

WASTE MANAGEMENT SUMMARY REPORT

Waste Identification	Pulp Sludge
Source	Mpact Operations (Pty) Ltd: Springs

Authorisation

WSP Environment & Energy (WSP) was appointed by Mpact Operations (Pty) Ltd (Mpact) to undertake an assessment of Pulp Sludge generated by its operations in Springs, Gauteng in terms of the National Environmental Management: Waste Act (NEM: WA) (as amended), as well as certain requirements under the Waste Classification and Management Regulations (Government Notice 634 of 2013, GN 634) together with the associated National Norms and Standards for the Assessment of Waste to Landfill Disposal (GN 635 of 2013) and the National Norms and Standards for Disposal of Waste to Landfill (GN 636 of 2013).

Scope of Assessment

Included	Element	Description
ü	Defined and Listed Waste Appraisal	Assessment of whether the waste is defined under Schedule 3 of the National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014) and/or listed in Annexure 1 (Regulation 4(1) of GN 634 of 2013). Where a discrepancy is apparent, Act 26 of 2014 takes precedence. Wastes either defined or listed do not necessarily require classification in terms of South African National Standard (SANS) 10234:2008 'Globally Harmonised System of Classification and Labelling of Chemicals (GHS)' (SANS 10234).
ü	Appraisal of Disposal Prohibitions	Determination of disposal prohibitions in terms of GN 636 of 2013.
ü	Waste Type Profiling for Landfill Disposal	Profiling in accordance with GN 635 of 2013.
ü	SANS 10234 Classification	Quantitative classification in broad accordance with South African National Standard (SANS) 10234:2008 'Globally Harmonised System of Classification and Labelling of Chemicals (GHS)' (SANS 10234).
ü	Safety Data Sheet	Preparation of Safety Data Sheet (SDS). A SDS is required for all hazardous wastes (excluding Health Care Risk Waste (HCRW) in terms of Regulation 5(1) of GN 634.

Waste Description

Process Origin	Chemical Inputs	Physical Characteristics
Pulp Sludge	None known	Compressed, brown, paper sludge

Sampling & Laboratory Analysis

Sampler	Date	Comments	
Mpact	11/01/2017	Composite and representative sample obtained.	
Laboratory Analysis		Matrix	
Suite		Total	Leachate
Metals and metalloids, as listed in GN 635		ü	ü
§ 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 635		N/A	ü
§ Chloride, nitrate, sulphate and Total Dissolved Solids			
§ Cyanide and fluoride		ü	ü

Organics, as listed in GN 635		
§ Benzene, toluene, ethylbenzene and xylenes (BTEX)	Ü	Ü
§ Petroleum hydrocarbons	Ü	N/A
§ Polychlorinated Biphenyls (PCB)	Ü	Ü
§ Polycyclic Aromatic Hydrocarbons (PAH)	Ü	N/A
§ Volatile and Semi-Volatile Organic Compounds (VOC and SVOC)	Ü	Ü
Pesticides, as listed in GN 635		
§ Aldrin + Dieldrin	Ü	Ü
§ DDT + DDD + DDE	Ü	Ü
§ 2,4-D	Ü	Ü
§ Chlordane	Ü	Ü
§ Heptachlor	Ü	Ü
General Parameters, to support classification and disposal restrictions appraisal		
§ Calorific Value	Ü	N/A
§ Flashpoint	Ü	N/A
§ Moisture Content	Ü	N/A
§ pH	Ü	N/A
§ Total Organic Carbon (TOC)	Ü	N/A
Additional Parameters reasonable expected to be present		
§ Aluminium, calcium, iron sulphur and titanium	Ü	N/A
§ Alcohols and acetates	Ü	N/A
N/A = Not applicable. Refer Annexure 1 for laboratory certificates of analysis.		

Notes to Laboratory Analysis
§ Leachate analysis prepared using acetic acid in accordance with GN 635 based on the potential future disposal with putrescible wastes.

Defined Waste Appraisal

Waste listed in Schedule 3 (Act 26 of 2014)	Yes
Schedule 3 descriptor	<p>Category A: Hazardous Waste 2. Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard (c) hazardous portion of wastes from pulp, paper and cardboard production and processing; or,</p> <p>Category B: General Waste 2. Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard (c) wastes from pulp, paper and cardboard production and processing not otherwise specified in Category A.</p>

Listed Waste Appraisal

Waste listed in Annexure 1 (GN634)	No
Annexure 1 category descriptor	N/A

Appraisal of Disposal Prohibitions

Restrictive Condition	Recommendation
None identified	Not applicable

Waste Type Profiling for Landfill Disposal

Type 3

Waste Type

Class C or GLB+

Landfill Class (subject to any prohibitions)

Notes to Waste Type Profiling

- Refer **Annexure 2** for indicative profiling assessment.
- Where a waste is not listed in Annexure 1 of GN 634, Type Profiling is based on consideration of total and leachate concentrations of substances published in Paragraph 6 of GN 635 and the appropriate landfill class is determined with reference to the Waste Acceptance Criteria in Paragraph 4 of GN 636.
- It is noted that while reference is made in GN 635 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

Ü

Non-hazardous

Refer **Annexure 3** for full assessment.

Notes to SANS 10234 Classification

- 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.
- Where applicable to the sample medium, results of laboratory analysis have been corrected according to sample-specific moisture content.
- 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.
- Hazard Statement Codes for the ingredients 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.
- Cognisance must be taken of the need to re-classify the waste every five years, or if the generation process changes or, otherwise if more data becomes available.

Safety Data Sheet

Required

Ü

Not required

Annexures

Annexure 1: Laboratory Analytical Certificates
Annexure 2: Type Profiling Assessment (GN 635/636)
Annexure 3: Material Classification (SANS 10234)

Annexure 1: Laboratory Analytical Certificates



Exova Jones Environmental South Africa

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

WSP Environmental & Energy Africa
Block A
1 On Langford
Langford Road
Westville 3629
Durban
South Africa



Attention :	Adam Sanderson
Date :	30th January, 2017
Your reference :	48487
Our reference :	Test Report 17/2645 Batch 1
Location :	Mpact, Springs
Date samples received :	19th January, 2017
Status :	Final report
Issue :	1

Three samples were received for analysis on 19th January, 2017 of which three 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:

**Simon Gomery BSc
Project Manager**

Client Name: WSP Environmental & Energy Africa
Reference: 48487
Location: Mpact, Springs
Contact: Adam Sanderson
JE Job No.: 17/2645

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

J E Sample No.	1	2	3																	
Sample ID	Pulp Sludge	Ash	Poly-Alu																	
Depth																				
COC No / misc																				
Containers	B	B	B																	
Sample Date	11/01/2017	11/01/2017	11/01/2017																	
Sample Type	Waste	Waste	Waste																	
Batch Number	1	1	1																	
Date of Receipt	19/01/2017	19/01/2017	19/01/2017																	
Boron (Aqua Regia Soluble)	-	149.20	-																	
Boron (Aqua Regia Soluble)	3.61	-	4.25																	
Zinc [#]	-	25	-																	
Zinc	26	-	<5																	
VOC MS																				
Chlorobenzene [#]	<6 _{AA}	<3	<15 _{AC}																	
Methyl Tertiary Butyl Ether [#]	<4 _{AA}	<2	<10 _{AC}																	
Benzene [#]	<6 _{AA}	21	<15 _{AC}																	
Toluene [#]	<6 _{AA}	30	25 _{AC}																	
Ethylbenzene [#]	<6 _{AA}	66	176 _{AC}																	
Xylenes (sum of isomers) [#]	<16 _{AA}	141	411 _{AC}																	
1,2-Dichlorobenzene [#]	<8 _{AA}	<4	<20 _{AC}																	
1,4-Dichlorobenzene [#]	<8 _{AA}	<4	<20 _{AC}																	
1,1-Dichloroethane (1,1 DCE) [#]	<12 _{AA}	<6	<30 _{AC}																	
1,2-Dichloroethane (1,2 DCA) [#]	<8 _{AA}	<4	<20 _{AC}																	
1,2-Dichloroethane (cis & trans) [#]	<12 _{AA}	<6	<30 _{AC}																	
1,1,1-Trichloroethane [#]	<6 _{AA}	<3	<15 _{AC}																	
1,1,2-Trichloroethane [#]	<6 _{AA}	<3	<15 _{AC}																	
1,1,1,2-Tetrachloroethane	<6 _{AA}	<3	<15 _{AC}																	
1,1,2,2-Tetrachloroethane [#]	<6 _{AA}	<3	<15 _{AC}																	
Trichlorobenzenes (1,2,3 & 1,2,4) [#]	<28 _{AA}	<14	<70 _{AC}																	
Carbon tetrachloride [#]	<8 _{AA}	<4	<20 _{AC}																	
Chloroform [#]	<6 _{AA}	<3	<15 _{AC}																	
Dichloromethane (DCM) [#]	<60 _{AA}	87	<150 _{AC}																	
Methyl Ethyl Ketone (MEK)	<200 _{AA}	<100	<500 _{AC}																	
Styrene	12 _{AA}	<3	658 _{AC}																	
Tetrachloroethene (PCE) [#]	<6 _{AA}	<3	<15 _{AC}																	
Trichloroethene (TCE) [#]	<6 _{AA}	<3	<15 _{AC}																	
Vinyl Chloride	<4 _{AA}	<2	<10 _{AC}																	
Pesticides																				
Organochlorine Pesticides																				
Aldrin	<10	<10	<10																	
Dieldrin	<10	<10	<10																	
Heptachlor	<10	<10	<10																	
DDE (o,p & p,p)	<20	<20	<20																	
DDT (o,p & p,p)	<20	<20	<20																	
TDE (o,p & p,p)	<20	<20	<20																	
Chlordane (cis & trans)	<20	<20	<20																	
2,4 - D	<100	<100	<100																	

Please see attached notes for all abbreviations and acronyms

LOD/LOR Units Method No.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/2645

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.

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.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
SA	ISO17025 (SANAS) 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 a 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
AA	x2 Dilution
AB	x3 Dilution
AC	x5 Dilution
AD	x10 Dilution

JE Job No: 17/2645

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM88	A 20:1 ratio of deionised water to as received soil, is leached for 18 hours with zero headspace.			AR	No
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	No
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	No
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.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

JE Job No: 17/2645

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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.	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		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	No
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.			AR	Yes
TM27	Modified US EPA method 9056.Determination of water soluble anions using Dionex (Ion-Chromatography).	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen and hydrazine. Samples are extracted using an orbital shaker.			AD	Yes
TM27	Modified US EPA method 9056.Determination of water soluble anions using Dionex (Ion-Chromatography).	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.			AR	No
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	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.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	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		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

JE Job No: 17/2645

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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	PM0	No preparation is required.			AR	No
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	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen and hydrazine. Samples are extracted using an orbital shaker.	Yes		AR	Yes
TM42	Modified US EPA method 8270. Pesticides and herbicides by GC-MS	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	No
TM42	Modified US EPA method 8270. Pesticides and herbicides by GC-MS	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM51	Formaldehyde determination by reaction with Ammonium Ions and acetylacetone which is analysed spectrophotometrically.	PM0	No preparation is required.				
TM51	Formaldehyde determination by reaction with Ammonium Ions and acetylacetone which is analysed spectrophotometrically.	PM112	As received soils are extracted with deionised water in a 4:1 ratio			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM79	Determination of Flashpoint using a Closed Cup Flashpoint Analyser	PM0	No preparation is required.			AR	No
TM83	Modified USEPA method 8260. Determination of Alcohols, Acetates, Acetone, Fuel Oxygenates, THF and Cyclohexane by Headspace GC-MS	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
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.	PM0	No preparation is required.			AR	No

JE Job No: 17/2645

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.	Yes		AR	Yes
TM149	Determination of Pesticides by Large Volume Injection on GC Triple Quad MS, based upon USEPA method 8270	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	
TM149	Determination of Pesticides by Large Volume Injection on GC Triple Quad MS, based upon USEPA method 8270	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	No
NONE	No Method Code	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
TM15_A	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds, Vinyl Chloride & Styrene by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

Annexure 2: Type Profiling Assessment (GN 635/636)

WSP Environmental (Pty) Ltd: Screening Waste Type Profiling & Disposal Prohibition Appraisal
Based on National Norms and Standards for the Assessment of Waste for Landfill Disposal GNR. 635 (23 August 2013)



Source of Waste: Mpaact Operations (Pty) Ltd, Springs, Pulp Sludge												
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				Assessed Concentration	Waste Type (based on LCTs and subject to TCTs)	
	TCT0	TCT1	TCT2	Assessed Concentration		LCT0	LCT1	LCT2	LCT3			
Metal Ions												
Arsenic	5.8	500	2000			0.01	0.5	1	4			
Boron	150	15000	60000	3.61	2, 3 or 4 - LCT Dependent	0.5	25	50	200	0.116	4	
Barium	62.5	6250	25000	14	2, 3 or 4 - LCT Dependent	0.7	35	70	280	0.243	4	
Cadmium	7.5	260	1040			0.003	0.15	0.3	1.2			
Cobalt	50	5000	20000			0.5	25	50	200			
Chromium	46000	800000	-	5.4	2, 3 or 4 - LCT Dependent	0.1	5	10	40	0.0022	4	
Chromium (Hexavalent)	6.5	500	2000			0.05	2.5	5	20			
Copper	16	19500	78000	22	2 or 3 - LCT Dependent	2	100	200	800			
Mercury	0.93	160	640			0.006	0.3	0.6	2.4			
Manganese	1000	25000	100000	22	2, 3 or 4 - LCT Dependent	0.5	25	50	200	0.285	4	
Molybdenum	40	1000	4000	1.1	2, 3 or 4 - LCT Dependent	0.07	3.5	7	28			
Nickel	91	10600	42400	2.1	2, 3 or 4 - LCT Dependent	0.07	3.5	7	28	0.003	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	1	2, 3 or 4 - LCT Dependent	0.2	10	20	80	0.0019	4	
Zinc	240	160000	640000	26	2, 3 or 4 - LCT Dependent	5	250	500	2000	0.097	4	
Inorganic Anions												
Total Dissolved Solids	-	-	-		Not Applicable	1000	12500	25000	100000	3951	3	
Chloride	-	-	-		Not Applicable	300	15000	30000	120000			
Sulphate	-	-	-		Not Applicable	250	12500	25000	100000			
Nitrate	-	-	-		Not Applicable	11	550	1100	4400			
Fluoride	100	10000	40000			1.5	75	150	600			
Cyanide	14	10500	42000	4.4	2, 3 or 4 - LCT Dependent	0.07	3.5	7	28	0.01	4	
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	4.431	2, 3 or 4 - LCT Dependent	-	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			
1,1,1-Trichloroethane	-	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	17.3	2, 3 or 4 - LCT Dependent	-	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	0.4	2, 3 or 4	-	-	-	-		Not Applicable	
>C10-C36	-	10000	40000	1054	2, 3 or 4	-	-	-	-		Not Applicable	
Phenol	-	560	2240			-	7	14	56			
Polychlorinated Biphenyls (PCBs)	-	12	48			-	0.025	0.05	0.2			
Styrene	-	120	480	0.012	2, 3 or 4 - LCT Dependent	-	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	1. The final waste type is determined from the highest 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 irrelevant for determining the waste type). 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.						
	Threshold			Assessed Concentration								
Metals (all concentrations <TCT0 & LCT0):					As above							No
Anions (all concentrations <TCT0 & LCT0):					As above							No
Total Organic Carbon	(%)	3	30.21	No								
BTEX (Sum)		6	<0.034	Yes								
Polychlorinated Biphenyls (PCBs)		1	<0.01	Yes								
Mineral Oil (>C10-C40)		500	1054	No								
Pesticides												
Aldrin + Dieldrin		0.05	<0.02	Yes								
DDT + DDD + DDE		0.05	<0.06	Likely								
2,4-Dichlorophenoxyacetic Acid (2,4-D)		0.05	<0.1	Likely								
Chlordane		0.05	<0.02	Yes								
Heptachlor		0.05	<0.01	Yes								
Overall Screened Waste Type (notwithstanding potential disposal prohibitions, see below)						Category of Landfill (Based on GNR. 636, 23 August 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							
pH <6 or >12	pH:				7.23							
Flashpoint <61° Celsius	Flashpoint (°C):				>93							
Moisture Content > 40%	Moisture Content (%):				37.4							
Hazardous with Calorific Value >10MJ/kg	CV (MJ/kg):				10							
Hazardous with Total Organic Carbon >6%	TOC (%):				30.21							
Brine (high salt content) >5% TDS	TDS (%):				N/A							
Leachable TDS >100 000mg/l	TDS (mg/l):				3951							

Annexure 3: Material Classification (SANS 10234)

WSP Reference: 48487, 0001	Prepared For: Mpact Operations (Pty) Ltd
Material Source: Springs	
Geographic Coordinates: TBC	
Production Process: Pulp Sludge	

General Appearance	Classification Summary
Compressed, brown paper sludge	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; and,*
2. *European Regulation (EC) No. 1272/2008, 'Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation).*

Hazard Statement Codes for individual ingredients 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; or,
4. Product (Material) Safety Data Sheet.

Where necessary, recorded concentrations have been converted from dry weight values to account for 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	0.13	Flashpoint Determined to be (<)93	No	
H225	Highly flammable liquid and vapour	0	0	If >0% then classified under H225 unless further information and/or testing proves otherwise	1.53	Flashpoint Determined to be (<)93	No	
H226	Flammable liquid and vapour	0	0	If >0% then classified under H226 unless further information and/or testing proves otherwise	0.00	Flashpoint Determined to be (<)93	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	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	<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	24.53	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	21.14	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	0.25	Further assessment not necessary	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	24.53	Further assessment not necessary	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	10.83	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	7.23	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	393.77	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	10.83	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	21.14	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	82.63	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	21.144	Further assessment not necessary	No	
H331	Toxic if inhaled	1	10000	If individual substance >1% classified under H331 (Category 3 Acute Toxicity); pending further assessment	24.53	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	9.79	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	82.62	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	0.25	Further assessment not necessary	No	
H341	Suspected of causing genetic defects	1	10000	If individual substance >1% classified under H341 (Category 2 Mutagen); pending further assessment	10.83	Further assessment not necessary	No	
H350	May cause cancer	0.1	1000	If individual substance >0.1% classified under H350 (Category 1 Carcinogen); pending further assessment	10.83	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	659.80	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	2.77	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	0.01	Further assessment not necessary	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	24.53	Further assessment not necessary	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	1.67	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	<u>PCB-specific assessment</u> 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	45.89	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	0.00	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	0.00	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	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
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	0.00	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	0.00	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	47.56	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 Codes), 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 (i.e. X-Ray Fluorescence (XRF), X-Ray Diffraction (XRD)), 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.
- Hazard Statement Codes for individual substances have been sourced from either i) SANS 10234, ii) CLP Regulations, iii) European Chemicals Agency C&L Inventory Database, or iv) appraised existing (M)SDS.
- 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 by WSP, 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

Aluminium Hydroxide, Barium Oxide, Boron Hydroxide, Calcium Carbonate, Chromium (iii) Oxide, Copper Dihydroxide, Cyanide, Iron (ii) Oxide, Magnesium Carbonate, Manganese, Molybdenum Trioxide, Nickel (ii) Oxide, Potassium Carbonate, Sodium Chloride, Sulphur, Titanium Dioxide, Vanadium (ii) Oxide, Zinc Hydroxide, Petroleum Range Organics (PRO), Diesel Range Organics (DRO),

End of Material Classification