



<b>Waste Classification No.:</b>	Scd-655	<b>Date:</b>	29 July 2016
<b>Waste Generator:</b>	Sappi		
<b>Request No.:</b>			
<b>Data sheet No.:</b>	N/a		
<b>Date sent/received:</b>	28 July 2016		
<b>Waste origin / Type:</b>	Biomass waste from timber production		

## 1. Introduction:

EnviroServ have been requested by **Sappi** to classify a sample of **biomass waste** in terms of the **Waste Classification and Management Regulations** (Government Notice 634 of 2013) based on data supplied by Jones Environmental Laboratory.

According to information provided by **Sappi** the biomass waste sample supplied to Jones Environmental Laboratory was a composite of the following materials provided by Sappi and was mixed according to the specified ratios shown below:

- Post-Harvest Residue (50% Pine and 50% Eucalyptus) – 70%
- Screening Rejects – 10%
- Softwood Bark – 20%

## 2. Waste Analysis and Hazard Rating:

The **National Environmental Management: Waste Amendment Act, (No. 26 of 2014)** and the list of pre-defined wastes in Schedule 3 of this Act supersede waste classification according to the **Waste Regulations**. However, as forestry wastes appear in Schedule 3 under both **Category A: Hazardous Wastes** as well as **Category B: General Wastes** it is permissible to make use of SANS 10234 to determine the hazardous nature of the waste as mandated by the **Waste Regulations**. To this end, the data made available by Sappi from Jones Environmental Laboratory was used to rate the hazardous nature of the waste and is shown in Appendix 1 for reference purposes.

The threshold values for hazard classes according to **SANS 10234** are shown in Figure 1 below. In this context it is also relevant to consider the nature of the waste and the potential constituents which could be viewed as hazardous materials or compounds. As the material is indicated to be only of biomass origin, the chances of having significant concentrations of inorganic contaminants or chlorinated hydrocarbons are remote. This is borne out by the Jones Laboratory data which reveals all chlorinated hydrocarbons analyzed for to be below detection level (BDL). In similar vein, the material reveals the most significant inorganic elements to be barium (Ba = 35 ppm), manganese (Mn = 374 ppm), boron (B = 15ppm) and zinc (Zn = 15ppm).

As none of the elements exceed the 1% (10,000ppm) or even the 0.1% (1,000ppm) thresholds shown in Figure 1, the biomass waste would not be viewed as hazardous due to inorganic elements present in the material.

**Figure 1:** Excerpt from SANS 10234 – Cut-off values/concentration limits for hazard classes

**Table 2 — Cut-off values/concentration limits for hazard classes**

1	2
Hazard class	Cut-off value (concentration limit)
	%
Acute toxicity	≥ 1,0
Skin corrosion	≥ 1,0
Skin irritation	≥ 1,0
Serious damage to eyes	≥ 1,0
Eye irritation	≥ 1,0
Respiratory sensitisation	≥ 1,0
Skin sensitisation	≥ 1,0
Mutagenicity:	
Category 1	≥ 0,1
Category 2	≥ 1,0
Carcinogenicity	≥ 0,1
Reproductive toxicity	≥ 0,1
Target organ systemic toxicity	
Single exposure	≥ 1,0
Repeat exposure	≥ 1,0
Hazardous to the aquatic environment	≥ 1,0

In similar vein, the waste biomass was evaluated against the organic contaminants analysed for by Jones Environmental Laboratory.

The data in Appendix 1 reveals that only toluene (0.14ppm) and styrene (0.26ppm) are flagged as single component organic pollutants above the detection level of the methodology used. It is also notable that both of these are significantly below the 0.1% (1,000ppm) threshold for mutagens, carcinogens or pollutants resulting in reproductive toxicity. Neither of the identified contaminants would therefore result in the waste biomass being viewed as hazardous despite styrene being recognized as a Class B carcinogen and teratogen.

It should be noted that Jones laboratory also conducted a test for extractable petroleum hydrocarbons (EPH = C<sub>10</sub>-C<sub>36</sub>) as well as gasoline range organics (GRO = C<sub>6</sub>-C<sub>9</sub>). This resulted in a measured value for EPH = 6,675ppm and GRO = 3.5ppm. However, the absence of other typical GRO compounds such as benzene or ethyl benzene (shown to be BDL in Appendix 1) is clear evidence that both the GRO as well as the EPH materials detected is probably attributable to the terpenes typically found in biomass material. The terpenes are a large range organic compounds produced by plants and particularly conifers. As the sample supplied to the Jones Laboratory contained a significant portion of pine as well as eucalyptus these compounds should be expected in any extract looking for hydrocarbons.

The simplest terpene is isoprene ( $C_5H_8$ ) with other terpenes typically being multiples of this building block. Monoterpenes are  $C_{10}H_{16}$  (two isoprene units) while sesquiterpenes are  $C_{15}H_{24}$  (three isoprene units). This continues up to triterpenes which are  $C_{30}H_{48}$  (six terpene units) and sesquiterpenes ( $C_{35}H_{56}$  – seven isoprene units) and would fall into the same range reported by Jones Environmental Laboratory as “**EPH (C10-C36)**” It is therefore certain that the materials reported by Jones laboratory as extractable petroleum hydrocarbons (EPH) are in fact a range of terpene compounds and not typical petroleum hydrocarbons, many of which are known to be potential cancer causing compounds. In comparison, the terpenes would typically, at worst, represent an eye or skin irritation hazard to humans and possibly an aquatic hazard to the environment when isolated from the biomass matrix. It is clear that in their natural state (ie. as entrained in the biomass) they are cannot be released at any concentration level likely to cause harm to humans or the environment (ie. as a single dose contaminant) and it is also clear from Table 1 that at the reported EPH level (6,675ppm) there would be no risk from terpene type compounds as this level is below the 1% (10,000ppm) trigger level for non-cancer causing compounds. The material would therefore not be viewed as hazardous for either of the EPH or GRO reported materials due to these being terpenoid materials, none of which are known to be identified as carcinogenic, mutagenic or teratogenic in nature.

The Jones Environmental Laboratory does not appear to have conducted flammability or explosive tests on the waste biomass which is clearly attributable to the origin of the material. A positive result would not be expected for either of these tests and the omission is not viewed as significant. The test for corrosive nature of a waste stream is often based on the pH of the material. This is reported as pH=5 by Jones Laboratory which is well within the acceptable range for non-corrosive material's (pH <2 or pH >11.5 is required to be corrosive) and the waste biomass is therefore not seen to have any corrosive nature.

### 3. Conclusion:

Evaluation of the data obtained by Jones Environmental Laboratory on a sample of biomass waste supplied by Sappi showed the waste to exhibit no physical hazards (ie. it is not flammable, explosive or corrosive).

In similar vein, the material when quantitatively analysed by Jones Environmental Laboratory does not contain any inorganic elements that would render the material hazardous while the range of organic compounds detected are all below the threshold values of SANS 10234 that would render the material hazardous. Based on the available data the material would be viewed as non-hazardous waste under the requirements of the **Waste Classification and Management Regulations**.

A SDS is therefore not required for the storage, transport or disposal of this waste stream under the **Waste Regulations**.

Dr J.L. Schoonraad



## Annexure 1



## Jones Environmental Laboratory - 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 :** Zaffar Hussain  
**Date :** 22nd June, 2016  
**Your reference :** Sappi 48087  
**Our reference :** Test Report 16/10025 Batch 1  
**Location :** Sappi  
**Date samples received :** 9th June, 2016  
**Status :** Final report  
**Issue :** 1

Five samples were received for analysis on 9th June, 2016 of which one 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.

All analysis was undertaken at Jones Environmental Laboratory in the UK, which is ISO 17025 accredited under UKAS (4225).

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

**Compiled By:**

A handwritten signature in black ink, appearing to read 'S. Gomery'.

**Simon Gomery BSc**  
**Project Manager**









16/10025-10

pH determination

Procedure

Due to the nature of the sample, pH determination of a standard 2:1 extraction was not possible (TM073)  
Instead a 4:1 extraction was performed and the pH determined manually.

Result

16/10025-10

pH = 5.011

C Llowarch/Jen Ellis

16/06/2016



**ABBREVIATIONS and ACRONYMS USED**

#	ISO17025 (UKAS) accredited - UK.
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	x5 Dilution
AC	x10 Dilution
AD	x100 Dilution

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 16/10025

## 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 (UKAS) accreditation applies to surface water and groundwater and 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.

## 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

JE Job No: 16/10025

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	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
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
TM19	Determination of pH by bench pH meter	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.			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
TM22	Modified USEPA 160.4. Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (450°C)	PM0	No preparation is required.			AD	Yes
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. Samples are extracted using an orbital shaker.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	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

JE Job No: 16/10025

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
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
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. Samples are extracted using an orbital shaker.			AR	Yes
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.	PM112	As received soils are extracted with deionised water in a 4:1 ratio			AR	Yes
TM79	Determination of Flashpoint using a Closed Cup Flashpoint Analyser	PM0	No preparation is required.			AR	No
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.			AR	Yes