WASTE ASSESSMENT FOR PROPOSED PCDS AT LAFARGE CEMENT PLANT, LICHTENBURG, NORTH WEST PROVINCE

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14 December 2022

For:

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SYNOPSIS

Specialist waste assessment in support of water use authorisation for proposed PCDs at the Cement Plant in Lichtenburg, North West Province

KEY WORDS:

Waste assessment, pollution control dam, laboratory analysis, liner

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2015 which has been independently certified by DEKRA Certification

Verification	Capacity	Name	Signature	Date
Authorised by	Executive Associate	R Schapers		14 Dec 2022

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1 INTRODUCTION AND SITE DESCRIPTION

This report presents the results of the waste assessment in support of the liner design requirements for two (2 No.) proposed Pollution Control Dams (PCD) for the Lafarge Cement Plant located in Lichtenburg, North West Province.

We refer to our proposals referenced 005524 2021006L01/rs, titled "Re: Waste Classification for Lafarge Lichtenburg", dated 28 May 2021, and 005752 18006/rs, titled "Lafarge Waste Assessment for PCD Liner Design", dated 31 October 2022. JG Afrika were requested to proceed with the waste assessment as agreed under under purchase order 4501873093, dated 26 April 2022.

2 SITE DESCRIPTION

The Cement Plant site is located on farm Lichtenburg Town and Townlands 27 IP in the Ditsobotla Local Municipality of the North West Province. The site is located immediately north east of the town of Lichtenburg and can be accessed from Lichtenburg via the R53 followed by the D379. The location of the site is shown in Figure 1.

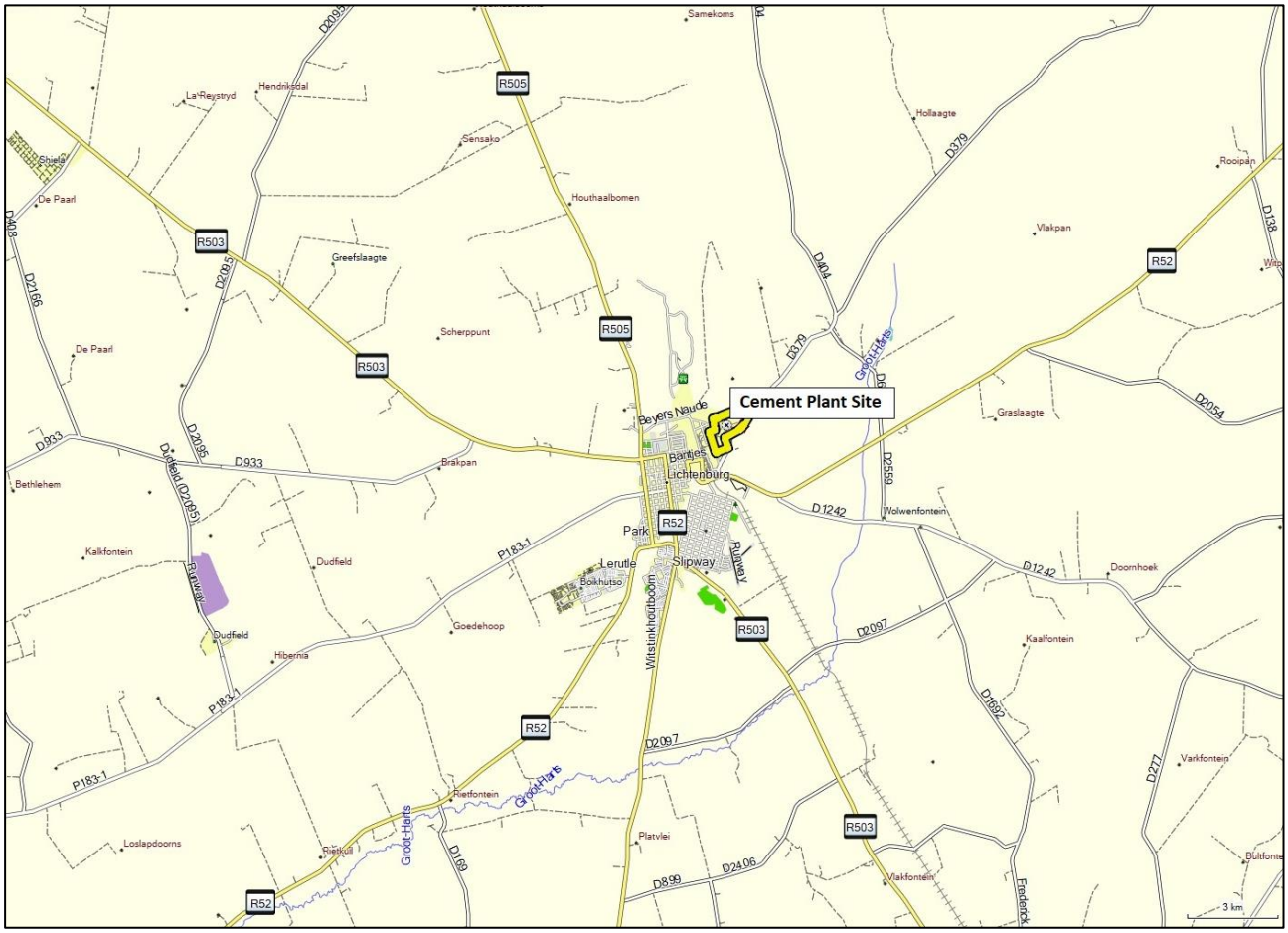

Figure 1: Location of Lafarge Cement Plant Site

The location of the proposed PCDs designated PCD1 and PCD2 are presented in Figure 2.

Figure 2: Location of Proposed PCDs

It is understood that PCD1 will receive waste water from the coal stockpiles while PCD2 will receive waste water from the additives stockpile. The additives are made up of magnetite and silica, dust and graded klinker, and bottom ash and bumatech.

3 APPROACH

The waste assessment is carried using the following guideline documents;

- Republic of South Africa, National Environmental Management Act, Act No. 25 of 2014, as amended
- The Department of Environmental Affairs, 23 August 2013. Government Notice No. R634. National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) – Waste Classification and Management Regulations

- The Department of Environmental Affairs, 23 August 2013. Government Notice No. R635. National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) – National Norms and Standards for the Assessment of Waste for Landfill Disposal
- The Department of Environmental Affairs, 23 August 2013. Government Notice No. R636. National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) – National Norms and Standards for the Disposal of Waste to Landfill

Reference is made to NEMA Chapter 5 - Integrated Environmental Management, Subsection 24S, The management of residue stockpiles and residue deposits;

Residue stockpiles and residue deposits must be deposited and managed in accordance with the provisions of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), on any site demarcated for that purpose in the environmental management plan or environmental management programme in question.

3.1 GN R634 SANS 10234 Classification

The GN R634 stipulates all waste generators must ensure that their waste is classified in accordance with SANS 10234 within 180 days of generation, except if it is listed in Annexure 1. Waste must be re-classified every 5 years.

Waste classification according to SANS 10234 (based on the Global Harmonised System) indicates physical, health and environmental hazards. The SANS 10234 covers the harmonised criteria for classification of potentially hazardous substances and mixtures, including wastes, in terms of its intrinsic properties/hazards.

The chemical test results and intrinsic properties of the waste streams are used for the SANS 10234 classification. Constituents present in concentrations exceeding the cut off values are used for classification in terms of health hazards. Environmental hazard is based on toxicity to the aquatic ecosystem and distinguish between acute and chronic toxicity, bioaccumulation and biodegradation.

3.2 GN R635 Waste Assessment

A GN R635 waste assessment is performed on waste intended for land disposal, to determine the type of waste. It is further used to determine the correct liner design requirements for disposal.

The GN R635 stipulates the potential level of risk associated with disposal of wastes must be determined by following the prescribed and appropriate leach test protocols. The results must be assessed against the four levels of thresholds for leachable and total concentrations. These are then used to determine the waste type and associated liner requirements. The following terminology is used:

- LC - the leachable concentration of a particular contaminant in a waste, expressed as mg/l
- TC - the total concentration of a particular contaminant in a waste, expressed as mg/kg
- LCT - the leachable concentration thresholds for particular contaminants in a waste (LCT0, LCT1, LCT2, LCT3)
- TCT - the total concentration thresholds for particular contaminants in a waste (TCT0, TCT1, TCT2).

The process to determine the waste type for correct disposal is taken from the GNR 635 flow diagram for waste assessment. Using this flow diagram, the waste needs to be analysed for total and leachable concentrations of potential Constituents of Concern (CoCs). The results are then compared to the threshold values to determine the waste type.

3.3 GN R636 Barrier Design Requirements

The GN R636 stipulates the liner design requirements, based on the type of waste, as presented in Table 1.

Table 1: Landfill Disposal Requirements (GN R636 of 2013)

Waste Type	Landfill Disposal Requirements
Type 0 Waste	The disposal of Type 0 waste to landfill is not allowed. The waste must be treated and re-assessed in terms of the Standard for Assessment of Waste for Landfill Disposal
Type 1 Waste	Type 1 waste may only be disposed of at a Class A landfill designed in accordance with Section 3(1) and 3(2), or, subject to Section 3(4), may be disposed of at a landfill site designed and operated in accordance with the requirements for a Hh / HH landfill as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., DWAF, 1998).
Type 2 Waste	Type 2 waste may only be disposed of at a Class B landfill designed in accordance with Section 3(1) and 3(2), or, subject to Section 3(4), may be disposed of at a landfill site designed and operated in accordance with the requirements for a GLB+ landfill as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., DWAF, 1998).
Type 3 Waste	Type 3 waste may only be disposed of at a Class C landfill designed in accordance with Section 3(1) and 3(2), or, subject to Section 3(4), may be disposed of at a landfill site designed and operated in accordance with the requirements for a GLB+ landfill as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., DWAF, 1998).
Type 4 Waste	Disposal allowed at a landfill with a Class D landfill designed in accordance with Section 3(1) and 3(2), or, subject to Section 3(4), may be disposed of at a landfill site designed and operated in accordance with the requirements for a GLB- landfill as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., DWAF, 1998).

4 SAMPLING AND ANALYSES

Waste samples representative of the receiving streams to the proposed PCDs were collected by Lafarge and submitted to EPL laboratories (Facility Accreditation Number T0419). Samples of the source waste designated *Stock 1* comprising coal stockpile source material, and *Stock 2* comprising additives source material were submitted in November 2022. Sample designation *Stock 2* comprised a composite of various additives sources blended in equal parts (Magnetite & Silica, Dust & Graded Klinker, Bottom Ash & Bumatech).

The samples were analysed in terms of the requirements of Waste Assessment for Disposal, GN R635 (Gazette No. 36784), LC - Australian Standard Leaching Procedure (ASLP), AS4439 – 1997.

5 RESULTS AND DISCUSSION

5.1 Waste assessment

A summary of the analytical results are presented in Table 2. The laboratory certificates of analysis are presented in Annexure A.

Table 2: Summary Results of Analysis by EPL

Determinant	Additives Stockpile		Coal Stockpile		Total Concentration Threshold (TCT) Limits (mg/kg)			Leachable Concentration Threshold (LCT) Limits (mg/l)			
	TC - Solids (mg/kg)	LC - DW (mg/l	TC - Solids (mg/kg)	LC - DW (mg/l	TCTO	TCT1	TCT2	LCTO	LCT1	LCT2	LCT3
Metal Ions											
As, Arsenic	4.53	< 0.01	4.65	< 0.01	5.8	500	2000	0.01	0.5	1	4
B, Boron	< 32	< 0.5	< 32	< 0.5	150	15000	60000	0.5	25	50	200
Ba, Barium	261.4	0.08	312.5	0.08	62.5	6250	25000	0.7	35	70	280
Cd, Cadmium	< 3.2	< 0.003	< 3.2	< 0.003	7.5	260	1040	0.003	0.15	0.3	1.2
Co, Cobalt	5.93	< 0.05	43.66	< 0.05	50	5000	20000	0.5	25	50	200
CrTotal, Chromium Total	11.99	< 0.05	115.5	< 0.05	46000	800000	N/A	0.1	5	10	40
Cr(VI), Chromium (VI)	< 2	< 0.05	< 2	< 0.05	6.5	500	2000	0.05	2.5	5	20
Cu, Copper	15.58	0.02	111.3	0.03	16	19500	78000	2	100	200	800
Hg, Mercury	1.78	< 0.005	1.01	< 0.003	0.93	160	640	0.006	0.3	0.6	2.4
Mn, Manganese	151.5	< 0.05	1239	< 0.05	1000	25000	100000	0.5	25	50	200
Mo, Molybdenum	< 6.4	< 0.05	< 6.4	< 0.05	40	1000	4000	0.07	3.5	7	28
Ni, Nickel	13.1	< 0.05	68.37	< 0.05	91	10600	42400	0.07	3.5	7	28
Pb, Lead	9.93	< 0.01	13.99	< 0.01	20	1900	7600	0.01	0.5	1	4
Sb, Antimony	< 3.2	0.013	5.15	< 0.01	10	75	300	0.02	1	2	8
Se, Selenium	< 6.4	< 0.01	< 6.4	< 0.01	10	50	200	0.01	0.5	1	4
V, Vanadium	24.58	1.8	482.7	< 0.05	150	2680	10720	0.2	10	20	80
Zn, Zinc	12.95	< 0.05	104.5	< 0.05	240	160000	640000	5	250	500	2000
Inorganic Anions											
TDS	N/A	448	N/A	448				1000	12500	25000	100000
Chloride	N/A	90.39	N/A	< 2				300	15 000	30 000	120 000
Sulphate	N/A	306.3	N/A	306.3				250	12 500	25 000	100 000
NO3 as N, Nitrate-N	N/A	0.94	N/A	< 0.5				11	550	1100	4400
F, Fluoride	< 0.5	< 0.05	12.19	0.09	100	10000	40000	1.5	75	150	600
CN- (total), Cyanide Total	< 1.55	< 0.07	< 1.55	< 0.07	14	10500	42000	0.07	3.5	7	28
Organics											
Benzene	< 0.02	< 0.001	0.023	< 0.001		10	40		0.01	0.02	0.08
Benzo(a)pyrene	< 0.04	< 0.001	0.51	< 0.001		1.7	6.8		0.035	0.07	0.28
Carbon tetrachloride	< 0.1	< 0.005	< 0.1	< 0.005		4	16		0.2	0.4	1.6
Chlorobenzene	< 0.04	< 0.002	< 0.04	< 0.002		8800	35200		5	10	40
Chloroform	< 0.1	< 0.005	< 100	< 0.005		700	2800		15	30	120
2-Chlorophenol	< 0.4	< 0.02	< 400	< 0.02		2100	8400		15	30	120
Di (2 ethylhexyl) phthalate	< 2	< 0.2	< 2000	< 0.2		40	160		0.5	1	4
1,2-Dichlorobenzene	< 0.04	< 0.002	< 0.04	< 0.002		31900	127600		5	10	40
1,4-Dichlorobenzene	< 0.04	< 0.002	< 0.04	< 0.002		18400	73600		15	30	120
1,2-Dichloroethane	< 0.05	< 0.002	< 0.05	< 0.002		3.7	14.8		1.5	3	12
1,1-Dichloroethylene	< 0.2	< 0.01	< 0.2	< 0.01		150	600		0.35	0.7	2.8
1-2-Dichloroethylene	< 0.2	< 0.01	< 0.2	< 0.01		3750	15000		2.5	5	20
Dichloromethane	< 1	< 0.05	< 1	< 0.05		16	64		0.25	0.5	2
2,4-Dichlorophenol	< 0.4	< 0.02	< 0.4	< 0.02		800	3200		10	20	80
2,4-Dinitrotoluene	< 1	< 0.05	< 1	< 0.05		5.2	20.8		0.065	0.13	0.52
Ethylbenzene	< 0.04	< 0.002	0.041	< 0.002		540	2160		3.5	7	28
Formaldehyde	< 2	< 0.1	< 2	< 0.1		2000	8000		25	50	200
Hexachlorobutadiene	< 0.04	< 0.002	< 0.04	< 0.002		2.8	5.4		0.03	0.06	0.24
Methyl ethyl ketone	< 20	< 1	< 20	< 1		8000	32000		100	200	800
MTBE (Methyl t-butyl ether)	< 0.1	< 0.005	< 0.1	< 0.005		1435	5740		2.5	5	20
Nitrobenzene	< 0.2	< 0.02	< 0.2	< 0.02		45	180		1	2	8
PAHs (total)	< 0.8	< 0.2	13	< 0.2		50	200		N/A	N/A	N/A
Petroleum H/Cs, C6 to C9	< 0.2	< 0.01	4.2	< 0.01		650	2600		N/A	N/A	N/A
Petroleum H/Cs, C10 to C36	< 3800	< 3.82	< 3800	< 3.82		10000	40000		N/A	N/A	N/A
Phenols (total, non-halogenated)	< 4	< 0.2	< 4	< 0.2		560	2240		7	14	56
Polychlorinated biphenyls	< 0.35	< 0.01	< 0.35	< 0.01		12	48		0.025	0.05	0.2
Styrene	< 0.1	< 0.005	< 0.1	< 0.005		120	480		1	2	8
1,1,1,2-Tetrachloroethane	< 0.2	< 0.01	< 0.2	< 0.01		400	1600		5	10	40
1,1,2,2-Tetrachloroethane	< 0.2	< 0.01	< 0.2	< 0.01		5	20		0.65	1.3	5.3
Tetrachloroethylene	< 0.2	< 0.01	< 0.2	< 0.01		200	800		0.25	0.5	2
Toluene	< 0.2	< 0.01	< 0.2	< 0.01		1150	4600		35	70	280
Trichlorobenzenes (total)	< 0.1	< 0.005	< 0.1	< 0.005		3300	13200		3.5	7	28
1,1,1-Trichloroethane	< 0.1	< 0.005	< 0.1	< 0.005		1200	4800		15	30	120
1,1,2-Trichloroethane	< 0.1	< 0.005	< 0.1	< 0.005		48	192		0.6	1	4
Trichloroethylene	< 0.2	< 0.01	< 0.2	< 0.01		11600	46400		0.25	2	8
2,4,6-Trichlorophenol	< 0.4	< 0.02	< 0.4	< 0.02		1770	7080		10	20	80
Vinyl chloride	< 0.2	< 0.01	< 0.2	< 0.01		1.5	6		0.015	0.03	0.12
Xylenes (total)	< 0.1	< 0.005	0.22	< 0.005		890	3560		25	50	200
Pesticides											
Aldrin + Dieldrin	< 0.02	< 0.001	< 0.02	< 0.001	0.05	1.2	4.8		0.015	0.03	0.03
DDT + DDD + DDE	< 0.02	< 0.001	< 0.02	< 0.001	0.05	50	200		1	2	2
2,4-D		nd		nd	0.05	120	480		1.5	3	3
Chlordane	< 0.02	< 0.001	< 0.02	< 0.001	0.05	4	16		0.05	0.1	0.1
Heptachlor	< 0.02	< 0.001	< 0.02	< 0.001	0.05	1.2	4.8		0.015	0.03	0.03

These results indicate the following:

- The TCT0 limits for barium and mercury are exceeded the Additives Stockpile sample
- The TCT0 limits for barium, copper, mercury, manganese and vanadium are exceeded in the Coal Stockpile sample
- The LCT0 limits for vanadium and sulphate are exceeded in the Additives Stockpile sample
- The LCT0 limit for sulphate is exceeded in The Coal Stockpile sample.

5.2 Barrier Design Requirements

Both solid samples have parameters exceeding the recommended TCT0 limit, however, no parameters exceed the TCT1 limits. Both water samples have parameters exceeding the recommended LCT0 limit, however, no parameters exceed the LCT1 limits. The final waste type classification is therefore *Waste Type 3*

Based on the results of analysis of the samples analysed and the waste type classification, a Class C liner system in terms of GN R636 would be sufficient for all waste samples. It should however be noted that the liner designs in GN R636 provides for landfill disposal of dry/dewatered waste and not on PCD liners specifically. It is inferred that the same application can be applied subject to Regulator approval.

6 CONCLUSION

This report presents the waste assessment for the proposed PCDs at the Lafarge Cement Plant. The analysis was carried out on source samples from the additives stockpile and the coal stockpile. Total concentration threshold limits (TCT0) were exceeded for selected metals indicating a final waste classification of Type 3. In terms of the GN R636 a Class C liner would be suitable for the waste streams.

It should be noted that the liner designs in GN R636 provides for landfill disposal of dry solid waste systems and not for PCD liners specifically. It is inferred that the same application can be applied in this instance subject to Regulator approval.

Annexure A: Laboratory Certificates on Analysis

EPL
ENVIRONMENTAL POLLUTION LABORATORY

Client Information

Company:	JG Africa
Attention:	Roberts Schapers
Tel:	(031) 275 5502
Fax:	
Address:	1ste Floor, Block C Westville Durban 3629

Analysis Report

Lab No: 40608

Test Information: *Waste Assesment for Disposal, GNR 635 (Gazette No. 36784)*
LC - Australian Standard Leaching Procedure (ASLP), AS4439 - 1997

Sample Information

Matrix:	Solid-DW	Date Received:	2022/11/09
Sample ID:	Stock 1	Date Completed:	2022/12/04
Ref No:	5803, Quote 11648	Date Issued:	2022/12/04

Parameters	Results		TCT*	LCT*
	TC - Solids	LC - DW		
pH - Leach Fluid	N/A	N/A		
pH - Sample	7.75	7.35		
Metals	mg/kg	mg/liter **		
As - Arsenic	4.65	< 0.01	< TCT0	= LCT0
B - Boron	< 32	< 0.5	< TCT0	= LCT0
Ba - Barium	312.5	0.08	< TCT1	< LCT0
Cd - Cadmium	< 3.2	< 0.003	< TCT0	= LCT0
Co - Cobalt	43.66	< 0.05	< TCT0	< LCT0
Cr Total - Chromium Total	115.5	< 0.05	< TCT0	< LCT0
Cr (VI) - Chromium (VI) *	< 2	< 0.05	< TCT0	= LCT0
Cu - Copper	111.3	0.03	< TCT1	< LCT0
Hg - Mercury *	1.01	< 0.003	< TCT1	< LCT0
Mn - Manganese	1239	< 0.05	< TCT1	< LCT0
Mo - Molybdenum	< 6.4	< 0.05	< TCT0	< LCT0
Ni - Nickel	68.37	< 0.05	< TCT0	< LCT0
Pb - Lead	13.99	< 0.01	< TCT0	= LCT0
Sb - Antimony	5.15	< 0.01	< TCT0	< LCT0
Se - Selenium	< 6.4	< 0.01	< TCT0	= LCT0
V - Vanadium	482.7	< 0.05	< TCT1	< LCT0
Zn - Zinc	104.5	< 0.05	< TCT0	< LCT0
Anions (Discrete Analyser)	mg/kg *	mg/liter		
Fluoride - F	12.19	0.09	< TCT0	< LCT0
Chloride - Cl	N/A	< 2	N/A	< LCT0
Nitrate as NO3	N/A	< 2.22	N/A	N/A
NO3 as N	N/A	< 0.5	N/A	< LCT0
Sulphate - SO4	N/A	306.3	N/A	< LCT1
CN - Total Cyanide *	< 1.55	< 0.07	< TCT0	= LCT0
Total Dissolved Solids	mg/kg	mg/liter		
TDS	N/A	448	N/A	< LCT0
Total Organic Carbon	mg/kg**	mg/liter*		
TOC	463800	< 10		
	ug/kg	ug/liter		
Formaldehyde	**Dilution X10 ***	**X2**		
Formaldehyde	< 2000	< 100	< TCT1	< LCT1

Authorized Signatory

M. Kannemeyer

sanas
Testing Laboratory

Disclaimer:
1) The results relate only to the test items provided, in the condition as received.
2) EPL takes no responsibility for sample/s prior to submission: this includes sampling, sample container, storage and shipping to our testing facility. The sample is analysed per customer request for analysis.
3) This report may not be reproduced, except in full, without the prior written approval of the laboratory.
4) Parameters marked " * " are not included in the SANAS Schedule of Accreditation for this laboratory. Analysis marked " ** " have been outsourced.
5) UTD - Unable to determine, NR - Not Requested, RTF - Results to Follow
BDL – Below Detection Limit (Please note that if the results is BDL, it does not indicate that the sample is clean or that the analyte result is equal to zero)
6) Storage Conditions: Fridge @ 0-6°C
7) Methods: EPL-WL-001 (Conductivity), EPL-WL-002 (Alkalinity), EPL-WL-003 (pH), EPL-WL-004 (TDS), EPL-WL-005 (Anions by IC), EPL-WL-006 (Cations by IC), EPL-WL-007 (Metals), EPL-WL-008 (Cr(VI)), EPL-WL-009 (TOC), EPL-WL-010 (Hg by DMA), EPL-WL-011 (Anions by Discrete Analyser), EPL-HPLC-001 (Formaldehyde)
8) Uncertainty of measurement for all methods included in the SANAS Schedule of Accreditation is available on request.

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EPL
ENVIRONMENTAL POLLUTION LABORATORY

Client Information

Company:	**JG Africa**
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Fax:	
Address:	**1ste Floor, Block C Westville Durban 3629**

Analysis Report

Lab No: 40608

Test Information: *Waste Assesment for Disposal, GNR 635 (Gazette No. 36784)*
LC - Australian Standard Leaching Procedure (ASLP), AS4439 - 1997

Sample Information

Matrix:	**Solid-DW**	**Date Received:**	**2022/11/09**
Sample ID:	**Stock 1**	**Date Completed:**	**2022/12/04**
Ref No:	**5803, Quote 11648**	**Date Issued:**	**2022/12/04**

Parameters	Results		TCT*	LCT*
	TC - Solids	LC - DW		
	ug/kg	ug/liter		
VOCs	**Dilution X20**	**X1**		
Benzene	23	< 1	< TCT1	< LCT1
Carbon Tetrachloride	< 100	< 5	< TCT1	< LCT1
Chlorobenzene	< 40	< 2	< TCT1	< LCT1
Chloroform	< 100	< 5	< TCT1	< LCT1
1,2-Dichlorobenzene	< 40	< 2	< TCT1	< LCT1
1,4-Dichlorobenzene	< 40	< 2	< TCT1	< LCT1
1,2-Dichloroethane	< 40	< 2	< TCT1	< LCT1
Ethylbenzene	41	< 2	< TCT1	< LCT1
Hexachlorobutadiene	< 40	< 2	< TCT1	< LCT1
MTBE	< 100	< 5	< TCT1	< LCT1
Styrene	< 100	< 5	< TCT1	< LCT1
1,1,1,2-Tetrachloroethane	< 200	< 10	< TCT1	< LCT1
1,1,2,2-Tetrachloroethane	< 200	< 10	< TCT1	< LCT1
Toluene	< 200	< 10	< TCT1	< LCT1
1,1,1-Trichloroethane	< 100	< 5	< TCT1	< LCT1
1,1,2-Trichloroethane	< 100	< 5	< TCT1	< LCT1
Xylenes total	220	< 5	< TCT1	< LCT1
Trichlorobenzene (Total)	< 100	< 5	< TCT1	< LCT1
Dichloromethane	< 1000	< 50	< TCT1	< LCT1
1,1-Dichloroethylene	< 200	< 10	< TCT1	< LCT1
1,2-Dichloroethylene	< 200	< 10	< TCT1	< LCT1
Tetrachloroethylene	< 200	< 10	< TCT1	< LCT1
Trichloroethylene	< 200	< 10	< TCT1	< LCT1
TPH	**Dilution X20**	**X1**		
Petroleum H/Cs,C6-C9	4200	< 10	< TCT1	N/A
Petroleum H/Cs,C10 to C36	< 3800000	< 3820	< TCT1	N/A
	ug/kg	ug/liter		
SVOCs	**Dilution X10**	**X10**		
Benzo(a)pyrene	510	< 1	< TCT1	< LCT1
Di(2-ethylhexyl)phthalate *	< 2000	< 200	< TCT1	< LCT1
Nitrobenzene *	< 200	< 10	< TCT1	< LCT1
2,4-Dinitrotoluene *	< 1000	< 50	< TCT1	< LCT1
Total PAH's	13000	< 200	< TCT1	N/A

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6) Storage Conditions: Fridge @ 0-6°C.
7) Methods: EPL-T-011 (TPH C10-C36), EPL-T-012 (TPH C6-C9, VOCs, Pesticides, PCBs in Water), EPL-T-016 (Polars), EPL-T-020 (SVOCs), EPL-T-034 (PCBs in Soil).
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EPL
ENVIRONMENTAL POLLUTION LABORATORY

Client Information

Company: JG Africa
Attention: Roberts Schapers
Tel: (031) 275 5502
Fax:
Address: 1ste Floor, Block C Westville
Durban
3629

Analysis Report

Lab No: 40608

Test Information: *Waste Assesment for Disposal, GNR 635 (Gazette No. 36784)*
LC - Australian Standard Leaching Procedure (ASLP), AS4439 - 1997

Sample Information

Matrix: Solid-DW
Sample ID: Stock 1
Ref No: 5803, Quote 11648

Date Received: 2022/11/09
Date Completed: 2022/12/04
Date Issued: 2022/12/04

Parameters		Results		TCT*	LCT*
		TC - Solids ug/kg	LC - DW ug/liter		
Phenols *	Dilution	X10	X10		
2-Chlorophenol		< 400	< 20	< TCT1	< LCT1
2,4-Dichlorophenol		< 400	< 20	< TCT1	< LCT1
2,4,6-Trichlorophenol		< 400	< 20	< TCT1	< LCT1
Phenols Speciated (total,non-halogenated)		< 4000	< 200	< TCT1	< LCT1
Pesticides *	Dilution	X200	X10		
Aldrin		< 20	< 1	< TCT0	< LCT1
Dieldrin		< 20	< 1	< TCT0	< LCT1
DDT		< 20	< 1	< TCT0	< LCT1
DDE		< 20	< 1	< TCT0	< LCT1
DDD		< 20	< 1	< TCT0	< LCT1
Heptachlor		< 20	< 1	< TCT0	< LCT1
Chlordane		< 20	< 1	< TCT0	< LCT1
2,4-Dichlorophenoxyacetic Acid			Unable to Detect	UTD	UTD
Polychlorinated Biphenyls (PCB)	Dilution	X1	X10		
Ballsmitters Totals *		< 350	< 10	< TCT1	< LCT1
Polars *	Dilution	X200	X10		
Methyl Ethyl Ketone (2-Butanone)		< 20000	< 1000	< TCT1	< LCT1
Vinyl Chloride		< 200	< 10	< TCT1	< LCT1

Type Assessment, based only on results and not detection limits

Highest Total Concentration Value	≤ TCT 1*
Highest Leachable Concentration Value	≤ LCT 1*
Final Waste Type Classification	Type 3*

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Client Information

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Analysis Report

Lab No: 40608

Test Information: *Waste Assesment for Disposal, GNR 635 (Gazette No. 36784)*
LC - Australian Standard Leaching Procedure (ASLP), AS4439 - 1997

Sample Information

Matrix:	Solid-DW	Date Received:	2022/11/09
Sample ID:	Stock 2	Date Completed:	2022/12/04
Ref No:	5803, Quote 11648	Date Issued:	2022/12/04

Parameters	Results		TCT*	LCT*
	TC - Solids	LC - DW		
pH - Leach Fluid	N/A	N/A		
pH - Sample	11.34	11.5		
Metals	mg/kg	mg/liter		
As - Arsenic	4.53	< 0.01	< TCT0	= LCT0
B - Boron	< 32	< 0.5	< TCT0	= LCT0
Ba - Barium	261.4	0.08	< TCT1	< LCT0
Cd - Cadmium	< 3.2	< 0.003	< TCT0	= LCT0
Co - Cobalt	5.93	< 0.05	< TCT0	< LCT0
Cr Total - Chromium Total	11.99	< 0.05	< TCT0	< LCT0
Cr (VI) - Chromium (VI) *	< 2	< 0.05	< TCT0	= LCT0
Cu - Copper	15.58	0.02	< TCT0	< LCT0
Hg - Mercury *	1.78	< 0.005	< TCT1	< LCT0
Mn - Manganese	151.5	< 0.05	< TCT0	< LCT0
Mo - Molybdenum	< 6.4	< 0.05	< TCT0	< LCT0
Ni - Nickel	13.1	< 0.05	< TCT0	< LCT0
Pb - Lead	9.93	< 0.01	< TCT0	= LCT0
Sb - Antimony	< 3.2	0.013	< TCT0	< LCT0
Se - Selenium	< 6.4	< 0.01	< TCT0	= LCT0
V - Vanadium	24.58	1.8	< TCT0	< LCT1
Zn - Zinc	12.95	< 0.05	< TCT0	< LCT0
Anions (Discrete Analyser)	mg/kg *	mg/liter		
Fluoride - F	< 0.5	< 0.05	< TCT0	< LCT0
Chloride - Cl	N/A	90.39	N/A	< LCT0
Nitrate as NO3	N/A	4.17	N/A	N/A
NO3 as N	N/A	0.94	N/A	< LCT0
Sulphate - SO4	N/A	47.32	N/A	< LCT0
CN - Total Cyanide *	< 1.55	< 0.07	< TCT0	= LCT0
Total Dissolved Solids	mg/kg	mg/liter		
TDS	N/A	873	N/A	< LCT0
Total Organic Carbon	mg/kg**	mg/liter*		
TOC	8900	< 10		
	ug/kg	ug/liter		
Formaldehyde	**Dilution X10 ***	**X2**		
Formaldehyde	< 2000	< 100	< TCT1	< LCT1

Authorized Signatory

M. Kannemeyer

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6) Storage Conditions: Fridge @ 0-6°C
7) Methods: EPL-WL-001 (Conductivity), EPL-WL-002 (Alkalinity), EPL-WL-003 (pH), EPL-WL-004 (TDS), EPL-WL-005 (Anions by IC), EPL-WL-006 (Cations by IC), EPL-WL-007 (Metals), EPL-WL-008 (Cr(VI)), EPL-WL-009 (TOC), EPL-WL-010 (Hg by DMA), EPL-WL-011 (Anions by Discrete Analyser), EPL-HPLC-001 (Formaldehyde)
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Address: 1ste Floor, Block C Westville
Durban
3629

Analysis Report

Lab No: 40608

Test Information: *Waste Assesment for Disposal, GNR 635 (Gazette No. 36784)*
LC - Australian Standard Leaching Procedure (ASLP), AS4439 - 1997

Sample Information

Matrix: Solid-DW
Sample ID: Stock 2
Ref No: 5803, Quote 11648

Date Received: 2022/11/09
Date Completed: 2022/12/04
Date Issued: 2022/12/04

Parameters	Results		TCT*	LCT*
	TC - Solids	LC - DW		
	ug/kg	ug/liter		
VOCs	**Dilution X20**	**X1**		
Benzene	< 20	< 1	< TCT1	< LCT1
Carbon Tetrachloride	< 100	< 5	< TCT1	< LCT1
Chlorobenzene	< 40	< 2	< TCT1	< LCT1
Chloroform	< 100	< 5	< TCT1	< LCT1
1,2-Dichlorobenzene	< 40	< 2	< TCT1	< LCT1
1,4-Dichlorobenzene	< 40	< 2	< TCT1	< LCT1
1,2-Dichloroethane	< 40	< 2	< TCT1	< LCT1
Ethylbenzene	< 40	< 2	< TCT1	< LCT1
Hexachlorobutadiene	< 40	< 2	< TCT1	< LCT1
MTBE	< 100	< 5	< TCT1	< LCT1
Styrene	< 100	< 5	< TCT1	< LCT1
1,1,1,2-Tetrachloroethane	< 200	< 10	< TCT1	< LCT1
1,1,2,2-Tetrachloroethane	< 200	< 10	< TCT1	< LCT1
Toluene	< 200	< 10	< TCT1	< LCT1
1,1,1-Trichloroethane	< 100	< 5	< TCT1	< LCT1
1,1,2-Trichloroethane	< 100	< 5	< TCT1	< LCT1
Xylenes total	< 100	< 5	< TCT1	< LCT1
Trichlorobenzene (Total)	< 100	< 5	< TCT1	< LCT1
Dichloromethane	< 1000	< 50	< TCT1	< LCT1
1,1-Dichloroethylene	< 200	< 10	< TCT1	< LCT1
1,2-Dichloroethylene	< 200	< 10	< TCT1	< LCT1
Tetrachloroethylene	< 200	< 10	< TCT1	< LCT1
Trichloroethylene	< 200	< 10	< TCT1	< LCT1
TPH	**Dilution X20**	**X1**		
Petroleum H/Cs,C6-C9	< 200	< 10	< TCT1	N/A
Petroleum H/Cs,C10 to C36	< 3800000	< 3820	< TCT1	N/A
	ug/kg	ug/liter		
SVOCs	**Dilution X10**	**X10**		
Benzo(a)pyrene	< 40	< 1	< TCT1	< LCT1
Di(2-ethylhexyl)phthalate *	< 2000	< 200	< TCT1	< LCT1
Nitrobenzene *	< 200	< 10	< TCT1	< LCT1
2,4-Dinitrotoluene *	< 1000	< 50	< TCT1	< LCT1
Total PAH's	< 800	< 200	< TCT1	N/A

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Analysis Report

Lab No: 40608

Test Information: *Waste Assesment for Disposal, GNR 635 (Gazette No. 36784)*
LC - Australian Standard Leaching Procedure (ASLP), AS4439 - 1997

Sample Information

Matrix: Solid-DW
Sample ID: Stock 2
Ref No: 5803, Quote 11648

Date Received: 2022/11/09
Date Completed: 2022/12/04
Date Issued: 2022/12/04

Parameters		Results		TCT*	LCT*
		TC - Solids ug/kg	LC - DW ug/liter		
Phenols *	Dilution	X10	X10		
2-Chlorophenol		< 400	< 20	< TCT1	< LCT1
2,4-Dichlorophenol		< 400	< 20	< TCT1	< LCT1
2,4,6-Trichlorophenol		< 400	< 20	< TCT1	< LCT1
Phenols Speciated (total,non-halogenated)		< 4000	< 200	< TCT1	< LCT1
Pesticides *	Dilution	X200	X10		
Aldrin		< 20	< 1	< TCT0	< LCT1
Dieldrin		< 20	< 1	< TCT0	< LCT1
DDT		< 20	< 1	< TCT0	< LCT1
DDE		< 20	< 1	< TCT0	< LCT1
DDD		< 20	< 1	< TCT0	< LCT1
Heptachlor		< 20	< 1	< TCT0	< LCT1
Chlordane		< 20	< 1	< TCT0	< LCT1
2,4-Dichlorophenoxyacetic Acid			Unable to Detect	UTD	UTD
Polychlorinated Biphenyls (PCB)	Dilution	X1	X10		
Ballsmitters Totals *		< 350	< 10	< TCT1	< LCT1
Polars *	Dilution	X200	X10		
Methyl Ethyl Ketone (2-Butanone)		< 20000	< 1000	< TCT1	< LCT1
Vinyl Chloride		< 200	< 10	< TCT1	< LCT1

Type Assessment, based only on results and not detection limits

Highest Total Concentration Value	≤ TCT 1*
Highest Leachable Concentration Value	≤ LCT 1*
Final Waste Type Classification	Type 3*

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