THE WALLERAWANG COLLIERIES LIMITED

2009 ANNUAL ENVIRONMENTAL

MANAGEMENT REPORT

Name of mine		Baal Bone Colliery	
Titles/Mining Leases		CCL 749, MPL 261, CL 391, ML 1302, ML 1382, ML 1607	
MOP Commencement Date	10/07/2009	**MOP Completion Date**	10/07/2016
AEMR Commencement Date	01/01/2009	**AEMR End Date**	31/12/2009
Name of leaseholder		The Wallerawang Collieries Limited	
Name of mine operator (if different)		Baal Bone Colliery	
Reporting Officer		Tony King	
Title		Environment and Community Co-ordinator	
Signature		.....	
Date			

Managed by xstrata coal

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SECTION 1.0: INTRODUCTION

1.1 Scope

This Annual Environmental Management Report (AEMR) for Baal Bone Mine is prepared annually by Baal Bone Colliery to fulfil the reporting requirements of various regulatory departments.

The layout of this AEMR has been aligned to the Department of Primary Industries – Mineral Resources' (DPI-MR) document: '*Guidelines and Format for Preparations of an Annual Environmental Management Report'*, Version 3, January 2006.

The report will be submitted to the following Authorities:

- Department of Industry and Investment (DII);
- Department of Planning (DoP);
- NSW Office of Water (NOW);
- Lithgow City Council (LCC);
- Department of Environment, Climate Change and Water (DECCW);
- Sydney Catchment Authority (SCA);
- Forests NSW.

The reporting period for this AEMR is 1st January 2009 to 31st December 2009.

It should be noted that this AEMR does necessarily provide a comprehensive description of each individual operation or environmental control that is currently employed at Baal Bone; this level of detail is available in the Mining Operations Plan (MOP) for Baal Bone's Underground Operations (July 2009).

Rather, this AEMR will focus on providing a succinct review of the significant operational and environmental activities undertaken throughout the year. It will also examine the performance of key site operations and environmental controls throughout the 2009 reporting period.

Included is a summary of monitored data (as applicable), a discussion regarding the level of compliance achieved; together with an overview of initiatives proposed and actions planned for the 2010 reporting period.

1.2 Consents, Leases and Licences

1.2.1 Current Consents, Leases and Licences

A list of all current consents, leases, licences and approvals are included below in **Table 1.1**.

Table 1.1. Consents, Leases, Licences and Approvals.

Type	Regulatory Authority	Approval Number	Holder	Issue Date	Expiry/Review Date	Scope
Development Consent	DoP	Nil	Coalex Pty Ltd	13/09/1982	Perpetuity (Under model provisions exp. 01.08.10)	Original development consent for Baal Bone Colliery – coal for export.
			Coalex Pty Ltd	31/12/1992	Perpetuity (Under model provisions exp. 01.08.10)	Section 102 EP&A Act (1979) modification of original Development Consent (13/09/1982) to include road haulage of 150,000 tonnes of coal per annum for industrial purposes
	DoP	164/98	The Wallerawang Collieries Ltd	19/08/1999	30/12/2000	Road haulage of 1.5 million tonnes of coal per annum for domestic market.
				25/08/2000	31/12/2003	Modification to DA 164/98 for the extension of coal haulage time for 900,000 tonnes of coal on the haulage road from Baal Bone Colliery by public road.
				23/12/2003	31/12/2015	Modification to DA 164/98 for the extension of the duration of the haulage road from Baal Bone Colliery to Mt Piper and Wallerawang Power Stations.
	Greater Lithgow Council	186/95	The Wallerawang Collieries Ltd	27/02/1996	Perpetuity	Development consent for open cut mining and associated development of Boxcut as part of the Northern Extension
	DoP	07_0035	The Wallerawang Collieries Ltd	24/10/2007	Perpetuity	Ventilation Shaft and Power Line Project
Environment Protection Licence	DECCW	765	The Wallerawang Collieries Ltd	17/11/2009	10/09/2014	Premises and Scheduled Activity (Coal Mining/ Washery) Licence
Mining Operations Plan	DII	09/2520	The Wallerawang Collieries Ltd	10/07/2009	10/07/2016	MOP for Baal Bone Colliery LW 29-31.

Type	Regulatory Authority	Approval Number	Holder	Issue Date	Expiry/Review Date	Scope
Mining Leases	DII	CCL 749	The Wallerawang Collieries Ltd	05/04/1990	23/03/2010	Mining Entitlement (Consolidates MPL 209, CL 246, CL 329, CL 330, CL331 and CL332) Various depths
	DII	MPL 261 (Act 1973)	The Wallerawang Collieries Ltd	22/08/1990	22/08/2011	Mining Entitlement (Southern mine dewatering bores) Parish: Ben Bullen, Depth: Surface - 10m
	DII	CL 391 (Act 1973)	The Wallerawang Collieries Ltd	24/02/1992	24/02/2013	Mining Entitlement Parish: Ben Bullen Depth: > 20m
	DII	ML 1302 (Act 1992)	The Wallerawang Collieries Ltd	29/09/1992	29/09/2013	Mining Entitlement Parish: Ben Bullen Depth: >20m
	DII	ML 1389 (Act 1992)	The Wallerawang Collieries Ltd	09/05/1996	09/05/2017	Mining Entitlement Parish: Ben Bullen Depth: Surface – unlimited Surface - 20m
	DII	ML1607	The Wallerawang Collieries Ltd	08/01/08	08/01/18	Mining Lease (Purposes) Parish: Cox Depth: Surface – 10m
S126(1) Approval	DII	317524306001	Baal Bone Colliery	14/11/2005	Perpetuity	Section 126(1) of the CMRA (1982) for the construction and operation REA 5
S100(1) Approval	DII	317551291001	Baal Bone Colliery	12/02/08	Perpetuity	Section 100(1) of the CMH&SA (2002) for the construction and operation of REA 6
Clause 88(1) Approval	DII	OUT09/1983	Baal Bone Colliery	16/02/2009	01/03/2012	Approval to longwall mine Panels 29 & 30 within the Lithgow seam.
Subsidence Management Plan	DII	06/7570	Baal Bone Colliery	07/12/2007	01/12/2014	Subsidence Management Plan for Extraction of Longwalls 29-31, Lithgow Seam
Occupation Permit	Forests NSW	14719	Baal Bone Colliery	05/03/1991	Perpetuity	Occupation permit relevant to the power line route from the company's freehold land to MPL 261 (Long Wall 1 Mine dewatering bore);

Type	Regulatory Authority	Approval Number	Holder	Issue Date	Expiry/Review Date	Scope
						includes various subsequent extensions.
		14161	Baal Bone Colliery	08/03/1991	Perpetuity	Occupation Permit for the powerline that supplies power to the railway loop on the western edge of Ben Bullen State Forest.
S22H (1)(a) Approval	DLWC	N/A	Baal Bone Colliery	27/07/1991	Perpetuity	Section 22H(1)(a) of the Rivers and Foreshores Act (1948) exemption. Permission to undertake activities on streams and drainage lines within the Baal Bone Mining Leases.
Bore Licences	NOW	80BL136703	The Wallerawang Collieries Ltd	14/01/2008	13/01/2013	Section 115 of the Water Act 1912. Bore – (under UC1 and UC2). Main washery water make-up bore near UC1
	NOW	80BL135509	The Wallerawang Collieries Ltd	09/06/2007	08/06/2012	Section 115 of the Water Act 1912. Borehole No. 6 near Rail Loop; washery make-up and dust suppression.
	NOW	80BL236132	The Wallerawang Collieries Ltd	18/01/1995	Perpetuity	Section 115 of the Water Act 1912. Bore – Mine dewatering Long Wall 1 (South Bore 1)
	NOW	80BL236134	The Wallerawang Collieries Ltd	18/01/1995	Perpetuity	Section 115 of the Water Act 1912. Bore – Mine dewatering Long Wall 1 (South Bore 2)
	NOW	80BL239077	The Wallerawang Collieries Ltd	19/06/2006	18/06/2011	Section 115 of the Water Act 1912. Bore – Mine dewatering Long Wall 19. North Bore.
	NOW	10BL601877	The Wallerawang Collieries Ltd	08/06/2007	Perpetuity	BBN175; LW29-31 groundwater monitoring piezo
	NOW	10BL601816	The Wallerawang Collieries Ltd	08/06/2007	Perpetuity	BBN176; LW29-31 groundwater

Type	Regulatory Authority	Approval Number	Holder	Issue Date	Expiry/Review Date	Scope
						monitoring piezo
	NOW	10BL601817	The Wallerawang Collieries Ltd	08/06/2007	Perpetuity	BBN177; LW29-31 groundwater monitoring piezo
	NOW	10BL601970	The Wallerawang Collieries Ltd	05/09/2007	Perpetuity	BBN 179; LW29-31 groundwater monitoring piezo
Water Licence	NOW	80SL046064	The Wallerawang Collieries Ltd	17/07/2007	17/07/2012	Section 12 of the Water Act 1912. Diversion works, 2 pumps, overshot and block dams, bywash dam.
Acknowledgement of Dangerous Goods on Premises	Work Cover Authority	35/023231	The Wallerawang Collieries Ltd	05/04/2009	22/07/2010	Dangerous Goods Licence.
Radiation Gauge	DECCW	29207	The Wallerawang Collieries Ltd	20/12/2007	16/01/11	To sell and posses – Radiation Control Act 1990. Coal quality sensing device
	DECCW	1123	The Wallerawang Collieries Ltd	16/09/2009	15/09/2011	Registration Certificate – Radiation Control Act 1990; fixed radiation gauge.

Abbreviations:

CCL – Consolidated Coal Lease
CL – Coal Lease
CMRA – Coal Mines Regulation Act 1982
DA – Development Application
DECCW – Department of Environment, Climate Change & Water
DoP – Department of Planning
DII – Department of Industries & Investment
EPL – Environment Protection Licence
ML – Mining Lease
MOP – Mining Operations Plan
MPL – Mining Purposes Lease
NOW – NSW Office of Water
REA - Refuse Emplacement Area

1.2.2 Amendments During the Reporting Period

Baal Bone's Mining Operations Plan (MOP) was reviewed during early 2009 due to its pending expiration, with a fresh document prepared and lodged with DPI-MR on 5 June 2009. This document was approved on 3rd July 2009.

The primary consent issued for Baal Bone in 1982 was issued under Part 4 the EP&A Act. Current mining activities at Baal Bone are taking place within Longwalls 29 to 31 which have been authorised by approval under Part 5 of the EP&A Act. *State Environmental Planning Policy (Major Development) 2005* (SEPP 2005) includes transitional provisions, under which the Part 5 approved activities cease to be of effect from 1 August 2010.

As existing longwall operations are not scheduled for completion until 2011 or beyond, Baal Bone is proposing to continue existing mining operations beyond the expiration of its Part 5 approval. Therefore, a fresh Project Approval under Part 3A of the EP&A Act is currently being sought to allow continuation of mining operations at Baal Bone.

AECOM Australia Pty Ltd has been engaged by Baal Bone to prepare an Environmental Assessment (EA) to assess potential impacts associated with "the Project". This EA is being prepared in accordance with the provisions of Part 3A of the EP&A Act, together with the Environmental Assessment Requirements (DGRs) issued by the Director General of the Department of Planning on the 28 October 2009.

A draft Environmental Assessment was lodged with the Department of Planning for adequacy review on 22 December 2009.

1.3 Mine Contacts

Baal Bone Colliery can be contacted via telephone on (02) 6350 6900 and fax (02) 6359 0530. The postal and street addresses are as follows:

Postal: Baal Bone Colliery
PO Box 13, Lithgow NSW 2790

Street: Baal Bone Colliery
Off Castlereagh Highway
Cullen Bullen, NSW 2790

Personnel responsible for environmental issues at Baal Bone Colliery are shown in **Table 1.2**. The current organisation chart is shown in **Figure 1.1**.

Table 1.2. Mine Personnel Contact Details

Contact Person	Position	Contact Details
John Hayward	Operations Manager	Ph: (02) 6350 6928 Email: jhayward@xstratacoal.com.au Fax: (02) 6359 0596
Gary Linford	Technical Services Manager	Ph: (02) 6350 6945 Email: glinford@xstratacoal.com.au Fax: (02) 6359 0530
Tony King	Environment and Community Co-ordinator	Ph: (02) 6350 6920 Email: tking@xstratacoal.com.au Fax: (02) 6359 0530

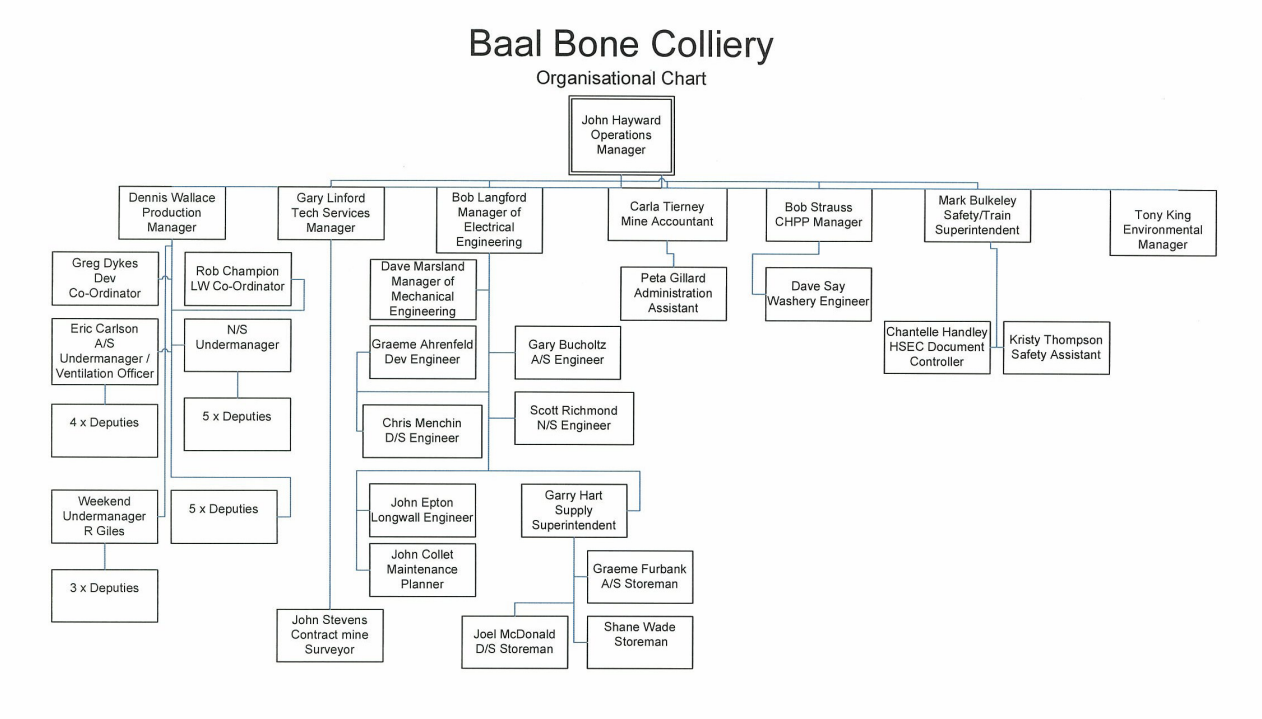

Figure 1.1. Baal Bone Organisational Chart

1.4 Actions Required at Previous AEMR Review and Site Inspection

The Dept. Primary Industries – Mineral Resources, Dept. Environment and Climate Change, Department of Water and Energy, State Forests and Lithgow City Council representatives attended a Joint Agency AEMR review meeting and site inspection at Baal Bone Colliery on 1st April 2009.

The purpose of the meeting was to review progress of site operations and to discuss issues relating to environmental management and performance for the 2008 AEMR reporting period. Baal Bone's AEMR was formally accepted by DPI in a letter dated 9 April 2009. Actions arising from the review are detailed in Table 1.3 below.

Table 1.3 Actions from a Review of the 2008 AEMR and Annual Environmental Inspection

Action Required	Where dealt with in this AEMR
Provide information on the Endangered Ecological Community in the swamps within the Jews Creek vicinity	Section 3.6
Label longwall numbers on Plan 2	Plan 2
Marking of the watershed boundaries on Plan 2, to identify individual catchments- especially the Cox's River Catchment	Plan 2

1.5 Employment Status and Demographics

Employment details for staff based at Baal Bone Colliery are found in **Tables 1.3 – 1.5** below:

Table 1.3 Employment Type

Employment Type	Number of persons in reporting period
Permanent	191
Contractor	36

Table 1.4 Male/Female Breakdown of Workforce

Gender	Number of persons in reporting period
Male	223
Female	4

Table 1.5 Residential Location of Employees

Residential Location	Number of persons in reporting period
Lithgow Shire	198
Bathurst	9
Blue Mountains	12
Mudgee	8

1.6 Environmental and Community Vision and Policy

Baal Bone Colliery has developed an Environment and Community Vision and Policy. These policies have the commitment and support of Baal Bone Management and have been developed with the Xstrata Coal NSW (XCN) Environment and Community Vision and Policy. They are displayed in prominent locations accessed by the workforce, contractors and visitors, as well as being provided on the intranet for all staff awareness. The Environment and Community vision and policy confirms Baal Bone's commitment to being recognised leaders in environmental management and valued operators within the community.

1.7 Enduring Value – The Australian Mineral Industry Framework for Sustainable Development

Xstrata Coal is a signatory to "Enduring Value – The Australian Minerals Industry Framework for Sustainable Development". As Baal Bone Colliery is owned and managed by Xstrata Coal Pty Ltd. (Xstrata Coal), it is obliged to operate within the guidelines for environmental management as part of Enduring Value.

1.8 National Pollution Inventory

In December 1997, the NSW Parliament passed a number of new legislation that saw the start of the National Pollution Inventory (NPI) reporting process. The NPI is an internet database designed to provide the community, industry and the government with information on the types and amounts of certain substances being emitted to the environment.

In early October, Baal Bone Colliery submitted an NPI report for the period of 1st July 2008 to 30th June 2009. The report detailed emissions of listed substances from Baal Bone Colliery to air, water and land requiring collation, analysis and interpretation of site-specific data. Results can be obtained from the NPI website www.npi.gov.au.

SECTION 2.0: OPERATIONS DURING THE REPORTING PERIOD

2.1 Exploration

There was no exploration activities conducted during the reporting period.

2.2 Land Preparation

No land clearing, vegetation removal or soil removing activities were undertaken during the reporting period.

2.3 Construction

The existing administration, amenities, workshops and coal handling infrastructure associated with the Baal Bone Colliery should remain unchanged for the remaining life of mine. Consequently there were no construction activities undertaken during the reporting period. Surface facilities and infrastructure are shown on **PLAN 1**.

2.4 Mining

2.4.1 Longwall Mining

Underground operations continue to extract coal using longwall mining methods from the Lithgow seam.

Extraction of the LW29-31 south-east extension commenced in April 2009 and is scheduled to be completed by Q3 2011 (**PLAN** 2). Development and extraction of LW29-31 were included in revised MOP as approved on 3rd July 2009.

2.4.2 Open Cut Mining

Open cut extraction of coal at Baal Bone was completed in July 2007.

PLAN 1 & **PLAN 2** shows the current mine layout and lease areas for both the open cut rehabilitation areas, reject emplacement areas, underground operations and associated surface facilities.

2.4.3 Production

The total Run of Mine (ROM) production for the 2009 reporting period was approximately 2.14 million tonnes. The principle export markets for the product in 2009 were Japan and Taiwan. **Table 2.1** shows the production record for 2006-2009 at Baal Bone Colliery.

Table 2.1 Production Record (2006 -2009) for Baal Bone Colliery (1000 tonnes)

Product	2006	2007	2008	2009
Domestic	629	0	0	0
PCI	159	147	30	0
Premium	-	-	-	-
Thermal	1770	1410	1211	1413
Total Saleable	2558*	1557	1241	1413
ROM Production	1,840 (UG) 648 (OC)	1,614 (UG) 411 (OC)	1,683 (UG)	2,140 (UG)

* total coal sold in 2006 exceeds ROM production due to a significant stockpile carry over from 2005

2.4.4 Resource Utilisation

Mining at Baal Bone Colliery targets the Lithgow Seam of the Illawarra Measures. This is the only seam in the area of sufficient thickness and quality to warrant economic recovery. Other seams in the Baal Bone area do not justify mining operations.

The Lithgow Seam in the open cut area ranged in thickness from 1.9-2.7m and was mainly of dull, medium volatile and generally non-swelling bituminous coal of moderate ash content (average 19.4%) and low sulphur content (0.6%) (Corkery & Co., 1995). The overburden to coal ratio averaged 6 BCM/t.

The Lithgow Seam in the underground workings ranges from 2.25-2.5m in thickness and the full seam height is extracted.

2.4.5 Changes in Mining Equipment or Method

Mining method remains the same as the previous reporting period. The major mining equipment fleet utilised at Baal Bone during 2009 is outlined in **Tables 2.2a** and **b** below.

Table 2.2a. Washery Equipment

Equipment Type	Number of Units
Caterpillar Dump Truck (773)	1
Dozers (Michigan W 380, CAT D11)	2
Caterpillar Front End Loader (966F)	1
Bobcat Skid Steer Loader (753)	1
Washery Water Cart	1
Toyota Landcruiser Utility	1
Gradall Forklift	1

Table 2.2b Underground Mining Equipment

Equipment Type	Number of Units
Bobcat Skid Steer Loader	1
913 Eimco	4
912 Eimco	1
915 Eimco	1
130 Eimco	2
Forklift	2
Domino Road Grader	1
PJB Man transports	8

2.5 Mineral Processing

Baal Bone produces three grades of washed coal, principally for the export market; these being 9%, 14% & 18% ash coal.

During the 2009 reporting period 1.994 Mt ROM underground coal was washed at a nominal rate of 550 tonnes per hour, compared with 1,683 Mt washed during the 2008 reporting period.

There have been no changes or additions to the process or facilities during the reporting period.

2.5.1 Production, Processing and Waste Summary

Table 2.3 shows production and waste for the reporting period plus an estimate for the 2010 reporting period.

Table 2.3 Production, Processing and Waste Summary

	Cumulative Production			
	Start of Reporting Period	2009 Total (non cumulative)	**End of Reporting Period**	**End of next reporting period (estimated)**
Topsoil (freedig) stripped (**m^3**)	1,020,092	nil	1,020,092	1,020,092
Topsoil (freedig) used/spread (**m^3**)	461,540	nil	461,540	491,540
Waste Rock (open cut) (**m^3**)	5,810,526	nil	5,810,526	5,810,526
ROM coal (**1000 tonnes**)	55,634	2,140	57,774	59,774
Processing Waste (CHPP) (**1000 tonnes**)	12,369	581	12,950	13,450
Product (**1000 tonnes**)	43,208	1,413	44,621	46,121

2.5.2 Product Destination and Transportation

During the reporting period there were no changes to the product transportation process. Product destination and tonnages for 2009 has been summarised in **Table 2.4** below.

The total quantity of coal dispatched from Baal Bone during the reporting period was transported by rail to Port Kembla for export. However, Baal Bone also holds a Development Consent to transport up to 900,000 tonnes per annum by public road to the Mount Piper and Wallerawang Power Stations.

Coal haulage by road to Mount Piper Power Station under the most recent Delta contract was ceased in January 2007. Due to the current price of export coal, and the relatively weak prices for domestic thermal coal, it is not envisaged that coal delivery to the power stations will recommence in the short to medium term.

Table 2.4 Product destination and tonnages for 2009

Destination	Tonnes dispatched (2009)	Mode of transportation
Export – Port Kembla	1,413,018	Rail

2.6 Waste Management

2.6.1 Washery Waste

Baal Bone Colliery reject comprises a mixture of high ash coal and non-coal materials, such as sedimentary rock and clay. These materials occur both within the coal seam and as floor or roof materials extracted during the mining operation. They are rejected during the beneficiation process on a specific gravity basis.

2.6.2 Coarse Reject

Baal Bone's coarse reject has a particle size ranging from 100 mm to 100 micron and comprises approximately 22% of Washery feed. Analysis of the Baal Bone coarse reject material confirms that it is non saline and pH is near neutral with negligible acid producing capacity. It does however exhibit poor physical characteristics with a coarse texture and low water holding capacity.

Even though it is chemically benign, this material is not suitable for use as a growth medium. All reshaped areas are therefore covered with a minimum of 300mm of soil (freedig) material to provide a covering layer in which a sustainable and protective vegetative cover will be established.

During the reporting period 447,621 t of coarse reject material was strategically placed around in and around the southern open cut void to eventually create the design final landform. Three dimensional modelling completed in late 2006 indicates that at the end of the 2009 reporting period, approximately 3.5Mt of coarse reject can still be placed in this area. Based on current production rates this area should provide sufficient capacity for the remainder of the life of mine.

2.6.3 Fine Reject

Fine Washery reject is generally smaller than 100 micron in diameter and comprises around 7% of Washery feed. Fine reject is pumped as 20–25 % w/w slurry to the designated tailings emplacement area contained within the southern open cut void.

Baal Bone Colliery has previously disposed of fine rejects in Reject Emplacement Area 5 (REA 5) which was decommissioned in August 2008. Reject Emplacement Area 6 (REA 6) received a Section 100 (CMH&S Act) approval in on 12.02.08. Pumping of tailings into REA 6 commenced in August 2008.

REA 6 utilises the void of the southern open cut workings and has a total volume of approximately 454,000m^3 in its two cells. During the reporting period 133,693 m^3 of tailings was pumped to REA 6. Based on expected average delivery rates this area will have an adequate capacity for fine material emplacement up until closure of mining activities in 2012.

Leachate generated by REA 6 is initially collected in an adjacent leachate collection dam and also later through seepage into the Box Cut sump. It is then returned to the process water circuit for reuse by the CHPP.

2.6.4 Open Cut Waste Rock

Open cut mining has ceased at Baal Bone, accordingly there was no open cut waste rock placed during the reporting period.

2.7 Ore and Product Stockpiles

The maximum working capacity of the Baal Bone coal stockpiles (both ROM and product) is approximately 1,000,000 tonnes.

During December 2009 the maximum tonnage of stockpiled underground ROM coal reached 156,593 tonnes and the maximum tonnage of stockpiled washed coal peaked at 209,446 tonnes in May.

2.8 Water Management

2.8.1 Process Water Circuit

Baal Bone Colliery has a cyclic Process Water Management System. That is, all site runoff is directed into and is reticulated around the Process Water Circuit for use in general site operations and the CHPP. Some water is discharged into the Jews Creek through an EPL licenced discharge point during high intensity rainfall events; although no water was discharged through this discharge point during the 2009 reporting period.

As at 31st December 2009, approximately 99 ML of water was held within the process water circuit, see **Table 2.5**. This water is used throughout the CHPP at a rate of 2.5 ML/day.

Tailings slurry from the CHPP is pumped to the tailings dam at an average rate of 150 m^3/hr. From the tailings dam, water is gravity fed through a filter embankment to the leachate collection dam, from where it is pumped back into the Dirty Water Dam. Some leachate is also returned via seepage into the Box Cut sump. Approximately 317 ML of leachate water was recycled from the Leachate Dam into the process water circuit in 2009.

Water from the Dirty Water Dam is subsequently pumped into the Process Water Dam prior to redistribution to the CHPP and to the underground operations for wash down, dust suppression and fire fighting purposes.

2.8.2 Potable Water

Potable water is purchased from State Water and is supplied through a connection into the Fish River Water Supply Pipeline. This connection services the administration centres and bathhouses, and is also used underground in a solcenic emulsion for the longwall hydraulic roof support system. Drinking water is also taken underground in containers.

Potable water usage for the reporting period was 18.578 ML. As a result of various water savings initiatives during 2009, consumption of potable water on site has been further reduced

by 6.125 ML compared to the 2008 reporting period. A total potable water reduction of 23.998 ML has been achieved over the past three years at Baal Bone.

Table 2.5 Stored Water at Baal Bone Colliery

	Volume Held			
	Start of Reporting Period	**End of Reporting Period**	**Volume lost/gained**	**Maximum Storage Capacity**
Dirty Water Dam	37 ML	37 ML	Remained even	37 ML
Process Water Dam	55 ML	55 ML	Remained even	55 ML
Box Cut Sump	6.9 ML	6.9 ML	Remained even	6.9 ML
Controlled Discharge Water (Salinity Trading Schemes)	Nil	Nil	Nil	Nil
Contaminated Water	Nil	Nil	Nil	Nil

2.8.3 Sewage Treatment and Disposal

Sewage and grey water effluent from site facilities, including the administration building, bathhouse, CHPP and amenities are collected in a sump and directed through macerator pumps to an on-site sewage treatment plant (STP). The waste is treated by an activated sludge treatment process then is discharged into two maturation ponds, with a total residence time of approximately 20 days.

Following treatment and maturation the overflow from the second pond discharges onto a well vegetated transpiration bed; this is an EPL Discharge and Monitoring Point. The location of the STP and maturation ponds is shown on **PLAN 1**.

Contra-Shear Technology completed a formal operational review of this system in January 2008.

2.8.4 Changes to the Water Management System During 2009

There were no changes to the water management system at Baal Bone during the 2009 reporting period.

2.9 Hazardous Material Management

2.9.1 Status of Licence

Baal Bone holds an *Acknowledgement of Notification of Dangerous Goods on Premises* (35/023231). In order to be granted a licence to store explosives, in accordance with the Explosives Regulation (2005), Baal Bone has nominated suitable persons to hold an Unsupervised Handling Licence following appropriate state and federal security background check. Accordingly the Explosive and Detonator Magazine was also included in the Acknowledgement.

Details of hazardous materials stored on-site during the reporting period are provided in **Table 2.6.** Location of the storage of hazardous goods can be found on **PLAN 1**.

Table 2.6 Hazardous Materials Stored On Site

Hazardous Material	Dangerous Goods Classification	Maximum Quantity Stored	Storage Type
Explosives; blasting, Type A	Class 1.1D	480 kg	Surface Explosive Magazine
Detonator, non-electric and electric	Class 1.1B	1000 kg	Surface Explosives Magazine
Petroleum gases, liquefied	Class 2.1	45,500 L	Above Ground Tanks (Pit-top and CHPP)
Diesel	Class C1	50,000 L	UST (Pit-top)
Diesel	Class C1	47,000 L	AST (CHPP)

2.9.2 Material Safety Data Sheets

Under Baal Bone Colliery's Environmental Management System (EMS) there is a Hazardous Substance Standard (HSEC STD 5.03 – Hazardous Substances), which deals with the safe storage, handling and disposal of chemicals and other hazardous substances. Materials Safety Data Sheets (MSDS) are made available to all employees at the Store facility.

The Colliery also has a comprehensive online "Chemalert" database, which provides all employees easy assess to information on all chemicals held on site. Information includes but is not limited to: the safe handling of products, Personal Protective Equipment (PPE) requirements, storage, use and disposal of the materials and spill response procedures. Chemalert is available on most PCs including the one for general employee use in the lamp room.

2.10 Other Infrastructure Management

The location of existing infrastructure is shown on **PLAN 1**. During the 2009 reporting period there were no changes or additions to processes or infrastructure facilities.

SECTION 3.0: ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

Baal Bone Colliery maintains and operates an Environmental Management System (EMS), which has been prepared to reflect industry best practice and to specifically address Development Consent conditions, approvals, licence and other statutory requirements. Baal Bone's EMS also includes the LW29-31 Subsidence Management Plan (SMP).

Detailed Plans of Management and Performance Standards for a wide range of environmental elements have subsequently been developed. These Plans and Standards detail relevant control measures, management strategies, monitoring requirements, reporting procedures and performance expectations/criteria.

SP Solutions Pty Limited conducts annual Broad Brush Risk Assessments (BBRA) at Baal Bone, with the 2009 review completed in October. Being a Broad Brush Risk Assessment this review tends to focus on high level health, safety, environmental and community issues.

In conjunction with a wide ranging EMS review completed during 2009, Baal Bone also commissioned a full review of the Environment and Community Risk Assessment (ECRA); this was conducted by **ngh**environmental in June 2009.

This process enabled a more comprehensive range of risks to be assessed and facilitated development of an updated Aspects and Impacts Register for Baal Bone. All management plans and operating procedures were reviewed accordingly and updated as required; several new documents were also developed so as to better manage identified risks / deficiencies.

It should be noted that this Section of the AEMR does necessarily provide a comprehensive description of each individual environmental control mechanism that is currently employed at Baal Bone; this level of detail is available in the Mining Operations Plan (MOP) for Baal Bone's Underground Operations (July 2009).

Rather, this Section will focus on providing a succinct review of the performance and/or modification of key control measures throughout the 2009 reporting period. Also included is a review of significant activities undertaken or actions completed throughout the year, a summary of monitored data (as applicable), a discussion regarding the level of compliance achieved; together with an overview of initiatives proposed and actions planned for the 2010 reporting period.

3.1 Air Pollution

3.1.1 Wind Speed and Direction

The Ben Bullen Range (and State Forest) provides reasonable shelter from winds with the exception of those from the north-west which have a clear fetch of approximately 12km upwind of the site. However, strong winds from the southwest and southeast may funnel through the gaps in the Ben Bullen Range and along the valleys.

Wind speed and direction at Baal Bone is comparable to the wind conditions from the Lithgow (Birdwood Street) Weather Station. Historic seasonal wind roses for this weather station are found in **Figure 3.1**.

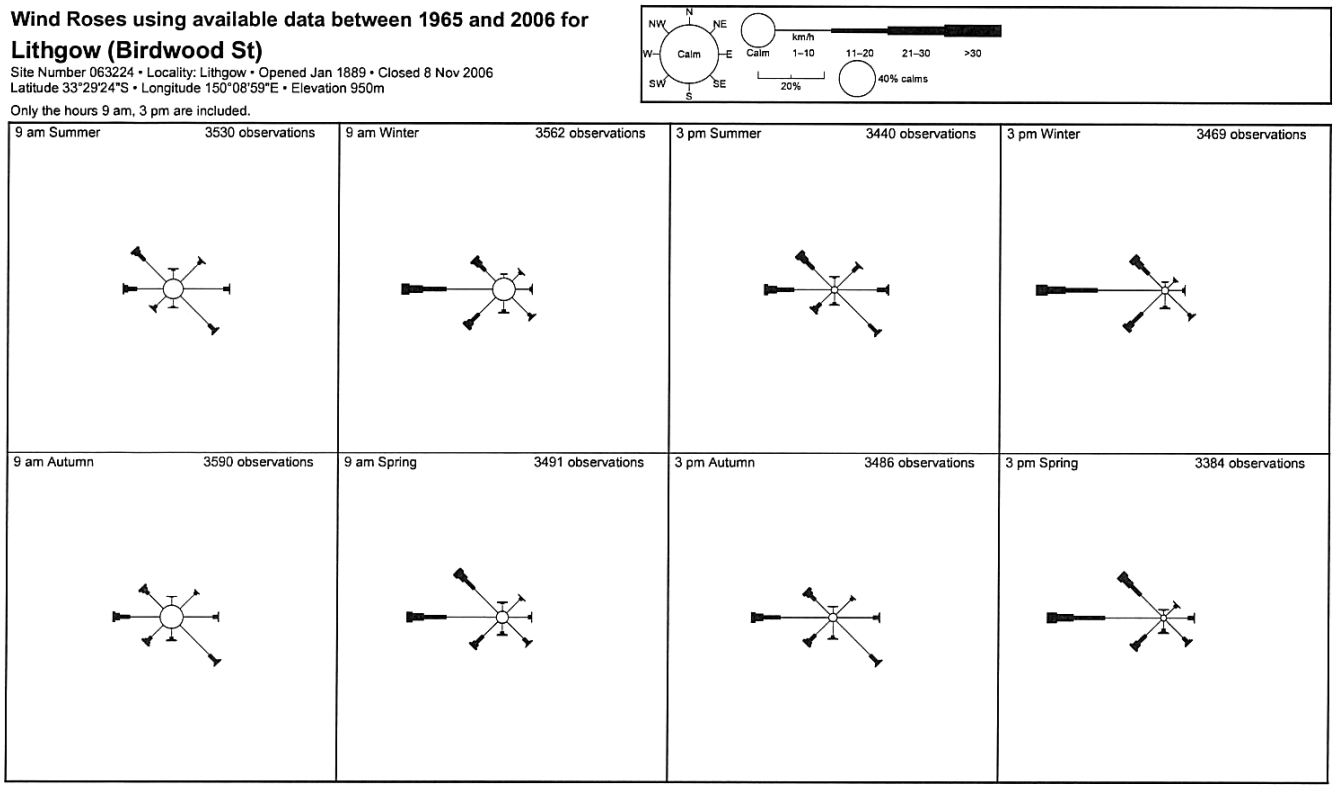

Figure 3.1 Historic Wind Roses for the Lithgow Weather Station (Birdwood Street)

3.1.2 Dust Monitoring and Sample Locations

Monthly dust fall-out monitoring is carried out in accordance with Australian Standard AS3580.10.1 and EPL requirements. Baal Bone has engaged Ecowise Environmental Pty Limited, a NATA Accredited laboratory, to undertake monthly sampling, monitoring and analysis.

Baal Bone maintains a network of 4 dust deposition gauges to monitor dust levels around site and in the vicinity of our nearest neighbour, these are:

- Sample Location DM1 (EPL Monitoring Point No. 7)
- Sample Location DM2 (EPL Monitoring Point No. 8)
- Sample Location DM3 (EPL Monitoring Point No. 9)
- Sample Location DM4 (EPL Monitoring Point No. 10)

Location of these gauges are illustrated on **Drawing 1**.

3.1.2 Modifications to the Dust Monitoring Network

There has been no change to any location of Ball Bone Colliery's dust fallout monitoring network during the reporting period.

3.1.3 Review and Interpretation of Dust Monitoring Results

Levels of *Total Solid Particles* were monitored in accordance with EPL 765 and the DECC Guideline of 4.0g/m^2/month has been adopted as a reasonable maximum level. Results of dust fallout monitoring conducted during the 2009 reporting period are illustrated graphically in **Figures 3.2 – 3.5** below.

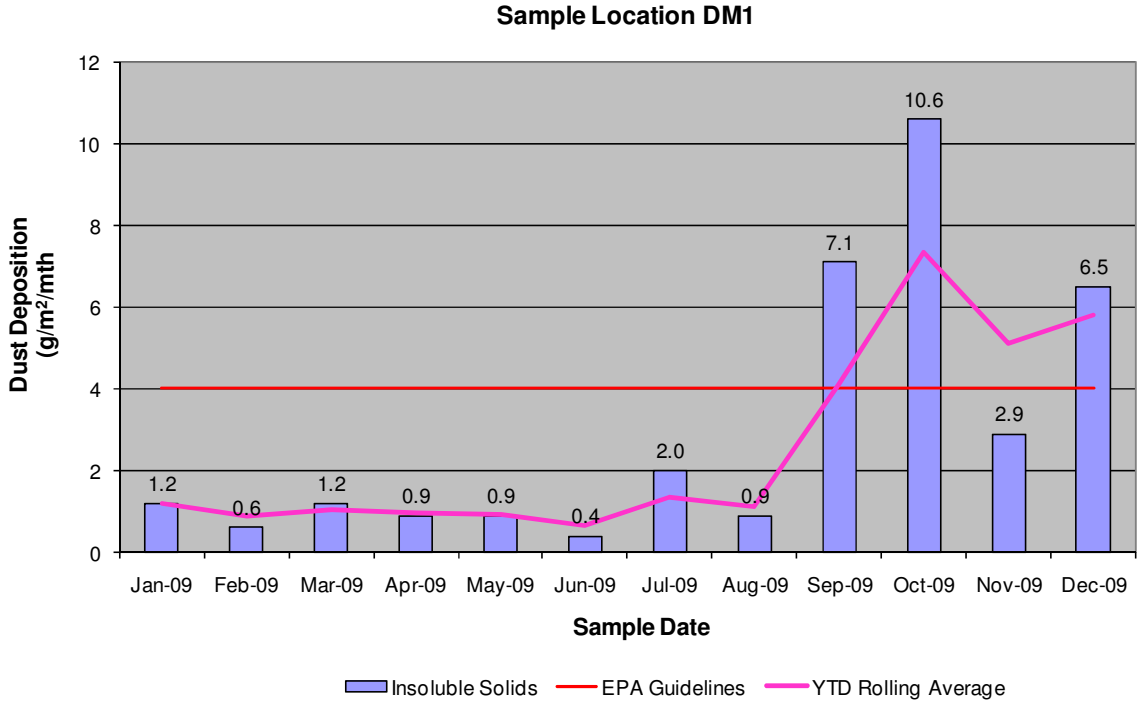

Figure 3.2. Monthly dust deposition results for Sample Location DM1

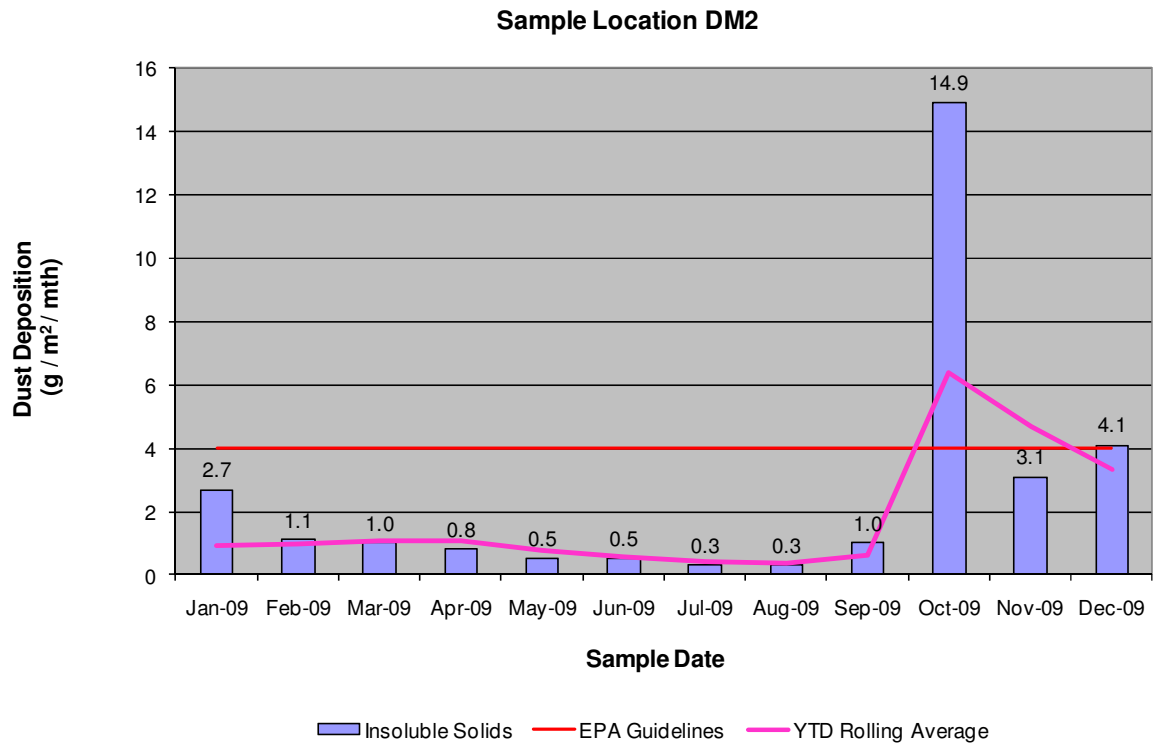

Figure 3.3. Monthly dust deposition results for Sample Location DM2

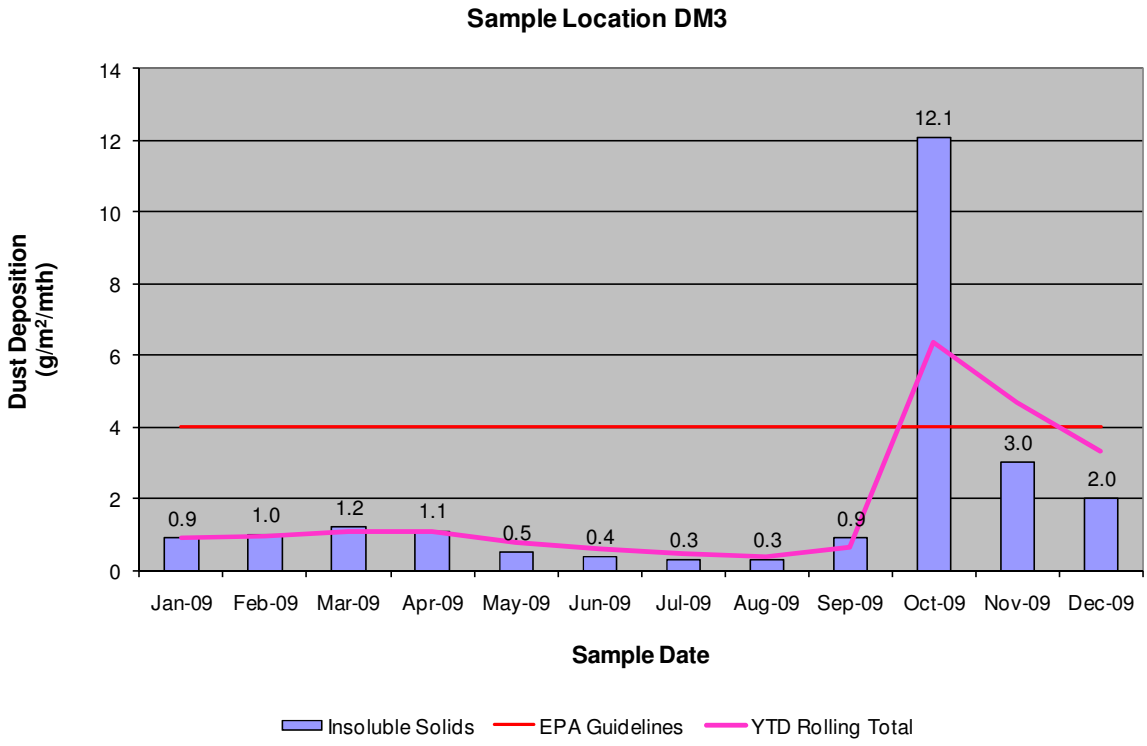

Figure 3.4. Monthly dust deposition results for Sample Location DM3

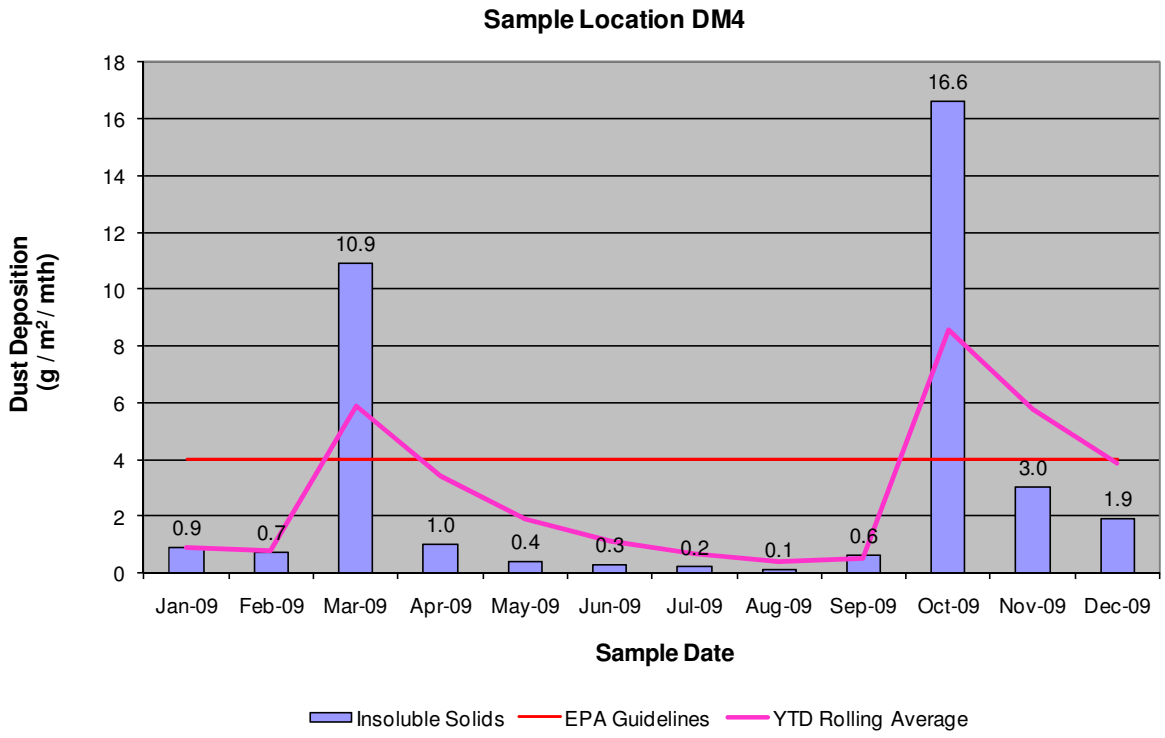

Figure 3.5. Monthly dust deposition results for Sample Location DM4

All four dust deposition gauges were sampled monthly during the reporting period. With the notable exception of the following, all remaining monthly concentrations of *Total Solid Particles* were well below the DECCW Guideline with an average of less than 4.0g/m^2/month:

- October readings for all dust deposition gauges
- September reading for DM1
- December readings for DM1 and DM2 (nominal), and
- March for DM4.

The elevated deposition levels across all gauges as shown for October, was due to the state-wide dust storms experienced on 23 September. The dust deposition gauges were sampled on 2 October, hence the data for the previous four weeks are shown as October.

Upon investigation, the elevated readings for September (DM1), and December (DM1 & DM2), which are both located on the western side of the Colliery, were found to be from extremely dusty clearing activities at another operation on the windward side of Baal Bone. Field sheets supplied by the sampling contractor confirm that the sample quality/ observation had noted *"sample cloudy brown with insects"*.

The abnormally high reading for March at DM4 cannot be explained as there were no unusual activities being undertaken at that time. DM4 is located to the north of the site and is surrounded for the most part by open grazing country. Field sheets supplied by the sampling contractor do not indicate any particular issues. We suspect that the erroneous reading may have resulted from a procedural error on behalf of the technician involved. As there have been

other similar instances involving this particular individual, we have requested that he not be assigned to Baal Bone in the future.

There were no dust related complaints received by Baal Bone during 2009.

3.2 Erosion and Sediment Control

In non-active areas of the mining lease, there have been negligible levels of erosion and sedimentation. Agisted livestock were removed in 2007 to ensure the maintenance of a satisfactory level of ground cover. Timely spring and early summer rains in 2008 subsequently resulted in a very good level of ground cover, and livestock were again reintroduced in April 2009.

As discussed in Section 2, all active surface mining and rehabilitation areas fall within Baal Bone's Surface Water Management System which is subdivided into "clean water" and "dirty water" systems. Features of the "clean water" system includes upslope diversion banks, levee banks, lined channels and drains and reed beds within the Ben Bullen Creek; features of the "dirty water" system include graded contour banks, containment bunds, primary arrestor/grit traps, sediment dams, water treatment plant and settlement dams.

The dirty water system is incorporated into Baal Bone's process water circuit. This is essentially a closed circuit which provides water for the CHPP, in addition to water for dust suppression, fire fighting and general underground operations. Water from this circuit is reused and is only discharged from site through a Licenced Discharge Point during high intensity rainfall events. No discharges occurred during 2009.

The Overshot Dam is located on the Colliery's northern boundary and is the final point of containment / retention for the clean water system. It also provides an additional opportunity for settlement and/or other treatment if required. The discharge from the Overshot Dam is Licenced Discharge Point No. LDP1 as noted on EPL 765.

There were no discharges off the mine site through LDP1 during the 2009 reporting period.

3.2.1 Activities During the Reporting Period

Rehabilitation activities during 2009 were limited to augmentation of drainage structures on the Box Cut stockpile area (completed in May) and aerial topdressing (fertiliser) over all the rehabilitation areas at the end of September. Topdressing also included some additional top-up seeding to the improved pasture areas.

Planting of riparian vegetation (tube stock) commenced along the restoration works on the Ben Bullen Creek diversion. Some tube stock planting of shelter areas was also incorporated into the pasture areas in the northern open cut rehabilitation precinct. Planting in both areas was suspended due to excessively hot and dry conditions in early Spring; planting is scheduled to recommence in Autumn 2010.

Further details regarding rehabilitation activities at Baal Bone are included in Section 5.

3.3 Surface Water

Baal Bone has engaged Ecowise Environmental Pty Limited, a NATA Accredited laboratory, to undertake monthly sampling, monitoring and analysis of a range of surface and subsurface waters.

Baal Bone maintains a network of 5 licenced Discharge and Monitoring Points in accordance with EPL 765 (viz. LD2, LD3, LD6, LDP1 and WMP1) (**Drawing 1 & Drawing 2**). In addition to the licenced discharge points, another 23 monitoring points are located throughout the site and the data obtained is used to assist internal management and planning decisions.

A description of discharge and monitoring sites, analyses conducted, frequency of sampling and concentration limits (where applicable) are shown in **Table 3.1** below.

Table 3.1. Baal Bone Colliery Water Monitoring Locations and Monthly Analysis

NB: Monitoring points highlighted in yellow indicate Licenced Discharge and Monitoring Points.

Sample Name	Sample Location	Frequency	Pollutants Analysed	EPL Limits Apply
BBLD2	EPL Monitoring Pt No.2. In sump at discharge from STP maturation pond to transpiration bed area	Monthly during discharge	Oil & grease, TSS, pH, BOD, faecal coliforms, nitrogen, phosphorus	Not specified
BBLD3	EPL Monitoring Pt No. 3. In stilling pond at pipe outlet of south mine dewatering bores	Monthly during discharge	EC, oil & grease, sulphate, iron, TSS, pH, MBAS, Pseudomonas, flow rate	Oil & grease, pH, TSS,
BBLD6	EPL Monitoring Pt No. 6. In stilling pond at pipe outlet of north mine dewatering bore	Monthly during discharge	EC, oil & grease, sulphate, iron, TSS, pH, MBAS, Pseudomonas, flow rate	pH, iron, TSS
BBLDP1	EPL Monitoring Pt No.11 Immediately below the pipe outlet or in stilling pool below spillway of overshoot dam	Monthly during discharge	EC, oil & grease, sulphate, iron, TSS, pH, flow rate, hardness, MBAS, nitrogen, phosphorus	Oil & grease, pH, TSS, iron
BBWMP1	EPL Monitoring Pt No. 12 Pool within Ben Bullen creek upstream of active surface mining area	Monthly (during flow)	EC, oil & grease, sulphate, iron, TSS, pH, flow rate, hardness, nitrogen, phosphorus	Not specified
BBPOT	Potable water from main bathroom in Administration	Monthly	pH, EC, Hardness, heterotrophic standard plate count, total coliforms, E coli, Pseudomonas	
BBBH	Potable water from Washery bathroom	Monthly	pH, EC, Hardness, heterotrophic standard plate count, total coliforms, E coli, Pseudomonas	
BBLR	Leachate pond on western side of REA5	Monthly	EC, oil & grease, sulphate, iron, TSS, pH, flow rate, hardness	

Sample Name	Sample Location	Frequency	Pollutants Analysed	EPL Limits Apply
BBMW No.5	Mine water discharge pipeline adjacent to No. 5 Adit	Monthly (only if discharging)	Flow rate, pH, EC, TSS, iron, sulphates, oil & grease, MBAS, heterotrophic standard plate count, faecal coliforms, pseudomonas	
BBMW No.3	Mine water discharge pipeline adjacent to No. 3 Adit	Monthly (only if discharging)	Flow rate, pH, EC, TSS, iron, sulphates, oil & grease, MBAS, heterotrophic standard plate count, faecal coliforms, pseudomonas	
BBPit 1	Pit-top grit trap/oil separator (eastern)	Monthly (only if discharging)	pH, oil & grease, MBAS	
BBPit 2	Pit-top grit trap/oil separator (western)	Monthly (only if discharging)	pH, oil & grease, MBAS	
BBPit 3	Washery grit trap/oil separator	Monthly (only if discharging)	pH, oil & grease, MBAS	
BBDW	Dirty water dam	Monthly	EC, Iron, oil & grease, pH, Sulphate, TSS, Hardness, MBAS	
BBPRW	Process water dam	Monthly	EC, Iron, oil & grease, pH, Sulphate, TSS, Hardness, MBAS, heterotrophic standard plate count, pseudomonas	
BBSTP1	STP Maturation Pond No 1	Monthly	pH, BOD, Faecal coliforms, nitrogen, phosphorus	
BBSTP2	STP Maturation Pond No 2	Monthly	pH, BOD, Faecal coliforms, nitrogen, phosphorus	
BBBC	Box cut sump	Monthly	pH, EC, iron, sulphates	
BBBBC Mid	Ben Bullen Creek mid-way through site	Monthly (during flow)	Flow rate, pH, EC, TSS, iron, sulphates, hardness, oil & grease, nitrogen, phosphorus	
BBBBC End	Ben Bullen Creek upstream of the Overshot Dam	Monthly	pH, EC, TSS, iron, sulphates, hardness, oil & grease, nitrogen, phosphorus	
BBJ	Jews Creek junction with discharge channel from Overshot Dam (downstream of all mining operations and dewatering bore discharges)	Monthly (during flow)	Flow rate, pH, EC, TSS, iron, sulphates, hardness, oil & grease, nitrogen, phosphorus	
BBJC2	Jews Creek upstream of mining operations, but below dewatering bore discharges	Monthly (during flow)	Flow rate, pH, EC, TSS, iron, sulphates, hardness, oil & grease, nitrogen, phosphorus	
BBJC3	Jews Creek at	Monthly	Flow rate, pH, EC, TSS, iron,	

Sample Name	Sample Location	Frequency	Pollutants Analysed	EPL Limits Apply
	confluence with un-named flowline from mine dewatering bore discharge	(during flow)	sulphates, hardness, oil & grease, nitrogen, phosphorus	
BBJCH	Jews Creek headwaters upstream of all mining operations and mine dewatering discharges	Monthly (during flow)	Flow rate, pH, EC, TSS, iron, sulphates, hardness, oil & grease, nitrogen, phosphorus	
BBLW19 Sed Dam	North bore settlement dam	Monthly	EC, Iron, oil & grease, pH, Sulphate, TSS, hardness, MBAS, pseudomonas	
BBN 134 - Pipe 2	Piezometer in Ben Bullen State Forest	Quarterly	pH, EC, Depth to water	
BBN 135	Piezometer in Ben Bullen State Forest	Quarterly	pH, EC, Depth to water	

BOD – Biochemical Oxygen Demand
COD – Chemical Oxygen Demand
EC – Electrical Conductivity
MBAS – Metheleyne Blue Active Substances
TSS – Total Suspended Solids

3.3.1 Interpretation and Review of Monitoring Results

Monitoring results for Baal Bone's seven licenced Discharge and Monitoring Points as required by EPL 765 are discussed below. Where available, samples were taken *monthly during discharge* in accordance with the EPL. However due to the continuing dry conditions discharges at many sites were minimal, with most of the water reused or recycled on site, and samples were not regularly available for collection. **Table 3.2** summarises the locations and months during which samples from the licenced Discharge and Monitoring Points were collected.

Results of these samples are tabulated below in **Table 3.3;** graphic interpretation of these results where the Licenced Discharge and Monitoring Points have Concentration Limits is included in **Figures 3.8 - 3.11**.

Table 3.2. Baal Bone's Licenced Discharge and Monitoring Points – samples available for collection in 2009

EPL Point	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BBLD2	No discharge	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No discharge	No discharge
BBLD3	Yes	Yes	Yes	No discharge	Yes	No discharge	Yes	No discharge	No discharge	No discharge	No discharge	No discharge
BBLD6	No discharge	Yes	Yes	No discharge	Yes	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge
BBLDP1	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge	No discharge
BBWMP1	No inflow	No inflow	No inflow	No inflow	No inflow	No inflow	No inflow	No inflow	No inflow	No inflow	No inflow	No inflow

Table 3.3. Summary of concentration levels recorded for DECCW licenced discharge points as required by EPL

EPL Point	Month	EC uS/cm	Oil & Grease mg/L	Sulphate mg/L	Iron mg/L	TSS mg/L	pH	BOD mg/l	Faecal Coliforms cos/100mls	Nitrogen mg/l	Phosphorus mg/l
BBLD2 (STP)	Feb	-	< 2	-	-	77	7.6	37	2120	11	5.8
	Mar	-	< 2	-	-	96	7.8	30	640	12	6.3
	Apr	-	2	-	-	56	7.2	29	220	8.5	5.9
	May	-	2	-	-	60	7.2	26	7	8.7	5.3
	June	-	3	-	-	108	7.5	37	60	8.9	5.0
	July	-	< 2	-	-	31	7.8	28	75	7.2	5.0
	Aug	-	< 2	-	-	13	7.3	19	23	7.6	4.9
	Sept	-	< 2	-	-	38	9.2	45	<1	6.2	4.9
	Oct	-	2	-	-	114	7.6	94	7	21	7.5
BBLD3	Jan	1390	<2	228	4.7	7	7.1	-	-	-	-
	Feb	1360	<2	207	0.99	2	7	-	-	-	-
	Mar	1340	<2	268	3.8	8	7.0	-	-	-	-
	May	1360	<2	265	4.6	8	7.0	-	-	-	-
	Jul	1380	<2	250	1.9	9	7.0	-	-	-	-
BBLD6	Feb	1200	<2	254	0.16	<2	7.4	-	-	-	-
	Mar	1160	<2	332	0.12	4	7.3	-	-	-	-
	May	1570	<2	393	0.4	6	7.1	-	-	-	-

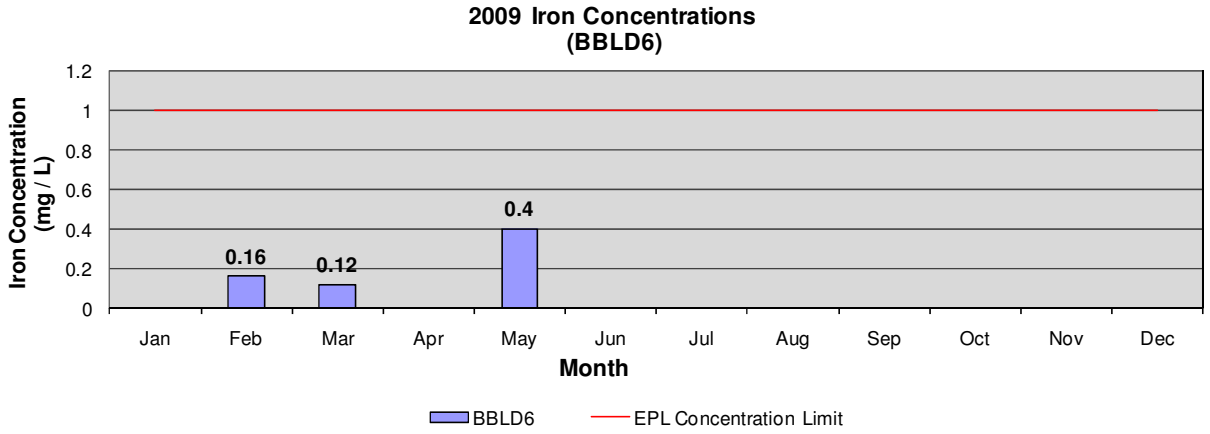

Figure 3.8. Total Iron Levels of Samples Recorded in Relation to EPL Concentration Limit of 1.0mg/L.

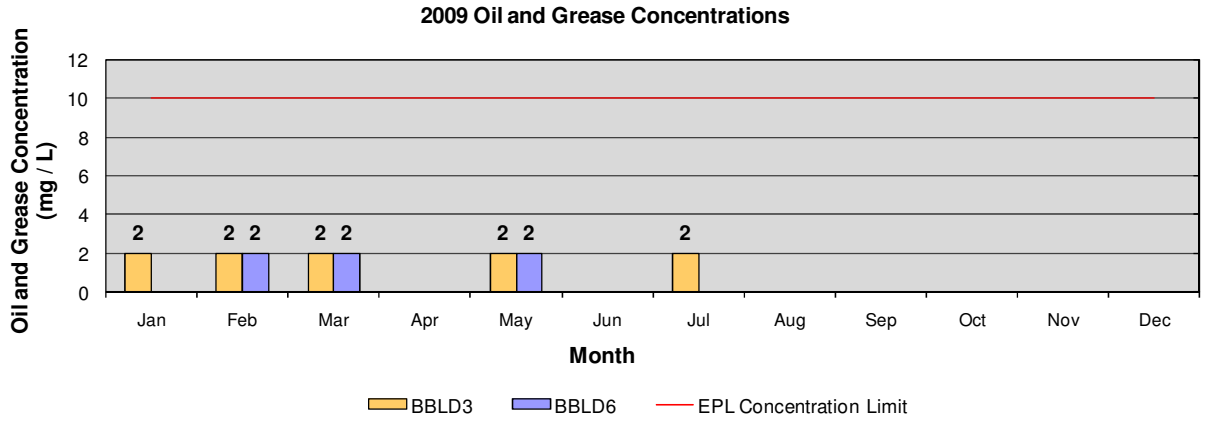

Figure 3.9. Oil and Grease Levels of Samples Recorded in Relation to EPL Concentration Limit of 10mg/L (Note: all values were reported as being <2).

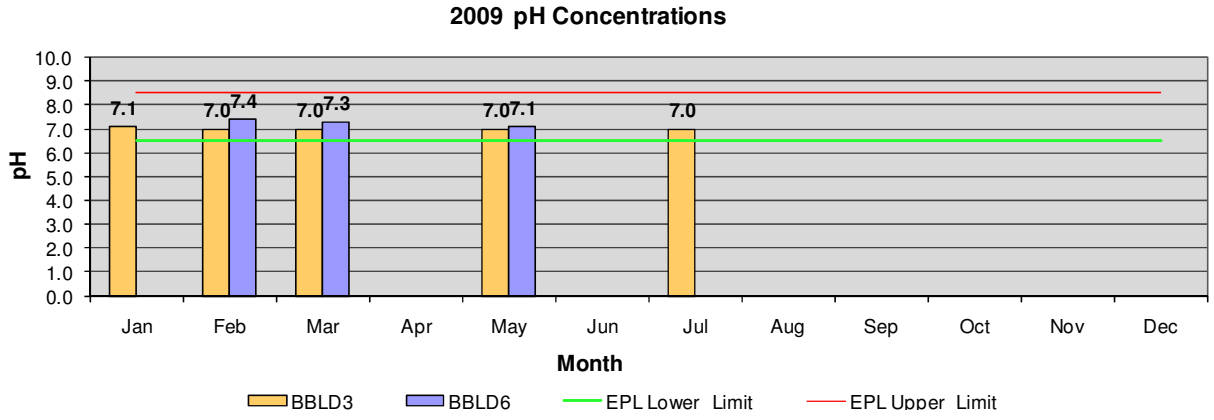

Figure 3.10. pH Levels of Samples Recorded in Relation to EPL Range of 6.5-8.5.

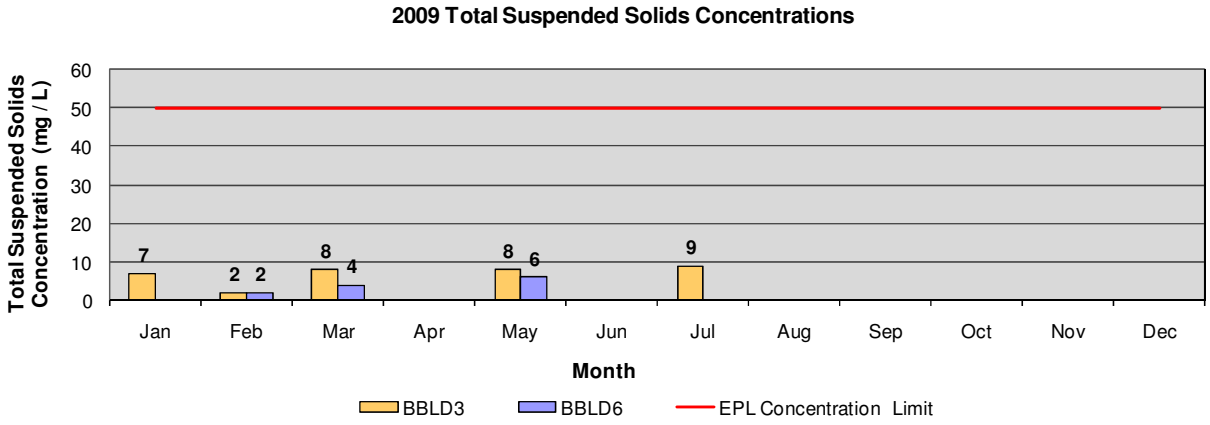

Figure 3.11. TSS Levels of Samples Recorded in Relation to EPL Concentration Limit of 50mg/L (Note: values shown as 2 were reported as being <2).

All samples recorded were within EPL Concentration Limits. A summary of monitoring results for EPL discharge and monitoring points (those with specified Concentration Limits) can be found below:

- all samples for both TSS and Total Iron were within EPL specified concentration limits of 50mg/L and 1.0mg/L respectively
- all samples returned oil and grease concentration levels of < 2mg/L, which is well below the EPL Concentration Limit of 10mg/L;
- all samples returned pH results that were within the upper and lower EPL Limits (8.5 and 6.5 respectively).

3.4 Ground Water and Pollution

Baal Bone Colliery currently has nine bores and piezometers licenced with NSW Office of Water (NOW); these are summarised in **Table 3.4**.

Table 3.4 Licenced Bores and Piezometers

Licence Number	Expiry Date	Location / Use
80BL136703	13/01/2013	CHPP water make-up bore near UC1 (not used during reporting period)
80BL135509	08/06/2012	Borehole No. 6 near Rail Loop; previously used for dust suppression (low yielding; no longer used)
80BL236132	Perpetuity	Mine dewatering Longwall 1 (South Bore 1)
80BL236134	Perpetuity	Mine dewatering Longwall 1 (South Bore 2)
80BL239077	18/06/2011	Mine dewatering Longwall 19. North Bore.
10BL601877	Perpetuity	BBN175; LW29-31 groundwater monitoring piezo
10BL601816	Perpetuity	BBN176; LW29-31 groundwater monitoring piezo
10BL601817	Perpetuity	BBN177; LW29-31 groundwater monitoring piezo
10BL601970	Perpetuity	BBN 179; LW29-31 groundwater monitoring piezo

The four groundwater monitoring piezometers were installed and equipped with data loggers in 2007 to gather background data and to monitor subsidence effects on local groundwater regimes as part of the SMP for LW 29-31.

Ian Forster from Aurecon Australia Pty Ltd (previously known as Connell Wagner) monitors data loggers in the piezometers on a regular basis to gather baseline data regarding groundwater level fluctuations in the vicinity of the Coxs River Swamp. Baseline data obtained prior to commencement of mining confirms a strong correlation between groundwater levels and prevailing climatic conditions; most particularly the relationship to rainfall.

Previously it was identified that there was a notable gap in the data for Bore BBP6 for the period 4 June to 16 July. It has been determined that the contractor responsible for collecting water quality samples failed to reinstall the instrument when samples were collected on 4 June; the instrument was subsequently replaced by the contractor when the July water samples were collected on the 16th. A normal data stream recommenced after this date.

Coincidentally, data downloaded in late July showed an anomalous groundwater behaviour at BBP1 that had also commenced on or about 16 July. Water levels in BBP1 were noted to have declined independent of the response normally attributed to the effect of climatic conditions. Some potential irregularities were noted in the data and an error was suspected due to temporary removal of the monitoring equipment by the water sampling contractor.

Contact was made with the Principal Subsidence Engineer in early August to provide verbal notification of the anomalous result and to discuss the possibility of irregularities in the data and/or instrument readings. Following this discussion, the decision was taken to continue monitoring and to review the results and report back with an update.

Subsequently, the calibration of the monitoring equipment was checked and the integrity of the monitoring dataset reviewed. Monitoring frequency was also increased from bi-monthly to fortnightly. This monitoring confirmed that the water level in BBP1 appeared to have stabilised, however a decline had subsequently appeared at BBP2 (which is further away from the longwall panel). The remainder of the monitoring bores had not registered any decline in water level that cannot be attributed to the ongoing dry conditions.

Whilst a water level decline in a piezometer adjacent to a longwall panel was not unexpected, it is notable that levels begun to fluctuate only three days following the first goaf fall for LW29 and at a point in time when the face had retreated only 47m and the extraction was still subcritical. At that time, the longwall face was approximately 320m distant from BBP1. The rate of change in water level also exceeded initial predictions.

Following a second conversation with the Principal Subsidence Engineer on 21 August it was agreed that this situation constitutes an “irregular result” as defined in the Trigger Action Response Plan (TARP) for both the Environmental Monitoring Program (Condition 13) and the Surface and Groundwater Response Strategy (Condition 16), and that written notification should be made in accordance with Condition 18 of Baal Bone’s SMP Approval.

In line with the response required by the TARP, an internal meeting has been held with Baal Bone's groundwater and subsidence consultants to review monitoring results, to consider additional monitoring options and to discuss a range of actions going forward. A preliminary Action Plan was formulated and discussed with the Principal Subsidence Engineer.

This included increasing the frequency of downloading and data review from the piezometers to a fortnightly cycle to enable more detailed monitoring of any future changes, completion of a snapshot flora assessment adjacent to the swamp piezometers, increasing the frequency of in-pit monitoring for additional seepage and inflows; together with a full review of the potential impact that Coxs River Lineament and/or other known geological structures in the immediate vicinity may have had on water levels in the aquifers.

Fortnightly monitoring was continued during late August and September, and an investigation report into the anomalous groundwater behaviour was prepared by Ian Forster of Aurecon Australia Pty Ltd (dated 01.10.09) and lodged with the Principal Subsidence Engineer on 1 October 2009.

The following discussion has been sourced directly from this report:

There are at least four possible scenarios that have been put forward for the decline in groundwater levels.

Scenario 1: The zone of interconnected fracturing in the strata above the longwall may have reached up into the Burra-Moko Head Sandstone aquifer and resulted in the drainage of groundwater from the aquifer into the mine workings. This would produce a drop in level in the piezometers nearest to the panel.

Scenario 2: The subsidence caused by the extraction of the longwall panel may have resulted in a change in the groundwater gradient, which has diverted groundwater towards the subsidence trough and away from the piezometers.

Scenario 3: The extraction of the panel may have caused a degree of stress relief, resulting in some movement on the fault zone that runs parallel to the swamp (ie. Coxs River Lineament). A known structural fault zone also runs between BBP1 and BBP2, and any movement on these faults could result in rapid drainage of water from the aquifer into the fault zone.

Scenario 4: The extraction of the panel may have resulted in some movement on the structural/stress zones located in/above the workings, with possible impacts on the groundwater in the aquifer.

The first possible scenario is considered unlikely for several reasons, but primarily because the initial decline in the groundwater level in BBP1 occurred when the longwall panel had retreated less than 50 metres. It is therefore considered highly unlikely that the zone of interconnected fracturing above the goaf would have reached the Burra-Moko Head Sandstone so soon, when the extraction was still sub-critical. The depth of cover to the Burra-Moko Head Sandstone at the start of the panel is about 120 metres, so that this represents a W/H ratio of 0.43, which is extremely low. Data published by Li (2005) indicates that the lowest W/H ratio for the cases examined, where hydraulic connection has been confirmed, is 1.29.

In addition, the depth of cover to the Burra-Moko Head Sandstone is about 47t, where t is the extraction thickness. Work by Forster & Enever (1992) in the Newcastle Coalfield indicated that the fractured zone extended from 20t to 33t above the seam, and there is no reason to assume that the situation is significantly different in the western coalfield. Again, this suggests that a hydraulic connection to the goaf is unlikely to be the cause of the anomalous conditions.

Another factor which indicates that drainage to the goaf is not the reason for the loss of water is the presence of the faults. The fault between BBP1 and BBP2 has a throw of up to 5 metres, so that the water-bearing zone in the sandstone, which is 2 to 3 metres thick, has been truncated by the faulting. As a result, it is unlikely that drainage would occur from the western side of the fault into the fractured zone above the goaf. Because of this, the groundwater level in BBP2 would not have shown any response to the mining, if this mechanism was the cause of the anomalous behaviour.

Given the above factors, it seems reasonable to assume that hydraulic connection between the aquifer in the Burra-Moko Head Sandstone and the mine workings is not the reason for the decline in groundwater level in the bores.

The second scenario has also been discounted for similar reasons to the first theory. Again, this is because the changes in gradient when the impacts were first observed would have been minimal, and unlikely to result in any significant drainage from the aquifer.

A more likely explanation for the observed changes is that there has been some movement on the major fault zone or on the structural/stress zones that have been located in the workings (Scenario 3). The major fault passes close to all affected boreholes and so any movement could potentially affect all of them. Even a small movement could open a cavity on the fault, and since the longwall panel converges with the fault as it retreats further, it is possible that further movements may continue to occur as the mining progresses.

The potential for any impact from the structural/stress zones detected in the mine is uncertain (Scenario 4), although both zones follow creek valleys, and both pass very close to the three boreholes, so they cannot be discounted as a causal factor. If there are high stresses in these zones, then even a small movement may trigger stress relaxation and the formation of fractures. This stress relaxation could produce anomalous movements in the groundwater levels.

Although the impact of major structures appears to be the most likely explanation for the anomalous groundwater movements (Scenarios 3 and 4), this is not certain at this stage, but may become clearer as the monitoring proceeds. It will also become evident whether the observed changes are temporary or permanent. At the end of August, the longwall had retreated 374 metres, which is just supercritical in terms of distance. This suggests that the strata disturbance is at its maximum, and that any additional movement may be limited.

Currently, there does not appear to be any impact on the swamp, but this needs to be monitored closely over the coming months. It worth noting that the groundwater supply to the swamp includes groundwater flow from the western side, in addition to any contribution from the eastern side. This is in addition to the contribution from rainfall and runoff. As a result, it is not certain that there will be any changes in the conditions in the swamp.

Ongoing monitoring of groundwater levels in the piezometers continued throughout October and November. While all sites have shown a slight decline in levels consistent with the ongoing dry conditions, the levels in the two piezometers affected by mining appear to have stabilised; BBP1 has begun to recover slightly and the decline at BBP2 has flattened out.

There have been no additional mining related impacts observed at these sites. At no time has there been any indication of mining related impacts in either of the two piezometers in the Coxs River swamp.

3.4.1 Ground Water Extraction

EPL 765 imposes volumetric limits on discharge from the north mine dewatering bore at LD6 of 12 ML/day; during the reporting period an average of 1.284 ML/day was discharged.

Bore Licences 80BL136703 and 80BL135509 as issued by NSW Office of Water impose a maximum total extraction limit of 750 ML/year. As stated previously, the yield from Bore 80BL135509 has proven to be unreliable and its use has since been discontinued. There was no water extracted from Bore 80BL136703 during the reporting period.

During the reporting period, the mine dewatering bores discharged a total of 983.165 ML into the Jews Creek.

3.5 Contaminated Land

Known contaminated or polluted lands at Baal Bone are limited to those affected by hydrocarbons. Hydrocarbon contamination is discussed in Section 3.17.

There were no environmental incidents recorded or additional areas of contaminated land identified during the reporting period.

3.6 Flora

Gingra Ecological Surveys submitted their Spring 2009 seasonal monitoring report which summarises baseline monitoring completed during November 2009. Additional monitoring of the Coxs River swamp in the vicinity of the swamp piezometers (BBP5 and BBP6) was also conducted on 26 August.

The results show that levels of species diversity were within the previously recorded range at each site. The total number of species records in summer 2007 was 113 and in autumn 2008 it was 161 records. For the spring samplings there were 119 records in 2007, 141 records in 2008 and 147 records in 2009.

Table 3.5 Plant Species Diversity for LW29-31 SMP Area

Site	Species Count						
	Summer 2007	Spring 2007	Autumn 2008	Spring 2008	Autumn 2009	August 2009*	Spring 2009
BB05	28	26	33	33	41	NS	35
BB06	22	24	29	26	31	NS	28
BB07	18	19	29	23	26	NS	24
BB08	22	24	33	27	29	NS	25
BB09	14	14	23	20	19	16	22
BB10	9	12	14	12	10	10	13

*Additional requested survey

Comparison of results within the Baal Bone SMP area for spring samplings from 2007 to 2009 show no significant change in plant species diversity at any of the survey sites. This holds for the mesic (moisture associated) sites within the area of mining impact and the two swamp sites which are downstream from the subsidence management area.

There has been an increase in the detection of weed species, with additional species detected within one swamp site in spring 2009. The species detected, Fleabane (*Conyza* sp.) and Spear Thistle (*Cirsium vulgare*) are wind-blown opportunistic species which are able to occupy bare patches during favourable seasons. These species are present within cleared agricultural land downstream from the swamp sites. There is no evidence that their presence in spring 2009 is related to an impact of subsidence.

A decline in ground water piezometer levels near LW29 was detected during late July 2009 (refer Section 3.4) and an additional review of the health of the swamp vegetation was immediately undertaken. The results from sampling of vegetation at the swamp survey sites in August and again in November 2009 do not indicate any effect of subsidence on species diversity, plant species composition or weed invasion.

From the floral surveys undertaken to date there have been no endangered species found, however 2 vulnerable species and 1 species of regional significance have been identified in the area around Baal Bone. These include Capertee Stringybark *(Eucalyptus cannonnii)*, Clandulla Geebung *(Persoonia marginata)* and Blue Devil *(Eryngium vesiculosum)* respectively.

Potential habitat for both *E. cannonnii* and *P. marginata* are isolated to areas north of the current lease area and they have not been affected by mining activities on site. Baal Bone has developed a Biodiversity and Land Management Plan to ensure that site operations (in particular vegetation clearing and ground disturbing activities) do not potentially impact on these species.

Swamp vegetation is present along Baal Bone Creek and lower arms of its tributaries and at the Coxs River Swamp along the upper Coxs River. The vegetation is typically closed sedgeland with patches of closed scrub and emergent trees.

Trees present include Mountain Gum (*E. dalrympleana*) and Blackwood (*Acacia melanoxylon*). Shrub patches include the tea-trees, *Leptospermum continentale*, *Leptospermum obovatum* and

Leptospermum grandifolium. The ground layer is dominated by *Carex gaudichaudiana* and Tussocky Poa (*Poa labillardieri*). Associated ground layer species include *Stellaria angustifolia*, *Epilobium gunnianum*, *Juncus sarophorus*, *Geranium homeanum* and Brooklime (*Gratiola latifolia*).

This vegetation type has a restricted distribution. It corresponds to the listed as Montane Peatlands and Swamps Endangered Ecological Community (EEC) under the NSW TSC Act. It does not correspond to the EPBC listed Temperate Highland Peat Swamps on Sandstone endangered ecological community.

Floral studies conducted by Gingra as part of Baal Bone Part 3A Environmental Assessment have confirmed that no significant modification of swamp vegetation will occur as a result of the current or proposed mining operations and that mining operations are not likely to increase the impact of any relevant key threatening process on this community.

3.7 Fauna

Biodiversity Monitoring Services (formerly known as Mount King Ecological Surveys) completed a seasonal survey of the LW29-31 SMP area in late November 2009.

Measurements of habitat characteristics derived from trap site descriptions have been used to provide an index of habitat complexity that can be helpful in determining changes over time of the habitats surveyed in the SMP Area. One index system used is that developed by Catling and Burt (1995), called the Habitat Complexity Score. This system scores the following parameters: Tree cover, tall and short shrub cover, ground cover, logs/rocks and litter cover. The scores range from 0 to 3, hence the maximum score is 18. The Habitat Complexity Scores for each site are given in the table below, together with the mean woodland results from 2005 to 2009.

Table 3.6 Habitat Complexity Scores for LW 29-31 SMP Area

	Spring 2005	**Summer 2006**	**Spring 2007**	**Spring 2008**	**Spring 2009**
Woodland1	13	16	15	15	17
Woodland2	14	14	16	17	16
Mean Woodland	13.5	15	15.5	16	16.5
Creek	16	16	16	16	16
Swamp	-	-	-	13	17
Overall	14.3	15.3	15.6	15.2	16.5

These scores indicate moderate to high habitat complexity. These scores also show that all sites provide good habitat for ground-dwelling mammals and woodland birds.

Nine native mammal (plus two introduced), 51 bird, seven reptile and four amphibian species were recorded from the SMP area. Statistical analysis (ANOVA) of these results shows no significant differences for the biodiversity indices over the years. The evenness in both groups fell this year, possibly due to relatively large numbers of individual species (e.g. Eastern Grey Kangaroo, Crimson Rosella, and Pied Currawong).

The report concluded by noting that due to the monitoring data set that has been accumulated over the past six seasons (2005 to 2009), it is now possible to assess any differences in the biodiversity and habitat condition of those sites that are subject to underground mining in the future. This comparison showed that there are no significant differences in the biodiversity and habitat complexity over the years. It is concluded that, at present, there are no discernable impacts from underground mining of LW29-31 at Baal Bone Colliery upon the fauna on the surface. A full analysis of the year's data will be undertaken after the summer survey.

Four threatened species are known to occur in or close to LW 29-31 SMP Extraction Area, these include the Gang-gang Cockatoo *(Callocephalon fimbriatum),* Brown Treecreeper *(Climacteris picumnus),* Turquoise Parrot *(Neophema pulchella)* and the Squirrel Glider *(Petaurus norfolcensis).*

All surveys conducted to date indicate that there should be no significant impact on either of these four species, or the twenty six other threatened species identified with the potential to occur in the area.

3.8 Weeds

A structured weed eradication campaign was continued in 2009. A full land management review of the Baal Bone site was undertaken by Land Asset Management Pty Limited in February 2009, which identified targeted species and their location.

A comprehensive weed spraying program was subsequently completed during March / April and again in November / December. These programs targeted Blackberry, St John's Wort and Biddy Bush *(Cassinia arcuata).*

Ongoing maintenance spraying will continue in 2010 and will also include isolated populations of Serrated Tussock (*Nassella trichotoma*) and Scotch Thistle (*Onopordum acanthium*).

3.9 Blasting

No blasting was conducted at Baal Bone during the reporting period.

3.10 Operational Noise

There were no changes to the operational noise profile during the reporting period, nor were there any noise related complaints.

3.11 Visual, Stray Light

All lighting associated with the CHPP and the UC1 conveyor/ROM stockpile has been designed and constructed so as to minimise glare and stray light. No complaints have been received during the reporting period in this respect.

3.12 Aboriginal and European Heritage

3.12.1 Aboriginal Heritage

In early 2007, an Indigenous Heritage Assessment was undertaken in conjunction with preparation of the LW29-31 Subsidence Management Plan (SMP) application. This assessment identified a potential rock shelter site (BBC-RS1) located above LW30 in the Ben Bullen State Forest.

Condition 23 of the SMP approval required Baal Bone to reach agreement with the DECC and the local Aboriginal community with regard to the ongoing management of this potential rock shelter site. OzArk were once again engaged to initiate the consultation process and to collaboratively develop an Aboriginal Heritage Management Plan (AHMP) for the site.

A meeting was held on Monday 27th September 2008 with representatives of the Indigenous community groups, as well as two DECC representatives, Maria Cotter (Northwest Regional Archaeologist) and Paul Houston (Aboriginal Heritage Planning Officer, Dubbo).

A draft AHMP was prepared and circulated to all participants for review and comment in November 2008. No submissions were received from the groups and the final report was submitted to DECC in December.

The recommendations in this report are currently being implemented; however, mining of LW30 is not scheduled to commence until Q2 2010.

3.12.2 European Heritage

No European Heritage Sites have been identified within the Baal Bone mining lease.

3.13 Natural Heritage

No natural heritage sites have been identified within the Baal Bone mining lease. However, the Gardens of Stone National Park lies approximately 5 kilometres northeast of the Colliery and the Blue Mountains World Heritage Area is located approximately 80 kilometres to the southeast of the Colliery.

The Ben Bullen State Forest covers much of the lease area; it is anticipated that this will be gazetted as a State Conservation Area at some time in the future.

3.14 Spontaneous Combustion

No spontaneous combustion events occurred in 2009.

Baal Bone has a Spontaneous Combustion Management Plan for the ROM stockpile. The plan principally involves regulating the duration of ROM storage on the stockpile to reduce residence time and therefore potential oxidation, and monitoring of internal stockpile temperatures.

3.15 Bushfire Management

There was no outbreak of bushfire during the reporting period at Baal Bone Colliery.

In the event of a bushfire with the adjacent State Forest, Forests NSW would assume responsibility for all fire fighting and emergency response activities. An agreement was been reached between Forests NSW and Baal Bone regarding use of the Colliery's helipad, first aid room and process water dam in emergency situations.

In the event that a bushfire is ignited on company owned land or where bushfire poses a threat to the mining operations, the Baal Bone's Emergency Response Procedure will be activated.

In addition, site management will ensure that:

- all boundary roads around the land within the Colliery freehold land are maintained in a condition suitable for use as fire breaks and access tracks during an emergency situation;
- a water cart at the Washery can assist in fire fighting activities;
- main access road and helipad are maintained suitable for use by emergency services;
- dams, voids and any other areas that may be utilised as watering points can be accessed by fire fighting equipment;
- portable radios are used at the time of emergency solely by the emergency response team who are trained and are provided with protective clothing;
- site earthmoving equipment can be utilised; and
- emergency phone, fire extinguishers and fire depots are located at strategic locations around the surface facilities.

Bushfire preparedness has also been included in Baal Bone's Biodiversity and Land Management Plan.

3.16 Mine Subsidence

3.16.1 Current Approvals

Baal Bone held a Section 138 approval (dated 9 May 2005) for extraction of LW's 25-28. This is supported by a *Subsidence and Environmental Plan and Monitoring Procedures for LW's 25-28* that received approval from the Principal Subsidence Engineer (DPI – Minerals) on 4 July 2006.

This s138 approval was due to expire on 1 January 2008, however a 12 month extension was sought due to unexpected delays to the mining sequence. Due to a change in legislation this extension approval was made under Clause 88 (1) of the Coal Mines Health and Safety Regulation 2006. It was received on 17 August 2007 and expired on 31 January 2009. A second extension was subsequently approved on 21 November 2008, with an expiry date of 31 July 2009; mining in LW28 ceased in early June 2009.

A *Subsidence Management Plan* for development and extraction of LW 29-31 was lodged with DPI-MR in June 2007. Approval was received from The Deputy Director General on 7 December 2007, with the approved period of mining to expire on 1 December 2014 (or at the expiry/cancellation of Baal Bone's Coal and Mining Leases).

Longwall production in the first panel (LW29) of the new SMP area commenced on 6 July 2009. As of 31 December 2009, the faceline has retreated 1122m, to chainage 334m. The first goaf fall was recorded on 13 July 2009 at which time the face had retreated 18m.

3.16.2 LW 28 End of Panel Summary

Maximum subsidence of 1,179 mm was recorded at C85 (centre of panel with 220m cover) on the C-C subsidence survey cross line which extended across LWs 26-28. Predicted ranges for subsidence were 1.5m to 1.6m in the valley regions with 140-160m depth of cover and around 1.4m on the ridge lines with 230-240m depth of cover.

In addition to the routine weekly inspections, two comprehensive surface inspections of the entire panel area have been conducted following the completion of Longwall 28. These were an assessment of potential cracking and soil disturbance issues conducted by David Pritchard, plus an ecological review conducted by Roger Lembitt to assess impacts on vegetation resilience and health.

The inspection conducted by David Pritchard revealed several areas of soil showing surface cracking. However, all cracking observed was within expected limits and it was concluded that subsidence impacts do not pose a safety risk to the general public. This review confirmed that there was no evidence of trees being dislodged or uprooted by surface cracking. Flow lines in the area have remained stable and have not been affected by any subsidence impacts.

Roger Lembitt's assessment of Longwall 28 also confirmed no evidence of decline in vegetation resilience and/or health resulting from the surface affects of subsidence. It was noted that a small area of understorey had been temporarily affected by the previously noted cracking. Elsewhere there was no evidence of decline in vegetation health resulting from the surface effects of subsidence.

3.16.3 LW29 Subsidence Development (Summary of Survey Results)

Baseline (pre-mining) survey monitoring of the E-E and F-F lines were conducted on 10 July 2009 and 27 May 2009 respectively. Following commencement of extraction of LW29, three dimensional subsidence movement surveys on the F-F line were undertaken on 3 August, 11 August and 18 August 2009. Results from these surveys confirm that subsidence movements remain within the acceptable range as defined in the SMP Application and as noted in the Subsidence Monitoring Program (summarised in **Table 3.7** below).

A slightly elevated level of horizontal movement (ie. 50mm) was however noted at Station 20 on the F-F line, which is inside the goaf area. Following a discussion with Dr Ken Mills of SCT Operations Pty Ltd, it was concluded that the steep nature of the terrain at this point would have exacerbated the level of horizontal movement (ie. creep) in a downslope (northward) direction; and that the systematic horizontal movement would nevertheless remain within the predicted range.

Table 3.7 LW29 Subsidence Survey Data Summary

Parameter	Predicted Results	Maximum measured result
Vertical subsidence (mm)	1400 - 1600	1341
Horizontal movement (mm)	400	450
Tensile strain (mm/m) K=1.5	9 - 16	11.7
Tilt (mm/m) K=5.0	32 - 52	25.6

There has been no damage to forest infrastructure and there has been no threat to the safety of the general public. To date there has been no subsidence impacts on rock features in the SMP area. Weekly inspections of the rock features were conducted around the LW29 start area and were continued until the longwall face had retreated at least 250m. Notification of this milestone was made to both DII and Forests NSW as required by the SMP Land Management Plan.

3.16.4 Protection of the Wolgan Escarpment

In compliance with Condition 15 of the SMP approval, Dr Ken Mills of SCT Operations Pty Ltd was commissioned by Baal Bone to prepare a thorough technical review of the mine layout, as contained within the SMP and to establish scientific confidence in the finish position of the panels and the width of LW31 in the vicinity of the two known pinch points. The results of this review and assessment (SCT Report BBO3432, dated 9 December 2008) indicated that a 30 metre reduction in the width of Longwall 31, down to 220 metres overall width, will ensure a higher level of confidence in the ability of the mine layout to protect the Wolgan Escarpment.

The Principal Subsidence Engineer has been consulted throughout the preparation of this report, as required by Condition 15(a), and has concurred with the recommendations contained therein. Baal Bone subsequently lodged a Subsidence Management Plan Variation Application to the Department of Industry and Investment to reduce the extraction width of LW31 from 240 metres to 210 metres, which reduces the extracted void width from 250 metres to 220 metres. This application was approval by the Director-General on 24 August 2009.

Stress change monitoring instruments have been installed and commissioned in the vicinity of the two pinch points on LW31. Stress changes in the rock strata are being monitored using a remote logger as Longwalls 29, 30 and 31 are progressively extracted. Stress cells are logged

on a twice daily cycle and information downloaded periodically for analysis by SCT Operations.

Results received to date confirm that neither instrument has registered any significant stress change associated with the mining of LW29; although this is not surprising as the distance between LW29 and the escarpment is large enough for there not to be any change.

Both instruments have registered some drift however, which is most probably associated with the depth of fresh bore hole above rock onto which the strain gauges are bonded (ie. inherent stresses introduced following initial drilling). Strains recorded are less than 200uS, which is well below the changes observed previously in LW26 where changes of significance were in the 1200-1400uS range.

Advice received from SCT Operations indicates that the minor stress changes introduced as part of the instrument installation process should stabilise/normalise within a relative short time period.

3.16.2 LW29 Anomalous Groundwater Behaviour

As discussed above in Section 3.4, anomalous groundwater behaviour in several monitoring bores was identified shortly after starting extraction of LW29. Following consultation with the Principal Subsidence Engineer and specialist consultants, it was agreed that this situation constituted an "irregular result" as defined in the Trigger Action Response Plan (TARP) for both the Environmental Monitoring Program (Condition 13) and the Surface and Groundwater Response Strategy (Condition 16).

Management of the situation, including written notification to stakeholders was undertaken in accordance with Condition 18 of Baal Bone's SMP Approval. At no time has there been any indication of mining related impacts in either of the two piezometers in the Coxs River swamp.

3.17 Hydrocarbon Contamination

A Preliminary (Phase 1) Assessment of Hydrocarbon Contamination at Baal Bone Colliery was conducted by HLA Environsciences Pty Ltd (HLA), with the report being finalised in April 2006. This assessment included a comprehensive soil and ground water investigation, sampling and monitoring program.

This assessment identified localised contamination from the Underground Storage Tank (UST) at the pit-top area and recommended ongoing groundwater monitoring to confirm the extent and level of contamination.

HLA were subsequently engaged to conduct a Phase 2 Hydrocarbon Contamination Assessment with the objective being to supplement previous investigations and to better quantify the nature and extent of potential soil and groundwater contamination. Concurrent with this HLA were also engaged to prepare a *Remediation Action Plan* with detailed requirements following closure of the mine.

The Phase 2 assessment quantified TPH contamination in shallow soils within the CHPP and pit-top areas of the site. TPH impacts at depth up to 2.8 m bgs were identified in the vicinity of the two diesel storage tanks.

In early December 2008, ENSR Australia Pty Ltd (previously HLA) undertook an annual review of water quality in nine groundwater monitoring wells located in the vicinity of the CHPP and pit-top diesel storage tanks. The opportunity was also taken to collect and analyse samples of sediment from the base of the Dirty Water Dam for both hydrocarbon and heavy metal contamination.

The monitoring program confirmed that groundwater contamination appears localised in the vicinity of point sources (i.e. fuel storage tanks) and has generally shown a decrease in concentrations when compared to the previous sampling event conducted in September 2007.

The results of the sediment sampling indicate the presence of TPH, PAH with some elevation in levels of Nickel in the sediments of the dirty water dam. Management of these sediments at mine closure will be incorporated into the *Remediation Action Plan*.

ENSR Australia has also been engaged to conduct an annual review of the groundwater monitoring wells at Baal Bone during February 2010.

Pursuant to section 60 of the *Contaminated Land Management Act 1997* and Part 2 of the *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997* (DECC, June 2009), a Site Contamination Notification for Baal Bone was formally lodged with the DECCW on 1 December 2009.

3.18 Methane Drainage and Ventilation

During the reporting period, monthly gas bag samples from the underground ventilation system were analysed by Coal Mines Technical Services, a NATA accredited company.

Results from the sampling completed throughout the reporting period confirm non-detectable levels of methane at Baal Bone Colliery (<0.01%). Consequently, methane drainage is not required at Baal Bone.

3.19 Public Safety

Fences are in place around the mining lease area, with all other boundary gates locked and maintained in correct working order. All access points onto the mine area are signposted to warn the public of Baal Bone Colliery's mining operations and of the risks involved. Warning signs have also been erected along public tracks in the Ben Bullen State Forest warning of mine subsidence and prohibiting entry to unauthorised persons.

All employees and contractors who enter the mining operations or workshop areas are inducted and must be suitably trained. All visitors must sign in and be accompanied by an employee or staff member of the mine if they have not been inducted by the Safety and Training Superintendent.

No incidents relating to public safety have been recorded during the reporting period.

3.20 Other Issues and Risks

3.20.1 Reportable Incidents

Pursuant to Xstrata's Categorisation of incidents, any incident that falls into the categories below must be reported to the Group Environment and Community Manager, the General Manager for Open Cut or Underground Operations (depending on the type of incident) and the Chief Operating Officer.

Category I: An incident that has caused negligible, reversible environmental impact, requiring very minor or no remediation. For example, exceeding EPL Limits or a hydrocarbon spill >20L.

Category II: An incident that has caused minor, reversible environmental impact, requiring minor remediation. For example, Hydrocarbon spill >20L but <205L AND contained on site.

Category III: An incident that has caused moderate, reversible environmental impact with short-term effect, requiring moderate remediation. For example, illegal discharge offsite that causes local but reversible damage. Also, a hydrocarbon spill <205L that was not contained readily or a spill of any amount of hydrocarbon into public waterways.

Category IV: An incident that has cause serious environmental impact, with medium-term effect, requiring significant remediation. For example, an incident that requires a remediation program over 1-12 months.

Category V: An incident that has caused disastrous environmental impact, with long-term effect, requiring major remediation. For example, an incident that requires a long-term remediation program over 12 months.

There was only one environmental incident recorded by Baal Bone during the reporting period; this related to the anomalous groundwater behaviour previously discussed in Section 3.4.

There were no fines or penalties recorded during the reporting period

3.20.2 Audits Conducted During the Reporting Period

In an order to assess our environmental performance at Baal Bone and to plan and implement a process of continual improvement, several audits and performance reviews were conducted during 2009. These included:

- An external, third party audit of Baal Bone's compliance with the conditions of its Coal Haulage Consent; this was carried out by **ngh** environmental on 28 August 2009;
- An internal, third party Rehabilitation Audit was conducted by Umwelt Australia on 29 April 2009. This included an audit against site rehabilitation commitments made in the Mining Operations Plan (MOP);

- An internal, third party Environmental Compliance Audit and Improvement Review; conducted by Pacrim Environmental on 18-20 November 2009;
- An internal, first and second party audit against Xstrata plc's 17 Sustainable Development Standards; conducted during August and September 2009.

These audits confirmed a high level of compliance with relevant approvals and secondly, reviewed environmental performance based upon site inspections and interviews with a range of personnel. It should be noted that the audit conducted by Pacrim covered a three year period (2007, 2008 and 2009),

In order to specifically comply with the requirements of several Conditions of Approval and Statements of Commitments, Baal Bone can confirm that it complies with the requirements of the following:

- Project Approval No. 07_0035;
- Mining Operations Plan, July 2009 (exp. 10.07.16);
- Mining Lease 1607.

SECTION 4.0: COMMUNITY RELATIONS

4.1 Environmental Complaints

In accordance with Baal Bone Health, Safety, Environment and Community (HSEC) Procedure PRO 01.09.01.02.009 (Community Complaints Management), Baal Bone Colliery has a comprehensive system in place to document and respond to community complaints in a timely manner and to maintain a comprehensive complaints database.

Consistent with the Mine's Environmental Protection Licence, Baal Bone maintains a 24 hour telephone complaints line and answering service for the purposes of receiving and responding to any complaints from members of the public in relation to activities conducted within the Baal Bone Colliery.

Upon receipt of a complaint, the following details are obtained from the complainant:

- Date of complaint;
- Notification method;
- Date of incident;
- Name of complainant;
- Contact details of complainant;
- Type of complaint;
- Actions taken;
- Persons notified; and
- Details of follow up actions taken, if required.

Following the receipt of a complaint, a thorough investigation of the complaint is undertaken and the complainant advised of the results of the investigation. Any action to be taken to prevent a recurrence is undertaken as soon as practicable.

No community complaints were received by Baal Bone during the 2009 reporting period.

4.2 Community Liaison

4.2.1 Community Initiatives

During 2009 the following community involvement initiatives were implemented:

- Support of the Black Coal Competency Traineeship
- Augmentation of school resources at Capertee Public School
- Support of Ironfest arts and cultural festival in Lithgow
- Sponsorship of the Life Education Van to attend Capertee and Portland Primary Schools
- Prize sponsorship of the Portland Art Show
- Sponsorship of team in the Movember Campaign
- Sponsorhip of book prizes for the Cullen Bullen School annual speech day

- Donation to Lithgow Christian Fellowship to provide Christmas lunch and Christmas hampers to the underprivileged in Lithgow.

Planned community involvement activities for 2010 include:

- Support of the Black Coal Competency Traineeship
- Augmentation of school resources at Wallerawang Public School
- Sponsorship of the Life Education Van to attend Wallerawang and Cullen Bullen Primary Schools
- Prize sponsorship of the Portland Art Show
- Sponsorship of team in the Movember Campaign
- Sponsorhip of book prizes for the Cullen Bullen School annual speech day
- Donation to Lithgow Christian Fellowship to provide Christmas lunch and Christmas hampers to the underprivileged in Lithgow.

4.2.2 Community Consultative Committee

The Baal Bone Colliery Community Consultative Committee (CCC) has been established to provide a formal conduit for exchange of information and views between the local community and Baal Bone's Management Team.

Membership of the current Baal Bone CCC include:

- Ray Blackley (Resident)
- Barbara Milne (Resident)
- David Speirs (Adjacent landholder)
- Gary Wallace (Lithgow City Council)
- Sue Watterson (Acting Principal, Cullen Bullen Public School)
- John Hayward (Operations Manager)
- Tony King (Environment and Community Coordinator)
- Mark Bulkeley (Safety and Training Superintendent)

The CCC met at Baal Bone on the 3rd June and 19th November 2009. Regular agenda items included:

- Operations Manager's update
- Health and Safety Manager's update
- Environment Manager's update
- Open cut rehabilitation update
- General Business and any other issues of concern from the community

The Baal Bone CCC is scheduled to meet again on 6th May 2010.

4.2.3 Baal Bone Newsletter

Baal Bone Colliery circulates a periodic community newsletter, *The Baal Bone Community Newsletter,* to approximately 250 neighbouring residents, to selected locations in Lithgow, Wallerawang and Portland, in addition to all Baal Bone employees and contractors.

The newsletter provides topical information regarding the mine's operational progress, environment and safety performance, and other areas of general interest including site rehabilitation and mine closure.

The last newsletter was distributed in late December 2009 and the next edition is scheduled for distribution in May 2010.

A Project Update Newsletter was also distributed to the local community during June / July 2009, to advise on Baal Bone's Project Application under Part 3A of the EP&A Act for continued operations past August 2010 (refer **Section 1.2.2**).

SECTION 5.0: REHABILITATION (in this AEMR period)

5.1 Buildings

No buildings were renovated or removed during the reporting period.

5.2 Rehabilitation of Disturbed Land

5.2.1 Final Landuse and Landform Design

As detailed in Baal Bone's current MOP, the basic objective for the rehabilitation of mined land at Baal Bone Colliery is to return the site to a condition where its landform, soils, hydrology, flora and fauna are self-sustaining, and compatible with the surrounding land fabric.

Therefore the proposed end land use for the site included a combination of grazing and bushland/wildlife habitat. This post-mining landscape would be dominated by Class V and Class VI which are compatible with adjoining lands. All rehabilitation and revegetation works undertaken at Baal Bone previously had been completed with this objective in mind.

A Final Landuse Options Workshop was held in November 2007 and included a range of agency and community stakeholders. This process validated the original rehabilitation objectives and confirmed the rehabilitation works completed to date were in accordance with these objectives.

5.2.2 Status of Land Shaping and Rehabilitation Works Completed During 2009

During the 2009 reporting period 447,621 t of coarse reject material from the CHPP was placed in the designated reject emplacement area. This material has been strategically placed around in and around the southern open cut pit to create the final design landform. Drainage paths, contour drains, ridgelines, and emplacements are being shaped in undulating informal profiles in keeping with natural landforms of the surrounding environment.

Rehabilitation activities are progressing in line the schedule proposed in the July 2009 MOP, notwithstanding the previous drought conditions. With the inclusion of the LW29-31 SMP area, the final rehabilitation of the fine and coarse reject emplacement area in the southern open cut precinct will not be commenced until after the cessation of mining in late 2012 (**PLAN 1**).

During 2009, approximately 81 ha of native revegetation was topdressed using Organic Life fertiliser at a rate of 500kg/ha and approximately 60 ha of improved pasture rehabilitation was also topdressed using Grower 12 fertiliser at a rate of 300 kg/ha.

All topdressing was completed in late September using a helicopter. Improved pasture areas also received an additional 20kg/ha of ryegrass and clover seed.

Concurrent with the topdressing operations, approximately 6.0 ha of sub-standard pasture sward on the northern face of the southern open cut was reworked. This included an application

of lime and gypsum with deep ripping. Seed and fertiliser was subsequently applied by helicopter.

Current rehabilitation status at the end of the reporting period is shown on **PLAN 1**. A summary of rehabilitation works at the start of the MOP period (July 2009), an estimate for the end of the MOP period (July 2016) and actual rehabilitation completed during 2009 AEMR reporting period are detailed in **Table 5.1**.

5.2.3 Stabilisation and Restoration of Ben Bullen Creek

In June 2007 a Natural Channel Design and Restoration Plan was prepared for the Ben Bullen Creek by Natural Resource Assessments Pty Limited (NRA) and Revegetation Contractors Pty Limited.

The Natural Channel Design includes a series of pools and riffles, interconnected via a meandering flowpath. It also includes the design of two significant grade stabilisation structures within the Ben Bullen Creek. Concurrence for these works have been obtained from Dept. Water and Energy (previously DNR) and Dept. Primary Industries – NSW Fisheries.

Implementation of works in Sections 1 and 3 commenced in late 2007 and were completed during 2009. Section 2 passes through the existing pit-top area and restoration works will not be implemented until final rehabilitation post mine closure.

In September and October 2009, planting of riparian vegetation (tube stock) commenced along Section 1 of the Ben Bullen Creek. Some tube stock planting of shelter areas was also incorporated into the pasture areas in the northern open cut rehabilitation precinct. Planting in both areas was suspended due to excessively hot and dry conditions in early Spring; planting is scheduled to recommence in Autumn 2010.

Table 5.1 Summary of Rehabilitation Performance

	Area Affected/Rehabilitated (hectares)		
	Start of MOP (July 2009)	**End of 2009 AEMR Reporting Period**	**End of MOP Period (July 2016)**
A: MINE LEASE AREA			
A1 Mine Lease(s) Area	5002 ha		
B: DISTURBED AREAS			
B1 Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	70.54 ha	70.54 ha	Nil
B2: Active Surface Mining Area (excluding items B3 - B5 below)	Nil	Nil	Nil
B3 Waste emplacements (dozer push and dumps in N and S) (active/unshaped/in or out-of-pit)	44.36 ha	44.36 ha	Nil
B4 Tailings emplacements (REA 5) (active/unshaped/uncapped)	9.88 ha	9.88 ha	Nil
B5 Shaped waste emplacement (awaits final vegetation)	5.60 ha	5.60 ha	Nil
ALL DISTURBED AREAS	130.38 ha	130.38 ha	Nil
C REHABILITATION PROGRESS (Cumulative)			
C1 Total Rehabilitated area (except for maintenance)	134.87 ha	134.87 ha	270.87 ha
D: REHABILITATION ON SLOPES (Cumulative)			
D1 10 to 18 degrees	38.25 ha	38.25 ha	38.25 ha
D2 Greater than 18 degrees	2.5 ha	2.5 ha	2.5 ha
E: SURFACE OF REHABILITATED LAND (Cumulative)			
E1 Pasture and grasses	59.99 ha	59.99 ha	89.39 ha
E2 Native forest/ecosystems	74.88 ha	181.48 ha	181.48 ha
E3 Plantations and crops	Nil	Nil	Nil
E4 Other (include non-vegetative outcomes)	Nil	Nil	Nil

5.3 Other Infrastructure

No other rehabilitation was undertaken during 2009 as a result of construction or decommissioning of site infrastructure.

5.4 Rehabilitation Trials and Research

There has not been any formal rehabilitation trials or research carried out at Baal Bone during the reporting period.

5.5 Development of a Detailed Mine Closure Plan

5.5.1 Mine Closure Planning

In accordance with Xstrata Coal STD5.12 Mine Closure Planning, Baal Bone is in the final stages of the preparation of a Detailed Mine Closure Plan.

Activities completed and/or initiated during 2009 have focussed on the following:

- Continuation of community consultation program
- Indicative market valuation of final Landuse options and accompanying cost to benefit and economic analysis of Landuse options (Trevor Hudson and Associates)
- Refinement of closure objectives and completion criteria for approved final Landuse options
- Development of scientifically based Rehabilitation Maintenance and Monitoring Plan using the concept of Landscape Function Analysis (LFA)
- Development of planned closure budget for approved land uses
- Annual Phase 2 Contamination Review for soil and ground water (AECOM Australia)
- Development of Detailed Mine Closure Plan document; this is to detail scope of all physical site works required, social mitigation/communication strategies, implementation costs, monitoring requirements, "sign off" and relinquishment procedures, closure indicators/milestones, timeline/critical path network etc.

Mine closure planning activities proposed for 2010 will focus on:

- Continuation of community consultation program
- Implementation of recommendations in Social Impact Assessment regarding redundancies
- Finalise hydrological and geochemical analysis of post completion water cycle
- Finalisation of closure budget and cost-benefit analysis
- Undertake risk assessments for demolition and decommissioning, and also for lease relinquishment activities
- Finalisation of closure objectives and detailed completion criteria to the satisfaction of stakeholders
- Annual Phase 2 Contamination Review for soil and ground water (AECOM Australia)
- Continuation of annual review and monitoring program using the concept of LFA
- Final collation of Detailed Mine Closure Plan document; this is to detail scope of all physical site works required, social mitigation/communication strategies, implementation costs, monitoring requirements, "sign off" and relinquishment procedures, closure indicators/milestones, timeline/critical path network etc.

It is proposed to have a Detailed Mine Closure Plan document prepared by early Q2 2010.

5.5.2 Rehabilitation Liability Estimate

Baal Bone's current Security Deposit as lodged with the Department in June 2008, is in the sum of $5,432,800.

As Baal Bone is approaching closure, and as part of our Detailed Mine Closure Plan, we have commissioned Liberty Industrial to prepare a Demolition and Decommissioning Study for the site. This Demolition Study included the preparation of a detailed demolition budget based on current industry rates; we concurrently working towards determination of our actual imminent closure costs, plus or minus 10%.

Therefore, as part of our calculation of the "close now" rehabilitation liability estimate for the 2009 AEMR, we have replaced the generic unit rates for decommissioning and demolition, as utilised previously, with the currently available detailed costing as determined above.

As a result, we have determined that our expected closure costs, at this point in time, have risen to $8,304,801.

SECTION 6.0: ACTIVTIES PROPOSED IN THE NEXT AEMR PERIOD

6.1 Operations and Systems

Projects and targets for the 2010 reporting period include the following:

- Receive Part 3A Project Approval from the Department of Planning for the continued operations at Baal Bone post 10 August 2010
- Renewal of Mining Purposes Lease 261
- Completion of extraction of LW29
- Continuation of SMP monitoring for LW 29-31 area
- Annual review and update of Baal Bone's EMS and E&C Risk Assessment, including all associated Management Plans and Procedures
- Finalisation of Detailed Mine Closure Plan
- Third party audit of Baal Bone's Coal Haulage Consent.

6.2 Rehabilitation

The majority of the rehabilitation works on both the north and south open cut precincts were completed during the 2008 reporting period. Focus for 2010 will continue to be on maintenance and/or improvement of rehabilitation works completed so far. Contingent upon climatic conditions at the time, it is anticipated that some reseeding and tree plants works may be undertaken in Autumn 2010.

It should also be noted that the southern void area will be maintained as a coarse and fine reject emplacement area for the remainder of the life of mine. Whilst it may be progressively or temporarily rehabilitated if the opportunity arises, final rehabilitation will be completed concurrent with mine closure. Similarly, the general underground infrastructure areas including the pit-top administration, bathhouses, workshops, conveyors, CHPP and rail loop will not be decommissioned and rehabilitated until after mine closure occurs.

Anticipated rehabilitation works to be completed within 2010 AEMR reporting period include the following:

- Maintenance of all existing rehabilitation areas in both the northern and southern open cut precincts
- Completion of riparian tree planting (tubestock) along the restoration works on Section 1 and Section 3 of the Ben Bullen Creek

6.3 Community Relations

Community Relation projects for the 2010 AEMR reporting period include the following:

- Preparation of two community newsletters;
- Hosting of two CCC meetings;
- Conducting a mine Open Day to highlight open cut rehabilitation works (TBC);
- Support of the Black Coal Competency Traineeship
- Augmentation of school resources at Wallerawang Public School
- Sponsorship of the Life Education Van to attend Wallerawang and Cullen Bullen Primary Schools
- Prize sponsorship of the Portland Art Show
- Sponsorship of team in the Movember Campaign
- Sponsorhip of book prizes for the Cullen Bullen School annual speech day
- Donation to Lithgow Christian Fellowship to provide Christmas lunch and Christmas hampers to the underprivileged in Lithgow.

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