WASTE CLASSIFICATION SUMMARY REPORT

WASTE IDENTIFICATION	BOILER ASH
SOURCE	SAPPI SOUTHERN AFRICA LIMITED Stanger Mill, Gledhow Mount, Stanger, 4450
DATE OF CLASSIFICATION	MAY, 2019

RELEVANT REGULATIONS AND STANDARDS

- National Environmental Management: Waste Act (NEM: WA, 2008)
- National Environmental Management: Waste Amendment Act (NEM: WAA, 2014)
- Waste Classification and Management Regulations (GN R634 of 2013)
- National Norms and Standards for the Assessment of Waste to Landfill Disposal (GN R635 of 2013)
- National Norms and Standards for Disposal of Waste to Landfill (GN R636 of 2013)
- South African National Standard (SANS) 10234:2008, Globally Harmonised System of Classification and Labelling of Chemicals (GHS) (SANS 10234)
- South African National Standard (SANS) 11014:2010, Safety Data Sheet for Chemical Products – Content and Order of Sections (SANS 11014)

SCOPE

INCLUDED	ELEMENT	DESCRIPTION
✓	Defined and Listed Waste Appraisal	Assessment of whether the waste is defined under Schedule 3 of the NEM: WAA and/or listed in Annexure 1 of GN R634 was not included within the scope.
✓	Appraisal of Disposal Prohibitions	Determination of possible disposal prohibitions in terms of GN R636.
✓	Waste Type Profiling for Landfill Disposal	Profiling in accordance with GN R635 and/or Waste Acceptance Criteria as detailed in GN R636.
✓	Classification	Quantitative classification in broad accordance with SANS 10234.
✓	Safety Data Sheet	A Safety Data Sheet (SDS) is required for all hazardous waste (excluding Health Care Risk Waste) in terms of GN R634.

Block A, 1 on Langford
Langford Road
Westville, Durban, 3629
South Africa

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WASTE DESCRIPTION

PROCESS ORIGIN	CHEMICAL INPUTS	PHYSICAL CHARACTERISTICS
Ash from coal-fired boiler	Chinco Fireside Treatment (catalyst) utilised within boiler	Dark grey to black, sand and gravel-sized fractions of ash

DEFINED WASTE APPRAISAL

LISTED IN SCHEDULE 3 OF NEM: WAA	Yes
DESCRIPTOR	Category A, Hazardous Waste, 7. Wastes from thermal processes (a) hazardous portion of wastes from power stations and other combustion plants

LISTED WASTE APPRAISAL

LISTED IN ANNEXURE 1 OF GN R634	No
DESCRIPTOR	Not applicable

SAMPLING AND LABORATORY ANALYSIS

SAMPLER	DATE	COMMENTS
WSP	11 March 2019	Representative sample collected by WSP

ANALYTICAL SUITE	MATRIX	
	Total	Leachate
Metals and metalloids, as listed in GN R635 — Antimony, arsenic, barium, boron, cadmium, chromium (total and hexavalent), cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, vanadium and zinc	✓	✓
Inorganics, as listed in GN R635 — Chloride, nitrate, sulphate and Total Dissolved Solids — Cyanide and fluoride	N/A ✓	✓ ✓
Organics, as listed in GN R635 — Benzene, toluene, ethylbenzene and xylenes (BTEX) — Petroleum hydrocarbons — Polychlorinated Biphenyls (PCB) — Polycyclic Aromatic Hydrocarbons (PAH) — Volatile and Semi-Volatile Organic Compounds (VOC and SVOC)	 ✓ ✓ ✓ ✓ ✓	 ✓ N/A ✓ N/A ✓
Pesticides, as listed in GN R635 — Aldrin + Dieldrin — DDT + DDD + DDE — 2,4-D — Chlordane — Heptachlor	 × × × × ×	 × × × × ×

General Parameters, to support classification — Calorific Value — Flashpoint — Mineral Oil — Moisture Content — pH — Total Organic Carbon (TOC)	 ✓ ✓ ✓ ✓ ✓ ✓	 N/A N/A N/A N/A N/A N/A
Other Parameters, reasonably expected — Calcium, iron, magnesium, potassium, sodium and sulphur	✓	N/A

Notes to Laboratory Analysis

1 N/A = Not applicable
2 Leachate analysis prepared using acetic acid in accordance with GN R635 for potential disposal with putrescible waste/s
3 Pesticides were omitted from the analysis as it is unreasonable to suspect their presence
4 Analytical certificates are provided in Appendix A

APPRAISAL OF DISPOSAL PROHIBITIONS

RESTRICTIVE CONDITION	DESCRIPTION
None identified based on the quantitative classification (non-hazardous) associated with the recent analysis. However, it is plausible that hazardous characteristics are batch dependent (see proceeding SANS 10234 Classification). As such, Sappi should take cognisance of the landfill disposal restrictions associated with hazardous wastes with a Calorific Value in excess of 10MJ/kg and/or Total Organic Carbon (TOC) content greater than 6%. The Calorific Value and TOC of the Boiler Ash have recently been recorded at 12MJ/kg and 35.53%, respectively which would result in a landfill disposal prohibition from August 2025 for batches deemed hazardous.	

WASTE TYPE PROFILING FOR LANDFILL DISPOSAL[1]

WASTE TYPE	3
LANDFILL CLASS	C (GLB+)

Notes to Waste Type Profiling

1 Refer to Appendix B for quantitative profiling assessment
2 While reference is made in GN R635 to the application of SANS 10234 classification to Waste Type Profiling, the Department of Environmental Affairs has confirmed during stakeholder engagement that Hazard Statement Codes for transportation and handling are not intended to be utilised for Waste Type Profiling for landfill disposal

[1] Subject to any prohibitions

SANS 10234 CLASSIFICATION

HAZARDOUS		NON-HAZARDOUS	✓

Notes to SANS 10234 Classification

1. Refer Appendix C for the detailed quantitative assessment
2. Based on the recent analysis, the Boiler Ash has been classified as non-hazardous. This is contradictory to the previous classification, which recognised the potential for eye and skin hazards associated with calcium oxide within the ash, and a lower moisture content. Therefore, it is plausible that classification will be batch dependent. In the absence of additional evidence, it is recommended that a hazardous classification is conservatively assumed
3. Where applicable to the sample medium, results of laboratory analysis have been corrected according to sample-specific moisture content
4. Assumptions in terms of the chemical form (speciation) in which elemental components of the waste stream are likely to occur have generally been conservative taking into account plausible thermodynamic and mineralogical assemblages
5. Where SANS 10234 guidance is either not available, unclear or relatively incomplete, cognisance has been taken of European Regulation (EC) No. 1272/2008 on the Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) which adopts, within the European community, the GHS as published by the United Nations Social and Economic Council
6. Hazard Statement Codes for chemical substances have been sourced from either the supplement to SANS 10234:2008 Edition 1, Table 3.1 of Annex VI of the CLP Regulations, or the European Chemicals Agency, Classification & Labelling Inventory Database
7. Cognisance must be taken of the need to re-classify the waste every five years, or if the generation process changes, subsequent to any treatment or, otherwise if more data becomes available

SAFETY DATA SHEET

REQUIRED	No

Notes

Whilst a SDS is not required based on the quantitative classification from the recent analysis only, one has been prepared taking cognisance of the previous recognition of potential hazards associated with calcium oxide, and the possibility that hazardous characteristics may be batch dependent (Appendix D)

ANNEXURES

No	Title
A	Laboratory Certificates of Analysis
B	Type Profiling Assessment (GN R635/R636)
C	Classification (SANS 10234)
D	Safety Data Sheet

WAIVER

The Waste Management Summary Report (Report) has been prepared by WSP Environmental Proprietary Limited (WSP) on behalf and at the request of Sappi Southern Africa Limited (Client), to provide the Client an understanding of the Relevant Documents. Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report. To prepare this Report, we have reviewed only the

documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report and except where otherwise indicated in the Report.

AUTHORISATION

Adam Sanderson
Senior Associate

APPENDIX

A LABORATORY ANALYTICAL CERTIFICATES

Exova Jones Environmental South Africa

Unit D2/5
9 Quantum Road
Firgrove Business Park
Somerset West
7130
South Africa

WSP - South Africa
1 on Langford Road
Westville
Durban
KwaZulu-Natal
South Africa
3639

Attention :	Brittany Purves
Date :	29th March, 2019
Your reference :	41101525
Our reference :	Test Report 19/189 Batch 1
Location :	Sappi Stanger
Date samples received :	13th March, 2019
Status :	Final report
Issue :	1

Six samples were received for analysis on 13th March, 2019 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Analysis was undertaken at either Exova Jones Environmental (UK), which is ISO 17025 accredited under UKAS (4225) or Exova Jones Environmental (SA) which is ISO 17025 accredited under SANAS (T0729) or a subcontract laboratory where specified.

NOTE: Under International Laboratory Accreditation Cooperation (ILAC), ISO 17025 (UKAS) accreditation is recognised as equivalent to SANAS (South Africa) accreditation.

Compiled By:

Aatifah Latief

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	10-11	12-13	14-16						LOD/LOR	Units	Method No.
Sample ID	Boiler Ash	Soda Ash	Anion Beads	Cation Beads	Pith								
Depth													
COC No / misc													
Containers	J	J B	J B	J B	J B								
Sample Date	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019								
Sample Type	Solid	Solid	Solid	Solid	Solid								
Batch Number	1	1	1	1	1								
Date of Receipt	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019								
Antimony*	<1	<1	<1	<1	<1						<1	mg/kg	UK_TM30/UK_PM15
Arsenic*	1.1	<0.5	<0.5	<0.5	<0.5						<0.5	mg/kg	UK_TM30/UK_PM15
Barium*	163	11	<1	206	48						<1	mg/kg	UK_TM30/UK_PM15
Cadmium*	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	UK_TM30/UK_PM15
Calcium*	7059	<500	<500	16380	14480						<500	mg/kg	UK_TM30/UK_PM15
Chromium*	39.4	3.6	3.2	1.8	41.3						<0.5	mg/kg	UK_TM30/UK_PM15
Cobalt*	8.8	<0.5	<0.5	0.5	2.3						<0.5	mg/kg	UK_TM30/UK_PM15
Copper*	8	8	2	3	20						<1	mg/kg	UK_TM30/UK_PM15
Iron*	5446	2420	681	5976	6285						<20	mg/kg	UK_TM30/UK_PM15
Lead*	<5	<5	<5	<5	<5						<5	mg/kg	UK_TM30/UK_PM15
Magnesium*	1693	85	43	6671	1275						<25	mg/kg	UK_TM30/UK_PM15
Manganese*	135	56	18	52	109						<1	mg/kg	UK_TM30/UK_PM15
Mercury*	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	UK_TM30/UK_PM15
Molybdenum*	3.6	0.3	1.0	0.5	1.8						<0.1	mg/kg	UK_TM30/UK_PM15
Nickel*	12.5	2.4	2.6	6.1	8.9						<0.7	mg/kg	UK_TM30/UK_PM15
Potassium*	295	2556	17	1637	410						<5	mg/kg	UK_TM30/UK_PM15
Selenium*	<1	<1	<1	<1	<1						<1	mg/kg	UK_TM30/UK_PM15
Sodium*	462	384400	546	16920	218						<5	mg/kg	UK_TM30/UK_PM15
Sulphur as S*	0.05	0.11	0.19	2.95	0.28						<0.01	%	UK_TM30/UK_PM15
Vanadium*	16	7	<1	2	11						<1	mg/kg	UK_TM30/UK_PM15
Boron (Aqua Regia Soluble)*	16.16	1.58	4.16	3.74	5.88						<0.25	mg/kg	UK_TM30/UK_PM15
Zinc*	<5	7	<5	85	69						<5	mg/kg	UK_TM30/UK_PM15

Please see attached notes for all abbreviations and acronyms

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-3	4-6	10-11	12-13	14-16						LOD/LOR	Units	Method No.
Sample ID	Boiler Ash	Soda Ash	Anion Beads	Cation Beads	Pith								
Depth													
COC No / misc													
Containers	J	J B	J B	J B	J B								
Sample Date	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019								
Sample Type	Solid	Solid	Solid	Solid	Solid								
Batch Number	1	1	1	1	1								
Date of Receipt	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019								
VOC MS													
Methyl Tertiary Butyl Ether	<2	<2	<2	<2	<2						<2	ug/kg	SA_TM15/SA_PM10
Vinyl Chloride	<2	<2	<2	<2	<2						<2	ug/kg	SA_TM15/SA_PM10
1,1-Dichloroethene (1,1 DCE)	<6	<6	<6	<6	<6						<6	ug/kg	SA_TM15/SA_PM10
Dichloromethane (DCM)	<30	<30	<30	<30	<30						<30	ug/kg	SA_TM15/SA_PM10
Chloroform	<3	<3	<3	19	<3						<3	ug/kg	SA_TM15/SA_PM10
1,1,1-Trichloroethane	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Carbon tetrachloride	<4	<4	<4	<4	<4						<4	ug/kg	SA_TM15/SA_PM10
1,2-Dichloroethane	<4	<4	<4	<4	<4						<4	ug/kg	SA_TM15/SA_PM10
Benzene	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Trichloroethene (TCE)	<3	<3	<3	159	<3						<3	ug/kg	SA_TM15/SA_PM10
Toluene	<3	<3	<3	19	<3						<3	ug/kg	SA_TM15/SA_PM10
1,1,2-Trichloroethane	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Tetrachloroethene (PCE)	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Chlorobenzene	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
1,1,1,2-Tetrachloroethane	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
Ethylbenzene	<3	1240^{++}	<3	17	21						<3	ug/kg	SA_TM15/SA_PM10
Xylenes (sum of isomers)	<8	7248	<8	65	84						<8	ug/kg	SA_TM15/SA_PM10
Styrene	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
1,1,2,2-Tetrachloroethane	<3	<3	<3	<3	<3						<3	ug/kg	SA_TM15/SA_PM10
1,4-Dichlorobenzene	<4	<4	<4	<4	<4						<4	ug/kg	SA_TM15/SA_PM10
1,2-Dichlorobenzene	<4	<4	<4	<4	<4						<4	ug/kg	SA_TM15/SA_PM10
1,2-Dichloroethene (cis & trans)	<6	<6	<6	<6	<6						<6	ug/kg	SA_TM15/SA_PM10
Trichlorobenzenes (1,2,3 & 1,2,4)	<14	<14	<14	<14	<14						<14	ug/kg	SA_TM15/SA_PM10
Methyl Ethyl Ketone (MEK)	<100	<100	<100	<100	<100						<100	ug/kg	SA_TM15/SA_PM10
Surrogate Recovery Toluene D8	69	39^{SV}	97	86	86						<0	%	SA_TM15/SA_PM10
Surrogate Recovery 4-Bromofluorobenzene	30^{SV}	31^{SV}	101	75	80						<0	%	SA_TM15/SA_PM10
SVOC MS													
Phenols													
2-Chlorophenol	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
2,4-Dichlorophenol	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
2,4,6-Trichlorophenol	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
PAHs													
Benzo(a)pyrene	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
PAH 16 Total	<160	<160	<160	<160	4062						<160	ug/kg	SA_TM16/SA_PM8
Phthalates													
Bis(2-ethylhexyl) phthalate	<100	<100	<100	<100	<100						<100	ug/kg	SA_TM16/SA_PM8

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-3	4-6	10-11	12-13	14-16						LOD/LOR	Units	Method No.
Sample ID	Boiler Ash	Soda Ash	Anion Beads	Cation Beads	Pith								
Depth													
COC No / misc													
Containers	J	J B	J B	J B	J B								
Sample Date	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019								
Sample Type	Solid	Solid	Solid	Solid	Solid								
Batch Number	1	1	1	1	1								
Date of Receipt	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019								
SVOC MS													
Other SVOCs													
2,4-Dinitrotoluene	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
Hexachlorobutadiene	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
Nitrobenzene	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM16/SA_PM8
Surrogate Recovery 2-Fluorobiphenyl	100	90	114	98	54[SV]						<0	%	SA_TM16/SA_PM8
Surrogate Recovery p-Terphenyl-d14	57[SV]	28[SV]	90	79	43[SV]						<0	%	SA_TM16/SA_PM8
EPH (C10-C36)	<10	<10	<10	<10	5259						<10	mg/kg	SA_TM5/SA_PM8
Mineral Oil (C10-C40)	<30	<30	<30	<30	1536						<30	mg/kg	SA_TM5/SA_PM8/PM16
GRO (C6-C9)	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	SA_TM36/SA_PM12
PCBs (Total vs Aroclor 1254)	<10	<10	<10	<10	<10						<10	ug/kg	SA_TM17/SA_PM8
Natural Moisture Content	41.6	<0.1	70.6	108.6	422.2						<0.1	%	SA_PM4/SA_PM0
Moisture Content (% Wet Weight)	29.4	<0.1	41.4	52.1	80.9						<0.1	%	SA_PM4/SA_PM0
Fluoride	0.3	NDP	0.9	<0.3	<0.3						<0.3	mg/kg	SA_TM27/SA_PM20
Hexavalent Chromium*	<0.3	<0.3	<0.3	<0.3	<0.3						<0.3	mg/kg	UK_TM38/UK_PM20
Total Cyanide*	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	mg/kg	UK_TM89/UK_PM45
Total Organic Carbon*	35.53	0.25	29.49	39.20	34.23						<0.02	%	UK_TM21/UK_PM24
Calorific Value*	12	<1	10	13	11						<1	MJ/kg	UK_TM21/UK_PM24
Flashpoint @ 93C*	>93	>93	>93	>93	>93						>93	Degrees C	UK_TM79/UK_PM0
pH	11.25	12.58	12.77	3.09	6.83						<2.00	pH units	SA_TM19/SA_PM11

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	7-9												
Sample ID	Coater Sludge												
Depth													
COC No / misc													
Containers	G												
Sample Date	11/03/2019												
Sample Type	Liquid												
Batch Number	1												
Date of Receipt	13/03/2019												
											LOD/LOR	Units	Method No.
Dissolved Antimony*	<2										<2	ug/l	UK_TM30/UK_PM14
Dissolved Arsenic*	<2.5										<2.5	ug/l	UK_TM30/UK_PM14
Dissolved Barium*	52										<3	ug/l	UK_TM30/UK_PM14
Dissolved Boron*	46										<12	ug/l	UK_TM30/UK_PM14
Dissolved Cadmium*	<0.5										<0.5	ug/l	UK_TM30/UK_PM14
Dissolved Calcium*	26.7										<0.2	mg/l	UK_TM30/UK_PM14
Total Dissolved Chromium*	<1.5										<1.5	ug/l	UK_TM30/UK_PM14
Dissolved Cobalt*	<2										<2	ug/l	UK_TM30/UK_PM14
Dissolved Copper*	<7										<7	ug/l	UK_TM30/UK_PM14
Total Dissolved Iron*	42										<20	ug/l	UK_TM30/UK_PM14
Dissolved Lead*	<5										<5	ug/l	UK_TM30/UK_PM14
Dissolved Magnesium*	5.5										<0.1	mg/l	UK_TM30/UK_PM14
Dissolved Manganese*	64										<2	ug/l	UK_TM30/UK_PM14
Dissolved Mercury*	<1										<1	ug/l	UK_TM30/UK_PM14
Dissolved Molybdenum*	<2										<2	ug/l	UK_TM30/UK_PM14
Dissolved Nickel*	19										<2	ug/l	UK_TM30/UK_PM14
Dissolved Potassium*	2.6										<0.1	mg/l	UK_TM30/UK_PM14
Dissolved Selenium*	<3										<3	ug/l	UK_TM30/UK_PM14
Dissolved Sodium*	29.0										<0.1	mg/l	UK_TM30/UK_PM14
Dissolved Vanadium*	<1.5										<1.5	ug/l	UK_TM30/UK_PM14
Dissolved Zinc*	593										<3	ug/l	UK_TM30/UK_PM14
Total Dissolved Sulphur as S*	7341										<10	ug/l	UK_TM30/UK_PM14

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	7-9										LOD/LOR	Units	Method No.
Sample ID	Coater Sludge												
Depth													
COC No / misc													
Containers	G												
Sample Date	11/03/2019												
Sample Type	Liquid												
Batch Number	1												
Date of Receipt	13/03/2019												
VOC MS													
Methyl Tertiary Butyl Ether	<0.1										<0.1	ug/l	SA_TM15/SA_PM10
Vinyl Chloride	<0.1										<0.1	ug/l	SA_TM15/SA_PM10
1,1-Dichloroethene (1,1 DCE)	<3										<3	ug/l	SA_TM15/SA_PM10
Dichloromethane (DCM)	<5										<5	ug/l	SA_TM15/SA_PM10
Chloroform	<2										<2	ug/l	SA_TM15/SA_PM10
1,1,1-Trichloroethane	<2										<2	ug/l	SA_TM15/SA_PM10
Carbon tetrachloride	<2										<2	ug/l	SA_TM15/SA_PM10
1,2-Dichloroethane	<2										<2	ug/l	SA_TM15/SA_PM10
Benzene	<0.5										<0.5	ug/l	SA_TM15/SA_PM10
Trichloroethene (TCE)	<3										<3	ug/l	SA_TM15/SA_PM10
Toluene	<5										<5	ug/l	SA_TM15/SA_PM10
1,1,2-Trichloroethane	<2										<2	ug/l	SA_TM15/SA_PM10
Tetrachloroethene (PCE)	<3										<3	ug/l	SA_TM15/SA_PM10
Chlorobenzene	<2										<2	ug/l	SA_TM15/SA_PM10
1,1,1,2-Tetrachloroethane	<2										<2	ug/l	SA_TM15/SA_PM10
Ethylbenzene	<1										<1	ug/l	SA_TM15/SA_PM10
Xylenes (sum of isomers)	<3										<3	ug/l	SA_TM15/SA_PM10
Styrene	<2										<2	ug/l	SA_TM15/SA_PM10
1,1,2,2-Tetrachloroethane	<4										<4	ug/l	SA_TM15/SA_PM10
1,4-Dichlorobenzene	<3										<3	ug/l	SA_TM15/SA_PM10
1,2-Dichlorobenzene	<3										<3	ug/l	SA_TM15/SA_PM10
1,2-Dichloroethene (cis & trans)	<6										<6	ug/l	SA_TM15/SA_PM10
Trichlorobenzenes (1,2,3 & 1,2,4)	<6										<6	ug/l	SA_TM15/SA_PM10
Methyl Ethyl Ketone (MEK)	<100										<100	ug/l	SA_TM15/SA_PM10
Surrogate Recovery Toluene D8	102										<0	%	SA_TM15/SA_PM10
Surrogate Recovery 4-Bromofluorobenzene	108										<0	%	SA_TM15/SA_PM10
SVOC MS													
Phenols													
2-Chlorophenol	<1										<1	ug/l	SA_TM16/SA_PM30
2,4-Dichlorophenol	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
2,4,6-Trichlorophenol	<1										<1	ug/l	SA_TM16/SA_PM30
PAHs													
Benzo(a)pyrene	<1										<1	ug/l	SA_TM16/SA_PM30
PAH 16 Total	<10										<10	ug/l	SA_TM16/SA_PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5										<5	ug/l	SA_TM16/SA_PM30

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	7-9										LOD/LOR	Units	Method No.
Sample ID	Coater Sludge												
Depth													
COC No / misc													
Containers	G												
Sample Date	11/03/2019												
Sample Type	Liquid												
Batch Number	1												
Date of Receipt	13/03/2019												
SVOC MS													
Other SVOCs													
2,4-Dinitrotoluene	<0.5										<0.5	ug/l	SA_TM16/SA_PM30
Hexachlorobutadiene	<1										<1	ug/l	SA_TM16/SA_PM30
Nitrobenzene	<1										<1	ug/l	SA_TM16/SA_PM30
Surrogate Recovery 2-Fluorobiphenyl	72										<0	%	SA_TM16/SA_PM30
Surrogate Recovery p-Terphenyl-d14	96										<0	%	SA_TM16/SA_PM30
EPH (C10-C36)	<10										<10	ug/l	SA_TM5/SA_PM30
Mineral Oil (C10-C40)	<10										<10	ug/l	SA_TM5/SA_PM30
GRO (C6-C9)	20										<10	ug/l	SA_TM36/SA_PM12
PCBs (Total vs Aroclor 1254)	<0.2										<0.2	ug/l	SA_TM17/SA_PM30
Fluoride	<0.3										<0.3	mg/l	SA_TM27/SA_PM0
Total Cyanide*	<0.01										<0.01	mg/l	UK_TM89/UK_PM0
Hexavalent Chromium*	<0.006										<0.006	mg/l	UK_TM38/UK_PM0
Flashpoint @ 93C*	>93										>93	Degrees C	UK_TM79/UK_PM0
pH	7.32										<2.00	pH units	SA_TM19/SA_PM0
Total Organic Carbon*	4										<2	mg/l	UK_TM60/UK_PM0

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : ASLP (20:1)-Acetate pH 5 or 2.9

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-3	4-6	10-11	12-13	14-16						LOD/LOR	Units	Method No.
Sample ID	Boiler Ash	Soda Ash	Anion Beads	Cation Beads	Pith								
Depth													
COC No / misc													
Containers	J	J B	J B	J B	J B								
Sample Date	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019								
Sample Type	Solid	Solid	Solid	Solid	Solid								
Batch Number	1	1	1	1	1								
Date of Receipt	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019								
Dissolved Antimony	<2	<2	<2	3	2						<2	ug/l	UK_TM30/UK_PM14
Dissolved Arsenic	22.0	23.8	14.5	14.8	5.3						<2.5	ug/l	UK_TM30/UK_PM14
Dissolved Barium	620	407	153	126	354						<3	ug/l	UK_TM30/UK_PM14
Dissolved Boron	143	156	95	113	111						<12	ug/l	UK_TM30/UK_PM14
Dissolved Cadmium	0.6	<0.5	<0.5	<0.5	1.3						<0.5	ug/l	UK_TM30/UK_PM14
Dissolved Chromium	8.7	5.5	2.7	<1.5	3.6						<1.5	ug/l	UK_TM30/UK_PM14
Dissolved Cobalt	11	<2	<2	<2	3						<2	ug/l	UK_TM30/UK_PM14
Dissolved Copper	14	31	<7	<7	<7						<7	ug/l	UK_TM30/UK_PM14
Dissolved Lead	<5	<5	<5	<5	<5						<5	ug/l	UK_TM30/UK_PM14
Dissolved Manganese	1043	<2	80	13	430						<2	ug/l	UK_TM30/UK_PM14
Dissolved Mercury	<1	<1	<1	<1	<1						<1	ug/l	UK_TM30/UK_PM14
Dissolved Molybdenum	3	4	<2	2	<2						<2	ug/l	UK_TM30/UK_PM14
Dissolved Nickel	26	8	<2	<2	4						<2	ug/l	UK_TM30/UK_PM14
Dissolved Selenium	<3	<3	<3	<3	<3						<3	ug/l	UK_TM30/UK_PM14
Dissolved Vanadium	25.3	94.5	5.9	5.1	6.8						<1.5	ug/l	UK_TM30/UK_PM14
Dissolved Zinc	480	21	51	67	449						<3	ug/l	UK_TM30/UK_PM14

Please see attached notes for all abbreviations and acronyms

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : ASLP (20:1)-Acetate pH 5 or 2.9

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-3	4-6	10-11	12-13	14-16						LOD/LOR	Units	Method No.
Sample ID	Boiler Ash	Soda Ash	Anion Beads	Cation Beads	Pith								
Depth													
COC No / misc													
Containers	J	J B	J B	J B	J B								
Sample Date	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019								
Sample Type	Solid	Solid	Solid	Solid	Solid								
Batch Number	1	1	1	1	1								
Date of Receipt	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019								
VOC MS													
Methyl Tertiary Butyl Ether	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	SA_TM15/SA_PM88
Vinyl Chloride	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	ug/l	SA_TM15/SA_PM88
1,1-Dichloroethene (1,1 DCE)	<3	<3	<3	<3	<3						<3	ug/l	SA_TM15/SA_PM88
Dichloromethane (DCM)	<5	<5	<5	<5	<5						<5	ug/l	SA_TM15/SA_PM88
Chloroform	<2	<2	<2	<2	<2						<2	ug/l	SA_TM15/SA_PM88
1,1,1-Trichloroethane	<2	<2	<2	<2	<2						<2	ug/l	SA_TM15/SA_PM88
Carbon tetrachloride	<2	<2	<2	<2	<2						<2	ug/l	SA_TM15/SA_PM88
1,2-Dichloroethane	<2	<2	<2	<2	<2						<2	ug/l	SA_TM15/SA_PM88
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	SA_TM15/SA_PM88
Trichloroethene (TCE)	<3	<3	<3	3	<3						<3	ug/l	SA_TM15/SA_PM88
Toluene	<5	<5	<5	<5	<5						<5	ug/l	SA_TM15/SA_PM88
1,1,2-Trichloroethane	<2	<2	<2	<2	<2						<2	ug/l	SA_TM15/SA_PM88
Tetrachloroethene (PCE)	<3	<3	<3	<3	<3						<3	ug/l	SA_TM15/SA_PM88
Chlorobenzene	<2	<2	<2	<2	<2						<2	ug/l	SA_TM15/SA_PM88
1,1,1,2-Tetrachloroethane	<2	<2	<2	<2	<2						<2	ug/l	SA_TM15/SA_PM88
Ethylbenzene	4	<1	<1	<1	<1						<1	ug/l	SA_TM15/SA_PM88
Xylenes (sum of isomers)	27	<3	<3	<3	<3						<3	ug/l	SA_TM15/SA_PM88
Styrene	<2	<2	<2	<2	<2						<2	ug/l	SA_TM15/SA_PM88
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4						<4	ug/l	SA_TM15/SA_PM88
1,4-Dichlorobenzene	<3	<3	<3	<3	<3						<3	ug/l	SA_TM15/SA_PM88
1,2-Dichlorobenzene	<3	<3	<3	<3	<3						<3	ug/l	SA_TM15/SA_PM88
1,2-Dichloroethene (cis & trans)	<6	<6	<6	<6	<6						<6	ug/l	SA_TM15/SA_PM88
Trichlorobenzenes (1,2,3 & 1,2,4)	<6	<6	<6	<6	<6						<6	ug/l	SA_TM15/SA_PM88
Methyl Ethyl Ketone (MEK)	<100	<100	<100	<100	<100						<100	ug/l	SA_TM15/SA_PM88
Toluene-D8	102	101	103	104	103						<0	%	SA_TM15/SA_PM88
4-Bromofluorobenzene	109	108	107	107	108						<0	%	SA_TM15/SA_PM88
SVOC MS													
Phenols													
2-Chlorophenol	<1	<1	<1	<1	<1						<1	ug/l	SA_TM16/SA_PM30
2,4-Dichlorophenol	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	SA_TM16/SA_PM30
2,4,6-Trichlorophenol	<1	<1	<1	<1	<1						<1	ug/l	SA_TM16/SA_PM30
PAHs													
Benzo(a)pyrene	<1	<1	<1	<1	<1						<1	ug/l	SA_TM16/SA_PM30
PAH 16 Total	<11	<11	<11	<11	<11						<11	ug/l	SA_TM16/SA_PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<5	<5	<5	<5	<5						<5	ug/l	SA_TM16/SA_PM30

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves
JE Job No.: 19/189

Report : ASLP (20:1)-Acetate pH 5 or 2.9

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-3	4-6	10-11	12-13	14-16						LOD/LOR	Units	Method No.
Sample ID	Boiler Ash	Soda Ash	Anion Beads	Cation Beads	Pith								
Depth													
COC No / misc													
Containers	J	J B	J B	J B	J B								
Sample Date	11/03/2019	11/03/2019	11/03/2019	11/03/2019	11/03/2019								
Sample Type	Solid	Solid	Solid	Solid	Solid								
Batch Number	1	1	1	1	1								
Date of Receipt	13/03/2019	13/03/2019	13/03/2019	13/03/2019	13/03/2019								
SVOC MS													
Other SVOCs													
2,4-Dinitrotoluene	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	ug/l	SA_TM16/SA_PM30
Hexachlorobutadiene	<1	<1	<1	<1	<1						<1	ug/l	SA_TM16/SA_PM30
Nitrobenzene	<1	<1	<1	<1	<1						<1	ug/l	SA_TM16/SA_PM30
Surrogate Recovery 2-Fluorobiphenyl	77	72	77	84	84						<0	%	SA_TM16/SA_PM30
Surrogate Recovery p-Terphenyl-d14	118	109	96	114	115						<0	%	SA_TM16/SA_PM30
PCBs (Total vs Aroclor 1254)*	<0.2	<0.2	<0.2	<0.2	<0.2						<0.2	ug/l	UK_TM16/UK_PM30
Sulphate as SO4*	10.5	225.3	10.8	17.4	15.9						<0.5	mg/l	UK_TM38/UK_PM0
Chloride*	45.1	55.6	215.1	35.5	0.9						<0.3	mg/l	UK_TM38/UK_PM0
Hexavalent Chromium*	<0.006	<0.006	<0.006	<0.006	<0.006						<0.006	mg/l	UK_TM38/UK_PM0
Nitrate as N*	0.14	0.10	0.28	<0.05	<0.05						<0.05	mg/l	UK_TM38/UK_PM0
Fluoride*	<0.3	<0.3	0.5	<0.3	<0.3						<0.3	mg/l	UK_TM173/UK_PM0
Total Cyanide*	<0.01	<0.01	<0.01	<0.01	<0.01						<0.01	mg/l	UK_TM89/UK_PM0
pH of leaching fluid	5.0	5.0	5.0	5.0	2.9						<	pH units	NONE/SA_PM80
pH of leaching fluid	5.0	5.0	5.0	5.0	2.9							pH units	NONE/SA_PM88
Total Dissolved Solids	8804	65204	8514	5271	510						<35	mg/l	SA_TM20/SA_PM80

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Method No.	NDP Reason
19/189	1	Soda Ash		4-6	SA_TM27/SA_PM20	Sample unsuitable for this test

Client Name: WSP - South Africa
Reference: 41101525
Location: Sappi Stanger
Contact: Brittany Purves

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 19/189						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 19/189

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to an Exova Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 19/189

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
NONE	No Method Code	SA_PM80	A 20:1 ratio of leaching fluid to as received soil, is leached for 18 hours. The client can choose to use any of the following leaching fluids a) deionised water b) pH5 c) pH 5/pH2.9 depending on pH of sample d) pH9.2			AR	No
NONE	No Method Code	SA_PM88	A 20:1 ratio of deionised water to as received soil, is leached for 18 hours with zero headspace.				No
SA_PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	SA_PM0	No preparation is required.			AR	
SA_TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds by Headspace GC-MS.	SA_PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
SA_TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds by Headspace GC-MS.	SA_PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
SA_TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds by Headspace GC-MS.	SA_PM88	A 20:1 ratio of deionised water to as received soil, is leached for 18 hours with zero headspace.			AR	No
SA_TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	SA_PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
SA_TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	SA_PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	No
SA_TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	SA_PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
SA_TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	SA_PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				

JE Job No: 19/189

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
SA_TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	SA_PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
SA_TM19	Determination of pH by bench pH meter	SA_PM0	No preparation is required.				
SA_TM19	Determination of pH by bench pH meter	SA_PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.			AR	No
SA_TM20	Modified BS 1377-3: 1990 Gravimetric determination of Total Dissolved Solids	SA_PM80	A 20:1 ratio of leaching fluid to as received soil, is leached for 18 hours. The client can choose to use any of the following leaching fluids a) deionised water b) pH5 c) pH 5/pH2.9 depending on pH of sample d) pH9.2			AR	No
SA_TM27	Major ions by Ion Chromatography	SA_PM0	No preparation is required.				
SA_TM27	Major ions by Ion Chromatography	SA_PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a orbital shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a orbital shaker.			AD	Yes
SA_TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12, MTBE and BTEX by headspace GC-FID.	SA_PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
SA_TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12, MTBE and BTEX by headspace GC-FID.	SA_PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
SA_TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	SA_PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
SA_TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	SA_PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes

JE Job No: 19/189

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
SA_TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	SA_PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
UK_TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	UK_PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				No
UK_TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	UK_PM0	No preparation is required.				No
UK_TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	UK_PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.				Yes
UK_TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	UK_PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
UK_TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	UK_PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				No
UK_TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	UK_PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.				Yes
UK_TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	UK_PM0	No preparation is required.				
UK_TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	UK_PM0	No preparation is required.				No
UK_TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	UK_PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.				Yes

JE Job No: 19/189

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
UK_TM60	Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR).	UK_PM0	No preparation is required.				
UK_TM79	Determination of Flashpoint using a Closed Cup Flashpoint Analyser	UK_PM0	No preparation is required.				
UK_TM79	Determination of Flashpoint using a Closed Cup Flashpoint Analyser	UK_PM0	No preparation is required.				No
UK_TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	UK_PM0	No preparation is required.				
UK_TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	UK_PM0	No preparation is required.				No
UK_TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	UK_PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.				Yes

APPENDIX

B TYPE PROFILING

Screening Waste Type Profiling and Disposal Prohibition Appraisal

Based on National Norms and Standards for the Assessment of Waste for Landfill Disposal (GN R635 of 2013) together with National Norms and Standards for Disposal of Waste to Landfill (GN R636 of 2013)

Source of Waste:	Sappi Southern Africa Limited, Stanger Mill, Gledhow Mount, Stanger, 4450, Boiler Ash
Waste Matrix (Liquid / Solid):	Solid
Leachate Preparation (Solids Only):	Putrescible: 0.1M Acetic Acid Solution (altered pH)

Substance	Concentration (ppm) - Solid/Total				Waste Type (based on TCTs and subject to LCTs)	Concentration (ppm) - Leachate/Liquid					Waste Type (based on LCTs and subject to TCTs)
	TCT0	TCT1	TCT2	Assessed Concentration		LCT0	LCT1	LCT2	LCT3	Assessed Concentration	
Metal Ions											
Arsenic	5.8	500	2000	1.1	2, 3 or 4 - LCT Dependent	0.01	0.5	1	4	0.022	3
Boron	150	15000	60000	16.16	2, 3 or 4 - LCT Dependent	0.5	25	50	200		
Barium	62.5	6250	25000	163	2 or 3 - LCT Dependent	0.7	35	70	280	0.62	4
Cadmium	7.5	260	1040			0.003	0.15	0.3	1.2		
Cobalt	50	5000	20000	8.8	2, 3 or 4 - LCT Dependent	0.5	25	50	200	0.011	4
Chromium	46000	800000	-	39.4	2, 3 or 4 - LCT Dependent	0.1	5	10	40	0.0087	4
Chromium (Hexavalent)	6.5	500	2000			0.05	2.5	5	20		
Copper	16	19500	78000	8	2, 3 or 4 - LCT Dependent	2	100	200	800	0.014	4
Mercury	0.93	160	640			0.006	0.3	0.6	2.4		
Manganese	1000	25000	100000	135	2, 3 or 4 - LCT Dependent	0.5	25	50	200	1.043	3
Molybdenum	40	1000	4000	3.6	2, 3 or 4 - LCT Dependent	0.07	3.5	7	28	0.003	4
Nickel	91	10600	42400	12.5	2, 3 or 4 - LCT Dependent	0.07	3.5	7	28	0.026	4
Lead	20	1900	7600			0.01	0.5	1	4		
Antimony	10	75	300			0.02	1	2	8		
Selenium	10	50	200			0.01	0.5	1	4		
Vanadium	150	2680	10720	16	2, 3 or 4 - LCT Dependent	0.2	10	20	80	0.0253	4
Zinc	240	160000	640000			5	250	500	2000		
Inorganic Anions											
Total Dissolved Solids	-	-	-		Not Applicable	1000	12500	25000	100000	8804	3
Chloride	-	-	-		Not Applicable	300	15000	30000	120000	45.1	4
Sulphate	-	-	-		Not Applicable	250	12500	25000	100000	10.5	4
Nitrate	-	-	-		Not Applicable	11	550	1100	4400	0.14	4
Fluoride	100	10000	40000	0.3	2, 3 or 4 - LCT Dependent	1.5	75	150	600		
Cyanide	14	10500	42000			0.07	3.5	7	28		
Organics											
Benzene	-	10	40			-	0.01	0.02	0.08		
Benzo(a)pyrene	-	1.7	6.8			-	0.035	0.07	0.28		
Carbon tetrachloride	-	4	16			-	0.2	0.4	1.6		
Chlorobenzene	-	8800	35200			-	5	10	40		
Chloroform	-	700	2800			-	15	30	120		
2-Chlorophenol	-	2100	8400			-	15	30	120		
Bis(2-ethylhexyl)phthalate	-	40	160			-	0.5	1	4		
1,2-Dichlorobenzene	-	31900	127600			-	5	10	40		
1,4-Dichlorobenzene	-	18400	73600			-	15	30	120		
1,2-Dichloroethane	-	3.7	14.8			-	1.5	3	12		
1,1-Dichloroethene	-	150	600			-	0.35	0.7	2.8		
1,2-Dichloroethene	-	3750	15000			-	2.5	5	20		
Dichloromethane	-	16	64			-	0.25	0.5	2		
2,4-Dichlorophenol	-	800	3200			-	10	20	80		
2,4-Dinitrotoluene	-	5.2	20.8			-	0.065	0.13	0.52		
Ethylbenzene	-	540	2160			-	3.5	7	28	0.004	3 or 4
Formaldehyde	-	2000	8000			-	25	50	200		
Hexachlorobutadiene	-	2.8	5.4			-	0.03	0.06	0.24		
Methyl Ethyl Ketone (2-Butanone)	-	8000	32000			-	100	200	800		
Methyl Tertiary Butyl Ether	-	1435	5740			-	2.5	5	20		
Nitrobenzene	-	45	180			-	1	2	8		
Total PAHs	-	50	200			-	-	-	-	Not Applicable	
>C6-C9	-	650	2600			-	-	-	-	Not Applicable	
>C10-C36	-	10000	40000			-	-	-	-	Not Applicable	
Phenol	-	560	2240			-	7	14	56		
Polychlorinated Biphenyls (PCBs)	-	12	48			-	0.025	0.05	0.2		
Styrene	-	120	480			-	1	2	8		
1,1,1,2-Tetrachloroethane	-	400	1600			-	5	10	40		
1,1,2,2-Tetrachloroethane	-	5	20			-	0.65	1.3	5.3		
Tetrachloroethene	-	200	800			-	0.25	0.5	2		
Toluene	-	1150	4600			-	35	70	280		
Trichlorobenzenes (Sum)	-	3300	13200			-	3.5	7	28		
1,1,1-Trichloroethane	-	1200	4800			-	15	30	120		
1,1,2-Trichloroethane	-	48	192			-	0.06	1	4		
Trichloroethene	-	11600	46400			-	0.25	2	8		
2,4,6-Trichlorophenol	-	1770	7080			-	10	20	80		
Vinyl chloride	-	1.5	6			-	0.015	0.03	0.12		
Xylenes (Sum)	-	890	3560			-	25	50	200	0.027	3 or 4
Pesticides											
Aldrin + Dieldrin	0.05	1.2	4.8			-	0.015	0.03	0.03		
DDT + DDD + DDE	0.05	50	200			-	1	2	2		
2,4-Dichlorophenoxyacetic Acid (2,4-D)	0.05	120	480			-	1.5	3	3		
Chlordane	0.05	4	16			-	0.05	0.1	0.1		
Heptachlor	0.05	1.2	4.8			-	0.015	0.03	0.03		

Supplementary Consideration for Confirmation of Type 4 Waste Type

Organics	Concentration (mg/kg), unless stated		Satisfy Type 4
	Threshold	Assessed Concentration	
Metals (all concentrations <TCT0 & LCT0):		As above	No
Anions (all concentrations <TCT0 & LCT0):		As above	No
Total Organic Carbon	(%) 3	35.53	No
BTEX (Sum)	6	Not Detected	Yes
Polychlorinated Biphenyls (PCBs)	1	Not Detected	Yes
Mineral Oil (>C10-C40)	500	<30	Yes
Pesticides			
Aldrin + Dieldrin	0.05		Not determined
DDT + DDD + DDE	0.05		Not determined
2,4-Dichlorophenoxyacetic Acid (2,4-D)	0.05		Not determined
Chlordane	0.05		Not determined
Heptachlor	0.05		Not determined

Notes to Waste Type Profiling

1. The final waste type is determined from the most conservative type calculated for any individual substance, whether this be based on Total (TCT) or Leachable (LCT) concentrations.
2. Where a number of waste types are applicable for any given substance (i.e. the consideration of TCTs in isolation cannot result in a Type 4 profile), the final waste type is determined by considering both the TCT and LCT analytical data simultaneously.
3. Only where laboratory analysis has resulted in positive identification of substances (i.e. above laboratory limits of detection) have these been compared to their respective TCTs and LCTs (i.e. substances determined to be at concentrations less than laboratory limits of detection have been assumed to be absent).
4. Notwithstanding disposal prohibitions, profiling of liquid wastes is undertaken by comparing the analytical results obtained directly from the liquid media to the LCT thresholds given that liquid wastes cannot provide a leachate extract for analysis.

Overall Screened Waste Type (notwithstanding potential disposal prohibitions, see below)	Category of Landfill (GN R636 of 2013)
Type 3 Waste	**Class C / GLB+**

Disposal Prohibitions (notwithstanding other potential restrictions associated with Waste Type)

PCBs > 50ppm	PCBs (ppm):			Not applicable, PCBs not detected
Explosive, corrosive or oxidising according to SANS 10234			No	Not applicable
pH <6 or >12	pH:	11.25	No	Not applicable
Flashpoint <61° Celsius	Flashpoint (°C):	>93	No	Not applicable
Moisture Content > 40%	Moisture Content (%):	29.4	No	Not applicable
Hazardous with Calorific Value >10MJ/kg	CV (MJ/kg):	12	No	Not applicable
Hazardous with Total Organic Carbon >6%	TOC (%):	35.53	No	Not applicable
Brine (high salt content) >5% TDS	TDS (%):	N/A	N/A	Not applicable to a solid waste
Leachable TDS >100 000mg/l	TDS (mg/l):	8804	No	Not applicable

End of Waste Type Profiling and Disposal Prohibition Appraisal

APPENDIX

C CLASSIFICATION

Material Classification (SANS 10234:2008; Edition 1.1)

WSP Reference:	41101525	Prepared For:	Sappi Southern Africa Limited
Generator:	Sappi Southern Africa Limited		
Source Address:	Stanger Mill, Gledhow Mount, Stanger, 4450		
Production Process:	Boiler Ash		

General Appearance

Dark grey to black, sand and gravel-sized fractions of ash

Classification Summary

Not Hazardous (General)

Applicable Hazard Statement Codes

Composition & Quantitative Classification

Composition assessed in general accordance with the following hierarchy:
1. South African National Standard, Globally Harmonised System of Classification and Labelling of Chemicals (GHS), SANS 10234:2008, Edition 1.1
2. European Regulation (EC) No. 1272/2008, 'Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation)

Hazard Statement Codes for individual compounds are sourced from:
1. Supplement to SANS 10234:2008 Edition 1
2. Table 3.1 of Annex VI of the CLP Regulations
3. European Chemicals Agency, Classification & Labelling Inventory Database
4. Product (Material) Safety Data Sheet

Where relevant, recorded concentrations have been converted from dry weight values to account for the recorded moisture content of material.

Quantitative screening assessment of individual Hazard Statement Codes presented on the following pages.

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
Physical Hazard Statements								
H200	Unstable explosive	0	0	If >0% then classified under H200 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H201	Explosive; mass explosion hazard	0	0	If >0% then classified under H201 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H202	Explosive; severe projection hazard	0	0	If >0% then classified under H202 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H203	Explosive; fire blast or projection hazard	0	0	If >0% then classified under H203 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H204	Fire or projection hazard	0	0	If >0% then classified under H204 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H205	May explode in fire	0	0	If >0% then classified under H205 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H220	Extremely flammable gas	0	0	If >0% then classified under H220 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H221	Flammable gas	0	0	If >0% then classified under H221 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H222	Extremely flammable aerosol	0	0	If >0% then classified under H222 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H223	Flammable aerosol	0	0	If >0% then classified under H223 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H224	Extremely flammable liquid and vapour	0	0	If >0% then classified under H224 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H225	Highly flammable liquid and vapour	0	0	If >0% then classified under H225 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H226	Flammable liquid and vapour	0	0	If >0% then classified under H226 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H227	Combustible liquid	0	0	If >0% then classified under H227 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H228	Flammable solid	0	0	If >0% then classified under H228 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H229	Pressurised container: may burst if heated	0	0	Relevant only for pressurised containers	Not applicable	Not applicable	No	
H230	May react explosively even in the absence of air	0	0	If >0% then classified under H230 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H231	May react explosively even in the absence of air at elevated pressure and/or temperature	0	0	If >0% then classified under H231 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H240	Heating may cause an explosion	0	0	If >0% then classified under H240 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H241	Heating may cause a fire or explosion	0	0	If >0% then classified under H241 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H242	Heating may cause a fire	0	0	If >0% then classified under H242 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H250	Catches fire spontaneously if exposed to air	0	0	If >0% then classified under H250 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H251	Self-heating; may catch fire	0	0	If >0% then classified under H251 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H252	Self-heating in large quantities; may catch fire	0	0	If >0% then classified under H252 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
		0	0	If >0% then classified under H260 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
		0.0076	76.1	Element-specific assessment Concentration of aluminium phosphide required to evolve sufficient volume of phosphine in contact with water to render hazardous; based on stoichiometry	No analysis for aluminium	Not applicable	No	
		1.177	11773	Element-specific assessment Concentration of free caesium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	No analysis for caesium	Not applicable	No	
		0.061	614.7	Element-specific assessment Concentration of free lithium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	No analysis for lithium	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H260	In contact with water releases flammable gases that may ignite spontaneously	0.108	1076	Element-specific assessment Concentration of free magnesium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	All magnesium assumed to be bound/ complexed	Not applicable	No	
		0.346	3463	Element-specific assessment Concentration of free potassium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	All potassium assumed to be bound/ complexed	Not applicable	No	
		0.757	7571	Element-specific assessment Concentration of free rubidium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	No analysis for rubidium	Not applicable	No	
		0.204	2036	Element-specific assessment Concentration of free sodium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	All sodium assumed to be bound/ complexed	Not applicable	No	
		0.388	3881	Element-specific assessment Concentration of free strontium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	No analysis for strontium	Not applicable	No	
		0	0	If >0% then classified under H261 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
		0.608	6082	Element-specific assessment Concentration of free barium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	All barium assumed to be bound/ complexed	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H261	In contact with water releases flammable gas	0.177	1775	Element-specific assessment Concentration of free calcium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	All calcium assumed to be bound/ complexed	Not applicable	No	
		0	0	Compound-specific assessment Ferrosilicon may evolve sufficient hydrogen in contact with water to render hazardous; based on ratio of iron:silicon	Ferrosilicon not identified	Not applicable	No	
		0.696	6964	Element-specific assessment Concentration of free gadolinium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	No analysis for gadolinium	Not applicable	No	
		0.666	6659	Element-specific assessment Concentration of free samarium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	No analysis for samarium	Not applicable	No	
H270	May cause or intensify fire; oxidiser	0	0	If >0% then classified under H270 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H271	May cause a fire or explosion; strong oxidiser	0	0	If >0% then classified under H271 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H272	May intensify fire; oxidiser	0	0	If >0% then classified under H272 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H280	Contains gas under pressure; may explode if heated	0	0	If >0% then classified under H280 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H281	Contains refrigerated gas; may cause cryogenic burns or injury	0	0	If >0% then classified under H281 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	
H290	May be corrosive to metals	0	0	If >0% then classified under H290 unless further information and/or testing proves otherwise	No substances identified	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
Health Hazard Statements								
H300	Fatal if swallowed	1	10000	If cumulative/additive >1% classified under H300 (Category 1 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H301	Toxic if swallowed	1	10000	If individual substance >1% classified under H301 (Category 3 Acute Toxicity); pending further assessment	0.78	Further assessment not necessary	No	
H302	Harmful if swallowed	1	10000	If individual substance >1% classified under H302 (Category 4 Acute Toxicity); pending further assessment	150.82	Further assessment not necessary	No	
H303	May be harmful if swallowed	1	10000	If individual substance >1% classified under H303 (Category 5 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H304	May be fatal if swallowed and enters airways	1	10000	If cumulative/additive >1% classified under H304 (Category 1 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H305	May be harmful if swallowed and enters airways	1	10000	If individual substance >1% classified under H305 (Category 5 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H310	Fatal in contact with skin	1	10000	If cumulative/additive >1% classified under H310 (Category 1 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H311	Toxic in contact with skin	1	10000	If individual substance >1% classified under H311 (Category 3 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H312	Harmful in contact with skin	1	10000	If individual substance >1% classified under H312 (Category 4 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H313	May be harmful in contact with skin	1	10000	If individual substance >1% classified under H313 (Category 5 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H314	Causes severe skin burns and eye damage	1	10000	If cumulative/additive >1% classified under H314 (Category 1 Skin Corrosion/Irritant); pending further assessment	439.67	Further assessment not necessary	No	
		≤2 pH Units ≥11.5		pH-specific assessment If ≤2 or ≥11.5 pH then classified as corrosive	11.25	Not applicable	No	
H315	Causes skin irritation	1	10000	If cumulative/additive >1% classified under H315 (Category 3 Skin Corrosion/Irritant), >10% then Category 2; pending further assessment	7326.11	Further assessment not necessary	No	
H316	Causes mild skin irritation	10	100000	If cumulative/additive >10% classified under H316 (Category 3 Skin Corrosion/Irritant); pending further assessment	No substances identified	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H317	May cause an allergic skin reaction	1	10000	If individual substance >1% classified under H317 (Category 1 Skin Sensitisation); pending further assessment	11.23	Further assessment not necessary	No	
H318	Causes severe eye damage	1	10000	If cumulative/additive >1% classified under H318 (Category 2 Skin/Eye Sensitisation); pending further assessment	6973.11	Further assessment not necessary	No	
H319	Causes severe eye irritation	10	100000	If cumulative/additive >10% classified under H319 (Category 2 Eye Sensitisation); pending further assessment	18.66	Further assessment not necessary	No	
H320	Causes eye irritation	10	100000	If cumulative/additive >10% classified under H320 (Category 2 Eye Sensitisation); pending further assessment	No substances identified	Not applicable	No	
H330	Fatal if inhaled	1	10000	If cumulative/additive >1% classified under H330 (Category 1 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H331	Toxic if inhaled	1	10000	If individual substance >1% classified under H331 (Category 3 Acute Toxicity); pending further assessment	0.78	Further assessment not necessary	No	
H332	Harmful if inhaled	1	10000	If individual substance >1% classified under H332 (Category 4 Acute Toxicity); pending further assessment	150.82	Further assessment not necessary	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H333	May be harmful if inhaled	1	10000	If individual substance >1% classified under H333 (Category 5 Acute Toxicity); pending further assessment	No substances identified	Not applicable	No	
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled	0.1	1000	If individual substance >0.1% classified under H334 (Category 1 Respiratory Sensitisation); pending further assessment	No substances identified	Not applicable	No	
H335	May cause respiratory irritation	20	200000	If cumulative/additive >20% classified under H335 under Generic Limits; pending further assessment	6991.77	Further assessment not necessary	No	
H336	May cause drowsiness or dizziness	20	200000	If cumulative/additive >20% classified under H336 under Generic Limits; pending further assessment	No substances identified	Not applicable	No	
H340	May cause genetic defects	0.1	1000	If individual substance >0.1% classified under H340 (Category 1 Mutagen); pending further assessment	No substances identified	Not applicable	No	
H341	Suspected of causing genetic defects	1	10000	If individual substance >1% classified under H341 (Category 2 Mutagen); pending further assessment	No substances identified	Not applicable	No	
H350	May cause cancer	0.1	1000	If individual substance >0.1% classified under H350 (Category 1 Carcinogen); pending further assessment	11.23	Further assessment not necessary	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H351	Suspected of causing cancer	0.1	1000	If individual substance >0.1% classified under H351 (Category 2 Carcinogen); pending further assessment	3.81	Further assessment not necessary	No	
H360	May damage fertility or the unborn child	0.1	1000	If individual substance >0.1% classified under H360 (Category 1 Teratogen); pending further assessment	No substances identified	Not applicable	No	
H361	Suspected of damaging fertility or the unborn child	0.1	1000	If individual substance >0.1% classified under H361 (Category 2 Teratogen); pending further assessment	No substances identified	Not applicable	No	
H361d	Suspected of damaging the unborn child	0.1	1000	If individual substance >0.1% classified under H361d; pending further assessment	No substances identified	Not applicable	No	
H362	May cause harm to breast-fed children	0.1	1000	If individual substance >0.1% classified under H362 (Additional Category Teratogen); pending further assessment	No substances identified	Not applicable	No	
H370	Causes damage to organs	1	10000	If individual substance >1% classified under H370 (Category 1 Single Exposure); pending further assessment	No substances identified	Not applicable	No	
H371	May cause damage to organs	1	10000	If individual substance >1% classified under H371 (Category 2 Single Exposure); pending further assessment	No substances identified	Not applicable	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H372	Causes damage to organs through prolonged or repeated exposure	1	10000	If individual substance >1% classified under H372 (Category 1 Repeat Exposure); pending further assessment	14.84	Further assessment not necessary	No	
H373	May cause damage to organs through prolonged or repeated exposure	1	10000	If individual substance >1% classified under H373 (Category 2 Repeat Exposure); pending further assessment	No substances identified	Not applicable	No	
		0.005	50	PCB-specific assessment If PCBs are present >0.005% then classified hazardous under H373	No substances identified	Not applicable	No	
Environmental Hazard Statements								
H400	Very toxic to aquatic life	1	10000	If cumulative/additive >1% classified under H400 (Category 1 Acute Aquatic Toxicity); pending further assessment	15.04	Further assessment not necessary	No	
H401	Toxic to aquatic life	25	250000	If modified cumulative/additive >25% classified under H401 (Category 2 Acute Aquatic Toxicity); pending further assessment	150.35	Further assessment not necessary	No	
H402	Harmful to aquatic life	25	250000	If modified cumulative/additive >25% classified under H402 (Category 3 Acute Aquatic Toxicity); pending further assessment	1503.50	Further assessment not necessary	No	
H410	Very toxic to aquatic life with long lasting effects	1	10000	If cumulative/additive >1% classified under H410 (Category 1 Chronic Aquatic Toxicity); pending further assessment	15.04	Further assessment not necessary	No	

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments
H411	Toxic to aquatic life with long lasting effects	25	250000	If modified cumulative/additive >25% classified under H411 (Category 2 Chronic Aquatic Toxicity); pending further assessment	150.35	Further assessment not necessary	No	
H412	Harmful to aquatic life with long lasting effects	25	250000	If modified cumulative/additive >25% classified under H412 (Category 3 Chronic Aquatic Toxicity); pending further assessment	1503.50	Further assessment not necessary	No	
H413	May cause long lasting harmful effects to aquatic life	25	250000	If modified cumulative/additive >25% classified under H413 (Category 4 Chronic Aquatic Toxicity); pending further assessment	26.27	Further assessment not necessary	No	
H420	Harms public health and the environment by destroying ozone in the upper atmosphere	0.1	1000	If individual substance >0.1% classified under H420 (Category 1). Substances based on Annexes to the Montreal Protocol.	No substances identified	Not applicable	No	

Assumptions and Comments

1. Acute Toxicity Estimates (ATE) have not been derived from LD50 data or conversion factors presented in SANS 10234; classification has been based on generic screening thresholds. Where more detailed assessment is recommended, appropriate LD50 should be sourced based on current available data.

2. Ecotoxicity for Category 1 Acute and Chronic Hazards have assumed 1% threshold and additive compounds rather than utilisation of Modification Factors presented in SANS 10234. Where more detailed assessment is recommended, this should follow the mixture-specific principles defined in SANS 10234.

3. Classification does not include European Union (EU), or other territory-specific, Hazard Statement Codes that may be applicable outside of the Republic of South Africa.

4. Only where data is presented, or where laboratory analysis has resulted in positive identification of compounds (i.e. above laboratory limits of detection), have the applicable Hazard Statement Codes been appraised (i.e. substances determined to be at concentrations less than laboratory limits of detection have been assumed to be absent).

5. Unless exact speciation has been established through detailed analysis classification has been based on reasonable assumptions of substances most-likely present based on expected behaviour within the material. It is recognised that this may not be applicable in all instances and, for clarity, a list of the individual substances appraised where assumptions have been made are listed below.

6. Where laboratory analysis has reported concentrations on a dry weight basis these have been converted to take account of sample moisture content using the formula:
Wet Weight Concentration = Dry Weight Concentration x ((100 - %moisture content)/100).

7. Where assessment has been undertaken on liquids, it has been assumed that 1-litre (volume) is equivalent to 1-kg (mass).

8. For additional details in respect of the individual substances that may render any given material type as hazardous, reference should be made to the appropriate Safety Data Sheet (SDS) which takes account of this classification or, if the SDS has not been prepared, the Waste Management Summary Report relevant for this classification.

Hazard Statement Code	Hazard Statement	Threshold (%)	Threshold (ppm)	Threshold and Test Comments	Assessment Concentration (ppm)	Outcome(s) of Further Testing	Hazardous (Yes / No)	Additional Comments

List of Assumed Substances

Arsenic Compounds, Barium Oxide, Calcium Oxide, Chromium (iii) Oxide, Cobalt (ii) Oxide, Copper (i) Oxide, Fluoride, Iron (ii) Oxide, Magnesium Oxide, Manganese Dioxide, Molybdenum Trioxide, Nickel (ii) Oxide, Potassium Oxide, Sodium Oxide, Sulphur, Vanadium (ii) Oxide,

End of Classification

APPENDIX

D SAFETY DATA SHEET

SAFETY DATA SHEET

1 – PRODUCT/MATERIAL/WASTE AND COMPANY INFORMATION

Supplier Details	Company Name	Sappi Southern Africa Limited	
	Address	Stanger Mill, Gledhow Mount, Stanger, 4450	
	Telephone	032 437 2222	
	Fax	032 551 1622	
	Email	StangerMill@sappi.com	
Emergency Contact	Name		
	Telephone		
Product/Material Name	Boiler Ash	Chemical Product Name/s	Not applicable
Other Name/s	Not applicable	Supplier Product Code	Not applicable
CAS No.	Not applicable	UN Number	1759
Recommended Uses	None		
Restrictions	Not applicable		

2 – HAZARDS IDENTIFICATION

HAZARD LABELS	
	
Hazards	Health Cat. 3 Skin Corrosion/Irritant. Cat. 2 Skin/Eye Sensitisation.
Hazard Statement Codes	H315 H318
Precautionary Statements	P264 P280 P302+P352 P305+P351+P338 P310 P321 P332+P313 P362+P364
Human Effect/s	Causes skin irritation. Causes severe eye damage.
Environmental Effect/s	None identified
Biological Hazard/s	None identified
Carcinogenicity	Not a suspected carcinogen
Mutagenicity	Not a suspected mutagen
Neurotoxicity	Not a suspected neurotoxin
Teratogenicity	Not a suspected teratogen

3 – COMPOSITION / INFORMATION ON INGREDIENTS

Single substance or mixture?		Mixture	
Substance	CAS No.	EC No.	Concentration (%, w/w)
Calcium oxide	1305-78-8	215-138-9	~0.7 – >1.0

Notes

1 Only those substances reasonably expected or confirmed to be present and possibly rendering the material hazardous under SANS 10234 are listed

2 It should be recognised that additional substances may be present that remain unidentified and which may represent a hazard

4 – FIRST AID MEASURES

General		First aider must protect oneself.
Eye Contact	Remove contact lenses if safe to do so. Whilst lifting eyelids flush eyes with copious amounts of warm water for at least 15 minutes. Seek immediate medical attention.	
	Effects/Symptoms	May cause immediate stinging, pain, redness or tearing. Corneal damage or blindness may occur in event of prolonged contact.
Skin Contact	Remove contaminated clothing and either launder before reuse or discard. Flush exposed area/s with copious amounts of soap and water. Seek medical attention.	
	Effects/Symptoms	May cause irritation, stinging and burning. Prolonged exposure may lead to dermatitis, dryness or cracking.
Inhalation	Move to fresh air in case of accidental inhalation. If breathing is irregular or stopped, administer artificial respiration. Seek medical attention.	
	Effects/Symptoms	May result in breathing difficulties and irritation of the respiratory tract.
Ingestion	Never give anything by mouth to an unconscious person. Do not induce vomiting without medical advice. Loosen tight clothing. Seek medical attention.	
	Effects/Symptoms	May result in irritation of the gastrointestinal tract.
Notes to Physician		Treatment should be symptomatic. First aider to communicate route and duration of exposure.

5 – FIRE FIGHTING MEASURES

Explosiveness	Not suspected to be explosive.
Flammability	Not flammable but may combust.
Suitable Extinguishing Media	Alcohol resistant foam, dry chemical powder, water spray or carbon dioxide.
Unsuitable Extinguishing Media	DO NOT use water jet.
Protective Clothing	Self-contained breathing apparatus and appropriate protective clothing as determined by appropriately competent specialist
Combustion Products	Oxides of carbon and metals.

6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions	Beware of slip potential. Avoid contact with spilled material.
Protective Equipment	Use personal protective equipment, listed in Section 8
Emergency Procedures	Avoid dust formation. Avoid breathing dust, vapours, mist, aerosols or particulates. Ensure adequate ventilation. Evacuate personnel to safe areas.
Environmental Precautions	Contain spill if possible and safe. Do not let product enter drains or other watercourses.

Containment / Clean-up Methods	Local authority to be advised if substantial spillage in accordance with local regulations. Contain / clean-up immediately if possible and safe. Pick up and arrange disposal without creating dust. Keep in suitable, closed containers for disposal with a registered hazardous waste removal contractor

7 – HANDLING AND STORAGE

Safe Handling
Observe label precautions. Do not breathe dusts. Handle in accordance with good industrial hygiene standards and safety practices. Avoid contact with eyes and skin. Wash hands before breaks and at end of shift/s. Provide adequate exhaust ventilation at places where dust is formed.
Safe Storage
Store in a cool, dry, well-ventilated place.

8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

Substance / Ingredient	Occupations Exposure Limit/s		Source
Calcium oxide	Not available		Not applicable
Engineering Controls	Handle along principles of good industrial hygiene and safety. Wash hands before breaks and at end of shift. Ensure adequate ventilation. Ensure eyewash stations and safety showers proximal to working area/s.		
Personal Protective Equipment (PPE)	Respiratory	Appropriate face-fit respirator, if required based on a risk assessment	
	Hand	Appropriate barrier gloves, inspected prior to use	
	Eye	Safety glasses with side-shields	
	Skin/Body	Suitably protective overalls	
Recommendation of PPE is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use or exposure.			
General Precautions	Practice good personal hygiene standards.		
Specific Precautions	None		
Environmental Exposure Controls	Prevent further leakage or spillage if safe to do so. Do not let product enter drains or watercourses. Discharge into the environment must be avoided.		

9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance Descriptor	Dark grey to black, sand and gravel-sized fractions of ash		
Odour Descriptor	Not determined	Flammability LFL/UFL (%)	Not determined
Odour Threshold Value PPM	Not determined	Decomposition Temperature °Celsius	Not determined
pH pH Units	11.25	Vapour Pressure Pa	Not determined
Bulk Density Mg/m^3	Not determined	Vapour Density Unitless	Not determined
Melting/Freezing Point °Celsius	Not determined	Density/Relative Density kg/m^3	Not determined
Boiling Point °Celsius	Not determined	Solubility mol/L (solvent)	Not determined

Flash Point °Celsius	>93	n-Octanol/Water Partition Coefficient logKow (unitless)	Not determined
Explosive Limits LEL/UEL (%)	Not determined	Viscosity mm2/s	Not determined
Auto-Ignition Temperature °Celsius	Not determined	Radioactivity Bq	Not determined

10 – STABILITY AND REACTIVITY

Conditions to Avoid	None identified
Incompatible Materials	Acids. Oxidising agents.
Hazardous Decomposition Products Excluding CO, CO_2 and H_2O	See combustion products

11 – TOXICOLOGICAL INFORMATION

Substance	LD_{50}	Route	Species	Comments
Calcium oxide	Not available	Not applicable	Not applicable	Not applicable
TOXICOLOGICAL EFFECTS / SYMPTOMS (IMMEDIATE AND/OR DELAYED)				
Inhalation	May result in breathing difficulties and irritation of the respiratory tract; cough, shortness of breath, headache, nausea, vomiting.			
Skin Contact	May cause irritation, stinging and burning. Prolonged exposure may lead to dermatitis, dryness or cracking.			
Eye Contact	May cause immediate stinging, pain, redness or tearing. Corneal damage or blindness may occur in event of prolonged contact.			
Ingestion	May result in irritation of the gastrointestinal tract.			
Specific Target Organ Toxicity (Single)	None known			
Specific Target Organ Toxicity (Repeat)	None known			
Carcinogenicity	Not a suspected carcinogen			
Mutagenicity	Not a suspected mutagen			
Reproductive Toxicity	Not a suspected teratogen			
Bioavailability	No data available			

12 – ECOLOGICAL INFORMATION

Substance	LC_{50}	Period	Species	Comments
Calcium oxide	1 070mg/l	96-h	Cyprinus carpio	None
ENVIRONMENTAL BEHAVIOUR				
Persistence and Degradability	No data available			
Bioaccumulative Potential	No data available			
Mobility in Soil / Water	No data available			

13 – DISPOSAL CONSIDERATIONS

Disposal Methods (applicable to substance as well as contaminated containers/packaging)
The generation of waste should be avoided or minimised wherever possible. Disposal should at all times comply with the requirements for environmental protection and waste disposal legislation, and any regional or local authority requirements.

14 – TRANSPORT INFORMATION

UN Number	1759	Class (SANS 10228)[1]	8
IMDG Code	8	Packing Group	III
Proper Shipping Name	CORROSIVE SOLID, N.O.S.		
Ship Type	Not applicable		
Marine Pollutant	No	Pollution Category (MARPOL Ann.II)	Not determined
LABELS			
			

15 – REGULATORY INFORMATION

Poisons Schedule Number	Not applicable
Handling, Storage and Disposal	Republic of South Africa 1 National Environmental Management: Waste Act, Act No. 59 of 2008, as amended 2 Globally Harmonised System of Classification and Labelling of Chemicals (GHS), SANS 10234, as amended 3 Waste Classification and Management Regulations, Government Notice GN R634 of 2013 Other Territories 1 United Nations, Globally Harmonised System of Classification and Labelling of Chemicals (GHS), as amended 2 Territory-specific regulations, standards and guidelines
Transport	Republic of South Africa 1 National Road Traffic Regulations, as amended, as per the National Road Traffic Act of 1996 2 The Identification and Classification of Dangerous Goods for Transport, SANS 10228, as amended Other Territories 1 Territory-specific regulations, standards and guidelines
Occupational	Republic of South Africa 1 Occupational Health and Safety Act of 1993, as amended 2 Hazardous Chemical Substances Regulations of 1995, as amended 3 Occupational Exposure Limits – Recommended Limits of 1995 Other Territories 1 Territory-specific regulations, standards and guidelines
Safety Data Sheet Content	This Safety Data Sheet broadly complies with the requirements of SANS 10234 applied under the Globally Harmonised System, and SANS 11014:2010 – Safety Data Sheet for Chemical Products, Content and Order of Sections.

[1] May require confirmatory testing in accordance with SANS 10228, or other relevant standard depending on territory

16 – OTHER INFORMATION

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Prepared By	WSP Environmental (Pty) Ltd

Notice to Reader

To the best of our knowledge, the information contained herein is accurate; however, neither the preparer of this Safety Data Sheet, the named supplier, nor any of its subsidiaries, assumes any liability whatsoever for its accuracy or completeness. Final determination of overall suitability of any material, and its management, is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, it cannot be guaranteed that these are the only hazards that exist, or that these have been defined in full.

END OF SAFETY DATA SHEET