



Berrima Colliery in Medway POELA Act 2011 Monitoring Data - 2017

Berrima Colliery, Medway, NSW Environmental Protection Licence Number 608, held by Boral Limited

Explanation of units of measure:

- mg/m³ = milligrams per cubic metre
- g/m²/month = grams per square metre per month
- µg/m³ = micrograms per cubic metre
- mg/L = milligrams per litre
- ML/d = megalitres per day

Record updated on: **11 September 2017**

1. Water monitoring

Berrima Colliery has two licensed discharge points and four ambient background monitoring points:

Discharge Points:

- Mine Adit - Naturally occurring groundwater is captured in the underground workings and is discharged into the Wingecarribee River. The monitoring point is referred to as the V Notch Weir (Licence Point 4).
- Pit Top Dam – Referred to as the Chitter Dam, this dam collects water runoff from the surface facilities area. This dam did not discharge during the reporting period.

Ambient background monitoring points:

- Wingecarribee River upstream of the mine adit discharge at Old Hume Highway Crossing at Berrima (Licence Point 9).
- Wingecarribee River upstream of the mine adit discharge at Macarthur's Crossing (Licence Point 10).
- Wingecarribee River downstream of the mine adit discharge at Biloela Camp Site (Licence Point 11).
- Wingecarribee River downstream of mine adit discharge at Black Bob's confluence (Licence Point 12).

Ambient monitoring points provide background data for reference purposes and were added to the licence on 23 December 2013 along with additional monitoring parameters for the discharge points. The licence was amended on 9th October 2015. The changes relate to a reduction in frequency of monitoring to two-monthly for the licensed discharge points and the ambient background monitoring locations

in the Wingecarribee River, as well as a reduction in the parameters required to be monitored.

Licence limits for both discharge points are as follows:

- pH: 6.5-8.5
- Oil and Grease: 10 mg/L
- Total Suspended Solids: 50 mg/L

Table 1 shows the results of parameters for Licence Point 4 for which the licence limits apply as listed above.

Table 2 provides the data for the new monitoring parameters added to the Licence Point 4 while Table 3 presents new ambient water monitoring data. No concentration limits were assigned to any of these new parameters.

Table 1 – Discharge Monitoring Data (Licence Point 4)

Sampling Date	Report received	Date published	pH	Oil and Grease (mg/L)	Total Suspended Solids (mg/L)
23/01/17	03/02/17	6/02/17	6.72	<5	24
31/03/17	08/05/17	5/06/17	6.83	<5	7
30/05/17	06/06/17	4/07/17	6.71	<5	9
04/07/17	07/08/17	8/08/17	6.80	<5	9

Note: values noted as <5 means that the levels were below laboratory detection limits.
Compliance summary: Discharge within the licence limits.

Table 2 – Additional Monitoring Parameters for Licence Point 4

Parameter	Date Sampled: 23/01/17 Report Received: 03/02/17 Date Published: 06/02/17	Date Sampled: 31/03/17 Report Received: 08/05/17 Date Published: 05/06/17	Date Sampled: 30/05/17 Report Received: 06/06/17 Date Published: 04/07/17	Date Sampled: 04/07/17 Report Received: 07/08/17 Date Published: 08/08/17
pH	6.72	6.83	6.71	6.80
Electrical conductivity	1030	1100	960	997
Total Suspended Solids	24	7	9	9
Sulphate	333	323	332	310
Chloride	52	59	59	58
Cobalt (dissolved)	0.147	0.135	0.134	0.139
Copper (dissolved)	<0.001	<0.001	<0.001	<0.001
Manganese (dissolved)	10.9	10.4	11.2	11.3
Nickel (dissolved)	0.421	0.367	0.393	0.414
Zinc (dissolved)	1.25	0.678	0.684	0.731
Iron (dissolved)	9.13	0.73	6.28	13.3
Oil and Grease	<5	<5	<5	<5
Dissolved oxygen	10.1	8.6	8.8	9.6

Units measured in milligrams per litre unless otherwise specified.

Table 3 –Ambient Water Monitoring Data

Date Sampled: 31 January 2017

Report Received: 7 February 2017

Date Published: 8 March 2017

Parameter	Berrima (Licence Point 9)	Macarthur's Crossing (Licence Point 10)	Biloela (Licence Point 11)	Black Bobs Creek (Licence Point 12)
pH	7.95	7.57	7.67	7.66
Electrical conductivity	393	301	577	586
Suspended Solids	8	<5	<5	8
Sulphate	29	11	126	114
Chloride	49	44	49	50
Cobalt	<0.001	<0.001	<0.001	<0.001
Copper (dissolved)	<0.001	<0.001	0.005	<0.001
Manganese (dissolved)	0.004	0.022	0.312	0.268
Nickel (dissolved)	<0.001	<0.001	0.006	0.004
Zinc (dissolved)	<0.005	<0.005	<0.005	<0.005
Iron (dissolved)	0.08	0.16	0.10	0.10

Units measured in milligrams per litre unless otherwise specified.

Table 3 –Ambient Water Monitoring Data - Continued

Date Sampled: 28 March 2017

Report Received: 6 April 2017

Date Published: 5 May 2017

Parameter	Berrima (Licence Point 9)	Macarthur's Crossing (Licence Point 10)	Biloela (Licence Point 11)	Black Bobs Creek (Licence Point 12)
pH	7.55	7.61	7.51	7.60
Electrical conductivity	161	168	186	189
Suspended Solids	13	24	6	<5
Sulphate	5	5	9	9
Chloride	19	20	22	22
Cobalt	<0.001	<0.001	0.001	<0.001
Copper (dissolved)	0.002	0.002	0.002	0.002
Manganese (dissolved)	0.027	0.046	0.124	0.111
Nickel (dissolved)	0.001	0.001	0.006	0.006
Zinc (dissolved)	0.005	<0.005	0.011	0.011
Iron (dissolved)	0.47	0.49	0.51	0.47

Units measured in milligrams per litre unless otherwise specified.

Table 3 –Ambient Water Monitoring Data - Continued

Date Sampled: 30 May 2017
 Report Received: 6 June 2017
 Date Published: 4 July 2017

Parameter	Berrima (Licence Point 9)	Macarthur's Crossing (Licence Point 10)	Biloela (Licence Point 11)	Black Bobs Creek (Licence Point 12)
pH	7.98	7.90	7.81	7.59
Electrical conductivity	213	222	312	302
Suspended Solids	7	6	6	<5
Sulphate	18	13	35	36
Chloride	33	33	37	36
Cobalt	<0.001	<0.001	<0.001	<0.001
Copper (dissolved)	0.001	<0.001	<0.001	<0.001
Manganese (dissolved)	0.036	0.006	0.078	0.064
Nickel (dissolved)	<0.001	<0.001	0.012	0.009
Zinc (dissolved)	0.038	0.034	0.046	0.044
Iron (dissolved)	0.74	0.56	0.52	0.42

Units measured in milligrams per litre unless otherwise specified.

Table 3 –Ambient Water Monitoring Data - Continued

Date Sampled: 3 August 2017
 Report Received: 17 August 2017
 Date Published: 11 September 2017

Parameter	Berrima (Licence Point 9)	Macarthur's Crossing (Licence Point 10)	Biloela (Licence Point 11)	Black Bobs Creek (Licence Point 12)
pH	7.69	7.82	7.67	7.67
Electrical conductivity	203	222	315	251
Suspended Solids	48	17	7	6
Sulphate	15	10	44	42
Chloride	34	35	38	37
Cobalt	<0.001	<0.001	0.001	<0.001
Copper (dissolved)	<0.001	<0.001	<0.001	<0.001
Manganese (dissolved)	0.006	0.006	0.212	0.081
Nickel (dissolved)	<0.001	<0.001	0.020	0.013
Zinc (dissolved)	<0.005	<0.005	0.021	0.014
Iron (dissolved)	0.24	0.29	0.21	0.29

Units measured in milligrams per litre unless otherwise specified.

2. Water Volume

The volume of water discharged from the mine is recorded at the V Notch Weir and summarised as follows:

Table 4 - V Notch Weir Discharge Volume Data

Data obtained on	Data published on	Volume discharged (ML/d)
19-Dec-2016	6/02/17	2.22
20-Dec-2016		2.29
21-Dec-2016		2.07
22-Dec-2016		1.91
23-Dec-2016		1.98
24-Dec-2016		2.05
25-Dec-2016		1.92
26-Dec-2016		1.9
27-Dec-2016		1.86
28-Dec-2016		1.85
29-Dec-2016		1.84
30-Dec-2016		1.81
31-Dec-2016		1.8
1-Jan-2017		1.79
2-Jan-2017		1.92
3-Jan-2017		1.89
4-Jan-2017		1.98
5-Jan-2017		2.11
6-Jan-2017		2.12
7-Jan-2017		2.1
8-Jan-2017		2.11
9-Jan-2017	1.93	
10-Jan-2017	1.88	
11-Jan-2017	2.03	
12-Jan-2017	1.92	
13-Jan-2017	1.96	
14-Jan-2017	1.95	
15-Jan-2017	1.91	
16-Jan-2017	2.02	
17-Jan-2017	2.11	
18-Jan-2017	2.15	
19-Jan-2017	2.28	
20-Jan-2017	2.65	
21-Jan-2017	2.15	



Data obtained on	Data published on	Volume discharged (ML/d)	
22-Jan-2017	6/2/17	2.14	
23-Jan-2017		2.22	
24-Jan-2017		2.31	
25-Jan-2017		2.4	
26-Jan-2017		2.62	
27-Jan-2017		2.57	
28-Jan-2017		2.55	
29-Jan-2017		2.55	
30-Jan-2017		8/3/17	2.49
31-Jan-2017	2.43		
1-Feb-2017	2.43		
2-Feb-2017	2.5		
3-Feb-2017	2.39		
4-Feb-2017	2.36		
5-Feb-2017	2.35		
6-Feb-2017	2.39		
7-Feb-2017	2.29		
8-Feb-2017	2.33		
9-Feb-2017	2.75		
10-Feb-2017	2.5		
11-Feb-2017	2.4		
12-Feb-2017	2.52		
13-Feb-2017	2.36		
14-Feb-2017	2.26		
15-Feb-2017	2.44		
16-Feb-2017	2.48		
17-Feb-2017	2.48		
18-Feb-2017	2.52		
19-Feb-2017	2.62		
20-Feb-2017	2.43		
21-Feb-2017	2.35		
22-Feb-2017	2.52		
23-Feb-2017	2.48		
24-Feb-2017	2.55		
25-Feb-2017	2.63		
26-Feb-2017	2.64		
27-Feb-2017	4/4/17		2.56
28-Feb-2017			2.63
1-Mar-2017		2.67	
2-Mar-2017		2.74	
3-Mar-2017		2.68	
4-Mar-2017	2.73		



Data obtained on	Data published on	Volume discharged (ML/d)	
5-Mar-2017	4/4/17	2.85	
6-Mar-2017		2.71	
7-Mar-2017		2.74	
8-Mar-2017		2.83	
9-Mar-2017		2.86	
10-Mar-2017		2.88	
11-Mar-2017		2.79	
12-Mar-2017		2.72	
13-Mar-2017		2.52	
14-Mar-2017		2.38	
15-Mar-2017		2.57	
16-Mar-2017		2.9	
17-Mar-2017		2.73	
18-Mar-2017		2.69	
19-Mar-2017		2.88	
20-Mar-2017		2.78	
21-Mar-2017		2.74	
22-Mar-2017		2.69	
23-Mar-2017		2.63	
24-Mar-2017		2.68	
25-Mar-2017		2.87	
26-Mar-2017		2.8	
27-Mar-2017		5/6/17	2.74
28-Mar-2017			2.84
29-Mar-2017			2.43
30-Mar-2017			2.43
31-Mar-2017	2.26		
1-Apr-2017	2.22		
2-Apr-2017	2.06		
3-Apr-2017	2.23		
4-Apr-2017	2.4		
5-Apr-2017	2.59		
6-Apr-2017	2.6		
7-Apr-2017	2.42		
8-Apr-2017	2.6		
9-Apr-2017	2.98		
10-Apr-2017	2.91		
11-Apr-2017	2.33		
12-Apr-2017	2.22		
13-Apr-2017	2.41		
14-Apr-2017	2.65		
15-Apr-2017	2.65		



Data obtained on	Data published on	Volume discharged (ML/d)
16-Apr-2017	5/6/17	2.67
17-Apr-2017		2.57
18-Apr-2017		2.48
19-Apr-2017		2.54
20-Apr-2017		2.56
21-Apr-2017		2.72
22-Apr-2017		2.62
23-Apr-2017		2.62
24-Apr-2017		2.65
25-Apr-2017		2.81
26-Apr-2017		2.93
27-Apr-2017		2.42
28-Apr-2017		2.26
29-Apr-2017		2.42
30-Apr-2017		2.34
1-May-2017		2.46
2-May-2017		2.48
3-May-2017		2.3
4-May-2017		2.34
5-May-2017		2.55
6-May-2017		2.62
7-May-2017		2.55
8-May-2017		2.51
9-May-2017		2.54
10-May-2017		2.56
11-May-2017		2.53
12-May-2017		2.35
13-May-2017	2.35	
14-May-2017	2.45	
15-May-2017	2.52	
16-May-2017	2.42	
17-May-2017	2.34	
18-May-2017	2.19	
19-May-2017	2.22	
20-May-2017	2.45	
21-May-2017	2.44	
22-May-2017	2.56	
23-May-2017	2.47	
24-May-2017	2.52	
25-May-2017	2.41	
26-May-2017	2.45	
27-May-2017	2.49	



Data obtained on	Data published on	Volume discharged (ML/d)
28-May-2017	5/6/17	2.72
29-May-2017	8/8/17	2.36
30-May-2017		2.41
31-May-2017		2.4
1-Jun-2017		2.49
2-Jun-2017		2.66
3-Jun-2017		2.84
4-Jun-2017		2.69
5-Jun-2017		2.71
6-Jun-2017		2.64
7-Jun-2017		2.4
8-Jun-2017		2.16
9-Jun-2017		2.23
10-Jun-2017		2.28
11-Jun-2017		2.47
12-Jun-2017		2.5
13-Jun-2017		2.3
14-Jun-2017		2.39
15-Jun-2017		2.52
16-Jun-2017		2.5
17-Jun-2017		2.36
18-Jun-2017		2.27
19-Jun-2017		2.34
20-Jun-2017		2.46
21-Jun-2017		2.49
22-Jun-2017		2.39
23-Jun-2017		2.57
24-Jun-2017		2.44
25-Jun-2017		2.29
26-Jun-2017		2.11
27-Jun-2017		2.24
28-Jun-2017	2.38	
29-Jun-2017	2.44	
30-Jun-2017	2.32	
1-Jul-2017	2.24	
2-Jul-2017	2.57	
3-Jul-2017	2.71	
4-Jul-2017	2.94	
5-Jul-2017	2.37	
6-Jul-2017	2.15	
7-Jul-2017	2.47	
8-Jul-2017	2.31	

Data obtained on	Data published on	Volume discharged (ML/d)
9-Jul-2017	11/9/17	2.14
10-Jul-2017		2.07
11-Jul-2017		2.04
12-Jul-2017		2.05
13-Jul-2017		2.68
14-Jul-2017		2.79
15-Jul-2017		2.44
16-Jul-2017		2.43
17-Jul-2017		2.51
18-Jul-2017		2.71
19-Jul-2017		2.58
20-Jul-2017		2.55
21-Jul-2017		2.24
22-Jul-2017		2.36
23-Jul-2017		2.56
24-Jul-2017		2.36
25-Jul-2017		2.22
26-Jul-2017		2.22
27-Jul-2017		2.28
28-Jul-2017		2.43
29-Jul-2017		2.29
30-Jul-2017		2.18
31-Jul-2017		2.04
1-Aug-2017		1.83
2-Aug-2017		1.98

Licence Limit: 10 ML/d.

Compliance summary: Discharge within licence limits.

3. Ambient Air/Dust Monitoring

Berrima Colliery has 4 dust monitoring locations as described below:

- Mine Office Dust Deposition (Gauge 1)
- Medway Village Dust Deposition (Gauge 2)
- Loch Catherine Coal Stockpile Dust Deposition (Gauge 3)
- Mine Entry Road PM₁₀ Atmospheric Dust (Gauge 4)

3.1 Dust Deposition Gauges: Total Insoluble Matter (grams per square metre per month)

Gauges 1 to 3 are dust deposition gauges which measure the levels of coarse dust. It is a measure of dust nuisance rather than an indication of potential health problems as this dust fraction does not penetrate into the respiratory system.

Licence limit: Not specified

Adopted limits: For dust deposition, the NSW State guideline of 4 g/m² /month (presented as a 12-month rolling average) has been adopted.

Table 5 – Dust Deposition Data

	Dust Deposition Gauges (g/m ² /month as 12-month rolling average)		
	Site 1 Office	Site 2 Medway Village	Site 3 Loch Catherine
December 2016 Report Received: 9/01/17 Date Published: 6/02/17	1.61	0.44	0.46
January 2017 Report Received: 6/02/17 Date Published: 6/02/17	1.58	0.58	0.45
February 2017 Report Received: 8/03/17 Date Published: 8/03/17	1.53	0.61	0.47
March 2017 Report Received: 16/03/17 Date Published: 4/04/17	1.65	0.65	0.50
April 2017 Report Received: 3/05/17 Date Published: 5/05/17	1.64	0.64	0.49
May 2017 Report Received: 5/06/17 Date Published: 5/06/17	1.67	0.65	0.50
June 2017 Report Received: 3/07/17 Date Published: 4/07/17	1.55	0.60	0.40
July 2017 Report Received: 7/08/17 Date Published: 8/08/17	1.49	0.61	0.40



	Dust Deposition Gauges (g/m²/month as 12-month rolling average)		
	Site 1 Office	Site 2 Medway Village	Site 3 Loch Catherine
August 2017 Report Received: 7/09/17 Date Published: 11/09/17	1.53	0.66	0.39

Compliance summary: The dust levels at Medway Village and other selected locations meet the adopted criteria.

3.2 Atmospheric Dust Sampling

Berrima Colliery is required to measure the very small fraction of total suspended particulate matter, namely the 10 micron fraction (PM₁₀). This test measures the levels of the very fine dust suspended in the air which is a measure of potential health effects (irritation of the respiratory tract) as the small particles can penetrate into the airways and the lungs. Fine dust can persist in the atmosphere for days or even months before it settles and can travel some distance. Gauge 4 is located near the mine entrance which is midway between the mine facilities and the village of Medway.

Licence limit: Not specified

Adopted limits: the National Environment Protection (Ambient Air Quality) Measure standard of 50 µg/m³ for a 24-hour average has been adopted. This is in line with current standards for the coal industry.

Table 6 – Atmospheric Dust Data

Month	Report Received	Date Published	PM ₁₀ µg/m ³ 24 hour average
January 2017	23/01/17	06/02/17	13.6
February 2017	16/02/17	08/03/17	73.3
March 2017	16/03/17	04/04/17	8.5
April 2017	20/04/17	05/05/17	11.6
May 2017	15/05/17	05/06/17	8.8
June 2017	14/06/17	04/07/17	2.8
July 2017	03/08/17	08/08/17	<0.1

Compliance summary:

The February result exceeded the NEPM standard at the mine office. The corresponding deposition monitoring data at the mine office and at Medway Village was still in compliance despite the elevated PM₁₀ reading on the mine site, and therefore deposition rates at the nearest residential receptor remain in compliance. Elevated dust readings will be expected in future as part of the earthworks component of the rehabilitation program.

REPORT ENDS