



ANNUAL REVIEW

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

Awaba Colliery

January 2014 to December 2014

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

Name of mine AWABA COLLIERY

Mining Titles/Leases CCL746, MPL327, MPL 328

AEMR Commencement Date 01/01/2014

AEMR Completion Date 31/12/2014

Name of leaseholder Centennial Newstan Pty Ltd

Name of mine operator (if different) as above

Reporting Officer Veronica Howat

Title Environment & Community Coordinator

Date 27 February 2014

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1. Introduction

Awaba Colliery was an underground coal mine operated by Centennial Newstan Pty Ltd (Centennial Newstan), 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 produced from the Great Northern Seam using a combination of first workings development, pillar extraction, pillar quartering, and pillar stripping.

An application for a Part 3A Project Approval was lodged in March 2010 by Centennial Newstan 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 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.

In March 2012 the Awaba Colliery ceased mining operations as the available coal reserves were exhausted. All mine entries were decommissioned in 2012, removing access to the underground workings.

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 mremp guide 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.

Plan ID Title Mineral (Ha) Surface (Ha) **Expiry** (Holding) (Holding) CCL746 2519 1900.00 31/12/2028 1 MPL327 Nil 1.041 05/08/2015 2 MPL328 Nil 0.397 05/08/2015 Total 2519 1901.438

Table 1. Summary of Colliery Lease Details

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 as per the review conducted in 2009. A reviewed security was submitted to the DRE in 2014, however is still awaiting comment.

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	Sections 2
carried out in the past calendar year, and the development that is proposed	& 5
to be carried out over the next year;	
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	Sections 3
measures/criteria;	& 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	Section
actions were (or are being) taken to ensure compliance;	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	Section 3
the project, and analyse the potential cause of any significant	
discrepancies; and	
f) describe what measures will be implemented over the next year to	Sections 3
improve the environmental performance of the project.	and 6

1.1.6 Environment Protection Licence

Awaba Colliery operates under current Environmental Protection Licence 443 administered by the Environmental Protection Authority (EPA). A copy of the 2014 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

Mine Manager: Grant Watson

Work Phone: 02 4956 0227 Mobile Phone: 0438 560 227

Environment & Community Coordinator: Veronica Howat

 Work Phone:
 02 4956 0206

 Mobile Phone:
 0428 438 792

1.3 Actions Required at Previous AEMR Review

The NSW Trade & Investment – Division of Resources and Energy (DRE) conducted an annual environmental review at Awaba Colliery on 11 September 2014. The purpose of the inspection was to review compliance with environmental requirements of relevant approval instruments including the Mining Lease, Mining Operation Plan (MOP) and Annual Environmental Management Report (AEMR).

Following the inspection DRE stated that there was general compliance with the relevant statutory approval instruments administered by the DRE. Awaba Colliery ceased mining operations in 2012, however Awaba infrastructure is planned to be used for Newstan Extension Project. The security will be reviewed with the pending submission of the MOP. The following actions were required as a result of the inspection:

Table 3. Actions Required at Previous AEMR

No	Issue / Observation	Action	Due	Section of the AEMR
1	Ongoing sinkhole rehabilitation	Continue sinkhole monitoring and rehabilitation activities as per approved Sinkhole Rehabilitation Plan	Ongoing	Section 6

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No	Issue / Observation	Action	Due	Section of the AEMR
2	Water Seepage	Ongoing monitoring of the seepage area and reporting (AEMR)	Ongoing	Sections 3.4 & 6
3	Water Seepage	Respond to the S240 Notice	30 November 2014	Section 3.4

2 OPERATIONS DURING THE REPORTING PERIOD

There was no mining undertaken during the reporting period. Previously mined areas can be found on Plan AW2245. The mine ceased underground operations in 2012, and the mine entries were sealed.

On 28 June 2011, the Awaba Coal Mine Rehabilitation and Environmental Management Plan dated April 2011 to 31 December 2015 was approved by the Department of Trade and Investment – Division of Resources and Energy (DRE) in accordance with the Mining Operations Plan Condition of Awaba Collieries mining leases. This REMP was also developed to satisfy the requirements of Project Approval (10-0038) Schedule 3 Conditions 28, 29 and 30.

In November 2014, Centennial Newstan submitted the Centennial Newstan Complex MOP for Operations and Care & Maintenance 2014 - 2017 therefore replacing the Newstan Colliery Mining Operations Plan 2014 - 2020, and the Awaba Colliery Rehabilitation and Environmental Management Plan (REMP). Centennial Newstan within this MOP includes the operations of both Newstan Colliery and Awaba Colliery. This MOP is currently with the DRE for approval.

2.1 Exploration

No drilling occurred on CCL 746 within the reporting period. Drilling is undertaken 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.

2.2 Land Preparation

No land preparation on the Awaba lease was undertaken for Awaba operations. Works completed for subsidence rehabilitation are included in Section 5.2 below.

2.3 Construction

No additional mine infrastructure for Awaba operations were constructed during the report period. Works onsite were limited to necessary maintenance of existing plant, or demolition and rehabilitation of existing infrastructure.

2.4 Mining

Mining at Awaba Colliery had been ongoing in the Great Northern Seam since 1947. The mine in this time has extended to the limits of its boundaries and then retreated to extract the remaining safely accessible coal. In 2012 Awaba Colliery ceased underground operations, and sealed all entries into the Colliery.

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 had been pillar extraction within narrow panels leaving coal pillars or barriers between adjacent narrow panels. The majority of the pillars were pre-existing, having been developed many years ago.

In areas where there were large pre-existing pillars or blocks of "virgin coal", roadways were 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 was produced using continuous miner machines. The mining sequence involved 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 ensured panels were 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 was 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 layout minimised the risk of rapid collapse of the conglomerate by keeping spans in the extraction panels to less than approximately 100 mm

Mining was 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.

2.5 Mineral Processing

No mineral processing is undertaken on site at Awaba Colliery. Mined coal was 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 was 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 was then delivered to the Final Product Bin by conveyor. From the Final Product Bin coal was 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 were transported directly to Eraring Power Station or to Newstan Coal Preparation Plant via the Eraring private haul road. The CPP and associated bins and conveyor infrastructure were decommissioned and removed from the Colliery in 2012.

2.6 Waste Management

Waste production from the Colliery is negligible since mine closure. The waste management system is maintained, however now only includes the following:

- Waste paper and cardboard recycling
- · General Waste.

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.

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

2.7 Ore and Product Stockpiles

The Colliery has the ability to stockpile approximately 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. Mine water Discharges from 10 South were ceased

in August 2013. A pump station at LDP004 was re-established and commissioned in September 2013. However pumping does not occur from this point at this stage.

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. The runoff from these areas is intercepted by drive in sumps and directed into the Pollution Control Dam (PCD).

Potable water is used on the surface in the bathhouse, for (minimal) equipment cleaning, and fire fighting supply.

On 20 October 2011, the EPA 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. This transfer stopped on 27 June 2013.

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 4 includes the actual quantities discharged from the Awaba Colliery during 2014.

Table 4. Water Balance

Year	Water pumped from 10 South (ML)	LDP004 (ML)	LDP009 (ML)
2014	0	0	0.438

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 copies are available through the Chemwatch database.

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.

Existing Surface infrastructure at the Colliery comprises:

- Mine entry/exit for personnel and materials (1:20 Decline). The drift was sealed in 2012.
- Old mine entry/exit for personnel and materials (1:5 Decline). The drift was sealed in 2012.
- Administration and bathroom facilities
- Workshop facilities
- Pollution control apparatus
- Enclosed and bulk open material and equipment stores facilities
- Air compressors
- Internal roads and car parking facilities
- Nine remote de-watering bores and security enclosures.

No additional surface infrastructure was removed or decommissioned in 2014.

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

Table 5.	Production and	d Waste Summary
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	End of 2013 Reporting Period (31 December 2013)	End of Reporting Period (31 December 2014)	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	0	0

Table 6. Stored Water

	Start Period	of	Reporting	End Period	of	Reporting	Storage Capacity
Clean Water (m ³)	40,000			40,000			40,000
Dirty Water (m³)	1,879		1,879		79	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 interrelationship between:

- People.
- Machinery.

- Methods of work.
- Environment.

An environmental risk assessment was completed in February 2014. 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.

Samples are taken from the depositional gauges every 28 (±2) 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. The following graph Figure 2 displays Awaba's monthly dust results.

The Awaba Colliery Mining Project EA for DG's 1-4 found the monthly averages and annual averages were below 2.6 g/m2/month, which is within the development consent limit of 4 g/m2/month annual average. The EA states that the results indicated that total annual average dust deposition levels at all receptors surround the Project are predicted to be below the Project criterion of 4 g/m2/month when using a conservative background level of 2 g/m2/month.

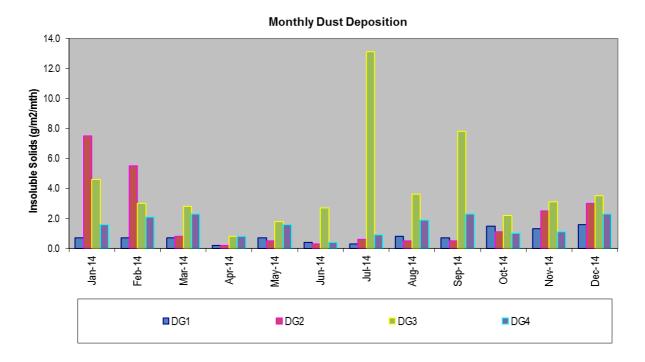
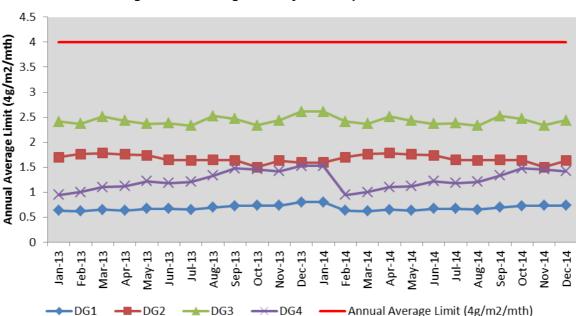


Figure 2. Figure 2: Awaba Monthly Dust Deposition Results for 2014.

The following high readings were removed from the graphs due to contamination of the results. The following provides further information:

- January DG3 recorded a reading of 4.6 g/m2/month. 55% of the result was a combination of Vegetation Matter and Polysaccharide slime.
- February DG2 recorded a reading of 5.5 g/m2/month. 55% of the result was a combination of Vegetation Matter and Polysaccharide slime.
- July DG3 recorded a reading of 13.1 g/m2/month. A breakdown of the material shows 50% of the result was a combination of Vegetation Matter and Polysaccharide slime.
- September DG3 recorded a reading of 7.8 g/m2/month. A breakdown of the material shows 50% was a combination of Vegetation Matter and Polysaccharide slime.

The following graph Figure 3 displays Awaba's Rolling Annual Average Dust Deposition for 2013 - 2014 (Insoluble Solids) against the development consent limit of 4g/m2/month.



Rolling Annual Average Monthly Dust Deposition 2013 - 2014

Figure 3. Awaba Average Annual Dust Deposition for 2013 - 2014.

All particulate dust gauges recorded an annual average particulate monitoring result below development consent limit of 4g/m2/month for the annual averaging period.

A requirement of the Project Approval and the EPL is to install a high volume air sampler to evaluate the performance of the project. This was installed in 2014/2015 at the location known as the Nitrogen Plant. The monitoring is planned to commence in 2015.

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.

No land disturbing activities occurred at Awaba Colliery during the reporting period.

3.3 Surface Water

Water monitoring is undertaken in accordance with the approved Water Management Plan, Project Approval and Environment Protection Licence 443 requirements. One discharge was recorded from licenced Discharge Point 9 in 2014. No other discharges occurred from Awaba Colliery in 2014 or 2013 and therefore no comparisons in the results can be made. Further information is provided in the Annual Return in Appendix 1. Surface monitoring locations are provided in on Plan AW1040.

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.

The surface water risk assessment (failure modes and effects analysis) was reviewed for the Awaba Colliery in 2012.

Upgrades to the pumping system at the Awaba Pollution Control Dam (PCD) was undertaken in 2014 to reduce the likelihood of discharge. Plans for the expansion of the PCD have been put on hold.

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 gravitates through an extensive goaf/underground dam system that allows filtration and settlement. The water can then be pumped from the mine via licensed discharge point 004, and via the 10 South Borehole into the Eraring Ash Dam. Mine water Discharges from 10 South were ceased in August 2013. A pump station at LDP004 was reestablished and commissioned in September 2013. Pumping from LDP004 has not commenced in the report period, apart from waters discharged during the commissioning process.

In August 2013 an inspection of an unnamed watercourse which flows to Muddy Lake identified an area of sodden ground which resulted in a water flow. This visual inspection indicated clear water with iron staining in the sediment.

The area affected is approximately 160m to the South of the nearest Awaba workings. The seepage area has shown results of low pH, high conductivity and other analytes.

Awaba Colliery workings have slowly been filling with water over several years. This rise in water level in the underground workings has occurred as a result of rainfall events infiltrating subsidence cracks and sinkholes, and groundwater infiltration. Awaba had also been receiving water under the EPL from Newstan Colliery of up to 4 ML/Day from 15 October 2011 to 27 June 2013. Ongoing monitoring is currently being undertaken at this location. The level within the workings was at 15m RL at the end of the reporting period.

In identification of the seepage area the following actions were undertaken:

- Initial water quality monitoring & establishment of monitoring points to determine water quality at the seepage area & downstream. After water quality returned unfavourable results, the following actions were undertaken;
- An assessment of water quality within the unnamed creek including a comparison against the Awaba Colliery underground water quality to determine if there are similarities.
- A preliminary Terrestrial Ecology Assessment.
- A preliminary Aquatic Ecology Assessment.
- · Ongoing Monthly water quality monitoring & review of data.
- Monthly borehole water dipping and water quality analysis.
- Annual Terrestrial Ecology Assessment & establishment of permanent quadrats in spring 2014.
- Commencement of Biannual Aquatic Ecology Assessments in spring 2014. This has been developed to align with assessments carried out for Cooranbong Services Site.

The results of monitoring and change to the wetting regime and water quality within the seepage area has had or may have the following impacts on terrestrial and aquatic ecology:

- In the long term, an increase in the degree of waterlogging and inundation in the groundcover and changes to the flow within the creek may lead to a change in the vegetation community at the seepage area
- Changes in water quality as a result of the seepage are likely to result in the site being unable to support Swamp Sclerophyll Forest
- Changes in vegetation community that result in a loss of understory shrubs, leaf litter, hollow logs and mature trees (including Swamp Mahogany) would decrease the available foraging habitat for reptiles, ground-dwelling and arboreal mammals, bats and forest birds.
- Changes in water quality as a result of the seepage are likely to render the area unable to support threatened and migratory fauna through both loss of forage habitat and changes in water quality and chemistry resulting in an undrinkable water source.
- There is a high risk of impact to a Groundwater Dependent Ecosystem (Swamp Sclerophyll Forest).
- There was a notable decrease in the levels of macroinvertebrate taxa richness, EPT richness and SIGNAL 2 at SP5 (SW013) since the July 2012 monitoring events. The macroinvertebrate community at SP5 (SW013) is no longer considered a non impacted site.
- If the acidic seepage continues on a long term basis the site will be unable to support a diverse aquatic system and will affect aquatic fauna recruitment rates into the system.

In January 2015 a consultation session was held with the relevant government departments and the Rehabilitation Works Plan is being developed in consultation the DRE, OEH, NOW, EPA & LMCC in accordance with the Section 240 Notice from the DRE. This Rehabilitation Works Plan will include the following:

- Details of the ongoing Water Quality Monitoring,
- Details of the ongoing Macro-invertebrate Monitoring,

- Details of the ongoing Terrestrial Ecology Monitoring,
- Completing an options assessment, which will include the feasibility of rehabilitation options, and any other options which may result from consultation,
- On selection of a preferred option, a review Rehabilitation Works Plan is to be completed, with additional information with regards to the final rehabilitation completion criteria.

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 were installed in February 2012, with water level loggers. One bore was installed above the Stage 3 mining area, and the other further downstream to the north of the Awaba pit top within the Stony Creek alluvium associated with the third order reach of Stony Creek. The boreholes are to a maximum depth of 10m below ground level (bgl).

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. The groundwater monitoring results for 2013 - 2014 are provided below. AWGW01 ceased logging from 13 October 2014 due to an error with the data logger.

34.0 32.0 30.0 Groundwater Level (m AHD) 28.0 26.0 24.0 22.0 20.0 I6-Apr-13 28-May-13-01-Jan-13 12-Feb-13 18-Jun-13 01 Oct 13 12-Nov-13 22 Jan 13 10-Sep-13 04-Feb-14 18-Mar-14 09-Jul-13 30-Jul-13 20-Aug-13 22-Oct-13 25-Feb-14 08-Apr-14 P-Jun-14 01-Jul-14 14-Jan-14 29-Apr-14 22-Jul-14 12-Aug-14 23 Sep 14 14-Ocl-14 AWGW01 AWGW02

Awaba Groundwater Monitoring 2013 - 2014

Figure 4. Groundwater Monitoring Results 2013 - 2014.

The Awaba Mining EA stated that there were no potential impacts identified and as such there would be no consequences from the Project.

3.5 Contaminated Land

A hazardous materials assessment of the site was 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 was undertaken in 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 February 2014 (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.

Transect photographs and descriptions are presented with Appendix 3. The vegetation in February 2014 was essentially the same as that recorded previously with two small changes on Transect A. These changes are the result of an individual plant having died and being replaced in the list with the next nearest species. They are small shrub or ground plants and the changes are minor and to be expected as part of natural variation. Appendix 3 provides example comparison photographs from one photo point for each transect for the seven monitoring periods, illustrating that there has been no deterioration of habitat over time.

Traversing between transects involved walking along over a kilometre of Stony Creek, including part of a tributary. In February 2013, the creek was full of flowing water as a result of recent heavy rain. There was a healthy amphibian population calling. The creek being full and flowing provided an ideal opportunity to detect any sections of the creek bed that might have water diverted underground. There were no breaks in water flow which, along with the healthy condition of vegetation, confirms that underground mining has had no effect on the creek or its habitat.

In February 2014 the creek bed was mostly dry with the occasional water hole. Despite this, the vegetation showed no signs of being under water stress. Again there was a healthy amphibian population calling. Another indication of the overall health of the ecosystem was a roosting Powerful Owl at Transect D. The 2014 was the last planned Stony Creek Flora inspection under the SMP.

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 an external contractor 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 was undertaken in February, May, July and December in accordance with:

- Department of Planning and Infrastructure (DoPI) Project approval schedule 3 condition 1;
- Environmental Protection Authority (EPA) Condition M8.2 of EPL 443 dated December 2011
- Office of Environment & Heritage (OEH), Industrial Noise Policy (INP).

The quarterly monitoring showed that the noise emissions from Awaba Colliery showed full compliance with the noise criteria set out within Condition 1 of Schedule 3 along with the predictions made within the Environmental Assessment.

An evening survey period 3 and night survey period 3 were not possible in December 2014 due to the presence of an electrical storm, heavy rain and strong winds which prevented any measurements being conducted.

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. A total of 1095.2 mm of rain fell in 2014

Total rainfall for the reporting period is shown in the Table 7 below.

Table 7. Awaba Rainfall Data

	Awaba Annual Rainfall Results (mm)											
Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0	0	8.4	0	0.2	8.6	0	0	0	0	1	0.6
2	0	0	7.4	0	0	0.8	0	0	12.2	0	0	4.2
3	0.8	0	1.4	0	0	0	0	2.8	0.2	0	0	4.8
4	0	5.4	2	11.2	1.4	3.8	0	0	0	0	0	2
5	0	0.2	7.2	0.4	0	4	0	0	0.4	0	10.4	36.4
6	0	0	0.2	10.4	0	25.2	0	0	7.6	0	0	4.8
7	1.2	0	0	0.6	0	2.6	0	0	6.8	0	0	6.6
8	1.4	0	0	0	3.6	0.2	0	0	0.2	10.4	0	11.6
9	0	0	0	0	3.6	4.6	0	0	0	1.2	0	0
10	0	0	0	0	0	4	0	0	9	0	0	8.8
11	0	2.2	0	6.6	2.6	0.4	0	0	0	0	0.4	16.6
12	0	0	0	0	1.6	0	0	0.2	0.6	0	0.2	2.8
13	0	0	0.8	0	13	0	0	8.4	0	7.6	0	0
14	0	1.6	0	10.2	0	1.4	0.6	0.2	0.8	3.4	0	0
15	0	3.8	4.4	8	0.2	0	0.2	0.2	0.2	27	0	0
16	0	26.8	1	4.6	0	0	1.2	5.4	0	0	2.4	0.2
17	0	2.2	0	0	0	0	0	28.4	0	4.2	0	0
18	0	0	0	0	0	0	0	6.4	0	0.4	0	0
19	0	34.4	0	0	0	0	0.6	31.8	0	0	0	0
20	0.2	0.2	0	0	0	1.8	0	0	0	3.4	0	0
21	5.6	0	13.8	0	0	0.2	0.6	18.6	0.8	3.2	0	0
22	0.8	0	0	0	0	0	0	3	0	0	0	0
23	3.8	0	1	0	0	0	0	9	0	0	4	4
24	4.4	4.6	1	0	0	0	0	0	0	0	22.8	0
25	2.4	0	0.2	60.2	0.2	0	0.4	0	1.2	0	0.4	41.8
26	0.4	8	2.6	0.2	0	0	9.4	17.6	0	0	0	1.6
27	0	10.4	15.6	11	0	0	0.2	18	0	0	0	0.2
28	0	149.4	25.6	1.4	0	0	0	28.8	0	0	0	0.6
29	0		0.8	0	8	0	0	0.8	0	0	0	3.2
30	0		9.4	13	5	0.2	0	0	0	0	0	0
31	0		1.2		0		0	0		0		
Monthly												
Total	24	240.2	104	127.0	20.4	F7 0	12.2	170.6	40	60.0	41.0	150.0
(mm)	21	249.2	104	137.8	39.4	57.8	13.2	179.6	40	60.8	41.6	150.8

3.11 Greenhouse Gas

Awaba ceased operations and sealed the shafts and portals in 2012. The minimal usage & greenhouse gas information (electricity) is included within Newstan Colliery reporting.

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.

In 2012 Centennial Coal developed the Centennial's Northern Holdings Aboriginal Cultural Heritage Management Plan. This document aims to provide a consistent approach to consultation between Centennial and the Aboriginal community as well as identify standard Aboriginal cultural heritage monitoring and management requirements.

Scarred Tree AHIMS#45-7-0318 (RPS ST 01) was identified in the northern portion of the Main South Mining area. This area was due to be undermined and thus the site was assessed for risk of harm by using observations of similar trees which had already been undermined in the southern portion of the Main South Mining area. The risk of harm identified was that the effects of subsidence may destabilise the tree resulting in tilting and potentially its collapse. Although this risk was assessed to be low; a monitoring programme was commenced to ensure that the site was not harmed. This monitoring programme began in 2010 when the site was first identified. It has been running for three years and has covered the pre-mining, mining and post mining phases. It was considered that tilting of greater than 10 degrees would pose a risk that the tree may fall over and consequently posed a risk of harming the site. During the course of monitoring, less than one degree of tilt was observed and thus there was no risk of harm to the site. The physical tree condition also had not changed as a result of subsidence. All subsidence effects in the vicinity of AHIMS#45-7-0318 have now occurred. There is no further risk to the site as a result of subsidence. Monitoring ceased in 2013.

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 2014 found no visual disturbances, or abnormal changes due to mining operations in these areas.

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 8 will not appear within the Lake Macquarie LGA LEP because they are only listed within the proposed/draft schedule.

Table 8. 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 also prepared and submitted 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, and was submitted to various stakeholders for consultation before being submitted to the Department of Planning & Infrastructure for Approval 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.

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 9 briefly outlines the subsidence monitoring and results conducted in accordance with the relevant SMP conditions.

Table 9. Subsidence Monitoring Results

23 (a) – Stage 2 18 (a) – 3 North 24 (a) – Stage 3 Subsidence and Environmental Monitoring Results Surface Surveys – All scheduled subsidence surveys completed to December 31st, 2014.	SMP Approval Condition No.	Requirement Summary	Comment / Description
Maximum subsidence in 2014 period was in Main South Stage 2 - XLE17 (-1.378 m in December), which is greater than the defined predicted subsidence levels. A resurvey in January 2014 found greater than predicted subsidence in Main South Stage 1 Area - along Mair South Crossline between XL24 to XL66 - and 8NE Centreline between CL01 to CL16. Maximum subsidence was at XL52 (-388mm). In response to the January results - a further resurvey was done in March 2014. The maximum subsidence was at XL40 (-1112mm) on Main South Crossline in Stage 1. No visual signs of subsidence have beer observed in Stage 1 Area. A resurvey in July 2014 found greater than predicted subsidence in Main South Stage 2 Area - along Mair	Condition No. 22 (a) – Stage 1 23 (a) – Stage 2 18 (a) – 3 North	Summary of Subsidence and Environmental Monitoring	The Following subsidence surveys and inspections have been completed: Surface Surveys — All scheduled subsidence surveys completed to December 31 st , 2014. All scheduled environmental monitoring completed to December 31 st , 2014. Maximum subsidence in 2014 period was in Main South Stage 2 - XLE17 (-1.378 m in December), which is greater than the defined predicted subsidence levels. A resurvey in January 2014 found greater than predicted subsidence in Main South Stage 1 Area - along Main South Crossline between XL24 to XL66 — and 8NE Centreline between CL01 to CL16. Maximum subsidence was at XL52 (-388mm). In response to the January results — a further resurvey was done in March 2014. The maximum subsidence was at XL40 (-1112mm) on Main South Crossline in Stage 1. No visual signs of subsidence have been

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Maximum subsidence was at XLE17 (-1255mm). A visual inspection conducted on 14/07/2014 found evidence of minor surface impacts within these areas. Visual signs of subsidence (0.1–0.2 metre steps and cracks) were observed in vicinity of MSXLE 17 to 20, and 8SW28 to 31.
		Stage 3 Subsidence monitoring results in 2014 were well within predicted levels and continue to be relatively stable.
		Visual Inspections found one case of surface impacts in Stage 3. This impact was a sinkhole - found following heavy rain over the June 2011 long weekend. The hole was approximately 33x38 metres in surface area with cover ranging between 26-30 metres.
		A subsequent inspection has found evidence of the sinkhole beginning to partially reactivate. This sinkhole has been included in the Sinkhole Rehabilitation Schedule.
		Environmental inspections were carried out in January 2014. Traversing between transects involved walking along over a kilometre of Stony Creek, including part of a tributary. The 2014 survey found no impact on Stony Creek, and is the last Ecological Survey.
		Underground Surveys –
		All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012
		Underground workings are no longer accessible.
22 (b) – Stage 1 23 (b) – Stage 2 18 (b) – 3 North	Analysis of Subsidence and Environmental Monitoring	January and March Surveys of 2014 found greater than predicted subsidence in Main South Stage 1 Area.
24 (b) – Stage 3 18 (b) – East B	Results	A report was prepared by a geotechnical consultant with regard to this event. The subsidence has had no adverse impact on surface infrastructure.
		Centennial Survey prepared a plan showing zones of

SMP Approval Condition No.	Requirement Summary	Comment / Description
		subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders.
		The significant increase in subsidence has occurred approximately 175 to 300 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles.
		There have been no observed visual environmental impacts in Stage 1 Area. No visual disturbance has been identified on tracks & trails during routine inspections.
		July 2014 Surveys found greater than predicted subsidence in Main South Stage 2 Area.
		Centennial Survey prepared a plan showing zones of subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders.
		The significant increase in subsidence occurred approximately 250 to 350 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles.
		Cracking has been observed in the Stage 2 area associated with the greater then predicted subsidence. No visual disturbance has been identified on tracks & trails during routine inspections.
		Stage 3 Subsidence monitoring results in 2014 were within predicted levels and continue to be relatively stable.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Environmental impacts in Stage 3 have been confined to the one sinkhole as described above. It is most likely linked to a significant rainfall event in June 2011.
22 (c) – Stage 1 23 (c) – Stage 2 18 (c) – 3 North 24 (c) – Stage 3 18 (c) – East B	Trends in Monitoring Results	In general - the trend in monitoring results shows that the majority of subsidence occurs during and shortly after mining extraction.
		In the following months the rate of subsidence decreases toward a stable environment.
		However after approximately 6 years of relative stability – there has been greater than predicted subsidence in Main South Stage 1 and Stage 2.
		During the year — after the initial sudden increase in subsidence - results began to trend toward decreasing movement. In recent months surveys have consistently shown relatively stable results.
22 (d) – Stage 1 23 (d) – Stage 2 18 (d) – 3 North 24 (d) – Stage 3 18 (d) – East B	Management Actions of Potential Impacts	In general - current Public Safety and Subsidence Management Plans are considered adequate. The current monitoring schedule is based on 6 monthly resurveys. Following the greater than predicted subsidence in Stage 1 and Stage 2 - Agreed temporary amendments have been in place to include fortnightly monitoring of 8NE, 9SW, 8SW and 6SW – and monthly monitoring of MSXL and MSXLE.
		Following greater than predicted subsidence in Stage 1 Main South Cross line / 8NE Centreline area;
		 All relevant government agencies and stakeholders were notified as per condition 20 after results of January survey.
		 Centennial Newstan conducted a follow up survey – including strain measurements in early March. The results were distributed to relevant government agencies and stakeholders.
		 A visual inspection was carried out on 21/03/2014 - by a Geotechnical consultant accompanied by the Mine Manager and Mine Surveyor. No visual signs of subsidence were observed. The results were

SMP Approval Condition No.	Requirement Summary	Comment / Description
		included in a geotechnical report.
		 A meeting between Centennial Newstan and PSE was held on 25/03/2014 to discuss the mechanics and management of this occurrence.
		 A report prepared by a geotechnical consultant with regard to this event was distributed to Transport NSW and the PSE on 27/03/2014. Further reports were distributed on 2/6/2014 and 23/6/2014.
		 A meeting to discuss the increased subsidence in Stage 1 was held in Chatswood on 02/04/2014. It was attended by the Principal Subsidence Engineer (PSE), Centennial Newstan, an independent geotechnical consultant, and Transport NSW. During the Chatswood meeting – it was agreed to temporarily increase the frequency of surveys until a trend of stable results was achieved. Note that as agreed during the meeting in Chatswood - subsidence of 50mm or greater observed within the Railway Protection Zone (RPZ) - will trigger further communication and review of the situation.
		Monitoring frequency was increased on 04/04/2014 to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. The increased frequency of surveys continues to the present.
		Following greater than predicted subsidence in Stage 2 Main South Crossline Extension / 8SW Centreline area;
		 All relevant government agencies and stakeholders were notified as per condition 21 after results of July survey.
		 A visual inspection carried out by the Mine Surveyor found evidence of minor surface impacts within these areas. Results were forwarded to PSE, relevant government departments and stakeholders on 14/07/2014.
		 Agreement was reached with the PSE and Transport NSW - to increase monitoring frequency to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. Subsidence of 50mm or greater observed within the Railway Protection Zone

SMP Approval Condition No.	Requirement Summary	Comment / Description
		(along 8SW) or the Railway Mining Barrier (along 6SW) - will trigger further communication and review of the situation.
		 Monitoring frequency was increased on 16/07/2014. The increased frequency of surveys continues to the present.
		Following the formation of the Stage 3 Sinkhole in June 2011 -The relevant government authorities and stake holders were informed within 24 hours of the discovery of the hole. Rehabilitation of the site has since been completed. The location of the sinkhole was plotted and is shown on the Stage 3 Face Position plan AW2176. Due to the partial reactivation of this hole - further rehabilitation works are planned in accordance with the Sinkhole Rehabilitation Plan.

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 was undertaken in 2012, the report was finalised in 2013.

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. Regular inspections of tracks and trails were undertaken during 2014 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 two non-compliances with the conditions of EPL443 during the reporting period. The 2014 Annual Return is located in Appendix 1 of this AEMR.

3.20.1 LDP009 exceedence

At approximately 7:20 am on Friday, 28 February water commenced overflowing from the Pollution Control Dam through LDP009 at the Awaba Colliery. A water sample was taken at 8:30 am. The results of this sample show that the quality of the discharge water exceeded the EPL 443 Total Suspended Solids (TSS) and pH limits at LDP009. The discharge continued until approximately 10:15 am, when the Pollution Control Dam ceased overflowing, and discharge via LDP009 stopped.

Water samples were collected at LDP009 at 8:30 am, Downstream at 8:50 am and Upstream at 9:00 am. The results show the TSS reading of the discharge from LDP009 was 647 mg/L, while the TSS results for upstream were 47 mg/L and downstream were 154 mg/L.

The pH reading of the discharge from LDP009 was 8.67, which was above the upper limit of 8.5. The pH result for upstream were 5.88 and downstream were 5.89.

The flow from the PCD through LDP009 has been calculated as 0.438 ML as the flow monitoring equipment at LDP009 had not been installed at the time of the discharge.

Awaba Colliery received a total of 111.2 mm of rainfall from 12 midnight Friday 28/02/14 to 7:20 am when the discharge commenced. This high intensity resulted in the capacity of the dam and the pumping system being exceeded resulting in the dam overtopping through LDP009.

The following actions were taken to minimise the discharge from the Pollution Control Dam through LDP009:

- Water within the PCD is pumped to a low level to increase the capacity of the dam;
- There are two pumps installed in the dam to increase the pumping capacity away from the dam:
- Sampling was undertaken upstream and downstream of the discharge point.

The following actions have been undertaken to minimise the potential for future discharges from the Pollution Control Dam through LDP009:

The pumps within the PCD were upgraded to increase the pumping capacity,

- An alarming system has been installed on the PCD to notify the site when the dam is approaching the discharge level,
- Additional storage area has been developed on the old stockpile area to slow the flow into the PCD.

3.20.2 Seepage Area.

In August 2013 an inspection of an unnamed watercourse which flows to Muddy Lake identified an area of sodden ground which resulted in a water flow. This visual inspection indicated clear water with iron staining in the sediment.

The area affected is approximately 160m to the South of the nearest Awaba workings. The seepage area has shown results of low pH, high conductivity and other analytes.

Awaba Colliery workings have slowly been filling with water over several years. This rise in water level in the underground workings has occurred as a result of rainfall events infiltrating subsidence cracks and sinkholes, and groundwater infiltration & may be influencing on the seepage area.

A Rehabilitation Works Plan is being developed in consultation with relevant stakeholders. This includes the commitment to complete an options assessment and further investigation work. Further information is included in Section 3.4.

3.20.3 Subsidence Greater then Predicted.

As described in Section 3.16 following greater than predicted subsidence in Stage 1 Main South Cross line / 8NE Centreline area;

- All relevant government agencies and stakeholders were notified as per Condition 20 of the SMP after results of January survey;
- Centennial Newstan conducted a follow up survey including strain measurements in early March. The results were distributed to relevant government agencies and stakeholders;
- A visual inspection was carried out on 21/03/2014 by a Geotechnical consultant accompanied by the Mine Manager and Mine Surveyor. No visual signs of subsidence were observed. The results were included in a geotechnical report;
- A meeting between Centennial Newstan and PSE was held on 25/03/2014 to discuss the mechanics and management of this occurrence;
- A report prepared by a geotechnical consultant with regard to this event was distributed to Transport NSW and the PSE on 27/03/2014. Further reports were distributed on 2/6/2014 and 23/6/2014;
- A meeting to discuss the increased subsidence in Stage 1 was held in Chatswood on 02/04/2014. It was attended by the Principal Subsidence Engineer (PSE), Centennial Newstan, an independent geotechnical consultant, and Transport NSW. During the Chatswood meeting

- it was agreed to temporarily increase the frequency of surveys until a trend of stable results was achieved. Note that as agreed during the meeting in Chatswood - subsidence of 50mm or greater observed within the Railway Protection Zone (RPZ) - will trigger further communication and review of the situation.

Monitoring frequency was increased on 04/04/2014 to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. The increased frequency of surveys continues to the present.

Following greater than predicted subsidence in Stage 2 Main South Crossline Extension / 8SW Centreline area;

- All relevant government agencies and stakeholders were notified as per Condition 21 of the SMP after the results of the July survey;
- A visual inspection carried out by the Mine Surveyor found evidence of minor surface impacts within these areas. Results were forwarded to PSE, relevant government departments and stakeholders on 14/07/2014;
- Agreement was reached with the PSE and Transport NSW to increase monitoring frequency
 to provide further data until the area becomes stable; and to monitor any possible increased
 subsidence moving toward the rail corridor. Subsidence of 50mm or greater observed within the
 Railway Protection Zone (along 8SW) or the Railway Mining Barrier (along 6SW) will trigger
 further communication and review of the situation;
- Monitoring frequency was increased on 16/07/2014. The increased frequency of surveys continues to the present.

4 Community Relations

4.1 Complaints

There were no complaints made during the 2014 reporting period regarding Awaba Colliery operations.

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 generally 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 March, June, September & 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 revised the Rehabilitation and Environmental Management Plan in accordance with Condition 30 of Schedule 3 of the Project Approval, and submitted to DRE for approval in May 2012.

5.1 Buildings

No surface infrastructure was removed or decommissioned in 2014.

5.2 Subsidence

Sinkhole Rehabilitation was undertaken during the reporting period in accordance with the Sinkhole Rehabilitation Management Plan. A total of 6 sinkholes were rehabilitated in 2014 in the areas MR7 – 1, 2, 3, 4, 5 (a 6th sinkhole was located during the process). All within close proximity of each other. The following occurred during the rehabilitation process:

- Each hole when finished was raised up in height and crowned off / re-shaped to shed water into diversion drains cut in around each hole;
- Access tracks to each hole were seeded with grass seed only to allow future access / ongoing monitoring;
- All holes were hand seeded with native mix as specified;
- All diversion drains were hydroseeded with grass seed and a range of sediment controls were put in place including silt fences, straw bales, rock check drains and boulders;
- All trees and vegetation cleared were spread over rehabilitated areas;
- All water was redirected around the first hole, across the access track and under power lines and around holes 2, 3, 4, 5 & 6. Either side of these holes using trapaziodal drains;
- Levels were taken using surveyors to determine fall from the second hole to the lowest point in Hawkmount Rd where water would naturally flow before subsidence issues;
- It was determined that the whole area between holes 2, 3, 4, 5 & 6 was lower than the rd crossing causing the flow of water to go down the sink holes into the mine workings. By raising the height of the whole area from holes 2, 3, 4, 5 & 6 cutting diversion drains either side of the whole area and lowering the level of Hawkmount rd with a rock lined causeway we achieved natural water flow around the whole area letting the water escape around the holes as opposed to passing over the holes.

Sinkhole rehabilitation is planned to continue in 2015. Rehabilitation monitoring and any additional maintenance and weed management will occur on previously rehabilitated sinkholes as required.

5.2.1 Sinkhole Photos











5.2.2 Sinkhole Rehabilitation Photos











5.3 Rehabilitation of Disturbed Lands

Table 10. Awaba Rehabilitation Summary.

	Area Affected	Area Affected / Rehabilitated (Hectares)				
	To date	Last Report (2014)	Next Report (estimated)			
A: Mine Lease Area			1			
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	0.655*	1			
E3 Plantations and crops	0	0	0			
E4 Other	0	0	0			

^{*} Estimated sinkhole rehabilitation area.

5.4 Other Infrastructure

No rehabilitation of infrastructure, other then already discussed was conducted during the reporting period.

5.5 Rehabilitation Trials and Research

No rehabilitation trials occurred during the report period.

6 Activities Proposed in the Next AEMR Period

Activities proposed for the 2015 reporting period include;

- Maintenance of the Awaba Colliery pit top and remaining buildings
- Rehabilitation of sink holes in accordance with the Sinkhole Rehabilitation Plan.
- Development of the Rehabilitation Works Plan in consultation the DRE, OEH, NOW, EPA & LMCC in accordance with the Section 240 Notice from the DRE. This Rehabilitation Works Plan will include the following:
 - · Details of the ongoing Water Quality Monitoring,
 - Details of the ongoing Macro-invertebrate Monitoring,
 - · Details of the ongoing Terrestrial Ecology Monitoring,
 - Completing an options assessment, which will include the feasibility of rehabilitation options, and any other options which may result from consultation,
 - On selection of a preferred option, a review Rehabilitation Works Plan is to be completed, with additional information with regards to the final rehabilitation completion criteria.

7 Plans

AW2245 - Great Northern Seam Workings.

AW2236 - Surface Water & Dust Monitoring Locations.

AW2223 Rev 3 – Waterways of Awaba Colliery licensed discharge points.

}	Appendices			

Appendix 1 – EPL443 2014 Annual Return

Appendix 2 - Awaba Environmental Risk Assessment - 2014

Appendix 3 – Ecological Monitoring of Riparian Vegetation Along Stony Creek at Awaba – February 2014.

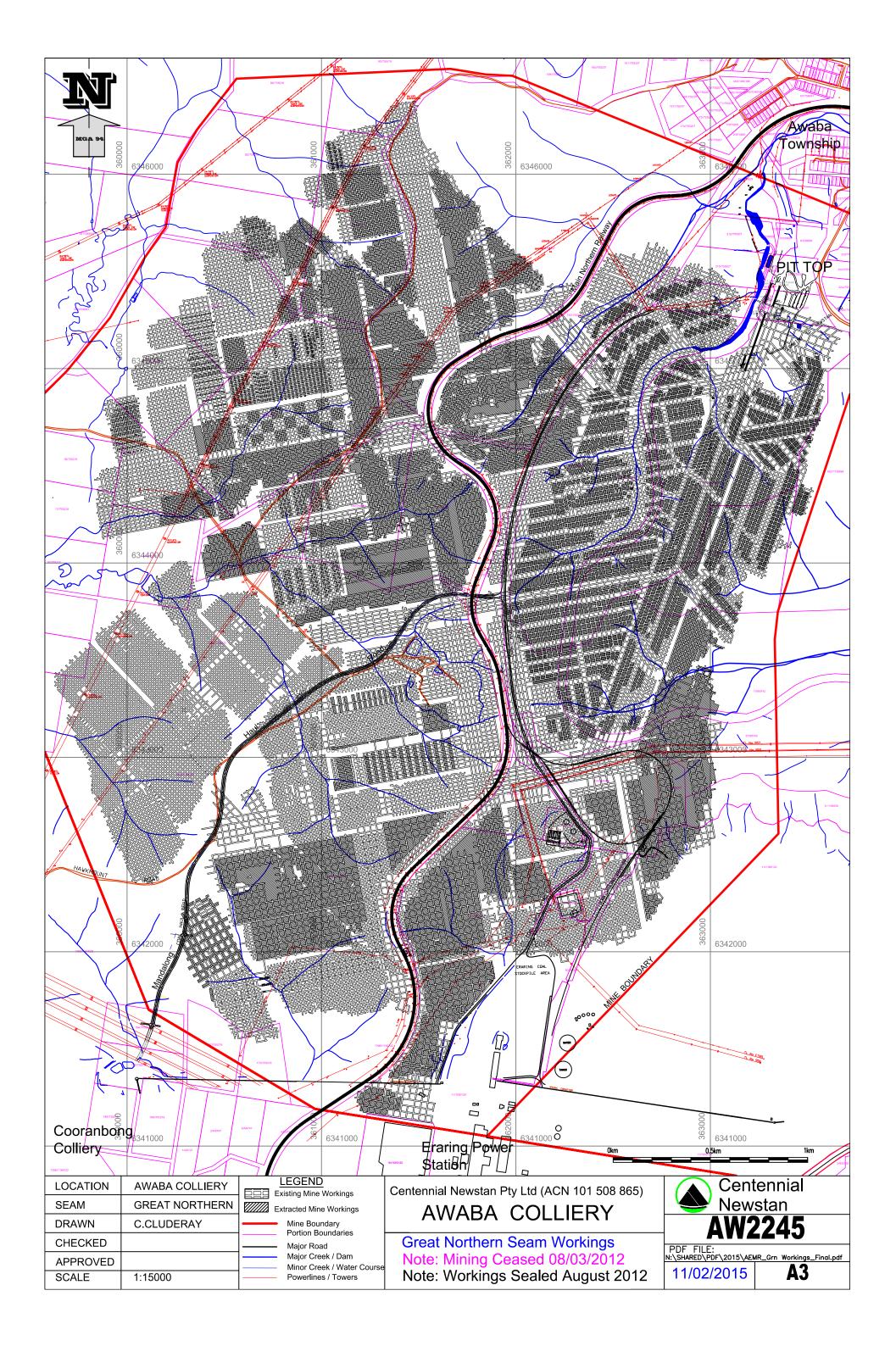
Appendix 4 - End of Year Subsidence Report.

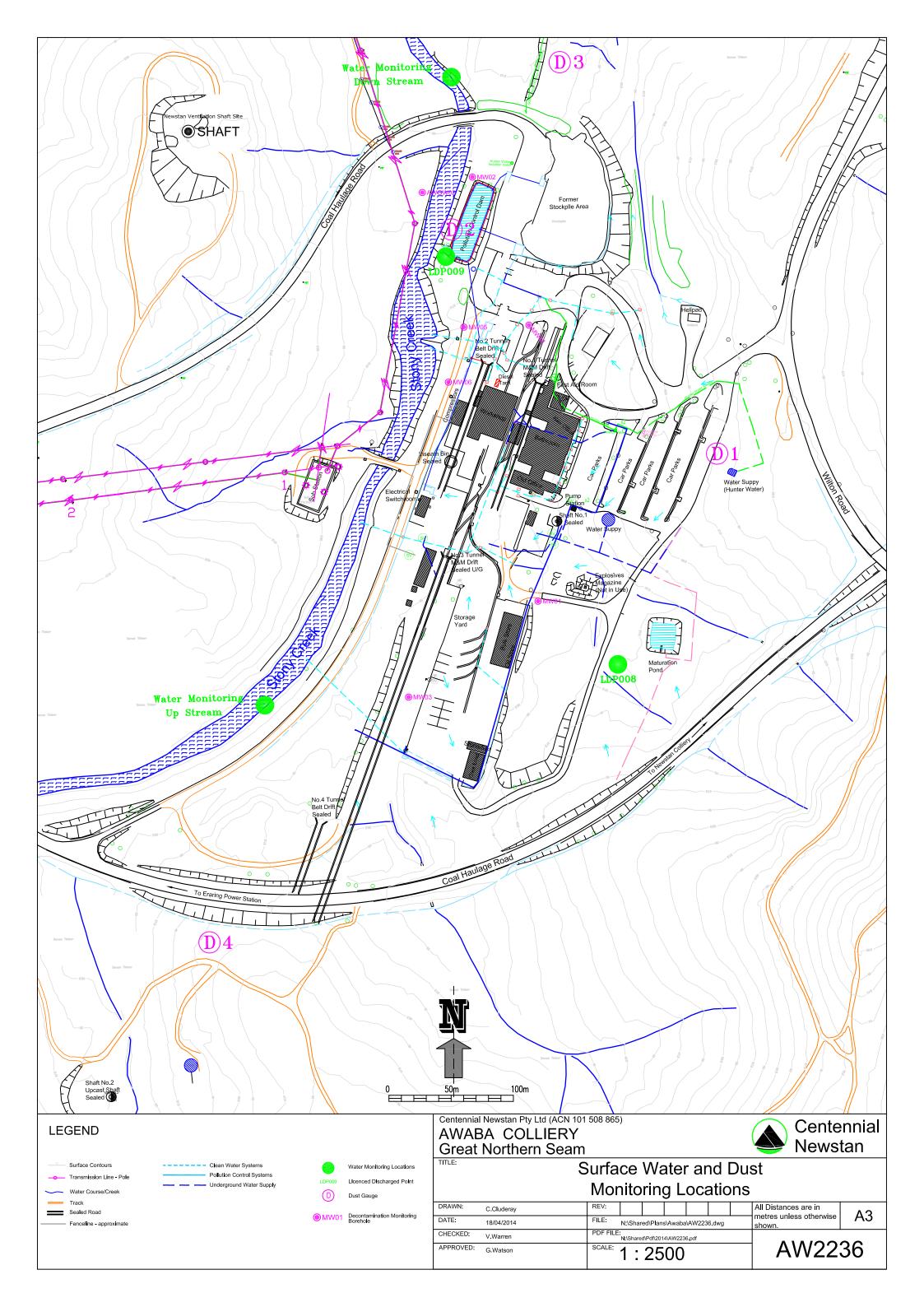
Centennial Coal

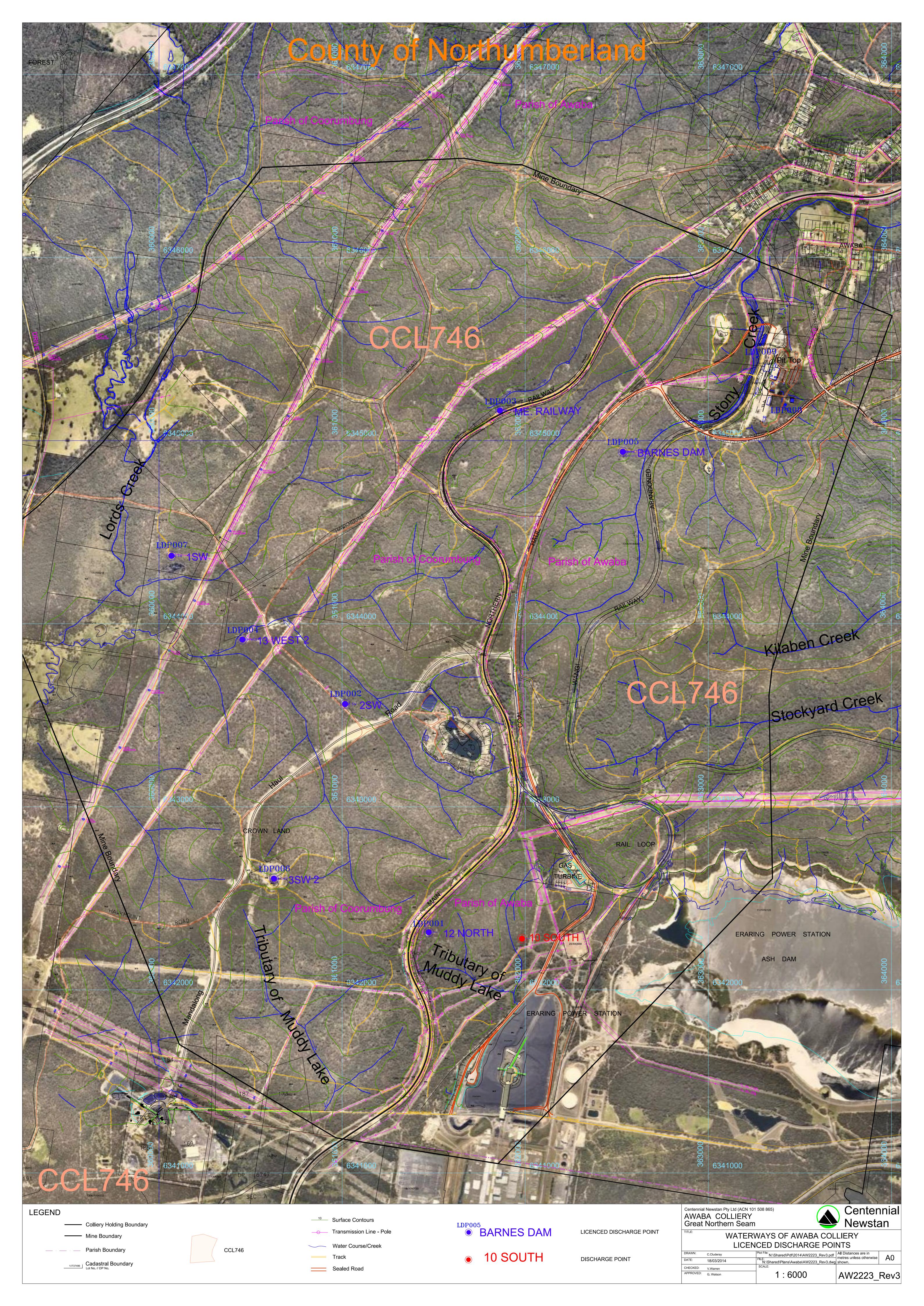
Centennial Coal Company Limited P O Box 1000 Toronto NSW 2283

www.centennialcoal.com.au









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prosecution.



ANNUAL RETURN

LICENCE NO	443						
LICENCE HOLDER	CENTENNIAL NEWSTAN PTY LIMITED						
REPORTING PERIOD	01-Jan-2014 to 31-Dec-2014						
If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates above and specify the new dates to which this Annual Return relates below:							
REVISED REPORTING PERIOD/to//							
(Note: the revised reporting p	period also needs to be entered in Section E)						
THIS ANNUAL RETURN MU	ST BE RECEIVED BY THE EPA BEFORE 02-Mar-2015						
Your Annual Return must be completed, including certification in Section E, and submitted to the EPA no later than 60 Days after the end of the reporting period for your licence.							
Failure to submit this ends may result in:	Annual Return within 60 days after the reporting period						
 the issue of a Penalty Notice for \$1500 (individuals) or \$3000 (corporations); 							

Please send your completed Annual Return by Registered Post to:

Regulatory and Compliance Support Unit Environment Protection Authority PO Box A290 SYDNEY SOUTH NSW 1232

It is an offence to supply any information in this form to the EPA that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect.

THERE IS A MAXIMUM PENALTY OF \$250,000 FOR A CORPORATION OR \$120,000 FOR AN INDIVIDUAL.

Details provided in this Annual Return will be available on the EPA's Public Register in accordance with section 308 of the Protection of the Environment Operations Act 1997.

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Use the checklist below to ensure that you have completed your Annual Return correctly. (✓ the boxes)

		CHECKLIST				
✓	Section A: All licence details are correct					
✓	Section 81:	You have entered the correct number in the complaints table				
✓	Section 82 - 83: If there are tables, you have provided the required details					
1	Section C: You have answered question 1, and 2 if applicable					
NA	Section D: If applicable, you have completed all load calculation worksheets					
1	Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable				
1	Section F:	You have answered question 1, 2 and 3 if applicable				
✓	Section G:	The Annual Return has been signed by appropriate person(s) and, if applicable, the revised reporting period entered				
✓	Make a copy of the completed Annual Return and keep it with your licence records					
	Attach a cheque (unless you have paid separately) for the payment of the administrative fee for the next licence fee period					

Please send your completed Annual Return by Registered Post to:

Regulatory and Compliance Support Unit Environment Protection Authority PO Box A290 SYDNEY SOUTH NSW 1232 CENTENNIAL NEWSTAN PTY LIMITED



A Statement of Compliance - Licence Details

ALL licence holders must check that the licence details in Section A are correct

If there are changes to any of these details you must advise the EPA and apply as soon as possible for a variation to your licence or for a licence transfer.

Licence variation and transfer application forms are available on the EPA website at: http://www.epa.nsw.gov.au/licensing, or from regional offices of the EPA, or by contacting us on telephone 02 9995 5700.

If you are applying to vary or transfer your licence you must still complete this Annual Return.

A1 Licence Holder

Licence Number 443

Licence Holder CENTENNIAL NEWSTAN PTY LIMITED

Trading Name (if applicable)

A8N 68 101 508 865

A2 Premises to which Licence Applies (if applicable)

Common Name (if any) AWA8A COLLIERY

Premises WILTON RD AWA8A NSW 2283

A3 Activities to which Licence Applies

Mining for Coal Coal Works

A4 Other Activities (if applicable)

Sewage Treatment Systems

A5 Fee-Based Activity Classifications

Note that the fee based activity classification is used to calculate the administrative fee.

Fee-based activity	Activity scale	Unit of measure T produced	
Mining for coal	> 0.00 - 500,000.00		
Coal works	> 0.00 - 2,000,000.00	T handled	

A6 Assessable Pollutants (Not Applicable)

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B Monitoring and Complaints Summary

B1 Number of Pollution Complaints

Number of complaints recorded			
If no complaints were receive complete the table below.	0		
Pollution Complaint Category	Number of Complaints		
Air			
Water			
Noise			
Waste			
Other			

B2 Concentration Monitoring Summary

For each monitoring point identified in your licence complete all the details for each pollutant listed in the tables provided below.

If concentration monitoring is not required by your licence, no tables will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

Discharge & Monitoring Point 1

Discharge to waters

Discharge quality monitoring Volume montoring, Outlet from bore hole pump from underground workings located on the eastern side Main Northern Railway, shown as "12 NORTH" on map AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/225-02).

		Pollutant	measure	samples required by		Lowest sample value		Highest sample value
--	--	-----------	---------	------------------------	--	------------------------	--	----------------------

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Conductivity	microsieme n s per centimetre	0	0	9 <u>=</u>	4	8
Oil and Grease	milligrams per litre	0	0	~	-	ш
рН	рН	0	0	-	741	-
Total suspended solids	milligrams per litre	0	0	-	5 # .	-

Discharge & Monitoring Point 2

Discharge to waters

Discharge quality monitoring

Volume monitoring, Outlet from bore hole pump from underground workings located along Hawk Mount Road, shown as "2SW" on plan AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/225-02).

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemen s per centimetre	0	0	S#C	(4)	Ħ
Oil and Grease	milligrams per litre	0	0	3 0	<u>(</u> ()	5
рН	РΗ	0	0	8	3 7	ä
Total suspended solids	milligrams per litre	0	0	en en	2"	12

Discharge & Monitoring Point 3

Discharge to waters

Discharge quality monitoring

Volume monitoring, Drain from bore hole pump from underground workings located on the western side Main Northern Railway, shown as "ME RAILWAY" on plan AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/25-02).

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Conductivity	microsieme n s per centimetre	0	0	ŧ	÷	-
Oil and Grease	milligrams per litre	0	0		1726	@-
рН	рН	0	0	-	122	1
Total suspended solids	milligrams per litre	0	0	144		-

Discharge & Monitoring Point 4

Discharge to waters

Discharge quality monitoing

Volume monitoring, Outlet from bore hole pump from underground workings located along Hawk Mount Road, shown as "13 WEST 2" on plan AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/225-02).

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemen s per centimetre	0	0	-	Ē	æ
Oil and Grease	milligrams per litre	0	0	-	-	o ™ s
рH	рН	0	0	<u>-</u>	98	(4)
Total suspended solids	milligrams per litre	0	0	÷	9	v <u>a</u> :

Discharge & Monitoring Point 5

Discharge to waters

Discharge quality monitoing

Volume monitoring, Outlet from bore hole pump from underground workings on eastern side of private haul road, shown as "BARNES DAM" on plan AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/225-02).

Pollutant	Unit of measure	No. of samples	No. of samples you	Lowest sample value	Mean of sample	Highest sample value
		required by licence	collected and analysed			

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Conductivity	microsieme n s per centimetre	0	0	'F	, w	1 GE
Oil and Grease	milligrams per litre	0	0		re-	:
рН	рН	0	0	.25	.e=	-:
Total suspended solids	milligrams per litre	0	0	ĕ	æ	表

Discharge & Monitoring Point 6

Discharge to waters

Discharge quality monitoring

Volume monitoring, Outlet from bore hole pump from underground workings located in private gravel quarry, shown as "3 SW 2" on plan AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/225-02).

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsiemen s per centimetre	0	0) -) * :	-
Oil and Grease	milligrams per litre	0	0	=		(#)
pH	рН	0	0	120	en en	Ē.
Total suspended solids	milligrams per litre	0	0	:41	2 0	=

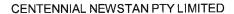
Discharge & Monitoring Point 7

Discharge to waters

Discharge quality monitoring

Volume monitoring, Outlet from bore hole pump from underground workings located on southern side of gravel road from Freemans Drive, shown as "1SW" on plan AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/225-02).

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Conductivity	microsieme n s per centimetre	0	0	8	#.	l=X





Oil and Grease	milligrams per litre	0	0		2.	<u>44</u> 17
рН	рН	0	0	2	æ	æ
Total suspended solids	milligrams per litre	0	0		¥	-

Discharge & Monitoring Point 8

Discharge to waters

Discharge quality monitoring, Discharge from utilisation area, shown as "LDP8" on plan AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/225-02).

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Oil and Grease	milligrams per litre	0	0	-	-	: # :
рН	рН	0	0		\(\frac{1}{2}\)	選
Total suspended solids	milligrams per litre	0	0	-	-	k ≅

Discharge & Monitoring Point 9

Discharge to waters

Discharge quality monitoring

Volume monitoring, Outlet from Settling Pond, shown as "LDP 9" on plan AW2109 titled "Waterways of Awaba Colliery Licensed Discharge Points" dated 7/4/2009 (on EPA file LIC07/225-02).

Pollutant	Unit of measure	samples	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Oil and Grease	milligrams per litre	1	1	< LOR	< LOR	< LOR
рН	рH	1	1	8.67	8.67	8.67

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Total suspended milligrams per litre 1 1 647 647 647
--

Monitoring Point 10

Dust deposition gauge, Labelled 'DG1' on map titled Awaba Colliery Air Quality Monitoring Network Figure 9.14

Pollutant	Unit of measure	required by	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Particulates - Deposited Matter	grams per square metre per month	12	12	0.2	0.8	1.6

Monitoring Point 11

Dust deposition guage, Labelled as 'DG2' on map titled Awaba Colliery Air Quality Monitoring Network Figure 9.14

Pollutant	Unit of measure	samples required by	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Particulates - Deposited Matter	grams per square metre per month	12	12	0.2	1.9	7.5

Monitoring Point 12

Dust deposition gauge, Labelled 'DG3' on map titled Awaba Colliery Air Quality Monitoring Network Figure 9.14

Pollutant	Unit of measure	samples required by	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Particulates - Deposited Matter	grams per square metre per month	12	12	0.8	4.1	13.1

Monitoring Point 13

Dust deposition gauge, Labelled 'GD4' on map titled Awaba Colliery Air Quality Monitoring Network Figure 9.14

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Pollutant	Unit of measure	samples	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Particulates - Deposited Matter	grams per square metre per month	12	12	0.4	1.5	2.3

Monitoring Point 14

Particulate matter (PM10), At a location agreeable by the EPA

Pollutant	Unit of measure	No. of samples required by licence	No. of samples you collected and analysed	Lowest sample value	Mean of sample	Highest sample value
Particulate matter	microgram s per cubic metre	*	*			

Equipment installed. Monitoring to commence in 2015.

B3 Volume or Mass Monitoring Summary

For each monitoring point identified in your licence complete the details of the volume or mass monitoring indicated in the tables provided below.

If volume or mass monitoring is not required by your licence, no tables will appear below.

Note that this does not exclude the need to conduct appropriate concentration monitoring of assessable pollutants as required by load-based licensing (if applicable).

Discharge & Monitoring Point 1

Discharge to waters

Discharge quality monitoring Volume monitoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Daily during any discharge	0	æ	ŧ	T.

Discharge & Monitoring Point 2

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Discharge to waters
Discharge quality monitoring
Volume monitoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Daily during any discharge	0	Æ	æ	인코

Discharge & Monitoring Point 3

Discharge to waters
Discharge quality monitoring
Volume monitoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Daily during any discharge	0	-	<u>12</u> 1	Ē

Discharge & Monitoring Point 4

Discharge to waters
Discharge quality monitoing
Volume monitoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Daily during any discharge	0	147	-	er.

Discharge & Monitoring Point 5

Discharge to waters Discharge quality monitoing Volume monitoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Daily during any discharge	0	7	+	-

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Discharge & Monitoring Point 6

Discharge to waters
Discharge quality monitoring
Volume monitoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Daily during any discharge	0	-	ų.	A.

Discharge & Monitoring Point 7

Discharge to waters
Discharge quality monitoring
Volume monitoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Daily during any discharge	0	Ξ	Ē.	2

Discharge & Monitoring Point 9

Discharge to waters
Discharge quality monitoring
Volume monitoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Continuous	1	438*	438*	438*

^{*} Volume discharge is estimated by calculation

Page 12 of 18

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C Statement of Compliance - Licence Conditions

C1	C	ompliance with Licence Conditions		
50	(E	Ithe boxes)		
	1	Were all conditions of the licence complied with (including monitoring and reporting requirements)?	☐ Yes	☑ No
		(✓ a box)		

If you answered 'No' to question 1, please supply the following details for each non -compliance in the format, or similar format, provided on the following page.

Please use a separate page for each licence condition that has not been complied with.

- a) What was the specific licence condition that was not complied with?
- b) What were the particulars of the non -compliance?
- c) What were the date(s) when the non -compliance occurred, if applicable?
- d) If relevant, what was the precise location where the non -compliance occurred?

Attach a map or diagram to the Statement to show the precise location.

- e) What were the registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance?
- f) What was the cause of the non-compliance?
- g) What action has been, or will be, taken to mitigate any adverse effects of the non-compliance?
- h) What action has been, or will be, taken to prevent a recurrence of the non-compliance?
- 3. How many pages have you attached?

Each attached page must be initialed by the person(s) who signs Section G of this Annual Return

3



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C2 Details of Non-Compliance with Licence

Licence condition number not complied with

L2.4 Water &/or Land Concentration Limits

Summary of particulars of the non-compliance (NO MORE THAN 50 WORDS)

At approximately 7:20 am on Friday, 28 February water commenced overflowing from the Pollution Control Dam through LDP009 at the Awaba Colliery. A water sample was taken at 8:30 am.

The results of this sample show that the quality of the discharge water exceeded the EPL 443 Total Suspended Solids (TSS) and pH limits at LDP009. The discharge continued until approximately 10:15 am, when the Pollution Control Dam ceased overflowing, and discharge via LDP009 stopped.

If required, further details on particulars of non-compliance

Water samples were collected at LDP009 at 8:30 am, Downstream at 8:50 am and Upstream at 9:00 am. The results show the TSS reading of the discharge from LDP009 was 647 mg/L, while the TSS results for upstream were 47 mg/L and downstream were 154 mg/L.

The pH reading of the discharge from LDP009 was 8.67, which was above the upper limit of 8.5. The pH result for upstream were 5.88 and downstream were 5.89.

The flow from the PCD through LDP009 has been calculated as 0.438 ML as the flow monitoring equipment at LDP009 had not been installed at the time of the discharge.

Date(s) when the non-compliance occurred, if applicable

28 February 2014

If relevant, precise location where the non-compliance occurred (attach a map or diagram)

The discharge occurred from EPL Point 9 – LDP009, which is located at the Pollution Control Dam at Awaba Colliery, and discharges into Stony Creek

If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance

Cause of non-compliance

Awaba Colliery received a total of 111.2 mm of rainfall from 12 midnight Friday 28/02/14 to 7:20 am when the discharge commenced.

This high intensity resulted in the capacity of the dam and the pumping system being exceeded resulting in the dam overtopping through LDP009.

Action taken or that will be taken to mitigate any adverse effects of the non-compliance

The following actions were taken to minimise the discharge from the Pollution Control Dam through LDP009:

- Water within the PCD is pumped to a low level to increase the capacity of the dam;
- There are two pumps installed in the dam to increase the pumping capacity away from the dam;
- · Sampling was undertaken upstream and downstream of the discharge point.

Action taken or that will be taken to prevent a recurrence of the non-compliance



M

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The following actions have been undertaken to minimise the potential for future discharges from the Pollution Control Dam through LDP009:

- The pumps within the PCD were upgraded to increase the pumping capacity,
- An alarming system has been installed on the PCD to notify the site when the dam is approaching the discharge level,
- Additional storage area has been developed on the old stockpile area to slow the flow into the PCD.

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C2 Details of Non-Compliance with Licence

Licence condition number not complied with EPL443 Condition L1 Pollution of waters Summary of particulars of the non-compliance (NO MORE THAN 50 WORDS) In August 2013 an inspection of an unnamed watercourse which flows to Muddy Lake identified an area of sodden ground which resulted in a water flow. This visual inspection indicated clear water with iron staining in the sediment. The area affected is approximately 160m to the South of the nearest Awaba workings. The seepage area has shown results of low pH, high conductivity and other analytes. If required, further details on particulars of non-compliance Date(s) when the non-compliance occurred, if applicable August 2013 to present If relevant, precise location where the non-compliance occurred (attach a map or diagram) If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance Cause of non-compliance Awaba Colliery workings have slowly been filling with water over several years. This rise in water level in the underground workings has occurred as a result of rainfall events infiltrating subsidence cracks and sinkholes, and groundwater infiltration & may be influencing on the seepage area. Action taken or that will be taken to mitigate any adverse effects of the non-compliance A Rehabilitation Works Plan is being developed in consultation with relevant stakeholders. This includes the commitment to complete an options assessment and further investigation work. Action taken or that will be taken to prevent a recurrence of the non-compliance



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D Statement of Compliance - Load-Based Fee Calculation Worksheets

If you are not required to monitor assessable pollutants by your licence, no worksheets will appear below. Please go to Section E.

If assessable pollutants have been identified on your licence (see licence condition L2), complete the following worksheets for each assessable pollutant to determine your load-based fee for the licence fee period to which this Annual Return relates.

Loads of assessable pollutants must be calculated using any of the methods provided in the EPA's Load Calculation Protocol for the relevant activity. A Load Calculation Protocol would have been sent to you with your licence. If you require additional copies you can download the Protocol from the EPA's website or you can contact us on telephone 02 9995 5700.

You are required to keep all records used to calculate licence fees for four years after the licence fee was paid or became payable, whichever is the later date.

PENALTIES APPLY FOR SUPPLYING FALSE OR MISLEADING INFORMATION

D1 - D8 (Not Applicable)

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E Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan (PIRMP) Under Section 153A of the POEO Act 1997

1 Have you prepared a PIF Act 1997?	RMP as rec	uired under s153A of the Protection of the	Environment O	perations
(✓ a box)			☑ Yes	[]No
If you answered 'Yes' to que	stion 1, ple	ase tick the appropriate box to indicate the	e following:	
2 Is the PIRMP available a	at the prem	ises?		
(✓ a box)			✓ Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes Yes	[]No
3 Is the PIRMP available i	n a promin	ent position on a publicly accessible web	site?	
(✓ a box)			☑ Yes	[]No
If the PIRMP is available on web site where the PIRMP c		accessible web site please indicate clearly essed:	below the addre	ess of the
Web site Address	www.c	entennialcoal.com.au		
4 Has the PIRMP been to	ested?			
(✓ a box)			✓ Yes	[]No
If you answered 'Yes' to que	stion 4 plea	ase indicate clearly below the date that the	e PIRMP was las	st tested:
The PIRMP was last tested o	מח	December 2014		
THE FIRMIT Was last tosted t	J11	Describer 2021		
5 Has the PIRMP been u	ndated?			
(✓ a box)	puatou:		☑ _{Yes}	[]No
,	stion 5 ple	ase indicate clearly below the date that the		
The PIRMP was last update		October 2014		
6 How many times has th	e PIRMP I	peen activated in this reporting period?	1	
If the PIRMP has been activ	ated, pleas	se indicate clearly below the date/s when t	ne PIRMP was a	activated:
The PIRMP was activated o	n	28 February 2014		

The EPA's guidelines for preparation of pollution incident response management plans are available at http://www.epa.nsw.gov.au/legislation/20120227egpreppirmp.htm

CENTENNIAL NEWSTAN PTY LIMITED



F Statement of Compliance - Requirement to Publish Pollution Monitoring Data Under Section 66(6) of the POEO Act 1997

1	Are there any conditions attached to your licence that require pollution monitoring to be undertaken?				
	(✓ a box)	☑ Yes	[]No		
lf y	If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:				
2	Do you operate a web site?				
	(✓ a box)	☑ Yes	[]No		
3	Is the pollution monitoring data published on your web site in accordance with the requirements for publishing pollution monitoring data?	e EPA's written			
	(✓ a box)	☑ Yes	[]No		
If you publish pollution monitoring data on a web site please indicate clearly below the address of the web site where the pollution monitoring data can be accessed:					
We	b site address www.centennialcoal.com.au				
	e EPA's written requirements for publishing pollution monitoring data are available p://www.epa.nsw.gov.au/legislation/20120263reqpubpmdata.htm	e at			

Note - if you do not maintain a web site, you must provide a copy of any monitoring data that relates to pollution, to any person requests a copy of the data at no charge to the person requesting the data.



Paler Farry

CENTENNIAL NEWSTAN PTY LIMITED



E Signature and Certification

This Annual Return may only be signed by a person(s) with legal authority to sign it as set out in the categories below. Please tick (<) the box next to the category that describes how this Annual Return is being signed.

If you are uncertain about who is entitled to sign or which category to tick, please contact us on telephone 02 9995 5700.

If the licence holder is: an individual	the Annual Return must be signed and certified: 1 by the individual licence holder, or 1 by a person approved in writing by the EPA to sign on the licence holder's behalf	
a company	 by affixing the common seal in accordance with Corporations Act 2001, or by 2 directors, or by a director and a company secretary, or if a proprietary company that has a sole director who is also the sole company secretary - by that director, or by a person de legated to sign on the company's behalf in accordance with the Corporations Act 2001 and approved in writing by the EPA to sign on the company's behalf. 	
a public authority (other than a council)	 by the Chief Executive Officer of the public authority, or by a person delegated to sign on the public authority's behalf in accordance with its legislation and approved in writing by the EPA to sign on the public authority's behalf. 	
a local council	 by the General Manager in accordance with s.377 of the Local Government Act 1993, or by affixing the seal of the council in a manner authorised under that Act. 	

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of \$250,000 for a corporation or \$120,000 for an individual.

IWe

- declare that the information in the Monitoring and Complaints Summary in section B of this Annual Return is correct and not false or misleading in a material respect, and
- certify that the information in the Statement of Compliance in sections A, C, D, E and F and any pages attached to Section C is correct and not false or misleading in a material respect.

If your licence has been transferred, suspended, surrendered or revoked by the EPA during this reporting period, cross out the dates below and specify the new dates to which this Annual Return relates below:				
For the reporting period 01-Jan-2014 to 31-Dec-2014	or/to/			
SIGNATURE: Flarry	SIGNATURE: Tany Macko			
NAME: Peter Parry (printed)	NAME: Tony Macko			
POSITION: MRECTOR	Company Secretary POSITION:			
DATE: 26 / 02 / 2015	DATE: 24 / 02 / 2015			

SEAL (if signing under seal)

PLEASE ENSURE THAT ALL APPROPRIATE BOXES HAVE BEEN COMPLETED AND THAT THE CHECKLIST ON PAGE 2 OF THE ANNUAL RETURN HAS BEEN COMPLETED





Ecological Monitoring of Riparian Vegetation along Stony Creek at Awaba

Awaba Colliery

February 2014





Ecological Monitoring of Riparian Vegetation along Stony Creek at Awaba – February 2014

Introduction

Condition 12 of the approval for pillar extraction of coal from the vicinity of Stony Creek by Centennial Awaba Colliery required monitoring to be conducted at selected intervals along the creekline. Winning (2008) prepared a detailed baseline survey of the vegetation at selected sites. Follow-up surveys were undertaken (Winning 2009; Hunter Eco 2011; Hunter Eco 2012; Hunter Eco 2013) to determine whether there was any deterioration in the riparian vegetation that may be attributed to coal extraction operations.

Reduction in the size of coal pillars can result in surface subsidence as a consequence of the pillar sinking into the floor and/or the wider area between pillars subsiding further. Severe subsidence can lead to cracks extending to the surface. If such cracks were to form in the creek bed, water could be diverted underground depriving groundwater dependent ecosystems.

Methods

A general inspection was conducted along the length of the creek, and detailed qualitative sampling conducted along five transects A to E. An additional transect F was added in 2011. Transect locations were chosen in consultation with Centennial environmental, surveying and operational personnel to ensure that they were representative of the Stony Creek system. The length of each transect was determined by the width of the creek at each location (measured from east or south, as relevant). Stakes, at which data were collected, were placed at 5 metre intervals along each transect. Upstream and downstream photographs and dominant floristics (the two nearest tree species and the two most abundant understorey species) were recorded. The transect locations are shown in **Figure 1**. It is not known what camera was used in 2008 and 2009. The camera used in 2011 and 2012 was a Panasonic FZ28; 2013 Panasonic FZ150, with a slightly wider angle lens than the FZ28; and 2014 Panasonic FZ200.

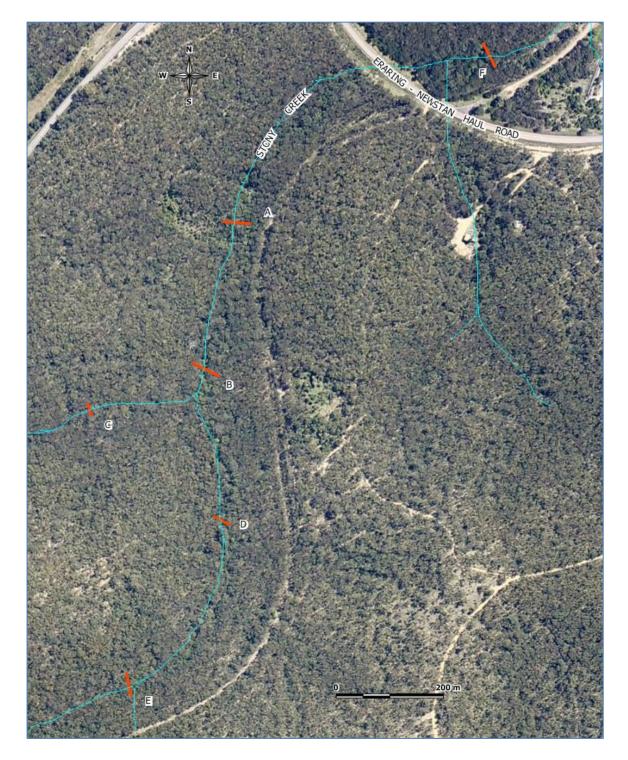


Figure 1 Showing the monitoring transects along Stony Creek

Results & Discussion

Transect photographs and descriptions are presented in **Appendix 1**. The vegetation in February 2013 was essentially the same as that recorded previously with two small changes on Transect A bolded. These changes are the result of an individual plant having died and being replaced in the list with the next nearest species. They are small shrub or ground plants and the changes are minor and to be expected as part of natural variation. **Appendix 2** provides example comparison photographs from one photo point for each transect for the seven monitoring periods, illustrating that there has been no deterioration of habitat over time.

Traversing between transects involved walking along over a kilometre of Stony Creek, including part of a tributary. In February 2013, the creek was full of flowing water as a result of recent heavy rain. There was a healthy amphibian population calling. The creek being full and flowing provided an ideal opportunity to detect any sections of the creek bed that might have water diverted underground. There were no breaks in water flow which, along with the healthy condition of vegetation, confirms that underground mining has had no effect on the creek or its habitat.

In February 2014 the creek bed was mostly dry with the occasional water hole. Despite this, the vegetation showed no signs of being under water stress. Again there was a healthy amphibian population calling. Another indication of the overall health of the ecosystem was a roosting Powerful Owl at Transect D (**Figure 2**).

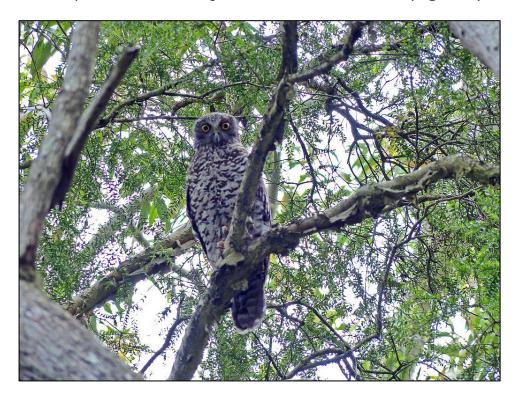


Figure 2 Powerful Owl roosting at Transect D

References

Winning, G 2008, Baseline ecological description of riparian vegetation along Stony Creek at Awaba. A report to Centennial Newstan by HWR Pty Ltd.

Winning G 2009, Ecological monitoring of riparian vegetation along Stony Creek at Awaba - 2009 survey. A report to Centennial Newstan by HWR Pty Ltd.

Hunter Eco (2011) Ecological Monitoring of Riparian Vegetation Along Stony Creek at Awaba – March 2011. A report to Centennial Awaba by Hunter Eco.

Hunter Eco (2012) Ecological Monitoring of Riparian Vegetation Along Stony Creek at Awaba – February 2012. A report to Centennial Awaba by Hunter Eco.

Appendix 1

Transect A

Point	Floristics	Downstream Photograph	Upstream Photograph
0m	Angophora costata x2 Leptospermum polygalifolium Doryanthes excelsa		
5m	Angophora costata x2 Dodonaea triquetra Doryanthes excelsa		
10m	Melaleuca styphelioides x2 Callicoma serratifolia Gahnia clarkei		
15m	Melaleuca styphelioides x2 Lomandra longifolia Gahnia clarkei		

20m	Angophora costata Melaleuca styphelioides Lomandra longifolia Entolasia stricta	
25m	Corymbia gummifera Eucalyptus umbra Dodonaea triquetra Entolasia stricta	
30m	Melaleuca styphelioides Eucalyptus resinifera Gahnia clarkei Leptospermum polygalifolia	
35m	Melaleuca styphelioides x2 Gahnia clarkei	

Point	Floristics	Downstream Photograph	Upstream Photograph
40m	Eucalyptus resinifera Angophora costata Gahnia clarkei Doryanthes excelsa		
45m	Eucalyptus resinifera x2 Doryanthes excelsa Dodonaea triquetra		
50m	Syncarpia glomulifera Eucalyptus resinifera Doryanthes excelsa Melaleuca styphelioides		

Transect B

Point	Floristics	Downstream Photograph	Upstream Photograph
0m	Corymbia maculata Eucalyptus umbra Dodonaea triquetra Leptospermu m polygalifolia		
5m	Corymbia gummifera Eucalyptus piperita Dodonaea triquetra Doryanthes excelsa		
10m	Corymbia gummifera Eucalyptus piperita Dodonaea triquetra Entolasia stricta		
15m	Corymbia gummifera x2 Dodonaea triquetra Entolasia stricta		

20m	Eucalyptus resinifera Melaleuca styphelioides Gahnia clarkei Acmena smithii	
25m	Melaleuca styphelioides Acmena smithii Gahnia clarkei Lomandra longifolia	
30m	Melaleuca styphelioides x2 Gahnia clarkei Lomandra longifolia	
35m	Eucalyptus resinifera Angophora costata Gahnia clarkei Smilax australis	

Point	Floristics	Downstream Photograph	Upstream Photograph
40m	Angophora costata Eucalyptus umbra Xanthorrhoea macronema Platylobium formosum		
45m	Corymbia gummifera Angophora costata Dodonaea triquetra Entolasia stricta		
50m	Eucalyptus piperita Eucalyptus umbra Dodonaea triquetra Entolasia stricta		

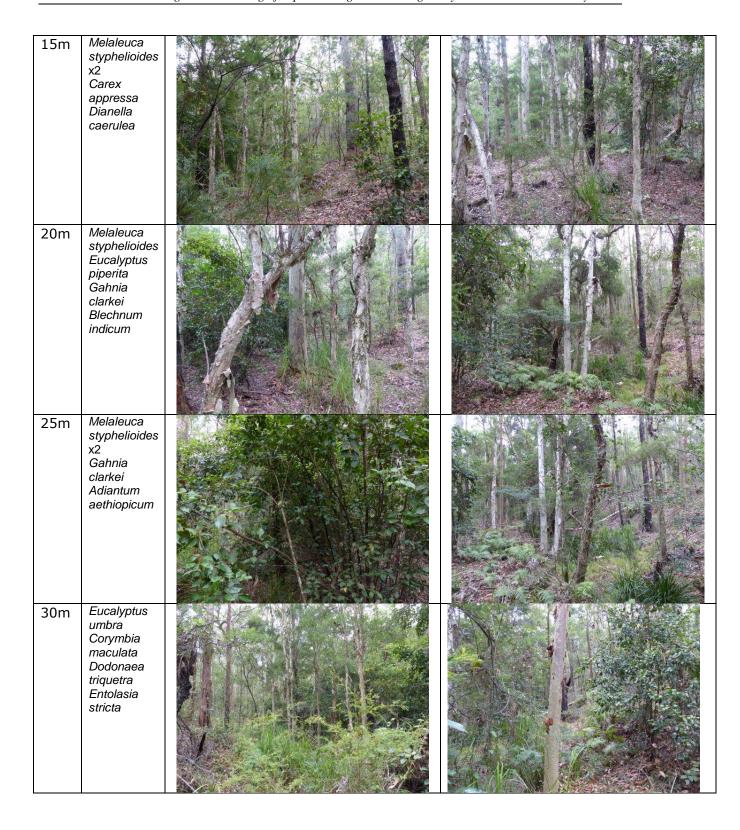
Transect C

Point	Floristics	Downstream Photograph	Upstream Photograph
0m	Eucalyptus umbra x2 Dodonaea triquetra Entolasia stricta		
5m	Eucalyptus umbra x2 Dodonaea triquetra Adiantum aethiopicum		
10m	Corymbia maculata Glochidion ferdinandi Imperata cylindrica Microlaena stipoides		
15m	Eucalyptus resinifera Angophora costata Entolasia stricta Dianella caerulea		



Transect D

Point	Floristics	Downstream Photograph	Upstream Photograph
0m	Eucalyptus piperita Corymbia maculata Dodonaea triquetra Doryanthes excelsa		
5m	Corymbia maculata x2 Dodonaea triquetra Pteridium esculentum		
10m	Angophora costata Eucalyptus umbra Dodonaea triquetra Smilax australis		



Transect E

Point	Floristics	istics Downstream Photograph Upstream Photograph	
0m	Corymbia maculata x2 Entolasia stricta Dodonaea triquetra		
5m	Angophora costata Syncarpia glomulifera Callicoma serratifolia Entolasia stricta		
10m	Melaleuca styphelioides Syncarpia glomulifera Calochlaena dubia Doryanthes excelsa		
15m	Corymbia maculata Syncarpia glomulifera Entolasia stricta Adiantum aethiopicum		



Transect F

D - : t	Flaniskias	Danisation and Dhata areas h	Harton on Dhata and
Point 0m	Floristics Eucalyptus piperita Angophora costata Leptospermum polygalifolium Acacia parramattensis	Downstream Photograph	Upstream Photograph
5m	Eucalyptus umbra Angophora costata Leptospermum polygalifolium Banksia spinosa		
10m	Melaleuca Iinariifolia x2 Melaleuca Iinariifolia Gahnia clarkei		

15m	Melaleuca linariifolia x2 Callicoma serratifolia Acmena smithii	
20m	Eucalyptus umbra Melaleuca Iinariifolia Gahnia clarkei x2	
25m	Eucalyptus umbra x2 Dodonaea triquetra x2	
30m	Eucalyptus piperita Corymbia maculata Dodonaea triquetra x2	

Appendix 2

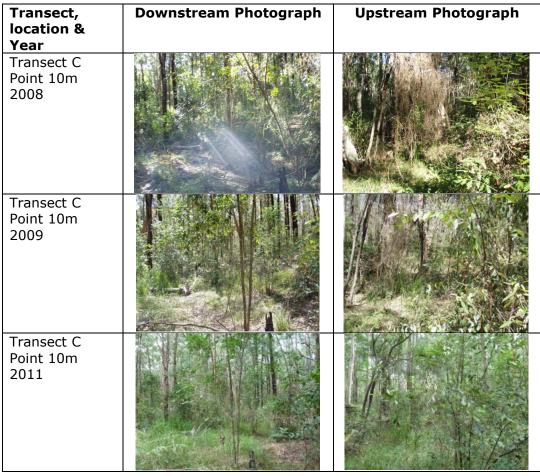
Sample photographs from the five monitoring periods

Sample photographs from the five monitoring periods.				
Transect,	Downstream Photograph	Upstream Photograph		
location & Year				
Transect A				
Point 0m 2008				
2000		华国历 至安原 温水		
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	Wall to Milk State State			
Transect A		宣传的 医神经检查		
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	THE WAR TO SEE THE SECOND SECO			
Transect A				
Point 0m				
2011				
		STATE OF THE STATE		
Transect A				
Point 0m				
2012				
Transect A				
Point 0m 2013				
2010				









Transect C Point 10m 2012	
Transect C Point 10m 2013	
Transect C Point 10m 2014	

Transect, location & Year	Downstream Photograph	Upstream Photograph
Transect D Point 20m 2008		
Transect D Point 20m 2009		
Transect D Point 20m 2011		
Transect D Point 20m 2012		
Transect D Point 20m 2013		
Transect D Point 20m 2013		

Transect, location & Year	Downstream Photograph	Upstream Photograph
Transect E Point 5m 2008		
Transect E Point 5m 2009		
Transect E Point 5m 2011		
Transect E Point 5m 2012		
Transect E Point 5m 2013		



Transect, location & Year	Downstream Photograph	Upstream Photograph	
Transect F Point 15m 2008	Not established Not established		
Transect F Point 15m 2009	Not established	Not established	
Transect F Point 15m 2011			
Transect F Point 15m 2012			
Transect F Point 15m 2013			



Centennial Coal





Centennial Newstan (Awaba) Colliery 2014 End of Year Subsidence Management Report

Report Number: 7

Reporting Period: 2014

Distribution List:

DTIRIS - Department of Trade & Investment, Regional Infrastructure & Services

- DTIRIS Director Environmental Sustainability
- DTIRIS Subsidence Executive Officer
- DTIRIS District Inspector
- DTIRIS Principal Subsidence Engineer
- DTIRIS Subsidence Engineer
- NOW NSW Office of Water
- OEH Office of Environment & Heritage
- DOP&E Department of Planning & Environment
- Ausgrid
- RailCorp (Transport NSW),
- Mine Subsidence Board,
- Eraring Energy,
- Telstra
- Newstan (Awaba) Mine Manager,
- Newstan (Awaba) Environmental Coordinator.

General Comments:

Stage 1:

- Approval to mine Stage 1 of Mine Subsidence Management Plan (MSMP) at Awaba Colliery was granted on 03/09/2007
- Mining completed on 26/06/2009.
- Monitoring variation from 3 to 6 monthly approved 28/06/2011.
- January and March 2014 resurveys recorded greater than predicted maximum subsidence along Main South Crossline between XL24 to XL66 – and 8NE Centreline between CL01 to CL16
- In response monitoring was temporarily increased to fortnightly in the active subsidence area until stable results are achieved.
- There have been relatively stable results achieved in recent months.

Stage 2:

- Approval to mine Stage 2 of MSMP at Awaba Colliery was granted on 29/08/2008
- Mining completed on 08/03/2012.
- Monitoring variation from 3 to 6 monthly approved 31/05/2013.
- July 2014 resurvey recorded greater than predicted subsidence along Main South Crossline Extension between XLE01to XLE22 – and 8SW Centreline between 8SW22 to 8SW43.
- In response monitoring was temporarily increased to fortnightly in the active subsidence area until stable results are achieved.
- There have been relatively stable monitoring results achieved in recent months.

3 North:

- Approval to mine MSMP 3 NORTH Area Awaba Colliery was granted on 13/05/2009
- Mining completed on 25/01/2010.
- Monitoring results show subsidence within predictions.
- Subsidence monitoring in the 3 North Area was completed on 31/01/2013.
- Monitoring points remain in place for future reference.

Stage 3:

- Approval to mine Stage 3 of MSMP at Awaba Colliery was granted on 15/12/2010
- Mining Completed on 22/12/2011.
- Monitoring variation from 3 to 6 monthly approved 31/05/2013.
- Additional amendments to Stage 3 monitoring program in consultation with Principal Subsidence Engineer (PSE) and relevant stakeholders.
- Monitoring results show subsidence within predictions.
- There continues to be relatively stable results recorded from surveys.

East B Area:

- Approval to mine MSMP East B Area at Awaba Colliery was granted on 27/07/2011
- Mining Completed on 21/12/2011.
- Monitoring results show subsidence within predictions.
- Subsidence monitoring in the East B Area was completed on 31/01/2013.
- Monitoring points remain in place for future reference.

Awaba Colliery Great Northern Seam Mining Ceased 08/03/2012.

- All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012.
- Underground workings are no longer accessible.

SMP Approval Condition No.	Requirement Summary	Comment / Description
22 (a) – Stage 1 23 (a) – Stage 2 18 (a) – 3 North 24 (a) – Stage 3 18 (a) – East B Summary of Subsidence and Environmental Monitoring Results	The Following subsidence surveys and inspections have been completed: Surface Surveys — All scheduled subsidence surveys completed to December 31 st , 2014. All scheduled environmental monitoring completed to December 31 st , 2014.	
		Maximum subsidence in 2014 period was in Main South Stage 2 - XLE17 (-1.378 m in December), which is greater than the defined predicted subsidence levels. A resurvey in January 2014 found greater than predicted subsidence in Main South Stage 1 Area - along Main South Crossline between XL24 to XL66 - and 8NE Centreline between CL01 to CL16. Maximum subsidence was at XL52 (-388mm). In response to the January results – a further resurvey was done in March 2014. The maximum subsidence was at XL40 (-1112mm) on Main South Crossline in Stage 1. No visual signs of subsidence have been observed in Stage 1 Area.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		A resurvey in July 2014 found greater than predicted subsidence in Main South Stage 2 Area - along Main South Crossline Extension between XLE01 to XLE22 – and 8SW Centreline between 8SW22 to 8SW43. Maximum subsidence was at XLE17 (-1255mm). A visual inspection conducted on 14/07/2014 found evidence of minor surface impacts within these areas. Visual signs of subsidence (0.1–0.2 metre steps and cracks) were observed in vicinity of MSXLE 17 to 20, and 8SW28 to 31.
		Stage 3 Subsidence monitoring results in 2014 were well within predicted levels and continue to be relatively stable.
		Visual Inspections found one case of surface impacts in Stage 3. This impact was a sinkhole - found following heavy rain over the June 2011 long weekend. The hole was approximately 33x38 metres in surface area with cover ranging between 26-30 metres.
		A subsequent inspection has found evidence of the sinkhole beginning to partially reactivate. This sinkhole has been included in the Sinkhole Rehabilitation Schedule.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Environmental inspections were carried out in January 2014. Traversing between transects involved walking along over a kilometre of Stony Creek, including part of a tributary. The 2014 survey found no impact on Stony Creek, and is the last Ecological Survey.
		Underground Surveys -
		All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012
		Underground workings are no longer accessible.
22 (b) – Stage 1 23 (b) – Stage 2	Analysis of Subsidence and Environmental	January and March Surveys of 2014 found greater than predicted subsidence in Main South Stage 1 Area.
18 (b) - 3 North 24 (b) - Stage 3 18 (b) - East B	Monitoring Results	A report was prepared by a geotechnical consultant with regard to this event. The subsidence has had no adverse impact on surface infrastructure.
		Centennial Survey prepared a plan showing zones of subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders.
		The significant increase in subsidence has occurred approximately 175 to 300 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles.
		There have been no observed visual environmental impacts in Stage 1 Area. No visual disturbance has been identified on tracks & trails during routine inspections.
		July 2014 Surveys found greater than predicted subsidence in Main South Stage 2 Area.
		Centennial Survey prepared a plan showing zones of subsidence along monitoring points in relation to surface features and underground workings to help bring perspective to results. A PDF of this plan was sent to relevant government departments and stakeholders.
		The significant increase in subsidence occurred approximately 250 to 350 metres from the Main Northern Railway Line. There is no subsidence impact on monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road, Haul Road Bridge, Telstra Tower or Railcorp and Ausgrid Power Poles.
		Cracking has been observed in the Stage 2 area associated with the greater

SMP Approval Condition No.	Requirement Summary	Comment / Description
		then predicted subsidence. No visual disturbance has been identified on tracks & trails during routine inspections.
		Stage 3 Subsidence monitoring results in 2014 were within predicted levels and continue to be relatively stable.
		Environmental impacts in Stage 3 have been confined to the one sinkhole as described above. It is most likely linked to a significant rainfall event in June 2011.
22 (c) – Stage 1	Trends in Monitoring	In general - the trend in monitoring results shows that the majority of subsidence occurs during and shortly after mining extraction.
23 (c) – Stage 2 18 (c) – 3 North	Results	
24 (c) – Stage 3		In the following months the rate of subsidence decreases toward a stable environment.
18 (c) – East B		
		However after approximately 6 years of relative stability – there has been greater than predicted subsidence in Main South Stage 1 and Stage 2 .
		During the year – after the initial sudden increase in subsidence - results began to trend toward decreasing movement. In recent months surveys have consistently shown relatively stable results.

SMP Approval Condition No.	Requirement Summary	Comment / Description
22 (d) - Stage 1 23 (d) - Stage 2 18 (d) - 3 North 24 (d) - Stage 3 18 (d) - East B	Management Actions of Potential Impacts	In general - current Public Safety and Subsidence Management Plans are considered adequate. The current monitoring schedule is based on 6 monthly resurveys. Following the greater than predicted subsidence in Stage 1 and Stage 2 - Agreed temporary amendments have been in place to include fortnightly monitoring of 8NE, 9SW, 8SW and 6SW – and monthly monitoring of MSXL and MSXLE.
		Following greater than predicted subsidence in Stage 1 Main South Cross line / 8NE Centreline area;
		All relevant government agencies and stakeholders were notified as per condition 20 after results of January survey.
		Centennial Newstan conducted a follow up survey – including strain measurements in early March. The results were distributed to relevant government agencies and stakeholders.
		A visual inspection was carried out on 21/03/2014 - by a Geotechnical consultant accompanied by the Mine Manager and Mine Surveyor. No visual signs of subsidence were observed. The results were included in a geotechnical report.
		A meeting between Centennial Newstan and PSE was held on 25/03/2014 to discuss the mechanics and management of this occurrence.
		A report prepared by a geotechnical consultant with regard to this event was distributed to Transport NSW and the PSE on 27/03/2014. Further reports were distributed on 2/6/2014 and 23/6/2014.
		A meeting to discuss the increased subsidence in Stage 1 was held in Chatswood on 02/04/2014. It was attended by the Principal Subsidence

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Engineer (PSE), Centennial Newstan, an independent geotechnical consultant, and Transport NSW. During the Chatswood meeting – it was agreed to temporarily increase the frequency of surveys until a trend of stable results was achieved. Note that as agreed during the meeting in Chatswood - subsidence of 50mm or greater observed within the Railway Protection Zone (RPZ) - will trigger further communication and review of the situation.
		Monitoring frequency was increased on 04/04/2014 to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. The increased frequency of surveys continues to the present.
		Following greater than predicted subsidence in Stage 2 Main South Crossline Extension / 8SW Centreline area;
		All relevant government agencies and stakeholders were notified as per condition 21 after results of July survey.
		A visual inspection carried out by the Mine Surveyor found evidence of minor surface impacts within these areas. Results were forwarded to PSE, relevant government departments and stakeholders on 14/07/2014.
		Agreement was reached with the PSE and Transport NSW - to increase monitoring frequency to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. Subsidence of 50mm or greater observed within the Railway Protection Zone (along 8SW) or the Railway Mining Barrier (along 6SW) - will trigger further communication and review of the situation.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Monitoring frequency was increased on 16/07/2014. The increased frequency of surveys continues to the present.
		Following the formation of the Stage 3 Sinkhole in June 2011 -The relevant government authorities and stake holders were informed within 24 hours of the discovery of the hole. Rehabilitation of the site has since been completed. The location of the sinkhole was plotted and is shown on the Stage 3 Face Position plan AW2176. Due to the partial reactivation of this hole - further rehabilitation works are planned in accordance with the Sinkhole Rehabilitation Plan.

Grant Watson

Centennial Newstan (Awaba) Colliery - Mine Manager

For any comments or questions please contact Grant WATSON- Mine Manager Ph.(W) 02 49560227 or Mob. 0438 560 227 grant.watson@centennialcoal.com.au

Title: Awaba Colliery Annual Environmental Risk Assessment

Stature ID:1000780003

Version: 1

Lifecycle State: Risk Assessment Made Effective



Dyadem Stature for Risk Management:

Risk Assessment Title: Awaba Colliery Annual Environmental Risk Assessment

1 of 65

Version: 1

Region: North

Site: Northern Mining Services

Department: Surface

Equipment / Process: Services

Stature Risk Assessment No.: 1000780003

Study Lifecycle State: Risk Assessment Made Effective

Potential Hazard No.: 28230 PULSE Actions Required URL:

Site Risk Assessment Ref. No. (Optional):

Title: Awaba Colliery Annual Environmental Risk Assessment

Stature ID:1000780003

Version: 1

Lifecycle State: Risk Assessment Made Effective



Executive Summary of Top 10 Risks

Background	Potential Incident	RR
Underground mine workings	There is a risk to Northern Mining Services from	6
	::: Seepage of mine water to the surface :::	(H)
	Caused by: Mine workings filling up with water	
	Resulting in: Community complaint or Contamination of land or Contamination of waters or Damage to	
	environment or Damage to reputation or Damage to vulnerable/threatened Flora & Fauna or	
	Discharge of sediment laden waters or Non compliance with EPL 443 or Reportable offence.	
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from	14
	::: Leaking of historical underground diesel tanks:::	(S)
	Caused by:	
	Residue diesel in tanks	
	Resulting in:	
	Discharge of contaminates from site or Ground water contamination or Land contamination.	
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from	14 (S)
	::: Subsidence impacting on surrounding water courses:::	(3)
	Caused by:	
	Failure of underground support/workings	
	Resulting in:	
	Damage to environment.	
Past Underground Operations impacts on Land and ground water	There is a risk to Northern Mining Services from	14
	::: Hydocarbon contamination of the land :::	(S)
	Caused by:	
	Historical leaking of hydrocarbon storages, machinery and infrastructure	
	Resulting in:	
	Contamination of land or Damage to environment or Exceedence of licence (EPL 443) conditions or Land contamination.	
Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from	18 (M)

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Background	Potential Incident	RR
	::: Sedimentation of surrounding water ways in average weather conditions :::	
	Caused by: Rain events	
	Resulting in: Discharge of contaminates from site.	
Discharge of waters	There is a risk to Northern Mining Services from	18 (M)
	::: Non compliance with licence conditions due to discharge of dirty water :::	
	Caused by: Insufficient capacity in PCD or Subsidence near boreholes	
	Resulting in: Non compliance with EPL 443.	
Vehicle Movements around colliery surface facilities - private vehicles, delivery trucks	. There is a risk to Northern Mining Services from	21 (L)
	::: Noise impacts on sensitive receivers :::	(=)
	Caused by: Vehicle movements around colliery	
	Resulting in: Community complaint or exceedance of Project Approval conditions and INP.	
Storage of remaining Hydrocarbonsand chemicalson site.	There is a risk to Northern Mining Services from	21 (L)
	::: leaking oil polluting Stony creek:::	
	Caused by: Leaks from the storage of hydrocarbons	
	Resulting in: Discharge of contaminates from site.	
Storage of remaining Hydrocarbonsand chemicalson site.	There is a risk to Northern Mining Services from	21
	::: Hydrocarbon pollution of the land from compressors and diesel tank:::	(L)
	Caused by: Significant oil spills	
	Resulting in: Land contamination.	
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from	21 (L)

Version: 1



Background	Potential Incident	RR
	::: Hydrocarbon and/or chemical pollution of ground water from compressors and diesel tank:::	
	Caused by:	
	Leaks from the storage of hydrocarbons	
	Resulting in:	
	Ground water contamination.	
Disposal of Grey water	There is a risk to Northern Mining Services from	21 (L)
	::: Pollution of Stoney creekby grey water :::	(上)
	Caused by:	
	Excessive use of sprinklers or failure of sprinklers/pipeline or Overtopping of maturation pond	
	Resulting in:	
	Discharge of contaminates from site.	
Control of weeds and pests	There is a risk to Northern Mining Services from	21 (L)
	::: Increased risk of fire :::	(上)
	Caused by:	
	Accumulation of weeds growing in and around switch room, switch yards and transformer compounds	
	Resulting in:	
	Damage to infrastructure / historical buildings or Injury to personnel.	
Cultural Heritage	There is a risk to Northern Mining Services from	21 (L)
	::: Damage to Heritage listed buildings:::	(=)
	Caused by:	
	Lack of maintenance/ up keep or Surface operations	
	Resulting in:	
	Loss of cultural heritage items.	
Bushfire control	There is a risk to Northern Mining Services from	21 (L)
	::: Fire impacting on surface facilities:::	(=)
	Caused by:	
	Inappropriate bushfire controls or Lackof maintenance or overgrowth of surrounding vegetation	
	Resulting in:	
	Damage to buildings and infrastructure.	
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from	21

Version: 1



Background	Potential Incident	RR
	::: Public vehicle falls into sink hole or subsidence cracks leading to injury :::	(L)
	Caused by:	
	Failure of underground support/workings	
	Resulting in: Damage to reputation or Injury to persons or Legal action against the colliery.	
Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from	21 (L)
	::: Damage to Aboriginal artifacts:::	(上)
	Caused by: Clearing for rehabilitation acitvities	
	Resulting in: Damage to reputation or Loss of cultural heritage items or Reportable offence.	
Discharge of waters	There is a risk to Northern Mining Services from	21 (L)
	::: Storm water contamination :::	(L)
	Caused by: Inappropriate storage of contaminants	
	Resulting in: Damage to environment or Discharge of contaminates from site.	
Tranfer of waters	There is a risk to Northern Mining Services from	21 (L)
	::: Unlicenced transfer of water :::	(=)
	Caused by: Historic water management (10 South) or Pumping under emergency situations	
	Resulting in: Non compliance with EPL 443.	
Surface Pit top impact on community	There is a risk to Northern Mining Services from	21 (L)
	::: Traffic on public roads:::	(=)
	Caused by: General operations	
	Resulting in: Community complaint or Vehicle collisions.	

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Title: Awaba Colliery Annual Environmental Risk Assessment

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Executive Summary of Top 10 Severities

Background	Potential Incident	MRC
Underground mine workings	There is a risk to Northern Mining Services from	3
	::: Seepage of mine water to the surface :::	
	Caused by: Mine workingsfilling up with water	
	Resulting in: Community complaint or Contamination of land or Contamination of watersor Damage to environment or Damage to reputation or Damage to vulnerable/threatened Flora & Fauna or Discharge of sediment laden watersor Non compliance with EPL 443 or Reportable offence.	
Vehicle Movements around colliery surface facilities - private vehicles, delivery truck	s. There is a risk to Northern Mining Services from	4
	::: Noise impacts on sensitive receivers :::	
	Caused by: Vehicle movements around colliery	
	Resulting in: Community complaint or exceedance of Project Approval conditions and INP.	
Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from	4
	::: Sedimentation of surrounding water ways in average weather conditions :::	
	Caused by: Rain events	
	Resulting in:	
	Discharge of contaminates from site.	
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from	4
	::: leaking oil polluting Stony creek:::	
	Caused by: Leaks from the storage of hydrocarbons	
	Resulting in: Discharge of contaminates from site.	
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from	4
	::: Hydrocarbon pollution of the land from compressors and diesel tank:::	

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Background	Potential Incident	MRC
	Caused by: Significant oil spills	
	Resulting in:	
	Land contamination.	
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from	4
	::: Hydrocarbon and/or chemical pollution of ground water from compressors and diesel tank:::	
	Caused by: Leaks from the storage of hydrocarbons	
	Resulting in: Ground water contamination.	
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from	4
	::: Leaking of historical underground diesel tanks:::	
	Caused by: Residue diesel in tanks	
	Resulting in: Discharge of contaminates from site or Ground water contamination or Land contamination.	
Disposal of sewage	There is a risk to Northern Mining Services from	4
	::: Pollution of Stony creekby nutrients and pathogens from escaping raw sewage into the environment :::	
	Caused by: Failure of Transporation tanks	
	Resulting in: Discharge of contaminates from site or Ground water contamination.	
Disposal of Grey water	There is a risk to Northern Mining Services from	4
	::: Pollution of Stoney creekby grey water :::	
	Caused by: Excessive use of sprinklers or failure of sprinklers/pipeline or Overtopping of maturation pond	
	Resulting in: Discharge of contaminates from site.	
Control of weeds and pests	There is a risk to Northern Mining Services from	4
	::: Increased risk of fire :::	

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Background	Potential Incident	MRC
	Caused by: Accumulation of weeds growing in and around switch room, switch yards and transformer compounds	
	Resulting in: Damage to infrastructure / historical buildings or Injury to personnel.	
Cultural Heritage	There is a risk to Northern Mining Services from	4
	::: Damage to Heritage listed buildings:::	
	Caused by: Lack of maintenance / up keep or Surface operations	
	Resulting in: Loss of cultural heritage items.	
Bushfire control	There is a risk to Northern Mining Services from	4
	::: Fire impacting on surface facilities:::	
	Caused by: Inappropriate bushfire controls or Lack of maintenance or overgrowth of surrounding vegetation	
	Resulting in: Damage to buildings and infrastructure.	
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from	4
	::: Subsidence impacting on surrounding water courses :::	
	Caused by: Failure of underground support/workings	
	Resulting in: Damage to environment.	
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from	4
	::: Subsidence impacting on infrastructure (Power and communication support towers and railways) :::	
	Caused by: Failure of underground support/workings	
	Resulting in: Damage to buildings and infrastructure or Damage to reputation or Injury to persons.	
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from	4

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Background	Potential Incident							
	::: Public vehicle falls into sinkhole or subsidence cracks leading to injury :::							
	Caused by: Failure of underground support/workings							
	Resulting in: Damage to reputation or Injury to persons or Legal action against the colliery.							
Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from	4						
	::: Damage to Aboriginal artifacts:::							
	Caused by: Clearing for rehabilitation acitvities							
	Resulting in: Damage to reputation or Loss of cultural heritage items or Reportable offence.							
Past Underground Operations impacts on Land and ground water	There is a risk to Northern Mining Services from	4						
	::: Hydocarbon contamination of the land :::							
	Caused by: Historical leaking of hydrocarbon storages, machinery and infrastructure							
	Resulting in: Contamination of land or Damage to environment or Exceedence of licence (EPL 443) conditions or Land contamination.							
Underground mine workings	There is a risk to Northern Mining Services from	4						
	::: Spontaneous combustion of UG coal :::							
	Caused by: Bushfires or Heating of coal							
	Resulting in: Bushfires on the surface or Damage to reputation or Injury to persons or Loss of resources or production of green house gases.							
Discharge of waters	There is a risk to Northern Mining Services from							
	::: Non compliance with licence conditions due to discharge of dirty water :::							
	Caused by: Insufficient capacity in PCD or Subsidence near boreholes							
	Resulting in:							

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Background	Potential Incident	MRC
	Non compliance with EPL 443.	
Discharge of waters	There is a risk to Northern Mining Services from	4
	::: Storm water contamination :::	
	Caused by: Inappropriate storage of contaminants	
	Resulting in: Damage to environment or Discharge of contaminates from site.	
Tranfer of waters	There is a risk to Northern Mining Services from	4
	::: Unlicenced transfer of water :::	
	Caused by: Historic water management (10 South) or Pumping under emergency situations	
	Resulting in: Non compliance with EPL 443.	
Surface Pit top impact on community	There is a risk to Northern Mining Services from	4
	::: Traffic on public roads:::	
	Caused by: General operations	
	Resulting in: Community complaint or Vehicle collisions.	

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Study Approval

Approver	Approved / Rejected	Date	Comments
1. Veronica Howat	Approved	March 24, 2014	

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Title: Awaba Colliery Annual Environmental Risk Assessment

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1. Background

The Department of Primary Industries (Mineral Resources) has included in the MOP and AEMR process the requirement to undertake an environmental risk assessment of operations. The purpose is to identify mine activities, processes and facilities which require control strategies to provide environmental protection and compliance with conditions of the lease, licence and development consent.

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To identify risks, consideration should be given to circumstances which may trigger or exacerbate risks from: intense rain or storm events; prolonged above average rain; drought; flood and inundation, wind, earthquake, fire, equipment breakdown, human error, and accidents.

Awaba Colliery ceased production in February 2012, and is no longer an operational mine. The equipment and personnel onsite are minimal, and the air compressors have been turned off.

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2. Objective

The following Hierarchy of Controls offers a framework for considering the effectiveness of controls. Note that the effectiveness of a control that is intended to reduce a risk decreases from top to bottom of the list. In other words, the closer the control type is to the top of the hierarchy, the more potentially effective the control.

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- •Eliminate the hazard or energy source (do not use the energy)
- •Minimise or replace the hazard or energy source (reduce the amount of energy to a less damaging level or replace the energy with another that has less potential negative consequences)
- •Control the hazard or energy using engineered devices (ex. Lock outs, chemical containers, mechanical roof support, gas monitors, etc.)
- Control the hazard or energy by using physical barriers (ex. machine guarding, warning signs, etc.)
- ·Control the hazard or energy with procedures (ex. Isolation procedures, standard operating procedures, etc.)
- Control the hazard or energy with personal protective equipment (ex. hard hats, boots with toe caps, gloves, safety glasses, welding gear, etc.)
- ·Control the hazard or energy with warnings and awareness (ex. posters, labels, stickers, verbal warnings, etc.)

The objective of this risk assessment is to meet the requirements of Section 6 of the DMR document titled "Guidelines to the Mining, Rehabilitation and Environment Management Process". To identify and assess the likelihood of occurrence and consequence of the environmental risks associated with Awaba Colliery, and to control the risks to people and the environment while conducting mine operations on Awaba lease holdings.

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3. Potential Hazards

- 1.1. Airborne dust
- 2.1. Sedimentation of surrounding waterways
- 2.2. Hydrocarbon contamination of the land
- 2.3. Spontaneous combustion of coal stockpile
- 3.1. Hydrocarbon pollution of Stony creek
- 3.2. Hydrocarbon pollution of the land
- 3.3. Hydrocarbon and/or chemical pollution of ground water
- 4.1. Pollution of Stony Creek
- 4.2. Hydrocarbon pollution of the land
- 4.3. Hydrocarbon and/or chemical pollution of ground water
- 5.1. Pollution of Stony creek by nutrients and pathogens from escaping raw sewage into the environment.

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- 7.1. Infestation and/or spread of declared weeds
- 9.1. Noise impacts on sensitive receivers
- 12.1. Damage to Heritage listed buildings
- 13.1. Bushfire impacting on site operations
- 14.1. Subsidence of land leading to injury to bush walkers and other persons.
- 14.2. Subsidence impacting on surrounding vegetation/creeks
- 14.3. Subsidence impacting on infrastructure (Power and communication support towers)
- 14.4. Ponding and/or draining in of creek water
- 14.5. Public vehicle falls into sink hole or subsidence cracks leading to injury
- 16.1. Public vehicles coming into contact with mine trucks and machinery
- 16.2. Member of the public falls into colliery dams/tanks.
- 17.1. Airborne dust
- 17.2. Sedimentation of surrounding water ways
- 17.3. Hydrocarbon contamination of creeks and swamp areas
- 17.4. Public vehicle collides with earthmoving vehicle during operations
- 18.1. Hydrocarbon contamination of the land
- 18.2. Hydrocarbon and/or chemical pollution of ground water
- 19.1. Impact on vulnerable and threatened plant species
- 19.2. Impact on significant site or artifacts
- 20.1. Spontaneous combustion of UG coal.

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4a. Risk Assessment Boundary Definition

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- 1. Vehicle Movements around colliery
- 2. Coal & Material Stockpiling and loading
- 3. Vehicle and machinery wash down area
- 4. Transport and storage of Hydrocarbons and chemicals on site.
- 5. Disposal of Grey water and sewage
- 6. Flora/Fauna
- 7. Control of weeds
- 8. Blasting (Not carried out)
- 9. Operational noise due to loading and transporting of product
- 10. Visual Stray Light
- 11. Aboriginal Heritage
- 12. Cultural Heritage
- 13. Bushfire control
- 14. Subsidence and sink holes
- 15. Methane drainage
- 16. Mine operations
- 17. Rehabilitation of Subsidence cracks, "sink" holes and access tracks
- 18. Land and ground water.
- 19. Clearing of vegetation for subsidence monitoring
- 20. Underground mining operations
- 21. Demolition
- 22. Seepage from underground workings

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4b. Boundary Definition



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5. Risk Assessment Methods

Yes/No	Method
Yes	Workplace Risk Assessment and Control (WRAC)
	Fault Tree Analysis (FTA)
	Safety Integrity Level Analysis to Australian Standard 61508 (SIL)
	Bow Tie Analysis (BTA)
	Failure Modesand Effects Analysis (FMEA)
	Hazard and Operability Analysis (HAZOP)

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6. Previous Risk Assessment and other documents to be used and/or referenced

Document Name	Title	Version	Referenced Document Date
PDF	Environment & Community Risk Assessment 2012	2012	30-May-2012
Environment { Community Ris Assessment			
	Plan AW2036		

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7. Information Required for Risk Assessment

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Awaba Environment & Community RA 2010, 2011 & 2012

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8. Venue and Time

Date	Description	Location	Start Time	End Time	Comment
1.04-Mar-2014	Scoping	Newstan Colliery	9:00 AM	9:30 AM	
2. 04-Mar-2014	Assessment	Newstan Colliery	9:30 AM	11:30 AM	
3.	Review				

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9. Risk Assessment Team Selection

									Atte	Attendance		
Name	Title	Company	Industry Start Date		Mobile Phone #	E-Mail Address	Pulse User No.	Role	1. 04- Mar- 2014	Mar-		
Veronica Warren	Environmental Coordinator	Northern Mining Services	06-Aug-2007	7	0428 438 792	veronica.warren@centennial coal.com.au	160050	Facilitator	Р	Р		
Morgan Gleeson	Environmental and Community Graduate	Mannering Colliery	09-May-2011	3		morgan.gleeson@centennial coal.com.au	100236		Р	Р		
Paul Williams	Regional Environmental Coordinator	Mannering Colliery Centennial Mandalong			0408965145 0408 965 145	paul.williams@centennialcoa l.com.au	100028		А	Р		
Grant Watson	Mine Manager	Northern Mining Services	02-Feb-1987	27	0438560227	grant.watson@centennialco al.com.au	100027	Risk Assessment Owner	А	Α		
Michael Blackeby	Compliance Manager	Northern Mining Services	01-Oct-1990	23	0406449752	michael.blackeby@centenni alcoal.com.au	160001		Р	Р		

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10. Scope Confirmation

Approver	Scope Confirmation	Date	Comments
1. Veronica Howat	Yes	February 17, 2014	

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WRAC Analysis Worksheet

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
facilities - private vehicles, delivery trucks.	There is a risk to Northern Mining Services from ::: Airborne dust ::: Caused by: Vehicle movements around colliery Resulting in: Community complaint or exceedance of Project Approval conditions.	1.1.a. Speed limits on haul road and colliery 1.1.b. Dust depositional gauges 1.1.c. Minimal operational vehicles movements on site	E (D)	5 (L)	25 (L)		
	There is a risk to Northern Mining Services from ::: Noise impacts on sensitive receivers ::: Caused by: Vehicle movements around colliery Resulting in: Community complaint or exceedance of Project Approval conditions and INP.	1.2.a. RTA registered 1.2.b. Deliveries only occur in daytime hours 1.2.c. Mine is no longer operational 1.2.d. Noise monitoring conducted quarterly	D (D)	4 (L)	21 (L)		
	There is a risk to Northern Mining Services from ::: Spillage of hydrocarbons from vehicle ::: Caused by: Collision of vehicles or Vehicle movements around colliery Resulting in: Discharge of contaminates from site.	1.3.a. RTA registered 1.3.b. Mine is no longer operational 1.3.c. Minimal operational vehicles movements on site	E (D)	5 (E)	25 (L)		
2. Storage of soil on surface Stockpiling area		2.1.a. Pollution (sediment) dam 2.1.b. Sediment sumps and drive in sumps	C (IF)	4 (L)	18 (M)	Schedule the monthly environmental inspection for Awaba in pulse. Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff.	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Caused by: Rain events Resulting in: Discharge of contaminates from site.	2.1.c. Inspection program and maintenance of sumps and basins				Determine if sediment fencing is required around soil stockpile to reduce load on the PCD	
		2.1.d. Pumping of turbid water underground					
		2.1.e. Lined and piped drains to minimise erosion					
		2.1.f. Program to remove accumulated sediment from basins and drains to maintain capacity					
		2.1.g. Monthly environmental inspection					
	There is a risk to Northern Mining Services from	2.2.a. Dust depositional gauges					
	::: Airborne dust during windy conditions impacting on local receivers. ::: Caused by: Dry & windy weather conditions		C (D)	5 (L)	22 (L)		
	Resulting in: Community complaint or exceedance of Project Approval conditions.						
3. Storage of remaining	There is a risk to Northern Mining	3.1.a. Mine isno longer operational					
Hydrocarbons and chemicals on site.	Services from ::: leaking oil polluting Stony creek:::	3.1.b. Monthly environmental inspection					
		3.1.c. Bunded storage areas	D	4	21		
	Caused by: Leaks from the storage of	3.1.d. Pollution Control Dam	(D)	(L)	(L)		
	hvdrocarbons	3.1.e. Minimal storage onsite					
	Resulting in: Discharge of contaminates from site.	3.1.f. Sediment sumps and drive in sumps					
		3.2.a. Bunded storage areas					
	Services from ::: Hydrocarbon pollution of the land	3.2.b. Monthly environmental inspection	D (D)	4 (E)	21 (L)		
	from compressors and diesel tank:::	3.2.c. Mine is no longer operational	(5)		(-)		

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Caused by: Significant oil spills Resulting in: Land contamination.						
	Services from ::: Hydrocarbon and/or chemical pollution of ground water from compressors and diesel tank::: Caused by: Leaks from the storage of hydrocarbons Resulting in: Ground water contamination.	3.3.a. Mine is no longer operational 3.3.b. Bunded storage areas 3.3.c. Monthly environmental inspection	D (D)	4 (E)	21 (L)		
	There is a risk to Northern Mining Services from ::: Leaking of historical underground diesel tanks ::: Caused by: Residue diesel in tanks Resulting in: Discharge of contaminates from site or Ground water contamination or Land contamination.	3.4.a. Phase 2 Contaminated Site Assessment completed	B (D)	4 (E)	14 (S)	Investigate decommissioning underground tanks and monitoring of contamination at Awaba Colliery	
4. Disposal of sewage	There is a risk to Northern Mining Services from ::: Pollution of Stony creek by nutrients and pathogens from escaping raw sewage into the environment ::: Caused by: Failure of Transporation tanks Resulting in: Discharge of contaminates from site or Ground water contamination.		E (D)	4 (E)	23 (L)		

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
5. Disposal of Grey water	Services from Pollution of Stoney creek by grey	5.1.a. Mine is no longer operational 5.1.b. Monthly environmental inspection 5.1.c. Minimal use of sprinkler system required due to minimal personnel onsite	D (D)	4 (L)	21 (L)		
6. Control of weeds and pests	trill Integration and for goread of	6.1.a. Monthly environmental inspection 6.1.b. Annual weed and pest control 6.1.c. Grounds maintenance (monthly)	D (D)	5 (E)	24 (L)		
7. Cultural Heritage	There is a risk to Northern Mining Services from ::: Increased risk of fire ::: Caused by: Accumulation of weeds growing in and around switch room, switch yards and transformer compounds Resulting in: Damage to infrastructure / historical buildings or Injury to personnel.	, , , , ,	D (D)	4 (F)	21 (L)		
7. Cultural Heritage	There is a risk to Northern Mining Services from :::: Damage to Heritage listed buildings	7.1.a. Buildings still being utilised 7.1.b. Monthly environmental inspection 7.1.c. Daily electrical inspections	D (D)	4 (L)	21 (L)		

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Caused by: Lack of maintenance/ up keep or Surface operations Resulting in: Loss of cultural heritage items.	7.1.d. Cultural Heritage Management Plan					
8. Bushfire control	There is a risk to Northern Mining Services from	8.1.a. Monthly environmental inspection 8.1.b. Bushfire Management Plan 8.1.c. Grounds maintenance (monthly) 8.1.d. Annual weed and pest control 8.1.e. Daily electrical inspections	D (Op)	4 (F)	21 (L)		
Subsidence and sink holesfrom previous mining operations	to bush walkers/ general public :::	9.1.a. Quarterly Inspectionsfor the Main South Area. 9.1.b. Annual subsidence inspections for historical workings 9.1.c. SMPs 9.1.d. Sinkhole Rehabilitation Plan	D (D)	5 (PI)	24 (L)	5. Schedule the Subsidence inspections for Awaba in pulse	
	surrounding water courses :::	9.2.a. Quarterly Inspectionsfor the Main South Area. 9.2.b. Annual subsidence inspections for historical workings 9.2.c. Sinkhole Rehabilitation Plan 9.2.d. SMPs	B (D)	4 (F)	14 (S)	6. Commission contractor to commence rehabilitation work at Awaba Colliery sinkholes 7. Develop a schedule for rehabilitating sinkholes & subsidence cracks for Newstan & Awaba.	

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Step	Potential Incident Damage to environment.	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	There is a risk to Northern Mining Services from ::: Subsidence impacting on infrastructure (Power and communication support towers and railways) ::: Caused by: Failure of underground support/workings Resulting in: Damage to buildings and infrastructure or Damage to reputation or Injury to persons.	9.3.a. Quarterly Inspectionsfor the Main South Area. 9.3.b. Annual subsidence inspections for historical workings 9.3.c. Sinkhole Rehabilitation Plan 9.3.d. SMPs 9.3.e. Buffer zones and barriers around infrastructure	E (Op)	4 (F)	23 (L)		
	There is a risk to Northern Mining Services from ::: Public vehicle falls into sink hole or subsidence cracks leading to injury ::: Caused by: Failure of underground support/workings Resulting in: Damage to reputation or Injury to persons or Legal action against the colliery.	9.4.a. Annual subsidence inspections for historical workings 9.4.b. Sinkhole Rehabilitation Plan 9.4.c. SMPs 9.4.d. Quarterly Inspections for the Main South Area. 9.4.e. Public Safety Management Plan	D (Pb)	4 (PI)	21 (L)		
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from	10.1.a. Sinkhole Rehabilitation Plan 10.1.b. Task specific training package for contractors	D (D)	5 (R)	24 (L)		
	There isa risk to Northern Mining Servicesfrom	10.2.a. Sinkhole Rehabilitation Plan 10.2.b. Task specific training package	D (D)	5 (E)	24 (L)		

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	::: Sedimentation of surrounding waterways ::: Caused by: Rehabilitation activities Resulting in: Damage to environment or Discharge of sediment laden waters.	for contractors					
	There is a risk to Northern Mining Services from ::: Hydocarbon contamination of the land from heavy vehicles, loaders etc.from earth moving vehicles or when filling these vehicles ::: Caused by: Rehabilitation activities Resulting in: Contamination of land or Contamination of waters.	10.3.a. Sinkhole Rehabilitation Plan 10.3.b. Daily inspections of machinery 10.3.c. SWMS of contractors engaged 10.3.d. Task specific training package for contractors	D (D)	5 (E)	24 (L)		
	There is a risk to Northern Mining Services from Public vehicle collides with	10.4.a. Sinkhole Rehabilitation Plan 10.4.b. SWMS of contractors engaged 10.4.c. Supervisors 10.4.d. Remote location	D (D)	5 (PI)	24 (L)		
	There is a risk to Northern Mining Services from ::: Failure of rehabilitation area over time :::	10.5.a. Sinkhole Rehabilitation Plan 10.5.b. Annual subsidence inspections for historical workings	C (D)	5 (F)	22 (L)		

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Caused by: Ongoing subsidence effects/ continuing erosion or Poor rehabilitation						
	Resulting in: Community complaint or Damage to environment or failure to achieve bond sign off.						
	There is a risk to Northern Mining Services from	10.6.a. Task specific training package for contractors					
	::: Damage to Aboriginal artifacts:::	10.6.b. Sinkhole Rehabilitation Plan					
	Caused by:	10.6.c. Aboriginal cultural heritage management plant	D	4	21		
	Clearing for rehabilitation acitvities Resulting in: Damage to reputation or Loss of cultural heritage items or Reportable offence.	10.6.d. Cultural heritage due diligence reports completed prior to commencing	(Pb)	(L)	(L)		
	There is a risk to Northern Mining Services from	10.7.a. Task specific training package for contractors					
	::: Impact on vulnerable and	10.7.b. Sinkhole Rehabilitation Plan					
	threatened plantspecies:::	10.7.c. Flora & Fauna MP					
	Caused by: Clearing for rehabilitation acitvities	10.7.d. Flora due diligence report completed prior to commencing	C (Pb)	5 (E)	22 (L)		
	Resulting in: Damage to reputation or Damage to vulnerable/threatened Flora & Fanuna.						
11. Past Underground Operationsimpactson Land and ground water	1	11.1.a. Phase 2 Contaminated Site Assessment completed				Investigate decommissioning underground tanks and monitoring of contamination at Awaba Colliery	
	::: Hydocarbon contamination of the land :::				4.4		
	Caused by: Historical leaking of hydrocarbon storages, machinery and infrastructure		B (Pb)	4 (E)	14 (S)		
	Resulting in:						

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Contamination of land or Damage to environment or Exceedence of licence (EPL 443) conditions or Land contamination.						
	There isa risk to Northern Mining Servicesfrom	11.2.a. Monitoring undertaken in accordance with EPL443					
	::: Contamination of surface water :::						
	Caused by: Discharge of contaminated water through LDP's		D (D)	5 (L)	24 (L)		
	Resulting in: Damage to environment or Exceedence of licence (EPL 443) conditions.						
	There is a risk to Northern Mining Services from	11.3.a. Inspection program and maintenance of sumps and basins					
	::: Contamination of ground water by discharge of surface water	11.3.b. Mine is no longer operational					
	underground :::	11.3.c. Minimal operational vehicles movements on site	D (D)	5 (E)	24		
	Caused by:	11.3.d. Minimal storage onsite			(L)		
	Transferring surface water underground	11.3.e. Monthly environmental inspection					
	Resulting in: Damage to environment or Ground water contamination.						
12. Maintenance of subsidence monitoring	There is a risk to Northern Mining Services from	12.1.a. Minimal clearing as lines already established					
lines	::: Impact on vulnerable and	12.1.b. Flora & Fauna MP					
	threatened plant species ::: Caused by:	12.1.c. Flora due diligence report completed prior to commencing	D	5	24		
	Clearing for access and subsidence lines	12.1.d. SMPs	(D)	(E)	(L)		
	Resulting in: Damage to vulnerable/threatened Flora & Fanuna.						

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	There is a risk to Northern Mining Services from	12.2.a. Minimal clearing as lines already established					
	::: Impact on significant site or artefact	12.2.b. Aboriginal cultural heritage management plant					
	Caused by: Clearing for access and subsidence	12.2.c. Cultural heritage due diligence reports completed prior to commencing	D (D)	5 (R)	24 (L)		
	lines	12.2.d. SMPs					
	Resulting in: Damage to archaeological artifacts.	12.2.e. Cultural Heritage Management Plan					
13. Underground mine	There is a risk to Northern Mining	13.1.a. Mine workingsfull of water					
workings	Servicesfrom	13.1.b. Sinkhole Rehabilitation Plan					
	::: Spontaneous combustion of UG coal :::	13.1.c. Mine is sealed					
	Caused by: Bushfires or Heating of coal		E (D)	4 (E)	23 (L)		
	Resulting in: Bushfires on the surface or Damage to reputation or Injury to persons or Loss of resources or production of green house gases.						
	There is a risk to Northern Mining Services from	13.2.a. Sinkhole Rehabilitation Plan 13.2.b. Monitoring of the seepage				Commission GHD to develop a strategy plan for the Awaba Colliery Seepage	
	::: Seepage of mine water to the surface :::	water					
	Caused by: Mine workings filling up with water			2	•		
	Resulting in: Community complaint or Contamination of land or Contamination of waters or Damage to environment or Damage to reputation or Damage to vulnerable/threatened Flora & Fauna or Discharge of sediment laden waters or Non compliance with EPL 443 or		A (D)	3 (E)	6 (H)		

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Reportable offence.						
14. Disposal of waste	There is a risk to Northern Mining Services from	14.1.a. Site locked up when no personnel onsite					
	::: Public disposing of waste at Awaba	14.1.b. Yates security inspections					
	ublic disposing of waste at Awaba	14.1.c. Lighting					
	Caused by: Unauthorised access to site by Public	14.1.d. Site isfenced	D (D)				
	Resulting in: Hazarduous materials entering site or Non compliance with EPL 443.						
15. Discharge of waters	There is a risk to Northern Mining Services from	15.1.a. Water quality monitoring on surface discharge points				Determine if sediment fencing is required around soil stockpile to reduce load on the PCD	
	::: Non compliance with licence conditions due to discharge of dirty	15.1.b. Monthly environmental inspection				2. Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff.	
	water:::	/ater ::: 15.1.c. Dams cleaned on a regular	S 4	18			
	Caused by:	15.1.d. Dams kept at low levels	C (D)	(L)	(M)		
	Insufficient capacity in PCD or Subsidence near boreholes	15.1.e. CITECT alarm	3				
	Resulting in:	15.1.f. Primary and secondary pumps to underground					
	Non compliance with EPL 443.	15.1.g. Daily monitoring during discharge					
	There is a risk to Northern Mining Services from	15.2.a. Deliveries only occur in daytime hours					
	::: Storm water contamination :::	15.2.b. Groundsmaintenance (monthly)					
	Caused by:	15.2.c. Mine is no longer operational	D	4	21		
	Inappropriate storage of contaminants	15.2.d. Minimal operational vehicles movementsonsite	(D)	(E)	(L)		
	Resulting in: Damage to environment or Discharge	15.2.e. Minimal storage onsite					
	of contaminates from site.	15.2.f. Monthly environmental inspection					
16. Tranfer of waters	There is a risk to Northern Mining	16.1.a. Water Management Plans					
	Services from ::: Unlicenced transfer of water :::	16.1.b. Awaba licenced to accept water from Newstan on EPL443	D (D)	4 (L)	21 (L)		
		16.1.c. No current plans to dewater					

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Caused by: Historic water management (10 South) or Pumping under emergency situations	Awaba Colliery workings					
	Resulting in: Non compliance with EPL 443.						
17. Surface Pit top impact on community	There isa risk to Northern Mining Servicesfrom	17.1.a. Noise Management Plan 17.1.b. Mine is no longer operational	- -				
	::: Noise impacts on Awaba community :::	17.1.c. Noise monitoring conducted quarterly	D	5	24		
	Caused by: General operations		(D)	(R)	(L)		
	Resulting in: Community complaint or exceedance of DECCW guidelines and INP.						
	There is a risk to Northern Mining	17.2.a. Mine is no longer operational					
	Services from ::: Visual pollution (incl lighting) :::	17.2.b. No complaints regarding lighting to date					
	visual portulion (incingriting)	17.2.c. Visual screens (vegetation)	E	5	25		
	Caused by: General operations		(D)	(R)	(L)		
	Resulting in: Community complaint.						
	There is a risk to Northern Mining Services from	17.3.a. Minimal operational vehicles movements on site					
	::: Traffic on public roads:::	17.3.b. Mine isno longer operational 17.3.c. Signage			0.4		
	Caused by: General operations		D (Op)	4 (PI)	21 (L)		
	Resulting in: Community complaint or Vehicle collisions.						
18. Site Security	There is a risk to Northern Mining Services from	18.1.a. Site locked up when no personnel onsite	C (D)	5 (F)	22 (L)		
		18.1.b. Yates security inspections					

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Lifecycle State: Risk Assessment Made Effective



Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	::: Unauthorised access by the public	18.1.c. Lighting					
	 "	18.1.d. Site isfenced					
	Caused by: Tresspassing	18.1.e. Building alarmed					
	Resulting in: Damage to infrastructure / historical buildings or Injury to persons or Theft.						

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Lifecycle State: Risk Assessment Made Effective



WRAC Analysis Sorted by RR

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
13. Underground mine workings	Servicesfrom	13.2.a. Sinkhole Rehabilitation Plan 13.2.b. Monitoring of the seepage				8. Commission GHD to develop a strategy plan for the Awaba Colliery Seepage
	::: Seepage of mine water to the surface :::	water				
	Caused by: Mine workings filling up with water					
	Resulting in: Community complaint or		A (D)	3 (E)	6 (H)	
	Contamination of land or Contamination of waters or Damage to environment or Damage to					
	reputation or Damage to vulnerable/threatened Flora & Fauna					
	or Discharge of sediment laden waters or Non compliance with EPL					
	443 or Reportable offence.					
Storage of remaining Hydrocarbons and chemicals on site.	Servicesfrom	3.4.a. Phase 2 Contaminated Site Assessment completed				Investigate decommissioning underground tanks and monitoring of contamination at Awaba Colliery
	::: Leaking of historical underground diesel tanks :::					
	Caused by: Residue diesel in tanks		B (D)	4 (E)	14 (S)	
	Resulting in: Discharge of contaminates from site or Ground water contamination or					
O Out of the case of district	Land contamination.	0.0 - Our standards are action of tenths				
Subsidence and sink holesfrom previous	There is a risk to Northern Mining Servicesfrom	9.2.a. Quarterly Inspections for the Main South Area.				Commission contractor to commence rehabilitation workat Awaba Colliery sinkholes
miningoperations	::: Subsidence impacting on surrounding water courses :::	9.2.b. Annual subsidence inspectionsfor historical workings	B (D)	4 (F)	14 (S)	 Develop a schedule for rehabilitating sinkholes & subsidence cracks for Newstan & Awaba.
	Oddsca by.	9.2.c. Sinkhole Rehabilitation Plan	(D)	(F)	(3)	
	Failure of underground support/workings	9.2.d. SMPs				

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Resulting in: Damage to environment.					
11. Past Underground Operations impacts on Land and ground water	There is a risk to Northern Mining Services from ::: Hydocarbon contamination of the land ::: Caused by: Historical leaking of hydrocarbon storages, machinery and infrastructure Resulting in: Contamination of land or Damage to environment or Exceedence of licence (EPL 443) conditions or Land contamination.	11.1.a. Phase 2 Contaminated Site Assessment completed	B (Pb)	4 (E)	14 (S)	4. Investigate decommissioning underground tanks and monitoring of contamination at Awaba Colliery
Storage of soil on surface Stockpiling area	Servicesfrom ::: Sedimentation of surrounding water ways in average weather conditions::: Caused by: Rain events Resulting in: Discharge of contaminates from site.	2.1.a. Pollution (sediment) dam 2.1.b. Sediment sumps and drive in sumps 2.1.c. Inspection program and maintenance of sumps and basins 2.1.d. Pumping of turbid water underground 2.1.e. Lined and piped drains to minimise erosion 2.1.f. Program to remove accumulated sediment from basins and drains to maintain capacity 2.1.g. Monthly environmental inspection	C (IF)	4 (L)	18 (M)	1. Schedule the monthly environmental inspection for Awaba in pulse. 2. Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff. 3. Determine if sediment fencing is required around soil stockpile to reduce load on the PCD
15. Discharge of waters	Services from ::: Non compliance with licence conditions due to discharge of dirty	 15.1.a. Water quality monitoring on surface discharge points 15.1.b. Monthly environmental inspection 15.1.c. Dams cleaned on a regular basis 15.1.d. Dams kept at low levels 15.1.e. CITECT alarm 	C (D)	4 (L)		3. Determine if sediment fencing is required around soil stockpile to reduce load on the PCD 2. Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff.

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Subsidence near boreholes Resulting in:	15.1.f. Primary and secondary pumpsto underground				
	Non compliance with EPL 443.	15.1.g. Daily monitoring during discharge				
Vehicle Movements	There is a risk to Northern Mining	1.2.a. RTA registered				
around colliery surface facilities - private vehicles, delivery	Services from: Noise impacts on sensitive	1.2.b. Deliveriesonly occur in daytime hours				
trucks.	receivers:::	1.2.c. Mine isno longer operational				
	Caused by: Vehicle movements around colliery	1.2.d. Noise monitoring conducted quarterly	D (D)	4 (L)	21 (L)	
	Resulting in: Community complaint or exceedance of Project Approval conditions and INP.					
3. Storage of remaining		3.1.a. Mine isno longer operational				
Hydrocarbons and chemicals on site.	Servicesfrom	3.1.b. Monthly environmental				
Shormadic on are.	::: leaking oil polluting Stony creek:::	inspection 3.1.c. Bunded storage areas			0.1	
	l a a las fue as the a standard of	3.1.d. Pollution Control Dam	D (D)	4 (L)	21 (L)	
		3.1.e. Minimal storage onsite		()	()	
		3.1.f. Sediment sumps and drive in				
	Resulting in: Discharge of contaminates from site.	sumps				
Storage of remaining Hydrocarbons and	Continontrom	3.2.a. Bunded storage areas				
chemicalson site.	::: Hydrocarbon pollution of the land	3.2.b. Monthly environmental inspection				
	from compressors and diesel tank:::	3.2.c. Mine isno longer operational	D	4 (E)	21	
	Caused by: Significant oil spills		(D)	(E)	(L)	
	Resulting in: Land contamination.					
3. Storage of remaining Hydrocarbons and	Camilana fuara	3.3.a. Mine is no longer operational 3.3.b. Bunded storage areas			0.1	
chemicalson site.	::: Hydrocarbon and/or chemical pollution of ground water from compressors and diesel tank:::	3.3.c. Monthly environmental inspection	D (D)	4 (E)	21 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Caused by: Leaks from the storage of hydrocarbons Resulting in: Ground water contamination.					
5. Disposal of Grey water	Services from Pollution of Stoney creek by grey	5.1.a. Mine is no longer operational 5.1.b. Monthly environmental inspection 5.1.c. Minimal use of sprinkler system required due to minimal personnel onsite	D (D)	4 (L)	21 (L)	
Control of weeds and pests	There is a risk to Northern Mining	6.2.a. Daily electrical inspections 6.2.b. Annual weed and pest control 6.2.c. Monthly environmental inspection 6.2.d. Groundsmaintenance (monthly)	D (D)	4 (F)	21 (L)	
7. Cultural Heritage	There is a risk to Northern Mining	7.1.a. Buildings still being utilised 7.1.b. Monthly environmental inspection 7.1.c. Daily electrical inspections 7.1.d. Cultural Heritage Management Plan	D (D)	4 (L)	21 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
8. Bushfire control	There is a risk to Northern Mining Services from	8.1.a. Monthly environmental inspection				
	::: Fire impacting on surface facilities	8.1.b. Bushfire Management Plan				
	:::	8.1.c. Groundsmaintenance (monthly)				
	Caused by: Inappropriate bushfire controls or	8.1.d. Annual weed and pest control	D (Op)	4 (F)	21 (L)	
	Lack of maintenance or overgrowth of surrounding vegetation	8.1.e. Daily electrical inspections				
	Resulting in: Damage to buildings and infrastructure.					
Subsidence and sink holes from previous mining operations	There is a risk to Northern Mining Services from	9.4.a. Annual subsidence inspections for historical workings				
mmingoperations	::: Public vehiclefallsinto sinkhole or subsidence cracks leading to injury :::	9.4.b. Sinkhole Rehabilitation Plan 9.4.c. SMPs				
	Caused by: Failure of underground	9.4.d. Quarterly Inspections for the Main South Area.	D (Pb)	4 (PI)	21 (L)	
	support/workings	9.4.e. Public Safety Management Plan				
	Resulting in: Damage to reputation or Injury to persons or Legal action against the colliery.	Fiaii				
Rehabilitation of Subsidence cracks,	There is a risk to Northern Mining Services from	10.6.a. Task specific training package for contractors				
"sink" holes and access tracks	::: Damage to Aboriginal artifacts:::	10.6.b. Sinkhole Rehabilitation Plan				
	Caused by: Clearing for rehabilitation acitvities	10.6.c. Aboriginal cultural heritage management plant	D (Pb)	4 (L)	21 (L)	
	Resulting in: Damage to reputation or Loss of cultural heritage items or Reportable offence.	10.6.d. Cultural heritage due diligence reports completed prior to commencing			(=)	
15. Discharge of waters	There is a risk to Northern Mining Servicesfrom	15.2.a. Deliveriesonly occur in daytime hours			0.1	
::	::: Storm water contamination :::	15.2.b. Groundsmaintenance (monthly)	D (D)	4 (E)		
		15.2.c. Mine isno longer				

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Step	Potential Incident	Current Controls		MRC	RR	Recommended Control
Oteh	Caused by:	onerational		IIII	IXIX	Necommended Control
	Inappropriate storage of contaminants	15.2.d. Minimal operational vehicles movements on site				
	Resulting in: Damage to environment or Discharge	15.2.e. Minimal storage onsite				
	of contaminates from site.	15.2.f. Monthly environmental inspection				
16. Tranfer of waters	There is a risk to Northern Mining	16.1.a. Water Management Plans				
	Servicesfrom	16.1.b. Awaba licenced to accept				
	::: Unlicenced transfer of water :::	water from Newstan on EPL443				
	Caused by: Historic water management (10 South) or Pumping under emergency situations	16.1.c. No current plansto dewater Awaba Colliery workings	D (D)	4 (L)	21 (L)	
	Resulting in: Non compliance with EPL 443.					
 Surface Pit top impact on community 	There isa risk to Northern Mining Servicesfrom	17.3.a. Minimal operational vehicles movements on site				
	::: Traffic on public roads:::	17.3.b. Mine isno longer operational				
	Caused by: General operations	17.3.c. Signage	D (Op)	4 (PI)	21 (L)	
	Resulting in: Community complaint or Vehicle collisions.					
Storage of soil on surface Stockpiling area	There isa risk to Northern Mining Servicesfrom	2.2.a. Dust depositional gauges				
alea	::: Airborne dust during windy conditionsimpacting on local receivers. :::		С	5	22	
	Caused by: Dry & windy weather conditions		(D)	(Ľ)	(L)	
	Resulting in: Community complaint or exceedance of Project Approval conditions.					
10. Rehabilitation of	There is a risk to Northern Mining	10.5.a. Sinkhole Rehabilitation	С	5	22	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
Subsidence cracks, "sink" holes and access tracks	Services from ::: Failure of rehabilitation area over time ::: Caused by: Ongoing subsidence effects/ continuing erosion or Poor rehabilitation Resulting in: Community complaint or Damage to environment or failure to achieve	Plan 10.5.b. Annual subsidence inspections for historical workings	(D)	(F)	(L)	
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	Servicesfrom ::: Impact on vulnerable and threatened plantspecies:::	10.7.a. Task specific training package for contractors 10.7.b. Sinkhole Rehabilitation Plan 10.7.c. Flora & Fauna MP 10.7.d. Flora due diligence report completed prior to commencing	C (Pb)	5 (E)	22 (L)	
18. Site Security	There is a risk to Northern Mining Services from Unauthorised access by the public	18.1.a. Site locked up when no personnel onsite 18.1.b. Yates security inspections 18.1.c. Lighting 18.1.d. Site isfenced 18.1.e. Building alarmed	C (D)	5 (F)	22 (L)	
4. Disposal of sewage	There is a risk to Northern Mining	4.1.a. Mine is no longer operational 4.1.b. Transporation tank Inspected quarterly	E (D)	4 (E)	23 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Caused by: Failure of Transporation tanks Resulting in: Discharge of contaminates from site or Ground water contamination.					
Subsidence and sink holes from previous mining operations	Servicesfrom ::: Subsidence impacting on infrastructure (Power and communication support towers and railways) :::	9.3.a. Quarterly Inspections for the Main South Area. 9.3.b. Annual subsidence inspections for historical workings 9.3.c. Sinkhole Rehabilitation Plan 9.3.d. SMPs 9.3.e. Buffer zones and barriers around infrastructure	E (Op)	4 (F)	23 (L)	
13. Underground mine workings	Services from Spontaneous combustion of UG	13.1.a. Mine workingsfull of water 13.1.b. Sinkhole Rehabilitation Plan 13.1.c. Mine issealed	E (D)	4 (E)	23 (L)	
6. Control of weeds and pests	There is a risk to Northern Mining Services from ::: Infestation and /or spread of declared weeds or pests on site :::	6.1.a. Monthly environmental inspection 6.1.b. Annual weed and pest control 6.1.c. Grounds maintenance (monthly)	D (D)	5 (E)	24 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Resulting in: Infestations or spider bites to personnel or Non compliance with weed & pests acts & regulations.					
holes from previous	Servicesfrom	9.1.a. Quarterly Inspections for the Main South Area.				5. Schedule the Subsidence inspections for Awaba in pulse
miningoperations	::: Subsidence of land leading to injury to bush walkers/ general public :::	9.1.b. Annual subsidence inspectionsfor historical workings	D	5	24	
	Causeu by.	9.1.c. SMPs 9.1.d. Sinkhole Rehabilitation Plan	(D)	(PI)	(L)	
	Resulting in: Injury to persons.					
10. Rehabilitation of Subsidence cracks,	There is a risk to Northern Mining Services from	10.1.a. Sinkhole Rehabilitation Plan				
"sink" holes and access tracks	::: Airborne dust :::	10.1.b. Task specific training package for contractors		_		
	Caused by: Rehabilitation activities		D (D)	5 (R)	24 (L)	
	Resulting in: Community complaint or exceedance of Project Approval conditions.					
10. Rehabilitation of Subsidence cracks,	There isa risk to Northern Mining Servicesfrom	10.2.a. Sinkhole Rehabilitation Plan				
"sink" holes and access tracks	::: Sedimentation of surrounding waterways :::	10.2.b. Task specific training package for contractors	_	E	24	
	Caused by: Rehabilitation activities		D (D)	5 (E)	(L)	
	Resulting in: Damage to environment or Discharge of sediment laden waters.					
10. Rehabilitation of Subsidence cracks,	There isa risk to Northern Mining Servicesfrom	10.3.a. Sinkhole Rehabilitation Plan				
"sink" holes and access tracks	::: Hydocarbon contamination of the land from heavy vehicles, loaders	10.3.b. Daily inspections of machinery	D (D)	5 (E)	24 (L)	
	etc.from earth moving vehicles or	10.3.c. SWMS of contractors engaged				

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	when filling these vehicles::: Caused by: Rehabilitation activities Resulting in: Contamination of land or Contamination of waters.	10.3.d. Task specific training package for contractors				
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	Services from ::: Public vehicle collides with	10.4.a. Sinkhole Rehabilitation Plan 10.4.b. SWMS of contractors engaged 10.4.c. Supervisors 10.4.d. Remote location	D (D)	5 (PI)	24 (L)	
11. Past Underground Operations impacts on Land and ground water	There is a risk to Northern Mining Services from ::: Contamination of surface water ::: Caused by: Discharge of contaminated water through LDP's Resulting in: Damage to environment or Exceedence of licence (EPL 443) conditions.	11.2.a. Monitoring undertaken in accordance with EPL443	D (D)	5 (L)	24 (L)	
11. Past Underground Operationsimpacts on Land and ground water	Services from ::: Contamination of ground water by discharge of surface water underground ::: Caused by: Transferring surface water	11.3.a. Inspection program and maintenance of sumps and basins 11.3.b. Mine isno longer operational 11.3.c. Minimal operational vehicles movements on site 11.3.d. Minimal storage on site 11.3.e. Monthly environmental	D (D)	5 (E)	24 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
•	Resulting in: Damage to environment or Ground water contamination.	inspection				
12. Maintenance of subsidence	There is a risk to Northern Mining Servicesfrom	12.1.a. Minimal clearing as lines already established				
monitoring lines	::: Impact on vulnerable and threatened plantspecies::: Caused by: 12.1.b. Flora & Faulta MF 12.1.c. Flora due diligence report completed prior to commencing D 5 (D) 5 (F)	24 (L)				
	Clearing for access and subsidence lines Resulting in: Damage to vulnerable/threatened Flora & Fanuna.	12.1.d. SMPs				
12. Maintenance of subsidence	There is a risk to Northern Mining Services from	12.2.a. Minimal clearing as lines already established				
monitoring lines	::: Impact on significant site or artefact	12.2.b. Aboriginal cultural heritage management plant	- n	5 (R)	24 (L)	
	Caused by: Clearing for access and subsidence	12.2.c. Cultural heritage due diligence reports completed prior to commencing				
	lines	12.2.d. SMPs				
	Resulting in: Damage to archaeological artifacts.	12.2.e. Cultural Heritage ManagementPlan				
14. Disposal of waste	There is a risk to Northern Mining Servicesfrom	14.1.a. Site locked up when no personnel onsite				
	::: Public disposing of waste at Awaba :::	14.1.b. Yates security inspections 14.1.c. Lighting		_	0.1	
	Caused by: Unauthorised access to site by Public	14.1.d. Site isfenced	D (D)	5 (BI)	24 (L)	
	Resulting in: Hazarduous materials entering site or Non compliance with EPL 443.					
17. Surface Pit top impact on community	tThere is a risk to Northern Mining Services from	17.1.a. Noise Management Plan				
on community	::: Noise impacts on Awaba	17.1.b. Mine isno longer operational	D (D)	5 (R)	24 (L)	
	community :::	17.1.c. Noise monitoring conducted quarterly	(-)	(-)		

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Caused by: General operations Resulting in: Community complaint or exceedance of DECCW guidelines and INP.					
Vehicle Movements around colliery surface facilities - private vehicles, delivery trucks.	e Services from	Speed limits on haul road and colliery Speed limits on haul road and colliery	E (D)	5 (L)	25 (L)	
Vehicle Movements around colliery surface facilities - private vehicles, delivery trucks.	There is a risk to Northern Mining Services from ::: Spillage of hydrocarbons from vehicle ::: Caused by: Collision of vehicles or Vehicle movements around colliery Resulting in: Discharge of contaminates from site.	1.3.a. RTA registered 1.3.b. Mine is no longer operational 1.3.c. Minimal operational vehicles movements on site	E (D)	5 (E)	25 (L)	
17. Surface Pittop impact on community	Servicesfrom ::: Visual pollution (incl lighting) :::	17.2.a. Mine isno longer operational 17.2.b. No complaints regarding lighting to date 17.2.c. Visual screens (vegetation)	E (D)	5 (R)	25 (L)	

Site: Northern Mining Services

Title: Awaba Colliery Annual Environmental Risk Assessment

Stature ID:1000780003

Version: 1

Lifecycle State: Risk Assessment Made Effective



WRAC Analysis Sorted by Consequence

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
13. Underground mine workings	There is a risk to Northern Mining Services from ::: Seepage of mine water to the surface ::: Caused by: Mine workings filling up with water	13.2.a. Sinkhole Rehabilitation Plan 13.2.b. Monitoring of the seepage water				8. Commission GHD to develop a strategy plan for the Awaba Colliery Seepage
	Resulting in: Community complaint or Contamination of land or Contamination of waters or Damage to environment or Damage to reputation or Damage to vulnerable/threatened Flora & Fauna or Discharge of sediment laden waters or Non compliance with EPL 443 or Reportable offence.		A (D)	3 (E)	6 (H)	
Storage of remaining Hydrocarbons and	There is a risk to Northern Mining Services from	3.2.a. Bunded storage areas 3.2.b. Monthly environmental				
chemicals on site.	::: Hydrocarbon pollution of the land	inspection	D	4		
	from compressors and diesel tank:::	3.2.c. Mine isno longer operational			21	
	Caused by: Significant oil spills		(D)	(E)	(L)	
	Resulting in: Land contamination.					
Storage of remaining Hydrocarbons and	There is a risk to Northern Mining Services from	3.3.a. Mine is no longer operational 3.3.b. Bunded storage areas				
chemicalson site.	::: Hydrocarbon and/or chemical	3.3.c. Monthly environmental				
	pollution of ground water from compressors and diesel tank:::	inspection	D (D)	4 (E)	21 (L)	
	Caused by: Leaks from the storage of hydrocarbons		(D)	(L)	(=)	
	Resulting in:					

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
•	Ground water contamination.					
Storage of remaining Hydrocarbonsand chemicalson site.	There is a risk to Northern Mining Services from ::: Leaking of historical underground diesel tanks :::	3.4.a. Phase 2 Contaminated Site Assessment completed				 Investigate decommissioning underground tanks and monitoring of contamination at Awaba Colliery
	Caused by: Residue diesel in tanks		B (D)	4 (E)	14 (S)	
	Resulting in: Discharge of contaminates from site or Ground water contamination or Land contamination.					
. Disposal of sewage	There is a risk to Northern Mining Services from	4.1.a. Mine isno longer operational 4.1.b. Transporation tankInspected				
	::: Pollution of Stony creekby nutrients and pathogens from escaping raw sewage into the environment :::	quarterly	E	4	23	
	Caused by: Failure of Transporation tanks		(D)	(E)	(L)	
	Resulting in: Discharge of contaminates from site or Ground water contamination.					
Past Underground Operations impacts of Land and ground	There is a risk to Northem Mining nServices from	11.1.a. Phase 2 Contaminated Site Assessment completed				Investigate decommissioning underground tanks and monitoring of contamination at Awaba Colliery
water	::: Hydocarbon contamination of the land :::					
	Caused by: Historical leaking of hydrocarbon storages, machinery and infrastructure		B (Pb)	4 (E)	14 (S)	
	Resulting in: Contamination of land or Damage to environment or Exceedence of licence (EPL 443) conditions or Land contamination.					
Underground mine workings	There is a risk to Northem Mining Services from	13.1.a. Mine workingsfull of water 13.1.b. Sinkhole Rehabilitation Plan	E (D)	4 (E)	23 (L)	
		13.1.c. Mine is sealed	()	()	()	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Spontaneous combustion of UG coal ::: Caused by: Bushfires or Heating of coal Resulting in: Bushfires on the surface or Damage to reputation or Injury to persons or Loss of resources or production of green house gases.					
15. Discharge of waters		15.2.a. Deliveries only occur in daytime hours 15.2.b. Grounds maintenance				
	Caused by: Inappropriate storage of contaminants	(monthly) 15.2.c. Mine is no longer operational 15.2.d. Minimal operational vehicles movements on site		4 (E)	21 (L)	
	Resulting in: Damage to environment or Discharge of contaminates from site.	15.2.e. Minimal storage onsite 15.2.f. Monthly environmental inspection				
6. Control of weeds and pests	-	6.2.a. Daily electrical inspections 6.2.b. Annual weed and pest control				
	::: Increased risk of fire ::: Caused by: Accumulation of weeds growing in and around switch room, switch yards and transformer compounds Resulting in: Damage to infrastructure / historical buildings or Injury to personnel.	6.2.c. Monthly environmental inspection 6.2.d. Grounds maintenance (monthly)	D (D)	4 (F)	21 (L)	
8. Bushfire control	Services from Fire impacting on surface facilities	8.1.a. Monthly environmental inspection 8.1.b. Bushfire Management Plan 8.1.c. Grounds maintenance (monthly)	D (Op)	4 (F)	21 (L)	
	Caused by: Inappropriate bushfire controls or Lack of maintenance or overgrowth of surrounding vegetation	8 1 d. Annual weed and pest control	(Op)	(1)	, (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Resulting in: Damage to buildings and infrastructure.					
Subsidence and sink holes from previous	There is a risk to Northern Mining Services from	9.2.a. Quarterly Inspections for the Main South Area.				Commission contractor to commence rehabilitation work at Awaba Colliery sinkholes
miningoperations	::: Subsidence impacting on surrounding water courses :::	9.2.b. Annual subsidence inspections for historical workings		4	4.4	7. Develop a schedule for rehabilitating sinkholes & subsidence cracks for Newstan & Awaba.
	Causcu by.	9.2.c. Sinkhole Rehabilitation Plan 9.2.d. SMPs	B (D)	4 (F)	14 (S)	
	Resulting in: Damage to environment.					
Subsidence and sink holes from previous	There isa risk to Northern Mining Servicesfrom	9.3.a. Quarterly Inspections for the Main South Area.				
mining operations	::: Subsidence impacting on infrastructure (Power and communication support towers and	9.3.b. Annual subsidence inspectionsfor historical workings	E (Op)			
	railways) :::	9.3.c. Sinkhole Rehabilitation Plan			0.0	
	Causa d bu	9.3.d. SMPs 9.3.e. Buffer zones and barriers around infrastructure		4 (F)	23 (L)	
	Resulting in: Damage to buildings and infrastructure or Damage to reputation or Injury to persons.					
Vehicle Movements around colliery surface		1.2.a. RTA registered				
facilities- private		 Deliveries only occur in daytime hours 				
vehicles, delivery trucks.	::: Noise impacts on sensitive receivers :::	1.2.c. Mine isno longer operational				
	Caused by: Vehicle movements around colliery	1.2.d. Noise monitoring conducted quarterly	D (D)	4 (L)	21 (L)	
	Resulting in: Community complaint or exceedance of Project Approval conditions and INP.					

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
2. Storage of soil on	There is a risk to Northern Mining	2.1.a. Pollution (sediment) dam				1. Schedule the monthly environmental inspection for Awaba in pulse.
surface Stockpiling area		2.1.b. Sediment sumps and drive in sumps				Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff.
	::: Sedimentation of surrounding water ways in average weather conditions::: Caused by:	2.1.c. Inspection program and maintenance of sumps and basins				Determine if sediment fencing is required around soil stockpile to reduce load on the PCD
	Rain events	2.1.d. Pumping of turbid water underground	С	4	18 (M)	
	Resulting in: Discharge of contaminates from site.	2.1.e. Lined and piped drains to minimise erosion	(IF)	(L)		
		2.1.f. Program to remove accumulated sediment from basins and drainsto maintain capacity				
		2.1.g. Monthly environmental inspection				
3. Storage of remaining	Services from ::: leaking oil polluting Stony creek:::	3.1.a. Mine isno longer operational				
Hydrocarbons and chemicals on site.		3.1.b. Monthly environmental inspection				
		3.1.c. Bunded storage areas	D (D)	4 (L)	21 (L)	
	Leaks from the storage of hydrocarbons	3.1.d. Pollution Control Dam				
		3.1.e. Minimal storage onsite			(=)	
		3.1.f. Sediment sumps and drive in sumps				
	Discharge of contaminates from site.					
5. Disposal of Grey water	There is a risk to Northern Mining	5.1.a. Mine isno longer operational				
		5.1.b. Monthly environmental inspection				
	::: Pollution of Stoney creekby grey water :::	5.1.c. Minimal use of sprinkler system required due to				
	Caused by: Excessive use of sprinklers or failure of sprinklers/pipeline or Overtopping of maturation pond Resulting in: Discharge of contaminates from site.	minimal personnel onsite	D (D)	4 (L)	21 (L)	
7. Cultural Heritage	There is a risk to Northern Mining	7.1.a. Buildings still being utilised		4	0.4	
	Servicesfrom	7.1.b. Monthly environmental inspection	D (D)	4 (L)	21 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	::: Damage to Heritage listed buildings ::: Caused by: Lack of maintenance/ up keep or Surface operations Resulting in: Loss of cultural heritage items.	7.1.c. Daily electrical inspections 7.1.d. Cultural Heritage Management Plan				
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	Services from ::: Damage to Aboriginal artifacts::: Caused by:	10.6.a. Task specific training package for contractors 10.6.b. Sinkhole Rehabilitation Plan 10.6.c. Aboriginal cultural heritage management plant 10.6.d. Cultural heritage due diligence reports completed prior to commencing	D (Pb)	4 (L)	21 (L)	
15. Discharge of waters	Services from ::: Non compliance with licence conditions due to discharge of dirty water ::: Caused by: Insufficient capacity in PCD or Subsidence near boreholes Resulting in:	15.1.a. Water quality monitoring on surface discharge points 15.1.b. Monthly environmental inspection 15.1.c. Dams cleaned on a regular basis 15.1.d. Dams kept at low levels 15.1.e. CITECT alarm 15.1.f. Primary and secondary pumpsto underground 15.1.g. Daily monitoring during discharge	C (D)	4 (L)		3. Determine if sediment fencing is required around soil stockpile to reduce load on the PCD 2. Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff.
16. Tranfer of waters	Services from ::: Unlicenced transfer of water :::	16.1.a. Water Management Plans 16.1.b. Awaba licenced to accept water from Newstan on EPL443 16.1.c. No current plans to dewater Awaba Colliery workings	D (D)	4 (L)	21 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
2.1.	Resulting in: Non compliance with EPL 443.					
Subsidence and sink holes from previous mining operations	Servicesfrom	9.4.a. Annual subsidence inspectionsfor historical workings				
	Subsidence cracks leading to injury	9.4.b. Sinkhole Rehabilitation Plan 9.4.c. SMPs				
	Failure of underground	9.4.d. Quarterly Inspections for the Main South Area.	D (Pb)	4 (PI)	21 (L)	
	support/workings Resulting in: Damage to reputation or Injury to persons or Legal action against the colliery.	9.4.e. Public Safety Management Plan				
17. Surface Pit top impact on community	There is a risk to Northern Mining Services from	17.3.a. Minimal operational vehicles movements on site				
	::: Traffic on public roads :::	17.3.b. Mine isno longer operational				
	Caused by: General operations	17.3.c. Signage	D (Op)	4 (PI)	21 (L)	
	Resulting in: Community complaint or Vehicle collisions.					
14. Disposal of waste	There is a risk to Northern Mining Services from	14.1.a. Site locked up when no personnel onsite				
	::: Public disposing of waste at Awaba	14.1.b. Yates security inspections 14.1.c. Lighting				
	Caused by: Unauthorised access to site by Public	14.1.d. Site isfenced	D (D)	5 (BI)	24 (L)	
	Resulting in: Hazarduous materials entering site or Non compliance with EPL 443.					
Vehicle Movements around colliery surface facilities private	Camilar of many	1.3.a. RTA registered 1.3.b. Mine is no longer operational		_	0.5	
facilities- private vehicles, delivery trucks.	::: Spillage of hydrocarbonsfrom vehicle :::	1.3.c. Minimal operational vehicles movements on site	E (D)	5 (E)	25 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Caused by: Collision of vehicles or Vehicle movements around colliery Resulting in: Discharge of contaminates from site.					
Control of weeds and pests	There is a risk to Northern Mining Services from ::: Infestation and /or spread of declared weeds or pests on site ::: Caused by: Lack of maintenance / up keep Resulting in: Infestations or spider bites to personnel or Non compliance with weed & pests acts & regulations.	6.1.a. Monthly environmental inspection 6.1.b. Annual weed and pest control 6.1.c. Grounds maintenance (monthly)	D (D)	5 (E)	24 (L)	
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from ::: Sedimentation of surrounding waterways ::: Caused by: Rehabilitation activities Resulting in: Damage to environment or Discharge of sediment laden waters.	10.2.a. Sinkhole Rehabilitation Plan 10.2.b. Task specific training package for contractors	D (D)	5 (E)	24 (L)	
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from ::: Hydocarbon contamination of the land from heavy vehicles, loaders etc.from earth moving vehicles or when filling these vehicles ::: Caused by: Rehabilitation activities Resulting in: Contamination of landor Contamination of waters.	10.3.a. Sinkhole Rehabilitation Plan 10.3.b. Daily inspections of machinery 10.3.c. SWMS of contractors engaged 10.3.d. Task specific training package for contractors	D (D)	5 (E)	24 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	Services from ::: Impact on vulnerable and threatened plant species :::	10.7.a. Task specific training package for contractors 10.7.b. Sinkhole Rehabilitation Plan 10.7.c. Flora & Fauna MP 10.7.d. Flora due diligence report completed prior to commencing	C (Pb)	5 (E)	22 (L)	
11. Past Underground Operations impacts on Land and ground water	Services from ::: Contamination of ground water by discharge of surface water underground ::: Caused by:	11.3.a. Inspection program and maintenance of sumpsand basins 11.3.b. Mine is no longer operational 11.3.c. Minimal operational vehicles movements on site 11.3.d. Minimal storage on site 11.3.e. Monthly environmental inspection	D (D)	5 (E)	24 (L)	
12. Maintenance of subsidence monitoring lines	Servicesfrom	12.1.a. Minimal clearing as lines already established 12.1.b. Flora & Fauna MP 12.1.c. Flora due diligence report completed prior to commencing 12.1.d. SMPs	D (D)	5 (E)	24 (L)	
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from ::: Failure of rehabilitation area over time :::	10.5.a. Sinkhole Rehabilitation Plan 10.5.b. Annual subsidence inspectionsfor historical workings	C (D)	5 (F)	22 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
•	Caused by: Ongoing subsidence effects/ continuing erosion or Poor rehabilitation Resulting in: Community complaint or Damage to environment or failure to achieve bond sign off.					
18. Site Security	There is a risk to Northern Mining Services from ::: Unauthorised access by the public ::: Caused by: Tresspassing Resulting in: Damage to infrastructure / historical buildings or Injury to persons or Theft.	18.1.a. Site locked up when no personnel onsite 18.1.b. Yates security inspections 18.1.c. Lighting 18.1.d. Site is fenced 18.1.e. Building alarmed	C (D)	5 (F)	22 (L)	
Vehicle Movements around colliery surfact facilities - private vehicles, delivery trucks.	There is a risk to Northem Mining e Services from ::: Airborne dust ::: Caused by: Vehicle movements around colliery Resulting in: Community complaint or exceedance of Project Approval conditions.	1.1.a. Speed limits on haul road and colliery 1.1.b. Dust depositional gauges 1.1.c. Minimal operational vehicles movements on site	E (D)	5 (L)	25 (L)	
Storage of soil on surface Stockpiling at	There is a risk to Northern Mining	2.2.a. Dust depositional gauges	C (D)	5 (L)	22 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
11. Past Underground Operations impacts on Land and ground water	There is a risk to Northern Mining Services from ::: Contamination of surface water ::: Caused by: Discharge of contaminated water through LDP's Resulting in: Damage to environment or Exceedence of licence (EPL 443) conditions.	11.2.a. Monitoring undertaken in accordance with EPL443	D (D)	5 (L)	24 (L)	
Subsidence and sink holesfrom previous mining operations	Services from ::: Subsidence of land leading to injury to bush walkers/ general public ::: Caused by:	9.1.a. Quarterly Inspectionsfor the Main South Area. 9.1.b. Annual subsidence inspectionsfor historical workings 9.1.c. SMPs 9.1.d. Sinkhole Rehabilitation Plan	D (D)	5 (PI)	24 (L)	5. Schedule the Subsidence inspections for Awaba in pulse
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from: Public vehicle collides with earthmoving vehicle during operations	10.4.a. Sinkhole Rehabilitation Plan 10.4.b. SWMS of contractors engaged 10.4.c. Supervisors 10.4.d. Remote location	D (D)	5 (PI)	24 (L)	
10. Rehabilitation of Subsidence cracks, "sink" holesand access tracks	There is a risk to Northern Mining	10.1.a. Sinkhole Rehabilitation Plan 10.1.b. Task specific training package for contractors	D (D)	5 (R)	24 (L)	

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Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Rehabilitation activities Resulting in: Community complaint or exceedance of Project Approval conditions.					
12. Maintenance of subsidence monitoring lines	Servicesfrom	12.2.a. Minimal clearing as lines already established				
	::: Impact on significant site or artefact	12.2.b. Aboriginal cultural heritage management plant				
	Caused by: Clearing for access and subsidence	12.2.c. Cultural heritage due diligence reports completed prior to commencing	D (D)	5 (R)	24 (L)	
		12.2.d. SMPs				
	Resulting in: Damage to archaeological artifacts.	12.2.e. Cultural Heritage ManagementPlan				
	Camila a fue	17.1.a. Noise Management Plan				
on community	::: Noise impacts on Awaba	17.1.b. Mine is no longer operational				
	community :::	17.1.c. Noise monitoring conducted quarterly	D	5	24	
	Caused by: General operations		(D)	(R)	(L)	
	Resulting in: Community complaint or exceedance of DECCW guidelines and INP.					
17. Surface Pit top impact on community	There is a risk to Northern Mining Services from	17.2.a. Mine isno longer operational				
	::: Visual pollution (incllighting) :::	17.2.b. No complaints regarding lighting to date	_	5	25	
	Caused by: General operations	17.2.c. Visual screens (vegetation)	E (D)	(R)	(L)	
	Resulting in: Community complaint.					

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Recommended Controls

Recommended Controls		Allocated To			
Do NOT enter additional Recommended Controls on this sheet.	Place(s) Used	(Only one SITE person for each Recommended Control)	Required By Date	Pulse User No.	PULSE Ref. No.
Schedule the monthly environmental inspection for Awaba in pulse.	Events: 2.1	Morgan Gleeson	30-May-2014	100236	28230.70797
Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff.	Events: 2.1, 15.1	Veronica Warren	27-Jun-2014	160050	28230.70798
Determine if sediment fencing is required around soil stockpile to reduce load on the PCD	Events: 2.1, 15.1	Veronica Warren	29-May-2014	160050	28230.70799
Investigate decommissioning underground tanks and monitoring of contamination at Awaba Colliery	Events: 3.4, 11.1	Morgan Gleeson	30-May-2014	100236	28230.70800
5. Schedule the Subsidence inspections for Awaba in pulse	Events: 9.1	Morgan Gleeson	29-May-2014	100236	28230.70801
Commission contractor to commence rehabilitation work at Awaba Colliery sinkholes	Events: 9.2	Veronica Warren	02-Apr-2014	160050	28230.70802
Develop a schedule for rehabilitating sinkholes & subsidence cracks for Newstan & Awaba.	Events: 9.2	Morgan Gleeson	29-May-2014	100236	28230.70803
Commission GHD to develop a strategy plan for the Awaba Colliery Seepage	Events: 13.2	Veronica Warren	01-May-2014	160050	28230.70804

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CEY Risk Matrix Page 1

									Likelihood					
	CENTENNIAL RISK MATRIX								C Possible	D Remote	E Improbable	Description (D)		
	Consequence Note: Consequence may result from a single event or may represent a cumulative impact over a period of 12 months. Use the worst case reasonable consequence if there is more than one.		Note: Consequence may result from a single event or may represent a cumulative impact over a						Common"	Has Happened within Centennial"	"Could Happen & has happened in non-CEY operations	Not Likely	"Practically impossible	Probability (Pb)
Rating	Impact to Annual	Personal Injury	Business Interruption	Legal (L)	Reputation (R)	Environment	Frequent incidents	Regular incidents	Infrequent incidents	Unlikely to occur. Very few recorded or known incidents	May occur in exceptional circumstances. Almost no recorded incidents.	Incident Frequency (IF)		
	Business Plan (F)	(PI)	(BI)	(L)	reputation (iv)	(E)	Operations – within 3 months	Operations – within 2 years	Operations – within 5 years	Operations – within 10 years	Operations – within 30 years	Operations (Op)		
							Project – Every project	Project – Every 2 projects	Project – Every 5 projects	Project – Every 10 projects	Project – Every 30 projects	Project (Pr)		
1. Catastrophic	>\$50m	Multiple Fatalities	> 1month	Prolonged litigation, heavy fines, potential jail term	Prolonged International media attention	Long term impairment habitats/ ecosystem	1 (E)	2 (E)	5 (H)	7 (H)	11 (S)			
2. Major	\$10m - \$50m	Single Fatality	1 week to 1 month	Major breach/ major litigation	International media attention	Long term effects of ecosystem	3 (E)	4 (E)	8 (H)	12 (S)	16 (M)			
3. Moderate	\$1m - \$10m	Serious/ Disabling Injury	1 day to 1 week	Serious breach of regulation. prosecution/ fine	National media attention	Serious medium term environmental effects	6 (H)	9 (H)	13 (S)	17 (M)	20 (L)			
4. Minor	\$100k - \$1m	Lost Time Injury	12 hrs to 1 day	Non-compliance, breaches in regulation	Adverse local public attention	Minor effects to physical environment	10 (S)	14 (S)	18 (M)	21 (L)	23 (L)			
5. Insignificant	<\$100k	First Aid Treatment Only	< 12 hrs	Low level compliance issue	Local complaints	Limited physical damage	15 (S)	19 (M)	22 (L)	24 (L)	25 (L)			

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CEY Risk Matrix Page 2

Risk Rating	Risk Rating Risk Category		Generic Management Actions
1 to 4	E Extreme		Immediate intervention required from senior management to eliminate or reduce this risk
5 to 9	H High		Imperative to eliminate or reduce risk to a lower level by the introduction of control measures. Management planning required at senior levels
10 to 15	S	Significant	Corrective action required, senior management attention needed to eliminate or reduce risk
16 to 19	M Moderate		Corrective action to be determined, management responsibility must be specified
20 to 25	20 to 25 L Low		Monitor and manage by corrective action where practicable

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CEY Risk Matrix Page 3

						ONTROL -	Impact / St	atus / Qualit	y
	Examples	Description	Rank	Control Category	A >= 80%	B 50 - 80%	C 50 / 50%	D 50 – 20%	= 20%
	Replace electric hand tools with compressed air alternatives in wet conditions	Eliminates a hazard by removal	1.	Elimination of hazard	100	45.0	40.0	14.0	10.0
	Replace large diameter, heavy cables with smaller ones that are easier to handle manually	Replace element with less risky alternative	2.	Substitution	85.0	40.0	35.0	13.0	8.5
CONTROL	Automatic fire fighting sprinkler systems	An automatic device that operates without intervention by personnel	3.	Engineered without people	70.0	30.0	25.0	12.0	7.0
TYPE OF (Fire alarm that sounds & the operator then has to initiate an evacuation	A device that requires personnel to respond to a stimulus	4.	Engineered with people	50.0	20.0	14.0	10.0	5.0
	Inspection, maintenance and repair of machinery	A process carried out by personnel	5.	Procedural	20.0	15.0	10.0	6.5	2.0
	Employee made aware of dangers of large moving equipment where the operators have limited vision	Induction training programs	6.	Awareness	5.0	3.0	2.5	1.5	1.0

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