



Centennial Coal



ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

Awaba Colliery

January 2011 to December 2011

**Mining Leases
Owned and Operated by
Centennial Newstan Pty Ltd
ABN 68 101 508 865**



TITLE BLOCK

<i>Name of mine</i>	AWABA COLLIERY
<i>Mining Titles/Leases</i>	Newstan Colliery Holding
<i>AEMR Commencement Date</i>	01/01/2011
<i>AEMR Completion Date</i>	31/12/2011
<i>Name of leaseholder</i>	CENTENNIAL COAL LIMITED
Name of mine operator (if different)	as above
Reporting Officer	Jeffrey Dunwoodie
Title	Environmental Coordinator
Signature	
Date	30 March 2012

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1 Introduction

Awaba Colliery is an underground coal mine operated by Centennial Newstan Pty Ltd, within the Newstan Colliery Holding producing coal by the bord and pillar method, using continuous miners. The mine has been operational since 1947. During this time over 35 million tonnes of coal has been won from the Great Northern Seam using a combination of first workings development, pillar extraction, pillar quartering, and pillar stripping. In March 2012 the Awaba Colliery entered a care and maintenance period with mining ceasing as the available coal reserves were exhausted at this time.

An application for a Part 3A Project Approval was lodged in March 2010 by Centennial for the Awaba Colliery Mining Project (the “Project”), which sought approval from the Minister for Planning to allow ongoing and extended underground mining and associated surface operations. The project was declared by NSW Department of Planning as a Major Project under Part 3A of the EP&A Act, with Director General’s Requirements (DGRs) issued on 22nd April 2010 (DA10_0038) for assessment under Section 75F of the Environmental Planning and Assessment Act (1979). The Environmental Assessment was submitted to the Department in September 2010. The Planning and Assessment Commission of New South Wales granted conditional approval to Centennial Newstan Pty Ltd (Centennial Newstan) for their Part 3A Application on the 13th of May 2011.

The mine entry and primary surface facilities are located approximately 1 km south of Awaba Township and 5.5 km south west of Toronto on Wilton Road. The mine extends from the western extremity of Lake Macquarie to the eastern foothills of the Watagan Mountains.

This AEMR has been developed in accordance with condition 3 of Schedule 5 of the Project Approval 10_0038, and as per Division of Resources & Energy (DRE) document “Guidelines to the Mining, Rehabilitation and Environmental Management Process”. (Document edg03 mremguide v3 dated January 2006).



Figure 1: Aerial photograph of Awaba Colliery Surface Facilities



1.1 Consents, Lease and Licenses

1.1.1 Leases

Awaba Colliery is wholly within the Newstan Colliery Holding and is subject to one mining lease and two mining purposes leases.

The Colliery overlies and is bordered to the north by Newstan Colliery, to the south east by Myuna Colliery and to the west and south west by Mandalong Mine, all Centennial mines.

The northern and eastern boundary of Awaba Colliery is also bordered by Mining Lease No. 1452 (ML1452).

The total mineral area for Awaba Colliery is 2519 hectares and comprises the Great Northern and Fassifern seams for the major portion of Consolidated Coal Lease 746 (CCL746). Surface leasehold land has an area of 1901.438 hectares. These areas are summarised in **Table 1**.

Table 1 - Summary of Colliery Lease Details

Plan ID	Title	Mineral (Ha) (Holding)	Surface (Ha) (Holding)	Expiry
	CCL746	2519	1900.00	31/12/2028
1	MPL327	Nil	1.041	25/03/2014
2	MPL328	Nil	0.397	25/03/2014
Total		2519	1901.438	

The leases above are held by Centennial Newstan Pty Ltd, and are included in a joint security deposit for Newstan.

1.1.2 Mining Leases

Consolidated Coal Lease 746 provides the right to mine for Awaba Colliery. The holding also includes two small surface areas comprised in Mining Purposes Leases 327 and 328.

Mining operations are controlled by the conditions contained within these mining leases, planning approvals and the provisions of the Coal Mines Health and Safety Act / Regulations and the Mining Act. This includes the successful periodic renewal of leases.

Table 1 shows details of mining leases and mining rights as they relate to the Awaba Colliery Holding

Awaba Colliery has no benefiting subleases with adjoining mining lease holders.



1.1.3 Authorisations (Exploration Licences)

Awaba Colliery has no authorisations or exploration licences under the Mining Act. Exploration for the Colliery is undertaken in accordance with the conditions of CCL746 and subject to the provisions of the Coal Mines Health & Safety Act and the Mining Act.

1.1.4 Security Deposit Calculation

Awaba Collieries DRE security deposit is included within the Centennial Newstan deposit of \$10,700,000 as per the review conducted in 2009. A copy of the rehabilitation cost calculation has been provided to DRE with the AEMR.

1.1.5 Consent Conditions

The Awaba Colliery Project Approval contains conditions that detail specific requirements on matters to be included in the AEMR. These are set out in Table 2 below, together with notation of the section of this document in which each matter is addressed. These sections of the report are to satisfy the Project Approval requirements and reporting of compliance to the Department of Planning & Infrastructure.

Table 2. Project Approval Condition Requirements

Project Approval Requirement	Section Addressed
Annual Review	
3. By the end of March 2012, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:	
(a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the next year;	Sections 3 & 5
b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the	
· the relevant statutory requirements, limits or performance measures/criteria;	Sections 3 & 4
· the monitoring results of previous years; and	
· the relevant predictions in the EA;	
c) identify any non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;	Section 3.20
d) identify any trends in the monitoring data over the life of the project;	Sections 3 & 4
e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and	Section 3
f) describe what measures will be implemented over the next year to improve the environmental performance of the project.	Sections 3 and 5



1.1.6 Environment Protection Licence

Awaba Colliery operates under current Environmental Protection Licence 443 administered by the Office of Environment & Heritage (OEH). A copy of the 2011 Annual Return is provided in **Appendix 1**.

1.1.7 Dangerous Goods

The Colliery does not store any dangerous or reportable goods above the manifest quantity requiring Notification to Workcover. Dangerous Goods License No 35/025012 was surrendered to Workcover in March 2006.

1.2 Mine Contacts

Acting Mine Manager: Alex Brown

Work Phone: 02 4950 3420

Mobile Phone: 0427 367 706

Environmental Coordinator: Jeffrey Dunwoodie

Work Phone: 02 4956 0206

Mobile Phone: 0448 490 023

Environmental Officer: Nerida Manley

Work Phone: 02 4956 0214

Mobile Phone: 0427 015 647

1.3 Actions Required at Previous AEMR Review

No actions were required following submission of the 2010 AEMR.



2 OPERATIONS DURING THE REPORTING PERIOD

The area of mining undertaken during the reporting period can be found on plan AW2232. Mining proposed for the 2012 reporting period is highlighted on plan AW2233.

The site rehabilitation plan was approved by the DRE on 28 June 2011.

2.1 Exploration

Drilling occurred on CCL 746 within the reporting period in accordance with the *Awaba East Exploration Project Review of Environmental Factors* dated August 2008, approved on the 1/9/08, and *Stage 2 Awaba East Exploration Project Review of Environmental Factors (REF)* May 2009, approved on the 13/7/09. Modifications were made to the 2008 REF and approved on the 15/12/08, & 9/4/09, and a third modification to both REF's was approved on the 4/11/09.

The drilling details in accordance with the above approvals which occurred within CCL746 can be found in the table below. Please note additional drilling occurred outside of the Awaba lease area in accordance with the above Approvals.

Table 3: Exploration Boreholes drilled in reporting period

BoreID	Easting	Northing	Collar	Started	Finish	TARGET SEAM
CAE53	362858.304	6344881.451	52.487	08/03/11	25/03/11	West Borehole
CAE54	363195.321	6343759.291	52.948	29/03/11	10/05/11	West Borehole

2.2 Land Preparation

No land preparation on the Awaba lease was undertaken for Awaba operations.

2.3 Construction

No additional mine infrastructure for Awaba operations was constructed during the report period. Works onsite were limited to necessary maintenance of existing plant.

2.4 Mining

Mining at Awaba Colliery has been ongoing in the Great Northern Seam since 1947. The mine in this time has extended to the limits of its boundaries and is now retreating to extract the remaining safely accessible coal. The Great Northern Seam ranges from less than 2.0 m to more than 4.0 m in thickness but generally varies between 2.5 and 3.5 m. The Great Northern seam within the Awaba Colliery is shallow, ranging from 15 to 100 m depth of cover. The seam dips generally in the westerly direction, and is generally thinner to the east.



The primary method of production in recent years has been pillar extraction within narrow panels leaving coal pillars or barriers between adjacent narrow panels. The majority of the pillars are pre-existing, having been developed many years ago.

In areas where there are large pre-existing pillars or blocks of “virgin coal”, roadways are driven and supported with additional pillars (in virgin coal) formed using traditional bord and pillar mining methods. These pillars are then subsequently extracted (or left as barriers). All coal is won using continuous miner machines. The mining sequence involves extracting between three or four rows of pillars and leaving at least one row as support. Depending on geotechnical advice, the resulting voids from this method may range between approximately 40 m and 100 m in width (key design parameter), and up to 500 m in length.

Mine planning ensures panels are not extracted where depth of cover or surface constraints preclude total extraction. This mining method was developed in consultation with DRE and has been utilised successfully to date.

The mining method is based on the requirement to maximise resource recovery while preventing any rapid uncontrolled collapse of the overlying Teralba Conglomerate impacting on the goaf edge stability, safety for the underground miners or subsidence on the surface. The proposed layout minimises the risk of rapid collapse of the conglomerate by keeping spans in the extraction panels to less than approximately 100 m. There is a high level of confidence in this design as the Teralba Conglomerate is known to be a relatively consistent unit across the majority of the mining area. In general, void widths of up to 100 m are considered conservative and ongoing geotechnical advice is sought to confirm the void widths before extraction. Predicted maximum subsidence for the current mining method is typically assessed to be less than 200 mm (upper limit used for assessment) although generally subsidence is predicted to be within a range of 90-135 mm.

Mining has been ongoing in the Main South Area (MSA) following staged SMP approvals received from the DRE in 2005, 2008, and 2010 under the NSW Mining Act, 1992. Mining undertaken to date in the MSA has involved the following:

- Stage 1 – This area is located at the southern end of the MSA and received SMP approval in 2005. This was the first area to utilise the current mining method, developed in consultation with DRE of pillar extraction using narrow panels. Mining within Stage 1 area was completed in June 2009.
- Stage 2 – The second stage of the MSA gained SMP approval in September 2008. Mining in this area was undertaken using the same total extraction method used successfully in Stage 1. Mining in this area was completed in March 2012.
- Stage 3 – The third stage of the MSA gained SMP approval on 15 December 2010. Mining in this area was undertaken using the same total extraction method used successfully in Stage 1 and 2. Mining in this area was completed in March 2012.
- East B – Mining commenced in this area following the approval of the East B Extraction Plan on 26 July 2011. Mining in the East B area was completed in December 2011.

The operating hours at Awaba Colliery are 24 hours 7 days per week. The current operational structure includes two (2) production panels working up to three (3) unit shifts per day each.



Equipment used onsite include:

Activity	Equipment Details	Quantity
Coal Mining	• Joy 12CM12 Continuous Miner	1
	• Eimco 25M3 continuous miner (Engart dust scrubbing system)	1
	• Joy 15SC shuttle car	6
	• Stamler Feeder breaker	1
	• Klockner Becorit Feeder Breaker	1
	• Hexham breaker feeder	1
	• VA Breaker line Supports (BLS)	4
	• Fletcher Mobile Roof Supports (MRS)	2
	• ARO twin boom 1400 Series rotary percussive bolter	1
	• Joy / Cram single mast rotary percussive bolter	4
	• Joy twin book multibolter	1
Coal Processing	• Screen (350 tonnes/hr)	3
	• Primary sizer (1200 tonnes/hr)	1
	• Secondary sizer (350 tonnes/hr)	2
	• Conveyor belt (ranging from 37KW to 150KW)	12
	• 800t run of mine bin (660 tone /hr)	1
Ancillary Equipment	• Emico 913 LHD (Underground)	5
	• MineCat skid steer loader (ug) (Hire)	1
	• Surface Fork Lift 10 tonne (Hire)	1
	• 4WD vehicles for inspection etc.	1
	• Underground man transport vehicles (PJB / SMV)	4
Coal Loading (Giacci)	• front end loader (utilised during occasions where coal is stockpiled)	1
	• 500t final product bin (1000t/hr)	1
Product Coal Haulage (Giacci)	• Road Trains (88t Gross – 58t Net)	5

Table 4: Equipment used at Awaba Colliery.

2.5 Mineral Processing

No mineral processing is undertaken on site at Awaba Colliery. Mined coal is transferred to the surface by a number of conveyors and through the Run of Mine (ROM) Bin before arriving at the Coal Preparation Plant (CPP) located at the Awaba Colliery pit top area. The CPP is comprised of three screens that coal is initially passed through before entering the primary and one of the two



secondary crushers. The final product size is adjusted to suit market demands and is generally less than 100 mm. This material is then delivered to the Final Product Bin by conveyor. From the Final Product Bin coal can be loaded into trucks for transport off-site, or, stockpiled in an adjacent area. Awaba Colliery has the capacity to stockpile up to 30,000 tonnes of ROM coal.

Raw materials are transported directly to Eraring Power Station or to Newstan Coal Preparation Plant via the Eraring private haul road. The entire ROM production for the report period was delivered as saleable coal.

2.6 Waste Management

There are a variety of waste management systems that were maintained during the reporting period at Awaba Colliery; including the following.

- Waste oil recycling
- Waste paper and cardboard recycling
- Scrap steel recycling
- Waste minimisation practices.

Waste oil is collected within an oil water separator, and two 1,000L IBC's located on the mine surface. A contractor regularly services and maintains the oil water separator. Weekly inspections are also conducted on the oil water separators to ensure proper operation. A licensed contractor working within the waste tracking provisions of the *Protection of the Environment Operations Act* (POEO Act) removes all waste oil and greases generated on the site.

General rubbish from the operation is sorted and placed into bins for recycling, reuse and disposal to land fill. Recycling at Awaba includes cardboard and paper from the offices and store, the draining and disposal of 20L oil drums, and the collection and recycling of waste oil.

The Waste Management System is monitored via a weekly environmental inspection where the status of waste oils, waste steel, waste cardboard/paper containers are reviewed for appropriate disposal, and recorded for compliance with the waste tracking guidelines within the POEO Act.

During the 2011 reporting period environmental awareness training was completed for all personnel at the Awaba Colliery.

2.7 Ore and Product Stockpiles

The Colliery has the ability to stockpile approx 30,000 tonnes of ROM coal. There are no plans to increase the stockpile capacity.



2.8 Water Management

2.8.1 Surface Runoff and Mine Water

Awaba Colliery pit top is located adjacent to Stony Creek. The aim of Awaba's water management system is to ensure that clean water is diverted away from potential contamination and discharged directly into Stony Creek. Contaminated runoff is retained within the Colliery Pollution Control System and pumped to underground workings for residence time and filtration through goaf areas before being pumped to the surface at either LDP004, or the 10 South Borehole and into Eraring Ash Dam. LDP005 ceased discharge in March 2010.

Clean water is diverted from buildings including the main administration building, bathhouse, workshop complex and hard stand areas via a network of downpipes, dish drains and underground storm water pipes directly into Stony Creek. This minimises the potential for contamination and maximises the effectiveness of the water pollution control system in the event of excessive rainfall.

The yard is divided into two separately drained areas. Areas being classified as clean water are diverted directly into Stony Creek, while the other areas are classified as contaminated. The areas zoned as contaminated are due to the potential risk of hydrocarbon and sediment contamination from the movement and maintenance of equipment. The runoff from these areas is intercepted by drive in sumps and an oil water separator and directed into the Pollution Control Dam (PCD).

Potable water usage for general surface and underground operations for the reporting period was 47.78ML. Water is used on the surface in the bathhouse, for equipment cleaning, and underground for dust suppression, and fire fighting supply.

On 20 October 2011, the Office of Environment & Heritage (OEH) approved a licence variation application for EPL 443 to allow Awaba to accept up to 4ML/day of water transferred from the Newstan underground workings. This water is stored within the Awaba Great Northern Seam workings. From 20 October 2011 to 31 December 2011 a total of 162ML had been transferred from Newstan to the Awaba Colliery underground workings.

2.8.2 Water Balance

The water balance completed for the Awaba Colliery Water Management Plan and for the Awaba Colliery Mining Project predicted that the annual average discharge (ML/year) from the Awaba underground workings would be 278.1 ML per annum. Table 5 includes the actual quantities discharged from the Awaba Colliery underground workings.

Table 5: Water Balance

Year	Water Use (ML)	Water pumped from 10 South (ML)	LDP004 (ML)	LDP009 (ML)
2011	47.78	140.763	1.785	0.075



2.9 Hazardous Material Management

Material safety data sheets are maintained for all substances used on site. Chemwatch an electronic chemical, MSDS, and handling system is utilised to assist chemical management.

No hazardous material or waste was disposed of on site.

The condition of supply of goods incorporates the supply of MSDS by the product supplier/vendor. This is implemented by means of a condition placed on stores purchase order forms. The MSDS's are managed as per the Colliery Hazardous Substances Safety System, with hard copies located in the first-aid room and electronic copies available on the company intranet.

2.10 Other Infrastructure Management

The Awaba Colliery is listed in the City of Lake Macquarie Heritage Study (1993) as item AW-07. Awaba Colliery is not listed as an LEP (Local Environmental Plan) item but is treated as a provisional heritage item under LMCC DCP1 2004.

Surface infrastructure at the Colliery comprises:

- Mine entry/exit for personnel and materials (1:20 Decline).
- Old mine entry/exit for personnel and materials (1:5 Decline).
- Coal conveyor drifts (1:3.5 Decline and 1:5 Decline).
- Limited coal handling facilities for breaking, crushing, sizing and storing product
- Overland conveyor systems
- Administration and bathroom facilities
- Workshop facilities
- Pollution control apparatus
- Enclosed and bulk open material and equipment stores facilities
- Mine ventilation equipment
- Air compressors
- Internal roads and car parking facilities
- Nine remote de-watering bores and security enclosures.
- Ballast borehole (delivery of ballast direct to underground workings).

The total area of effect of the colliery surface infrastructure is approximately seventeen hectares.

Table 6: Production and Waste Summary

	Start of Reporting Period (13 May 2011)	End of Reporting Period (31 December 2011)	End of Next Reporting Period (Estimated)
Topsoil stripped	0	0	0
Topsoil used/spread	0	0	0
Waste rock	0	0	0
Ore	0	0	0
Processing Waste	0	0	0



Product (Tonnes)	0	643,814t	0
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Table 7: Stored Water

	Start of Reporting Period	End of Reporting Period	Storage Capacity
Clean Water (m ³)	40,000	40,000	40,000
Dirty Water (m ³)	1,879	1,879	3,187



3 Environmental Management and Performance

In October 2011, an Environmental Management Strategy (EMS) was developed for the Awaba Colliery in accordance with Condition 1 of Schedule 5 of the Project Approval (10_0038) and approved by the Department of Planning & Infrastructure in November 2011.

The EMS has been developed to provide an effective management strategy to identify and control potential environmental impacts to achieve compliance with environmental legislation and regulatory requirements applicable to Awaba Colliery.

The objectives of the EMS are as follows:

- Provide the strategic framework for the environmental management of the Project;
- Identify the statutory approvals that apply to the project;
- Describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
- Describe the procedures that would be implemented to:
 - Keep the local community and relevant agencies informed about the operation and environmental performance of the project (receive, handle, respond to and record complaints);
 - Respond to any non-compliance;
 - Respond to emergencies;
- Include copies of any strategies, plans and programs approved under the conditions of this approval; and
- Include a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.

As required by the EMS, Awaba Colliery uses the risk assessment process to identify safety, environmental and business risks in its operations. Involving its employees (and external experts where necessary) to recommend appropriate controls for these risks. Focus is on the inter-relationship between:

- People.
- Machinery.
- Methods of work.
- Environment.

An annual environmental risk assessment was completed in 2011 as part of the AEMR process as a requirement of DRE. The purpose is to identify mine activities, processes and facilities which require control strategies to ensure environmental protection and compliance with conditions of the lease, licence and consents. This environmental risk assessment is attached in **Appendix 2**.



3.1 Air Quality & Dust

An Air Quality & Greenhouse Gas Management Plan was established at Awaba in October 2011 in accordance with Condition 7 of Schedule 3 of the Project Approval and approved by the Department of Planning & Infrastructure in November 2011. In order to determine the effectiveness of the colliery's dust control measures, a network of dust depositional monitoring gauges have been established. Depositional gauges are located within the Colliery perimeter as well as adjoining areas. A total of 4 depositional gauges are utilised, all located within the Colliery boundary. The following graph **Figure 2** displays Awaba's Annual Average Dust Deposition in 2011 (Insoluble Solids).

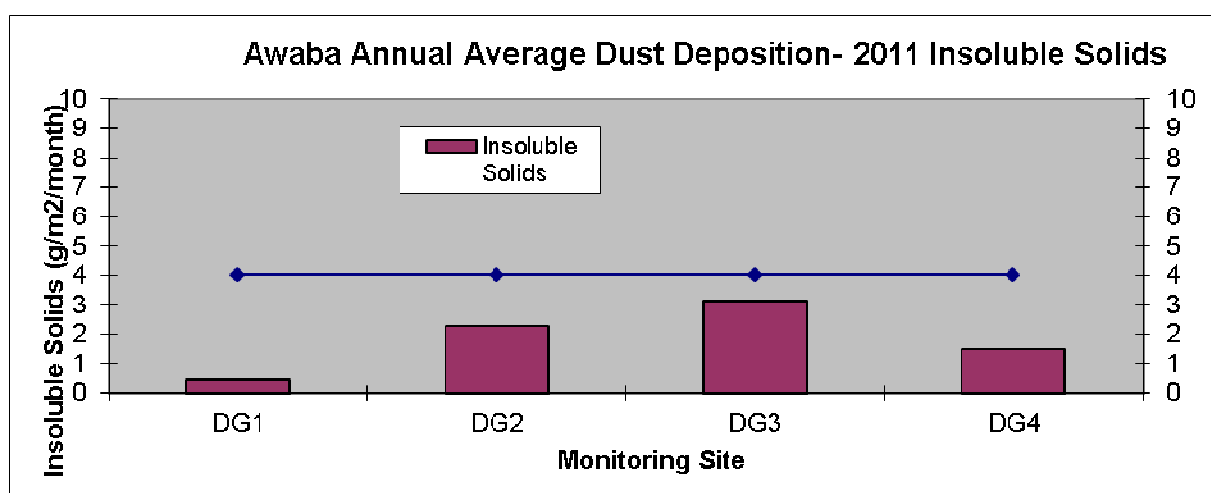


Figure 2: Awaba Average Annual Dust Deposition for 2011.

Samples are taken from the depositional gauges every 28 days as per *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* as administered by the Office of Environment & Heritage As predicted with in the Environmental Assessment for the Awaba Colliery Mining Project dust deposition levels were below the Project air quality criteria at all surrounding dwellings.

A dust suppression system (sprinklers) was installed adjacent to the Awaba Colliery stockpile to reduce the dust emissions from the roadways and stockpile area.

A requirement of the Project Approval and the EPL is to install a high volume air sampler to evaluate the performance of the project. Discussions with the Lake Macquarie City Council (LMCC) have been ongoing since August 2011 to potentially allow for the installation of a high volume air sampler adjacent to the Awaba tennis courts.

3.2 Erosion and Sedimentation

An Erosion and Sediment Control Plan was developed for the Awaba Colliery in October 2011 in accordance with Condition 19 of Schedule 3 of the Project Approval and was approved by the Department of Planning & Infrastructure in November 2011.



The only land disturbing activities that occurred at the Awaba Colliery during the reporting period were as a result of sinkhole rehabilitation works which are discussed in Section 3.20.

3.3 Surface Water

Water monitoring is undertaken in accordance with the approved Water Management Plan, Project Approval and Environment Protection Licence 443 requirements. Figures 3, 4, 5 and 6 show the pH, total suspended solids (TSS), oil & grease and electrical conductivity (EC) trends for LDP004 and LDP009 in 2011. A detailed summary of the surface water monitoring results for 2011 (including metals) are provided in the Annual Return in **Appendix 1**. Surface monitoring locations are provided in on **Plan AW1040**.

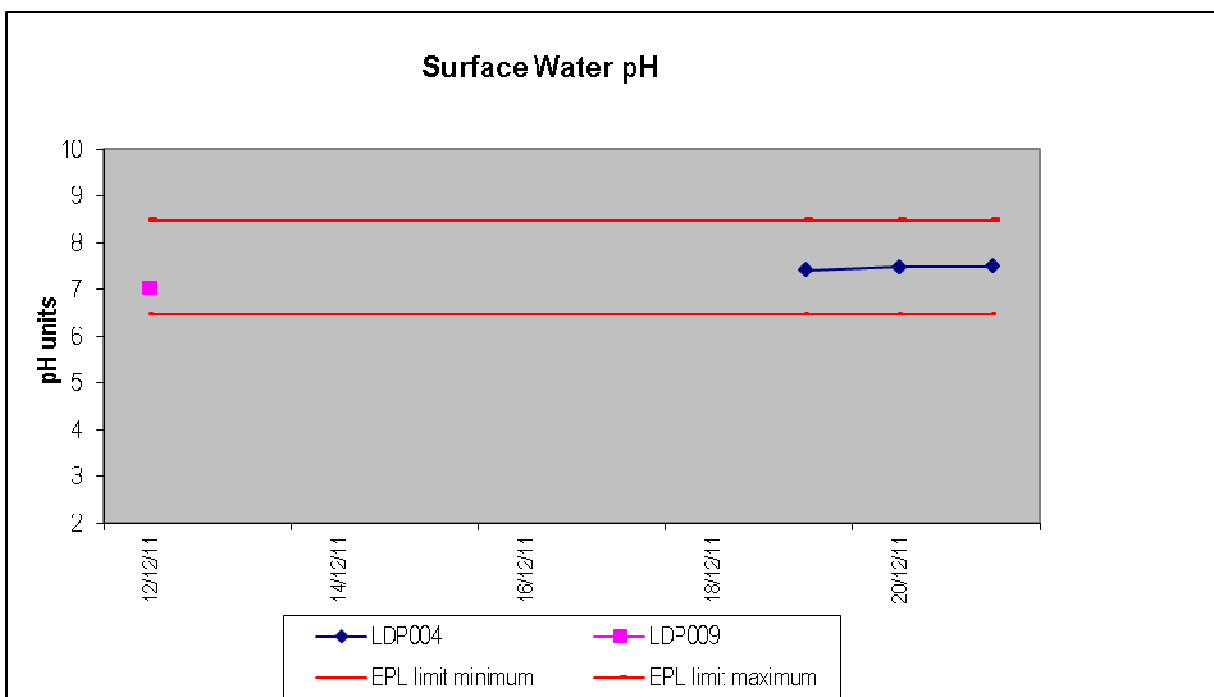


Figure 3 - LDP004 and LDP009 pH trends (2011)

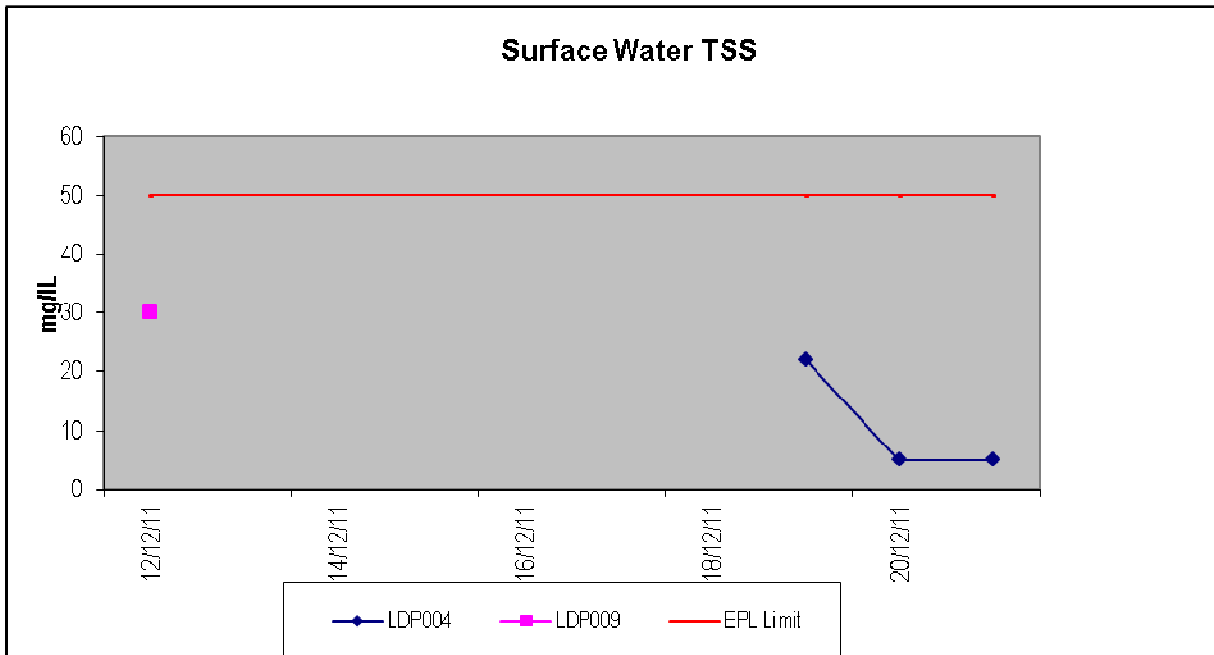


Figure 4 - LDP004 and LDP009 TSS trends (2011).

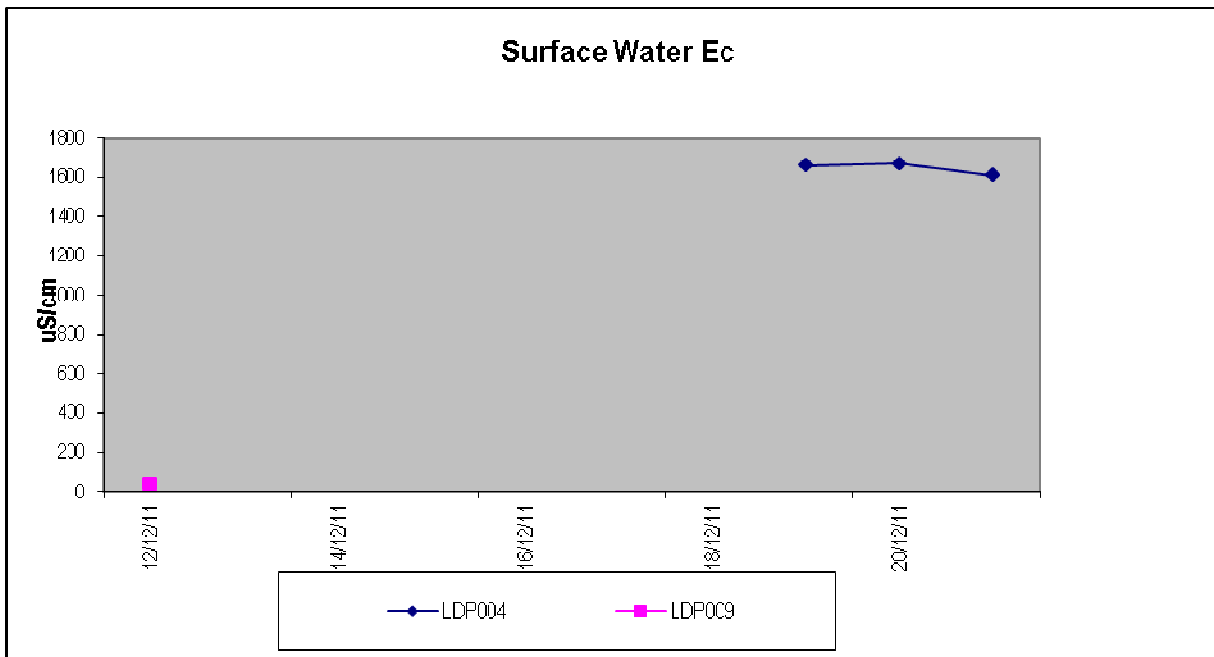


Figure 5 - LDP004 and LDP009 EC trends (2011).

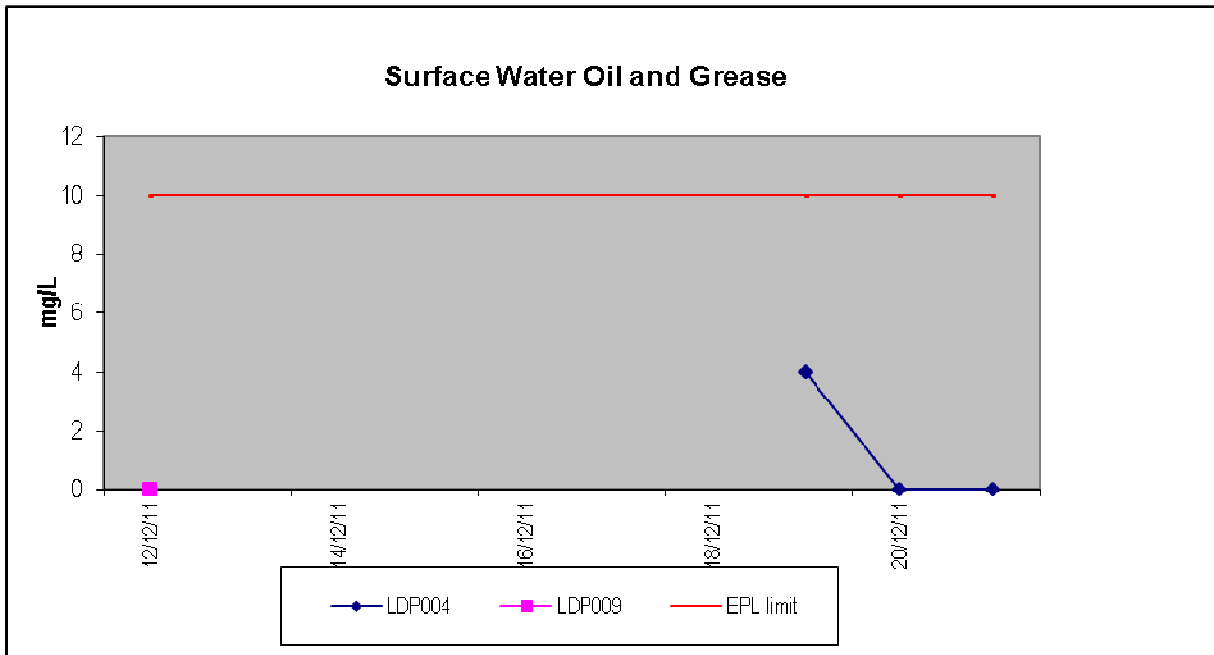


Figure 6 - LDP004 and LDP009 Oil and Grease trends (2011).

The Water Management Plan for Awaba Colliery was developed in October 2011 as per Condition 17 - 22 of Schedule 3 of the Project Approval and was approved by the Department of Planning and Infrastructure in November 2011.

During the reporting period a detailed surface water risk assessment (failure modes and effects analysis) was reviewed for the Awaba Colliery.

The Awaba Pollution Control Dam (PCD) was de-silted to increase capacity using a long reach excavator during the reporting period and an additional pump was also installed in the PCD to reduce the likelihood of discharge. Plans for the expansion of the PCD are dependent on the decommissioning of infrastructure at Awaba within 2012.

Upstream and downstream sampling has continued along Stony Creek to establish natural background concentrations, along with the introduction of an additional reference site in the Jigadee Creek catchment area as recommended in the surface water assessment completed for the Environmental Assessment.

3.4 Groundwater

Water underground is generated from groundwater which is released from the strata into underground mine workings. The collected water is pumped through an extensive goaf/underground dam system that allows filtration and settlement. The water is then pumped from the mine via licensed discharge point 004, and via the 10 South Borehole into the Eraring Ash Dam. Discharge from LDP005 ceased in March 2010.



In October 2011, a Groundwater Monitoring Program was developed in accordance with Condition 21 of Schedule 3 of the Project Approval (10_0038) and approved by the Department of Planning and Infrastructure in November 2011.

As recommended by the Groundwater Monitoring Program two groundwater bores will be installed within the Stony Creek alluvium in early 2012 upstream and downstream of the Awaba Colliery Pit Top. Monitoring of water levels in the proposed alluvial bores in Stony Creek will be conducted and recorded on a monthly basis.

The purpose of monitoring the alluvials in Stony Creek is to identify any adverse impacts on groundwater dependant ecosystems and riparian vegetation located in the vicinity of the creek. The trigger for impacts on the Stony Creek alluvium will be flagged when a decreasing underlying trend of the water levels in the bores is detected. The underlying trend can be determined when water levels have been separated from the effects of rainfall. Groundwater monitoring results will be provided in the 2012 AEMR.

3.5 Contaminated Land

A hazardous materials assessment of the site was also completed in 2009 to assist the colliery in meeting its obligations under the *Occupational Health & Safety Regulation 2001*. The objective of the survey was to identify the location and condition of visually accessible asbestos-containing and other hazardous materials present on the site. Subsequently as a result of this report an Asbestos Management Plan was developed for the site.

A Phase 1 Environmental Site Assessment (ESA) was completed in the 2009 reporting period. The objective of the Phase 1 ESA was to assess the potential for soil and groundwater contamination and using the findings determine if further assessment is required.

There were several areas which were observed to be potentially impacted by Contaminants of Potential Concern (CoPC's). The Phase 1 report recommended that a Phase 2 site assessment be completed to identify the risks of contamination to possible receptors. The Phase 2 site assessment is scheduled to be undertaken in early 2012.

In 2010, Awaba Colliery undertook an environmental assessment to support a Part 3A application to continue mining. During this assessment, the risks associated with contaminated land were reviewed, and the Mine closure Plan updated to include commitments arising from the assessment.

3.6 Flora & Fauna

A Biodiversity Management Plan was developed for Awaba Colliery in October 2011 in accordance with Condition 23 of Schedule 3 of the Project Approval and was approved by the Department of Planning & Infrastructure in November 2011.

Hunter Eco consultants undertook the annual monitoring of riparian vegetation along Stony Creek in March 2011 (**Appendix 3**). A detailed baseline survey was first undertaken in 2008 of the vegetation along Stony Creek with subsequent surveys undertaken to assess whether there has been any changes



in vegetation that may be attributed to mining operations, in particular subsidence impacts within the Main South Area. A groundwater dependent ecosystem (GDE) of riparian vegetation was also identified along Stony Creek within the Main South Area by Hunter Eco in 2010 during the ecology survey for the Awaba Colliery Mining Project. The survey completed in March 2011 identified no impacts to the Stony Creek GDE and no substantial changes in vegetation since the baseline survey was completed in 2008.

Ecologists from RPS were also engaged in June 2011 to complete an ecological survey of the area of proposed disturbance for the rehabilitation of the Stage 3 sinkhole (refer to Section 3.20 for further details). The aim of the survey was to identify whether any threatened species or ecological constraints existed within the plug failure area. The ecological inspection found that the proposed subsidence rehabilitation activities were unlikely to have a significant impact on threatened species, populations or ecological communities in the area.

No additional flora or fauna monitoring was requested by the Director General, Department of Planning & Infrastructure during the reporting period.

3.7 Weeds

Weed and pest management was undertaken by Greg Hall Pest Control throughout the reporting period.

Records of chemical usage are kept on site.

3.8 Blasting

No blasting was undertaken in the reporting period and therefore no monitoring was required.

3.9 Noise

A Noise Management Plan for Awaba Colliery was developed in October 2011 as per Condition 2 of Schedule 3 and was approved by the Department of Planning and Infrastructure in November 2011.

Attended noise monitoring commenced in November 2011 at two locations identified within the Noise Management Plan and the Project Approval. The operator attended survey consists of a daytime period (7am – 6pm), an evening (6pm – 10pm) and two night surveys (10pm – 7am) for each of the monitoring locations.

Quarterly noise monitoring undertaken in November showed that Awaba Colliery was in compliance with the noise criteria set out within Condition 1 of Schedule 3 along with the predictions made within the Environmental Assessment.



DAY MINE CONTRIBUTIONS		
Monitoring Location	Noise Criteria dB(A) L_{Aeq} (15 minute)	Sound pressure level dB(A) L_{Aeq} (15 minute)
1A Olney Street, Awaba	37	Nil
15 Evans Street	35	Nil

EVENING MINE CONTRIBUTIONS		
Monitoring Location	Noise Criteria dB(A) L_{Aeq} (15 minute)	Sound pressure level dB(A) L_{Aeq} (15 minute)
1A Olney Street, Awaba	36	Nil
15 Evans Street	35	Nil

NIGHT MINE CONTRIBUTIONS				
Monitoring Location	Noise Criteria dB(A) L_{Aeq} (15 minute)	Sound pressure level dB(A) L_{Aeq} (15 minute) Night 1, 2	Noise Criteria dB(A) L_A (1 minute)	Sound pressure level dB(A) L_A (1 minute) Night 1, 2
1A Olney Street, Awaba	36	Nil, Nil	46	Nil, Nil
15 Evans Street	35	Nil, Nil	45	Nil, Nil

Table 8: Awaba 2011 Acoustic Assessment Results

3.10 Meteorological Monitoring

A meteorological monitoring station was installed in April 2011 to comply the requirements of EPL443. The meteorological station complies with the requirements of AS 2922 1987.

Total rainfall for the reporting period is shown in the Table 9 below.

Table 9: Awaba Rainfall Data

Total Rainfall for 2011 (mm)	
Month	2011
Jan	No data
Feb	No data
Mar	No data
Apr	8.4
May	131.6
Jun	181.6
Jul	164.6
Aug	48.4
Sep	109.8
Oct	137.4
Nov	193
Dec	183
Total Rainfall	1157



3.11 Greenhouse Gas

Table 10 provides a summary of Awaba's Greenhouse Gas emissions for the 2011 AEMR reporting period.

Table10: Awaba's Greenhouse Gas emissions for 2011.

Emissions Summary (CO₂-eT)	
	2011 Total
Electricity	8,178.25
Diesel	804.16
Fugitives – CH₄	1.43
Fugitives – CO₂	8534.10
Total GHG Emissions (tonnes)	17,517.95

3.12 Visual, Stray Light

There are topographic and vegetative barriers between the Awaba Colliery and the nearest residences which act as a barrier, reducing the visual impacts to residents. As such there have been no visual or stray light issues.

3.13 Cultural Heritage

Cultural heritage management at Awaba Colliery is documented in the Archaeology and Cultural Heritage Management Plan completed in October 2011.

During the reporting period quarterly subsidence inspections were undertaken for the areas of moderate and high Aboriginal archaeological sensitivity (as identified in the Aboriginal Heritage Impact Assessment completed for the Awaba Colliery Mining Project) within the East B Area, along Stony Creek and adjacent to a tributary of Stony Creek. Subsidence inspections completed in 2011 found no visual disturbances, or abnormal changes due to mining operations in these areas.

Archaeologists from RPS were also engaged in June 2011 to complete an archaeological survey of the area of proposed disturbance for the rehabilitation of the Stage 3 sinkhole (refer to Section 3.20 for further details). Awaba Colliery sought archaeological advice from RPS to assist in the review of relevant environmental and heritage information to identify whether Aboriginal places or objects were present in the subsided area and to determine if they were at risk of being impacted upon. The area containing the plug failure was to be subject to revegetation works as part of the rehabilitation programme for the plug failure. No Aboriginal cultural heritage items were identified during the survey or during the rehabilitation works.



European heritage items at the Awaba Colliery have been identified within the Proposed Schedule of Heritage Sites and Items (Table 11). Each of these items has been proposed for heritage listing within the Lake Macquarie Local Government Area (LGA) Local Environmental Plan (LEP). It is important to emphasise that the items in Table 11 will not appear within the Lake Macquarie LGA LEP because they are only listed within the proposed/draft schedule.

Table 11: Proposed Schedule of Heritage Sites and Items

Name of Item	Item Number
Awaba-Wangi Railway Line	AW-07
Awaba State Mine	AW-07
The Water Pumping Station	AW-06

The buildings including the Administration Office and the Workshop at the Awaba Colliery Pit Top area associated with the Awaba State Mine (AW-07) have been identified with local significance in the Lake Macquarie Inventory, in addition to the Awaba-Wangi Railway Line under the same item number (AW-07). The Water Pumping Station (AW-06) has also been identified in two previous reports as having a very high potential local heritage significance in term of representing extractive industries in the area (Suters Architects Snell 1993a; Suters Architects Snell 1996b).

Awaba Colliery is currently preparing a Post Mining Heritage Management Plan in accordance with Condition 31 of Schedule 3 of the Project Approval. This management plan will include a study of the significance of the existing European heritage on the site which will be undertaken in 2012.

3.14 Spontaneous Combustion

There were no occurrences of spontaneous combustion during the reporting period. A Spontaneous Combustion Management Plan has been prepared in accordance with Condition 11(g) of Schedule 3 of the Project Approval and was approved by the Executive Director of Mineral Resources (Division of Resources & Energy) in July 2011.

3.15 Bush Fire

All surface structures have fire protection equipment installed around them and are compliant with the Coal Mines Health and Safety Act. A designated Fire Officer is in charge of maintaining the fire equipment on the surface and underground areas of the site.

Regular mowing of the lawns surrounding the building structures ensures fire fuel loading is well within acceptable limits. Asset protection zone and hazard reduction slashing was completed in the reporting period.

A Bushfire Management Plan was developed for the Awaba Colliery in the 2010 reporting period.



3.16 Mine Subsidence

Monitoring in the reporting period was conducted in accordance with the Subsidence Management Plan (SMP), SMP approval conditions and the Extraction Plan (as required by Condition 11 of Schedule 3 of the Project Approval) and the associated subsidence monitoring program. Table 12 briefly outlines the subsidence monitoring and results conducted in accordance with the relevant SMP conditions.

Table 12: Subsidence Monitoring Results

Monitoring Results in Accordance with Awaba's SMP Conditions			
Main South Condition No (Stages 1, 2 and 3)	3 North Condition No	Document	Monitoring Results
12.	12	Subsidence Monitoring Programme	<p>Maximum subsidence in Main South Stage 1 was -126mm on 09/03/2010, which was within the defined predicted subsidence levels. There was no subsidence impact in monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road Bridge or Railcorp Power Poles. Note that Stage 1 Mining was completed on 26/06/2009.</p> <p>The maximum subsidence in the Stage 2 area was -75mm recorded on 12/10/2010.</p> <p>The maximum subsidence in the Stage 3 area was -30 mm with no impacts on the infrastructure within the Stage 3 area (Eraring Haul Road, Telstra Tower, Rail Corp & Ausgrid Power Poles).</p> <p>Statutory inspections undertaken by mining officials have found no evidence of underground roof failure.</p> <p>Ongoing visual inspections undertaken on a quarterly basis have found no evidence of surface impacts.</p> <p>Subsidence has been within predicted levels and has had no detectable adverse impact on surface infrastructure.</p> <p>Maximum subsidence recorded in the 3 North Area was -60mm on 07/06/2010. Note that 3 North Mining was completed on 25/01/2010.</p> <p>Statutory inspections undertaken by mining officials</p>



			<p>have found no evidence of underground roof failure.</p> <p>Visual inspections continuing have found no evidence of surface impacts.</p>
13.	13	Environmental Monitoring Programme	<p>A Stony Creek vegetation study was completed in 2009, 2010 and 2011 in accordance with the Environmental Management Plan.</p> <p>The ecological monitoring of riparian vegetation along Stony Creek at Awaba (Appendix 3) was completed as a follow up on the baseline study completed in 2008. This study was undertaken to assess whether there has been any evident changes in the vegetation that may be attributed to extraction operations.</p> <p>This study found that the vegetation along Stony Creek was essentially the same as recorded in 2008, and there was no evidence of cracks that may be attributed to subsidence.</p> <p>Additional quarterly creek inspections were undertaken to identify the following; surface cracking along creeks, step change in bed, damage to drainage channels, and ponding. Visual inspections found no visual disturbances, or abnormal changes due to mining operations.</p>
15.	14	Spontaneous Combustion Management Plan	<p>Surface visual inspections did not identify any sinkholes during the reporting period in the Main South or 3 North Areas (or other areas) apart from the Stage 3 sinkhole as described in Section 3.20 of this AEMR.</p> <p>Stockpiling of coal on the surface did not occur over long periods of time during the reporting period.</p> <p>Production district inspections & out-bye inspections found no abnormal gas results that may indicate or cause spontaneous combustion in the underground workings.</p> <p>History of the mine shows that there have been no known spontaneous combustion events since opening in 1947.</p>
20.	15	Public Safety Management	<p>Visual inspections were completed on a monthly basis during 2011 as per the Public Safety</p>



		Plan	Management Plan. Inspections were undertaken to identify the following; surface cracking, step changes in road pavement, and damage to drainage, watersheds and creeks. Additional creek inspections aim to identify surface cracking along creeks, step change in bed, damage to drainage channels, and ponding. Visual inspections found no visual disturbances, or abnormal changes due to mining operations.
22.	17	Subsidence Management Status Report	The Subsidence Management Status Reports were submitted to the various stakeholders on 25/2/11, 18/3/11, 5/4/11, 12/5/11, 31/5/11, 15/6/11, 23/6/11, 15/7/11, 1/9/11, 20/9/11, 11/10/11, 26/10/11, 2/11/11, 11/11/11 and 30/11/11.

A Subsidence Monitoring Program was completed for the East B Area as required by Condition 11 (g) of Schedule 3 of the Project Approval. Table 13 provides a summary of the subsidence monitoring undertaken for the East B Area and the subsidence results.

Table 13 – East B Subsidence Monitoring Program & Results

SUBSIDENCE MONITORING Reference is made to Plan AW2202 for mark locations.	INITIAL SURVEY COMMENCEMENT	RESURVEY FREQUENCY	FINAL SURVEY*	RESULTS / COMMENTS
Bush Track Monitoring points	Before Commencement of Extraction All points surveyed twice for Easting, Northing and Height (X,Y,Z)	3 Monthly Resurvey of All Points	Two further surveys to be done after completion Six (6) months and Twelve (12) months. Meeting to be then held with PSE to discuss and agree on further survey schedule if deemed necessary.	Monitoring points at approx. 50 metre spacings (Levels only) in safe suitable positions. All surveys completed during 2011 and Subsidence Management Status Reports were provided to the various stakeholders. Mining in the East B Area ceased on 21/12/11. The maximum level of recorded subsidence in the East B Area in 2011 was -44mm. The predicted maximum level of the subsidence in the Awaba Mining Project was 200mm. Subsidence levels to date are significantly lower than the predicted maximum levels. Subsidence monitoring in the



SUBSIDENCE MONITORING Reference is made to Plan AW2202 for mark locations.	INITIAL SURVEY COMMENCEMENT	RESURVEY FREQUENCY	FINAL SURVEY*	RESULTS / COMMENTS
				East B area will continue in 2012.
Bush Track Visual Inspections	Before Commencement of Extraction	Monthly by Environmental officer or representative	As above	<p>Monthly visual surface inspections when mining within 50 metres of Bush Tracks.</p> <p>Visual inspections were completed on a monthly basis during 2011 as per the Public Safety Management Plan.</p> <p>Visual inspections found no visual disturbances, or abnormal changes due to mining operations.</p>
Water Course Visual inspection	Before Commencement of Extraction	3 Monthly by environmental officer / representative and/or following significant rainfall	As above	<p>Quarterly water course inspections completed in 2011.</p> <p>Inspections are undertaken to identify the following; surface cracking along creeks, step change in bed, damage to drainage channels, and ponding.</p> <p>Visual inspections completed in 2011 found no visual disturbances, or abnormal changes due to mining operations.</p>
Haul Road – Newstan/Eraring Monitoring points Visual Inspections	Before Commencement of Extraction All points surveyed twice for X,Y,Z.	Midway and completion of North B Panel	As Above	<p>Monitoring points at approx. 50 metre spacings (Levels only) in safe suitable positions.</p> <p>Weekly Visual Inspection when Mining within 100 metres of the Eraring Haul Road. No impacts were identified in 2011.</p>
Moderate Heritage Value Site Visual Inspections within East B Area	Before Commencement of extraction	3 Monthly Resurvey Monthly by Environmental officer or representative	As Above	Quarterly visual surface inspections completed in 2011. No impacts identified.



3.17 Hydrocarbon Contamination

Potential areas where historic operations may have contaminated land have been identified. A Phase 1 site contamination assessment was completed in 2009. The Phase 1 report recommended that a Phase 2 site assessment be completed to identify the risks of contamination to possible receptors. A Phase 2 site contamination assessment is scheduled to be undertaken in early 2012.

Awaba Colliery installed a new hydro-cyclone separator system adjacent to the Wash Bay in 2009. The underground diesel tanks at Awaba Colliery were de-commissioned (no longer in use) and replaced by a 30,000 litre portable self-bunded Transtank during 2009.

3.18 Methane Drainage / Ventilation

There is no methane drainage conducted at Awaba Colliery.

3.19 Public Safety

Awaba Colliery is completely surrounded by fencing and is patrolled by security staff on a regular basis; therefore, public safety was not a concern during the reporting period. Awaba Colliery has an approved Public Safety Management Plan and a Built Features Management Plan. Monthly inspections of tracks and trails undertaken during 2011 as required by these management plans within the Stage 2, Stage 3 and East B areas. No subsidence impacts were identified to tracks and trails in these areas during the reporting period.

3.20 Reportable Incidents

There were no non-compliances with the conditions of EPL443 during the reporting period. The 2011 Annual Return is located in **Appendix 1** of this AEMR.

During 2011, there was one incident which required reporting to the Director-General in accordance with Condition 6 of Schedule 5 of the Project Approval (10_0038).

Following heavy rainfall over the June 2011 long weekend a pot hole / plug failure developed above a goaf area within the Stage 3 Subsidence Management Plan (SMP) Area at Awaba Colliery. Notifications were provided to the Division of Resources & Energy (DRE), the Department of Planning & Infrastructure (DoPI) and the NSW Office of Water (NOW) in accordance with the relevant Stage 3 SMP approval conditions and Project Approval conditions.

The affected area was approximately 30 metres in diameter and was in bushland approximately 100 metres to the west of the Newstan to Eraring Haulage Road and approximately 200 metres to the south of the Awaba Colliery intersection on the Haul Road. The affected area was adjacent to the Haul Road subsidence monitoring peg – 1HR10. The area was not accessible to the general public but was roped off to prevent access as per the Public Safety Management Plan. There was no affect nor was there a risk of any future effects on any of the infrastructure in the area as a result of the incident.



The area was extracted approximately 5 weeks prior to the incident occurring where the depth of cover was between 26 – 30 metres.

Awaba Colliery commenced repairs and rehabilitation works following all required environmental inspections (including inspections by DRE officers) and checks being completed on 20 June 2011. Rehabilitation of the site was undertaken by contractors the SNK Group who specialise in rehabilitation and erosion and sediment controls which involved clearing and preparing the area for repair, refilling and compacting the area and rehabilitating the site with the original top soil and remaining vegetation as cover plus seeding with a sterile millet and rye seed mix.

Rehabilitation of the site was completed on 9 of August 2011 with further monitoring undertaken on annual basis.



Figure 7: Commencement of clearing.



Figure 8: Concrete used to assist compaction at the source of the plug failure.



Figure 9: Replaced top soil and vegetation and surrounding water diversion drains.



Figure 10: Sterile grass mix germination 1 month after civil works completed.

3.21 Independent Environmental Audit

The next Independent Environmental Audit of the Awaba Colliery in accordance with Condition 8 of Schedule 5 of the Project Approval is required to be completed prior to May 13, 2012.



4 Community Relations

4.1 Complaints

There were no complaints made during the 2011 reporting period at the Awaba Colliery.

4.2 Community Liaison

Awaba Colliery is supportive of its local community and seeks opportunities to provide assistance to community groups whenever possible.

A Community Consultative Committee (CCC) for the Awaba Colliery was established and combined with the Newstan CCC with the approval of the Director-General in October 2011. The Committee meets quarterly to review the environmental performance of the mine and other relevant matters. Minutes of the meeting are kept and distributed by the independent Chairman. The minutes are also available on the Centennial Newstan website. Meetings of the Newstan / Awaba CCC were held in August & November during the reporting period.



5 Rehabilitation

A revised version of the Awaba Colliery Rehabilitation and Environmental Management Plan was approved by DRE on 28 June 2011.

Awaba Colliery is currently revising the Rehabilitation and Environmental Management Plan in accordance with Condition 30 of Schedule 3 of the Project Approval.

5.1 Buildings

No buildings were renovated or removed during the reporting period.

5.2 Rehabilitation of Disturbed Lands

Rehabilitation works were conducted for the Stage 3 sinkhole as described in Section 3.20 of the AEMR.

Table 14: Awaba Rehabilitation Summary.

	Area Affected / Rehabilitated (Hectares)		
	To date	Last Report (2011)	Next Report (estimated)
A: Mine Lease Area			
A1 Mine Lease(s) area	1910		
B: Disturbed Areas			
B1 Infrastructure area	17	17	17
B2: Active Mining Area	0	0	0
B3: Waste emplacements	0	0	0
B4: Tailings emplacements	0	0	0
B5: Shaped waste emplacement	0	0	0
All Disturbed Areas	17	17	17
C: Rehabilitation Progress			
C1 Total rehabilitation area	0	0	0
D: Rehabilitation on Slopes			
D1 10 to 18 degrees	0	0	0
D2 Greater than 18 degrees	0	0	0
E: Surface of Rehabilitated Land			
E1 Pasture and grasses	0	0	0
E2 Native forests / ecosystems	0	0	0
E3 Plantations and crops	0	0	0
E4 Other	0	0	0



5.3 Other Infrastructure

No rehabilitation of infrastructure was conducted during the reporting period.

5.4 Rehabilitation Trials and Research

No rehabilitation trials occurred during the report period.



6 Activities Proposed in the Next AEMR Period

Activities proposed for the 2012 reporting period include;

- Care & maintenance for the Awaba Colliery;
- Complete Phase 2 Contaminated Site Assessment;
- Install two groundwater monitoring bores within the Stony Creek alluvium;
- Decommissioning of surface coal handling infrastructure; and
- Commence sealing the Awaba Colliery shafts and portals.



7 Plans

AW2232 – Great Northern Seam Workings January to December 2011

AW2233 – Great Northern Seam Projected Workings January - December 2012

AW1167 – Surface Water & Dust Monitoring Locations.

AW2109 Rev 1 – Waterways of Awaba Colliery licensed discharge points

AW2202 – Subsidence Monitoring Plan



8 Appendices



8.1 Appendix 1 – EPL443 2011 Annual Return



Appendix 2 – Awaba Annual Environmental Risk Assessment – 2011



**Appendix 3 – Ecological Monitoring of Riparian Vegetation Along Stony Creek at Awaba –
March 2011.**



Appendix 4 – End of Year Subsidence Report.