The Coal Authority

Resolving the impacts of mining

August 2019

Bilston Glen No.1 DC Shaft Survey

Produced by: Megan Nicholson

Checked by John Leyland

Summary

A downhole CCTV survey was carried out of Bilston Glen No.1 DC (downcast) Shaft (Site Ref 432.1) on 10 July 2019. In addition, a geophysical survey using an electrical conductivity (EC) and temperature probe was run, as well as the collection of discrete water 'grab' samples for laboratory analysis.

Immediately prior to the survey, water level was dipped at 113.6 mBGL. This was confirmed by the CCTV and downhole geophysical survey.

Water samples were collected from the following depths:

- 220 mBGL;
- 350 mBGL;
- 480 mBGL; and
- 610 mBGL (close to the 2010' inset level, now shaft base due to partial shaft filling)

Sample depths were selected based on previous survey sample depths, and are relatively evenly spread through the water column. The samples were submitted to SOCOTEC Ltd for laboratory analysis for the Coal Authority CA1 suite.

The reported total depth of the Bilston Glen No. 1 DC (downcast) Shaft (from abandonment plans) is 753 mBGL. Previous survey in 2016 confirmed that the shaft terminates at 612 mBGL (believed intentionally filled below this level). In 1989, a platform was constructed within the void shaft at a depth of 24m below ground level and a 6m thick concrete plug was cast on top of the platform. The shaft above the plug was then filled to the surface.

Visual observations

The downhole CCTV camera survey was conducted to assess shaft condition, to identify potential obstructions and to provide a subjective assessment of water quality and/or stratification (as indicated by visibility/clarity). Key observations are included below:

- The shaft is capped with a manhole access, the cap is penetrated by a 150mm casing;
- Below the cap (depth 24 m) the shaft is large diameter (7.3 m from shaft files);

- Above water within the shaft various structures including risers and possibly cage guides and beams can be seen;
- Below water the visibility was good with clear water though some light coloured suspended sediment was visible. Due to the shaft diameter and the limits of light penetration the shaft sides were not clearly visible;
- Regular steel beams were visible at approximately 3 m intervals, these appeared to be in stable condition. Accumulations of light coloured sediment were present on top of all beams; and
- The base of shaft was visible with good water clarity, various structures including a suspected handrail were visible with accumulations of light coloured sediment.

Physical and Chemical Results

Standing water level at the time of survey was 113.6 mBGL. Samples were collected from the depths listed above. The full downhole geophysical survey results are presented in **Figure 1** with the shaft survey log included as **Appendix A**.

The key findings of the field and laboratory water assessment include:

- The shaft temperature profile showed the water temperature to be in the range 16.5 to 17.4°C. The temperature profile is presented in **Figure 2** together with the in shaft temperature profiles from previous surveys in 2012 and 2016;
- Laboratory measured EC of the four water samples collected was in the range 1660 to 1680 µS/cm @25°C. The highest EC was measured in the deepest sample. The laboratory results match the field measured EC profile as presented in **Figure 3** together with the in shaft EC profiles from previous surveys in 2012 and 2016;
- Total Iron concentrations in the four samples collected were in the range 0.33 to 0.5 mg/l. Iron concentrations increased with depth with the highest concentration measured in the deepest (610 mbgl) sample. Iron results from 2019 analysis are presented in **Figure 4** by depth together with the 2012 results and the EC profile;
- Sulphate concentrations in the four samples collected were in the range 65 to 81 mg/l. Sulphate concentrations decreased with depth with the lowest concentration measured in the deepest (610 mBGL) sample. The sulphate results are presented by depth with the EC profile in **Figure 5**;
- Chloride concentrations in the four samples collected were in the range 251 to 263 mg/l with the highest concentration measured in the deepest (610 mBGL) sample. The chloride results are presented by depth with the EC profile in **Figure 6**; and
- Alkalinity fluctuated throughout the depth of the shaft, with a range from 305 to 467 mg/l as $CaCO_3$ with the highest concentration in the shallowest (220 mBGL) sample. The alkalinity results are plotted against depth with EC in **Figure 8**.

The results of laboratory analysis for selected parameters are included in **Table 1** together with the depths from which the samples were collected.

Table 1: Summary of selected laboratory results on the 4 samples taken during the survey

Parameter	Sample Depth (mBGL)			
	220	350	480	610
Iron (mg/l) Total	0.33	0.39	0.41	0.5
Iron (mg/l) Dissolved	0.28	0.28	0.34	0.33
pH	7.7	7.7	7.7	7.7
Sulphur as SO_4 (mg/l) Dissolved	81	76	70	65
Chloride (mg/l)	251	254	256	263
Alkalinity as $CaCO_3$ (mg/l)	467	472	464	465
Electrical Conductivity (at 25°C)	1660	1660	1670	1680
On-Site Temperature (°C)	16.8	17	17.2	17.4

Full results of laboratory analysis are presented in SOCOTEC laboratory UKAS report reference W28_7271 included as appendix B.

Comparison to Previous Surveys

Previous shaft surveys were carried out in 2012 and 2016. The temperature and EC results from all three surveys are presented for comparison in **Figure 2** and **Figure 3**.

The mine water level in the Bilston Glen mining system has risen by approximately 100 m between 2012 and 2019 as measured in the Bilston Glen No.1 DC Shaft. The water level at time of survey is indicated in the comparative figures (**Figure 2**, **Figure 3**, **Figure 4**). The average rate of mine water rise in the period 2012 and 2019 was 14 m/year.

In addition to the water level, the iron concentration in the water at all depths sampled has increased. This is shown in **Figure 4** which presents both 2012 and 2019 iron data for comparison. The increase is relatively consistent at all sampling depths with a rise of approximately 0.4 mg/L over a 7 year period.

Overall, the 2019 assessment shows no substantial change in either in-shaft conditions or water quality from the previous surveys. The EC and the temperature profiles from each survey show the similar traces, representing consistent conditions throughout the shaft with no step changes detected, indicating a lack of stratification.

The only significant change between this and previous assessments is the rise in mine water levels which has been observed via the routine water level monitoring that has been ongoing in the period between the downhole surveys.

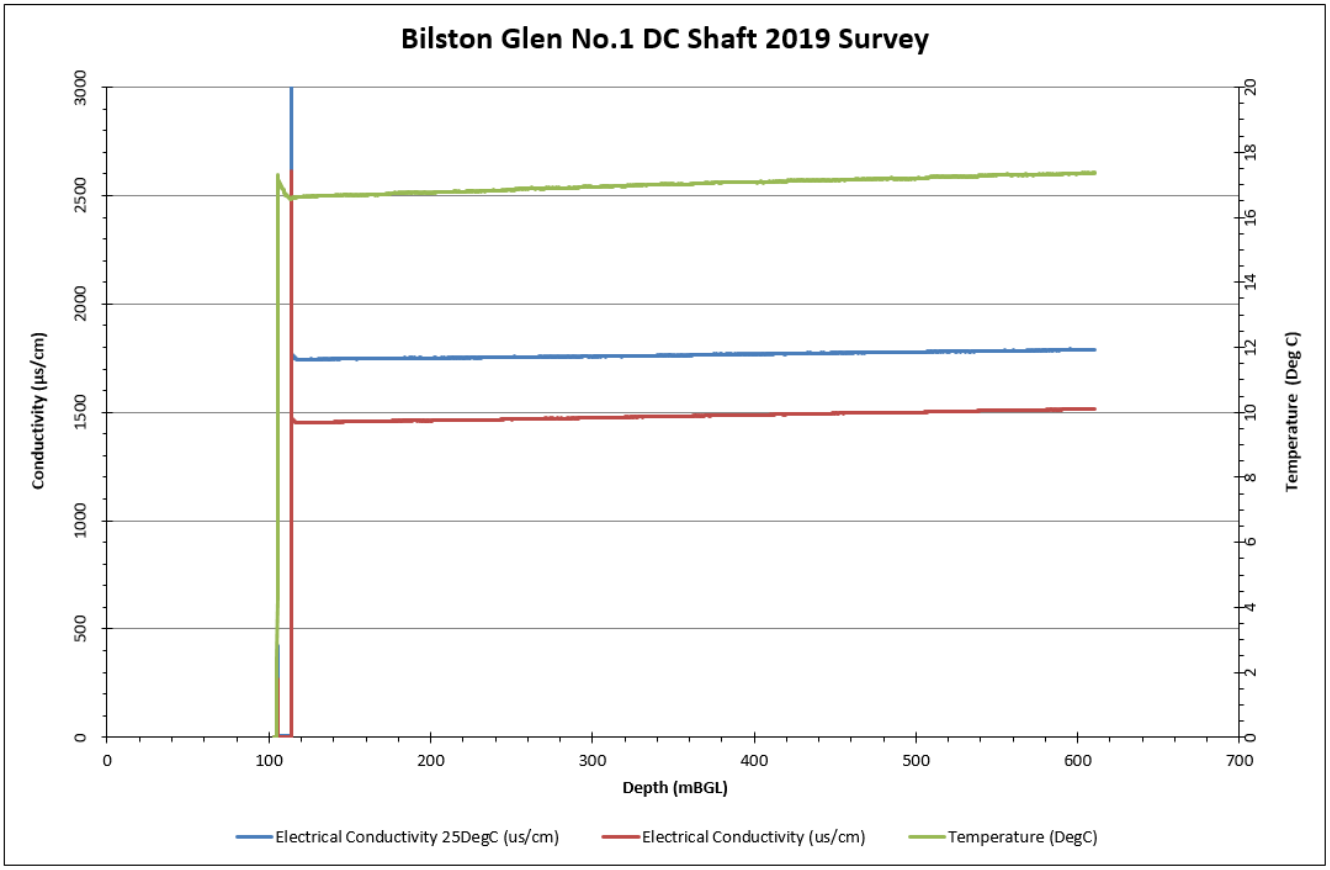


Figure 1: 2019 shaft survey showing electrical conductivity at 25°C, electrical conductivity, natural gamma and temperature vs depth

Figure 2: Comparison of 2012, 2016 and 2019 Bilston Glen shaft surveys, showing temperature

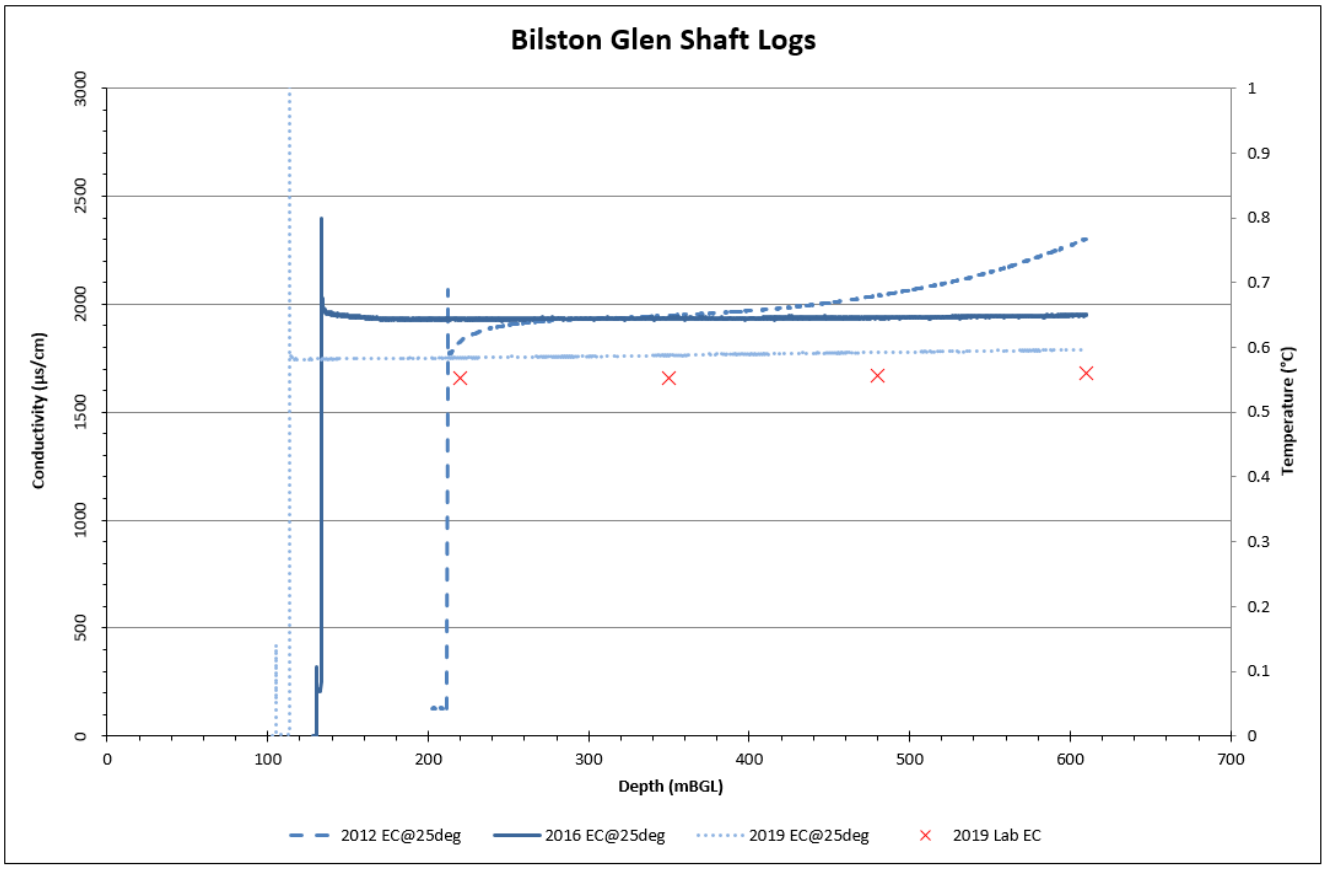


Figure 3: Comparison of 2012, 2016 and 2019 Bilston Glen shaft surveys, showing conductivity at 25°C

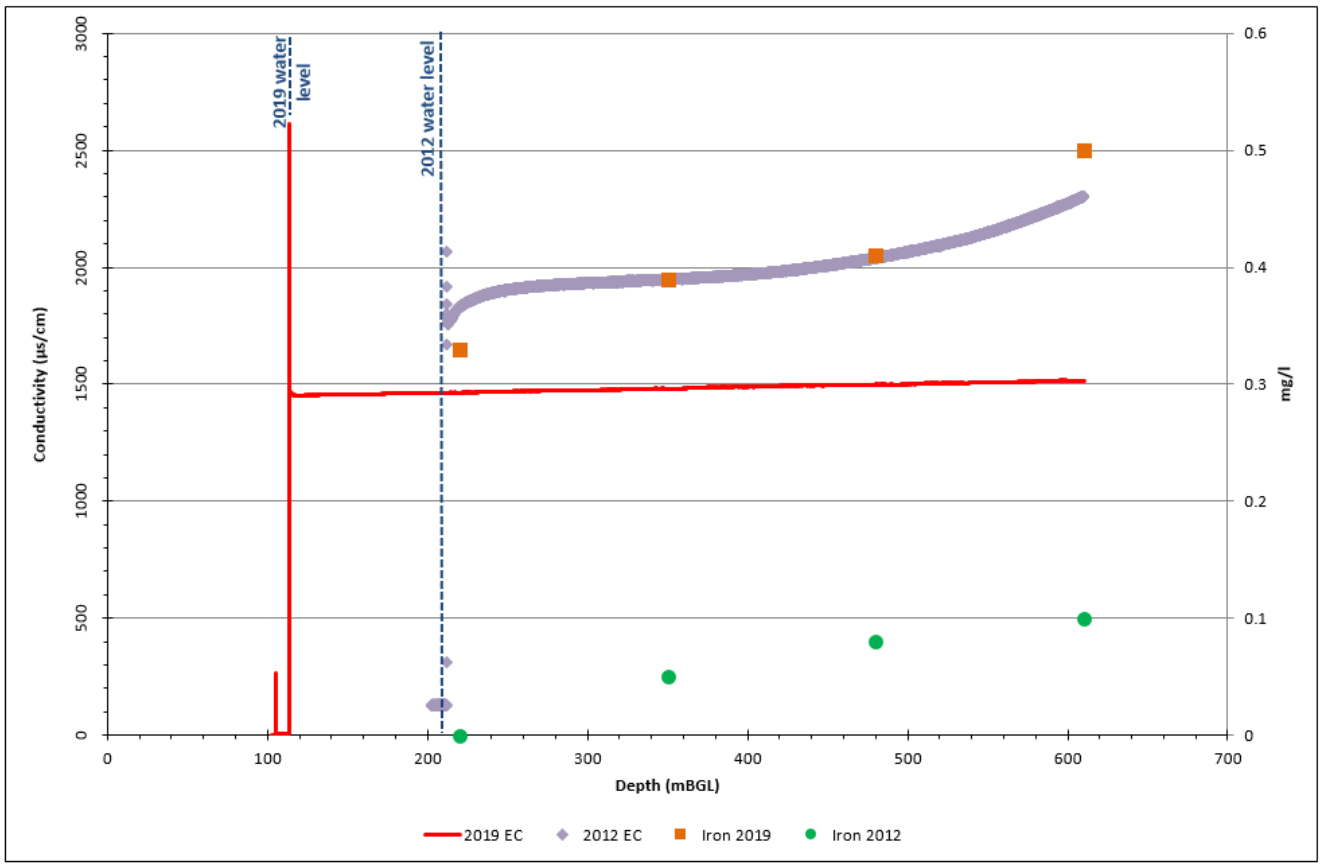


Figure 4: Electrical conductivity and Iron results from 2012 and 2019

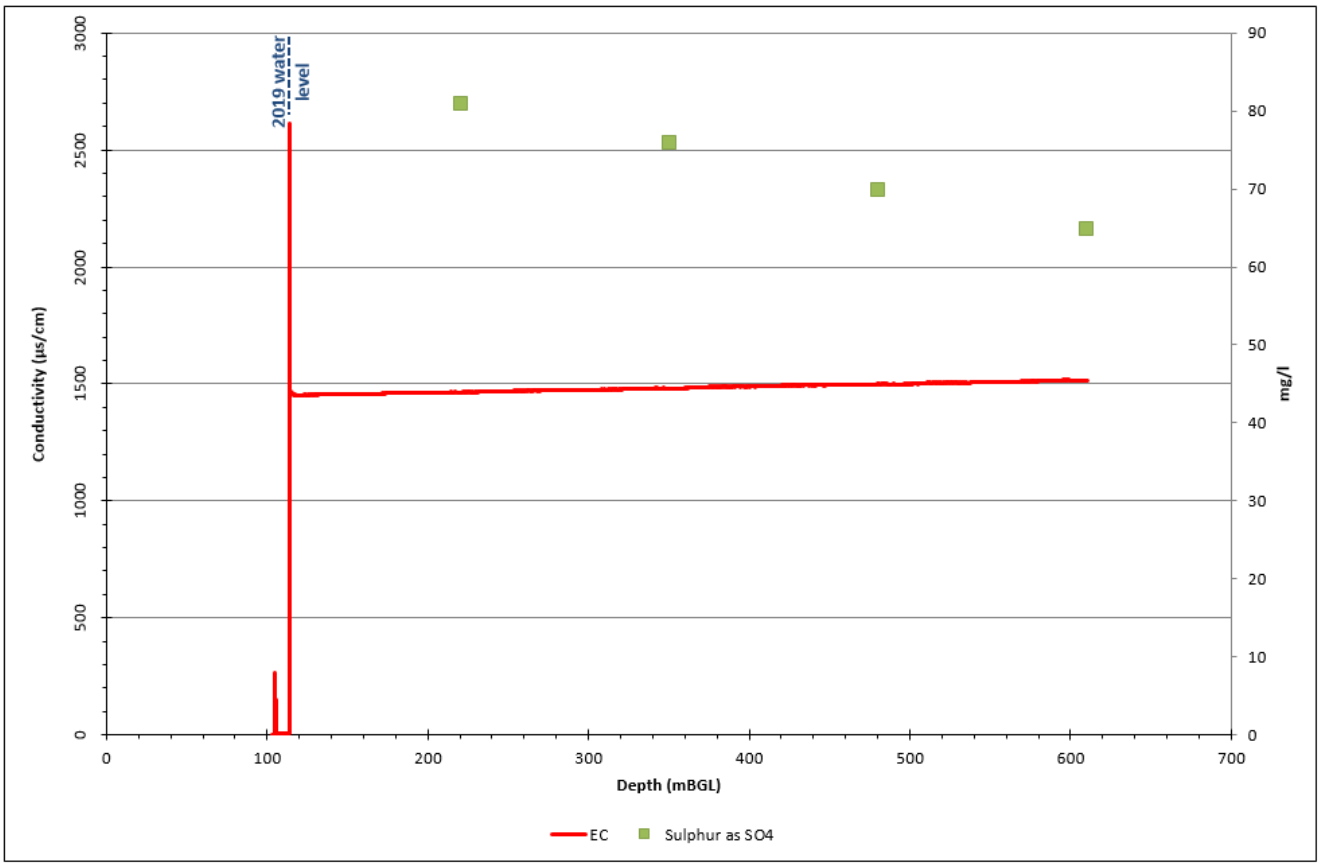


Figure 5: Electrical Conductivity Vs Sulphur

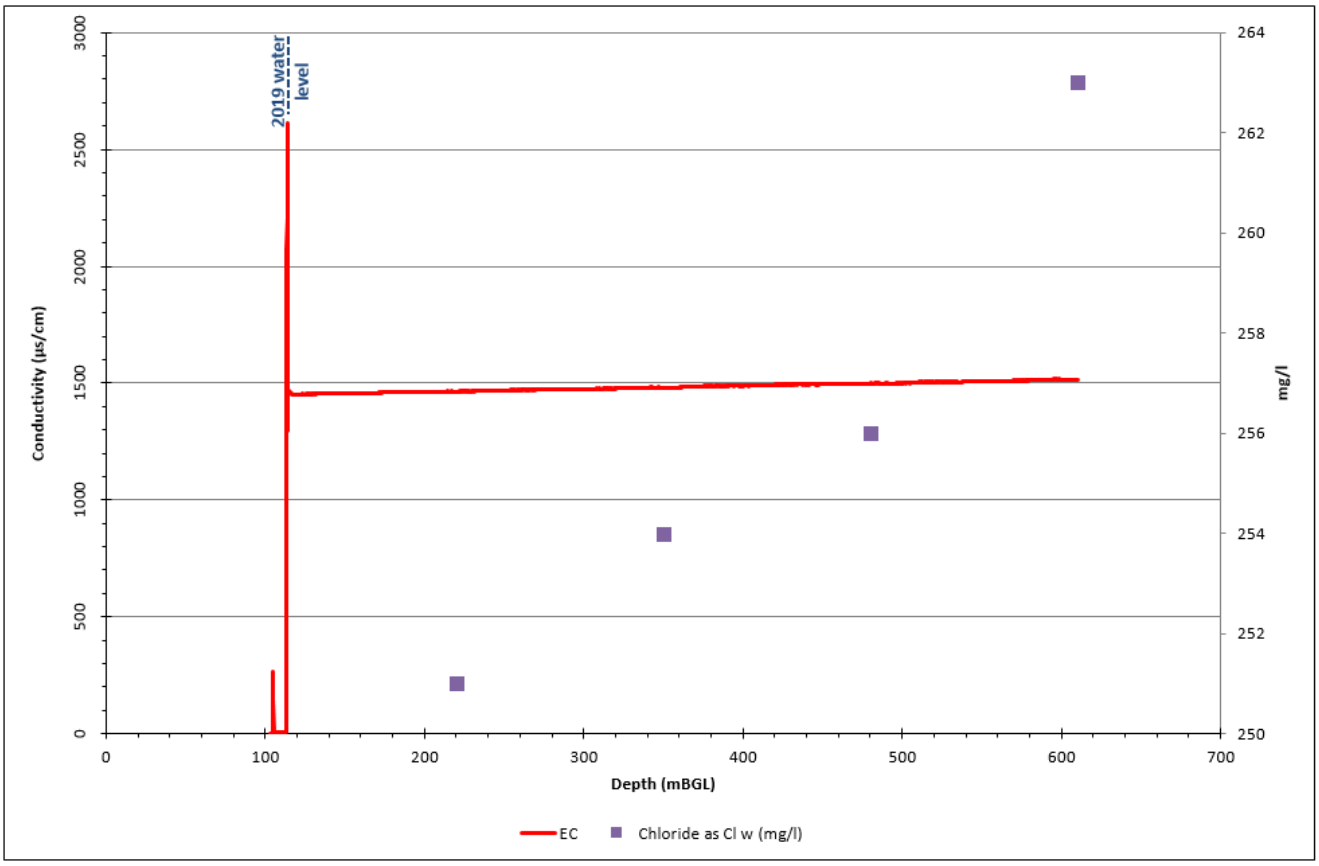


Figure 6**: Electrical Conductivity Vs Chloride**

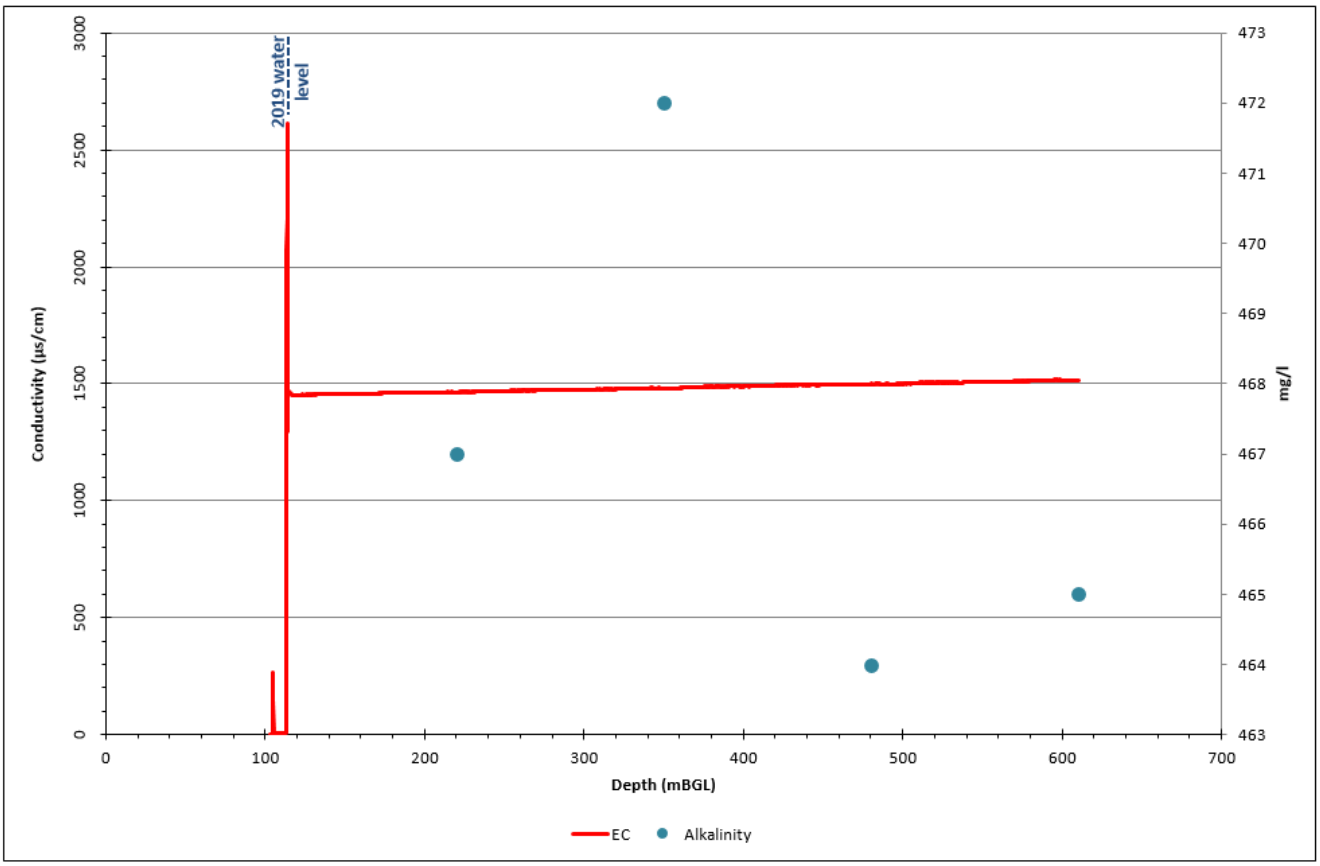


Figure 7: Electrical Conductivity Vs Alkalinity

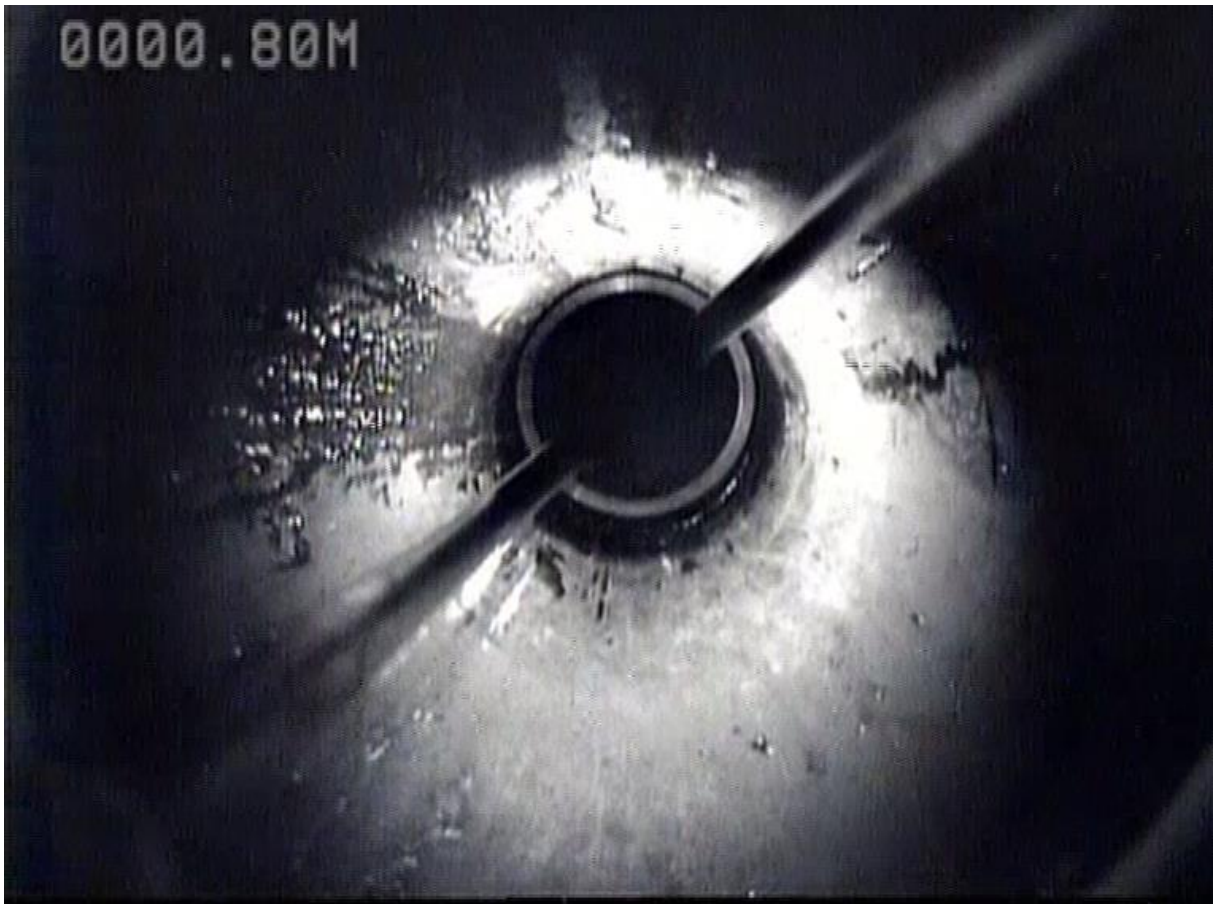


Plate 1: Cased (~100mm) penetration through shaft cap (0 – 24mBGL)

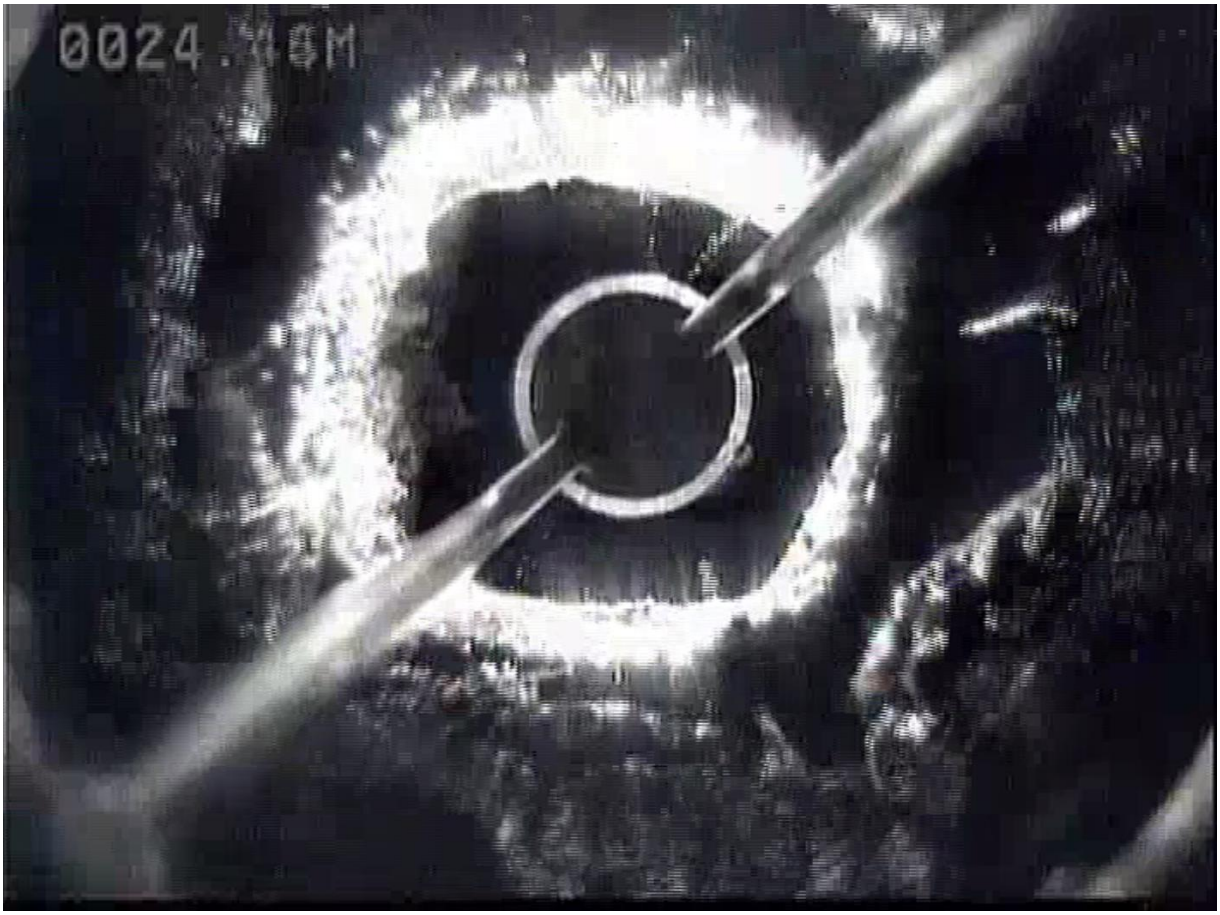


Plate 2: Base of the shaft cap at 24mBGL.

Plate 3: Water level at 113.6 mBGL

Plate 4: First sampling point at 220 mBGL

Plate 5: Photo 5: Second sampling point at 350 mBGL

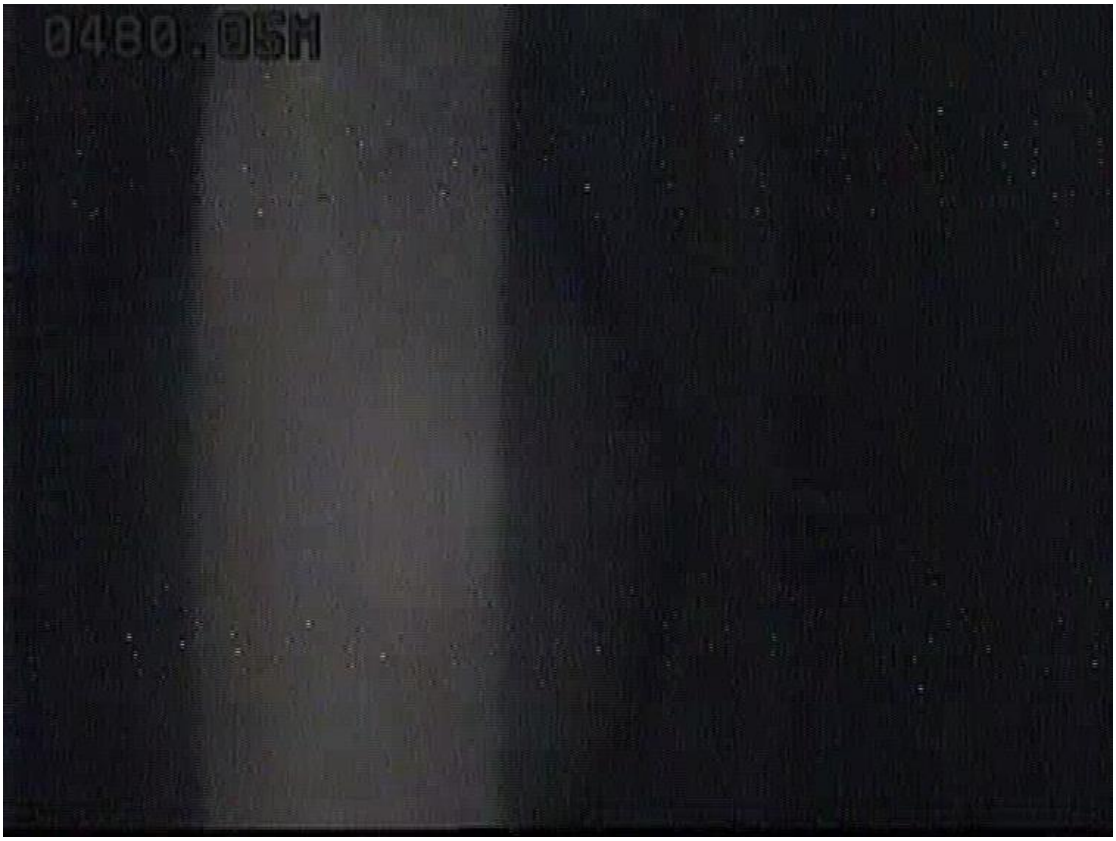


Plate 6: Third sampling point at 480 mBGL

Plate 7: Final sampling point at 610 mBGL

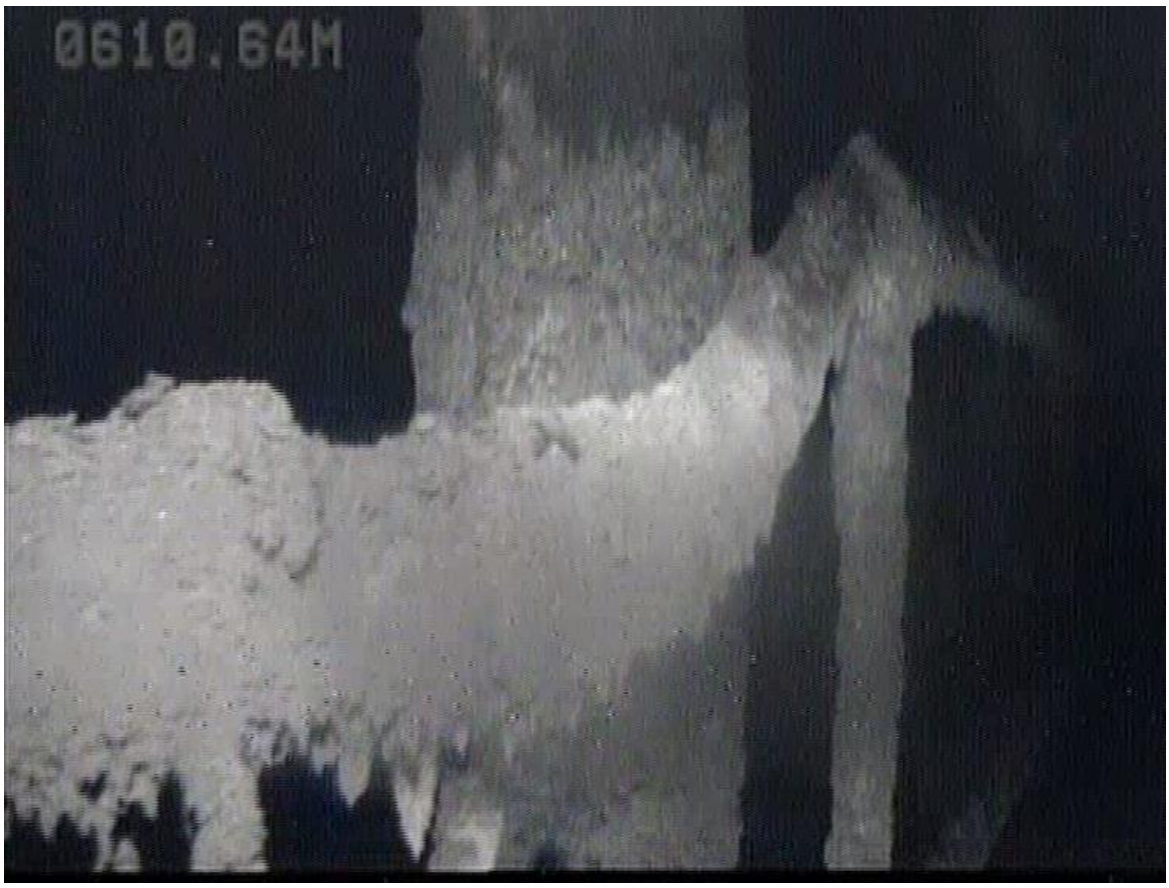


Plate 8: Handrail at the base of the shaft 610 mBGL, probably associated with the 2010' Inset Level

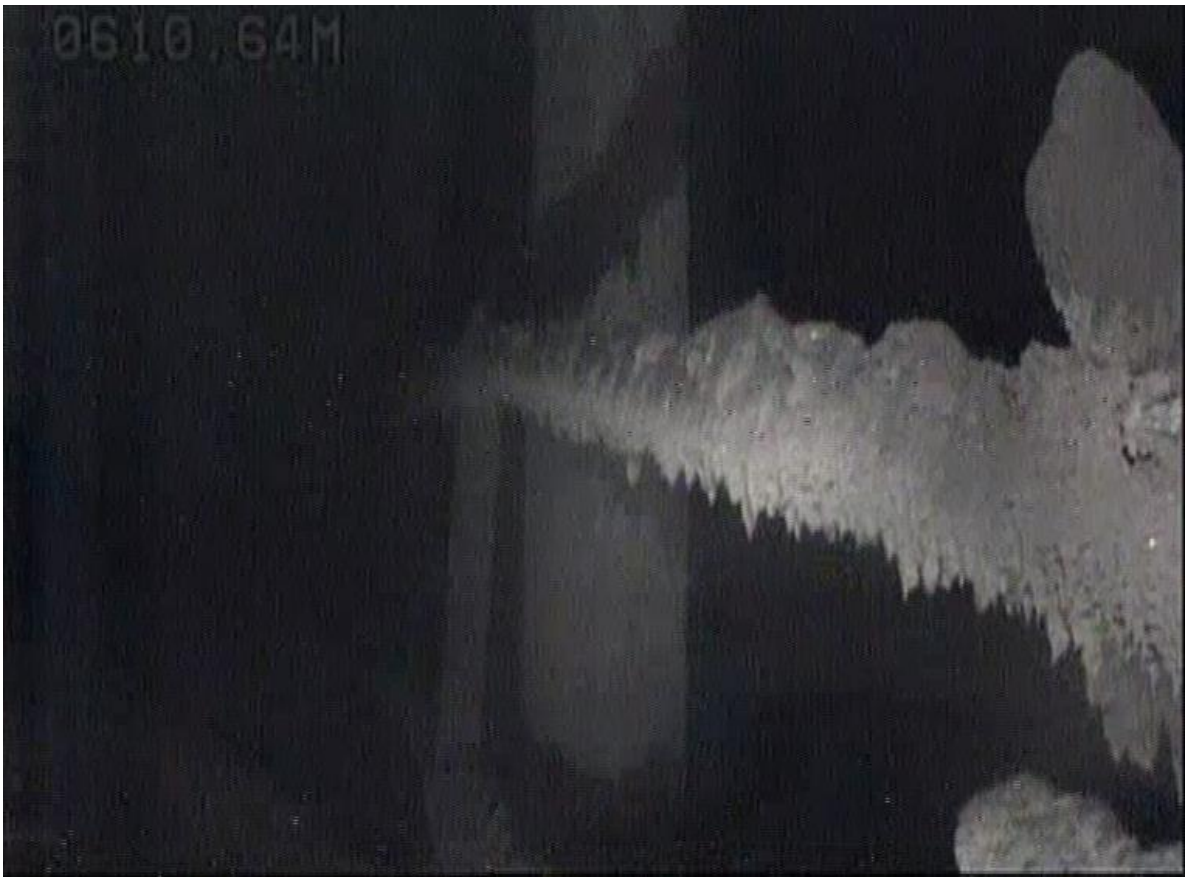


Plate 9: Handrail at the base of the shaft 610 mBGL, probably associated with the 2010' Inset Level

Appendix A – Geophysical Logs

CA08/20/1/901/5

Bilston Glen Shaft 1 - 20190710.zip (metadata)

ROBERTSON GEO SERVICES
Unlocking Your GeoData

CO	Coal Authority		
WELL	Bilston Glen		
FLD	Bilston Glen Industrial Estate		
CTY	Scotland		
STE			
FILING No			

COMPANY Coal Authority
WELL ID Bilston Glen
FIELD Bilston Glen Industrial Estate
COUNTRY Scotland STATE
LOCATION
Latitude: 55.873335
Longitude: -3.1639317

OTHER SERVICES

SEC TWP RGE

PERMANENT DATUM	GL	ELEVATION	K.B.
LOG MEAS. FROM		ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

DATE	10/07/19	TYPE FLUID IN HOLE	Water
RUN No		SALINITY	
TYPE LOG	Temperature Conductivity	DENSITY	
DEPTH-DRILLER	612	LEVEL	113.6
DEPTH-LOGGER	610.64	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	610.64		
TOP LOGGED INTERVAL	105.00	CASING SHOE	24
OPERATING RIG TIME			
RECORDED BY	KO		
WITNESSED BY	JB		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO

CERTIFICATE OF CONFORMITY

Certificate of Conformity

This is to certify that the following equipment conforms to the specification detailed below

ROBERTSON GEO
Unlocking Your GeoData

Equipment type: Temperature Conductivity Probe

RG Order No: ORD00000

Serial No: TCDS 2822

Comm. Type: Standard 4-Core

Quality Management System:
ISO 9001:2015
Certified by TÜV SÜD

Tested by: T Hamflett

Date: 14/03/19

Approved by:

Tim Hamflett | *Test Engineer*

Date: 14/03/19

ISO 9001
Certified
Quality Management System
www.tuv-sud.com/ms-cert

Robertson Geologging Ltd.
Deganwy, Conwy, LL31 9PX,
United Kingdom
T: +44 (0) 1492 582 323
E: support@robertson-geo.com
www.robertson-geo.com

ROBERTSON GEO
Unlocking Your GeoData

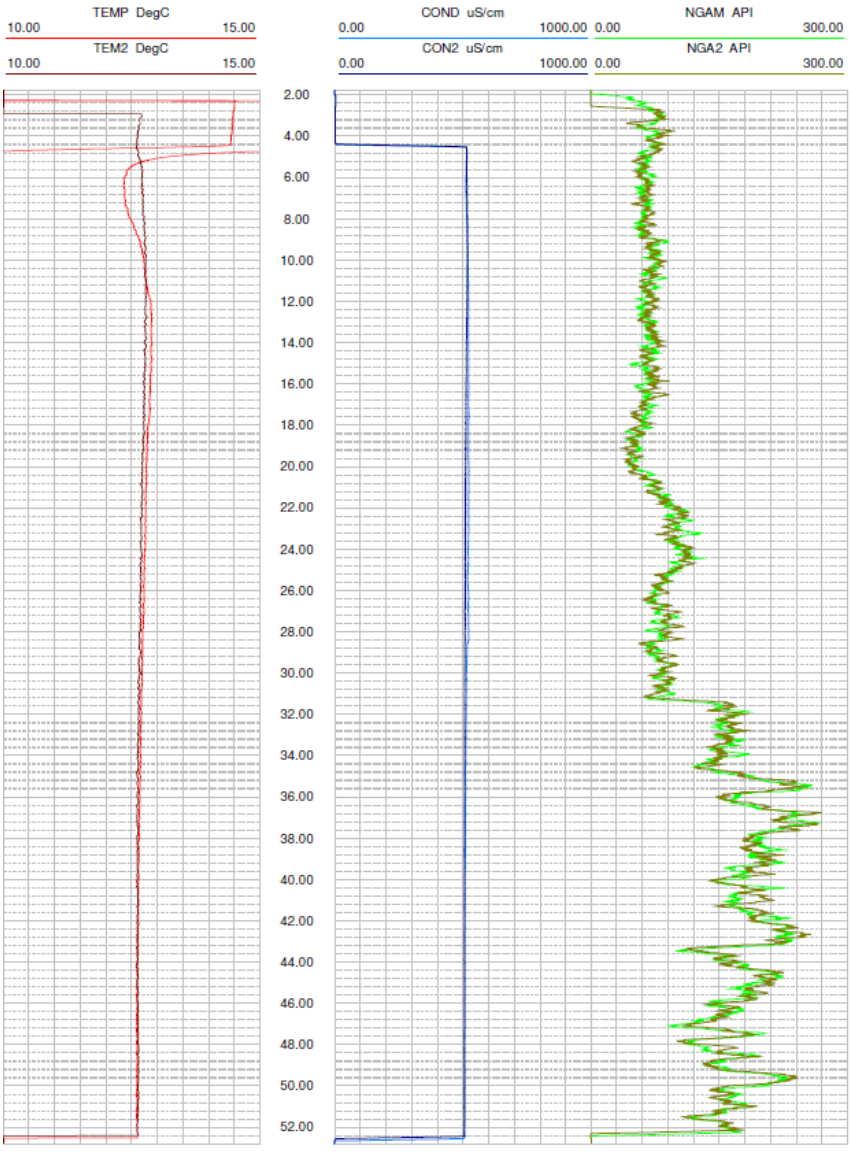
CERTIFICATE OF CONFORMITY

The probe detailed has been calibrated and then logged in the **ROBERTSON** GEO Test Borehole (Deganwy, UK). The resulting data falls within acceptable tolerances and meets all test criteria.

ROBERTSON GEO
Unlocking Your GeoData

Down Pass: 0-50m

Up Pass: 50-0m



Channel	x^n	Coefficient
1 TEMP	0	-8.81863
	1	4.81721E-3
	2	0.0
	3	0.0
2 COND	0	4.33278
	1	0.958435
	2	3.76568E-7
	3	7.06512E-11
3 NGAM	0	0.0
	1	1.29518
	2	0.0
	3	0.0
4	0	0.0
	1	1.0
	2	0.0
	3	0.0
5	0	0.0
	1	1.0
	2	0.0
	3	0.0
6	0	0.0
	1	1.0
	2	0.0
	3	0.0
7	0	0.0
	1	1.0
	2	0.0
	3	0.0
8	0	0.0
	1	1.0
	2	0.0
	3	0.0
9	0	0.0
	1	1.0
	2	0.0
	3	0.0
10	0	0.0
	1	1.0
	2	0.0
	3	0.0
11	0	0.0
	1	1.0
	2	0.0
	3	0.0
12	0	0.0
	1	1.0
	2	0.0
	3	0.0

Calibrated Value=$ax^0+bx^1+cx^2+dx^3$

TÜV SÜD ISO 9001
ISO 9001
Certified
Quality Management System
www.tuv-sud.com/ms-cert

Robertson Geologging Ltd.
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E: growlands@robertson-geo.com
www.robertson-geo.com

ROBERTSON GEO
Unlocking Your GeoData

Appendix B – Laboratory Certificate of Analysis

CA08/20/1/901/5

Bilston Glen Shaft 1 - 20190710.zip (metadata)

Our Ref: EXR/287271 (Ver. 1)
Your Ref:

July 22, 2019

Environmental Chemistry
SOCOTEC UK Limited
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

John Leyland
Coal Authority
200 Lichfield Lane
Berry Hill
Mansfield
Nottinghamshire
NG18 4RG

For the attention of John Leyland

Dear John Leyland

Sample Analysis - Bilston Glen

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with SOCOTEC UK Limited (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for SOCOTEC UK Limited

E Jones
Project Co-ordinator
01283 554400

TEST REPORT

Report No. EXR/287271 (Ver. 1)

Coal Authority
200 Lichfield Lane
Berry Hill
Mansfield
Nottinghamshire
NG18 4RG

Site: Bilston Glen

The 5 samples described in this report were registered for analysis by SOCOTEC UK Limited on 13-Jul-2019. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 22-Jul-2019

The following tables are contained in this report:

On behalf of
SOCOTEC UK Lim

Becky Batham Operations Manager
Energy & Waste Services

Date of Issue: 22-Jul-2019

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected. SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Units :			mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
Method Codes :			ICPMSW	ICPMSW	ICPMSWT	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR	ICPWATVAR
Method Reporting Limits :			0.001	0.002	0.002	0.01	0.01	0.01	1	0.01	0.01	0.01	1	1	0.1	1	0.01	3
LAB ID Number EX/	**Client Sample Description**	**Sample Date**	**Nickel as Ni (Dissolved)**	**Zinc as Zn (Dissolved)**	**Manganese as Mn (Total)**	**Barium as Ba (Dissolved) a**	**Boron as B (Dissolved) a**	**Cadmium as CD (Dissolved) a**	**Calcium as Ca (Dissolved) a**	**Copper as Cu (Dissolved) a**	**Iron as Fe (Dissolved) a**	**Lead as Pb (Dissolved) a**	**Magnesium as Mg (Dissolved) a**	**Potassium as K (Dissolved) a**	**Silicon as Si (Dissolved) a**	**Sodium as Na (Dissolved) a**	**Strontium as Sr (Dissolved) a**	**Total Sulphur as SO4 (Dissolved) a**
1988836	No.1 DC Shaft 220	**10-Jul-19 16:46**	0.002	0.007	0.373	0.88	0.18	<0.01	120	<0.01	0.87	<0.01	71	18	4.8	147	2.28	81
1988837	No.1 DC Shaft 350	**10-Jul-19**	0.003	0.016	0.352	0.95	0.18	<0.01	117	<0.01	0.87	<0.01	70	19	4.7	147	2.28	76
1988838	No.1 DC Shaft 480	**10-Jul-19 17:40**	0.005	0.016	0.334	1.07	0.18	<0.01	116	<0.01	0.91	<0.01	72	19	4.8	150	2.35	70
1988839	No.1 DC Shaft 610	**10-Jul-19 18:35**	0.008	0.019	0.308	1.22	0.18	<0.01	114	<0.01	0.91	<0.01	72	19	4.8	154	2.39	65
1988840	Great Seam BH 225	**11-Jul-19 10:50**	0.09	0.469	7.177	0.04	0.73	<0.01	388	<0.01	66.3	<0.01	324	33	8.2	44	2.85	214

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name	**Coal Authority**
Contact	John Leyland

Bilston Glen

Sample Analysis

Date Printed	**22-Jul-2019**
Report Number	**EXR/287271**
Table Number	**1**

Where individual results are flagged see report notes for status.

			Units :	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	%	meq	meq	mg/l	mg/l	mg/l	mg/l	mg/l
			Method Codes :	ICPWATVART	ICPWATVART	KONEFE	KONEFE	KONENS	KONENS	KONENS	KONENS	WCALC1	WCALC1	WCALC1	WSLM10	WSLM12	WSLM13	WSLM13	WSLM17
			Method Reporting Limits :	0.01	0.01	0.01	0.01	0.01	1	0.2	0.01	0.1	0.1	0.1	5		0.2	0.2	2
LAB ID Number EX/	Client Sample Description	Sample Date		Aluminium as Al (Total) a	Iron as Fe (Total) a	Ferrous Iron as Fe(2+)	Iron as Fe:(Total)	Ammoniacal Nitrogen as N	Chloride as Cl w	Nitrate as N	Phosphate as P	Ionic Balance % c	Total Anions meq c	Total Cations meq c	Suspended Solids w	Total Alkalinity as CaCO3 w	Dissolved Organic Carbon w	Total Organic Carbon w	Cold Acidity as CaCO3 w
1988836	No.1 DC Shaft 220	10-Jul-19 16:46		<0.01	0.33	0.31	0.32	1.0	251	<0.2	0.02	2.0	18.1	18.9	<5	467	1.0	0.96	Nil
1988837	No.1 DC Shaft 350	10-Jul-19		0.01	0.39	0.37	0.37	1.0	254	<0.2	<0.01	1.3	18.2	18.6	<5	472	0.99	0.97	Nil
1988838	No.1 DC Shaft 480	10-Jul-19 17:40		<0.01	0.41	0.40	0.43	1.0	256	<0.2	<0.01	2.6	18.0	18.9	<5	464	0.98	0.92	Nil
1988839	No.1 DC Shaft 610	10-Jul-19 18:35		<0.01	0.5	0.52	0.45	1.0	263	<0.2	<0.01	2.5	18.1	19.0	<5	465	0.98	0.93	Nil
1988840	Great Seam BH 225	11-Jul-19 10:50		0.15	85.3	85.3	76.4	1.7	68	0.5	<0.01	60.8	12.5	51.3	175	305	2.0	2.0	92

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

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Fax +44 (0) 1283 554422

Client Name Coal Authority

Contact John Leyland

Bilston Glen

Sample Analysis

Date Printed	22-Jul-2019
Report Number	EXR/287271
Table Number	1

Where individual results are flagged see report notes for status.

Units :			mg/l	uS/cm	pH units														
Method Codes :			WSLM17	WSLM2	WSLM3														
Method Reporting Limits :			2	100															
LAB ID Number EXR	**Client Sample Description**	**Sample Date**	**Total Acidity as CaCO3 w**	**Conductivity uS/cm @ 25C w**	**pH units w**														
1988836	No.1 DC Shaft 220	**10-Jul-19 16:46**	Nil	1660	7.7														
1988837	No.1 DC Shaft 350	**10-Jul-19**	Nil	1660	7.7														
1988838	No.1 DC Shaft 480	**10-Jul-19 17:40**	Nil	1670	7.7														
1988839	No.1 DC Shaft 610	**10-Jul-19 18:35**	Nil	1680	7.7														
1988840	Great Seam BH 225	**11-Jul-19 10:50**	Nil	2910	6.4														

SOCOTEC

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

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Fax +44 (0) 1283 554422

Client Name **Coal Authority**

Contact John Leyland

Bilston Glen

Sample Analysis

Date Printed	**22-Jul-2019**
Report Number	**EXR/287271**
Table Number	**1**

Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer **Coal Authority**
Site **Bilston Glen**
Report No **W287271**

Consignment No W157707
Date Logged 13-Jul-2019
In-House Report Due 22-Jul-2019

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	Matrix Type	Sampled	Report A	Nickel as Ni MS (Dissolved)	Zinc as Zn MS (Dissolved)	Manganese as Mn MS (Total)	Total Sulphur as SO4 (Diss) VAR	Calcium as Ca (Dissolved) VAR	Magnesium as Mg (Dissolved) VAR	Barium as Ba (Dissolved) VAR	Strontium as Sr (Dissolved) VAR	Sodium as Na (Dissolved) VAR	Potassium as K (Dissolved) VAR	Cadmium as Cd (Dissolved) VAR	Copper as Cu (Dissolved) VAR	Lead as Pb (Dissolved) VAR	Iron as Fe (Dissolved) VAR	Boron as B (Dissolved) VAR	Silicon as Si (Dissolved) VAR	Iron as Fe (Total) VAR
MethodID				CUSTSERV	ICPMSW		ICPMSWT	ICPWATVAR													ICPWATVART
					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
EX/1988836	No.1 DC Shaft 220	Unclassified	10/07/19																		
EX/1988837	No.1 DC Shaft 350	Unclassified	10/07/19																		
EX/1988838	No.1 DC Shaft 480	Unclassified	10/07/19																		
EX/1988839	No.1 DC Shaft 610	Unclassified	10/07/19																		
EX/1988840	Great Seam BH 225	Unclassified	11/07/19																		

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
^	Analysis Subcontracted - **Note: due date may vary**

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Analytical and Deviating Sample Overview

Customer **Coal Authority**
Site **Bilston Glen**
Report No **W287271**

Consignment No W157707
Date Logged 13-Jul-2019
In-House Report Due 22-Jul-2019

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	Matrix Type	Sampled	MethodID	ICPWATVART	KONEFE		KONENS				WCALC1			WSLM10	WSLM12	WSLM13		WSLM17		WSLM2	WSLM3
					Aluminium as Al (Total) VAR	Ferrous Iron as Fe(2+) KONE	Iron as Fe (Total) KONE	Chloride as Cl (Kone)	Ammoniacal Nitrogen (Kone)	Nitrate as N (Kone calc)	Phosphate as P. (kone)	Ionic Balance %	Total Anions meq	Total Cations meq	Suspended Solids	Total Alkalinity as CaCO3	Total Organic Carbon	Dissolved Organic Carbon	Total Acidity as CaCO3	Cold Acidity as CaCO3	Conductivity uS/cm @ 25C	pH units
					✓	✓	✓	✓	✓	✓	✓				✓	✓	✓		✓	✓	✓	✓
EX/1988836	No.1 DC Shaft 220	Unclassified	10/07/19																			
EX/1988837	No.1 DC Shaft 350	Unclassified	10/07/19																			
EX/1988838	No.1 DC Shaft 480	Unclassified	10/07/19																			
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Deviating Sample Key

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Requested Analysis Key

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Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPMSWT	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPMS quantitation
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ICPWATVART	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPOES quantitation
Water	KONEFE	As Received	Direct analysis using discrete colorimetric analysis (calculation of Ferric Iron from Total Iron and Ferrous Iron data if required)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	WCALC1	As Received	Calculation based on concentrations of dissolved Cations and anions
Water	WSLM10	As Received	Determination of Suspended Solids in waters by gravimetry
Water	WSLM12	As Received	Titration with Sulphuric Acid to required pH
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM17	As Received	Titration with Sodium Hydroxide to required pH
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105ºC dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15^{o}C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
***** All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Coal Authority
Site : Bilston Glen
Report Number : W28_7271

Lab ID Number	Client ID	Description
EX/1988836	No.1 DC Shaft 220	Unclassified
EX/1988837	No.1 DC Shaft 350	Unclassified
EX/1988838	No.1 DC Shaft 480	Unclassified
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