



SOCOTEC

Environmental Chemistry
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Certificate of Analysis

Project No: 20091731

Client: Shetland Islands Council

Quote Number: BEC200911582

Project Reference: September Residue Analysis

Site Name: ERP

Contact: [REDACTED]

Address: Lerwick Energy Recovery Plant
Greenhead Base
Gremista Industrial Estate
Lerwick, Shetland

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Number of Samples Received: 4

Date Received: 25/09/2020

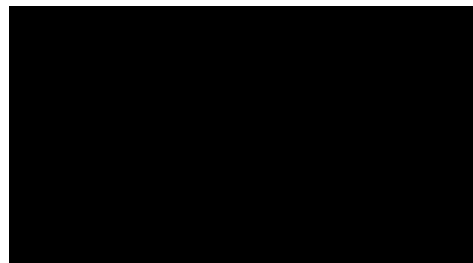
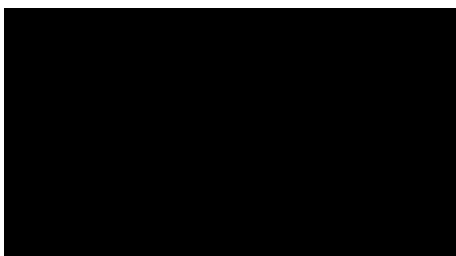
Analysis Date: 15/10/2020

Date Issued: 15/10/2020

Job Status: Complete

Report Type: Final Version 01

This report supersedes any versions previously issued by the laboratory





Client: Shetland Islands Council

Project Name: ERP

Project No: 20091731

Date Issued: 15/10/2020

Samples Analysed

<u>Sample Reference</u>	<u>Text ID</u>	<u>Sample Date</u>	<u>Sample Type</u>
Bottom Ash	20091731-001	18/09/2020 00:00:00	SOLID
ESP	20091731-002	18/09/2020 00:00:00	SOLID
Bag Filter	20091731-003	18/09/2020 00:00:00	SOLID
Filter Press	20091731-004	19/09/2020 00:00:00	SOLID

Analysis Results

20091731									
Project ID		001		002		003			
Sample ID		Bottom Ash		ESP		Bag Filter			
Customer ID									
Sample Type		SOLID		SOLID		LPL			
Sampling Date		18/09/2020		18/09/2020		18/09/2020		18/09/2020	
Analysis	Method Code	MDL	Units	Accred	LPL	SOLID	LPL	SOLID	LPL
Antimony as Sb	ICPMSW (Dissolved)	0.01	mg/kg^	N	<0.01		0.02		0.01
Arsenic as As	ICPMSW (Dissolved)	0.01	mg/kg^	N	<0.01		0.08		<0.01
Barium as Ba	ICPWATVAR (Dissolved)	0.1	mg/kg^	N	3.9		1.2		6.0
Cadmium as Cd	ICPMSW (Dissolved)	0.0002	mg/kg^	N	0.0004		0.110		<0.0002
Chloride as Cl	KONENS	10	mg/kg^	N	2860		93400		8280
Total Chromium as Cr	ICPMSW (Dissolved)	0.01	mg/kg^	N	0.11		<0.01		<0.01
Copper as Cu	ICPMSW (Dissolved)	0.01	mg/kg^	N	3.57		0.30		0.03
Lead as Pb	ICPMSW (Dissolved)	0.01	mg/kg^	N	499		452		0.49
Mercury as Hg	ICPMSW (Dissolved)	0.0003	mg/kg^	N	<0.0003		0.0004		<0.0003
Molybdenum as Mo	ICPMSW (Dissolved)	0.01	mg/kg^	N	1.26		6.40		0.51
Nickel as Ni	ICPMSW (Dissolved)	0.01	mg/kg^	N	0.03		<0.01		<0.01
Phenol Index	SFAPI	0.5	mg/kg^	N	<0.5		0.6		<0.5
Selenium as Se	ICPMSW (Dissolved)	0.01	mg/kg^	N	<0.01		0.20		0.07
Total Sulphur as SO4	ICPWATVAR (Dissolved)	30	mg/kg^	N	5400		35700		22400
TDS as mg/kg	WSLM2 & 3	700	mg/kg^	N	60000		292000		89900
Leached Organic Carbon	WSLM13	2	mg/kg^	N	110		<2.0		33.0
Fluoride as F	ISEF	1	mg/kg^	N	5		40		3
Zinc as Zn	ICPMSW (Dissolved)	0.02	mg/kg^	N	11.9		30.2		2.81
Conductivity at 25°C	WSLM2 & 3	100	µS/cm	U	7090		38600		10800
pH	WSLM2 & 3	1	pH units	U	12.3		12.5		12.4
TDS as mg/l	WSLM2 & 3	70	mg/l	N	6000		29200		8990
Chloride as Cl	KONENS	1	mg/l	U	286		9340		828
Phenol Index	SFAPI	0.05	mg/l	U	<0.05		0.06		<0.05
Fluoride as F	ISEF	0.1	mg/l	U	0.5		4.0		0.3
Total Organic Carbon	WSLM59	0.02	% m/m	U		0.38*		0.28*	

Analysis Results

Project ID					20091731	
Sample ID					003	
Customer ID					Bag Filter	
Sample Type					SOLID	
Sampling Date					18/09/2020	
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Analysis Results

20091731									
Project ID		001		002		003			
Sample ID		Bottom Ash		ESP		Bag Filter			
Customer ID									
Sample Type		SOLID		SOLID		LPL		LPL	
Sampling Date		18/09/2020		18/09/2020		18/09/2020		18/09/2020	
Analysis		Method Code		MDL		Units		Accred	
LOI @ 450°C	LOI(%MM)	0.2		% m/m		N			
Leached Organic Carbon	WSLM13	0.2		mg/l		U			
Antimony as Sb	ICPMSS	0.1		mg/kg		N		262.9	
Arsenic as As	ICPMSS	0.3		mg/kg		N		60.8	
Cadmium as Cd	ICPMSS	0.1		mg/kg		N		203.6	
Cobalt as Co	ICPMSS	0.1		mg/kg		N		7.1	
Copper as Cu	ICPMSS	0.5		mg/kg		N		427.2	
Lead as Pb	ICPMSS	0.5		mg/kg		N		1145	
Manganese as Mn	ICPMSS	1		mg/kg		N		315.5	
Mercury as Hg	ICPMSS	0.1		mg/kg		N		<0.1	
Nickel as Ni	ICPMSS	0.5		mg/kg		N		28.6	
Total Chromium as Cr	ICPMSS	0.5		mg/kg		N		51.0	
Thallium as Tl	ICPMSS	0.1		mg/kg		N		<0.1	
Antimony as Sb	ICPMSW (Dissolved)	0.001		mg/l		U		0.001	
Arsenic as As	ICPMSW (Dissolved)	0.001		mg/l		U		<0.001	
Cadmium as Cd	ICPMSW (Dissolved)	0.00002		mg/l		U		0.0110	
Total Chromium as Cr	ICPMSW (Dissolved)	0.001		mg/l		U		<0.001	
Copper as Cu	ICPMSW (Dissolved)	0.001		mg/l		U		0.003	
Lead as Pb	ICPMSW (Dissolved)	0.001		mg/l		U		45.2	
Mercury as Hg	ICPMSW (Dissolved)	0.00003		mg/l		U		0.00004	
Molybdenum as Mo	ICPMSW (Dissolved)	0.001		mg/l		U		0.640	
Nickel as Ni	ICPMSW (Dissolved)	0.001		mg/l		U		<0.001	
Selenium as Se	ICPMSW (Dissolved)	0.001		mg/l		U		0.007	
Zinc as Zn	ICPMSW (Dissolved)	0.002		mg/l		U		3.02	
Barium as Ba	ICPWATVAR (Dissolved)	0.01		mg/l		U		0.12	
								0.60	

Analysis Results

Analysis		Method Code		MDL		Units		Accred		20091731			
LOI @ 450°C		LOI(%MM)		0.2		% m/m		N		003		004	
Leached Organic Carbon		WSLM13		0.2		mg/l		U		Bag Filter		Filter Press	
Antimony as Sb		ICPMS		0.1		mg/kg		N		SOLID		SOLID	
Arsenic as As		ICPMS		0.3		mg/kg		N		19/09/2020		19/09/2020	
Cadmium as Cd		ICPMS		0.1		mg/kg		N					
Cobalt as Co		ICPMS		0.1		mg/kg		N					
Copper as Cu		ICPMS		0.5		mg/kg		N					
Lead as Pb		ICPMS		0.5		mg/kg		N					
Manganese as Mn		ICPMS		1		mg/kg		N					
Mercury as Hg		ICPMS		0.1		mg/kg		N					
Nickel as Ni		ICPMS		0.5		mg/kg		N					
Total Chromium as Cr		ICPMS		0.5		mg/kg		N					
Thallium as Tl		ICPMS		0.1		mg/kg		N					
Antimony as Sb		ICPMSW (Dissolved)		0.001		mg/l		U					
Arsenic as As		ICPMSW (Dissolved)		0.001		mg/l		U					
Cadmium as Cd		ICPMSW (Dissolved)		0.0002		mg/l		U					
Total Chromium as Cr		ICPMSW (Dissolved)		0.001		mg/l		U					
Copper as Cu		ICPMSW (Dissolved)		0.001		mg/l		U					
Lead as Pb		ICPMSW (Dissolved)		0.001		mg/l		U					
Mercury as Hg		ICPMSW (Dissolved)		0.0003		mg/l		U					
Molybdenum as Mo		ICPMSW (Dissolved)		0.001		mg/l		U					
Nickel as Ni		ICPMSW (Dissolved)		0.001		mg/l		U					
Selenium as Se		ICPMSW (Dissolved)		0.001		mg/l		U					
Zinc as Zn		ICPMSW (Dissolved)		0.002		mg/l		U					
Barium as Ba		ICPWATVAR (Dissolved)		0.01		mg/l		U					



Date Issued: 15/10/2020

20091731									
Project ID		001			002			003	
Sample ID		Bottom Ash			ESP			Bag Filter	
Customer ID									
Sample Type		LPL		SOLID		LPL		SOLID	
Sampling Date		18/09/2020		18/09/2020		18/09/2020		18/09/2020	
Analysis		Method Code		MDL		Units		Accred	
Total Sulphur as SO4		ICPWATVAR (Dissolved)		3		mg/l		U	
Acenaphthene		PAHMSUS		0.08		mg/kg		U	
Acenaphthylene		PAHMSUS		0.08		mg/kg		U	
Anthracene		PAHMSUS		0.08		mg/kg		U	
Benzol(a)anthracene		PAHMSUS		0.08		mg/kg		U	
Benzol(a)pyrene		PAHMSUS		0.08		mg/kg		U	
Benzol(b)fluoranthene		PAHMSUS		0.08		mg/kg		U	
Benzol(g,h,i)perylene		PAHMSUS		0.08		mg/kg		U	
Benzol(k)fluoranthene		PAHMSUS		0.08		mg/kg		U	
Chrysene		PAHMSUS		0.08		mg/kg		U	
Dibenzol(a,h)anthracene		PAHMSUS		0.08		mg/kg		U	
Fluoranthene		PAHMSUS		0.08		mg/kg		U	
Fluorene		PAHMSUS		0.08		mg/kg		U	
Indeno(1,2,3-cd)pyrene		PAHMSUS		0.08		mg/kg		U	
Naphthalene		PAHMSUS		0.08		mg/kg		U	
Phenanthrene		PAHMSUS		0.08		mg/kg		U	
Pyrene		PAHMSUS		0.08		mg/kg		U	
Total PAH 16		PAHMSUS		1.28		mg/kg		U	
Total Moisture at 105°C		TMS5		0.1		%		U	
Total Moisture at 35°C		CLANDPREP		0.1		%		N	
Description of Solid Material		CLANDPREP				-		N	
Equivalent Weight of Dry Material (kg)		Leachate Preparation CEN 10:1				kg		N	
Fraction above 4mm (%)		Leachate Preparation CEN 10:1				%		N	
Fraction of non-crushable material (%)		Leachate Preparation CEN 10:1				%		N	
Volume of Water for 10:1 Leach (ltr)		Leachate Preparation CEN 10:1				l		N	



Analysis Results

Project ID		20091731	
Sample ID		004	
Customer ID		Filter Press	
Sample Type		SOLID	
Sampling Date		19/09/2020	
Method Code		LPL	
MDL		1650	
Units		Accred	
Analysis		U	
Total Sulphur as SO ₄	ICP/WAT/VAR (Dissolved)	3	mg/l
Acenaphthene	PAHMSUS	0.08	mg/kg
Acenaphthylene	PAHMSUS	0.08	mg/kg
Anthracene	PAHMSUS	0.08	mg/kg
Benzo[a]anthracene	PAHMSUS	0.08	mg/kg
Benzo[a]pyrene	PAHMSUS	0.08	mg/kg
Benzo[b]fluoranthene	PAHMSUS	0.08	mg/kg
Benzo[g,h,i]perylene	PAHMSUS	0.08	mg/kg
Benzo[k]fluoranthene	PAHMSUS	0.08	mg/kg
Chrysene	PAHMSUS	0.08	mg/kg
Dibenz[a,h]anthracene	PAHMSUS	0.08	mg/kg
Fluoranthene	PAHMSUS	0.08	mg/kg
Fluorene	PAHMSUS	0.08	mg/kg
Indeno[1,2,3-cd]pyrene	PAHMSUS	0.08	mg/kg
Naphthalene	PAHMSUS	0.08	mg/kg
Phenanthrene	PAHMSUS	0.08	mg/kg
Pyrene	PAHMSUS	0.08	mg/kg
Total PAH 16	PAHMSUS	1.28	mg/kg
Total Moisture at 105°C	TMSS	0.1	%
Total Moisture at 35°C	CLANDPREP	0.1	%
Description of Solid Material	CLANDPREP	-	-
Equivalent Weight of Dry Material (kg)	Leachate Preparation CEN 10:1	kg	0.090
Fraction above 4mm (%)	Leachate Preparation CEN 10:1	%	0
Fraction of non-crushable material (%)	Leachate Preparation CEN 10:1	%	0
Volume of Water for 10:1 Leach (ltr)	Leachate Preparation CEN 10:1	l	0.898

Analysis Results

20091731									
Project ID									
Sample ID									
Customer ID									
Sample Type									
Sampling Date									
Method Code									
MDL									
Units									
Accred									
Weight of Sample Leached (kg)		Leachate Preparation CEN 10:1		kg		N			
WAC Report		WAC		-		N			
Dioxins & Furans and Dioxin-like PCBs		SUB030		-		N			
Free Lime Content		SUB051		0.1		%		N	
								4.73	
								See Attached	
								See Attached	
								0.090	
								See Attached	
								18/09/2020	
								SOLID	
								LPL	
								ESP	
								003	
								001	
								Bottom Ash	
								18/09/2020	
								18/09/2020	
								18/09/2020	
								18/09/2020	
								0.091	
								See Attached	
								See Attached	
								0.090	
								See Attached	
								See Attached	
								4.73	

Analysis Results

Project ID		20091731	
Sample ID	003	004	
Customer ID	Bag Filter	Filter Press	
Sample Type	SOLID	LPL	SOLID
Sampling Date	18/09/2020	19/09/2020	19/09/2020
Analysis	Method Code	MDL	Units
Weight of Sample Leached (kg)	Leadate Preparation CEN 10:1		kg
WAC Report	WAC		-
Dioxins & Furans and Dioxin-like PCBs	SUB030		-
Free Lime Content	SUB051	0.1	%
		0.092	
		See Attached	See Attached
		See Attached	See Attached
		9.76	
			0.134
			See Attached
			See Attached

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	Shetland Islands Council	
Site	ERP	
Project	20091731	
Sample No	Sample Description	Issue Date
20091731-001	Bottom Ash	09/10/2020

Leaching Data	
Weight of Sample (kg)	0.091
Moisture content @ 105°C (% Wet Weight)	0.8
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (litres)	0.899
Fraction of sample above 4mm %	45.1
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
	WSLM59	Total Organic Carbon (% M/M)		3	5	6
	LOI450	Loss on Ignition (%)				10
	BTEXHSA	Sum of BTEX (mg/kg)		6		
	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)		1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	Sum of 17 PAHs (mg/kg)		100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative amount leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
			mg/l except **	mg/kg (dry wt)	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
U	WSLM3**	pH (pH Units)	12.3				
U	WSLM2**	Conductivity (µS/cm)	7090				
U	ICPMSW	Arsenic	<0.001		0.5	2	25
U	ICPWATVAR	Barium	0.39		20	100	300
U	ICPMSW	Cadmium	0.00004		0.04	1	5
U	ICPMSW	Chromium	0.011		0.5	10	70
U	ICPMSW	Copper	0.357		2	50	100
U	ICPMSW	Mercury	<0.00003		0.01	0.2	2
U	ICPMSW	Molybdenum	0.126		0.5	10	30
U	ICPMSW	Nickel	0.003		0.4	10	40
U	ICPMSW	Lead	49.9		0.5	10	50
U	ICPMSW	Antimony	0.001		0.06	0.7	5
U	ICPMSW	Selenium	0.001		0.1	0.5	7
U	ICPMSW	Zinc	1.19		4	50	200
U	KONENS	Chloride	286		800	15000	25000
U	ISEF	Fluoride	0.5		10	150	500
U	ICPWATVAR	Sulphate as SO4	540		1000	20000	50000
N	WSLM27	Total Dissolved Solids	6000		4000	60000	100000
U	SFAPI	Phenol Index	<0.05		1		
U	WSLM13	Dissolved Organic Carbon	11		500	800	10000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited .
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11 th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	Shetland Islands Council	
Site	ERP	
Project	20091731	
Sample No	Sample Description	Issue Date
20091731-002	ESP	09/10/2020

Leaching Data	
Weight of Sample (kg)	0.090
Moisture content @ 105°C (% Wet Weight)	0.4
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (litres)	0.900
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
	WSLM59	Total Organic Carbon (% M/M)		3	5	6
	LOI450	Loss on Ignition (%)				10
	BTEXHSA	Sum of BTEX (mg/kg)		6		
	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)		1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	Sum of 17 PAHs (mg/kg)		100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative amount leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
			mg/l except **	mg/kg (dry wt)	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
U	WSLM3**	pH (pH Units)	12.5				
U	WSLM2**	Conductivity (µS/cm)	38600				
U	ICPMSW	Arsenic	0.008		0.5	2	25
U	ICPWATVAR	Barium	0.12		20	100	300
U	ICPMSW	Cadmium	0.0110		0.04	1	5
U	ICPMSW	Chromium	<0.001		0.5	10	70
U	ICPMSW	Copper	0.030		2	50	100
U	ICPMSW	Mercury	0.00004		0.01	0.2	2
U	ICPMSW	Molybdenum	0.640		0.5	10	30
U	ICPMSW	Nickel	<0.001		0.4	10	40
U	ICPMSW	Lead	45.2		0.5	10	50
U	ICPMSW	Antimony	0.002		0.06	0.7	5
U	ICPMSW	Selenium	0.020		0.1	0.5	7
U	ICPMSW	Zinc	3.02		4	50	200
U	KONENS	Chloride	9340		800	15000	25000
U	ISEF	Fluoride	4.0		10	150	500
U	ICPWATVAR	Sulphate as SO4	3570		1000	20000	50000
N	WSLM27	Total Dissolved Solids	29200		4000	60000	100000
U	SFAPI	Phenol Index	0.06		1		
U	WSLM13	Dissolved Organic Carbon	<0.20		500	800	10000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited .
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11 th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	Shetland Islands Council	
Site	ERP	
Project	20091731	
Sample No	Sample Description	Issue Date
20091731-003	Bag Filter	09/10/2020

Leaching Data	
Weight of Sample (kg)	0.092
Moisture content @ 105°C (% Wet Weight)	2.6
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (litres)	0.898
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
	WSLM59	Total Organic Carbon (% M/M)		3	5	6
	LOI450	Loss on Ignition (%)				10
	BTEXHSA	Sum of BTEX (mg/kg)		6		
	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)		1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	Sum of 17 PAHs (mg/kg)		100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative amount leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
			mg/l except **	mg/kg (dry wt)	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
U	WSLM3**	pH (pH Units)	12.4				
U	WSLM2**	Conductivity (µS/cm)	10800				
U	ICPMSW	Arsenic	<0.001		0.5	2	25
U	ICPWATVAR	Barium	0.60		20	100	300
U	ICPMSW	Cadmium	<0.00002		0.04	1	5
U	ICPMSW	Chromium	<0.001		0.5	10	70
U	ICPMSW	Copper	0.003		2	50	100
U	ICPMSW	Mercury	<0.00003		0.01	0.2	2
U	ICPMSW	Molybdenum	0.051		0.5	10	30
U	ICPMSW	Nickel	<0.001		0.4	10	40
U	ICPMSW	Lead	0.049		0.5	10	50
U	ICPMSW	Antimony	0.001		0.06	0.7	5
U	ICPMSW	Selenium	0.007		0.1	0.5	7
U	ICPMSW	Zinc	0.281		4	50	200
U	KONENS	Chloride	828		800	15000	25000
U	ISEF	Fluoride	0.3		10	150	500
U	ICPWATVAR	Sulphate as SO4	2240		1000	20000	50000
N	WSLM27	Total Dissolved Solids	8990		4000	60000	100000
U	SFAPI	Phenol Index	<0.05		1		
U	WSLM13	Dissolved Organic Carbon	3.3		500	800	10000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited .
Calculated data is not UKAS accredited
Landfill Waste Acceptance Criteria limit values correct as of 11 th March 2009.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/2

Client	Shetland Islands Council	
Site	ERP	
Project	20091731	
Sample No	Sample Description	Issue Date
20091731-004	Filter Press	09/10/2020

Leaching Data	
Weight of Sample (kg)	0.134
Moisture content @ 105°C (% Wet Weight)	33.0
Equivalent weight based on drying @ 105°C (kg)	0.090
Volume of Water required for 10:1 stage (litres)	0.856
Fraction of sample above 4mm %	0
Fraction of non-crushable material %	0

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
	WSLM59	Total Organic Carbon (% M/M)		3	5	6
	LOI450	Loss on Ignition (%)				10
	BTEXHSA	Sum of BTEX (mg/kg)		6		
	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)		1		
	TPHFIDUS	Mineral Oil (mg/kg)		500		
	PAHMSUS	Sum of 17 PAHs (mg/kg)		100		
	PHSOIL	pH (pH Units)			>6	
	ANC	Acid Neutralisation Capacity (mol/kg)			To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	10:1 Single Stage Leachate	Cumulative amount leached at 10:1	Landfill Waste Acceptance Criteria Limit Values		
			mg/l except **	mg/kg (dry wt)	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
U	WSLM3**	pH (pH Units)	8.0				
U	WSLM2**	Conductivity (µS/cm)	3620				
U	ICPMSW	Arsenic	<0.001		0.5	2	25
U	ICPWATVAR	Barium	0.02		20	100	300
U	ICPMSW	Cadmium	<0.00002		0.04	1	5
U	ICPMSW	Chromium	<0.001		0.5	10	70
U	ICPMSW	Copper	<0.001		2	50	100
U	ICPMSW	Mercury	<0.00003		0.01	0.2	2
U	ICPMSW	Molybdenum	0.029		0.5	10	30
U	ICPMSW	Nickel	0.056		0.4	10	40
U	ICPMSW	Lead	0.001		0.5	10	50
U	ICPMSW	Antimony	0.038		0.06	0.7	5
U	ICPMSW	Selenium	<0.001		0.1	0.5	7
U	ICPMSW	Zinc	0.086		4	50	200
U	KONENS	Chloride	516		800	15000	25000
U	ISEF	Fluoride	4.2		10	150	500
U	ICPWATVAR	Sulphate as SO4	1650		1000	20000	50000
N	WSLM27	Total Dissolved Solids	2600		4000	60000	100000
U	SFAPI	Phenol Index	<0.05		1		
U	WSLM13	Dissolved Organic Carbon	1.4		500	800	10000

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited .

Calculated data is not UKAS accredited

Landfill Waste Acceptance Criteria limit values correct as of 11 th March 2009.

UKAS accredited testing laboratory No. 1668

Name of Client : Socotec UK Ltd

Test Certificate No: 74878

Address : Environmnetal Chemistry, Ashby Road, Bretby, Burton-on-Trent, DE15 0ZY

ANALYSIS OF PCDDs and PCDFs

Job Reference: 20091731
Sample Identifier : 20091731-001-15
Sample No: 74878
Order No: B161266BEC
Sample Type: Ash
Sample Condition : conforming
Instrument : Thermo DFS
GC Column : DB5
Calibration File : 11020

Date of Receipt : 29/09/20
Date of Analysis : 04/10/20
Date of Report : 07/10/20

Test Method : 2002a
Blank : 280920
Sample size: 1

expressed as ng /kg

Congener	Conc	DL	Rec %	Congener	Conc	DL	Rec %
2378-TCDF	8.95	0.553	77	2378-TCDD	*	0.166	87
12378-PCDF	10.5	0.464	83	12378-PCDD	*	0.295	85
23478-PCDF	4.52	0.483	72	123478-HxCDD	*	0.288	83
123478-HxCDF	18.3	0.402	75	123678-HxCDD	0.536	0.28	80
123678-HxCDF	4.73	0.398	74	123789-HxCDD	*	0.278	
234678-HxCDF	3.41	0.345	81	1234678-HpCDD	5.95	0.286	70
123789-HxCDF	0.8	0.343	90	OCDD	29.5	0.886	71
1234678-HpCDF	18.7	0.31	65				
1234789-HpCDF	7.56	0.38	63				
OCDF	84.4	0.525					
Total 2,3,7,8-Furans	162			Total 2,3,7,8-Dioxins	36		
TEQ (Nato)		TEQ ¹ 7.27	TEQ ² 6.9	TEQ (WHO)- Mammals		TEQ ¹ 6.22	TEQ ² 5.7
				TEQ (WHO)- Fish		6.85	6.24
				TEQ (WHO)- Birds		18	17.5

* Isomer Not detected
TEQ Toxic Equivalent Value
TEF Toxic Equivalent Factor
Conc Concentration
DL Detection Value
REC Recovery

TEQ¹ Concentration of Non Detected
Congeners at Detection Limit
TEQ² Concentration of Non Detected
Congeners at Zero

Reported by
Position

Signature



1668

UKAS accredited testing laboratory No. 1668

Name of Client : Socotec UK Ltd

Test Certificate No: 74878

Address : Environmnetal Chemistry, Ashby Road, Bretby, Burton-on-Trent, DE15 0ZY

ANALYSIS OF PCBs

Job Reference: 20091731
Sample Identifier : 20091731-001-15
Sample No: 74878
Order No: B161266BEC
Sample Type: Ash
Sample Condition : conforming
Instrument : Micromass Ultima NT
GC Column : DB5
Calibration File : 40920

Date of Receipt : 29/09/20
Date of Analysis : 02/10/20
Date of Report : 06/10/20

Test Method : 2002
Blank : 280920
Sample size: 1

expressed as ng /kg

Congener	Conc	DL	Rec %
PCB-81	*	0.686	89
PCB-77	5.7	0.7	86
PCB-123	*	1.03	47
PCB-118	23.9	1.04	44
PCB-114	*	1	50
PCB-105	9.62	1.27	43
PCB-126	*	1	100
PCB-167	2.1	0.52	72
PCB-156	3.55	0.621	60
PCB-157	0.779	0.684	57
PCB-169	*	0.093	86
PCB-189	1.61	0.772	40
Total-PCBs	47.3		
		TEQ1	TEQ2
TEQ (WHO)- Mammals		0.105	0.0018
TEQ (WHO)- Fish		0.0061	0.0008
TEQ (WHO)- Birds		0.455	0.286

* Isomer Not detected
TEQ Toxic Equivalent Value
TEF Toxic Equivalent Factor
Conc Concentration
DL Detection Value
REC Recovery

TEQ¹ Concentration of Non Detected
Congeners at Detection Limit
TEQ² Concentration of Non Detected
Congeners at Zero

Reported by :
Position :

Signat



1668

UKAS accredited testing laboratory No. 1668

Name of Client : Socotec UK Ltd

Test Certificate No: 74879

Address : Environmnetal Chemistry, Ashby Road, Bretby, Burton-on-Trent, DE15 0ZY

ANALYSIS OF PCDDs and PCDFs

Job Reference: 20091731
Sample Identifier : 20091731-002-16
Sample No: 74879
Order No: B161266BEC
Sample Type: Ash
Sample Condition : conforming
Instrument : Thermo DFS
GC Column : DB5
Calibration File : 11020

Date of Receipt : 29/09/20
Date of Analysis : 07/10/20
Date of Report : 09/10/20

Test Method : 2002a
Blank : 51020
Sample size: 1

expressed as ng /kg

Congener	Conc	DL	Rec %	Congener	Conc	DL	Rec %
2378-TCDF	*	0.487	86	2378-TCDD	*	0.303	85
12378-PCDF	*	1.03	73	12378-PCDD	2.93	0.573	88
23478-PCDF	11.4	0.843	79	123478-HxCDD	4.71	0.999	98
123478-HxCDF	15.9	1.19	107	123678-HxCDD	8.43	0.988	104
123678-HxCDF	19.6	1.19	100	123789-HxCDD	7.63	0.98	
234678-HxCDF	48.6	1.08	99	1234678-HpCDD	162	1.31	90
123789-HxCDF	3.21	1.28	95	OCDD	792	1.43	94
1234678-HpCDF	237	0.937	77				
1234789-HpCDF	55.2	0.92	85				
OCDF	402	0.737					
Total 2,3,7,8-Furans	793			Total 2,3,7,8-Dioxins	978		
TEQ (Nato)		TEQ ¹ 24.1	TEQ ² 23.7	TEQ (WHO)- Mammals		TEQ ¹ 22.4	TEQ ² 22
				TEQ (WHO)- Fish		23.4	23.1
				TEQ (WHO)- Birds		28.2	27.3

* Isomer Not detected
TEQ Toxic Equivalent Value
TEF Toxic Equivalent Factor
Conc Concentration
DL Detection Value
REC Recovery

TEQ¹ Concentration of Non Detected
Congeners at Detection Limit
TEQ² Concentration of Non Detected
Congeners at Zero

Reported by
Position

Signature :



1668

UKAS accredited testing laboratory No. 1668

Name of Client : Socotec UK Ltd

Test Certificate No: 74879

Address : Environmnetal Chemistry, Ashby Road, Bretby, Burton-on-Trent, DE15 0ZY

ANALYSIS OF PCBs

Job Reference: 20091731
Sample Identifier : 20091731-002-16
Sample No: 74879
Order No: B161266BEC
Sample Type: Ash
Sample Condition : conforming
Instrument : Micromass Ultima NT
GC Column : DB5
Calibration File : 240920

Date of Receipt : 29/09/20
Date of Analysis : 06/10/20
Date of Report : 08/10/20

Test Method : 2002
Blank : 51020
Sample size: 1

expressed as ng /kg

Congener	Conc	DL	Rec %
PCB-81	0.348	0.229	88
PCB-77	4.64	0.239	82
PCB-123	0.624	0.397	90
PCB-118	19.8	0.399	85
PCB-114	0.827	0.381	102
PCB-105	6.92	0.491	89
PCB-126	*	0.822	131
PCB-167	1.2	0.145	82
PCB-156	3.19	0.178	80
PCB-157	0.988	0.185	78
PCB-169	0.76	0.0796	101
PCB-189	1.95	0.284	96
Total-PCBs	41.2		
	TEQ1	TEQ2	
TEQ (WHO)- Mammals	0.107	0.0244	
TEQ (WHO)- Fish	0.005	0.0009	
TEQ (WHO)- Birds	0.351	0.269	

* Isomer Not detected
TEQ Toxic Equivalent Value
TEF Toxic Equivalent Factor
Conc Concentration
DL Detection Value
REC Recovery

TEQ¹ Concentration of Non Detected
Congeners at Detection Limit
TEQ² Concentration of Non Detected
Congeners at Zero

Reported by
Position

Signature :



1668

UKAS accredited testing laboratory No. 1668

Name of Client : Socotec UK Ltd

Test Certificate No: 74880

Address : Environmnetal Chemistry, Ashby Road, Bretby, Burton-on-Trent, DE15 0ZY

ANALYSIS OF PCDDs and PCDFs

Job Reference: 20091731
Sample Identifier : 20091731-003-16
Sample No: 74880
Order No: B161266BEC
Sample Type: Ash
Sample Condition : conforming
Instrument : Thermo DFS
GC Column : DB5
Calibration File : 11020

Date of Receipt : 29/09/20
Date of Analysis : 04/10/20
Date of Report : 07/10/20

Test Method : 2002a
Blank : 280920
Sample size: 0.5

expressed as ng /kg

Congener	Conc	DL	Rec %	Congener	Conc	DL	Rec %
2378-TCDF	265	9.44	78	2378-TCDD	36.2	4.6	86
12378-PCDF	368	7.41	92	12378-PCDD	133	3.5	96
23478-PCDF	1150	6.92	85	123478-HxCDD	134	1.7	77
123478-HxCDF	910	4.79	64	123678-HxCDD	231	1.96	70
123678-HxCDF	1020	4.04	69	123789-HxCDD	197	1.95	
234678-HxCDF	2020	3.12	85	1234678-HpCDD	911	1.47	70
123789-HxCDF	137	3.72	87	OCDD	811	1.68	70
1234678-HpCDF	2940	1.73	70				
1234789-HpCDF	780	1.73	78				
OCDF	1370	1.35					
Total 2,3,7,8-Furans 11000				Total 2,3,7,8-Dioxins 2450			
TEQ (Nato)		TEQ ¹ 1240	TEQ ² 1240	TEQ (WHO)- Mammals		TEQ ¹ 1060	TEQ ² 1060
				TEQ (WHO)- Fish		1300	1300
				TEQ (WHO)- Birds		2100	2100

* Isomer Not detected
TEQ Toxic Equivalent Value
TEF Toxic Equivalent Factor
Conc Concentration
DL Detection Value
REC Recovery

TEQ¹ Concentration of Non Detected
Congeners at Detection Limit
TEQ² Concentration of Non Detected
Congeners at Zero

Reported by
Position

Signature



1668

UKAS accredited testing laboratory No. 1668

Name of Client : Socotec UK Ltd

Test Certificate No: 74880

Address : Environmnetal Chemistry, Ashby Road, Bretby, Burton-on-Trent, DE15 0ZY

ANALYSIS OF PCBs

Job Reference: 20091731
Sample Identifier : 20091731-003-16
Sample No: 74880
Order No: B161266BEC
Sample Type: Ash
Sample Condition : conforming
Instrument : Micromass Ultima NT
GC Column : DB5
Calibration File : 40920

Date of Receipt : 29/09/20
Date of Analysis : 02/10/20
Date of Report : 06/10/20

Test Method : 2002
Blank : 280920
Sample size: 0.5

expressed as ng /kg

Congener	Conc	DL	Rec %
PCB-81	44	1.2	98
PCB-77	154	1.27	94
PCB-123	16.7	1.36	81
PCB-118	156	1.34	77
PCB-114	24.5	1.36	84
PCB-105	125	1.63	78
PCB-126	175	2.37	101
PCB-167	50.2	1.11	121
PCB-156	121	1.31	101
PCB-157	84.2	1.34	99
PCB-169	90.2	1.54	95
PCB-189	137	1.34	69
Total-PCBs	1178		
		TEQ1	TEQ2
TEQ (WHO)- Mammals		20.2	20.2
TEQ (WHO)- Fish		0.92	0.92
TEQ (WHO)- Birds		29.7	29.7

* Isomer Not detected
TEQ Toxic Equivalent Value
TEF Toxic Equivalent Factor
Conc Concentration
DL Detection Value
REC Recovery

TEQ¹ Concentration of Non Detected
Congeners at Detection Limit
TEQ² Concentration of Non Detected
Congeners at Zero

Reported by :
Position :

Signature :



1668

UKAS accredited testing laboratory No. 1668

Name of Client : Socotec UK Ltd

Test Certificate No: 74881

Address : Environmnetal Chemistry, Ashby Road, Bretby, Burton-on-Trent, DE15 0ZY

ANALYSIS OF PCDDs and PCDFs

Job Reference: 20091731
Sample Identifier : 20091731-004-13
Sample No: 74881
Order No: B161266BEC
Sample Type: Misc. Enviro. Solid
Sample Condition : conforming
Instrument : Thermo DFS
GC Column : DB5
Calibration File : 11020

Date of Receipt : 29/09/20
Date of Analysis : 04/10/20
Date of Report : 07/10/20

Test Method : 2002a
Blank : 280920
Sample size: 1

expressed as ng /kg

Congener	Conc	DL	Rec %	Congener	Conc	DL	Rec %
2378-TCDF	*	0.317	80	2378-TCDD	*	0.165	81
12378-PCDF	0.943	0.434	88	12378-PCDD	*	0.265	93
23478-PCDF	5.55	0.415	81	123478-HxCDD	1.66	0.647	91
123478-HxCDF	7.81	0.862	88	123678-HxCDD	3.7	0.64	91
123678-HxCDF	8.11	0.846	87	123789-HxCDD	2.93	0.635	
234678-HxCDF	43.3	0.8	88	1234678-HpCDD	118	0.923	77
123789-HxCDF	3.11	0.845	94	OCDD	909	0.957	91
1234678-HpCDF	162	0.787	67				
1234789-HpCDF	61	0.875	70				
OCDF	762	0.446					
Total 2,3,7,8-Furans	1050			Total 2,3,7,8-Dioxins	1030		
TEQ (Nato)		TEQ ¹ 15.3	TEQ ² 15	TEQ (WHO)- Mammals		TEQ ¹ 13.1	TEQ ² 12.7
				TEQ (WHO)- Fish		12.9	12.5
				TEQ (WHO)- Birds		15.6	14.8

* Isomer Not detected
TEQ Toxic Equivalent Value
TEF Toxic Equivalent Factor
Conc Concentration
DL Detection Value
REC Recovery

TEQ¹ Concentration of Non Detected
Congeners at Detection Limit
TEQ² Concentration of Non Detected
Congeners at Zero

Reported by
Position

Signature



1668

UKAS accredited testing laboratory No. 1668

Name of Client : Socotec UK Ltd

Test Certificate No: 74881

Address : Environmnetal Chemistry, Ashby Road, Bretby, Burton-on-Trent, DE15 0ZY

ANALYSIS OF PCBs

Job Reference: 20091731
Sample Identifier : 20091731-004-13
Sample No: 74881
Order No: B161266BEC
Sample Type: Misc. Enviro. Solid
Sample Condition : conforming
Instrument : Micromass Ultima NT
GC Column : DB5
Calibration File : 40920

Date of Receipt : 29/09/20
Date of Analysis : 02/10/20
Date of Report : 06/10/20

Test Method : 2002
Blank : 280920
Sample size: 1

expressed as ng /kg

Congener	Conc	DL	Rec %
PCB-81	0.315	0.177	99
PCB-77	2.69	0.179	100
PCB-123	0.351	0.205	76
PCB-118	14.6	0.205	72
PCB-114	0.555	0.187	83
PCB-105	5.76	0.256	71
PCB-126	*	0.783	99
PCB-167	0.284	0.137	109
PCB-156	0.818	0.162	93
PCB-157	0.395	0.167	91
PCB-169	0.188	0.0335	93
PCB-189	1.28	0.317	64
Total-PCBs	27.2		
	TEQ1	TEQ2	
TEQ (WHO)- Mammals	0.085	0.0067	
TEQ (WHO)- Fish	0.0045	0.0006	
TEQ (WHO)- Birds	0.245	0.167	

* Isomer Not detected
TEQ Toxic Equivalent Value
TEF Toxic Equivalent Factor
Conc Concentration
DL Detection Value
REC Recovery

TEQ¹ Concentration of Non Detected
Congeners at Detection Limit
TEQ² Concentration of Non Detected
Congeners at Zero

Reported by
Position

Signature



1668

KIRTON CONCRETE SERVICES LTD.

INDEPENDENT TESTING LABORATORY

Manor House, Station Road, Hibaldstow, Brigg, North Lincolnshire, DN20 9EB, England

Telephone: (01652) 656931 Fax: (01652) 651082 E-mail Kirtonlab@aol.com

PFA TEST RESULTS to EN 450 :2012

Client	:-	SOCOTEC
Our reference	:-	SOCOTEC 63
Your reference	:-	20091731-002-17
Order	:-	20091731.0
Date received	:-	29-Sep-20
Purchase Order Number	:-	20091731.0
Date of tests	:-	29-Sep-20 to 14-Oct-20

RESULTS

Free Calcium oxide 4.73 %

Signed.....

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PFA TEST RESULTS to EN 450 :2012

Client	:-	SOCOTEC
Our reference	:-	SOCOTEC 64
Your reference	:-	20091731-003-17
Order	:-	20091731.0
Date received	:-	29-Sep-20
Purchase Order Number	:-	20091731.0
Date of tests	:-	29-Sep-20 to 14-Oct-20

RESULTS

Free Calcium oxide 9.76 %

Signed.....

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PAHMSUS	001,002,004	The Primary process control data associated with this Test has not wholly met the requirements of the Laboratory Quality Management System QMS with one or more target analytes falling outside acceptable limits. However the remaining data gives the Laboratory confidence that the test has performed satisfactorily and that the validity of the data may not have been significantly affected. However in line with our QMS policy we have removed accreditation, where applicable, from the affected analytes (Indeno[1,2,3-cd]pyrene, Benzo[ghi]perylene) . These circumstances should be taken into consideration when utilising the data.
PAHMSUS	3	Due to matrix interference, the Surrogate recovery for this Test is below the required QMS specification. This has been confirmed by repeating the analysis. All other Laboratory Process Controls meet the requirements of the QMS unless otherwise stated. These circumstances should be taken into consideration when utilising the data.
PAHMSUS	3	The matrix of this sample has been found to interfere with the result for this test. The sample has therefore been diluted, but in doing so, the detection limit for this test has been elevated.

LIMS-F002 - Report Notes

<u>Deviating Sample Report</u>			Incorrect Container	Incorrect Label	Headspace	Incorrect/No Preservative	No Sampling Date	Holding Time	Handling Time
Sample Reference	Text ID	Reported Name							

Analysis Method

Analysis

CLANDPREP
HCEXTS
ICPMSS
ICPMSW (Dissolved)
ICPWATVAR (Dissolved)
ISEF
KONENS
Leachate Preparation CEN 10:1
LOI(%MM)
PAHMSUS
SFAP1
SUB030
SUB051
TMSS
WAC
WSLM13
WSLM2 & 3
WSLM59

Analysis Type

PHYS
ORGANIC
METALS
METALS
METALS
CHEM
INORGANIC
PHYS
INORGANIC
ORGANIC
INORGANIC
SUBCON
SUBCON
PHYS
GENERAL
INORGANIC
INORGANIC
INORGANIC

Analysis Method

As Received
As Received
Air Dried & Ground
Filtered
Filtered

Filtered
As Received
Air Dried & Ground
As Received
Filtered

As Received

Filtered
Filtered
Air Dried & Ground



Client: Shetland Islands Council

Project Name: ERP

Project No: 20091731

Date Issued: 15/10/2020

Additional Information

This report refers to samples as received, and SOCOTEC Uk Ltd takes no responsibility for accuracy or competence of sampling by others.

Results within this report relate only to the samples tested.

In the accreditation column of analysis report the codes are as follows:

U = UKAS accredited analysis

M = MCERT accredited analysis

N = Unaccredited analysis

Any units marked with ^ signify results are reported on a dry weight basis of 105 ° c

All Air Dried and Ground Samples (ADG) are oven dried at less than 35 ° c.

This report shall not be reproduced except in full and with approval from the laboratory.

Opinions and interpretations given are outside the scope of our UKAS accreditation.

Any samples marked with * are not covered by our scope of UKAS accreditation. If applicable, further report notes have been added.

Any solid samples where the Major Constituents are not one of the following (Sand, Silt, Clay, Made Ground) are not one of our accredited matrix types.

Any samples marked with ‡ have had MCERTS accreditation removed for this result

Any samples marked with a tick in the deviant table is deviant for the specific reason.

Any samples reported as IS, NA, ND mean the following:

IS = Insufficient Sample to complete analysis

NA = Sample is not amenable for the required analysis

ND = Results cannot be determined

Our deviating sample report does not include deviancy information for Subcontracted analysis. Please see the report from the Subcontracted lab for information regarding any deviancies for this analysis.

End of Certificate of Analysis