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Erosion and Sediment Control Management Plan

Rixs Creek Open Cut Coal Mine

March 2010

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1 INTRODUCTION

This Erosion and Sediment Control Plan (ESCP) has been compiled to ensure that Rixs Creek Pty Ltd, Rixs Creek Colliery (RXC) comply with Development Consent Conditions (DA 49/94) and achieve best practice erosion and sediment control management at the RXC open cut coal mine located in the Hunter Valley (refer to **Figure 1** in the Water Management Plan for Rixs Creek Open Cut Coal Mine (2010)).

Potential impacts resulting from altered surface water flows and increased erosion and sediment mobilisation from mining activities have been investigated in the Environmental Impact Statements (EIS) for RXC. The EIS's address the environmental issues associated with construction activities and mining.

This ESCP details the sediment and erosion control management practices that RXC will implement at RXC to mitigate potential impacts on land and water resources within and beyond the area disturbed by mining and its associated activities. These practices represent best practice management, in addition to other standard practices currently employed by RXC at the RXC site. Erosion control measures will be established and a monitoring program undertaken to ensure that surface waters are not affected beyond the criteria designated in the mine's Licence and Consent conditions. The results of this monitoring will be reported in the mine's Annual Environmental Management Report (AEMR).

This management plan has been prepared in consultation with the NSW Office of Water (NOW). Correspondence in relation to the preparation of the ESCP is attached as **Attachment A**.

2 OBJECTIVES

The objectives for Erosion and Sediment Control include:

- Minimise erosion and sedimentation of undisturbed land, watercourses and waterbodies; and
- Minimise topsoil loss from areas disturbed by mining activities.

3 EROSION AND SEDIMENT CONTROL CRITERIA AND GUIDELINES

All erosion and sediment control devices will be designed and constructed according to the guidelines *Managing Urban Stormwater: Soils and Construction – Volume 2E Mines and Quarries* (DECC NSW 2008). Recommendations from the *Draft Guidelines for Establishing Stable Drainage Lines on Rehabilitated Minesites* (DLWC, 1999) will also be incorporated.

The *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZECC, 2000) or the site specific impact criteria (where determined) will be used as a guide for the concentration of suspended particulate matter or turbidity released from the site.

4 EROSION AND SEDIMENT CONTROL MEASURES

4.1 Potential Impacts from Mining Operations

Substantial land disturbance has already occurred in the Hunter Valley from agriculture and previous mining activities. Further disturbance will result from the continuation of mining at RXC, which has the potential to alter existing surface water flow patterns. Activities that have the potential to cause erosion are:

- Vegetation clearing and topsoil stripping;
- Stockpiling of topsoil;
- Construction of roads and infrastructure; and
- Construction of overburden dumps.

Potential impacts from these activities include:

- Increased surface erosion from disturbed and rehabilitated areas through the removal of vegetation and stripping of topsoil;
- Increased sediment and pollutant load entering the natural water system; and
- Siltation or erosion of watercourses and waterbodies.

4.2 Control Measures

Through its Environmental Management System (EMS), RXC has established Environmental Standards and Procedures that will be followed during construction, operation and decommissioning of its mining operations at RXC.

4.2.1 Construction

Construction activities generally require the removal of vegetation and disturbance to the land surface. Some activities may also require fill to be imported to the construction site. Wherever possible fill from the local area will be used rather than fill from outside the area.

Prior to the disturbance of land, appropriate erosion and sediment controls will be established and approved by RXC's Environmental Officer at RXC. Erosion and sediment control measures that may be used include settling ponds, silt fences and hay bales. These will be consistent with *Managing Urban Stormwater: Soils and Construction – Volume 2E Mines and Quarries* (DECC NSW 2008).

Where practicable, runoff from undisturbed catchments will be diverted around the construction activities via diversion drains and banks which direct water into the natural watercourses. Runoff from disturbed areas will be retained on site in sediment dams and allowed to settle prior to discharge into the natural system. Drains, diversion banks and channels will be compacted and stabilised as they are constructed. Detailed construction control measures are presented in **Attachment B**.

4.2.2 Operations

Sediment and erosion control will be designed to ensure effective management of clean surface water and sediment laden runoff. Sediment mobilisation and erosion will be minimised by:

- Installing erosion and sediment controls prior to the disturbance of any land;
- Minimising the extent of disturbance to the extent that is practical;
- Reducing the rate of water flow across the ground particularly on exposed surfaces and in areas where water concentrates;
- Progressively rehabilitating disturbed land and constructing drainage controls to improve stability of rehabilitated land;
- Ripping of rehabilitation areas to promote infiltration;
- Protecting natural drainage lines and watercourses by constructing erosion control devices which include sediment retention dams and diversion banks and channels. Steep gradients will require the installation of a rock riprap, geotextile fabric sediment filters or other suitable measures; and
- Restricting access to rehabilitated areas.

The location of the erosion and sediment control structures for each site are described in **Table 4-1** and are shown on **Figure 10** in the main report (i.e. Water Management Plan for Rixs Creek Open Cut Coal Mine (2010)). Detailed operation control measures are presented in **Attachment C**.

Table 4-1 *Rixs Creek Erosion and Sediment Control Structures*

Current Maximum Dam Storage Capacities at RXC		
STORAGE NAME	**Spillway Volume (ML)**	**Storage Capacity (ML)**
North Pit Storage/Old North Cut (in-pit)	1000	1780
West Pit Storage Dam	N/A	33.5
Tailings Dam	2500	N/A
DWD1	N/A	28
DWD2	N/A	16
DWD4 (was CWD4)	N/A	335
Rail Loader	N/A	38
CWD1	N/A	10
CWD2	N/A	10
CWD6	N/A	75
Sediment Dam Pit 3 - East	N/A	10
Sediment Dam Pit 3 - West	N/A	10
Sediment Dam – North	N/A	10

N/A = Not available

4.2.3 Decommissioning

RXC will develop a detailed decommissioning plan for each pit prior to the final year of mining. Each mining pit will be rehabilitated in stages and sediment and erosion management controls modified where necessary on an ongoing basis. Sediment and erosion control devices will remain in place where necessary until rehabilitated surfaces are stable. Sediment dams will remain as farm dams to enhance the value of the resultant land for agricultural purposes and biodiversity value. Surface water will be diverted away from the final void. Control measures are presented in **Appendix C**.

5 Monitoring, Reporting And Performance Outcomes

5.1 Monitoring

The current RXC water monitoring program monitors upstream and downstream surface waters and key water storages at the site. All data is reviewed regularly as part of compliance procedures.

Monitoring includes real time weather monitoring, quarterly assessment of all erosion control and sediment retention devices and monthly and annual surface water quality monitoring. Sampling and analysis is undertaken in accordance with ANZECC 2000, Environmental Protection License 3391 and RXC Development Consent (DA 49/94). Records of desilting of sediment control structures are maintained includes the date desilting commenced. Monitoring control measures are presented in **Attachment E**.

5.2 Reporting and Performance Outcomes

Details of the monitoring program and the effectiveness of water management structures and sediment control devices are reported in the AEMR. Performance against the objectives of this ESCP will also be reported in the AEMR. These objectives will be achieved if:

- Measured water quality in waterways and waterbodies is within surface water trigger levels or acceptable limits;
- No active erosion is observable in rehabilitated areas
- No increase in erosion/siltation is observable in watercourses downstream of the mine; and
- Disturbance is restricted to areas shown in the *Mining Operation Plan (MOP)*.

Reporting control measures are presented in **Attachment F**.

ATTACHMENT A – AGENCY CONSULTATION

ATTACHMENT B – CONSTRUCTION CONTROL MEASURES

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
1. All Contractors must attend a RXC Induction prior to commencing work on-site. The induction will ensure an awareness and understanding of the erosion and sediment control objectives and incident response procedures.	RXC Mine Manager/ All new Contract staff to attend	Ongoing	As per RXC procedures
2. All major contracts will be required to undertake a Safety and Environmental Risk Assessment prior to commencing work on site. This will be done with a representative(s) of RXC and will be signed off by both the Contractor and RXC. Copies of the risk assessment will be kept by both RXC and the Contractor.	Contractor/ Environmental Officer	Prior to the commencement of work	As per RXC procedures
3. All sedimentation dams will be designed to control and treat runoff from a 1 in 20 year storm event.	Environmental Officer	On-going	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
4. All erosion and sediment control devices including dams, sediment fences and banks and channels will be consistent with *Managing Urban Stormwater: Soils and Construction – Volume 2E Mines and Quarries* (DECC NSW 2008). Recommendations from the *Draft Guidelines for Establishing Stable Drainage Lines on Rehabilitated Minesites* (DLWC, 1999) will also be incorporated	Environmental Officer	As required	As noted

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
5. Where practicable runoff from undisturbed catchments will be diverted around the construction areas via diversion drains and banks to discharge into natural watercourses.	Environmental Officer	As required	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
6. All runoff from disturbed areas will be diverted via perimeter channels and diversion drains into sediment retention dams before release into natural watercourses**.**	Environmental Officer	At all times	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
7. Sediment will be settled out before the treated runoff overflows/discharges into natural watercourses.	Environmental Officer	As required	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
8. Scour protection will be provided where runoff joins the natural drainage channel, as required.	Environmental Officer	As required	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
10. All surface water management structures will be inspected quarterly to ensure the integrity of the system is maintained. Silt fencing will be inspected weekly and after significant rainfall events.	Environmental Officer	Quarterly	As per RXC procedures
11. All sediment dams will be inspected quarterly to ensure they have at least 75% of their capacity available for runoff/sediment retention. Desilting will be undertaken as soon as practicable, with silt being disposed of to an area approved by RXC.	Environmental Officer	Quarterly	As per RXC procedures
12. Topsoil will be stockpiled for reuse and all stockpiles will be protected by temporary erosion control works.	Environmental Officer	As required	As per RXC procedures
13. The contractor will minimise the extent of clearing to that which is essential and will limit traffic to cleared areas by barriers and signage.	Environmental Officer	As required	As per RXC procedures
14. All erosion and sediment control measures will remain in place until exposed areas are rehabilitated and stabilised.	Environmental Officer	As required	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)

ATTACHMENT C - OPERATIONAL CONTROL MEASURES

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
1. All Contractors must attend a RXC Induction prior to commencing work on-site. The induction will ensure an awareness and understanding of the erosion and sediment control objectives and incident response procedures.	Mine Manager / All new Contract staff to attend	Ongoing	As per RXC procedures
2. All sedimentation dams will be designed to control and treat runoff from a 1 in 20 year storm event.	Environmental Officer	Ongoing	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
3. All surface drainage systems on rehabilitated areas will be designed to be consistent with *Guidelines for Establishing Stable Drainage Lines on Rehabilitated Minesites (Draft)* (DLWC 1999).	Environmental Officer	As Required	As noted
4. All erosion and sediment control devices including dams, sediment fences and banks and channels will be consistent with *Managing Urban Stormwater: Soils and Construction – Volume 2E Mines and Quarries* (DECC NSW 2008). Recommendations from the *Draft Guidelines for Establishing Stable Drainage Lines on Rehabilitated Minesites* (DLWC, 1999) will also be incorporated	Environmental Officer	As Required	As noted
5. Where practicable, runoff from undisturbed catchments will be diverted around the mine via diversion drains and banks to prevent erosion of cleared or rehabilitated areas.	Environmental Officer	Ongoing	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
6. All runoff from disturbed and rehabilitated areas will be diverted via contour banks and diversion drains into a system of sediment retention dams before release into natural watercourses.	Manager Technical Services/Manager Mining	Ongoing	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
7. Sediment will be allowed to settle out before the treated runoff overflows into natural watercourses.	Mine Manager	As required	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
8. Erosion control structures will be grassed to improve their stability, and scour protection will be provided where treated runoff joins the natural drainage channel.	Mine Manager	As Required	As per RXC procedures
9. The results of the water monitoring program and the effectiveness and performance of the soil and erosion control system will be reviewed regularly.	Environmental Officer	Monthly	As per RXC procedures
10. All surface water management structures will be inspected quarterly to ensure the integrity of the system is maintained. Silt fencing will be inspected weekly and after significant rainfall events.	Environmental Officer	Quarterly	As per RXC procedures
11. All sediment dams will be inspected quarterly to ensure they have at least 75% of their capacity available for sediment retention. Desilting will be undertaken as soon as practicable, with silt being disposed of to an area approved by RXC.	Environmental Officer	Quarterly	As per RXC procedures

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
12. Progressive rehabilitation of mined areas will be undertaken as soon as possible. Reshaped areas awaiting revegetation will be cultivated on the contour to maximise infiltration.	Mine Manager / Environmental Officer	As Required	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
13. Topsoil will be stockpiled for reuse and all stockpiles will be protected by temporary erosion control works such as bunding, silt fences and hay bales.	Mine Manager / Environmental Officer	As required	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
14. The extent of clearing will be restricted to that which is essential and access to all cleared areas will be controlled.	Mine Manager	As required	As per RXC procedures
15. All erosion control and sediment control measures will remain in place until exposed areas are rehabilitated and stabilised.	Mine Manager	As required	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)

ATTACHMENT D - DECOMMISSIONING CONTROL MEASURES

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
1. All Contractors must attend a RXC Induction prior to commencing work on-site. The induction will ensure an awareness and understanding of the erosion and sediment control objectives and incident response procedures.	Environmental Officer to co-ordinate All Contract staff to attend	Ongoing	As per RXC procedures
2. All major contracts will be required to undertake a Safety and Environmental Risk Assessment prior to commencing work on site. This will be done with a representative(s) of RXC and will be signed off by both the Contractor and RXC. Copies of the risk assessment will be kept by both RXC and the Contractor.	Contractor/ Mine Manager	Prior to the commencement of work	As per RXC procedures
3. All contractors will abide by all appropriate Control Measures outlined in **Appendices B and C**.	Contractor	As required	As noted
5. Runoff from undisturbed areas will continue to be diverted around disturbed areas until rehabilitation works are completed.	Environmental Officer	Ongoing	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
6. Runoff from disturbed areas will continue to be diverted into sediment retention dams until the disturbed areas are stabilised. Once stabilised, sediment dams may remain as farm dams to enhance the value of the land for agriculture.	Environmental Officer	Ongoing	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
7. Erosion and sediment control structures will remain in place to divert water away from the final void.	Environmental Officer	At all times	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)
8. Rehabilitation measures including water management structures will be regularly checked to determine their integrity and effectiveness.	Environmental Officer	Monthly	Managing Urban Stormwater: Soils and Construction – V2E Mines and Quarries V.1 (2008)

ATTACHMENT E - MONITORING CONTROL MEASURES

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
1. Monitoring of weather conditions, including but not limited to rainfall, wind speed and direction and temperature will be undertaken at a weather station	Environmental Officer	Ongoing	As per RXC procedures
2. Monitoring of water quality from sedimentation dams will be undertaken during overflow events. This will include measurement of suspended solids, pH and EC or as required by EPA Licence Conditions.	Environmental Officer	As required until a consistent data set is developed	RXC EPL 3391
3. All sediment dams will be inspected quarterly to ensure they have at least 75% of their capacity available for sediment retention. Desilting will be undertaken as soon as practicable, with silt being disposed of to an area approved by RXC. Details will be recorded on inspection logs.	Environmental Officer	Quarterly	As per RXC procedures
4. Visual inspection of sediment and erosion control safeguards (dams, sediment traps, contour banks, channels and diversions, silts fences and hay bales) will be undertaken quarterly and after periods of heavy rainfall to ensure their structural integrity. Excess sediment will be removed from banks and drains.	Environmental Officer	Quarterly	As per RXC procedures
5. The results of the water monitoring program and the effectiveness of sediment and erosion management will be reported in the AEMR.	Environmental Officer	Annually	As per RXC procedures

ATTACHMENT F- REPORTING CONTROL MEASURES

CONTROL MEASURE	RESPONSIBILITY	TIMING/ FREQUENCY	RELEVANT PROCEDURE
1. Erosion and sediment monitoring results, reviews of performance and responses will be reported through RXC internal performance measurement process.	Environmental Officer	As required	As per RXC procedures
2. The results of the erosion and sediment monitoring program will be reported in the AEMR.	Environmental Officer	Annually	As per RXC procedures
3. Details will be included in the AEMR of any remedial measures undertaken to correct situations where erosion or heavy sediment deposition has occurred.	Environmental Officer	Annually	As per RXC procedures

APPENDIX D

Management Plan- Copy of Approval DPE

NSW GOVERNMENT | Planning & Infrastructure

Contact: Scott Brooks
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Our ref: DA 49/94

Mr John Hindmarsh
Environmental Officer
Rix's Creek Pty Limited
PO Box 4
EAST MAITLAND NSW 2323

Dear John

Rix's Ck – Approval of Management Plans

Thank you for forwarding a number of management plans for review as required by your mine Approval DA 49/94. We have reviewed the following management plans.

Traffic Management Plan (Condition 9, Schedule 2);
Water Management Plan (Condition 15, Schedule 2);
Erosion and Sediment Control Plan (Condition 15a, Schedule 2);
Landscape Management Plan (Condition 16, Schedule 2), this includes;
- Rehabilitation Management Plan (Condition 16b, Schedule 2);
- Final Void Management Plan (Condition 16c, Schedule 2);
- Mine Closure Plan (Condition 16d, Schedule 2).

The Department has reviewed the management plans identified above and can advise they have been approved by the Director General.

Accordingly, the Department requests that a copy of the management plans marked "final" are forwarded to the Singleton office, by the end of January 2014, as a soft copy for our records.

If you require further information please contact Ann Hagerthy on 6575 3403 or by email to ann.hagerthy@planning.nsw.gov.au.

Yours sincerely

Scott Brooks
Team Leader Compliance
2-1-2014
As nominee for the Director-General