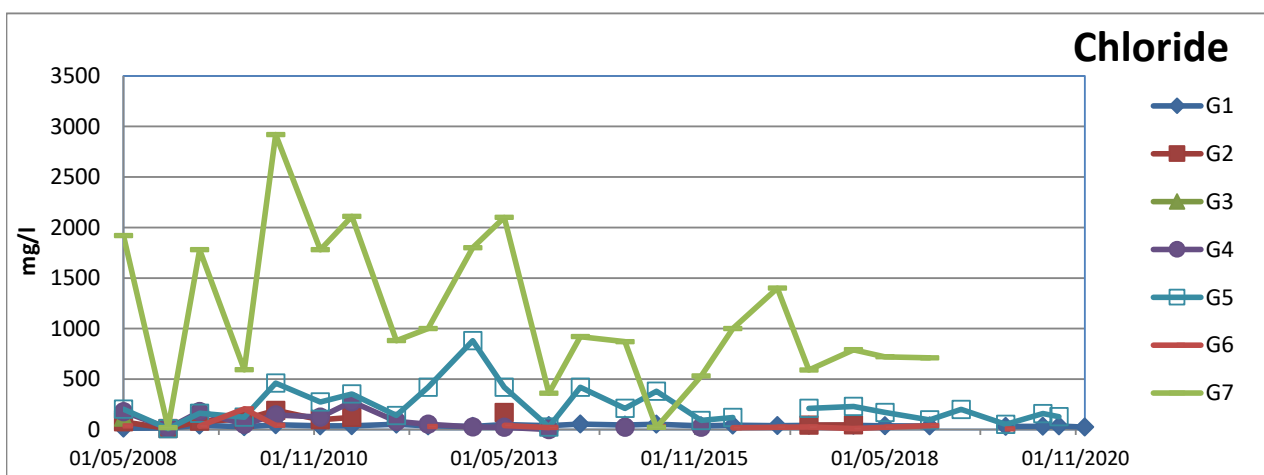
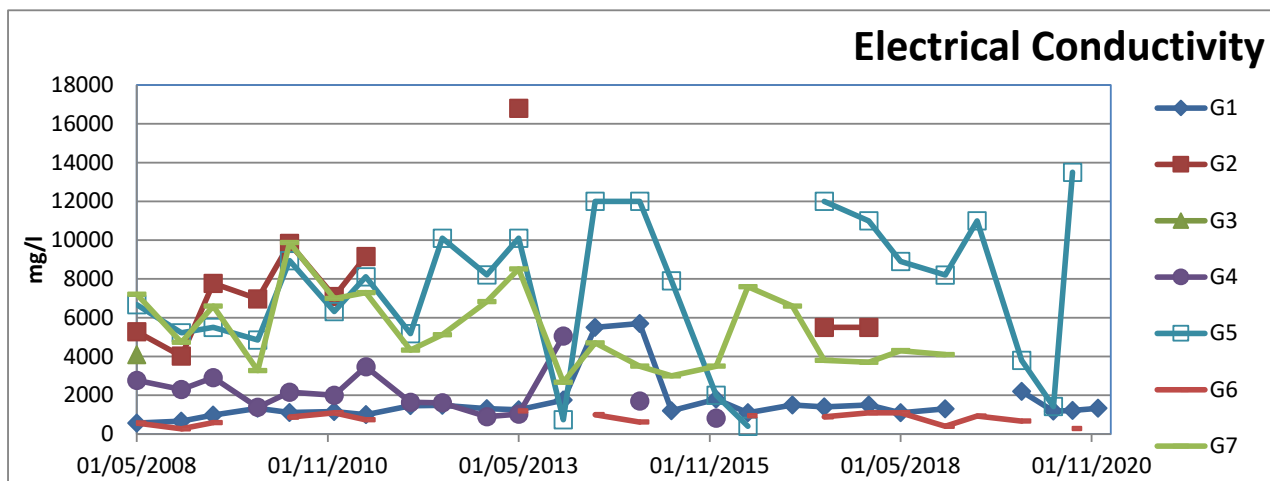
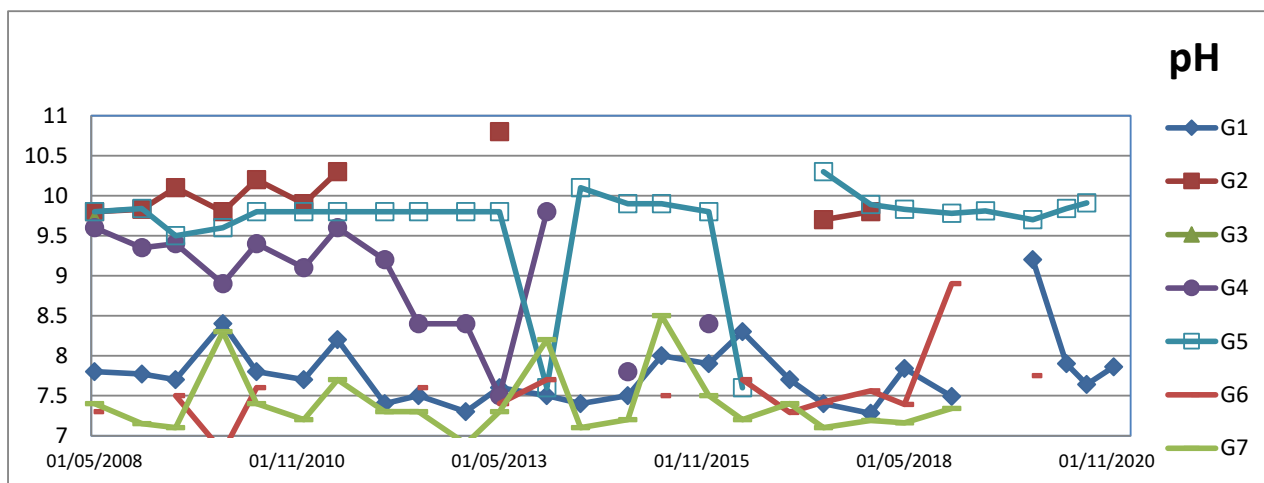
AMG RESOURCES

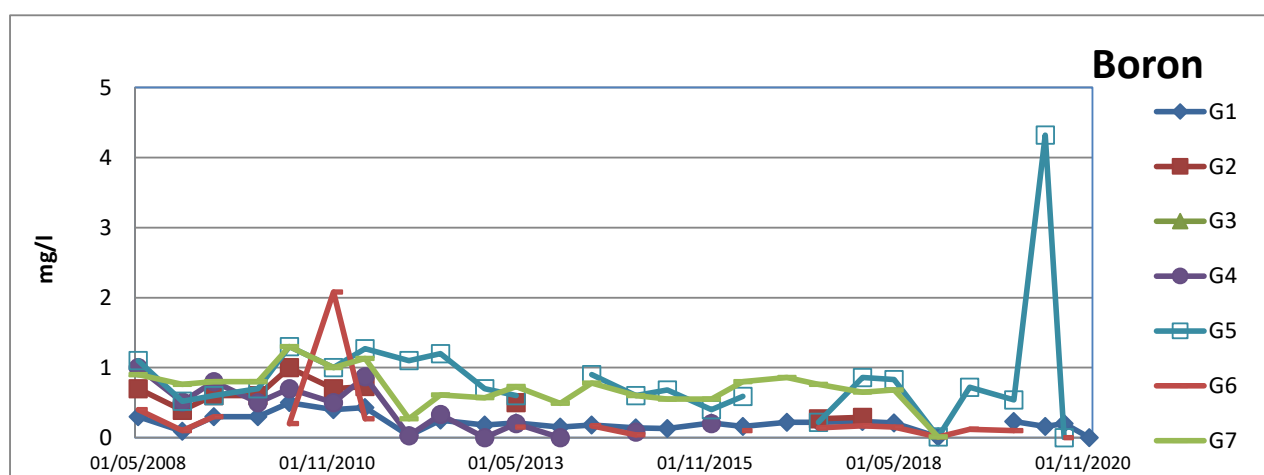
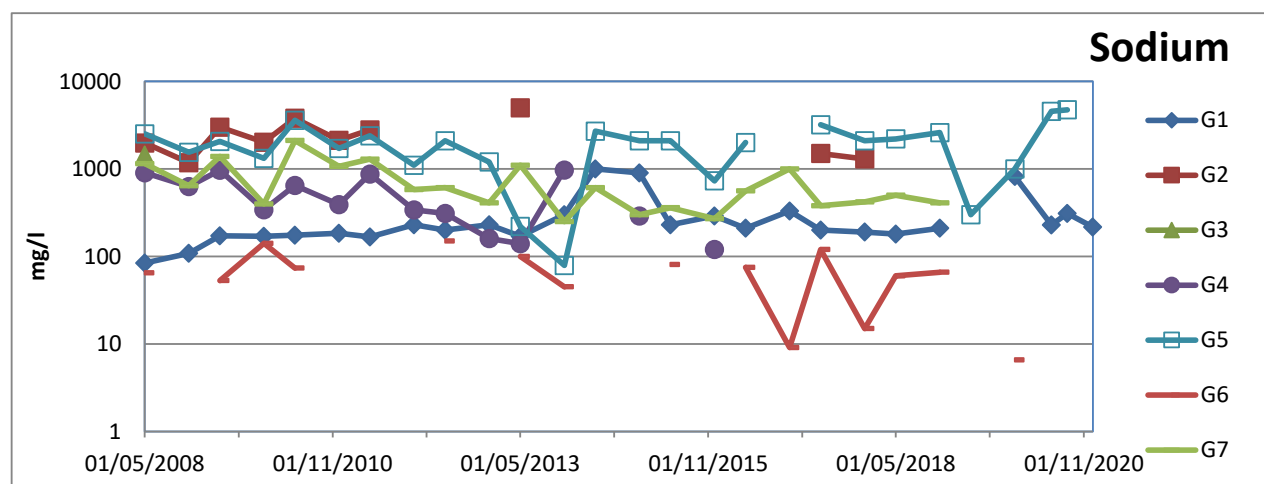
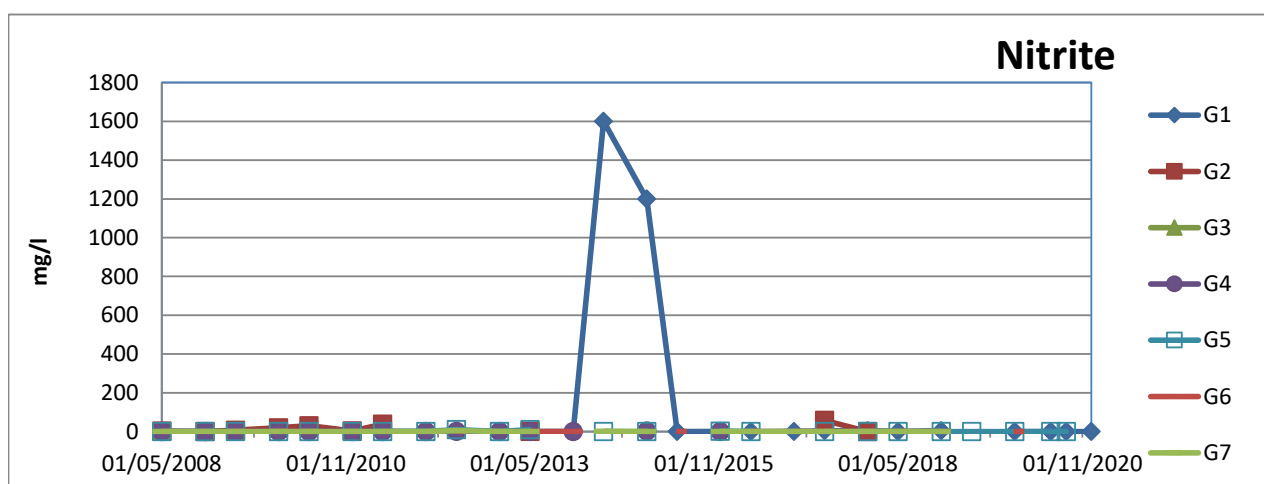
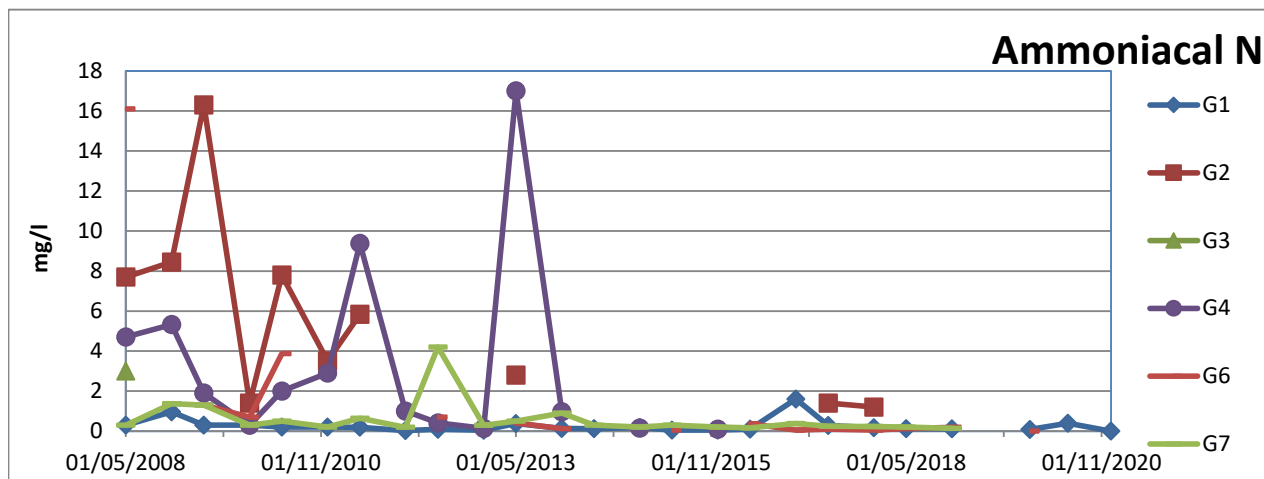
**Permit number
EPR/BM2381IQ**

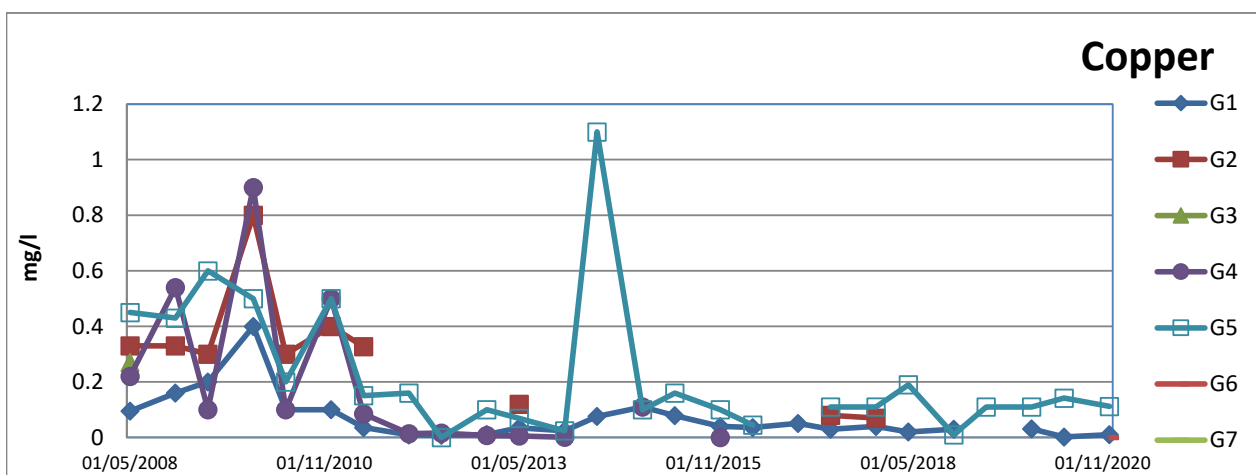
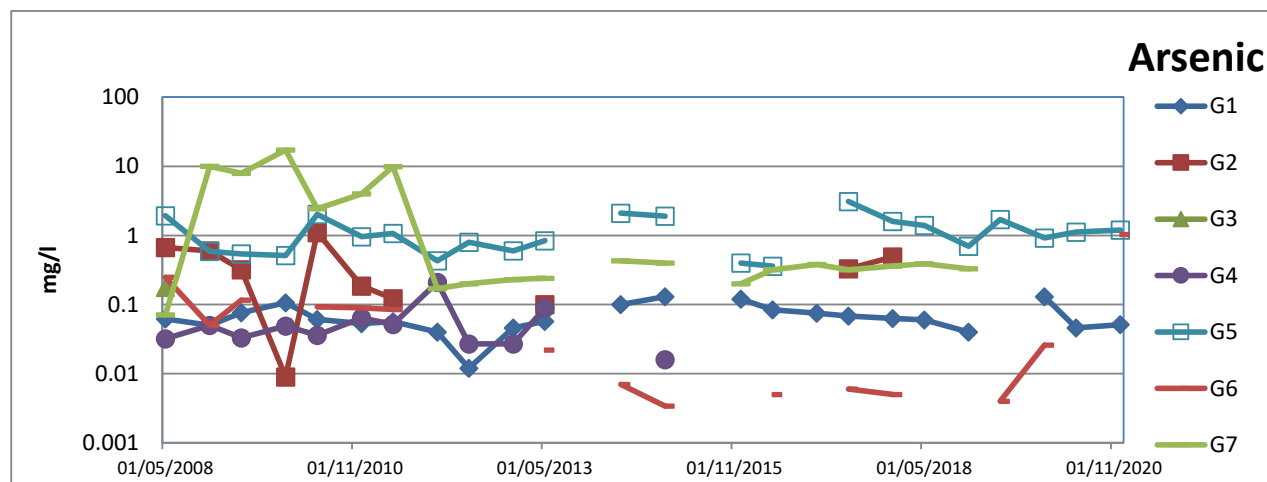
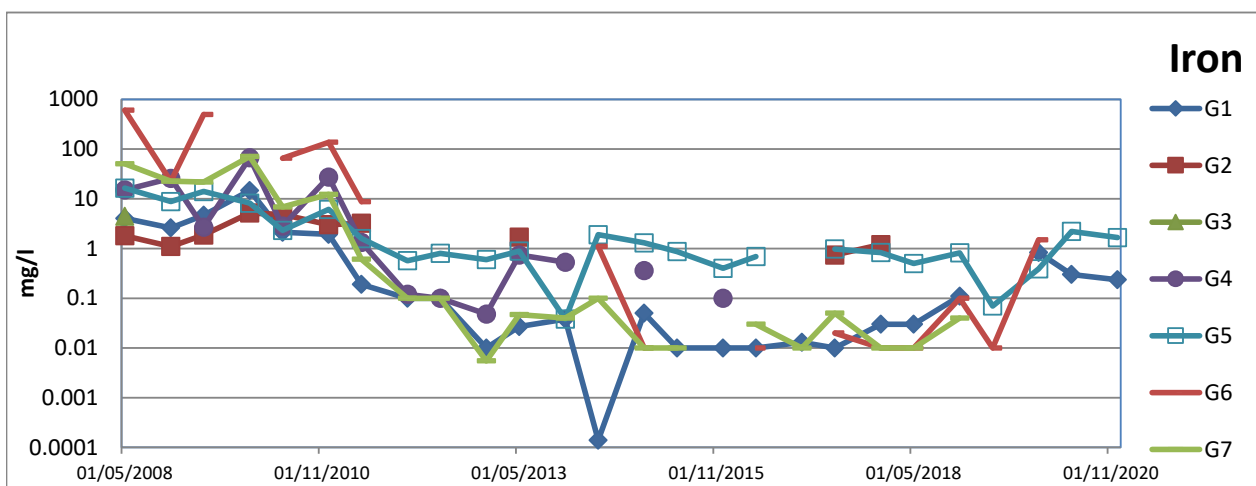
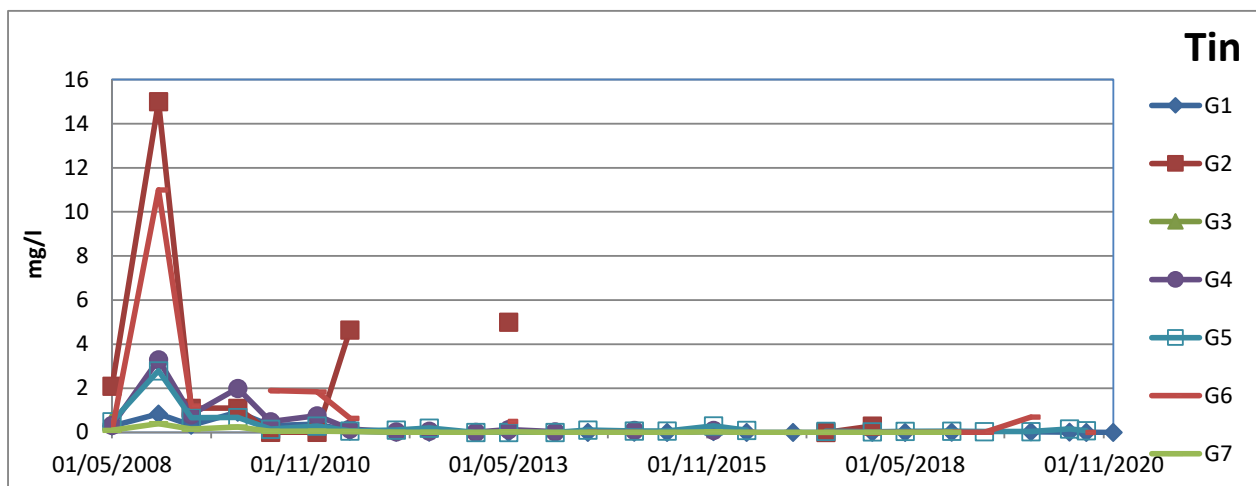
**2020 Annual
Review**

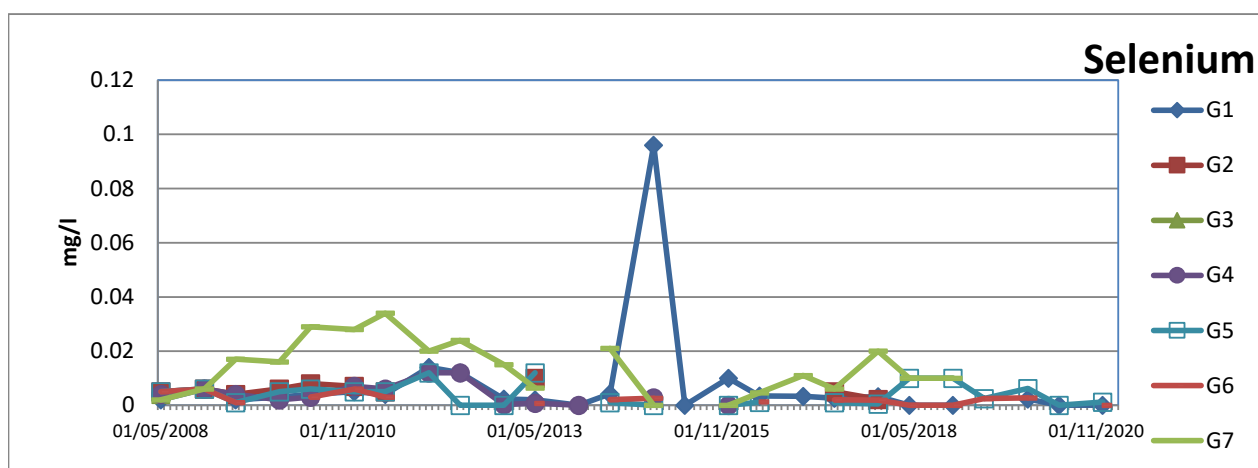
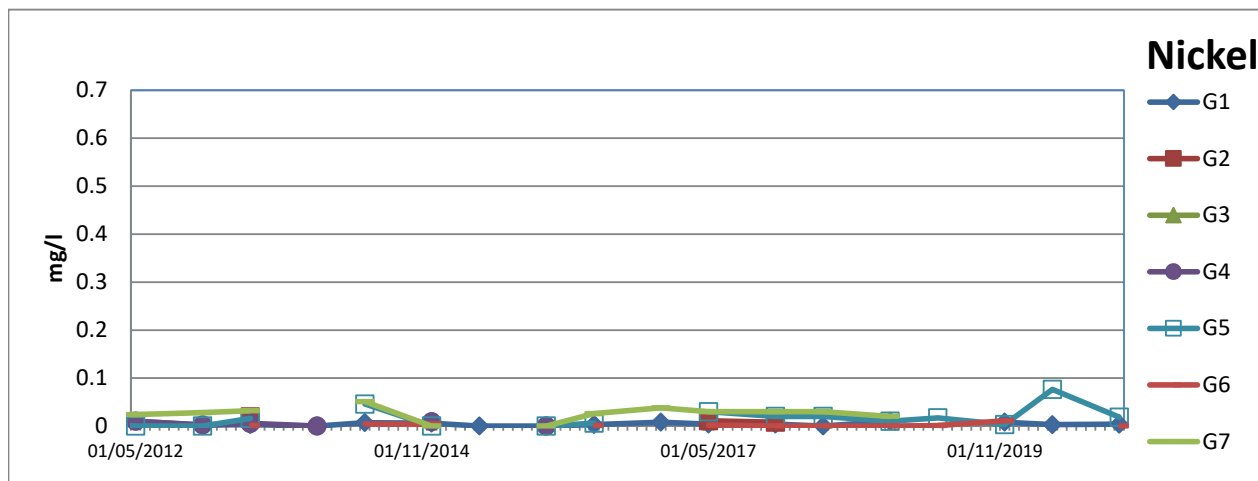
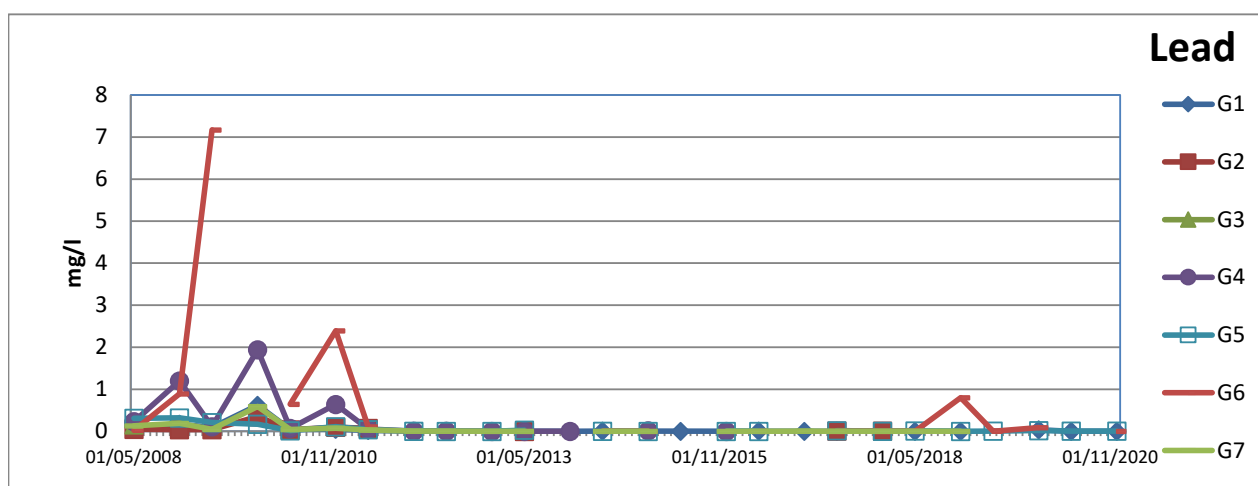
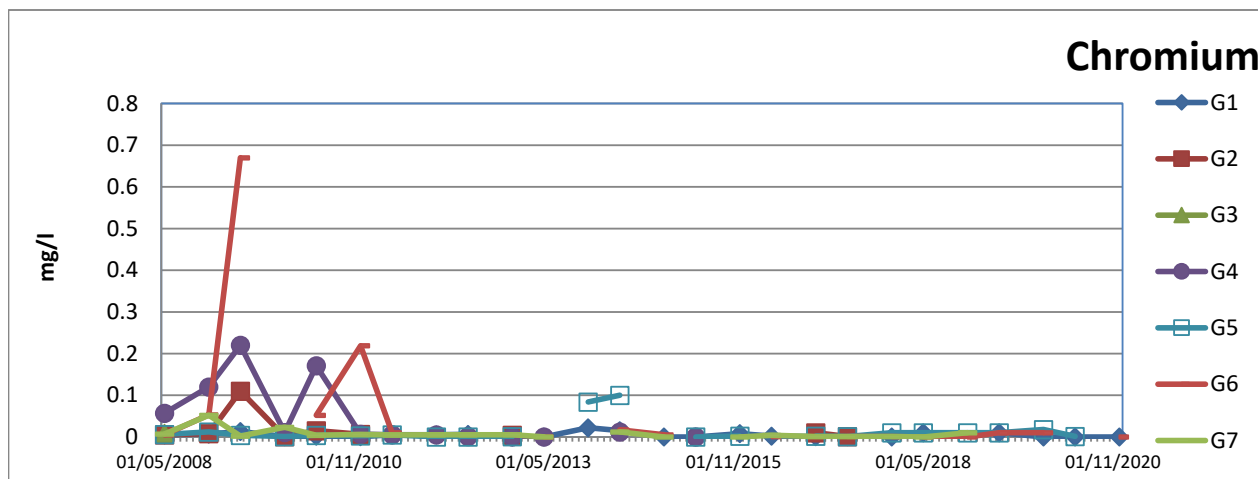
**Appendix 3
Time Series Plots of
Groundwater
Monitoring Results**

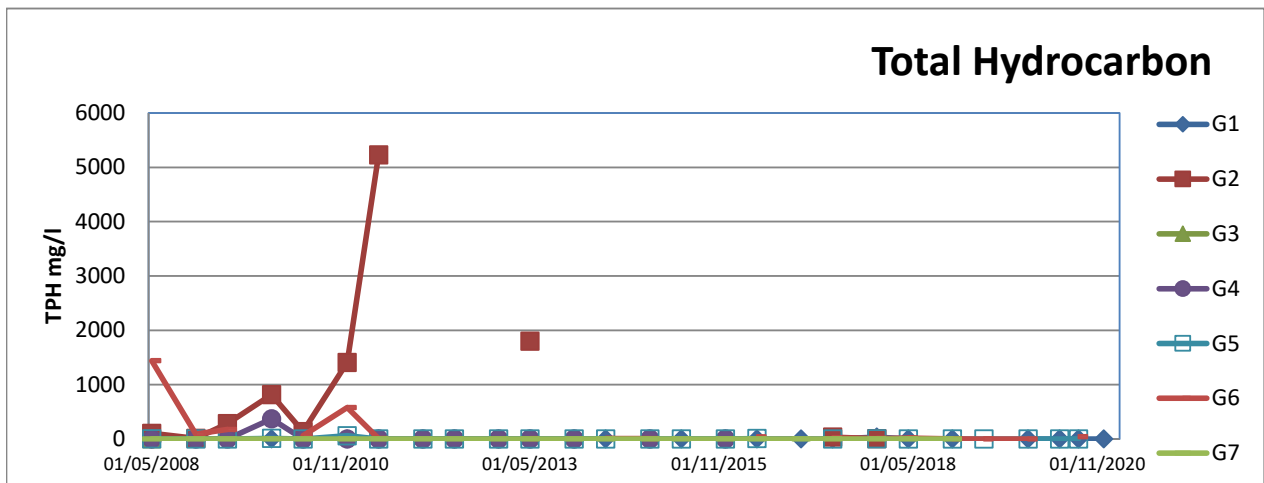
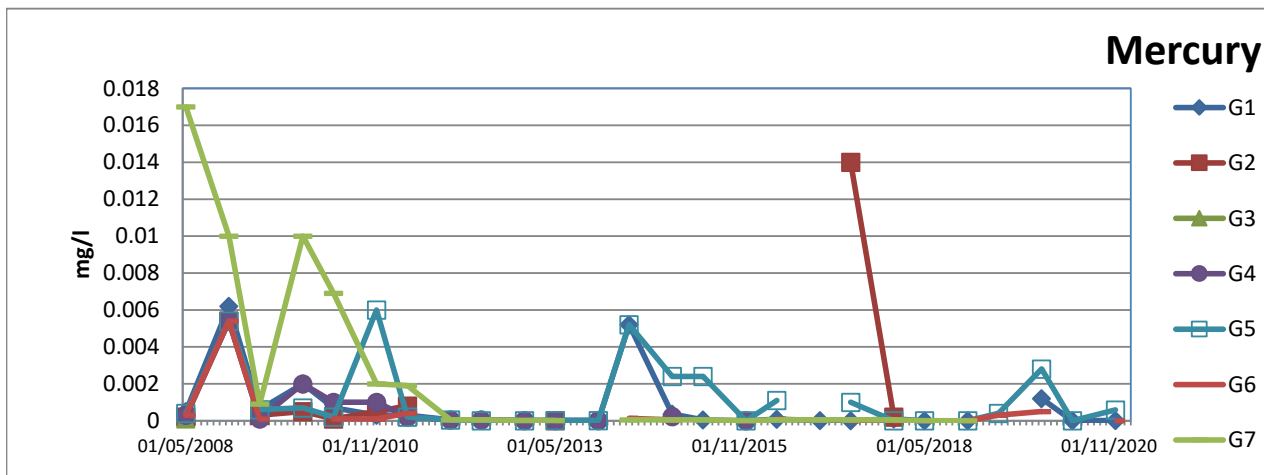
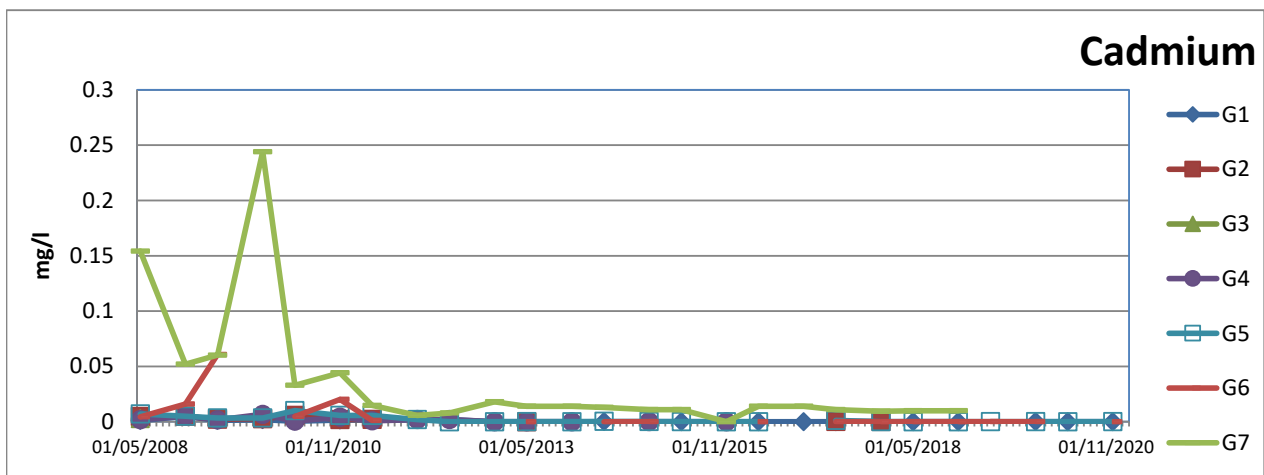
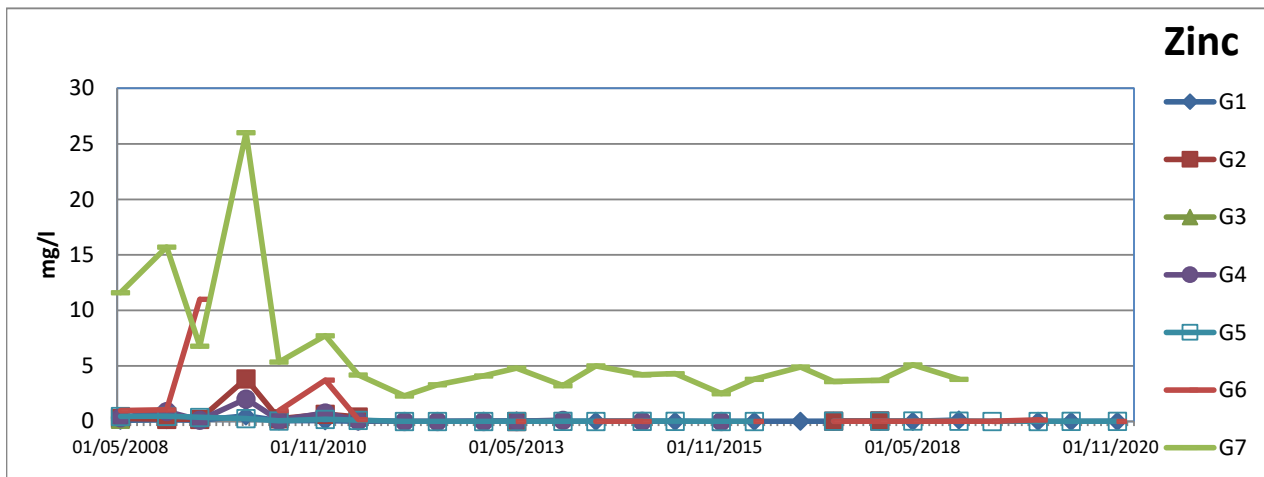
Report Number 2125r1v1d0121

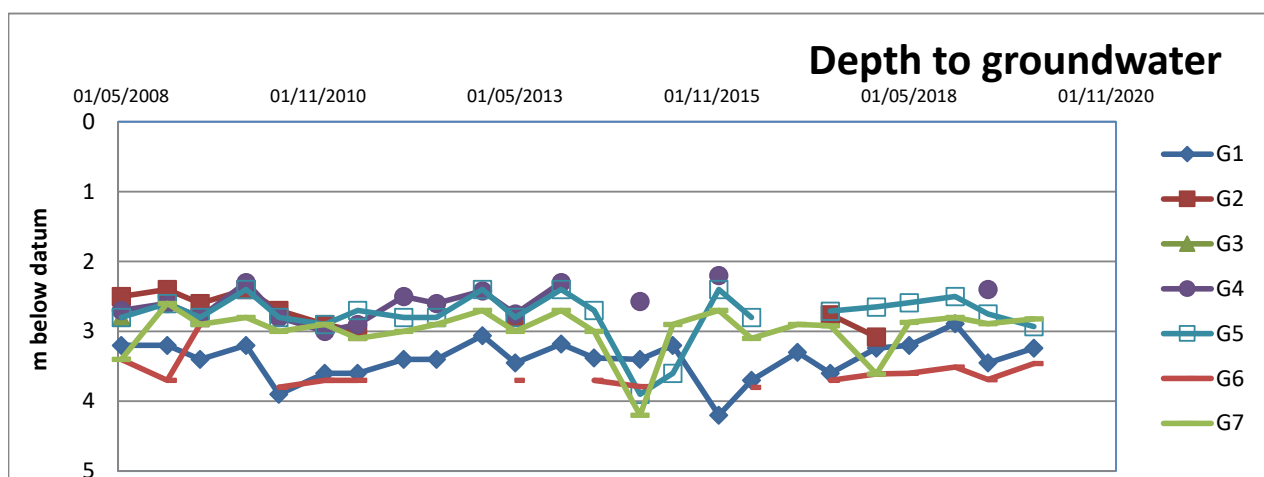
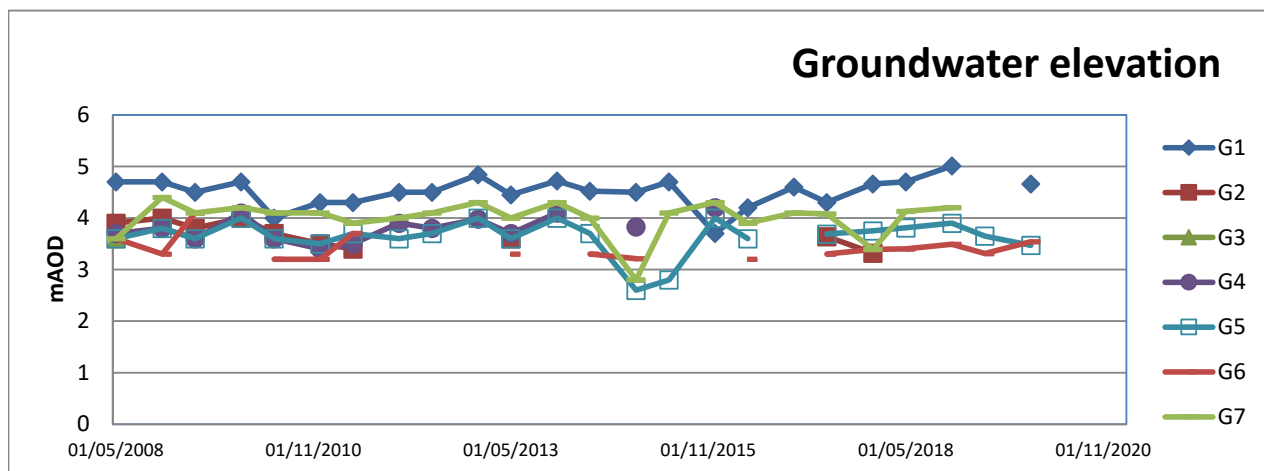
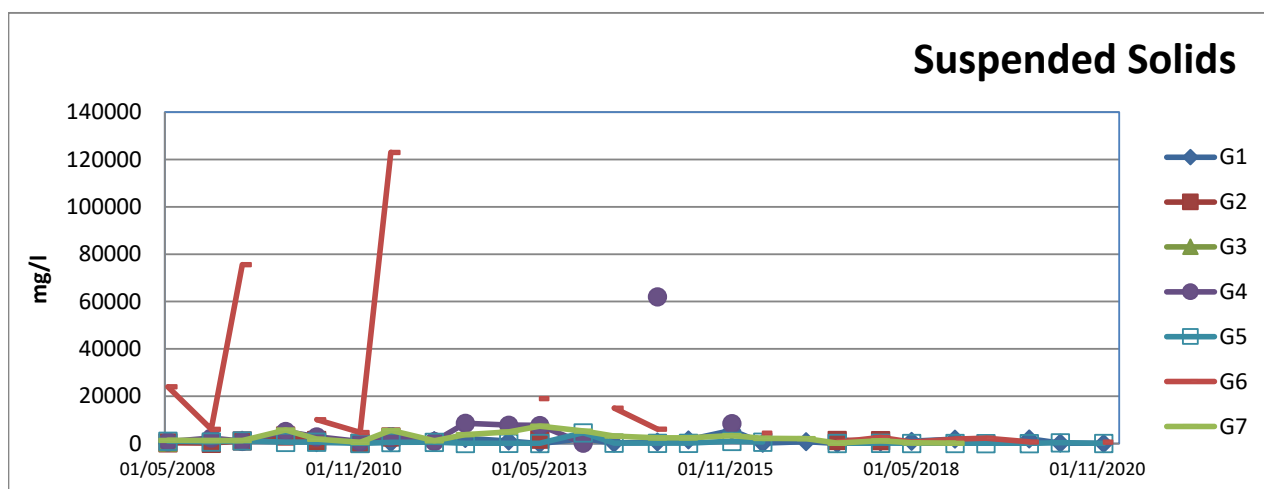
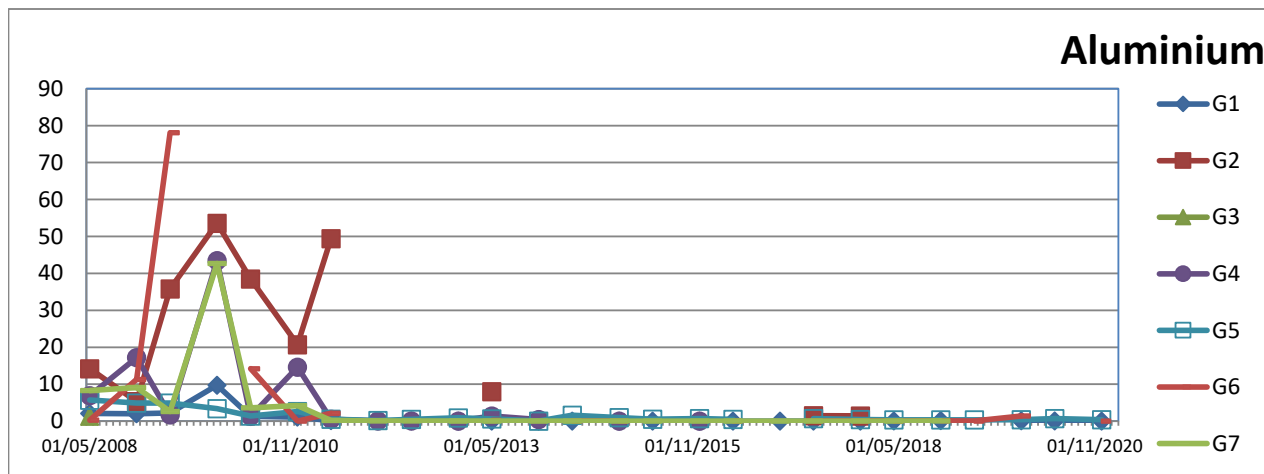














GEO
TECHNOLOGY

Geotechnical &
Environmental Services

Ty Coed
Cefn-yr-Allt
Aberdulais
Neath SA10 8HE

T 01639 775293
F 01639 779173

enquiries@geotechnology.net
www.geotechnology.net