



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory

ABN: 30 008 127 802  
221 Leitchs Road, Brendale, QLD, 4500  
PO Box 5805, Brendale, QLD, 4500

Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: pac.itabrendale@au.bureauveritas.com

## **FINAL REPORT**

**REFERENCE NUMBER:** 85042738

**CLIENT NAME AND ADDRESS:** **HardRock Coal Mining Pty. Ltd.**  
PO Box 3051, Prahran East,  
Victoria, Australia 3181

**PROGRAM:** **Fingal Tier Coal Project**


**HOLE NUMBER:** **VR13**

**CORE SIZE:** HQ

**CORE DIAMETER (mm):** 63.5

**DATE SAMPLES RECEIVED:** 21-April-2017

**REPORT DATE:** 27-April-2018

**REPORTED BY:**   
**Duncan Green**  
**Business Unit Manager**



Accredited for compliance with  
ISO/IEC 17025 - Testing.

**CORPORATE ACCREDITATION NUMBER:** 1805  
**SITE ACCREDITATION NUMBER:** 18415

This final report replaces all preliminary reports and shall not be reproduced except in full.

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**ORIGIN :** HardRock Coal Mining Pty. Ltd.  
**DESCRIPTION :** VR13  
**REPORTED TO :** Paul Wootton

**BV Reference # :** 85042738  
**Dated Received :** 21-Apr-17  
**Date Reported :** 27-Apr-18

## APPARENT RELATIVE DENSITY

VR13

Sample Details														Analysis				Comments
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Core Diameter	Mass		Apparent Relative Density (ARD)	Calculation								
							Start Mass	Air-Dried Mass										
											As-Received	As-Tested						
			metres	metres	metres	mm	grams	grams	g/cc	%								
HVC276	1017247	Seam A	257.33	257.38	0.05	63.5	343	343	2.20	98.5	Shattered core; unable to determine length.							
HVC277	1017249	Seam A	257.38	257.44	0.06	63.5	468	467	2.35	104.6								
HVC278	1017251	Seam A	257.44	257.85	0.41	63.5	2,122	2,121	2.40	68.1								
HVC279	1017253	Seam A	257.85	258.12	0.27	63.5	2,090	2,090	2.41	101.4								
HVC280	1017255	Seam A	258.12	258.43	0.31	63.5	2,376	2,374	2.41	100.3	Rubble core; unable to determine length.							
HVC281	1017257	Seam A	258.43	258.83	0.40	63.5	2,568	2,567	2.33	87.0								
HVC282	1017259	Seam A	258.83	258.89	0.06	63.5	426	426	2.32	96.6								
HVC283	1017261	Seam A	258.89	259.01	0.12	63.5	766	766	2.35	85.8								
HVC284	1017263	Seam A	259.01	259.05	0.04	63.5	266	266	2.27	92.2	Rubble core; unable to determine length.							
HVC285	1017265	Seam A	259.05	259.11	0.06	63.5	421	421	2.19	101.2								
HVC286	1017267	Seam A	259.11	259.24	0.13	63.5	700	699	2.26	75.1								
HVC287	1017269	Seam A	259.24	259.39	0.15	63.5	901	899	1.92	98.6								

Shattered core; unable to determine length.

Rubble core; unable to determine length.  
Rubble core; unable to determine length.  
Rubble core; unable to determine length.

Rubble core; unable to determine length.  
Broken core; measureable length 0.13m



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							Start Mass	Air-Dried Mass						
												As-Received	As-Dried	
														grams
			metres	metres	metres	mm		g/cc		%				
HVC288	1017271	Seam A	259.39	259.49	0.10	63.5	461	460	1.96	74.1	Broken core; unable to determine length			
HVC289	1017273	Seam A	259.49	259.53	0.04	63.5	284	284	2.18	102.8	Rubble core; unable to determine length.			
HVC290	1017275	Seam A	259.53	259.63	0.10	63.5	368	368	1.77	65.7	Core length 0.07m			
HVC291	1017277	Seam A	259.63	259.68	0.05	63.5	327	325	2.18	104.6	Rubble core; unable to determine length.			
HVC292	1017279	Seam A	259.68	259.74	0.07	63.5	449	449	2.03	107.4	Broken core; measureable length 0.07m			
HVC293	1017281	Seam A	259.74	259.79	0.05	63.5	276	276	2.02	86.3	Core length 0.06m			
HVC294	1017283	Seam A	259.79	260.29	0.50	63.5	405	404	2.46	10.4				
HVC295	1017285	Seam B1-2	271.80	271.85	0.05	63.5	398	398	2.30	109.3	Broken core; measureable length 0.06m			
HVC296	1017287	Seam B1-2	271.85	272.07	0.22	63.5	1,350	1,348	2.23	86.8				
HVC297	1017289	Seam B1-2	272.07	272.37	0.30	63.5	2,105	2,105	2.24	100.6	Broken core; measureable length 0.06m			
HVC298	1017291	Seam B1-2	272.37	272.56	0.20	63.5	620	620	2.15	46.7				
HVC299	1017293	Seam B1-2	272.56	272.80	0.24	63.5	1,234	1,234	2.19	74.1	Shattered core; unable to determine length.			



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							Start Mass	Air-Dried Mass										
											As-Received	Air-Dried						
													As-Tested	Mixed Bases				
			metres	metres	metres	mm	grams	grams	g/cc	%								
HVC300	1017295	Seam B1-2	272.80	273.04	0.24	63.5	1,239	1,239	1.97	82.7	Shattered core; measureable length 0.26m							
HVC301	1017297	Seam B1-2	273.04	273.40	0.36	63.5	2,359	2,359	2.35	88.0								
HVC302	1017299	Seam B1-2	273.40	273.60	0.20	63.5	1,306	1,306	2.31	89.3								
HVC303	1017301	Seam B1-2	273.60	274.00	0.40	63.5	2,177	2,177	2.19	78.5								
HVC304	1017303	Seam B1-2	274.00	274.29	0.29	63.5	1,476	1,476	1.92	83.7								
HVC305	1017305	Seam B1-2	274.29	275.07	0.78	63.5	5,848	5,847	2.25	105.9	Shattered core; unable to determine length.							
HVC306	1017307	Seam B1-2	275.07	275.80	0.74	63.5	3,146	3,145	2.18	62.0								
HVC307	1017309	Seam B1-2	275.80	275.88	0.08	63.5	487	487	2.00	96.1								
HVC308	1017311	Seam B1-2	275.88	276.47	0.59	63.5	2,980	2,978	2.18	73.1	Shattered core; unable to determine length.							
HVC309	1017313	Seam B1-2	276.47	276.63	0.16	63.5	896	896	1.89	93.6								
HVC310	1017315	Seam B1-2	276.63	277.23	0.60	63.5	3,679	3,678	2.17	89.2								
HVC311	1017317	Seam B1-2	277.23	277.66	0.43	63.5	2,115	2,113	1.74	89.2								



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							Start Mass	Air-Dried Mass							
											As-Received	As-Tested			
			metres	metres	metres	mm	grams	grams	g/cc	%					
HVC312	1017319	Seam B1-2	277.66	278.12	0.46	63.5	2,944	2,943	2.32	87.1	Shattered core; unable to determine length.				
HVC313	1017321	Seam B1-2	278.12	278.49	0.32	63.5	2,103	2,102	2.08	99.7	Shattered core; measurable length 0.34m				
HVC314	1017323	Seam B1-2	278.49	278.54	0.05	63.5	316	316	2.27	97.7					
HVC315	1017325	Seam B3	282.49	282.54	0.05	63.5	342	342	2.35	91.9					
HVC316	1017327	Seam B3	282.54	283.03	0.49	63.5	2,677	2,676	2.11	81.7					
HVC317	1017329	Seam B3	283.03	283.15	0.12	63.5	727	727	1.99	96.1					
HVC318	1017331	Seam B3	283.15	283.45	0.30	63.5	1,504	1,503	2.07	76.4	Shattered core; unable to determine length.				
HVC319	1017333	Seam B3	283.45	283.84	0.39	63.5	2,456	2,454	2.23	89.1					
HVC320	1017335	Seam B3	283.84	283.90	0.06	63.5	466	465	2.48	98.7	Rubble core; unable to determine length.				
HVC321	1017337	Seam C	306.62	306.65	0.03	63.5	196	193	2.08	97.7	Rubble core; unable to determine length.				
HVC322	1017339	Seam C	306.65	306.68	0.03	63.5	171	170	2.01	89.0					
HVC323	1017341	Seam C	306.68	307.10	0.42	63.5	2,135	2,133	2.16	74.2	Rubble core; unable to determine length.				



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							Start Mass	Air-Dried Mass			
									grams	grams	
			metres	metres	metres	mm	grams	grams	g/cc	%	
HVC324	1017343	Seam C	307.10	307.28	0.18	63.5	766	764	1.76	76.2	Rubble core; unable to determine length.
HVC325	1017345	Seam C	307.28	307.46	0.18	63.5	1,262	1,262	2.20	100.6	
HVC326	1017347	Seam C	307.46	307.67	0.21	63.5	965	964	1.66	87.3	
HVC327	1017349	Seam C	307.67	307.91	0.24	63.5	1,462	1,461	2.28	84.3	
HVC328	1017351	Seam C	307.91	307.98	0.07	63.5	503	503	2.31	98.2	
HVC329	1017353	Seam C	307.98	308.16	0.18	63.5	1,029	1,029	1.82	99.2	Rubble core; unable to determine length.
HVC330	1017355	Seam C	308.16	308.28	0.12	63.5	768	768	2.10	96.2	
HVC331	1017357	Seam C	308.28	308.41	0.13	63.5	551	551	1.51	88.6	
HVC332	1017359	Seam C	308.41	308.45	0.04	63.5	283	283	2.18	102.5	Rubble core; unable to determine length.
HVC333	1017361	Seam C	308.45	308.51	0.06	63.5	379	379	1.82	109.6	
HVC334	1017363	Seam C	308.51	308.67	0.16	63.5	744	744	2.31	63.6	
HVC335	1017365	Seam C	308.67	308.77	0.10	63.5	524	524	1.95	84.9	Rubble core; unable to determine length.



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							Start Mass	Air-Dried Mass								
												As-Received	Air-Dried			
														grams	grams	
			metres	metres	metres	mm		g/cc	%							
HVC336	1017367	Seam C	308.77	308.82	0.05	63.5	290	290	2.35	77.9	Broken core; measureable length 0.03m					
HVC337	1017369	Seam C	308.82	308.98	0.16	63.5	889	889	2.15	81.5						
HVC338	1017371	Seam C	308.98	309.68	0.70	63.5	3,614	3,614	1.85	88.0						
HVC339	1017373	Seam C	309.68	309.75	0.07	63.5	544	544	2.38	103.1						
HVC340	1017375	Seam D1	334.11	334.16	0.05	63.5	377	377	2.24	106.0						
HVC341	1017377	Seam D1	334.16	334.28	0.12	63.5	540	540	2.06	68.8						
HVC342	1017379	Seam D1	334.28	334.35	0.07	63.5	314	314	1.53	92.3	Rubble core; unable to determine length.					
HVC343	1017381	Seam D1	334.35	334.48	0.13	63.5	615	615	2.13	70.0	Shattered core; unable to determine length.					
HVC344	1017383	Seam D1	334.48	334.84	0.36	63.5	1,384	1,384	1.44	84.3						
HVC345	1017385	Seam D1	334.84	334.96	0.12	63.5	548	548	2.08	69.3						
HVC346	1017387	Seam D1	334.96	335.06	0.10	63.5	541	541	1.68	101.5	Rubble core; unable to determine length.					
HVC347	1017389	Seam D1	335.06	335.35	0.29	63.5	1,225	1,225	1.42	93.9						



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							Start Mass	Air-Dried Mass			
									grams	grams	
			metres	metres	metres	mm		grams	g/cc	%	
HVC348	1017391	Seam D1	335.35	335.40	0.05	63.5	301	299	2.10	89.9	Broken core; length 0.08m
HVC349	1017393	Seam D2	343.24	343.31	0.07	63.5	527	527	2.35	101.2	
HVC350	1017395	Seam D2	343.31	344.30	0.99	63.5	6,388	6,378	2.41	84.4	Shattered core; unable to determine length.
HVC351	1017397	Seam D2	344.30	344.80	0.50	63.5	2,303	2,300	1.72	84.4	
HVC352	1017399	Seam D2	344.80	344.90	0.10	63.5	565	564	2.20	81.0	Shattered core; unable to determine length.
HVC353	1017401	Seam D2	344.90	344.99	0.090	63.5	709	708	2.39	103.9	
HVC354	1017403	Seam D2	344.99	345.44	0.45	63.5	2,461	2,459	2.12	81.4	Shattered core; unable to determine length.
HVC355	1017405	Seam F3	394.60	394.67	0.07	63.5	516	516	2.27	102.5	
HVC356	1017407	Seam F3	394.67	395.02	0.35	63.5	1,531	1,528	1.58	87.2	Core length 0.08m
HVC357	1017409	Seam F3	395.02	395.07	0.05	63.5	358	358	2.22	101.8	
HVC358	1017411	Seam G1	444.41	444.46	0.05	63.5	336	336	2.50	84.9	Shattered core; unable to determine length.
HVC359	1017413	Seam G1	444.46	444.50	0.04	63.5	249	249	2.24	100.3	





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							Start Mass	Air-Dried Mass			
			metres	metres	metres	mm	grams	grams	g/cc	%	
HVC360	1017415	Seam G1	444.50	445.05	0.56	63.5	3,001	2,999	1.99	85.7	Shattered core; unable to determine length.
HVC361	1017417	Seam G1	445.05	445.13	0.08	63.5	482	480	2.27	83.5	
HVC362	1017419	Seam G1	445.13	445.18	0.05	63.5	268	268	2.58	65.6	
HVC363	1017421	Seam G2-3	449.37	449.42	0.05	63.5	356	356	2.44	92.1	Shattered core; measureable length 0.18m
HVC364	1017423	Seam G2-3	449.42	449.71	0.29	63.5	1,584	1,584	2.27	76.0	
HVC365	1017425	Seam G2-3	449.71	450.30	0.59	63.5	1,978	1,975	1.48	71.4	
HVC366	1017427	Seam G2-3	450.30	450.61	0.31	63.5	1,443	1,440	1.99	73.7	Shattered core; measureable length 0.40m
HVC367	1017429	Seam G2-3	450.61	451.13	0.52	63.5	2,288	2,283	1.51	91.8	
HVC368	1017431	Seam G2-3	451.13	451.30	0.17	63.5	513	511	1.54	61.6	
HVC369	1017433	Seam G2-3	451.30	451.34	0.04	63.5	264	262	2.34	101.0	Shattered core; measureable length 0.11m
HVC370	1017435	Seam H1	460.29	460.33	0.04	63.5	302	302	2.38	100.2	
HVC371	1017437	Seam H1	460.33	460.44	0.11	63.5	541	536	1.96	78.5	



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											As-Received	Air-Dried		
									grams	grams			As-Tested	
			metres	metres	metres	mm			g/cc	%				
HVC372	1017439	Seam H1	460.44	460.46	0.02	63.5	157	156	2.23	110.4	Rubble core: unable to determine length.  Broken core: Length 0.06m  Broken core: measureable length 0.07m			
HVC373	1017441	Seam H1	460.46	460.53	0.07	63.5	377	376	1.97	86.1				
HVC374	1017443	Seam H1	460.53	460.58	0.05	63.5	384	384	2.14	113.3				
HVC375	1017445	Seam H1	460.58	460.74	0.16	63.5	856	855	1.97	85.7				
HVC376	1017447	Seam H1	460.74	460.78	0.04	63.5	262	260	2.43	96.5				
HVC377	1017449	Seam H2	468.03	468.09	0.06	63.5	480	480	2.39	105.7				
HVC378	1017451	Seam H2	468.09	468.33	0.24	63.5	1,427	1,423	2.18	85.9				
HVC379	1017453	Seam H2	468.33	468.44	0.11	63.5	424	423	1.54	78.8				
HVC380	1017455	Seam H2	468.44	468.92	0.48	63.5	2,080	2,074	1.51	90.4				
HVC381	1017457	Seam H2	468.92	468.97	0.05	63.5	325	325	2.33	88.1				



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory  
ABN: 30 008 127 802  
221 Leitchs Road, Brendale, QLD, 4500  
PO Box 5605, Brendale, QLD, 4500  
Tel: (07) 3893 6800 | Fax: (07) 3893 6840  
E-mail: [perc.l@brendale.bureauveritas.com](mailto:perc.l@brendale.bureauveritas.com)



HardRock Coal Mining Pty. Ltd.

VR13

ORIGIN :

DESCRIPTION :

REPORTED TO :

Paul Wootton

BV Reference # :

85042738

Dated Received :

21-Apr-17

Date Reported :

27-Apr-18

## RAW ANALYSIS

VR13

Sample Details										Analysis									
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Core Diameter	Mass		Proximate Analysis				General Analysis				Forms of Sulphur		Report No.
							Start Mass	Air-Dried Mass	Analysis Moisture	Ash	Volatile Matter	Fixed Carbon	Total Sulphur	Calorific Value (Gross, Sulphur Corrected)	Pyritic Sulphur	Sulfate Sulphur	Organic Sulphur		
							As-Received	Air-Dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried		
			metres	metres	metres	mm	grams	grams	%	%	%	%	%	kJ/kg	%	%	%	%	
HVC276	1017248	Seam A	257.33	257.38	0.05	63.5	343	343	0.7	97.3	2.0	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R
HVC277	1017250	Seam A	257.38	257.44	0.06	63.5	468	467	2.0	93.5	3.9	0.6	0.01	0.07	N/R	N/R	N/R	N/R	N/R
HVC278	1017252	Seam A	257.44	257.85	0.41	63.5	2,122	2,121	5.0	85.8	5.9	3.3	0.02	0.74	N/R	N/R	N/R	N/R	N/R
HVC279	1017254	Seam A	257.85	258.12	0.27	63.5	2,090	2,090	2.0	93.7	4.3	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R
HVC280	1017256	Seam A	258.12	258.43	0.31	63.5	2,376	2,374	3.3	91.0	4.9	0.8	0.01	0.22	N/R	N/R	N/R	N/R	N/R
HVC281	1017258	Seam A	258.43	258.83	0.40	63.5	2,568	2,567	5.9	87.4	5.5	1.2	0.02	0.19	N/R	N/R	N/R	N/R	N/R
HVC282	1017260	Seam A	258.83	258.89	0.06	63.5	426	426	8.4	84.1	7.3	0.2	0.02	<0.001	N/R	N/R	N/R	N/R	N/R
HVC283	1017262	Seam A	258.89	259.01	0.12	63.5	766	766	7.0	86.7	5.9	0.4	0.01	<0.001	N/R	N/R	N/R	N/R	N/R
HVC284	1017264	Seam A	259.01	259.05	0.04	63.5	266	266	8.9	82.5	8.1	0.5	0.02	<0.001	N/R	N/R	N/R	N/R	N/R
HVC285	1017266	Seam A	259.05	259.11	0.06	63.5	421	421	9.0	76.3	7.3	7.4	0.07	1.85	N/R	N/R	N/R	N/R	N/R
HVC286	1017268	Seam A	259.11	259.24	0.13	63.5	700	699	10.2	81.9	7.6	0.3	0.01	<0.001	N/R	N/R	N/R	N/R	N/R
HVC287	1017270	Seam A	259.24	259.39	0.15	63.5	901	899	5.6	58.2	4.0	32.2	0.29	10.19	N/R	N/R	N/R	N/R	N/R
HVC288	1017272	Seam A	259.39	259.49	0.10	63.5	461	460	3.0	67.9	2.0	27.1	0.22	8.86	N/R	N/R	N/R	N/R	N/R
HVC289	1017274	Seam A	259.49	259.53	0.04	63.5	284	284	9.3	78.2	6.1	6.4	0.02	1.54	N/R	N/R	N/R	N/R	N/R
HVC290	1017276	Seam A	259.53	259.63	0.10	63.5	368	368	8.3	44.5	4.1	43.1	0.32	14.55	N/R	N/R	N/R	N/R	N/R
HVC291	1017278	Seam A	259.63	259.68	0.05	63.5	327	325	9.6	82.2	6.5	1.7	0.02	0.21	N/R	N/R	N/R	N/R	N/R
HVC292	1017280	Seam A	259.68	259.74	0.07	63.5	449	449	4.5	63.1	2.7	29.7	0.24	9.48	N/R	N/R	N/R	N/R	N/R
HVC293	1017282	Seam A	259.74	259.79	0.05	63.5	276	276	3.8	70.8	3.1	22.3	0.16	6.80	N/R	N/R	N/R	N/R	N/R
HVC294	1017284	Seam A	259.79	260.29	0.50	63.5	405	404	2.9	93.1	3.4	0.6	0.01	0.05	N/R	N/R	N/R	N/R	N/R
HVC295	1017286	Seam B1-2	271.80	271.85	0.05	63.5	398	398	3.3	93.4	3.3	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R
HVC296	1017288	Seam B1-2	271.85	272.07	0.22	63.5	1,350	1,348	6.6	80.7	7.1	5.6	0.02	1.56	N/R	N/R	N/R	N/R	N/R
HVC297	1017290	Seam B1-2	272.07	272.37	0.30	63.5	2,105	2,105	4.4	80.9	5.5	9.2	0.05	2.80	N/R	N/R	N/R	N/R	N/R



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory  
ABN: 30 008 127 802  
221 Leitchs Road, Brendale, QLD, 4500  
PO Box 5805, Brendale, QLD, 4500  
Tel: (07) 3893 6900 | Fax: (07) 3893 6940  
E-mail: [pec@brendale.bv.com](mailto:pec@brendale.bv.com)



ORIGIN : HardRock Coal Mining Pty. Ltd.

DESCRIPTION : VR13

REPORTED TO : Paul Wootton

BV Reference # : 85042738

Dated Received : 21-Apr-17

Date Reported : 27-Apr-18

## RAW ANALYSIS

VR13

Sample Details										Analysis										Report No.
Client Sample Number	Lab Sample Number	Ply Name	Depth From metres	Depth To metres	Thickness metres	Core Diameter mm	Mass		Proximate Analysis				General Analysis			Forms of Sulphur				
							Start Mass grams	Air-Dried Mass grams	Analysis Moisture %	Ash %	Volatile Matter %	Fixed Carbon %	Total Sulphur %	Calorific Value (Gross, Sulphur Corrected) MJ/kg	Pyritic Sulphur %	Sulfate Sulphur %	Organic Sulphur %			
							As-Received	Air-Dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried		
HVC298	1017292	Seam B1+2	272.37	272.56	0.20	63.5	620	620	2.2	74.9	4.1	18.8	0.10	6.37	N/R	N/R	N/R	N/R	N/R	
HVC299	1017294	Seam B1+2	272.56	272.80	0.24	63.5	1,234	1,234	7.8	79.0	6.4	6.8	0.03	2.03	N/R	N/R	N/R	N/R	N/R	
HVC300	1017296	Seam B1+2	272.80	273.04	0.24	63.5	1,239	1,239	7.2	67.8	6.6	18.4	0.10	6.20	N/R	N/R	N/R	N/R	N/R	
HVC301	1017298	Seam B1+2	273.04	273.40	0.36	63.5	2,359	2,359	4.8	88.9	4.8	1.5	0.01	0.43	N/R	N/R	N/R	N/R	N/R	
HVC302	1017300	Seam B1+2	273.40	273.60	0.20	63.5	1,306	1,306	4.1	85.4	4.6	5.9	0.01	1.73	N/R	N/R	N/R	N/R	N/R	
HVC303	1017302	Seam B1+2	273.60	274.00	0.40	63.5	2,177	2,177	6.8	81.2	6.2	5.8	0.01	1.94	N/R	N/R	N/R	N/R	N/R	
HVC304	1017304	Seam B1+2	274.00	274.29	0.29	63.5	1,476	1,476	3.2	62.5	5.3	29.0	0.16	10.41	N/R	N/R	N/R	N/R	N/R	
HVC305	1017306	Seam B1+2	274.29	275.07	0.78	63.5	5,848	5,847	7.1	82.2	6.3	4.4	0.01	1.32	N/R	N/R	N/R	N/R	N/R	
HVC306	1017308	Seam B1+2	275.07	275.80	0.74	63.5	3,146	3,145	6.9	80.5	8.0	4.6	0.01	1.41	N/R	N/R	N/R	N/R	N/R	
HVC307	1017310	Seam B1+2	275.80	275.88	0.08	63.5	487	487	6.4	64.8	7.7	21.1	0.17	7.18	N/R	N/R	N/R	N/R	N/R	
HVC308	1017312	Seam B1+2	275.88	276.47	0.59	63.5	2,980	2,978	6.8	77.6	7.4	8.2	0.01	2.76	N/R	N/R	N/R	N/R	N/R	
HVC309	1017314	Seam B1+2	276.47	276.63	0.16	63.5	896	896	5.6	61.5	7.3	25.6	0.15	9.28	N/R	N/R	N/R	N/R	N/R	
HVC310	1017316	Seam B1+2	276.63	277.23	0.60	63.5	3,679	3,678	7.3	76.5	8.2	8.0	0.02	2.63	N/R	N/R	N/R	N/R	N/R	
HVC311	1017318	Seam B1+2	277.23	277.66	0.43	63.5	2,115	2,113	4.4	49.7	9.6	36.3	0.16	14.25	N/R	N/R	N/R	N/R	N/R	
HVC312	1017320	Seam B1+2	277.66	278.12	0.46	63.5	2,944	2,943	7.3	86.6	6.1	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	
HVC313	1017322	Seam B1+2	278.12	278.49	0.32	63.5	2,103	2,102	6.1	74.2	6.7	13.0	0.07	4.60	N/R	N/R	N/R	N/R	N/R	
HVC314	1017324	Seam B1+2	278.49	278.54	0.05	63.5	316	316	7.0	86.8	6.2	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	
HVC315	1017326	Seam B3	282.49	282.54	0.05	63.5	342	342	8.5	86.8	4.7	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	
HVC316	1017328	Seam B3	282.54	283.03	0.49	63.5	2,677	2,676	5.1	76.1	8.6	10.2	0.09	4.43	N/R	N/R	N/R	N/R	N/R	
HVC317	1017330	Seam B3	283.03	283.15	0.12	63.5	727	727	5.2	71.1	10.9	12.8	0.12	5.99	N/R	N/R	N/R	N/R	N/R	
HVC318	1017332	Seam B3	283.15	283.45	0.30	63.5	1,504	1,503	5.7	74.1	9.4	10.8	0.08	4.90	N/R	N/R	N/R	N/R	N/R	
HVC319	1017334	Seam B3	283.45	283.84	0.39	63.5	2,466	2,454	5.2	80.7	8.1	6.0	0.04	2.71	N/R	N/R	N/R	N/R	N/R	



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory  
ABN: 30 008 127 802  
221 Leitchs Road, Brendale, QLD, 4500  
PO Box 5905, Brendale, QLD, 4500  
Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: [pec.ltbrendale@au.bureauveritas.com](mailto:pec.ltbrendale@au.bureauveritas.com)



ORIGIN : HardRock Coal Mining Pty. Ltd.

DESCRIPTION : VR13

REPORTED TO : Paul Wootton

BV Reference # : 85042738

Dated Received : 21-Apr-17

Date Reported : 27-Apr-18

## RAW ANALYSIS

VR13

Sample Details							Analysis													
Client Sample Number	Lab Sample Number	Ply Name	Depth From metres	Depth To metres	Thickness metres	Core Diameter mm	Mass		Proximate Analysis				General Analysis				Forms of Sulphur			Report No.
							Start Mass	Air-Dried Mass	Analysis Moisture	Ash	Volatile Matter	Fixed Carbon	Total Sulphur	Calorific Value (Gross, Sulphur Corrected)	Pyritic Sulphur	Sulfate Sulphur	Organic Sulphur			
							As-Received	Air-Dried	%	%	%	%	%	MJ/kg	Air-dried	%	Air-dried	%		
HVC320	1017336	Seam B3	283.84	283.90	0.06	63.5	466	465	5.6	83.5	9.4	1.5	0.02	0.75	N/R	N/R	N/R	N/R	N/R	
HVC321	1017338	Seam C	306.62	306.65	0.03	63.5	196	193	11.5	80.5	8.0	0.0	0.03	<0.001	N/R	N/R	N/R	N/R	N/R	
HVC322	1017340	Seam C	306.65	306.68	0.03	63.5	171	170	7.5	60.1	17.4	15.0	0.20	9.51	N/R	N/R	N/R	N/R	N/R	
HVC323	1017342	Seam C	306.68	307.10	0.42	63.5	2,135	2,133	10.5	77.2	9.5	2.8	0.02	1.19	N/R	N/R	N/R	N/R	N/R	
HVC324	1017344	Seam C	307.10	307.28	0.18	63.5	766	764	9.3	52.3	13.8	24.6	0.14	11.26	N/R	N/R	N/R	N/R	N/R	
HVC325	1017346	Seam C	307.28	307.46	0.18	63.5	1,262	1,262	11.6	80.7	7.7	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	
HVC326	1017348	Seam C	307.46	307.67	0.21	63.5	965	964	7.6	45.4	18.7	28.3	0.27	14.37	N/R	N/R	N/R	N/R	N/R	
HVC327	1017350	Seam C	307.67	307.91	0.24	63.5	1,462	1,461	5.3	79.7	11.3	3.7	0.01	1.43	N/R	N/R	N/R	N/R	N/R	
HVC328	1017352	Seam C	307.91	307.98	0.07	63.5	503	503	5.5	81.6	11.0	1.9	0.01	0.85	N/R	N/R	N/R	N/R	N/R	
HVC329	1017354	Seam C	307.98	308.16	0.18	63.5	1,029	1,029	7.5	54.4	14.4	23.7	0.16	10.37	N/R	N/R	N/R	N/R	N/R	
HVC330	1017356	Seam C	308.16	308.28	0.12	63.5	768	768	9.0	80.7	9.6	0.7	0.03	0.22	N/R	N/R	N/R	N/R	N/R	
HVC331	1017358	Seam C	308.28	308.41	0.13	63.5	551	551	6.4	28.2	23.3	42.1	0.37	20.91	N/R	N/R	N/R	N/R	N/R	
HVC332	1017360	Seam C	308.41	308.45	0.04	63.5	283	283	5.1	77.4	12.2	5.3	0.05	2.33	N/R	N/R	N/R	N/R	N/R	
HVC333	1017362	Seam C	308.45	308.51	0.06	63.5	379	379	6.7	51.7	15.2	26.4	0.16	11.77	N/R	N/R	N/R	N/R	N/R	
HVC334	1017364	Seam C	308.51	308.67	0.16	63.5	744	744	6.1	80.5	11.1	2.3	0.02	0.98	N/R	N/R	N/R	N/R	N/R	
HVC335	1017366	Seam C	308.67	308.77	0.10	63.5	524	524	8.7	62.0	12.3	17.0	0.09	6.91	N/R	N/R	N/R	N/R	N/R	
HVC336	1017368	Seam C	308.77	308.82	0.05	63.5	290	290	5.0	82.1	10.9	2.0	0.02	0.82	N/R	N/R	N/R	N/R	N/R	
HVC337	1017370	Seam C	308.82	308.98	0.16	63.5	889	888	5.5	75.3	12.3	6.9	0.06	2.72	N/R	N/R	N/R	N/R	N/R	
HVC338	1017372	Seam C	308.98	309.68	0.70	63.5	3,614	3,611	6.4	57.9	16.7	19.0	0.21	9.43	N/R	N/R	N/R	N/R	N/R	
HVC339	1017374	Seam C	309.68	309.75	0.07	63.5	544	544	4.2	89.2	5.9	0.7	0.02	0.40	N/R	N/R	N/R	N/R	N/R	
HVC340	1017376	Seam D1	334.11	334.16	0.05	63.5	377	376	2.0	95.3	2.7	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	
HVC341	1017378	Seam D1	334.16	334.28	0.12	63.5	540	539	5.0	74.0	11.3	9.7	0.16	5.79	N/R	N/R	N/R	N/R	N/R	



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory  
ABN: 30 008 127 802  
221 Leichs Road, Brendale, QLD, 4500  
PO Box 5905, Brendale, QLD, 4500  
Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: pac.tabrendale@bvu.bureauveritas.com



ORIGIN : HardRock Coal Mining Pty. Ltd.

DESCRIPTION : VR13

REPORTED TO : Paul Wootton

BV Reference # : 85042738

Dated Received : 21-Apr-17

Date Reported : 27-Apr-18

## RAW ANALYSIS

VR13

Sample Details													Analysis										Forms of Sulphur		Report No.
Client Sample Number	Lab Sample Number	Ply Name	Depth From metres	Depth To metres	Thickness metres	Core Diameter mm	Mass		Proximate Analysis				General Analysis												
							Start Mass grams	Air-Dried Mass grams	Analysis Moisture Air-dried	Ash %	Volatile Matter Air-dried	Fixed Carbon Air-dried	Total Sulphur Air-dried	Calorific Value (Gross, Sulphur Corrected) MJ/kg	Pyritic Sulphur Air-dried	Sulfate Sulphur Air-dried									
																	%	%	%	%	%	%	%	%	
HVC342	1017380	Seam D1	334.28	334.35	0.07	63.5	314	313	7.3	28.2	22.4	42.1	0.35	21.23	N/R	N/R	N/R	N/R	N/R	N/R					
HVC343	1017382	Seam D1	334.35	334.48	0.13	63.5	615	614	12.9	78.7	8.4	0.0	0.02	<0.001	N/R	N/R	N/R	N/R	N/R	N/R					
HVC344	1017384	Seam D1	334.48	334.84	0.36	63.5	1,384	1,384	6.6	22.7	23.0	47.7	0.40	23.45	N/R	N/R	N/R	N/R	N/R	N/R					
HVC345	1017386	Seam D1	334.84	334.96	0.12	63.5	548	548	14.7	77.1	8.2	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	N/R					
HVC346	1017388	Seam D1	334.96	335.06	0.10	63.5	541	540	9.6	49.3	17.3	23.8	0.24	12.21	N/R	N/R	N/R	N/R	N/R	N/R					
HVC347	1017390	Seam D1	335.06	335.35	0.29	63.5	1,225	1,225	6.7	23.3	27.7	42.3	0.48	23.07	N/R	N/R	N/R	N/R	N/R	N/R					
HVC348	1017392	Seam D1	335.35	335.40	0.05	63.5	301	299	5.9	77.9	9.8	6.4	0.12	3.85	N/R	N/R	N/R	N/R	N/R	N/R					
HVC349	1017394	Seam D2	343.24	343.31	0.07	63.5	527	527	5.3	89.7	4.9	0.1	0.02	0.08	N/R	N/R	N/R	N/R	N/R	N/R					
HVC350	1017396	Seam D2	343.31	344.30	0.99	63.5	6,388	6,378	5.1	90.1	4.8	0.0	0.02	0.06	N/R	N/R	N/R	N/R	N/R	N/R					
HVC351	1017398	Seam D2	344.30	344.80	0.50	63.5	2,303	2,300	7.3	49.5	18.2	25.0	2.63	13.36	1.95	0.06	0.62	0.62	L124033						
HVC352	1017400	Seam D2	344.80	344.90	0.10	63.5	565	564	4.4	82.3	8.5	4.8	0.13	3.00	N/R	N/R	N/R	N/R	N/R	N/R					
HVC353	1017402	Seam D2	344.90	344.99	0.09	63.5	709	708	4.0	89.3	5.7	1.0	0.03	0.75	N/R	N/R	N/R	N/R	N/R	N/R					
HVC354	1017404	Seam D2	344.99	345.44	0.45	63.5	2,461	2,459	5.8	73.8	9.9	10.5	0.10	5.01	N/R	N/R	N/R	N/R	N/R	N/R					
HVC355	1017406	Seam F3	394.60	394.67	0.07	63.5	516	516	1.8	96.0	2.2	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	N/R					
HVC356	1017408	Seam F3	394.67	395.02	0.35	63.5	1,531	1,528	6.1	38.7	22.7	32.5	0.32	17.58	N/R	N/R	N/R	N/R	N/R	N/R					
HVC357	1017410	Seam F3	395.02	395.07	0.05	63.5	358	358	5.3	85.5	6.3	2.9	0.02	1.35	N/R	N/R	N/R	N/R	N/R	N/R					
HVC358	1017412	Seam G1	444.41	444.46	0.05	63.5	336	336	2.9	90.9	5.2	1.0	0.01	0.49	N/R	N/R	N/R	N/R	N/R	N/R					
HVC359	1017414	Seam G1	444.46	444.50	0.04	63.5	249	249	3.6	80.6	7.7	8.1	0.05	3.43	N/R	N/R	N/R	N/R	N/R	N/R					
HVC360	1017416	Seam G1	444.50	445.05	0.56	63.5	3,001	2,999	5.2	84.3	12.1	18.4	0.14	7.97	N/R	N/R	N/R	N/R	N/R	N/R					
HVC361	1017418	Seam G1	445.05	445.13	0.08	63.5	482	480	4.1	80.8	8.2	6.9	0.06	2.98	N/R	N/R	N/R	N/R	N/R	N/R					
HVC362	1017420	Seam G1	445.13	445.18	0.05	63.5	268	268	3.7	91.3	5.0	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	N/R					
HVC363	1017422	Seam G2-3	449.37	449.42	0.05	63.5	356	356	2.3	93.4	4.3	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	N/R	N/R					



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory  
ABN: 30 008 127 802  
221 Leichs Road, Brendale, QLD, 4500  
PO Box 5905, Brendale, QLD, 4500  
Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: [pec.labrendale@bureauveritas.com](mailto:pec.labrendale@bureauveritas.com)



ORIGIN : HardRock Coal Mining Pty. Ltd.

DESCRIPTION : VR13

REPORTED TO : Paul Wootton

BV Reference # : 85042738

Dated Received : 21-Apr-17

Date Reported : 27-Apr-18

## RAW ANALYSIS

VR13

Sample Details						Analysis													
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Core Diameter	Mass		Proximate Analysis				General Analysis			Forms of Sulphur			Report No.
							Start Mass	Air-Dried Mass	Analysis Moisture	Ash	Volatile Matter	Fixed Carbon	Total Sulphur	Calorific Value (Gross, Sulphur Corrected)	Pyritic Sulphur	Sulfate Sulphur	Organic Sulphur		
							As-Received	Air-Dried	%	Air-dried	%	Air-dried	%	MJ/kg	Air-dried	%	Air-dried		
HVC364	1017424	Seam G2-3	449.42	449.71	0.29	63.5	1,584	1,584	3.0	84.4	7.2	5.4	0.06	2.65	N/R	N/R	N/R	N/R	
HVC365	1017426	Seam G2-3	449.71	450.30	0.59	63.5	1,978	1,975	6.1	26.1	21.1	46.7	0.37	22.08	N/R	N/R	N/R	N/R	
HVC366	1017428	Seam G2-3	450.30	450.61	0.31	63.5	1,443	1,440	6.6	62.5	13.3	17.6	0.13	7.41	N/R	N/R	N/R	N/R	
HVC367	1017430	Seam G2-3	450.61	451.13	0.52	63.5	2,288	2,283	5.5	29.9	21.8	42.8	0.38	20.76	N/R	N/R	N/R	N/R	
HVC368	1017432	Seam G2-3	451.13	451.30	0.17	63.5	513	511	5.9	40.4	23.1	30.6	0.34	16.77	N/R	N/R	N/R	N/R	
HVC369	1017434	Seam G2-3	451.30	451.34	0.04	63.5	264	262	3.5	89.6	5.9	1.0	0.01	0.45	N/R	N/R	N/R	N/R	
HVC370	1017436	Seam H1	460.29	460.33	0.04	63.5	302	302	2.6	92.5	4.8	0.1	0.01	0.09	N/R	N/R	N/R	N/R	
HVC371	1017438	Seam H1	460.33	460.44	0.11	63.5	541	536	4.4	65.7	12.8	17.1	0.13	8.08	N/R	N/R	N/R	N/R	
HVC372	1017440	Seam H1	460.44	460.46	0.02	63.5	157	155	4.3	83.1	8.5	4.1	0.03	1.75	N/R	N/R	N/R	N/R	
HVC373	1017442	Seam H1	460.46	460.53	0.07	63.5	377	376	6.5	64.0	15.4	14.1	0.17	7.38	N/R	N/R	N/R	N/R	
HVC374	1017444	Seam H1	460.53	460.58	0.05	63.5	384	384	5.6	75.2	11.2	8.0	0.07	3.55	N/R	N/R	N/R	N/R	
HVC375	1017446	Seam H1	460.58	460.74	0.16	63.5	856	855	6.3	66.0	12.4	15.3	0.17	6.85	N/R	N/R	N/R	N/R	
HVC376	1017448	Seam H1	460.74	460.78	0.04	63.5	262	260	4.6	85.7	8.7	1.0	0.01	0.28	N/R	N/R	N/R	N/R	
HVC377	1017450	Seam H2	468.03	468.09	0.06	63.5	480	480	3.2	92.3	4.5	0.0	0.01	<0.001	N/R	N/R	N/R	N/R	
HVC378	1017452	Seam H2	468.09	468.33	0.24	63.5	1,427	1,423	5.3	74.9	11.2	8.6	0.07	3.61	N/R	N/R	N/R	N/R	
HVC379	1017454	Seam H2	468.33	468.44	0.11	63.5	424	423	5.7	32.1	26.5	35.7	0.47	20.21	N/R	N/R	N/R	N/R	
HVC380	1017456	Seam H2	468.44	468.92	0.48	63.5	2,080	2,074	5.2	29.7	22.1	43.0	0.40	21.16	N/R	N/R	N/R	N/R	
HVC381	1017458	Seam H2	468.92	468.97	0.05	63.5	325	325	3.5	88.9	6.0	1.6	0.03	0.76	N/R	N/R	N/R	N/R	



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory  
ABN: 30 008 127 802  
221 Leitchs Road, Brendale, QLD, 4500  
PO Box 5805, Brendale, QLD, 4500  
Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: pac.itabrendale@au.bureauveritas.com



**ORIGIN :** HardRock Coal Mining Pty, Ltd.  
**DESCRIPTION :** VR13  
**REPORTED TO :** Paul Woolton  
**BV Reference # :** 85042738  
**Dated Received :** 21-Apr-17  
**Date Reported :** 27-Apr-18

## WASHABILITY VR13

Sample Details										Analysis									
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Stage	Sink / Froth # Fraction	Float / Froth Fraction	Fractional				Cumulative						
									Mass		Analysis		Mass		Analysis				
									Mass	Mass	Ash	Total Sulfur	Mass	Mass	Ash	Total Sulfur			
									As-Tested	As-Tested	Air-dried	Air-dried	As-Tested	As-Tested	Air-dried	Air-dried			
									grams	%	%	%	grams	%	%	%			
HVC338	1148831	Seam C	308.98	309.70	0.72	Start mass Float sink		1.40 1.50 1.60 1.70 1.80 1.90	2,793.0 14.0 6.0 49.0 250.0 264.0 897.0 1,288.0	0.5 0.2 1.8 9.0 9.5 32.1 47.0	8.1 19.0 35.7 42.3 50.7 57.4 65.0	N/R N/R N/R N/R N/R N/R N/R	0.5 0.7 2.5 11.4 20.9 53.0 100.0	8.1 11.4 28.6 39.3 44.5 52.3 58.3	N/R N/R N/R N/R N/R N/R N/R				





ABN: 30 008 127 802  
221 Leitchs Road, Brendale, QLD, 4500  
PO Box 5805, Brendale, QLD, 4500

Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: [pac.itabrendale@au.bureauveritas.com](mailto:pac.itabrendale@au.bureauveritas.com)

BUREAU  
VERITAS

**ORIGIN :** HardRock Coal Mining Pty. Ltd.

**DESCRIPTION :**

**REPORTED TO:**

BV Reference # : 85042738

**Dated Received :** 21-Apr-17

Date Reported : 27-Apr-18

## WASHABILITY

## VR13

Sample Details										Analysis									
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Stage	Sink / Froth # Fraction	Float / Froth Fraction	Fractional						Cumulative				
									Mass			Analysis			Mass		Analysis		
									Mass	Mass	Mass	Ash	Ash	Total Sulfur	Mass	Mass	Ash	Ash	
									As-Tested	As-Tested	As-Tested	As-Tested	As-Tested	As-Tested	As-Tested	As-Tested	As-Tested	As-Tested	
									grams	%	%	%	%	%	grams	%	%	%	
HVC342-347	1043962	Seam D1	334.28	335.35	1.07	Start mass Float sink		1.40	2,713.0	541.0	19.9	13.2	N/R	541.0	19.9	13.2	N/R		
							1.40	1.50	611.0	22.5	21.4	N/R	N/R	1,152.0	42.5	17.5	N/R		
							1.50	1.60	255.0	9.4	32.1	N/R	N/R	1,407.0	51.9	20.2	N/R		
							1.60	1.70	233.0	8.6	36.7	N/R	N/R	1,640.0	60.4	22.5	N/R		
							1.70	1.80	71.0	2.6	46.0	N/R	N/R	1,711.0	63.1	23.5	N/R		
							1.80	1.90	62.0	2.3	52.2	N/R	N/R	1,773.0	65.4	24.5	N/R		
							1.90		930.0	34.6	75.5	N/R	N/R	2,703.0	100.0	42.2	N/R		



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### WASHABILITY VR13

Sample Details						Analysis										
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Stage	Sink / Froth # Fraction	Float / Froth Fraction	Fractional				Cumulative			
									Mass		Analysis		Mass		Analysis	
									Mass	Mass	Ash	Total Sulfur	Mass	Mass	Ash	Total Sulfur
									As-Tested	As-Tested	Air-dried	Air-dried	As-Tested	As-Tested	Air-dried	Air-dried
			metres	metres	metres				grams	%	%	%	grams	%	%	%
HVC365-368	1043971	Seam G2-3	449.71	451.30	1.59	Start mass		1.40	3,750.0	23.1	12.6	N/R	867.0	23.1	12.6	N/R
						Float sink	1.40	1.50	867.0	18.3	17.5	N/R	1,553.0	41.4	14.8	N/R
							1.50	1.60	471.0	12.6	27.3	N/R	2,024.0	54.0	17.7	N/R
							1.60	1.70	392.0	10.5	37.5	N/R	2,416.0	64.4	20.9	N/R
							1.70	1.80	281.0	7.5	44.1	N/R	2,697.0	71.9	23.3	N/R
							1.80	1.90	160.0	4.3	51.3	N/R	2,857.0	76.2	24.9	N/R
							1.90		893.0	23.8	73.9	N/R	3,750.0	100.0	36.6	N/R



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory  
ABN: 30 008 127 802  
221 Leitchs Road, Brendale, QLD, 4500  
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Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: pac.itabrendale@au.bureauveritas.com



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**WASHABILITY**  
**VR13**

Sample Details						Analysis														
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Stage	Sink / Froth # Fraction	Float / Froth Fraction	Fractional				Cumulative							
									Mass		Analysis		Mass		Analysis					
									Mass	Mass	Ash	Total Sulfur	Mass	Mass	Ash	Total Sulfur				
									As-Tested	As-Tested	Air-dried	Air-dried	As-Tested	As-Tested	Air-dried	Air-dried				
			metres	metres	metres				grams	%	%	%	grams	%	%	%	grams	%	%	%
HVC351	1211192	Seam D2	344.30	344.80	0.50	Start mass		1.40	1,776.0	1.7	13.0	0.50	31.0	1.7	13.0	0.50	31.0	1.7	13.0	0.50
						Float sink	1.40	1.50	108.0	6.1	20.2	0.46	139.0	7.8	18.6	0.47	139.0	7.8	18.6	0.47
							1.50	1.60	277.0	15.6	35.1	0.41	416.0	23.4	29.6	0.43	416.0	23.4	29.6	0.43
							1.60	1.70	498.0	28.0	41.9	0.31	914.0	51.5	36.3	0.36	914.0	51.5	36.3	0.36
							1.70	1.80	181.0	10.2	51.1	0.32	1,095.0	61.7	38.7	0.36	1,095.0	61.7	38.7	0.36
							1.80		665.0	38.3	63.5	5.39	1,760.0	100.0	48.2	2.29	1,760.0	100.0	48.2	2.29



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PO Box 5805, Brendale, QLD, 4500

Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: [pac.itabrendale@au.bureauveritas.com](mailto:pac.itabrendale@au.bureauveritas.com)



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## RAW COAL COMPOSITE

VR13

Sample Details						Analysis						
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Proximate Analysis			General Analysis			
						Analysis Moisture	Ash	Volatile Matter	Fixed Carbon	Total Sulphur	Calorific Value (Gross, Sulphur Corrected)	Chlorine
						Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried
						%	%	%	%	%	MJ/Kg	%
HVC338	1017372	Seam C	308.98	309.68	0.70	6.4	57.9	16.7	19.0	0.21	9.43	<0.01
HVC342-347	1043970	Seam D1	334.28	335.35	1.07	9.3	42.6	18.9	29.2	0.28	15.01	0.01
HVC365-368	1043979	Seam G2-3	449.71	451.30	1.59	5.9	37.6	20.0	36.5	0.31	17.60	<0.01



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Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: [pac.itabrendale@au.bureauveritas.com](mailto:pac.itabrendale@au.bureauveritas.com)



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## CLEAN COAL COMPOSITE

### VR13

Sample Details						Analysis					
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Proximate Analysis			General Analysis		
						Analysis Moisture	Ash	Volatile Matter	Fixed Carbon	Total Sulphur	Calorific Value (Gross, Sulphur Corrected)
						Air-dried	Air-dried	Air-dried	Air-dried	Air-dried	Air-dried
						%	%	%	%	%	MJ/Kg
HVC342-347	1060713	Seam D1	334.28	335.35	1.07	6.4	23.8	24.3	45.5	0.44	23.09
HVC365-368	1060714	Seam G2-3	449.71	451.30	1.59	5.5	23.6	22.4	48.5	0.40	23.31



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ABN: 30 008 127 802  
221 Leitchs Road, Brendale, QLD, 4500  
PO Box 5805, Brendale, QLD, 4500

Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: pac.itabrendale@au.bureauveritas.com



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## CLEAN COAL COMPOSITE

### VR13

Sample Details			Analysis														
Client Sample Number	Lab Sample Number	Ply Name	Ash Analysis														
			SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	CaO	MgO	Na <sub>2</sub> O	K <sub>2</sub> O	TiO <sub>2</sub>	Mn <sub>3</sub> O <sub>4</sub>	P <sub>2</sub> O <sub>5</sub>	SO <sub>3</sub>	BaO	SrO	ZnO	
			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
			%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
HVC342-347	1060713	Seam D1	67.0	18.4	7.0	2.47	1.64	0.40	0.65	0.68	0.08	<0.02	0.88	<0.02	0.06	<0.02	
HVC365-368	1060714	Seam G2-3	59.6	30.9	2.86	1.71	0.73	0.51	0.65	1.01	0.03	0.04	0.24	0.09	0.05	<0.02	



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221 Leitchs Road, Brendale, QLD, 4500  
PO Box 5805, Brendale, QLD, 4500

Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: pac.ltabrendale@au.bureauveritas.com



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**CLEAN COAL COMPOSITE**  
**VR13**

Sample Details			Analysis			
Client Sample Number	Lab Sample Number	Ply Name	Ash Fusion Temperatures - Reducing Atmosphere			
			Deformation	Spherical	Hemispherical	Flow
			As-Tested °C	As-Tested °C	As-Tested °C	As-Tested °C
HVC342-347	1060713	Seam D1	1300	1320	1330	1430
HVC365-368	1060714	Seam G2-3	>1560	>1560	>1560	>1560



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221 Leitchs Road, Brendale, QLD, 4500  
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E-mail: [pac.itabrendale@au.bureauveritas.com](mailto:pac.itabrendale@au.bureauveritas.com)

**BUREAU  
VERITAS**

HardRock Coal Mining Pty. Ltd.

**DESCRIPTION :**

VR13

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## CLEAN COAL COMPOSITE

**VR13**

Sample Details					Analysis														
Client Sample Number	Lab Sample Number	Ply Name	Depth From	Depth To	Thickness	Trace Elements - Major Concern								Trace Elements - Moderate Concern					
						As	B	Cd	Pb	Hg	Mo	Se	Cr	Cu	F	Ni	V	Zn	
						Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	
					metres	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres
HVC342-347	1060713	Seam D1	334.28	335.35	1.07	0.4	13	0.07	22	0.03	<2	0.2	11	15	130	9	18	20	
HVC365-368	1060714	Seam G2-3	449.71	451.30	1.59	0.6	15	0.27	38	0.05	<2	0.4	8	10	75	7	20	42	



**ORIGIN :**

HardRock Coal Mining Pty. Ltd.

**DESCRIPTION :**

VR13

**REPORTED TO :**

Paul Wootton

BV Reference #: 85042738

**Dated Received :** 21-Apr-17

Date Reported : 27-Apr-18

## CLEAN COAL COMPOSITE

## VR13

Analysis																			
Sample Details				Trace Elements - Minor Concern															
Client Sample Number	Lab Sample Number	Ply Name	Sb	Ba	Be	Bi	Ce	Cs	Co	Ga	Ge	In	La	Mn	Nb	Sc	Ag	Sr	
			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
HVC342-347	1060713	Seam D1	0.9	30	5	0.84	51.7	2.7	13	15.3	<20	0.08	12	10	150	8.6	0.46	110	
HVC365-368	1060714	Seam G2-3	1.5	48	4	1.2	130	1.5	4	19.7	<20	0.12	30	22	56	13	0.35	100	



Bureau Veritas Minerals Pty Ltd  
Brisbane Exploration Laboratory  
ABN: 30 008 127 802  
221 Leichs Road, Brendale, QLD, 4500  
PO Box 5805, Brendale, QLD, 4500  
Tel: (07) 3883 6800 | Fax: (07) 3883 6840  
E-mail: pac.itabrendale@au.bureauveritas.com



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**DESCRIPTION :** VR13  
**REPORTED TO :** Paul Wootton  
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**CLEAN COAL COMPOSITE**  
**VR13**

Sample Details			Analysis								
Client Sample Number	Lab Sample Number	Ply Name	Trace Elements - Minor Concern						Trace Elements - Radioactive		
			Ta	Te	Tl	Sn	W	Y	Zr	Th	U
			Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
			ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
HVC342-347	1060713	Seam D1	1	0.2	<0.01	2.9	2.6	20	120	16.4	4.2
HVC365-368	1060714	Seam G2-3	1	0.28	<0.01	4.2	1.9	33	160	24.4	6.5



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#### LISTING OF BRISBANE LABORATORY'S ACCREDITED COAL METHODS

The analyses reported herein have been performed according to the appropriate Standard listed below

Standard	Test Method	Standard	Test Method
AS 1038.1 (2001)	Total Moisture	BS 1016 Part 1	Total Moisture
AS 1038.3 (2000)	Proximate Analysis	BS 1016 Part 6	Total Sulphur
AS 1038.5 (1998)	Gross Calorific Value	BS 1016 Part 8	Chlorine
AS 1038.6.3.3	Total Sulfur	BS 1016 Part 104.1	Moisture in Sample
AS 1038.6.4	Carbon, Hydrogen, Nitrogen	BS 1016 Part 104.3	Volatile Matter
AS 1038.8.1	Chlorine	BS 1016 Part 104.4	Ash
AS 1038.12.1 (2002)	Crucible Swelling Number	BS 1016 Part 105	Gross Calorific Value
AS 1038.12.2	Gray King	BS 1016 Part 107.1	Crucible Swelling Number
AS 1038.12.3 (2002)	Dilatation	BS 1016 Part 107.2	Gray King
AS 1038.12.4.1 (1995)	Plasticity	BS 1016 Part 109	Size Analysis
AS 1038.13 (1990)	Methods for the Analysis and Testing of Coal and Coke – Tests Specific	BS 1017	Sampling
AS 1038.15 (1995)	Ash Fusibility	ASTM D409	Hardgrove Grindability Index
AS 1038.17	Moisture Holding Capacity - Higher Rank	ASTM D440	Drop Shatter
AS 1038.20	Hardgrove Grindability Index	ASTM D441	Drum Tumble
AS 1038.21.1.1	Relative Density	ASTM D720	Crucible Swelling Number
AS 1038.21.1.2	Relative Density	ASTM D1412	Equilibrium Moisture
AS 1038.23	Carbonate Carbon	ASTM D1756	Carbonate carbon
AS 1038.26	Apparent Relative Density	ASTM D1857	Ash Fusibility
AS 2267 (1997)	Guide to the Conduct of Pilot Coke Oven Tests (Coke Making)	ASTM D2639	Plasticity
AS 2434.3	Moisture Holding Capacity - Lower Rank	ASTM D2961	Single Stage Total Moisture
AS 3881 (2002)	Size Analysis	ASTM D3172	Proximate
AS 4156.1	Float Sink Testing	ASTM D3173	Proximate Moisture
AS 4156.2.1	Froth Flotation - Basic	ASTM D3174	Proximate Ash
AS 4156.2.2	Froth Flotation - Sequential	ASTM D3302	Total Moisture
AS 4156.8	Drop shatter	ASTM D4239 (B)	Total Sulfur
AS 4264.1	Sampling	ASTM D4749	Sieve Analysis
AS 4264.4	Sampling - Precision and bias	ASTM D5061	Total Sulfur
AS 4264.5	Sampling - Inspection of mechanical systems	ASTM D5341 (2010)	Measuring Coke Reactivity Index (CRI) and Coke Strength after Reaction (CSR)
ISO 501	Crucible Swelling Number	ASTM D5373	Carbon, Hydrogen, Nitrogen
ISO 502	Gray King	ASTM D5865	Gross Calorific Value
ISO 540	Ash Fusibility	ASTM D2013	Preparing Coal Sample for Analysis
ISO 556	Determination of mechanical strength	ASTM D2234	Collection of Gross Sample
ISO 562	Proximate, Volatile Matter	Note the following tests were performed at Bureau Veritas Minerals Laboratories Ltd - Cardiff Laboratory (NATA accreditation no.: 626)	
ISO 579	Total Moisture	AS 1038.14.3	Ash Composition Analysis by XRF
ISO 587	Chlorine	AS 1038.10	Trace elements (Aluminium; barium; calcium; chromium; copper; iron; magnesium; manganese; nickel; phosphorus; potassium; silicon; sodium; strontium; titanium; vanadium; zinc) by XRF
ISO 589 (B & C)	Total Moisture	AS 1038.10	Trace elements (Antimony; arsenic; selenium) by AES/ICP (Hydride generation)
ISO 925	Carbonate Carbon	AS 1038.10	Trace elements (Barium; beryllium; boron; cobalt; lithium; molybdenum) by AES/ICP
ISO 1171	Proximate, Ash	AS 1038.10	Trace elements (Cadmium; lead) by AAS (graphite furnace)
ISO 1928	Gross Calorific Value	AS 1038.10	Trace elements (Fluorine) by ISE
ISO 1953	Size Analysis	AS 1038.10	Trace elements (Mercury) by AAS (Vapour generation)
ISO 5074	Hardgrove Grindability Index		
ISO 8264	Dilatation		
ISO 11722	Proximate, Moisture		
ISO 19579	Total Sulfur		
ISO 10329	Dilatation		
ISO 17246	Proximate analysis - fixed carbon		
ISO 19579	Total Sulfur		
ISO 13909.1	Mechanical Sampling – General		
ISO 13909.2	Mechanical Sampling - Moving streams		
ISO 13909.3	Mechanical Sampling - Stationary lots		
ISO 13909.4	Mechanical Sampling - Preparation of samples		
ISO 18283	Manual Sampling		
ISO 18894	Determination of Coke Reactivity Index (CRI) and Coke Strength after Reaction (CSR)		
ISO 23873	Dilatation		

TEXT SUBSTITUTIONS		
TEST	AS ANALYSED (BY REPORT)	MODIFIED RESULT (THIS REPORT)
Crucible Swelling Number	Greater than 9 (>9)	>9
Ash Fusion	Greater than 1560 (> 1560)	>1560
Gieseler Plastometer	No Fluidity (0)	NF
Ash Analysis	nd	< 0 (where 0 is the relevant detection limit)
Trace Elements	nd	< 0 (where 0 is the relevant detection limit)
Forms of Sulfur	nd	< 0 (where 0 is the relevant detection limit)
ABBREVIATIONS		
All Tests (where applicable)	I/S	Insufficient Sample
All Tests (where applicable)	N/R	Not Required
Dilatation	CO	Contraction Only