Centennial Coal

ANNUAL REVIEW

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT

Awaba Colliery

January 2013 to December 2013

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

Centennial Coal
Environment Matters

TITLE BLOCK

Name of mine	**AWABA COLLIERY**
Mining Titles/Leases	**Newstan Colliery Holding**
AEMR Commencement Date	**01/01/2013**
AEMR Completion Date	**31/12/2013**
Name of leaseholder	**CENTENNIAL COAL LIMITED**
Name of mine operator (if different)	as above
Reporting Officer	Veronica Howat
Title	Environmental Coordinator
Date	28 March 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**.

Table 1. Summary of Colliery Lease Details

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

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

1.1.2 Mining Leases

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

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

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

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

1.1.3 Authorisations (Exploration Licences)

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

1.1.4 Security Deposit Calculation

Awaba Collieries DRE security deposit is included within the Centennial Newstan deposit as per the review conducted in 2009.

1.1.5 Consent Conditions

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

Table 2. Project Approval Condition Requirements

Project Approval Requirement	Section Addressed
Annual Review	
3. By the end of March 2012, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the next year;	Sections 2 & 5
b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the · the relevant statutory requirements, limits or performance measures/criteria; · the monitoring results of previous years; and · the relevant predictions in the EA;	Sections 3 & 4
c) identify any non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;	Section 3.20
d) identify any trends in the monitoring data over the life of the project;	Sections 3 & 4
e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and	Section 3
f) describe what measures will be implemented over the next year to improve the environmental performance of the project.	Sections 3 and 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 2013 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

Environmental 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 24 September 2013. 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).

During the inspection, DRE found centennial to be in general compliance with the relevant statutory approval instruments administered by DRE. 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	1. Continue sinkhole monitoring and rehabilitation activities as per approved Sinkhole	Ongoing	Section 6

No	Issue / Observation	Action	Due	Section of the AEMR
		Rehabilitation Plan		
2	Ongoing monitoring of the Water Seepage Area	1. Continue monitoring Awaba water seepage area	Ongoing	Sections 3.20.2 & 6
3	AEMR Reporting	1. Ensure that Section 5 (Rehabilitation) of the AEMR guidelines is fully addresses in the AEMR	Next AEMR	Section 5

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.

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

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.

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 has 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

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

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

Waste oil is collected within an oil water separator located on the mine surface. A contractor regularly services and maintains the oil water separator. A licensed contractor working within the waste tracking provisions of the *Protection of the Environment Operations Act* (POEO Act) removes all waste oil and greases generated on the site.

General rubbish from the operation is sorted and placed into bins for recycling, reuse and disposal to land fill. Recycling at Awaba includes cardboard and paper from the offices.

The Waste Management System is monitored via a regularinspection where the status of waste oils, 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 for residence time and filtration through goaf areas before being pumped to the surface at the 10 South Borehole and into Eraring Ash Dam. Mine water Discharges from 10 South were ceased temporarily from August 2013. A pump station at LDP004 was re-established and commissioned in September 2013.

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 an oil water separator and directed into the Pollution Control Dam (PCD).

Potable water usage for general surface operations for the reporting period was approximately 9.6ML. Water is used on the surface in the bathhouse, for (minimal) equipment cleaning, and fire fighting supply, as well as for the shaft drilling works for Newstan Colliery.

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. During the reporting period a total of approximately 165.3 ML had been transferred from Newstan to the Awaba Colliery underground 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 5 includes the actual quantities discharged from the Awaba Colliery underground workings.

Table 4. Water Balance

Year	Water Use (ML)	Water pumped from 10 South (ML)	LDP004 (ML)	LDP009 (ML)
2013	9.6	213.1	1.98	0

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 2013.

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

Table 5. Production and Waste Summary

	End of 2012 Reporting Period (31 December 2012)	End of Reporting Period (31 December 2013)	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)	17,768	0	0

Table 6. Stored Water

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

3 Environmental Management and Performance

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

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

The objectives of the EMS are as follows:

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

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

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

An annual environmental risk assessment was completed in February 2014 as part of the AEMR process as a requirement of DRE. The purpose is to identify mine activities, processes and facilities which require control strategies to ensure environmental protection and compliance with conditions of the lease, licence and consents. This environmental risk assessment is attached in **Appendix 2**.

3.1 Air Quality & Dust

An Air Quality & Greenhouse Gas Management Plan was established at Awaba in October 2011 in accordance with Condition 7 of Schedule 3 of the Project Approval and approved by the Department of Planning & Infrastructure in November 2011. In order to determine the effectiveness of the colliery's dust control measures, a network of dust depositional monitoring gauges have been established. Depositional gauges are located within the Colliery perimeter as well as adjoining areas. A total of 4 depositional gauges are utilised, all located within the Colliery boundary. The following graph **Figure 2** displays Awaba's Annual Average Dust Deposition in 2013 (Insoluble Solids).

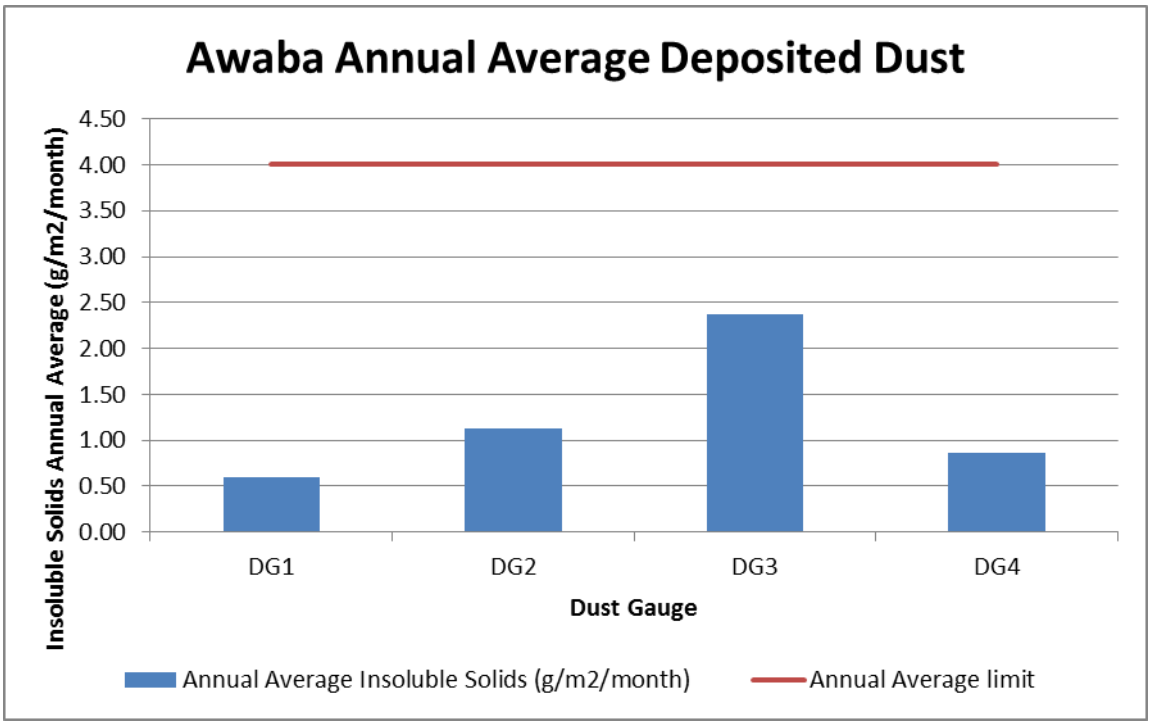


Figure 2: Awaba Average Annual Dust Deposition for 2013.

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.

A requirement of the Project Approval and the EPL is to install a high volume air sampler to evaluate the performance of the project. Discussions with the Lake Macquarie City Council (LMCC) have been ongoing since August 2011 to potentially allow for the installation of a high volume air sampler adjacent to the Awaba tennis courts, an agreement was reached in 2013, and the installation works are planned for 2014.

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. Discharges were recorded from one Licenced Discharge Point in 2013. 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.

An additional pump was also installed in the Awaba Pollution Control Dam (PCD) in 2011 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 is then 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 temporarily from August 2013. A pump station at LDP004 was re-established and commissioned in September 2013. Pumping from LDP004 had not commenced in the report period, apart from waters discharged during the commissioning process.
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. Groundwater monitoring results for 2013 are provided below. The data for December was not recorded due to a recording error with the data loggers.

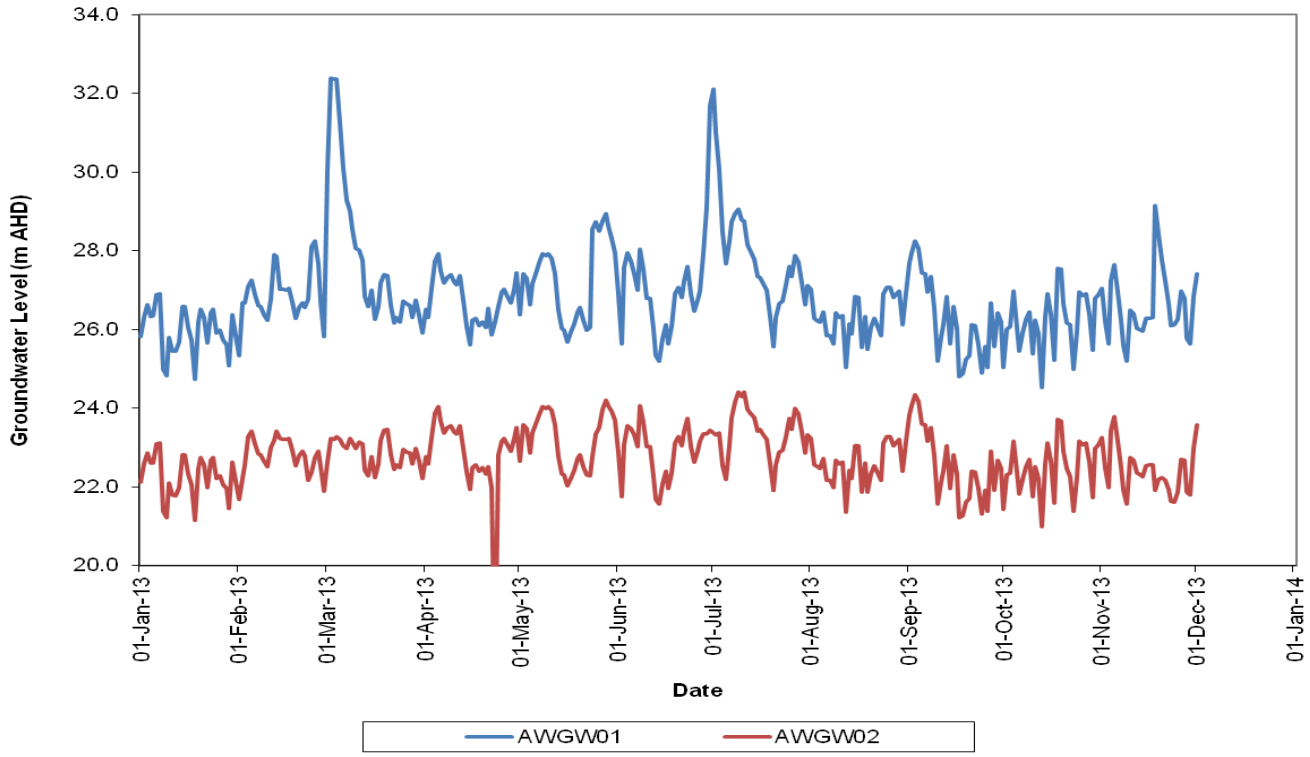


Figure 3: Groundwater Monitoring Results.

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 2013 (**Appendix 3**). A detailed baseline survey was first undertaken in 2008 of the vegetation along Stony Creek with subsequent surveys undertaken to assess whether there has been any changes in vegetation that may be attributed to mining operations, in particular subsidence impacts within the Main South Area. A groundwater dependent ecosystem (GDE) of riparian vegetation was also identified along Stony Creek within the Main South Area by Hunter Eco in 2010 during the ecology survey for the Awaba Colliery Mining Project. The vegetation in February 2013 was essentially the same as that recorded previously. The creek was full of flowing water as a result of recent heavy rain. There was also a healthy amphibian population calling.

Traversing between transects involved walking along over a kilometre of Stony Creek, including part of a tributary. 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.

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, August and November in accordance with:

- Department of Planning and Infrastructure (DoPI) Project approval schedule 3 condition 1;
- Environmental Protection Authority (EPA) Condition M8.2 of EPL 433 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.

The November Noise report states that the Awaba Noise Compliance Assessment for the year 2013 indicated that the noise impact from Awaba Colliery was within the noise criteria and was inaudible during the majority of the noise surveys undertaken at all of the monitoring locations.

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 1597.2 mm of rain fell in 2013

Total rainfall for the reporting period is shown in the Table 9 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	34.8	133.8	1.8	0	0.6	0.8	0.2	0	1	0	0.2
2	0	41.2	41.4	0	0	23.8	0.2	0	0	0	0	0
3	0	0	2.6	21.6	0	0	0	0	0	5.2	0	0

4	0	0	0	29	0	0	0.4	0	0	0	0	0
5	0	0	0	2	0	0	0	0	0	0	0	0.8
6	0	0	0	0.8	0	0	0	0	0	0	0	0
7	0	0	0	0.2	0.2	0	0	10.2	0	0	0	0
8	0	0	0	0	0.2	0	0	2.6	0	1.2	0	0
9	0	0	0	7.2	0	0	3.4	0	0	0	0	0
10	0	7.2	0	0.4	0	0	0.6	0	0	0	26	0
11	0	10.2	0	0	2	0.2	0	0	0	0.6	47.4	2
12	0	67.4	0	0	0.2	7.8	0	0.2	0	0	9	0
13	12.8	0.6	0	0	0	0.2	0	0	0	6.8	0	0
14	1.8	0	0	0	5.4	0	0	0	6.8	7.4	0	0
15	0	1.2	10.4	0.4	0.2	0	0.8	0	0	0	28	0
16	0	0.2	0.2	2.8	0	0	0	0	15.2	0	14.2	0
17	0	1.4	0	0	0	0	0	0	4.6	0	93.8	0
18	4	1.6	4	0	0	0	0	0	0.2	0	89	0
19	9.4	0.2	0	0	0	9.2	1.4	0	0	0	0.2	0
20	23	2.2	0	40.6	0	0	0.2	0	0	0	0.4	0
21	0	15.8	0	0.2	0	9	0	0	0	0	0	0
22	2.2	24.4	0	0.4	4.8	0.6	0	0	0	0	20.4	0
23	0.2	101.8	0	0	59	21.4	0	0	0.2	0	7.6	0
24	0.2	0.2	0	0	14.4	0.2	0	0	0	0	0	9.6
25	0	0	0	0	0.6	0	0	0	0	0	8	13.2
26	1.8	0	0	0	0.2	2.4	0	0	0	0	0	1.6
27	40	0	0	0	1.4	14.6	0	0	0	0.4	0	0
28	120.8	19.4	6	0	3.4	5.6	0	0	0	0	0	0
29	10.8		1.4	0	0.2	13.2	0	0	0	41.2	25.8	0
30	0.2		0	0	0.2	14	0	0	0	0.6	3	0
31	0		0		0		5.2	0		0		
Total (mm)	**227.2**	**329.8**	**199.8**	**107.4**	**92.4**	**122.8**	**13**	**13.2**	**27**	**64.4**	**372.8**	**27.4**

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.

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 2013 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

Name of Item	Item Number
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

Monitoring Results in Accordance with Awaba's SMP Conditions			
Main South Condition No (Stages 1, 2 and 3)	**3 North Condition No**	**Document**	**Monitoring Results**
12.	**12**	**Subsidence Monitoring Programme**	Maximum subsidence in **Main South Stage 1** was -154 mm in July 2013, which was within the defined predicted subsidence levels. There was no subsidence impact in monitoring points nearer to the Main Northern Railway, Ulan Rail Loop, Haul Road Bridge or Railcorp Power Poles. Note that Stage 1 Mining was completed on 26/06/2009. The maximum subsidence in the **Stage 2** area was -79mm recorded in July 2013. Note that Stage 2 Mining was completed on 08/03/2012. The maximum subsidence in the **Stage 3** area was -30 mm recorded in January 2013. There were no impacts on the infrastructure within the Stage 3 area (Eraring Haul Road, Telstra Tower, Rail Corp & Ausgrid Power Poles). Note that Stage 3 Mining was completed on 22/12/2011. Statutory inspections undertaken by mining officials prior to the mine being sealed found no evidence of underground pillar failure. Visual Inspections have found one case of surface impacts. This impact was a sinkhole in the Stage 3 area - 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. The relevant government authorities and stake holders were informed of this within 24 hours of the discovery of the hole. Rehabilitation of the site was completed. The location of the sinkhole was plotted and is shown on the Stage 3 Face Position plan AW2176. Ongoing visual inspections have been undertaken on a quarterly basis. It was discovered during a rehabilitation inspection that the above sinkhole in the

			stage 3 area had re-activated during the reporting period and required further rehabilitation work. This work has been included in the rehabilitation schedule. There was no other evidence of surface impacts found in these areas during the reporting period. Subsidence has been within predicted levels and has had no detectable adverse impact on surface infrastructure. Maximum subsidence recorded in the **3 North Area** was -57mm in January 2013. Note that 3 North Mining was completed on 25/01/2010. Subsidence monitoring in the **3 North Area** is now completed. Statutory inspections undertaken by mining officials prior to the mine being sealed found no evidence of underground pillar failure. Visual inspections have found no evidence of surface impacts.
13.	**13**	**Environmental Monitoring Programme**	A Stony Creek vegetation study was completed in 2009, 2010, 2011, 2012 and 2013 in accordance with the Environmental Management Plan. The ecological monitoring of riparian vegetation along Stony Creek at Awaba (**Appendix 3**) was completed as a follow up on the baseline study completed in 2008. This study was undertaken to assess whether there has been any evident changes in the vegetation that may be attributed to extraction operations. This study found that the vegetation along Stony Creek was essentially the same as recorded in 2008, and there was no evidence of cracks that may be attributed to subsidence. This report is included in Appendix 3. Additional quarterly creek inspections were undertaken to identify the following; surface cracking along creeks, step change in bed, damage to drainage channels, and ponding. Visual inspections found no

			visual disturbances, or abnormal changes due to mining operations.
15.	**14**	**Spontaneous Combustion Management Plan**	Surface visual inspections did not identify any new sinkholes during the reporting period in the Main South or 3 North Areas (or other areas). An old sinkhole within the Stage 3 area re-activated (as discussed above). This work has been included in the rehabilitation schedule. Stockpiling of coal on the surface did not occur during the reporting period, as the mine has ceased operating. History of the mine shows that there have been no known spontaneous combustion events since opening in 1947.
20.	**15**	**Public Safety Management Plan**	Visual inspections were completed on a quarterly basis during 2013. Inspections were undertaken to identify the following; surface cracking, step changes in road pavement, and damage to drainage, watersheds and creeks. Additional creek inspections aim to identify surface cracking along creeks, step change in bed, damage to drainage channels, and ponding. Visual inspections found no visual disturbances, or abnormal changes due to mining operations.
22.	**17**	**Subsidence Management Status Report**	Subsidence results were submitted to the various government departments and stakeholders following scheduled surveys in January and July 2013. The Centennial Awaba Colliery End of Year Subsidence Management Report was submitted on 26/03/2013 – and posted on Centennial Website.

A Subsidence Monitoring Program was completed for the East B Area as required by Condition 11 (g) of Schedule 3 of the Project Approval. Table 10 provides a summary of the subsidence monitoring undertaken for the East B Area and the subsidence results.

Table 10. East B Subsidence Monitoring Program & Results

SUBSIDENCE MONITORING	INITIAL SURVEY COMMENCEMENT	RESURVEY FREQUENCY	FINAL SURVEY*	RESULTS / COMMENTS

SUBSIDENCE MONITORING	INITIAL SURVEY COMMENCEMENT	RESURVEY FREQUENCY	FINAL SURVEY*	RESULTS / COMMENTS
Bush Track Monitoring points	Before Commencement of Extraction All points surveyed twice for Easting, Northing and Height (X,Y,Z)	3 Monthly Resurvey of All Points	Two further surveys to be done after completion Six (6) months and Twelve (12) months. Meeting to be then held with PSE to discuss and agree on further survey schedule if deemed necessary.	Monitoring points at approx. 50 metre spacings (Levels only) in safe suitable positions. Final surveys were completed in January 2013 and Subsidence Results were provided to the various stakeholders. Note that **East B Area** Mining was completed on 21/12/2011. The maximum level of recorded subsidence in the **East B Area** in 2013 was -41mm. The predicted maximum level of the subsidence in the Awaba Mining Project was 200mm. Subsidence levels to date are significantly lower than the predicted maximum levels. Subsidence monitoring in the East B area is now completed.
Bush Track Visual Inspections	Before Commencement of Extraction	Monthly by Environmental officer or representative	As above	Monthly visual surface inspections when mining within 50 metres of Bush Tracks. Visual inspections were completed on a Quarterly basis during 2013. No mining undertaken in 2013. Visual inspections found no visual disturbances, or abnormal changes due to mining operations.
Water Course Visual inspection	Before Commencement of Extraction	3 Monthly by environmental officer / representative and/or following significant rainfall	As above	Quarterly water course inspections completed in 2013. Inspections are undertaken to identify the following; surface cracking along creeks, step change in bed, damage to drainage channels, and ponding. Visual inspections completed in 2013 found no visual

SUBSIDENCE MONITORING	INITIAL SURVEY COMMENCEMENT	RESURVEY FREQUENCY	FINAL SURVEY*	RESULTS / COMMENTS
				disturbances, or abnormal changes due to mining operations.
Haul Road – Newstan/Eraring Monitoring points Visual Inspections	Before Commencement of Extraction All points surveyed twice for X,Y,Z.	Midway and completion of North B Panel	As Above	Monitoring points at approx. 50 metre spacings (Levels only) in safe suitable positions. All surveys were completed during 2013 and Subsidence Reports were provided to the various stakeholders. Weekly Visual Inspection when Mining within 100 metres of the Eraring Haul Road. No impacts were identified in 2013.
Moderate Heritage Value Site Visual Inspections within East B Area	Before Commencement of extraction	3 Monthly Resurvey Monthly by Environmental officer or representative	As Above	Monitoring in 2013 found no impacts on the scar tree. A final due diligence report was completed in 2013 to cease monitoring at this point.

3.17 Hydrocarbon Contamination

Potential areas where historic operations may have contaminated land have been identified. A Phase1 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.

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

3.18 Methane Drainage / Ventilation

There is no methane drainage conducted at Awaba Colliery.

3.19 Public Safety

Awaba Colliery is completely surrounded by fencing and is patrolled by security staff on a regular basis; therefore, public safety was not a concern during the reporting period. Awaba Colliery has an approved Public Safety Management Plan and a Built Features Management Plan. Quarterly inspections of tracks and trails were undertaken during 2013 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-compliance with the conditions of EPL443 during the reporting period. The 2013 Annual Return is located in Appendix 1 of this AEMR.

3.20.1 LDP008 pH exceedence

During the reporting period LDP008 flowed due to heavy rainfall over several days. The sample taken from this point returned a pH result of 5.88, which is below the limit of 6.5.

Upstream samples taken for the same day returned a pH of 5.87, and downstream of 5.96. A different creek system, Jigadee Creek, also returned a pH result of 5.87. Due to the result at LDP008 being similar to the background, it is presumed that there was no environmental harm, and the area has naturally low pH.

3.20.2 Seepage from Underground workings.

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 has also been receiving water under licence 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.

3.21 Independent Environmental Audit

The Independent Environmental Audit of the Awaba Colliery in accordance with Condition 8 of Schedule 5 of the Project Approval was completed in 2012. This audit assessed compliance with relevant approvals, licences and other management plans applicable to Awaba Colliery. The overall compliance status was found to be high, and is summarised in the table below.

Table 11. Overall Compliance Assessment and Audit Score

Relevant Approval	Per Cent Compliant (%)	Number of Conditions non compliant or indeterminate
Project Approval 10_0038 (59 conditions)	85	9
Environmental Protection Licence No. 443 (88 conditions)	93	6
Consolidated Coal Lease 746 (37 conditions)	89	4

4 Community Relations

4.1 Complaints

There were no complaints made during the 2013 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 June, September & December during the reporting period. The meeting in February was cancelled.

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 2013.

5.2 Rehabilitation of Disturbed Lands

Table 12. Awaba Rehabilitation Summary.

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

5.3 Other Infrastructure

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

5.4 Rehabilitation Trials and Research

No rehabilitation trials occurred during the report period.

6 Activities Proposed in the Next AEMR Period

Activities proposed for the 2014 reporting period include;

- Maintenance of the Awaba Colliery pit top and remaining buildings
- Rehabilitation of sink holes in accordance with the Sinkhole Rehabilitation Plan.
- Ongoing Monitoring at the Awaba seepage area

7 Plans

AW2245 – Great Northern Seam Workings.

AW2236 – Surface Water & Dust Monitoring Locations.

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

8 Appendices

Appendix 1 – EPL443 2013 Annual Return

Appendix 2 – Awaba Annual Environmental Risk Assessment – 2014

Appendix 3 – Ecological Monitoring of Riparian Vegetation Along Stony Creek at Awaba – February 2013.

Appendix 4 – End of Year Subsidence Report.

County of Northumberland

Parish of Coorumbung

Parish of Awaba

Mine Boundary

330KV TRANSMISSION LINE

CCL746

LDP003 NORTHERN RAILWAY ME. RAILWAY

LDP005 BARNES DAM

LDP008 Pit Top

LDP007 1SW

LDP004 13 WEST 2

LDP002 2SW

LDP006 3SW 2

LDP001 12 NORTH

10 SOUTH

AWABA

Stony Creek

Lords Creek

Kilaben Creek

Stockyard Creek

Tributary of Muddy Lake

HAWKMOUNT ROAD

ABANDONED RAILWAY

CROWN LAND

RAIL LOOP

GAS TURBINE

ERARING POWER STATION

ASH DAM

CONVEYOR

TL No F785

TL No 956

AWABA COLLIERY - DEWATERING BORES

Name	Status	Licence No.	Volume Limit (kL/day)	pH Limit	TSS Limit (mg/L)	O&G (mg/L)	Water Levels: Floor RL	Water Levels: Danger RL	Water Levels: Exemption Level to Volume Discharge (m)	Co-ordinates: Eastings	Co-ordinates: Northings	LOT	DP	PARISH	COUNTY	COUNCIL
12 North	Not Active	443	200	6.5-8.5	50	10	-4	-3	-3	361 473.0	6 342 314.5	11	1050120	Awaba	Northumberland	Lake Macquarie
2SW	Decommissioned	443	200	6.5-8.5	50	10	-6	-1	-3	361 016.1	6 343 560.9	7306	1164232	Coorumbung	Northumberland	Lake Macquarie
Main East Railway	Not Active	443	2000	6.5-8.5	50	10	4	6	6	361 861.5	6 345 164.0	153	755207	Awaba	Northumberland	Lake Macquarie
13 West 2	Active	443	2000	6.5-8.5	50	10	-11	-4	-5	360 455.3	6 343 914.3	7306	1164232	Coorumbung	Northumberland	Lake Macquarie
Barnes Dam	Not Active	443	200	6.5-8.5	50	10	-1	5	0	362 532.5	6 344 938.8	7304	1149082	Awaba	Northumberland	Lake Macquarie
3SW2	Decommissioned	443	200	6.5-8.5	50	10	-3	-16	-19	360 627.5	6 342 607.4	7306	1164232	Coorumbung	Northumberland	Lake Macquarie
1SW	Not Active	443	500	6.5-8.5	50	10	-10	0	-5	360 067.4	6 344 370.9	98	755218	Coorumbung	Northumberland	Lake Macquarie
Irrigation Area Runoff	Active	443	n/a	6.5-8.5	50	10	n/a	n/a	n/a	363 420.6	6 345 195.9	7305	1149082	Awaba	Northumberland	Lake Macquarie
Pollution Control Dam	Active	443	n/a	6.5-8.5	50	10	n/a	n/a	n/a	363282.4	6345523.6	Crown Waterway		Awaba	Northumberland	Lake Macquarie
10 South	Active	n/a	n/a	n/a	n/a	n/a	-6.2	n/a	n/a	361 982.4	6 342 279.2	11	1050120	Awaba	Northumberland	Lake Macquarie

LEGEND

- Colliery Holding Boundary
- Mine Boundary
- Parish Boundary
- Cadastral Boundary (1//737496) — Lot No, // DP No.
- CCL746
- Surface Contours (10)
- Transmission Line - Pole
- Water Course/Creek
- Track
- Sealed Road
- LDP005 BARNES DAM — LICENCED DISCHARGE POINT
- 10 SOUTH — DISCHARGE POINT

Centennial Newstan Pty Ltd (ACN 101 508 865)

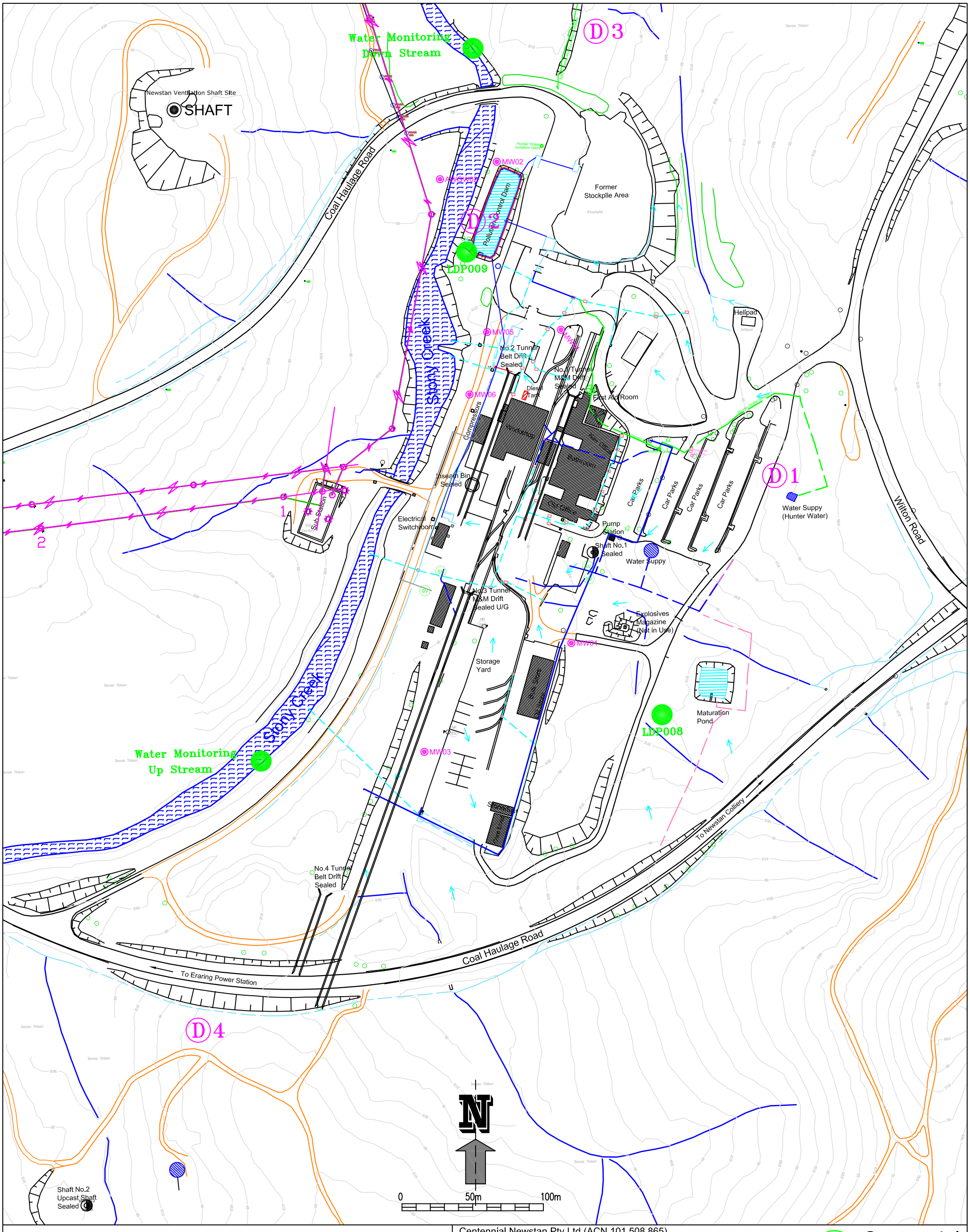
AWABA COLLIERY

Great Northern Seam

Centennial Newstan

TITLE: WATERWAYS OF AWABA COLLIERY
LICENCED DISCHARGE POINTS

DRAWN:	C.Cluderay	Plot File: N:\Shared\Pdf\2014\AW2223_Rev3.pdf	A0
DATE:	18/03/2014	FILE: N:\Shared\Plans\Awaba\AW2223_Rev3.dwg	All Distances are in metres unless otherwise shown.
CHECKED:	V.Warren	SCALE: 1 : 6000	AW2223_Rev3
APPROVED:	G. Watson		



LEGEND

- Surface Contours
- Transmission Line - Pole
- Water Course/Creek
- Track
- Sealed Road
- Fenceline - approximate
- Clean Water Systems
- Pollution Control Systems
- Underground Water Supply
- Water Monitoring Locations
- LDP009 Licenced Discharged Point
- D Dust Gauge
- MW01 Decontamination Monitoring Borehole

Centennial Newstan Pty Ltd (ACN 101 508 865)

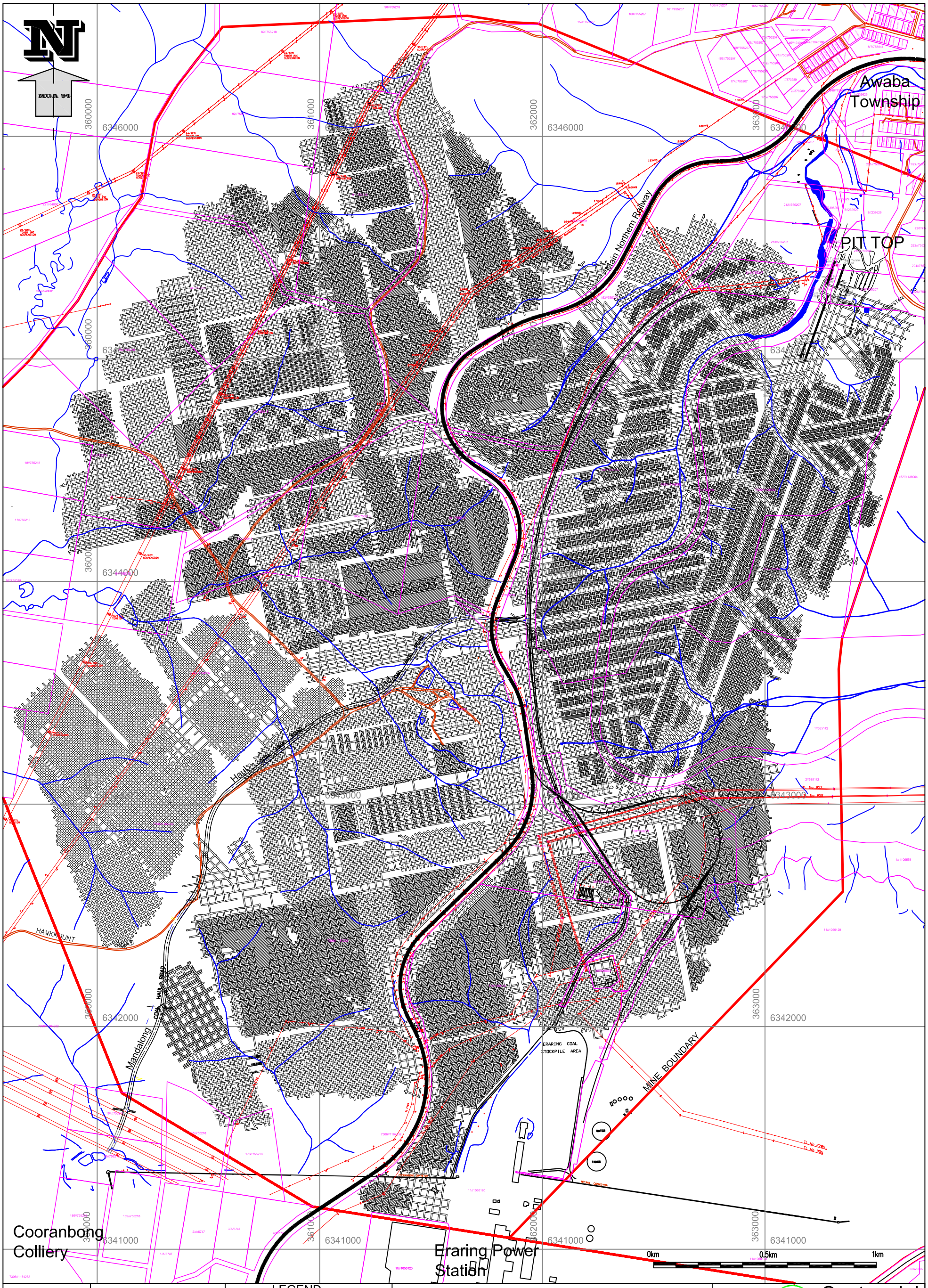
AWABA COLLIERY
Great Northern Seam

Centennial Newstan

TITLE:

Surface Water and Dust Monitoring Locations

DRAWN:	C.Cluderay	REV:		All Distances are in metres unless otherwise shown.	A3
DATE:	18/04/2014	FILE:	N:\Shared\Plans\Awaba\AW2236.dwg		
CHECKED:	V.Warren	PDF FILE:	N:\Shared\Pdf\2014\AW2236.pdf		AW2236
APPROVED:	G.Watson	SCALE:	1 : 2500		



LOCATION	AWABA COLLIERY
SEAM	GREAT NORTHERN
DRAWN	C.CLUDERAY
CHECKED	
APPROVED	
SCALE	1:15000

LEGEND

- Existing Mine Workings
- Extracted Mine Workings
- Mine Boundary
- Portion Boundaries
- Major Road
- Major Creek / Dam
- Minor Creek / Water Course
- Powerlines / Towers

Centennial Newstan Pty Ltd (ACN 101 508 865)

AWABA COLLIERY

Great Northern Seam Workings

Note: Mining Ceased 08/03/2012

Centennial Newstan

AW2245

PDF FILE: N:\SHARED\PDF\2014\AEMR_Grn Workings_Final.pdf

07/03/2014 | A3

ANNUAL RETURN

LICENCE NO	**443**
LICENCE HOLDER	CENTENNIAL NEWSTAN PTY LIMITED
REPORTING PERIOD	01-Jan-2013 to 31-Dec-2013

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 period also needs to be entered in Section E)

THIS ANNUAL RETURN MUST BE RECEIVED BY THE EPA BEFORE 02-Mar-2014

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 Annual Return within 60 days after the reporting period ends may result in:

- **the issue of a Penalty Notice for $750 (individuals) or $1500 (corporations);**

OR

- **prosecution.**

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.*

Annual Return

CENTENNIAL NEWSTAN PTY LIMITED

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 B1:	You have entered the correct number in the complaints table
✓	Section B2 – B3:	If there are tables, you have provided the required details
✓	Section C:	You have answered question 1, and 2 if applicable
NA	Section D:	If applicable, you have completed all load calculation worksheets
✓	Section E:	You have answered question 1, 2, 3, 4, 5 and 6 if applicable
✓	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

Annual Return

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)*	
ABN	68 101 508 865

A2 Premises to which Licence Applies (if applicable)

Common Name (if any)	AWABA COLLIERY
Premises	WILTON RD AWABA 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
Mining for coal	> 0.00 - 500,000.00	T produced
Coal works	> 0.00 - 2,000,000.00	T handled

A6 Assessable Pollutants (Not Applicable)

B Monitoring and Complaints Summary

B1 Number of Pollution Complaints

Number of complaints recorded by the licensee during the reporting period. **If no complaints were received enter nil in the attached box, otherwise complete the table below.**	Nil

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	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	microsiemens per centimetre	Nil				
Oil and Grease	milligrams per litre	Nil				
pH	pH	Nil				
Total suspended solids	milligrams per litre	Nil				

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	microsiemens per centimetre	Nil				
Oil and Grease	milligrams per litre	Nil				
pH	pH	Nil				
Total suspended solids	milligrams per litre	Nil				

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).

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	microsiemens per centimetre	Nil				
Oil and Grease	milligrams per litre	Nil				
pH	pH	Nil				
Total suspended solids	milligrams per litre	Nil				

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	microsiemens per centimetre	4	4	2110	2170	2210
Oil and Grease	milligrams per litre	4	4	0	0	0
pH	pH	4	4	7.25	7.295	7.34
Total suspended solids	milligrams per litre	4	4	0	2.5	10

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

Conductivity	microsiemens per centimetre	Nil				
Oil and Grease	milligrams per litre	Nil				
pH	pH	Nil				
Total suspended solids	milligrams per litre	Nil				

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	microsiemens per centimetre	Nil				
Oil and Grease	milligrams per litre	Nil				
pH	pH	Nil				
Total suspended solids	milligrams per litre	Nil				

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	microsiemens per centimetre	Nil				
Oil and Grease	milligrams per litre	Nil				
pH	pH	Nil				
Total suspended solids	milligrams per litre	Nil				

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	1	1	0	0	0
pH	pH	1	1	5.88	5.88	5.88
Total suspended solids	milligrams per litre	1	1	0	0	0

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	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	Nil				
pH	pH	Nil				

Total suspended solids	milligrams per litre	Nil				

Monitoring Point 10

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

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
Particulates - Deposited Matter	grams per square metre per month	12	12	0.3	0.6	1.4

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	No. of samples required by licence	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	1.1	3.4

Monitoring Point 12

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

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
Particulates - Deposited Matter	grams per square metre per month	12	12	1.2	2.4	3.5

Monitoring Point 13

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

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
Particulates - Deposited Matter	grams per square metre per month	12	12	0.4	0.9	1.6

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	micrograms per cubic metre	*				

*Equipment to be installed. LMCC Approval for monitoring location approved in 2013. To be installed in 2014.

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 montoring

Unit of measure	Frequency	No. of measurements made	Lowest result	Mean result	High result
kilolitres per day	Daily during any discharge	Nil			

Discharge & Monitoring Point 2

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	Nil			

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	Nil			

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	4	0	5	1980

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	Nil			

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	Nil			

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	Nil			

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	Nil			

Annual Return

CENTENNIAL NEWSTAN PTY LIMITED

C Statement of Compliance - Licence Conditions

C1 Compliance with Licence Conditions

(☑ the boxes)

1 Were all conditions of the licence complied with (including monitoring and reporting requirements)? ☐ Yes ✓ No

(✓ a box)

2 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 registrati on 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 initialled by the person(s) who signs Section G of this Annual Retum 7

C2 Details of Non-Compliance with Licence

Licence condition number not complied with
EPL443 condition L2.4 (Concentration Limits) at LDP008 for pH
Summary of particulars of the non-compliance **(NO MORE THAN 50 WORDS)**
The Awaba LDP008 flowed due to rainfall over several days. The sample taken from this point had a pH result of 5.88, which is below the limit of 6.5. Upstream results taken for the same day had a pH of 5.87, while downstream was 5.96.
If required, further details on particulars of non-compliance
A close creek system, Jigadee Creek, which is also within the greater Lake Macquarie catchment, also returned a result of 5.87 pH.
Date(s) when the non-compliance occurred, if applicable
19/11/2013
If relevant, precise location where the non-compliance occurred (attach a map or diagram)
LDP008
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
N/A
Cause of non-compliance
Surface rain runoff from the upstream catchment being naturally acidic.
Action taken or that will be taken to mitigate any adverse effects of the non-compliance
Due to the result at LDP8 being to similar and influenced by background runoff no environmental harm is expected or was observed.
Action taken or that will be taken to prevent a recurrence of the non-compliance

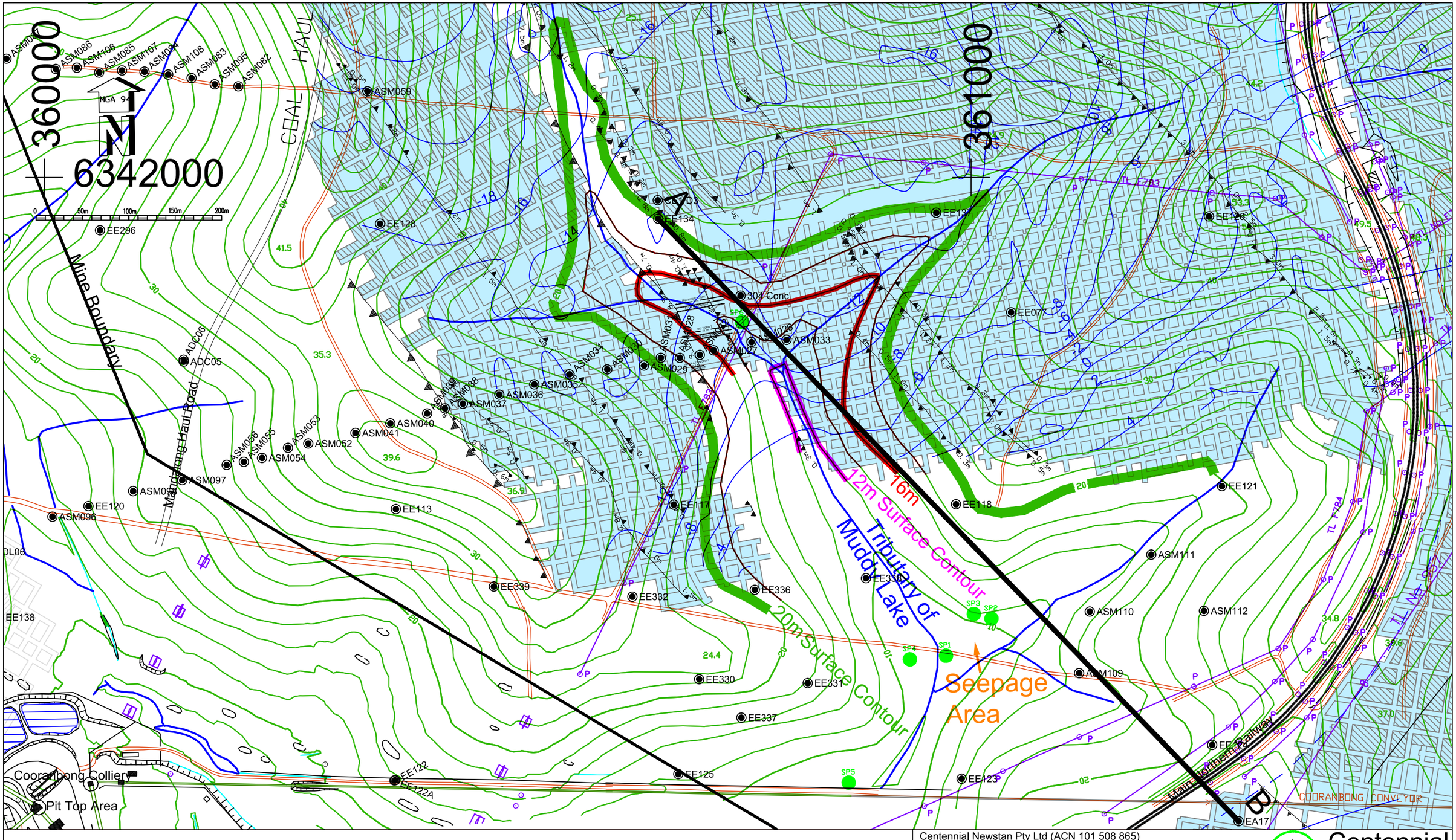
Annual Return

CENTENNIAL NEWSTAN PTY LIMITED

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
Identified in August 2013. Seepage is ongoing.
If relevant, precise location where the non-compliance occurred (attached a map or diagram)
See attached plan AW2237
If applicable, registration numbers of any vehicles or the chassis number of any mobile plant involved in the non-compliance
NA
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. Awaba has also been receiving water under licence from Newstan Colliery of up to 4 ML/Day from 15 October 2011 to 27 June 2013.

Action taken or that will be taken to mitigate any adverse effects of the non-compliance
Newstan Colliery ceased transferring water to Awaba Colliery in June 2013. Ongoing monitoring is currently been undertaken at this location.
Action taken or that will be taken to prevent a recurrence of the non-compliance



LEGEND

- Mine Boundary
- Great Northern Seam Workings
- Sealed Road
- Track
- 20 Surface Contour - A.H.D.
- 20 Grn Seam Floor Contour - A.H.D.
- Water Course
- Transmission Line - Pole
- SP3 Water Sampling Point
- EE10 Borehole
- X-Section - refer to Plan AW2040
- Underground Water

Centennial Newstan Pty Ltd (ACN 101 508 865)

AWABA COLLIERY
Great Northern Seam

Centennial Newstan

TITLE:

Awaba Colliery Seepage Area

DRAWN:	C.Cluderay	REV:		All Distances are in metres unless otherwise shown.	A3
DATE:	10/09/2013	PDF FILE:	N:\Shared\PDF\2013\AW2237.pdf		
CHECKED:	V.Warren	SCALE:	1 : 4000		AW2237
APPROVED:	G.Watson				

Waste Water Maintenance Pty Ltd
ABN 97 123 372 958

Mobile: 0430 218 866
Phone/Fax: (02) 4677 0372
Accounts: 0425 281 096

PO Box 957
Picton NSW 2571

E: deandalpra@yahoo.com.au

No. 1231

Client Awaba Coal

Date 12/3/13

Purchase Order No.

Job No.

Comments

* Checked Tank.
* Checked for Leaks.
* Checked for Wet Area's.
* Keep up regular Pumpouts.

Start Time	Finish Time	Travel Time

Parts used or needing replacement

Test Results		Checks and Recommendations			
Temperature		Chlorine	✓	Float Switch	
Dissolved Oxygen		Belts	✓	Timers / Relays	✓
pH		Bearings	✓	Pump No. 1 HRM	
Nitrate		Pump Operation	✓	Pump No. 2 HRM	✓
Ammonia		Balance No. 1	✓	Decant HRM	✓
30 min. Settle Test		Balance No. 2	✓	Irrigation Pump	
Turbidity		Pump No. 1	✓	Sprays	✓
Sludge Colour (Odour)		Pump No. 2	✓	Irrigation Area	✓
Others	✓				

Serviceman Dean

Client

Waste Water Maintenance Pty Ltd
ABN 97 123 372 958

Mobile: 0430 218 866
Phone/Fax: (02) 4677 0372
Accounts: 0425 281 096

PO Box 957
Picton NSW 2571

E: deandalpra@yahoo.com.au

No. 1312

Client Awaba Sewage

Date 19/6/13

Purchase Order No. NS 140611

Job No.

Comments

* Check Condition of Tank.
* No Visible Wet Areas
* Keep up regular Pump outs.

Start Time 7.15 | Finish Time | Travel Time

Parts used or needing replacement

Test Results		Checks and Recommendations			
erature		Chlorine		Float Switch	
Dissolved Oxygen		Belts		Timers / Relays	
pH		Bearings		Pump No. 1 HRM	
Nitrate		Pump Operation		Pump No. 2 HRM	
Ammonia		Balance No. 1		Decant HRM	
30 min. Settle Test		Balance No. 2		Irrigation Pump	
Turbidity		Pump No. 1		Sprays	
Sludge Colour (Odour)		Pump No. 2		Irrigation Area	
Others					

Serviceman

Client

Waste Water Maintenance Pty Ltd
ABN 97 123 372 958

Mobile: 0430 218 866
Phone/Fax: (02) 4677 0372
Accounts: 0425 281 096

PO Box 957
Picton NSW 2571

E: deandalpra@yahoo.com.au

No. 1386

Client Awaba Coal

Date 10/9/13

Purchase Order No.

Job No.

(Veronica Waren)

Comments (10am)

* Checked Tanks for Cracks.
* No visable wet Area's
* Keep up regular Pump outs.

Start Time | Finish Time | Travel Time

Parts used or needing replacement

Test Results		Checks and Recommendations			
erature		Chlorine		Float Switch	
Dissolved Oxygen		Belts		Timers / Relays	
pH		Bearings		Pump No. 1 HRM	
Nitrate		Pump Operation		Pump No. 2 HRM	
Ammonia		Balance No. 1		Decant HRM	
30 min. Settle Test		Balance No. 2		Irrigation Pump	
Turbidity		Pump No. 1		Sprays	
Sludge Colour (Odour)		Pump No. 2		Irrigation Area	
Others					

Serviceman

Client

Waste Water Maintenance Pty Ltd
ABN 97 123 372 958

Mobile: 0430 218 866
Phone/Fax: (02) 4677 0372
Accounts: 0425 281 096

PO Box 957
Picton NSW 2571

E: deandalpra@yahoo.com.au

No. 1462

Client Awaba Colliery

Date 10/12/13

Purchase Order No. NS140611

Job No.

Comments

* Checked Tank.
* No wet Area's
* Keep up Pump outs.

Start Time 7am Finish Time 7.30 am Travel Time

Parts used or needing replacement

Test Results		Checks and Recommendations			
Temperature		Chlorine		Float Switch	
Dissolved Oxygen		Belts		Timers / Relays	
pH		Bearings		Pump No. 1 HRM	
Nitrate		Pump Operation		Pump No. 2 HRM	
Ammonia		Balance No. 1		Decant HRM	
30 min. Settle Test		Balance No. 2		Irrigation Pump	
Turbidity		Pump No. 1		Sprays	
Sludge Colour (Odour)		Pump No. 2		Irrigation Area	
Others					

Serviceman Dean

Client

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)

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 PIRMP as required under s153A of the Protection of the Environment Operations Act 1997?

(✓ a box) ✓ Yes ☐ No

If you answered 'Yes' to question 1, please tick the appropriate box to indicate the following:

2 Is the PIRMP available at the premises?

(✓ a box) ✓ Yes ☐ No

3 Is the PIRMP available in a prominent position on a publicly accessible web site?

(✓ a box) ✓ Yes ☐ No

If the PIRMP is available on a publicly accessible web site please indicate clearly below the address of the web site where the PIRMP can be accessed:

Web site Address: http://www.centennialcoal.com.au/Operations/OperationsList/Awaba.aspx

4 Has the PIRMP been tested?

(✓ a box) ✓ Yes ☐ No

If you answered 'Yes' to question 4 please indicate clearly below the date that the PIRMP was last tested:

The PIRMP was last tested on: 16 July 2013

5 Has the PIRMP been updated?

(✓ a box) ✓ Yes ☐ No

If you answered 'Yes' to question 5 please indicate clearly below the date that the PIRMP was last updated:

The PIRMP was last updated on: 14 November 2013

6 How many times has the PIRMP been activated in this reporting period? 1

If the PIRMP has been activated, please indicate clearly below the date/s when the PIRMP was activated:

The PIRMP was activated on: 2 November 2013

The EPA's guidelines for preparation of pollution incident response management plans are available at

http://www.epa.nsw.gov.au/legislation/20120227egpreppirmp.htm

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

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 EPA's written requirements for publishing pollution monitoring data?

(✓ 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:

Web site address http://www.centennialcoal.com.au/Operations/OperationsList/Awaba.aspx

The EPA's written requirements for publishing pollution monitoring data are available at http://www.epa.nsw.gov.au/legislation/20120263reqpubpmdata.htm

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.

G 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:		the Annual Return must be signed and certified:
an individual	☐	by the individual licence holder, or
	☐	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 delegated 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.

I/We

- *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-2013 to 31-Dec-2013 or ___/___/___ to ___/___/___

SIGNATURE:_____ SIGNATURE:_____

NAME:
(printed)_____ NAME:
(printed)_____

POSITION:_____ POSITION:_____

DATE:_____/_____/_____ DATE:_____/_____/_____

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

Centennial Coal

Dyadem Stature for Risk Management:

Risk Assessment Title: Awaba Colliery Annual Environmental Risk Assessment
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):

Executive Summary of Top 10 Risks

Background	Potential Incident	RR
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 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.	6 (H)
Storage of remaining Hydrocarbons and chemicals on site.	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.	14 (S)
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from ::: Subsidence impacting on surrounding water courses ::: Caused by: Failure of underground support/workings Resulting in: Damage to environment.	14 (S)
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.	14 (S)
Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from	18 (M)

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 ::: 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.	18 (M)
Vehicle Movements around colliery surface facilities - private vehicles, delivery trucks.	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.	21 (L)
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: leaking oil polluting Stony creek ::: Caused by: Leaks from the storage of hydrocarbons Resulting in: Discharge of contaminates from site.	21 (L)
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: Hydrocarbon pollution of the land from compressors and diesel tank ::: Caused by: Significant oil spills Resulting in: Land contamination.	21 (L)
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from	21 (L)

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 ::: Pollution of Stoney creek by 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.	21 (L)
Control of weeds and pests	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.	21 (L)
Cultural Heritage	There is a risk to Northern Mining Services from ::: Damage to Heritage listed buildings ::: Caused by: Lack of maintenance / up keep or Surface operations Resulting in: Loss of cultural heritage items.	21 (L)
Bushfire control	There is a risk to Northern Mining Services from ::: 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.	21 (L)
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from	21

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

Executive Summary of Top 10 Severities

Background	Potential Incident	MRC
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 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.	3
Vehicle Movements around colliery surface facilities - private vehicles, delivery trucks.	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.	4
Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from ::: Sedimentation of surrounding water ways in average weather conditions::: Caused by: Rain events Resulting in: Discharge of contaminates from site.	4
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: leaking oil polluting Stony creek::: Caused by: Leaks from the storage of hydrocarbons Resulting in: Discharge of contaminates from site.	4
Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: Hydrocarbon pollution of the land from compressors and diesel tank:::	4

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 ::: 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.	4
Storage of remaining Hydrocarbons and chemicals on site.	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.	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.	4
Disposal of Grey water	There is a risk to Northern Mining Services from ::: Pollution of Stoney creek by 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.	4
Control of weeds and pests	There is a risk to Northern Mining Services from ::: Increased risk of fire :::	4

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 ::: Damage to Heritage listed buildings ::: Caused by: Lack of maintenance / up keep or Surface operations Resulting in: Loss of cultural heritage items.	4
Bushfire control	There is a risk to Northern Mining Services from ::: 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.	4
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from ::: Subsidence impacting on surrounding water courses ::: Caused by: Failure of underground support/workings Resulting in: Damage to environment.	4
Subsidence and sinkholes from previous mining operations	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.	4
Subsidence and sinkholes from previous mining operations	There is a risk to Northern Mining Services from	4

Background	Potential Incident	MRC
	::: 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 ::: Damage to Aboriginal artifacts ::: Caused by: Clearing for rehabilitation acitvities Resulting in: Damage to reputation or Loss of cultural heritage items or Reportable offence.	4
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.	4
Underground mine workings	There is a risk to Northern Mining Services from ::: 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..	4
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:	4

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

Study Approval

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

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.

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.

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.

·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.

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.
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.

4a. Risk Assessment Boundary Definition

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

4b. Boundary Definition

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 Modes and Effects Analysis (FMEA)
	Hazard and Operability Analysis (HAZOP)

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

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

7. Information Required for Risk Assessment

Awaba Environment & Community RA 2010, 2011 & 2012

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				

9. Risk Assessment Team Selection

Name	Title	Company	Industry Start Date	Yrs. of Exp.	Mobile Phone #	E-Mail Address	Pulse User No.	Role	Attendance		
									1. 04-Mar-2014	2. 04-Mar-2014	3.
Veronica Warren	Environmental Coordinator	Northern Mining Services	06-Aug-2007	7	0428 438 792	veronica.warren@centennialcoal.com.au	160050	Facilitator	P	P	
Morgan Gleeson	Environmental and Community Graduate	Mannering Colliery	09-May-2011	3		morgan.gleeson@centennialcoal.com.au	100236		P	P	
Paul Williams	Regional Environmental Coordinator	Mannering Colliery Centennial Mandalong			0408965145 0408 965 145	paul.williams@centennialcoal.com.au	100028		A	P	
Grant Watson	Mine Manager	Northern Mining Services	02-Feb-1987	27	0438560227	grant.watson@centennialcoal.com.au	100027	Risk Assessment Owner	A	A	
Michael Blackeby	Compliance Manager	Northern Mining Services	01-Oct-1990	23	0406449752	michael.blackeby@centennialcoal.com.au	160001		P	P	

10. Scope Confirmation

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

WRAC Analysis Worksheet

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
1. Vehicle Movements around colliery surface 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 onsite	**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 onsite	**E** (D)	5 (E)	25 (L)		
2. Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from ::: Sedimentation of surrounding water	2.1.a. Pollution (sediment) dam 2.1.b. Sediment sumps and drive in sumps	**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.	

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

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Caused by: Significant oil spills Resulting in: Land contamination.						
	There is a risk to Northern Mining 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)	4. 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.	4.1.a. Mine is no longer operational 4.1.b. Transporation tank Inspected quarterly	**E** (D)	4 (E)	23 (L)		

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
5. Disposal of Grey water	There is a risk to Northern Mining Services from ::: Pollution of Stoney creek by 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.	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	There is a risk to Northern Mining Services from ::: Infestation and /or spread of declared weeds or pests onsite ::: 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)		
	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.	6.2.a. Daily electrical inspections 6.2.b. Annual weed and pest control 6.2.c. Monthly environmental inspection 6.2.d. Grounds maintenance (monthly)	**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)		

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 ::: 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.	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)		
9. Subsidence and sink holes from previous mining operations	There is a risk to Northern Mining Services from ::: Subsidence of land leading to injury to bush walkers/ general public ::: Caused by: Failure of underground support/workings Resulting in: Injury to persons.	9.1.a. Quarterly Inspections for 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	
	There is a risk to Northern Mining Services from ::: Subsidence impacting on surrounding water courses ::: Caused by: Failure of underground support/workings Resulting in:	9.2.a. Quarterly Inspections for 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.	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Damage to environment.						
	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 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)		
	There is a risk to Northern Mining Services from ::: 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.	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 ::: Airborne dust ::: Caused by: Rehabilitation activities Resulting in: Community complaint or exceedance of Project Approval conditions.	10.1.a. Sinkhole Rehabilitation Plan 10.1.b. Task specific training package for contractors	**D** (D)	5 (R)	24 (L)		
	There is a risk to Northern Mining Services from	10.2.a. Sinkhole Rehabilitation Plan 10.2.b. Task specific training package	**D** (D)	5 (E)	24 (L)		

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 earthmoving vehicle during operations ::: Caused by: Rehabilitation activities Resulting in: Damage to vehicles or Injury to persons or Legal action against the colliery.	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)		

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 ::: Damage to Aboriginal artifacts ::: Caused by: Clearing for rehabilitation acitvities Resulting in: Damage to reputation or Loss of cultural heritage items or Reportable offence.	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)		
	There is a risk to Northern Mining Services from ::: Impact on vulnerable and threatened plant species ::: Caused by: Clearing for rehabilitation acitvities Resulting in: Damage to reputation or Damage to vulnerable/threatened Flora & Fanuna.	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	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:	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	

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 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)		
	There is a risk to Northern Mining Services from ::: Contamination of ground water by discharge of surface water underground ::: Caused by: Transferring surface water underground Resulting in: Damage to environment or Ground water contamination.	11.3.a. Inspection program and maintenance of sumps and basins 11.3.b. Mine is no longer operational 11.3.c. Minimal operational vehicles movements onsite 11.3.d. Minimal storage onsite 11.3.e. Monthly environmental inspection	**D** (D)	5 (E)	24 (L)		
12. Maintenance of subsidence monitoring lines	There is a risk to Northern Mining Services from ::: Impact on vulnerable and threatened plant species ::: Caused by: Clearing for access and subsidence lines Resulting in: Damage to vulnerable/threatened Flora & Fanuna.	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)		

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	There is a risk to Northern Mining Services from ::: Impact on significant site or artefact ::: Caused by: Clearing for access and subsidence lines Resulting in: Damage to archaeological artifacts.	12.2.a. Minimal clearing as lines already established 12.2.b. Aboriginal cultural heritage management plant 12.2.c. Cultural heritage due diligence reports completed prior to commencing 12.2.d. SMPs 12.2.e. Cultural Heritage Management Plan	**D** (D)	5 (R)	24 (L)		
13. Underground mine workings	There is a risk to Northern Mining Services from ::: 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..	13.1.a. Mine workings full of water 13.1.b. Sinkhole Rehabilitation Plan 13.1.c. Mine is sealed	**E** (D)	4 (E)	23 (L)		
	There is a risk to Northern Mining Services from ::: Seepage of mine water to the surface ::: 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	13.2.a. Sinkhole Rehabilitation Plan 13.2.b. Monitoring of the seepage water	**A** (D)	3 (E)	6 (H)	8. Commission GHD to develop a strategy plan for the Awaba Colliery Seepage	

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 ::: Public disposing of waste at Awaba ::: Caused by: Unauthorised access to site by Public Resulting in: Hazarduous materials entering site or Non compliance with EPL 443.	14.1.a. Site locked up when no personnel onsite 14.1.b. Yates security inspections 14.1.c. Lighting 14.1.d. Site is fenced	**D** (D)	5 (BI)	24 (L)		
15. 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: Non compliance with EPL 443.	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 pumps to underground 15.1.g. Daily monitoring during discharge	**C** (D)	4 (L)	18 (M)	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.	
	There is a risk to Northern Mining Services from ::: Storm water contamination ::: Caused by: Inappropriate storage of contaminants Resulting in: Damage to environment or Discharge of contaminates from site.	15.2.a. Deliveries only occur in daytime hours 15.2.b. Grounds maintenance (monthly) 15.2.c. Mine is no longer operational 15.2.d. Minimal operational vehicles movements onsite 15.2.e. Minimal storage onsite 15.2.f. Monthly environmental inspection	**D** (D)	4 (E)	21 (L)		
16. Tranfer of waters	There is a risk to Northern Mining 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	**D** (D)	4 (L)	21 (L)		

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 Resulting in: Non compliance with EPL 443.	Awaba Colliery workings					
17. Surface Pit top impact on community	There is a risk to Northern Mining Services from ::: Noise impacts on Awaba community ::: Caused by: General operations Resulting in: Community complaint or exceedance of DECCW guidelines and INP.	17.1.a. Noise Management Plan 17.1.b. Mine is no longer operational 17.1.c. Noise monitoring conducted quarterly	**D** (D)	5 (R)	24 (L)		
	There is a risk to Northern Mining Services from ::: Visual pollution (incl lighting) ::: Caused by: General operations Resulting in: Community complaint.	17.2.a. Mine is no longer operational 17.2.b. No complaints regarding lighting to date 17.2.c. Visual screens (vegetation)	**E** (D)	5 (R)	25 (L)		
	There is a risk to Northern Mining Services from ::: Traffic on public roads ::: Caused by: General operations Resulting in: Community complaint or Vehicle collisions.	17.3.a. Minimal operational vehicles movements onsite 17.3.b. Mine is no longer operational 17.3.c. Signage	**D** (Op)	4 (PI)	21 (L)		
18. Site Security	There is a risk to Northern Mining Services from	18.1.a. Site locked up when no personnel onsite 18.1.b. Yates security inspections	**C** (D)	5 (F)	22 (L)		

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

WRAC Analysis Sorted by RR

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 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.	13.2.a. Sinkhole Rehabilitation Plan 13.2.b. Monitoring of the seepage water	**A** (D)	3 (E)	6 (H)	8. Commission GHD to develop a strategy plan for the Awaba Colliery Seepage
3. Storage of remaining Hydrocarbons and chemicals on site.	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)	4. Investigate decommissioning underground tanks and monitoring of contamination at Awaba Colliery
9. Subsidence and sink holes from previous mining operations	There is a risk to Northern Mining Services from ::: Subsidence impacting on surrounding water courses ::: Caused by: Failure of underground support/workings	9.2.a. Quarterly Inspections for 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.

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
2. Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from ::: 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	**C** (IF)	4 (L)	18 (M)	1. Schedule the monthly environmental inspection for Awaba in pulse.
		2.1.b. Sediment sumps and drive in sumps				2. Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff.
		2.1.c. Inspection program and maintenance of sumps and basins				3. 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				
15. 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	15.1.a. Water quality monitoring on surface discharge points	**C** (D)	4 (L)	18 (M)	3. Determine if sediment fencing is required around soil stockpile to reduce load on the PCD
		15.1.b. Monthly environmental inspection				2. Investigate rehabilitation or removal of soil on the stockpile area to reduce sediment runoff.
		15.1.c. Dams cleaned on a regular basis				
		15.1.d. Dams kept at low levels				
		15.1.e. CITECT alarm				

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Subsidence near boreholes Resulting in: Non compliance with EPL 443.	15.1.f. Primary and secondary pumps to underground 15.1.g. Daily monitoring during discharge				
1. Vehicle Movements around colliery surface facilities - private vehicles, delivery trucks.	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)	
3. Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: leaking oil polluting Stony creek ::: Caused by: Leaks from the storage of hydrocarbons Resulting in: Discharge of contaminates from site.	3.1.a. Mine is no longer operational 3.1.b. Monthly environmental inspection 3.1.c. Bunded storage areas 3.1.d. Pollution Control Dam 3.1.e. Minimal storage on site 3.1.f. Sediment sumps and drive in sumps	**D** (D)	4 (L)	21 (L)	
3. Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: Hydrocarbon pollution of the land from compressors and diesel tank ::: Caused by: Significant oil spills Resulting in: Land contamination.	3.2.a. Bunded storage areas 3.2.b. Monthly environmental inspection 3.2.c. Mine is no longer operational	**D** (D)	4 (E)	21 (L)	
3. Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: Hydrocarbon and/or chemical pollution of ground water from compressors and diesel tank :::	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)	

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	There is a risk to Northern Mining Services from ::: Pollution of Stoney creek by 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.	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	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.	6.2.a. Daily electrical inspections 6.2.b. Annual weed and pest control 6.2.c. Monthly environmental inspection 6.2.d. Grounds maintenance (monthly)	**D** (D)	4 (F)	21 (L)	
7. Cultural Heritage	There is a risk to Northern Mining Services from ::: Damage to Heritage listed buildings ::: Caused by: Lack of maintenance / up keep or Surface operations Resulting in: Loss of cultural heritage items.	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)	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
8. Bushfire control	There is a risk to Northern Mining Services from ::: 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.	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)	
9. Subsidence and sink holes from previous mining operations	There is a risk to Northern Mining Services from ::: 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.	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 ::: Damage to Aboriginal artifacts ::: Caused by: Clearing for rehabilitation acitvities Resulting in: Damage to reputation or Loss of cultural heritage items or Reportable offence.	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	There is a risk to Northern Mining Services from ::: Storm water contamination :::	15.2.a. Deliveries only occur in daytime hours 15.2.b. Grounds maintenance (monthly) 15.2.c. Mine is no longer	**D** (D)	4 (E)	21 (L)	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Caused by: Inappropriate storage of contaminants Resulting in: Damage to environment or Discharge of contaminates from site.	operational 15.2.d. Minimal operational vehicles movements onsite 15.2.e. Minimal storage onsite 15.2.f. Monthly environmental inspection				
16. Tranfer of waters	There is a risk to Northern Mining Services from ::: Unlicenced transfer of water ::: Caused by: Historic water management (10 South) or Pumping under emergency situations Resulting in: Non compliance with EPL 443.	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)	
17. Surface Pit top impact on community	There is a risk to Northern Mining Services from ::: Traffic on public roads ::: Caused by: General operations Resulting in: Community complaint or Vehicle collisions.	17.3.a. Minimal operational vehicles movements onsite 17.3.b. Mine is no longer operational 17.3.c. Signage	**D** (Op)	4 (PI)	21 (L)	
2. Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from ::: Airborne dust during windy conditions impacting on local receivers. ::: Caused by: Dry & windy weather conditions Resulting in: Community complaint or exceedance of Project Approval conditions.	2.2.a. Dust depositional gauges	**C** (D)	5 (L)	22 (L)	
10. Rehabilitation of	There is a risk to Northern Mining	10.5.a. Sinkhole Rehabilitation	**C**	5	22	

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 bond sign off.	Plan 10.5.b. Annual subsidence inspections for historical workings	(D)	(F)	(L)	
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from ::: Impact on vulnerable and threatened plant species ::: Caused by: Clearing for rehabilitation acitvities Resulting in: Damage to reputation or Damage to vulnerable/threatened Flora & Fanuna.	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 ::: 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)	
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 :::	4.1.a. Mine is no longer operational 4.1.b. Transporation tank Inspected quarterly	**E** (D)	4 (E)	23 (L)	

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.					
9. Subsidence and sink holes from previous mining operations	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 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	There is a risk to Northern Mining Services from ::: 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..	13.1.a. Mine workings full of water 13.1.b. Sinkhole Rehabilitation Plan 13.1.c. Mine is sealed	**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 onsite ::: Caused by: Lack of maintenance / up keep	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)	

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.					
9. Subsidence and sink holes from previous mining operations	There is a risk to Northern Mining Services from ::: Subsidence of land leading to injury to bush walkers/ general public ::: Caused by: Failure of underground support/workings Resulting in: Injury to persons.	9.1.a. Quarterly Inspections for 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
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from ::: Airborne dust ::: Caused by: Rehabilitation activities Resulting in: Community complaint or exceedance of Project Approval conditions.	10.1.a. Sinkhole Rehabilitation Plan 10.1.b. Task specific training package for contractors	**D** (D)	5 (R)	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	10.3.a. Sinkhole Rehabilitation Plan 10.3.b. Daily inspections of machinery 10.3.c. SWMS of contractors engaged	**D** (D)	5 (E)	24 (L)	

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	There is a risk to Northern Mining Services from ::: Public vehicle collides with earthmoving vehicle during operations ::: Caused by: Rehabilitation activities Resulting in: Damage to vehicles or Injury to persons or Legal action against the colliery.	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 Operations impacts on Land and ground water	There is a risk to Northern Mining Services from ::: Contamination of ground water by discharge of surface water underground ::: Caused by: Transferring surface water underground	11.3.a. Inspection program and maintenance of sumps and basins 11.3.b. Mine is no longer operational 11.3.c. Minimal operational vehicles movements onsite 11.3.d. Minimal storage onsite 11.3.e. Monthly environmental	**D** (D)	5 (E)	24 (L)	

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

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.					
1. Vehicle Movements around colliery surface 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 onsite	**E** (D)	5 (L)	25 (L)	
1. 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 onsite	**E** (D)	5 (E)	25 (L)	
17. Surface Pit top impact on community	There is a risk to Northern Mining Services from ::: Visual pollution (incl lighting) ::: Caused by: General operations Resulting in: Community complaint.	17.2.a. Mine is no longer operational 17.2.b. No complaints regarding lighting to date 17.2.c. Visual screens (vegetation)	**E** (D)	5 (R)	25 (L)	

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 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.	13.2.a. Sinkhole Rehabilitation Plan 13.2.b. Monitoring of the seepage water	**A** (D)	3 (E)	6 (H)	8. Commission GHD to develop a strategy plan for the Awaba Colliery Seepage
3. Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: Hydrocarbon pollution of the land from compressors and diesel tank::: Caused by: Significant oil spills Resulting in: Land contamination.	3.2.a. Bunded storage areas 3.2.b. Monthly environmental inspection 3.2.c. Mine is no longer operational	**D** (D)	4 (E)	21 (L)	
3. Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining 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:	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)	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Ground water contamination.					
3. Storage of remaining Hydrocarbons and chemicals on site.	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)	4. 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.	4.1.a. Mine is no longer operational 4.1.b. Transporation tank Inspected quarterly	**E** (D)	4 (E)	23 (L)	
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
13. Underground mine workings	There is a risk to Northern Mining Services from	13.1.a. Mine workings full of water 13.1.b. Sinkhole Rehabilitation Plan 13.1.c. Mine is sealed	**E** (D)	4 (E)	23 (L)	

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	There is a risk to Northern Mining Services from ::: Storm water contamination ::: Caused by: Inappropriate storage of contaminants Resulting in: Damage to environment or Discharge of contaminates from site.	15.2.a. Deliveries only occur in daytime hours 15.2.b. Grounds maintenance (monthly) 15.2.c. Mine is no longer operational 15.2.d. Minimal operational vehicles movements onsite 15.2.e. Minimal storage onsite 15.2.f. Monthly environmental inspection	**D** (D)	4 (E)	21 (L)	
6. Control of weeds and pests	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.	6.2.a. Daily electrical inspections 6.2.b. Annual weed and pest control 6.2.c. Monthly environmental inspection 6.2.d. Grounds maintenance (monthly)	**D** (D)	4 (F)	21 (L)	
8. Bushfire control	There is a risk to Northern Mining Services from ::: Fire impacting on surface facilities ::: Caused by: Inappropriate bushfire controls or Lack of maintenance or overgrowth of surrounding vegetation	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)	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Resulting in: Damage to buildings and infrastructure.					
9. Subsidence and sink holes from previous mining operations	There is a risk to Northern Mining Services from ::: Subsidence impacting on surrounding water courses ::: Caused by: Failure of underground support/workings Resulting in: Damage to environment.	9.2.a. Quarterly Inspections for 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.
9. Subsidence and sink holes from previous mining operations	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 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)	
1. Vehicle Movements around colliery surface facilities - private vehicles, delivery trucks.	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)	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
2. Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from ::: 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
3. Storage of remaining Hydrocarbons and chemicals on site.	There is a risk to Northern Mining Services from ::: leaking oil polluting Stony creek ::: Caused by: Leaks from the storage of hydrocarbons Resulting in: Discharge of contaminates from site.	3.1.a. Mine is no longer operational 3.1.b. Monthly environmental inspection 3.1.c. Bunded storage areas 3.1.d. Pollution Control Dam 3.1.e. Minimal storage onsite 3.1.f. Sediment sumps and drive in sumps	**D** (D)	4 (L)	21 (L)	
5. Disposal of Grey water	There is a risk to Northern Mining Services from ::: Pollution of Stoney creek by 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.	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)	
7. Cultural Heritage	There is a risk to Northern Mining Services from	7.1.a. Buildings still being utilised 7.1.b. Monthly environmental inspection	**D** (D)	4 (L)	21 (L)	

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	There is a risk to Northern Mining Services from ::: Damage to Aboriginal artifacts ::: Caused by: Clearing for rehabilitation acitvities Resulting in: Damage to reputation or Loss of cultural heritage items or Reportable offence.	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	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: Non compliance with EPL 443.	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 pumps to underground 15.1.g. Daily monitoring during discharge	**C** (D)	4 (L)	18 (M)	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	There is a risk to Northern Mining Services from ::: Unlicenced transfer of water ::: Caused by: Historic water management (10 South) or Pumping under emergency situations	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)	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Resulting in: Non compliance with EPL 443.					
9. Subsidence and sink holes from previous mining operations	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)	
17. Surface Pit top impact on community	There is a risk to Northern Mining Services from ::: Traffic on public roads ::: Caused by: General operations Resulting in: Community complaint or Vehicle collisions.	17.3.a. Minimal operational vehicles movements onsite 17.3.b. Mine is no longer operational 17.3.c. Signage	**D** (Op)	4 (PI)	21 (L)	
14. Disposal of waste	There is a risk to Northern Mining Services from ::: Public disposing of waste at Awaba ::: Caused by: Unauthorised access to site by Public Resulting in: Hazarduous materials entering site or Non compliance with EPL 443.	14.1.a. Site locked up when no personnel onsite 14.1.b. Yates security inspections 14.1.c. Lighting 14.1.d. Site is fenced	**D** (D)	5 (BI)	24 (L)	
1. Vehicle Movements around colliery surface facilities - private vehicles, delivery trucks.	There is a risk to Northern Mining Services from ::: Spillage of hydrocarbons from vehicle :::	1.3.a. RTA registered 1.3.b. Mine is no longer operational 1.3.c. Minimal operational vehicles movements onsite	**E** (D)	5 (E)	25 (L)	

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.					
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 ::: 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 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)	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
10. Rehabilitation of Subsidence cracks, "sink" holes and access tracks	There is a risk to Northern Mining Services from ::: Impact on vulnerable and threatened plant species ::: Caused by: Clearing for rehabilitation acitvities Resulting in: Damage to reputation or Damage to vulnerable/threatened Flora & Fanuna.	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	There is a risk to Northern Mining Services from ::: Contamination of ground water by discharge of surface water underground ::: Caused by: Transferring surface water underground Resulting in: Damage to environment or Ground water contamination.	11.3.a. Inspection program and maintenance of sumps and basins 11.3.b. Mine is no longer operational 11.3.c. Minimal operational vehicles movements onsite 11.3.d. Minimal storage onsite 11.3.e. Monthly environmental inspection	**D** (D)	5 (E)	24 (L)	
12. Maintenance of subsidence monitoring lines	There is a risk to Northern Mining Services from ::: Impact on vulnerable and threatened plant species ::: Caused by: Clearing for access and subsidence lines Resulting in: Damage to vulnerable/threatened Flora & Fanuna.	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 inspections for historical workings	**C** (D)	5 (F)	22 (L)	

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)	
1. Vehicle Movements around colliery surface 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 onsite	**E** (D)	5 (L)	25 (L)	
2. Storage of soil on surface Stockpiling area	There is a risk to Northern Mining Services from ::: Airborne dust during windy conditions impacting on local receivers. ::: Caused by: Dry & windy weather conditions Resulting in: Community complaint or exceedance of Project Approval conditions.	2.2.a. Dust depositional gauges	**C** (D)	5 (L)	22 (L)	

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)	
9. Subsidence and sink holes from previous mining operations	There is a risk to Northern Mining Services from ::: Subsidence of land leading to injury to bush walkers/ general public ::: Caused by: Failure of underground support/workings Resulting in: Injury to persons.	9.1.a. Quarterly Inspections for 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
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 ::: Caused by: Rehabilitation activities Resulting in: Damage to vehicles or Injury to persons or Legal action against the colliery.	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" holes and access tracks	There is a risk to Northern Mining Services from ::: Airborne dust ::: Caused by:	10.1.a. Sinkhole Rehabilitation Plan 10.1.b. Task specific training package for contractors	**D** (D)	5 (R)	24 (L)	

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

Recommended Controls

Recommended Controls Do NOT enter additional Recommended Controls on this sheet.	Place(s) Used	Allocated To (Only one SITE person for each Recommended Control)	Required By Date	Pulse User No.	PULSE Ref. No.
1. Schedule the monthly environmental inspection for Awaba in pulse.	Events: 2.1	Morgan Gleeson	30-May-2014	100236	28230.70797
2. 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
3. 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
4. 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
6. Commission contractor to commence rehabilitation work at Awaba Colliery sinkholes	Events: 9.2	Veronica Warren	02-Apr-2014	160050	28230.70802
7. Develop a schedule for rehabilitating sinkholes & subsidence cracks for Newstan & Awaba.	Events: 9.2	Morgan Gleeson	29-May-2014	100236	28230.70803
8. Commission GHD to develop a strategy plan for the Awaba Colliery Seepage	Events: 13.2	Veronica Warren	01-May-2014	160050	28230.70804

CEY Risk Matrix Page 1

RISK MANAGEMENT STANDARD **Management Standard-004**

CENTENNIAL RISK MATRIX							Likelihood					
							A Certain	B Probable	C Possible	D Remote	E Improbable	Description (D)
Rating	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.						Common"	Has Happened within Centennial"	"Could Happen & has happened in non-CEY operations	Not Likely	"Practically impossible	Probability (Pb)
	Impact to Annual Business Plan (F)	Personal Injury (PI)	Business Interruption (BI)	Legal (L)	Reputation (R)	Environment (E)	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)
							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)	

CEY Risk Matrix Page 2

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	L	Low	Monitor and manage by corrective action where practicable

CEY Risk Matrix Page 3

TYPE OF CONTROL	BOW TIE ANALYSIS - Control Effectiveness Matrix								
	Examples	Description	Rank	Control Category	CONTROL – Impact / Status / Quality				
					A >= 80%	B 50 – 80%	C 50 / 50%	D 50 – 20%	E <= 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
	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
	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

Centennial Coal

Ecological Monitoring of Riparian Vegetation along Stony Creek at Awaba

Awaba Colliery

February 2014

HUNTER ECO

Centennial Coal
Environment Matters

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.

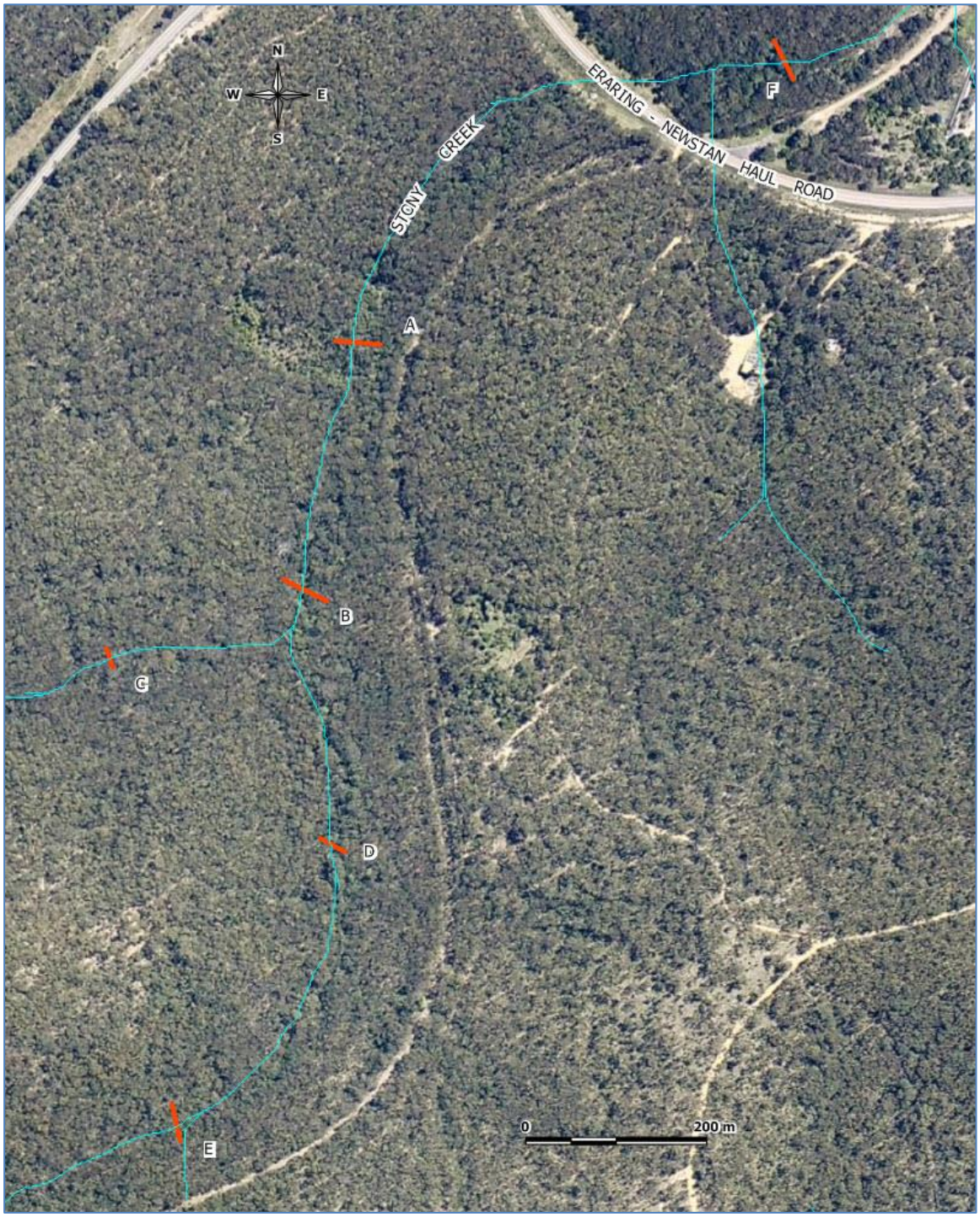


Figure 1 Showing the monitoring transects along Stony Creek

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* *Leptospermum 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***		

20m	*Corymbia gummifera* x2 *Entolasia stricta* *Leptospermum polygalifolium*		

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*		

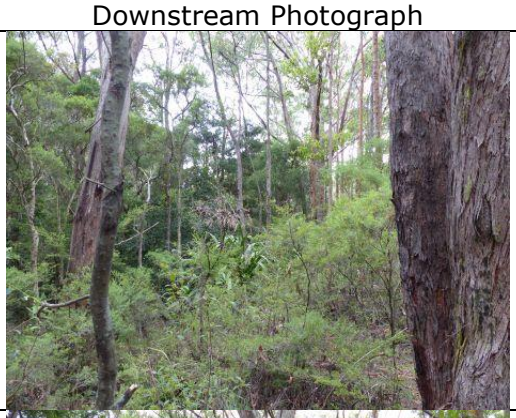
15m	*Melaleuca styphelioides* x2 *Carex appressa* *Dianella caerulea*		
20m	*Melaleuca styphelioides* *Eucalyptus piperita* *Gahnia clarkei* *Blechnum indicum*		
25m	*Melaleuca styphelioides* x2 *Gahnia clarkei* *Adiantum aethiopicum*		
30m	*Eucalyptus umbra* *Corymbia maculata* *Dodonaea triquetra* *Entolasia stricta*		

Transect E

Point	Floristics	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*		

20m	*Corymbia maculata* *Corymbia gummifera* *Dodonaea triquetra* *Callicoma serratifolia*		

Transect F

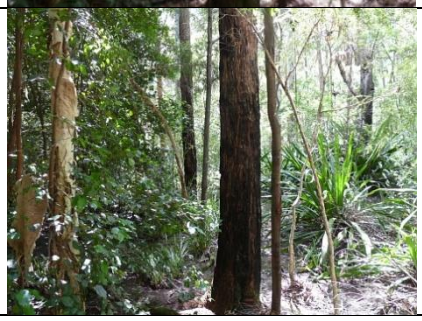
Point	Floristics	Downstream Photograph	Upstream Photograph
0m	*Eucalyptus piperita* *Angophora costata* *Leptospermum polygalifolium* *Acacia parramattensis*		
5m	*Eucalyptus umbra* *Angophora costata* *Leptospermum polygalifolium* *Banksia spinosa*		
10m	*Melaleuca linariifolia x2* *Melaleuca linariifolia* *Gahnia clarkei*		

15m	*Melaleuca linariifolia x2* *Callicoma serratifolia* *Acmena smithii*		
20m	*Eucalyptus umbra* *Melaleuca linariifolia* *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.

Transect, location & Year	**Downstream Photograph**	**Upstream Photograph**
Transect A Point 0m 2008		
Transect A Point 0m 2009		
Transect A Point 0m 2011		
Transect A Point 0m 2012		
Transect A Point 0m 2013		

Transect A Point 0m 2014		

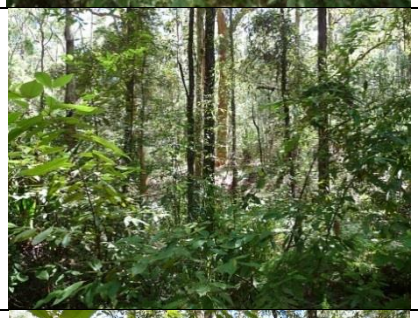
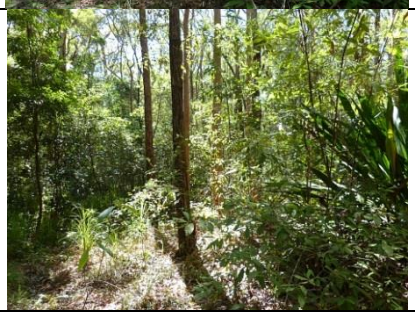
Transect, location & Year	**Downstream Photograph**	**Upstream Photograph**
Transect B Point 20m 2008		
Transect B Point 20m 2009		
Transect B Point 20m 2011		
Transect B Point 20m 2012		

Transect B Point 20m 2013		
Transect B Point 20m 2014		

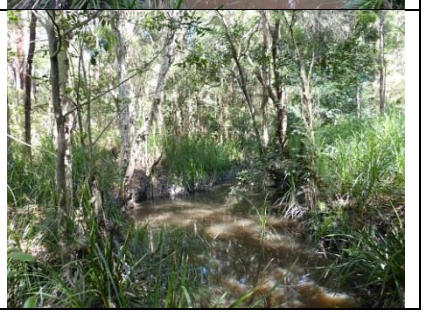
Transect, location & Year	**Downstream Photograph**	**Upstream Photograph**
Transect C Point 10m 2008		
Transect C Point 10m 2009		
Transect C Point 10m 2011		

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 E Point 5m 2014		

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		

Transect F Point 15m 2014		

Centennial Coal

Centennial Coal Company Limited
P O Box 1000
Toronto NSW 2283
www.centennialcoal.com.au

Centennial Coal
Environment Matters

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

Report Number: 6

Date: 28-03-2014

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
- DOPI – Department of Planning & Infrastructure
- Ausgrid
- RailCorp (Transport NSW),
- Mine Subsidence Board,
- Eraring Energy,
- Telstra
- Newstan (Awaba) Mine Manager,
- Newstan (Awaba) Environmental Coordinator.

General Comments:

- Approval to mine Stage 1 of Mine Subsidence Management Plan (MSMP) at Awaba Colliery was granted on 03/09/2007
- Stage 1 Mining completed on 26/06/2009.
- Stage 1 Monitoring variation from 3 to 6 monthly approved 28/06/2011.
- Stage 1 January and March 2014 resurveys recorded significant subsidence above Main South Crossline and part of 8NE centreline.
- Stage 1 Monitoring increased in active subsidence area until stable results are achieved.

- Approval to mine Stage 2 of MSMP at Awaba Colliery was granted on 29/08/2008
- Stage 2 Mining completed on 08/03/2012.
- Stage 2 Monitoring variation from 3 to 6 monthly approved 31/05/2013.

- Approval to mine MSMP 3 NORTH Area - Awaba Colliery was granted on 13/05/2009
- 3 North Mining completed on 25/01/2010.
- Subsidence monitoring in the 3 North Area is now completed.
- Monitoring points remain in place for future reference.

- Approval to mine Stage 3 of MSMP at Awaba Colliery was granted on 15/12/2010
- Stage 3 Mining Completed on 22/12/2011.
- Stage 3 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.

- Approval to mine MSMP East B Area at Awaba Colliery was granted on 27/07/2011
- East B Mining Completed on 21/12/2011.
- Subsidence monitoring in the East B Area is now completed.
- 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)	**Summary of Subsidence and Environmental Monitoring Results**	The Following subsidence surveys and inspections have been completed: ***Surface Surveys –*** All scheduled subsidence surveys completed at end of January 2014. Maximum subsidence in **2013 period** was in Main South Stage 1 - XL52 and XL53 (-154 mm in July), which was within 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. As of 31/03/2014, the maximum subsidence is at XL40 (-1112mm) on Main South Crossline in Stage 1. 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.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Visual Inspections found one case of surface impacts. This impact was a sinkhole in the Stage 3 area - 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. The relevant government authorities and stake holders were informed of this 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. A subsequent inspection in 2013 found evidence of the sinkhole reactivating. Further rehabilitation works are planned in 2014. ***Underground Surveys –*** All Awaba Mine entries (Drifts and Shafts) were sealed in August 2012 Underground workings are no longer accessible.
22 (b)	**Analysis of Subsidence and Environmental Monitoring Results**	Subsidence was within predicted levels in 2013. However the January and March Surveys of 2014 found greater than predicted subsidence in Main South Stage 1 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. A report has been prepared by a geotechnical consultant with regard to this event. The subsidence has had no adverse impact on surface infrastructure.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		Environmental impacts have been confined to the one sinkhole as described above. It is most likely linked to a significant rainfall event in November 2013 – and is scheduled for further rehabilitation during 2014.
22 (c)	**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 Area in January to March 2014.
22 (d)	**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 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 also distributed to relevant government agencies and stakeholders.

SMP Approval Condition No.	Requirement Summary	Comment / Description
		• A meeting between Centennial Newstan and PSE was held on 25/03/2014 to discuss the mechanics and management of this occurrence. • Monitoring frequency is being increased to provide further data until the area becomes stable; and to monitor any possible increased subsidence moving toward the rail corridor. • A report prepared by a geotechnical consultant with regard to this event was distributed to Railcorp and the PSE on 27/03/2014. • A meeting between Centennial Newstan, Railcorp and PSE is scheduled to be held on 02/04/2014 to review monitoring results, and discuss relevant management measures.

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