GLENCORE

BAAL BONE COLLIERY

July to September 2015
Environmental Monitoring Summary

1. Introduction

In accordance with Schedule 5, Condition 9 of Project Approval 09_0178 this report provides a summary of environmental monitoring results for Baal Bone Colliery, for the period **1 July 2015 to 30 September 2015**. Baal Bone's licensed discharge and monitoring locations are identified in **Drawing 1**.

2. Air quality

Monthly dust monitoring is carried out in accordance with Australian Standard AS3580.10.1, EPL requirements and Baal Bone's Air Quality Monitoring Program.
Monitoring is undertaken by the ALS Group Environmental Division, a NATA Accredited laboratory.

Baal Bone maintains a network of dust deposition gauges:

- Sample location DM1 (EPL monitoring point No. 7);
- Sample location DM2 (EPL monitoring point No. 13);
- Sample location DM3 (EPL monitoring point No. 14);
- Sample location DM4 (EPL monitoring point No. 15).

Locations of the dust deposition gauges are shown in **Drawing 1**.

Schedule 3, Condition 10 of Project Approval 09_0178 includes air quality impact assessment criteria for the project (summarised in Table 1). The pollutants to be monitored include deposited dust, TSP and PM^{10}.

In accordance with the DoPI approved Air Quality Monitoring Program, monitoring for TSP and PM^{10} was discontinued in June 2012. The monitoring was discontinued following Baal Bone mining operations entering care and maintenance in September 2011, and the completion of coal washing and transporting of coal off-site in December 2011 and April 2012 respectively.

Table 1: Baal Bone Air Quality Impact Assessment Criteria

Pollutant	Averaging period	Criterion	
Deposited dust	Annual	Maximum increase	Maximum total
		2 g/m^2/month	4 g/m^2/month
TSP	Annual	90 $\mu g/m^3$	
PM^{10}	24 hour	50 $\mu g/m^3$	
	Annual	30 $\mu g/m^3$	

The monthly results for each of the monitoring locations are summarised in Table 2. Figures 1 to 4 provide monthly results for each site.

Table 2: Deposited dust monitoring results for 2015 (g/m²/month)

Month	DM1	DM2	DM3	DM4
January	0.3	0.6	0.5	0.6
February	0.7	0.4	0.7	0.6
March	0.6	0.5	0.5	0.5
April	1.2	0.1	0.3	0.2
May	1.9	0.4	0.5	0.4
June	0.2	1.3	0.2	0.2
July	0.2	0.1	0.1	0.1
August	0.1	0.1	0.1	0.1
September	0.7	0.2	5.0*	0.3
October				
November				
December				

* The September dust monitoring result for DM3 has increased by 4.9 g/m²/month from the August 2015 result of 0.1 g/m²/month. The twelve month rolling average is 0.50 g/m²/month. Due to the abnormal increase of greater than 2 g/m²/month, the DM3 sample was microscopically analysed to determine the source of particles. The analysis was undertaken by the ALS Group Environmental Division, a NATA Accredited laboratory and results indicated that the insoluble matter was comprised of insects, bird droppings and vegetation.

Based on historical monitoring results from January 2015, with the highest monitoring result of 0.7 g/m²/month recorded at DM3 in February 2015 and consistent low results of all other dust monitoring points, the analysis suggests that the maximum increase in deposited dust level by 2 g/m²/month from DM3 is most likely from non-mining related sources.

The NSW Department of Planning and Environment and NSW Environment Protection Authority (EPA) were notified of the DM3 elevated result on 7 October 2015. The EPA advised on 8 October 2015 that based on the microscopic analysis of the sample no further action was required by Baal Bone Colliery and the elevated result would be captured in the next Annual Return.

All dust monitoring results for 2015 to date, besides DM3 in September, are below the maximum allowable annual average dust level of 4 g/m²/month, in accordance with Schedule 3, Condition 8 of Project Approval 09_0178.

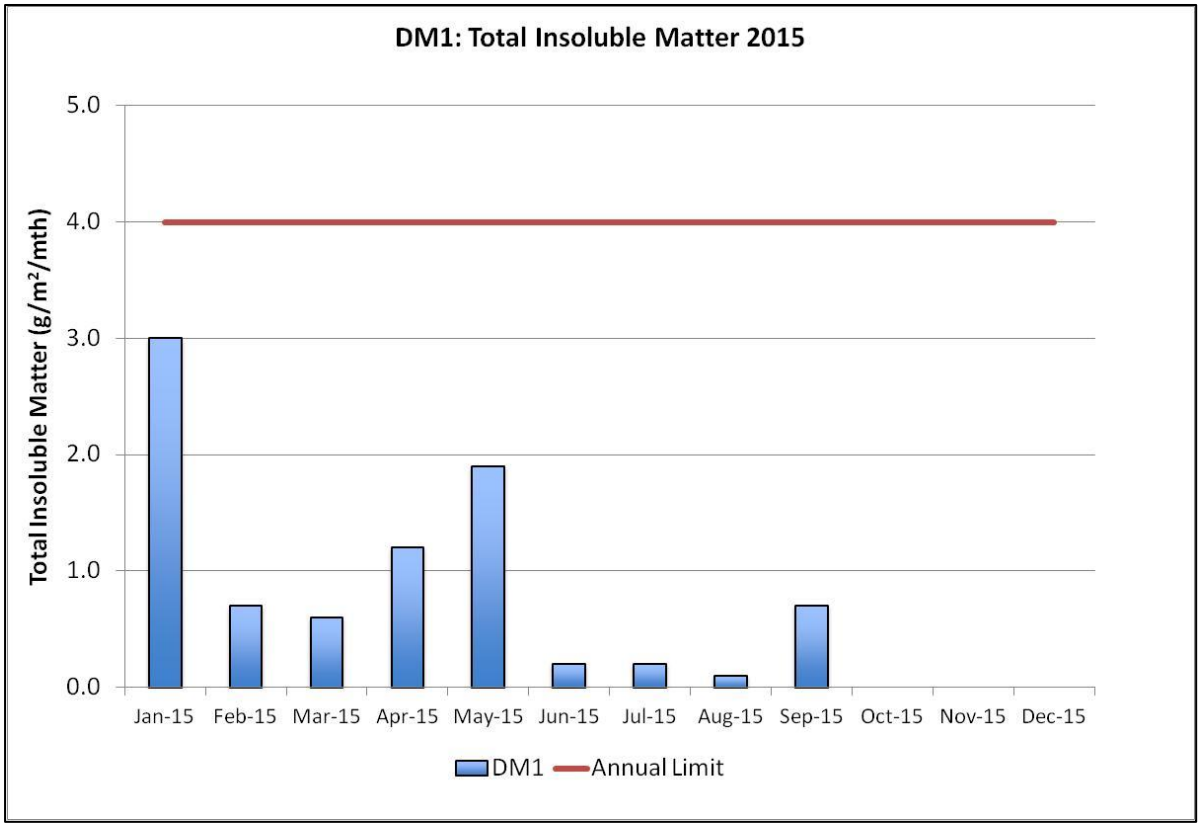


Figure 1: Dust monitoring gauge DM1 (EPL monitoring point No. 7)

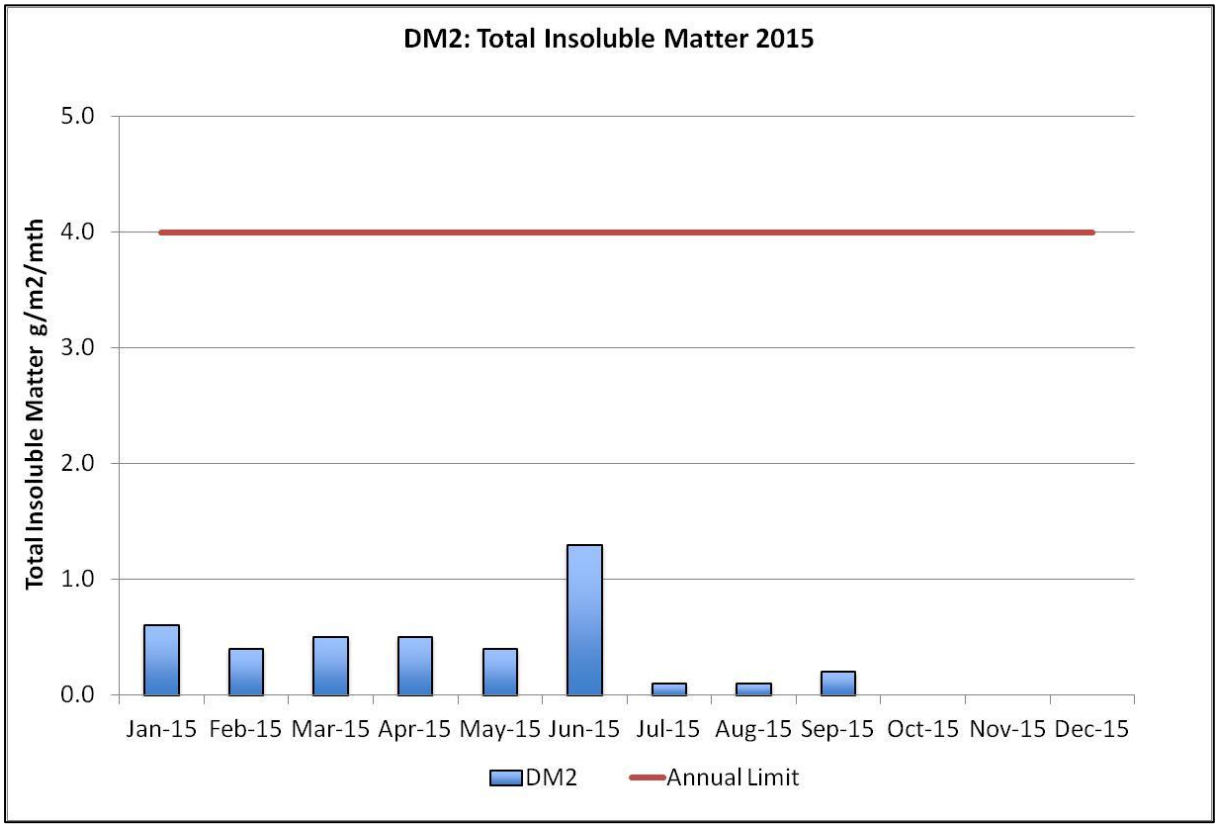


Figure 2: Dust monitoring gauge DM2 (EPL monitoring point No. 13)

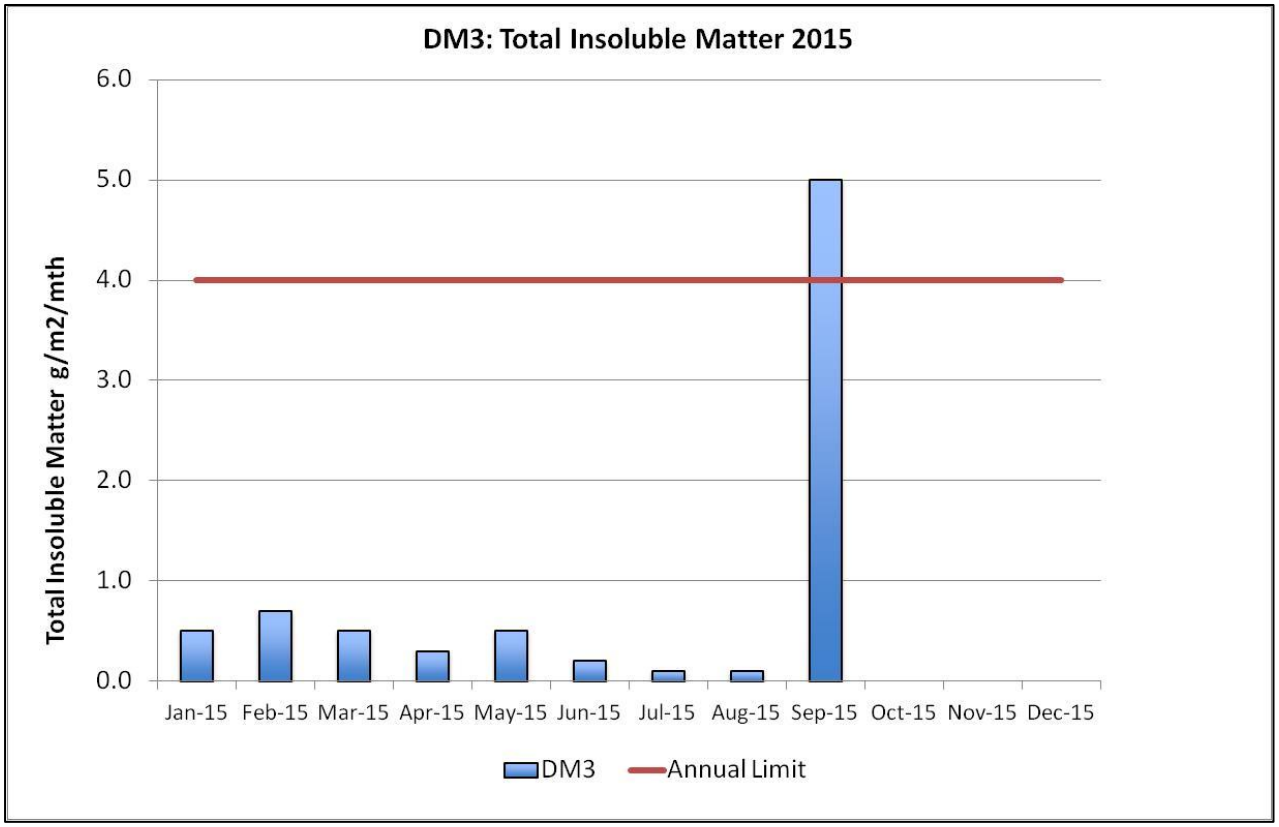


Figure 3: Dust monitoring gauge DM3 (EPL monitoring point No. 14)

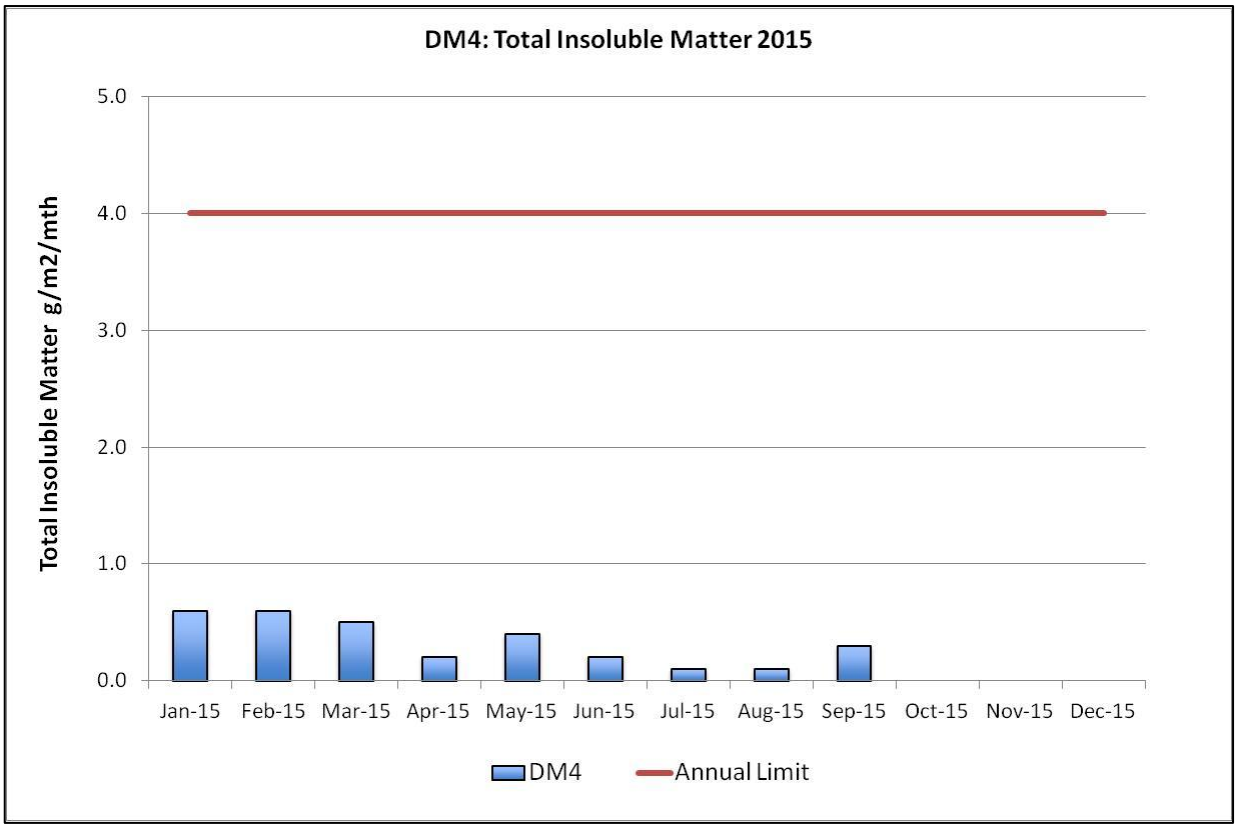


Figure 4: Dust monitoring gauge DM4 (EPL monitoring point No. 15)

3. Surface Water

Condition L2 of EPL 765 outlines water concentration limits for oil and grease, pH, total suspended solids and total iron. These limits are presented below in Table 3.

Table 3: EPL 765 concentration limits

	LD2	LDP1	WMP1
Oil and grease (mg/L)	-	10	-
pH	-	6.5-8.5	-
Total Suspended Solids (mg/L)	-	50	-
Total Iron (mg/L)	-	1.0	-

The monthly results for each of the monitoring locations are summarised in Table 4. Figures 5 to 8 provide monthly results for each pollutant.

Table 4: EPL Water quality results for the Quarter 3 2015

EPL Point	Month	EC uS/cm	O&G mg/L	SO^{2-}_4 mg/L	Fe mg/L	TSS mg/L	pH	BOD mg/L	Faecal Coliforms cos/100mls	N mg/L	P mg/L
LD2[a]	Jul										
	Aug										
	Sep										
LDP1	Jul	1180	<1	294	0.18	2	8.1	-	-	-	-
	Aug	1120	<1	301	0.18	2	8.2	-	-	-	-
	Sep	1240	<1	314	0.18	<1	8.0	-	-	-	-
WMP1[b]	Jul										
	Aug										
	Sep										

Notes

(a) No samples taken at LD2 during period as sample location was dry

(b) No samples taken at WMP1 during period as sample location was dry

Legend

BOD = Biological oxygen demand

EC = Electrical conductivity

Fe = Iron

N = Nitrogen

O & G = Oil and Grease

P = Phosphorus

SO^{2-}_4 = Sulfate

TSS = Total suspended solids

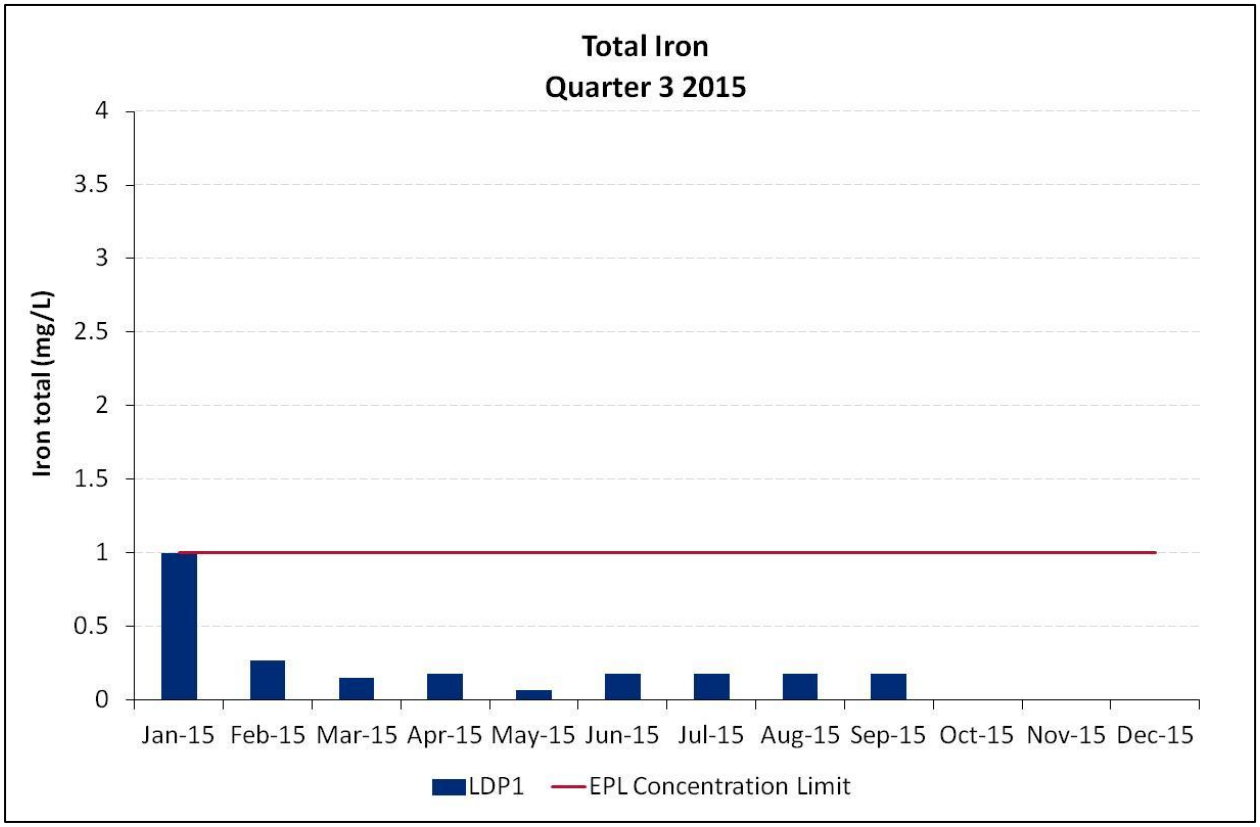


Figure 5: Total iron levels

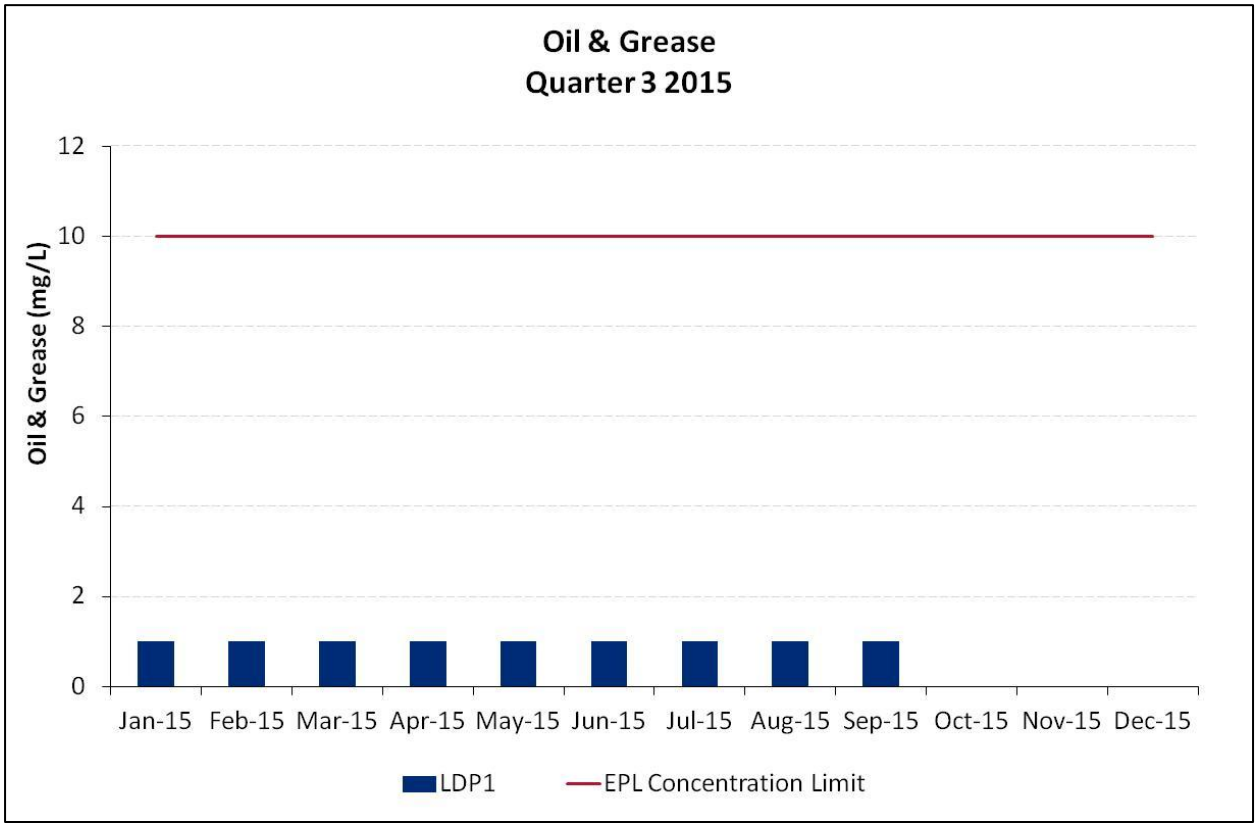


Figure 6: Oil and grease levels

Note: all values shown as 1 were reported as <1 (refer to Table 4).

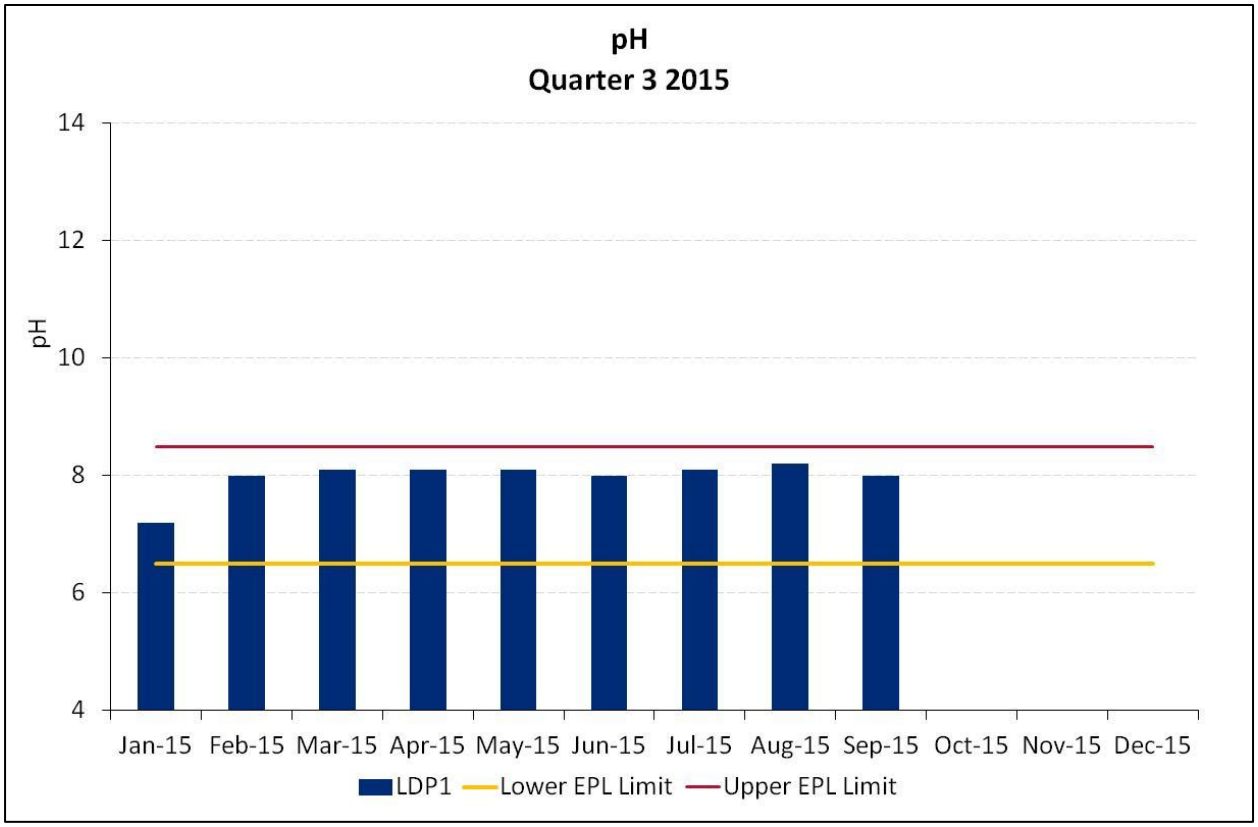


Figure 7: pH levels

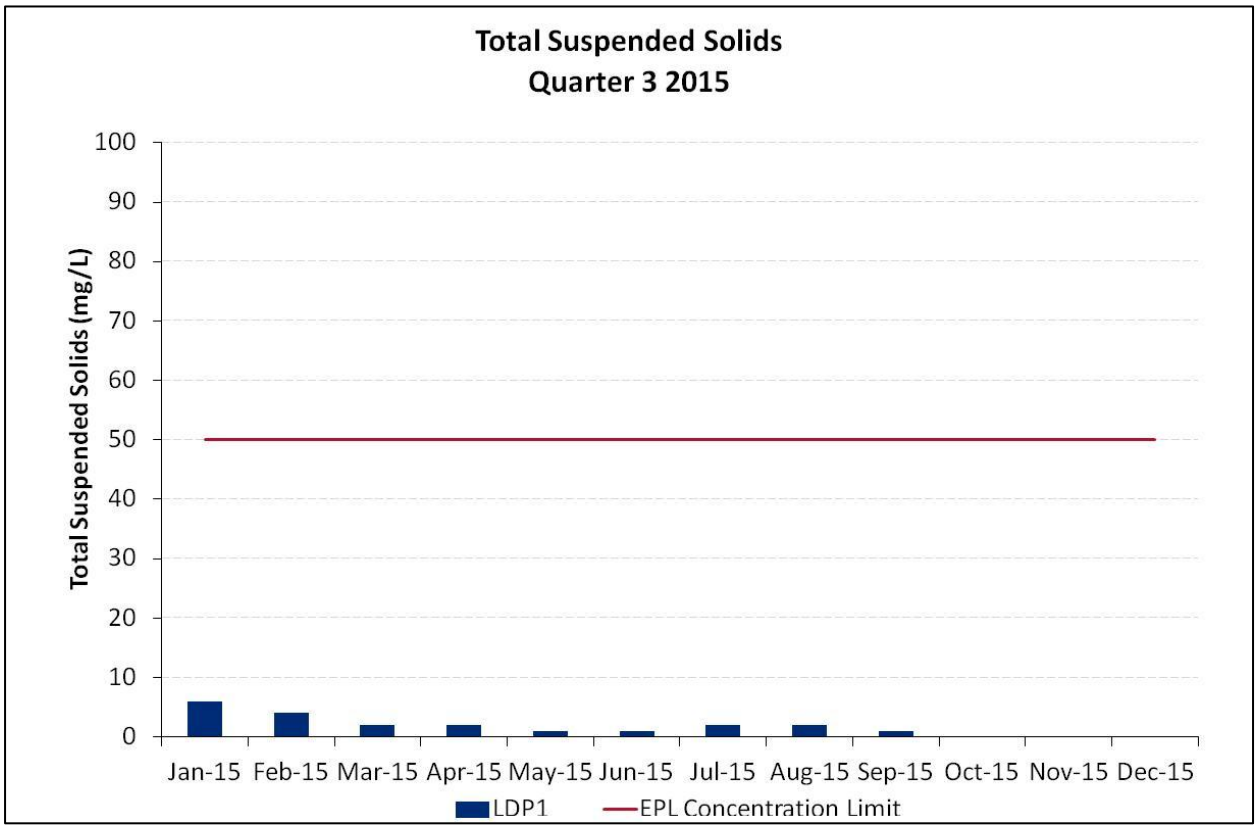


Figure 8: Total suspended solids levels

Note: some values shown as 1 were reported as <1 (refer to Table 4).

Monthly EPL reporting can be accessed at:
http://www.glencore.com.au.webauth/EN/who-we-are/baal-bone/Pages/epl-reporting.aspx

4. Noise

Noise Impact Assessment Criteria

Schedule 3, Condition 4 of Project Approval 09_0178 includes long term noise impact assessment criteria. Table 5 outlines the assessment criteria.

Table 5: Long term noise impact assessment criteria

Location	All periods dB(a) $L_{Aeq(15\ min)}$	Night dB(a) $L_{A1(1\ min)}$
R1	46	47
R2	41	48
R3	41	48
All other privately-owned land	35	45

From 2013 onwards attended monitoring is undertaken on an annual basis at receptors R1 and R2/R3 (**refer to Drawing 2**).

Noise Audit Results

Atkins Acoustics carried out an environmental compliance noise audit at Baal Bone Colliery on Tuesday 11 August 2015 between 3.00pm and 11.45pm.

Table 6 summarises the results from the audit.

Table 6: Noise Audit Summary

Location (Start time)	Measured Predicted Colliery Noise L_{Aeq}	Limit	Unit	Comments
Daytime Audit (1350-1505) – Tuesday 11 August 2015				
Location R1 (1600 hours)	<30	46	dBA	Mine ventilation fan <30dBA; Dist road traffic 35/48dBA; Birds 35/40dBA
Location R1 (1615 hours)	<30	46	dBA	Mine ventilation fan <30dBA; Birds 55/58dBA; Dist road traffic 35/8dBA
Location R2/3 (1648 hours)	<30	41	dBA	Breeze in trees, Dist road traffic 40/45dBA, Birds 38/45dBA
Location R2/3 (1648 hours)	<30	41	dBA	Breeze in trees, Dist road traffic 38/45dBA, Birds 35/48dBA

Location (Start time)	Measured Predicted Colliery Noise L_{Aeq}	Limit	Unit	Comments
Evening Audit (2000 to 2130) - Tuesday 11 August 2015				

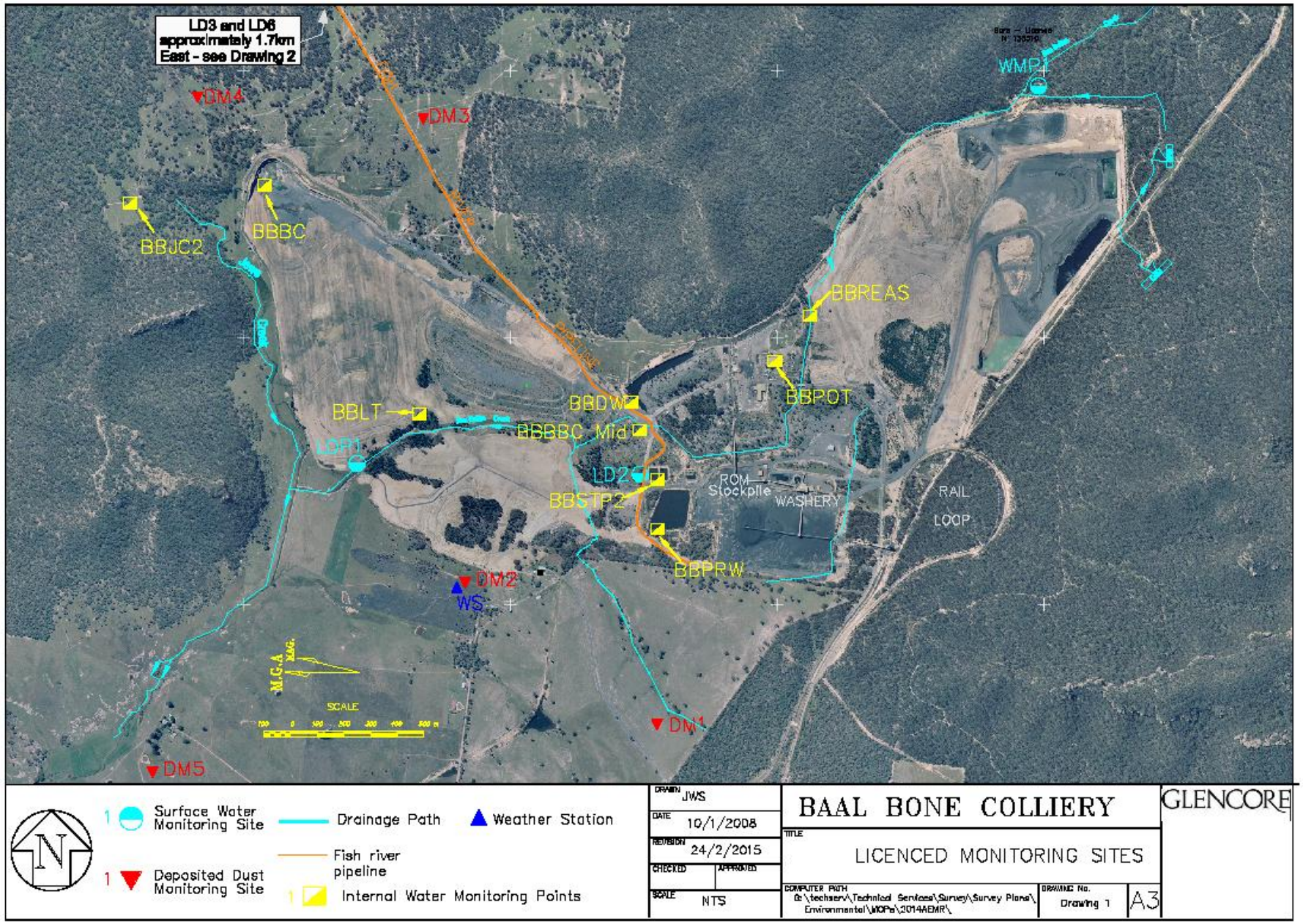
Location R1 (1840 hours)	<30	46	dBA	Mine ventilation fan <30dBA; Dist road traffic 46/54dBA; Insects
Location R1 (1855 hours)	<30	46	dBA	Mine ventilation fan <30dBA; Dist road traffic 46/54dBA; Insects
Location R2/3 (1805 hours)	<30	41	dBA	Dist road traffic 45/54dBA; Birds; Domestic; Dogs
Location R2/3 (1820 hours)	<30	41	dBA	Dist road traffic 48-55dBA; Birds; Domestic; Dogs

Location (Start time)	Measured Predicted Colliery Noise L_{Aeq}	Limit	Unit	Comments
Night Audit (2200 to 2330) - Tuesday 11 August 2015				
Location R1 (2205 hours)	<30	46	dBA	Ventilation fan <30dBA; Road traffic 46/8dBA; Insects
Location R1 (2220 hours)	<35	46	dBA	Ventilation fan <30dBA; Road traffic 46/8dBA; Insects
Location R2/3 (2250 hours)	<30	41	dBA	Ventilation fan <30dBA; Road traffic 46/8dBA; Insects
Location R2/3 (2303 hours)	<30	41	dBA	Ventilation fan <30dBA; Cows; Insects

The audit report concluded that:

> *"During the site-attended audits noise from the ventilation fan would not be described as tonal, impulsive, irregularity or with low frequency content. Accordingly no 'modifying factor' corrections are required to satisfy EPL 765 (L4.7). From the audit measurements and assessment, the LAeq, 15 min noise contributions from BBC during the day, evening and night assessment periods satisfied the long-term licence noise limits.*
>
> *BBC related LAmax noise levels were not observed to cause exceedances of the licence noise limits at measurement locations for the duration of the audit."*

The full August 2015 audit report and previous noise audit reports can be accessed from the Baal Bone publications page at:
http://www.glencore.com.au.webauth/EN/who-we-are/baal-bone/Pages/epl-archives.aspx



Drawing 1. Baal Bone Monitoring Points

Drawing 2. Baal Bone Monitoring Points