



WASTE MANAGEMENT SUMMARY REPORT

WASTE IDENTIFICATION	COAL WASH WASTE
SOURCE	MANUNGU COLLIERY Mpumalanga
DATE OF ASSESSMENT	MARCH, 2018

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. Where a discrepancy is apparent the NEM: WAA takes precedence. Wastes either defined or listed do not necessarily require classification in terms of SANS 10234.
✓	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	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.

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WASTE DESCRIPTION

PROCESS ORIGIN	CHEMICAL INPUTS	PHYSICAL CHARACTERISTICS
Coal Wash Plant	None known	Coal wash waste (sludge)

DEFINED WASTE APPRAISAL

LISTED IN SCHEDULE 3 OF NEM: WAA	Yes
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DESCRIPTOR	Category A, Hazardous Waste, <u>Residue Deposits and Residue Stockpiles</u> , 1. Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals (c) waste from physical and chemical processing of non-metalliferous minerals
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LISTED WASTE APPRAISAL

LISTED IN ANNEXURE 1 OF GN R634	No
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DESCRIPTOR	Not applicable
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SAMPLING AND LABORATORY ANALYSIS

SAMPLER	DATE	COMMENTS
Geostratum Groundwater and Geochemistry Consult (Pty) Ltd (Geostratum)	2017	Laboratory analytical results provided to WSP within Geostratum Report No. 1708001, Geochemical Assessment of the Manungu Colliery Discard, dated March 2018.
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		N/A
— Cyanide* and fluoride		✓
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)		×
Pesticides, as listed in GN R635		
— Aldrin + Dieldrin		×
— DDT + DDD + DDE		×
— 2,4-D		×
— Chlordane		×
— Heptachlor		×

General Parameters, to support classification and disposal restrictions appraisal		
– Calorific Value	x	N/A
– Flashpoint	x	N/A
– Moisture Content	x	N/A
– pH	✓	✓
– Total Organic Carbon (TOC)	✓	N/A
Additional Analyses		
– Beryllium, calcium, iron, magnesium, potassium, sodium and strontium	✓	N/A
– Major oxides and trace elements via X-Ray Fluorescence (XRF)	✓	N/A
– Chemical Oxygen Demand (COD)	N/A	✓
Notes to Laboratory Analysis		
<p>1 Items marked '*' within suites where data is available were not included within the analysis provided to WSP</p> <p>2 Whilst pesticides are unlikely to be present, the absence of data for organics as well as certain physical parameters represent a potentially substantial data gap and should be addressed</p> <p>3 N/A = Not applicable</p> <p>4 Leachate analysis prepared using reagent water</p> <p>5 Reference should be made to the Geostratum, 2018 report for relevant laboratory certificates of analysis</p>		

APPRAISAL OF DISPOSAL PROHIBITIONS

RESTRICTIVE CONDITION	DESCRIPTION
Calorific Value and Total Organic Carbon	Hazardous wastes with a range of calorific values in excess of 10MJ/kg are to be restricted from landfill disposal over timeframes that commenced in August 2017. Those with an organic carbon content exceeding 6% are to be prohibited from August 2028. Whilst the calorific value of the waste was not determined, the analysis recorded an organic carbon content of 54.8% which, whilst confirming the disposal restriction of August 2028, is indicative of a residual calorific value that is likely to exceed other applicable thresholds. Therefore, supplementary analysis is recommended to ensure adequate waste management in the event that landfill disposal is pursued.
Liquid Waste / Moisture Content	Waste with an angle of repose of <5°, or becomes free flowing at <60°C, or is generally not capable of being picked up by a spade or shovel, or that with a moisture content >40% is to be prohibited from landfill disposal from August 2019. The moisture content of the waste has not been determined; however, given that this is reportedly a sludge, it is plausible that the aforementioned restrictions might be applicable. Therefore, supplementary analysis is recommended to ensure adequate waste management in the event that landfill disposal is pursued.

INDICATIVE WASTE TYPE PROFILING FOR LANDFILL DISPOSAL¹

WASTE TYPE	3
LANDFILL CLASS	Class C (GLB+)

¹ Subject to any prohibitions, and reliant only on the analytical data provided

Notes to Waste Type Profiling

- 1 Refer [Appendix A](#) for the indicative quantitative profiling assessment
- 2 The provided laboratory analysis did not include mercury, cyanide or the range of organics and pesticides published in GN R635. Given the origin of the waste it is plausible that the magnitude of organics, particularly Polycyclic Aromatic Hydrocarbons (PAHs) and phenols, may result in a more profile that requires more stringent containment. Therefore, laboratory analysis comprehensively characterising the wash waste will be necessary to ensure appropriate management.
- 3 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

SANS 10234 CLASSIFICATION

HAZARDOUS	✓	NON-HAZARDOUS	
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Notes to SANS 10234 Classification

- 1 Refer to [Appendix B](#) for the indicative quantitative assessment based on the laboratory data provided
- 2 The waste has been classified as hazardous, displaying Hazard Statement Code H315 (Causes Skin Irritation) and H318 (Causes Severe Eye Damage). These hazards have been identified based on the concentration of calcium oxide (1.72%) and sulphur (0.8%), determined via XRF
- 3 Assumptions in terms of the chemical form (speciation) in which other elemental components are likely to occur have generally been conservative taking into account plausible thermodynamic and mineralogical assemblages
- 4 Where applicable to the sample medium, results of laboratory analysis should be corrected according to sample-specific moisture content; however, moisture content was not reported within the laboratory analysis provided
- 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. Therefore, the current classification should be seen as indicative and will require updating based on the results of comprehensive laboratory analysis to inform appropriate management

SAFETY DATA SHEET

REQUIRED	Yes. Refer Appendix C for indicative SDS.
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ANNEXURES

No	Title
A	Indicative Type Profiling Assessment (GN R635/R636)
B	Indicative Classification (SANS 10234)
C	Indicative 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 Environmental Impact Management Services (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

TYPE PROFILING



Source of Waste: Manungu Colliery, Mpumalanga, Coal Wash Waste											
Waste Matrix (Liquid / Solid): Solid											
Leachate Preparation (Solids Only): Non-Putrescible (Mono-Disposal): Reagent Water											
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	384	2 or 3 - LCT Dependent	0.01	0.5	1	4	<0.01	4
Boron	150	15000	60000	4.5	2, 3 or 4 - LCT Dependent	0.5	25	50	200	0.104	4
Barium	62.5	6250	25000	495	2 or 3 - LCT Dependent	0.7	35	70	280	1.25	3
Cadmium	7.5	260	1040	<2	2, 3 or 4 - LCT Dependent	0.003	0.15	0.3	1.2	<0.01	4
Cobalt	50	5000	20000	<2	2, 3 or 4 - LCT Dependent	0.5	25	50	200	<0.01	4
Chromium	46000	800000	-	12.7	2, 3 or 4 - LCT Dependent	0.1	5	10	40	<0.01	4
Chromium (Hexavalent)	6.5	500	2000	<2	2, 3 or 4 - LCT Dependent	0.05	2.5	5	20	<0.01	4
Copper	16	19500	78000	10.6	2, 3 or 4 - LCT Dependent	2	100	200	800	<0.02	4
Mercury	0.93	160	640			0.006	0.3	0.6	2.4		
Manganese	1000	25000	100000	58	2, 3 or 4 - LCT Dependent	0.5	25	50	200	0.131	4
Molybdenum	40	1000	4000	16.9	2, 3 or 4 - LCT Dependent	0.07	3.5	7	28	<0.01	4
Nickel	91	10600	42400	7	2, 3 or 4 - LCT Dependent	0.07	3.5	7	28	<0.01	4
Lead	20	1900	7600	7	2, 3 or 4 - LCT Dependent	0.01	0.5	1	4	<0.01	4
Antimony	10	75	300	<5	2, 3 or 4 - LCT Dependent	0.02	1	2	8	<0.02	4
Selenium	10	50	200	<5	2, 3 or 4 - LCT Dependent	0.01	0.5	1	4	<0.02	4
Vanadium	150	2680	10720	176	2 or 3 - LCT Dependent	0.2	10	20	80	<0.01	4
Zinc	240	16000	640000	10.1	2, 3 or 4 - LCT Dependent	5	250	500	2000	0.081	4
Inorganic Anions											
Total Dissolved Solids	-	-	-		Not Applicable	1000	12500	25000	100000	269	4
Chloride	-	-	-		Not Applicable	300	15000	30000	120000	188	4
Sulphate	-	-	-		Not Applicable	250	12500	25000	100000	6.18	4
Nitrate	-	-	-		Not Applicable	11	550	1100	4400	<0.2	4
Fluoride	100	10000	40000	<1000	2 or 3 - LCT Dependent	1.5	75	150	600	0.5	4
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		
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		
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						Notes to Waste Type Profiling					
Organics	Concentration (mg/kg), unless stated				Satisfy Type 4	<p>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.</p> <p>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.</p> <p>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).</p> <p>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.</p>					
	Threshold		Assessed Concentration								
Metals (all concentrations <TCT0 & LCT0):				As above	No						
Anions (all concentrations <TCT0 & LCT0):				As above	No						
Total Organic Carbon	(%)	3		54.8	No						
BTEX (Sum)	6				Not determined						
Polychlorinated Biphenyls (PCBs)	1				Not determined						
Mineral Oil (>C10-C40)	500				Not determined						
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						

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):		No analysis for PCBs: although, unlikely to be present
Explosive, corrosive or oxidising according to SANS 10234		No	Not applicable
pH <6 or >12	pH:	7.00	Not applicable
Flashpoint <61° Celsius	Flashpoint (°C):		Flashpoint not determined
Moisture Content > 40%	Moisture Content (%):		Moisture Content not determined
Hazardous with Calorific Value >10MJ/kg	CV (MJ/kg):		Calorific Value (MJ/kg) not determined
Hazardous with Total Organic Carbon >6%	TOC (%):	54.8	Landfill Disposal to be Prohibited by August 2028
Brine (high salt content) >5% TDS	TDS (%):	N/A	Not applicable to a solid waste
Leachable TDS >100 000mg/l	TDS (mg/l):	269	Not applicable

APPENDIX

B

CLASSIFICATION



WSP Reference: 41100404

Prepared For: Environmental Impact Management Services (Pty) Ltd

Generator: Manungu Colliery

Source Address: Mpumalanga

Production Process: Coal Wash Waste

General Appearance

Coal Wash Waste (Sludge)

Classification Summary

Hazardous unless proven otherwise

Applicable Hazard Statement Codes

H315 H318

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	<u>Element-specific assessment</u> Concentration of aluminium phosphide required to evolve sufficient volume of phosphine in contact with water to render hazardous; based on stoichiometry	Aluminium assumed not as phosphide	Not applicable	No	
		1.177	11773	<u>Element-specific assessment</u> 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	<u>Element-specific assessment</u> 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	<u>Element-specific assessment</u> 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	<u>Element-specific assessment</u> 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	<u>Element-specific assessment</u> 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	<u>Element-specific assessment</u> 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	<u>Element-specific assessment</u> Concentration of free strontium required to evolve sufficient volume of hydrogen in contact with water to render hazardous; based on stoichiometry	All strontium assumed to be bound/complexed	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	<u>Element-specific assessment</u> 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	<u>Element-specific assessment</u> 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	<u>Compound-specific assessment</u> 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	<u>Element-specific assessment</u> 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	<u>Element-specific assessment</u> 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	384.00	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	552.67	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	5569.44	Further assessment not necessary	No	
		≤2 pH Units ≥11.5		<u>pH-specific assessment</u> If ≤2 or ≥11.5 pH then classified as corrosive	7.00	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	25200.00	Not undertaken: detailed assessment may clarify hazard	Yes, unless proven otherwise	Hazardous unless proven otherwise by detailed toxicological assessment
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	8.91	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	17200.00	Not undertaken: detailed assessment may clarify hazard	Yes, unless proven otherwise	Hazardous unless proven otherwise by detailed toxicological assessment
H319	Causes severe eye irritation	10	100000	If cumulative/additive >10% classified under H319 (Category 2 Eye Sensitisation); pending further assessment	26156.63	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	384.00	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	552.67	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	17456.63	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	8.91	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	25.35	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	14.49	Further assessment not necessary	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	231.28	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	7.00	Further assessment not necessary	No	
		0.005	50	<u>PCB-specific assessment</u> If PCBs are present >0.005% then classified hazardous under H373	No analysis for PCBs	Not applicable	Unclarified: not anticipated	
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	403.57	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	4035.72	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	40357.15	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	403.57	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	4035.72	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	40357.15	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	412.48	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

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

Aluminium Oxide, Muscovite, Arsenic Compounds, Barium Oxide, Boron Trioxide, Calcium Oxide, Iron Oxide (Hematite), Lead Compounds, Magnesium Oxide, Manganese (II) Oxide, Molybdenum Trioxide, Nickel (ii) Oxide, Phosphorus Pentoxide, Potassium Oxide, Silicon Dioxide, Sodium Oxide, Strontium Oxide, Sulphur, Titanium Dioxide, Vanadium (ii) Oxide, Zinc Oxide, Zircon,

End of Classification

APPENDIX

C

DATA SHEET




INDICATIVE SAFETY DATA SHEET

1 - PRODUCT/MATERIAL/WASTE AND COMPANY INFORMATION

Supplier Details	Company Name	Mbuyelo Coal	
	Address	Manungu Colliery	
	Telephone		
	Fax		
	Email		
Emergency Contact	Name		
	Telephone		
Product/Material Name	Coal Wash Waste	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	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	~1.7
Sulphur	7704-34-9	231-722-6	~0.8

Notes

- Only those substances reasonably expected or confirmed to be present and possibly rendering the material hazardous under SANS 10234 are listed
- 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 suspected to be flammable.
Suitable Extinguishing Media	Alcohol resistant foam, dry chemical powder, water spray or carbon dioxide.
Unsuitable Extinguishing Media	Unknown
Protective Clothing	Self-contained breathing apparatus and appropriate protective clothing as determined by appropriately competent specialist
Combustion Products	Oxides of carbon, sulphur 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 gas. 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	Comments
Calcium oxide	Not available	None
Sulphur	1 ppm TWA	Based on hydrogen sulphide
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	Coal Wash Waste (Sludge)		
Odour Descriptor	Not determined	Flammability LFL/UFL (%)	Not determined
Odour Threshold Value PPM	Not determined	Decomposition Temperature °Celsius	Not determined
pH pH Units	7	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	Not determined	n-Octanol/Water Partition Coefficient logKow (unitless)	Not determined
Explosive Limits LEL/UEL (%)	Not determined	Viscosity mm ² /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 ₂ O	See combustion products

11 - TOXICOLOGICAL INFORMATION

Substance	LD ₅₀	Route	Species	Comments
Calcium oxide	Not available	Not applicable	Not applicable	Not applicable
Sulphur	>3 000mg/kg >2 000mg/kg	Oral Dermal	Rat Rabbit	None
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
Sulphur	866mg/l	96-h	Brachydanio rerio	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 <small>(applicable to substance as well as contaminated containers/packaging)</small>
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 <small>(MARPOL Ann.II)</small>	Not determined
LABELS			
			

15 - REGULATORY INFORMATION

Poisons Schedule Number	Not applicable
Handling, Storage and Disposal	<u>Republic of South Africa</u> 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 <u>Other Territories</u> 1 United Nations, Globally Harmonised System of Classification and Labelling of Chemicals (GHS), as amended 2 Territory-specific regulations, standards and guidelines
Transport	<u>Republic of South Africa</u> 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 <u>Other Territories</u> 1 Territory-specific regulations, standards and guidelines
Occupational	<u>Republic of South Africa</u> 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 <u>Other Territories</u> 1 Territory-specific regulations, standards and guidelines

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

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.
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16 - OTHER INFORMATION

Date of Issue	16 March 2018
Version / Revision No	INDICATIVE ONLY
Next Review / Revision Due	AS SOON AS ADDITIONAL DATA IS AVAILABLE
Prepared By	WSP Environmental (Pty) Ltd

Notice to Reader

This Safety Data Sheet should be seen as indicative only as it has been prepared based on a limited dataset. 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 INDICATIVE SAFETY DATA SHEET

INDICATIVE SAFETY DATA SHEET

1 - PRODUCT/MATERIAL/WASTE AND COMPANY INFORMATION

Supplier Details	Company Name	Mbuyelo Coal	
	Address	Manungu Colliery	
	Telephone		
	Fax		
	Email		
Emergency Contact	Name		
	Telephone		
Product/Material Name	Coal Wash Waste	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	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	~1.7
Sulphur	7704-34-9	231-722-6	~0.8

Notes

- Only those substances reasonably expected or confirmed to be present and possibly rendering the material hazardous under SANS 10234 are listed
- 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 suspected to be flammable.
Suitable Extinguishing Media	Alcohol resistant foam, dry chemical powder, water spray or carbon dioxide.
Unsuitable Extinguishing Media	Unknown
Protective Clothing	Self-contained breathing apparatus and appropriate protective clothing as determined by appropriately competent specialist
Combustion Products	Oxides of carbon, sulphur 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 gas. 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	Comments
Calcium oxide	Not available	None
Sulphur	1 ppm TWA	Based on hydrogen sulphide
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	Coal Wash Waste (Sludge)		
Odour Descriptor	Not determined	Flammability LFL/UFL (%)	Not determined
Odour Threshold Value PPM	Not determined	Decomposition Temperature °Celsius	Not determined
pH pH Units	7	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	Not determined	n-Octanol/Water Partition Coefficient logKow (unitless)	Not determined
Explosive Limits LEL/UEL (%)	Not determined	Viscosity mm ² /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 ₂ O	See combustion products

11 - TOXICOLOGICAL INFORMATION

Substance	LD ₅₀	Route	Species	Comments
Calcium oxide	Not available	Not applicable	Not applicable	Not applicable
Sulphur	>3 000mg/kg >2 000mg/kg	Oral Dermal	Rat Rabbit	None
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
Sulphur	866mg/l	96-h	Brachydanio rerio	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	<u>Republic of South Africa</u> 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 <u>Other Territories</u> 1 United Nations, Globally Harmonised System of Classification and Labelling of Chemicals (GHS), as amended 2 Territory-specific regulations, standards and guidelines
Transport	<u>Republic of South Africa</u> 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 <u>Other Territories</u> 1 Territory-specific regulations, standards and guidelines
Occupational	<u>Republic of South Africa</u> 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 <u>Other Territories</u> 1 Territory-specific regulations, standards and guidelines

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

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.
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16 - OTHER INFORMATION

Date of Issue	16 March 2018
Version / Revision No	INDICATIVE ONLY
Next Review / Revision Due	AS SOON AS ADDITIONAL DATA IS AVAILABLE
Prepared By	WSP Environmental (Pty) Ltd

Notice to Reader

This Safety Data Sheet should be seen as indicative only as it has been prepared based on a limited dataset. 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 INDICATIVE SAFETY DATA SHEET