

**Pre-Project
Risk Assessment Register**

Dyadem Stature for Risk Management:

Risk Assessment Title: Bore 7 and 8 Project Approval

Version: 1

Region: West

Site: Springvale UG

Department: Surface

Equipment / Process: Process

Stature Risk Assessment No.: 1000218001

Study Lifecycle State: Risk Assessment In Progress

Potential Hazard No.:

PULSE Actions Required URL:

Site Risk Assessment Ref. No. (Optional):

Springvale Coal is seeking to prepare an Environmental Assessment (EA) to support an application for a Modification of the current development consent under the NSW *Environmental Planning and Assessment Act 1979* (**EP&A Act**). This modification (**The Project**) includes the construction and operation of additional surface mine dewatering facilities (Bores 7 and 8).

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 key objectives of the risk assessment are:

To identify, assess and prioritise environmental and community issues associated with the project to ensure they are assessed to an appropriate level within the environmental assessment process.

To identify any potential knowledge gaps requiring further assessment in the EA.

The following aspects will be assessed:

Tenure and land ownership
Ecology
Cultural Heritage
Noise
Traffic and transport
Air quality
Surface water (erosion and sediment control)
Groundwater
Greenhouse gas
Visual amenity
Landuse/land capability
Rehabilitation and closure
Community impacts
Bushfire
Waste management

The risk assessment will cover potential risks associated with the construction and operation of additional dewatering bores. Two facility footprints of 120m x 120m each will be assessed, in addition to a total of 5,110m of access track and power/pipe alignment. This equates to a total assessment area of 33.54ha, however it is expected that the actual area of initial disturbance will be limited to an area of approximately 10ha (of which approximately 2.5ha is pre-existing access track or forest fire trail).

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

Document Name	Title	Version	Referenced Document Date
Project Description	Springvale Mine Dewatering Bore 8 Project Description	1	11-Aug-2011
Scope of Work	Springvale Mine Dewatering Bore Principal Consultant Scope of Work	1	01-Sep-2011

Date	Description	Location	Start Time	End Time	Comment
1. 16-Nov-2011	Scoping	Springvale Boardroom	12:00 PM	2:00 PM	
2. 17-Nov-2011	Assessment	Springvale Boardroom	9:00 AM	3:00 PM	
3.	Review				

Name	Title	Company	Industry Start Date	Yrs. of Exp.	Mobile Phone #	E-Mail Address	Pulse User No.	Role	Attendance		
									1. 16-Nov-2011	2. 17-Nov-2011	3.
Tony King	Environmental Coordinator	Springvale Mine UG Operation	05-Apr-1988	24		Tony.King@centennialcoal.com.au	140109				
Andrew Hutton	Facilitator	GSSE	27-Jan-1996	16	0409 288 909	hutton@gssenvironmental.com					
Nicole Armit	Facilitator	GSSE	24-Jan-2000	12	0407910841	armit@gssenvironmental.com					
Rebecca Pagan	Forester	Forests NSW	17-Jan-2006	6		rebecca.pagan@sf.nsw.gov.au					
Paul Rutzou	Senior Geologist	Springvale Mine UG Operation	20-Feb-2000	12	0428 668 069	paul.rutzou@centennialcoal.com.au	140077				
Tom Hollis	Graduate Environmental Officer	Centennial Coal	16-Jan-2011	1		tom.hollis@centennialcoal.com.au					
John Swane	Manager of Mechanical Engineering	Springvale Mine UG Operation	12-Nov-1974	37	0419 501655	john.swane@centennialcoal.com.au	140069				
Edwina White	Regional Environment Manager	Centennial Coal									
Rod Banks	Electrical Superintendent	Springvale Mine UG Operation	16-Aug-2004	7	0407 580349	Rod.Banks@centennialcoal.com.au	140111				
Sophie Whittaker	Environmental Scientist	GSSE	17-Apr-2009	3	0411788127	whittaker@gssenvironmental.com					
James Tomlin (by phone)	Hydrogeologist	AGE									

Approver	Scope Confirmation	Date	Comments
1. Richard Gelson	Yes	November 16, 2011	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
1. Land Tenure/ownership	There is a risk to Springvale UG from ::: Failure to achieve an occupation permit from Forests NSW ::: Caused by: Inadequate consultation and communication Resulting in: Failure to meet project timelines.	1.1.a. Existing occupation permit in place.	D (Pb)	3 (F)	17 (M)	2. Forests NSW require spatial information and Project Approval from DP&I.	
		1.1.b. Consultation with Forests NSW and existing relationship				3. Finalise stakeholder engagement strategy for the Project	
	There is a risk to Springvale UG from ::: Failure to identify native title ::: Caused by: Inadequate assessment of title over project area Resulting in: Failure to meet project timeframes and increased costs to the project associated with negotiations.	1.2.a. Engaged specialist archaeologists to undertake assessment.	D (Pb)	3 (F)	17 (M)	3. Finalise stakeholder engagement strategy for the Project	
		1.2.b. Corporate awareness of issues.					
		1.2.c. Six-monthly meetings held with the Gundungarra					
		1.2.d. Existing agreements					
		1.2.e. Consultation has commenced in accordance with the ACHCRs					
	There is a risk to Springvale UG from ::: Failure to identify crown roads within project area ::: Caused by: Inadequate assessment of project area Resulting in: Failure to meet project timelines.	1.3.a. Cadastre layers are available	E (Pb)	4 (F)	23 (L)	1. Confirm presence of crown roads in project area - source cadastre layers if required from Land and Property Management Authority.	
	There is a risk to Springvale UG from ::: Restricted access to the borehole site ::: Caused by: Change in tenure over the Project Area (from State Forest to State Conservation Area) Resulting in: Significant restriction to proposed operations.	1.4.a. Corporate awareness of potential change in land tenure	C (D)	3 (F)	13 (S)	4. Investigate possibility of obtaining an MPL over project area following granting of Project Approval from DP&I.	
		1.4.b. Existing relationship with Forests NSW				5. Include consultation with DPI (titles) in stakeholder consultation strategy	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
2. Ecology	There is a risk to Springvale UG from ::: NSW and/or federally listed endangered species found within project area ::: Caused by: Location of the project area (bore hole and infrastructure corridor) Resulting in: Delay to project approval due to referral process or failure to obtain approval.	2.1.a. Specialist consultant has been engaged to undertake ecological assessment	C (Pb)	3 (F)	13 (S)	24. Review the project layout to minimise any interactions with endangered/listed species	
		2.1.b. Surveys undertaken with sufficient lead time				25. Undertake a review of the preliminary outcomes of the ecology assessment prior to the end of 2011 to understand the impacts on the project layout	
		2.1.c. Good understanding of the ecology of the area due to previous projects					
		2.1.d. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed)					
	There is a risk to Springvale UG from ::: NSW and/or federally listed endangered species found within project areas ::: Caused by: Location of the project area (bore hole and infrastructure corridor) Resulting in: The need to establish substantial offsets.	2.2.a. Specialist consultant has been engaged to undertake ecological assessment	D (Pb)	3 (F)	17 (M)	25. Undertake a review of the preliminary outcomes of the ecology assessment prior to the end of 2011 to understand the impacts on the project layout	
		2.2.b. Surveys undertaken with sufficient lead time				26. If offsets are required; discuss with CEY whether any offset opportunities are available (at what ratio).	
		2.2.c. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed)					
	There is a risk to Springvale UG from ::: Failure to identify all endangered/threatened species within project area ::: Caused by: Inadequate survey effort Resulting in: Failure to obtain workable approval.	2.3.a. Specialist consultant has been engaged to undertake ecological assessment	E (Pb)	3 (F)	20 (L)		
		2.3.b. Good understanding of the ecology of the area due to previous projects					
		2.3.c. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed)					
3. Traffic and transport	There is a risk to Springvale UG from ::: Temporary increase in traffic into project area ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor	3.1.a. Existing traffic management plan for operations on the Newnes Plateau	D (Pb)	4 (R)	21 (L)	6. Notify Forests NSW when drill rigs are to be moved into project area.	
		3.1.b. Existing relationship with Forests NSW (Western region) regarding track maintenance				7. Review and update existing traffic management plan. Include commitment to abide by Forests NSW traffic management procedures i.e.: two way radio contact on entering area.	
		3.2.b. No change to coal clearance					

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Resulting in: Damage to local roads or unacceptable impacts on current forestry operations and the local community.	system (overland coal conveyor) proposed					
4. Noise	There is a risk to Springvale UG from ::: Exceedance of noise criteria at the nearest sensitive receptors ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: Onerous development consent conditions imposed or potential impacts on local community.	4.3.a. No sensitive receptors in vicinity of new bore site. Nearest receptors are approximately 9 km away. 4.3.b. Short term construction duration. 4.3.c. Noise levels limited by OH&S noise limits	D (D)	5 (R)	24 (L)	19. Construction noise to be included in Noise Assessment.	
5. Aboriginal and European heritage	There is a risk to Springvale UG from ::: Unavoidable impact to known or unknown Aboriginal / European sites ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: A change to the preferred project layout, e.g.: alignment of infrastructure corridor and/or bore.	5.1.a. Specialist consultant has been engaged 5.1.b. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed) 5.1.c. Stakeholder engagement strategy 5.1.d. Consultation has commenced in accordance with the ACHCRs 5.1.e. Six-monthly meetings held with the Gundungarra	D (Pb)	3 (F)	17 (M)	27. Review the project layout to minimise any interactions with the known Aboriginal sites (following survey) - complete by the end of Jan 2012.	
	There is a risk to Springvale UG from ::: Failure to obtain community support ::: Caused by: Inadequate consultation / impacts Resulting in: Failure to obtain approval.	5.2.a. Specialist consultant has been engaged 5.2.b. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed) 5.2.c. Stakeholder engagement strategy 5.2.d. Six-monthly meetings held with the Gundungarra 5.2.e. Consultation has commenced in accordance with the	D (Pb)	3 (F)	17 (M)	28. Confirm that the scope of works for RPS includes consideration for European heritage.	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
		ACHCRs					
6. Air Quality	There is a risk to Springvale UG from ::: Exceeding Air Quality Criteria ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: Onerous development consent conditions imposed.	6.1.a. Watercart	E (D)	5 (E)	25 (L)	21. Construction Management Plan	
		6.1.b. Availability of water in the area				22. Engage specialist consultant to undertake Air Quality Assessment	
		6.1.c. Short term construction duration.					
	There is a risk to Springvale UG from ::: Exceeding Air Quality Criteria ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: Unacceptable impacts on the community.	6.2.a. Availability of water in the area	D (D)	5 (R)	24 (L)	21. Construction Management Plan	
		6.2.b. Short term construction duration.				22. Engage specialist consultant to undertake Air Quality Assessment	
		6.2.c. Watercart					
		6.4.b. No changes proposed to coal clearance system and stockpiles.					
7. Surface Water	There is a risk to Springvale UG from ::: Discharge of sediment laden water from the bore hole site ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor (civil works) Resulting in: Unacceptable impacts on the environment.	7.1.a. Known industry guidelines for sediment control	D (Pb)	4 (E)	21 (L)	11. Inspection regime during construction	
		7.1.b. Conditions relating to erosion and sediment control within Occupation Permit				12. Document erosion and sediment controls, include in commitment in EA	
	There is a risk to Springvale UG from ::: Discharge of sediment laden water from the bore hole site ::: Caused by: Drilling activities (boreholes only) Resulting in:	7.2.a. Previous experience	D (Pb)	4 (E)	21 (L)	16. Develop a sump management procedure, including possibility of installing pipeline to take water from sumps to bore 5	
		7.2.b. Drilling sump design review undertaken by Aurecon					
		7.2.c. Known existing industry guidelines for sediment control					
		7.2.d. Allowing for larger drill pad for increased sump capacity					

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Unacceptable impacts on the environment.						
8. Ground Water	There is a risk to Springvale UG from ::: Failure to meet dewatering expectations ::: Caused by: Inadequate assessment and update of the groundwater model Resulting in: Interruption to production.	8.1.a. Existing groundwater model 8.1.b. Groundwater monitoring network	D (D)	3 (BI)	17 (M)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.	
	There is a risk to Springvale UG from ::: Unacceptable impacts on the regional groundwater system (other users) ::: Caused by: Inadequate assessment and update of the groundwater model Resulting in: Community opposition to the project or Failure to obtain approval.	8.2.a. No other known significant users	D (D)	4 (R)	21 (L)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.	
						14. Conduct bore licence search to confirm presence of regional groundwater users	
	There is a risk to Springvale UG from ::: Unacceptable impacts on the regional groundwater dependant ecosystems (hanging swamps). ::: Caused by: Inadequate assessment and update of the groundwater model Resulting in: Failure to obtain approval or the need to establish substantial offsets.	8.3.a. Extensive monitoring system in place. 8.3.b. Good understanding of interactions between surface aquifers and groundwater dependant ecosystems 8.3.c. Good understanding of long-term impacts of mining on groundwater dependant ecosystems 8.3.d. New dewatering bore will be fully lined and grouted, therefore no direct connectivity	D (Pb)	4 (E)	21 (L)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.	
	There is a risk to Springvale UG from ::: Unacceptable impacts on the regional groundwater dependant ecosystems (hanging swamps). :::	8.4.a. Stakeholder engagement strategy 8.4.b. Extensive groundwater monitoring network	B (Pb)	4 (R)	14 (S)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.	
						3. Finalise stakeholder engagement strategy for the Project	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Caused by: Inadequate assessment and update of the groundwater model Resulting in: Community opposition to the project.						
	There is a risk to Springvale UG from ::: Inability to transfer existing bore licence allocation to new facility ::: Caused by: Change in legislation from Water Act 1912 to Water Management Act 2000 Resulting in: Failure to meet project timelines.	8.5.a. Relationship with the NSW Office of Water 8.5.b. Understanding of legislation changes	D (D)	2 (BI)	12 (S)	3. Finalise stakeholder engagement strategy for the Project 15. Engage and consult with the NSW Office of Water regarding transfer of water allocation	
	There is a risk to Springvale UG from ::: New groundwater model indicates substantial increase in water make requiring an increase in volume allocation ::: Caused by: Review and update of groundwater model Resulting in: Need to seek new increased licence allocation.	8.6.a. Existing groundwater model 8.6.b. Spare capacity within existing licence allocation 8.6.c. Trend analysis	D (D)	4 (F)	21 (L)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.	
9. Greenhouse Gas	There is a risk to Springvale UG from ::: Greater than expected GHG emissions ::: Caused by: Increase release of gas due to construction and installation of bore and associated infrastructure. Resulting in: Community opposition to the project.	9.1.a. Current NGERs reporting 9.1.b. Stakeholder engagement strategy 9.1.c. Corporate awareness of issues.	D (Pb)	5 (R)	24 (L)	29. Engage specialist consultant to undertake a GHG assessment and provide advice on mitigation options	
10. Visual Amenity	There is a risk to Springvale UG from ::: Unacceptable impact on the visual amenity of the area :::	10.1.a. No sensitive receptors in vicinity of new bore site. Nearest receptors are approximately 9 km away.	D (Pb)	5 (R)	24 (L)		

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Caused by: Construction and installation of bore and associated infrastructure Resulting in: Onerous development consent conditions imposed.	10.1.b. Site located in the forest away from residential areas 10.1.c. Minor temporary buildings and infrastructure which are coloured to blend into the surroundings					
11. Land Use / Land Capability	There is a risk to Springvale UG from ::: Current land use compromised (Ag land, etc) ::: Caused by: Construction and installation of bore and associated infrastructure Resulting in: Onerous development consent conditions imposed.	11.1.a. Site currently used as a State Forest, it is not suitable for agriculture 11.1.b. Bore is temporary and rehabilitation commitments are to return the site to as similar to the previous land use as possible 11.1.c. Centennial have experience in rehabilitation of drilling and bore hole sites on the plateau	D (Pb)	5 (E)	24 (L)		
12. Bushfire	There is a risk to Springvale UG from ::: Bushfire ::: Caused by: Construction, installation and operation of bore and associated infrastructure Resulting in: Damage to the company's reputation or impact on local community / environment.	12.1.a. Bushfire management plan 12.1.b. Hot work permit system 12.1.c. Guidelines from Forests NSW regarding bushfire preparedness 12.1.d. Fire fighting capabilities will be installed at dewatering site, including water fill points. 12.1.e. Fire fighting capabilities at existing dewatering bores, as well as dams for fire fighting. 12.1.f. Previous experience and safety record - no bushfire related incidents to date	D (Pb)	4 (R)	21 (L)	8. Confirm required asset protection zone around infrastructure. 9. Confirm assessments (ecology and archaeology) cover required asset protection zone as soon as possible.	
	There is a risk to Springvale UG from ::: Damage or loss of dewatering infrastructure ::: Caused by: Bushfire in the vicinity (not started by project) or hazard reduction burn by Forests NSW Resulting in:	12.2.a. Notification from Forests NSW on high risk days which limits activities that can be undertaken. 12.2.b. Bushfire management plan. 12.2.c. Fire fighting capabilities will be installed at dewatering sites, including water fill points. 12.2.d. Fire fighting capabilities at	D (IF)	2 (BI)	12 (S)	8. Confirm required asset protection zone around infrastructure. 10. Supply spatial information to Forest NSW detailing location of infrastructure on a regular basis (six monthly) and as part of EA process.	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control	Bow Tie Extension
	Financial loss (reinstallation of infrastructure and loss of production) or inability to dewater the pit.	existing dewatering bores, as well as dams for fire fighting.					
		12.2.e. Contractor management plan, includes requirement to have EPERB and satellite phone on site					
13. Waste Management general/recyclable - (to include bore hole cuttings)	There is a risk to Springvale UG from ::: Inadequate management of waste material during construction and operation ::: Caused by: waste generated during construction Resulting in: Impact on local community / environment.	13.1.a. Management of cuttings from existing dewatering bores	C (Pb)	4 (E)	18 (M)	17. Construction management plan to address management of drill cuttings.	
14. Rehabilitation and closure	There is a risk to Springvale UG from ::: Failure to adequately rehabilitate the site once no longer required ::: Caused by: Inadequate rehabilitation effort Resulting in: Damage to the company's reputation.	14.1.a. Bore is temporary and rehabilitation commitments are to return the site to as similar to the previous land use as possible 14.1.b. Centennial have experience in rehabilitation of drilling and bore hole sites on the plateau 14.1.c. Stakeholder engagement strategy	D (Pb)	4 (R)	21 (L)		
15. Community identification and engagement	There is a risk to Springvale UG from ::: Vocal community opposition (e.g. active NGOs) ::: Caused by: Inadequate identification and engagement of the appropriate stakeholders Resulting in: Damage to the company's reputation or failure to obtain approval.	15.1.a. Stakeholder engagement strategy 15.1.b. Active engagement strategy already in place (regular scheduled meetings)	B (Pb)	5 (R)	19 (M)	31. Ensure stakeholder engagement plan is executed	

Risk Register in Order of Risk Ranking

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
8. Ground Water	There is a risk to Springvale UG from ::: Inability to transfer existing bore licence allocation to new facility ::: Caused by: Change in legislation from Water Act 1912 to Water Management Act 2000 Resulting in: Failure to meet project timelines.	8.5.a. Relationship with the NSW Office of Water 8.5.b. Understanding of legislation changes	D (D)	2 (BI)	12 (S)	3. Finalise stakeholder engagement strategy for the Project 15. Engage and consult with the NSW Office of Water regarding transfer of water allocation
12. Bushfire	There is a risk to Springvale UG from ::: Damage or loss of dewatering infrastructure ::: Caused by: Bushfire in the vicinity (not started by project) or Hazard reduction burn by Forests NSW Resulting in: Financial loss (reinstallation of infrastructure and loss of production) or inability to dewater the pit.	12.2.a. Notification from Forests NSW on high risk days which limits activities that can be undertaken. 12.2.b. Bushfire management plan. 12.2.c. Fire fighting capabilities will be installed at dewatering sites, including water fill points. 12.2.d. Fire fighting capabilities at existing dewatering bores, as well as dams for fire fighting. 12.2.e. Contractor management plan, includes requirement to have EPERB and satellite phone on site	D (IF)	2 (BI)	12 (S)	8. Confirm required asset protection zone around infrastructure. 10. Supply spatial information to Forest NSW detailing location of infrastructure on a regular basis (six monthly) and as part of EA process.
1. Land Tenure/ownership	There is a risk to Springvale UG from ::: That access is restricted to the borehole site ::: Caused by: Change in tenure over the Project Area (from State Forest to State Conservation Area) Resulting in: Significant restriction to proposed operations.	1.4.a. Corporate awareness of potential change in land tenure 1.4.b. Existing relationship with Forests NSW	C (D)	3 (F)	13 (S)	4. Investigate possibility of obtaining an MPL over project area following granting of Project Approval from DP&I. 5. Include consultation with DPI (titles) in stakeholder consultation strategy
2. Ecology	There is a risk to Springvale UG from ::: NSW and/or federally listed	2.1.a. Specialist consultant has been engaged to undertake ecological assessment	C (Pb)	3 (F)	13 (S)	24. Review the project layout to minimise any interactions with endangered/listed species

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	endangered species found within project areas ::: Caused by: Location of the project area (bore hole and infrastructure corridor) Resulting in: Delay to project approval due to referral process or failure to obtain approval.	2.1.b. Surveys undertaken with sufficient lead time 2.1.c. Good understanding of the ecology of the area due to previous projects 2.1.d. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed)				25. Undertake a review of the preliminary outcomes of the ecology assessment prior to the end of 2011 to understand the impacts on the project layout
8. Ground Water	There is a risk to Springvale UG from ::: Unacceptable impacts on the regional groundwater dependant ecosystems (hanging swamps). ::: Caused by: Inadequate assessment and update of the groundwater model Resulting in: Community opposition to the project.	8.4.a. Stakeholder engagement strategy 8.4.b. Extensive groundwater monitoring network				13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project. 3. Finalise stakeholder engagement strategy for the Project
1. Land Tenure/ownership	There is a risk to Springvale UG from ::: Failure to achieve an occupation permit from Forests NSW ::: Caused by: Inadequate consultation and communication Resulting in: Failure to meet project timelines.	1.1.a. Existing occupation permit in place. 1.1.b. Consultation with Forests NSW and existing relationship				2. Forests NSW require spatial information and the Project Approval from DP&I. 3. Finalise stakeholder engagement strategy for the Project
1. Land Tenure/ownership	There is a risk to Springvale UG from ::: Failure to identify native title ::: Caused by: Inadequate assessment of title over project area Resulting in: Failure to meet project timeframes and increased costs to the project associated with negotiations.	1.2.a. Engaged specialist archaeologists to undertake assessment. 1.2.b. Corporate awareness of issues. 1.2.c. Six-monthly meetings held with the Gundungarra 1.2.d. Existing agreements 1.2.e. Consultation has commenced in accordance with the ACHCRs				3. Finalise stakeholder engagement strategy for the Project
2. Ecology	There is a risk to Springvale UG from	2.2.a. Specialist consultant has				25. Undertake a review of the preliminary outcomes of the ecology assessment

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	∴ NSW and/or federally listed endangered species found within project areas ∴ Caused by: Location of the project area (bore hole and infrastructure corridor) Resulting in: The need to establish substantial offsets.	been engaged to undertake ecological assessment 2.2.b. Surveys undertaken with sufficient lead time 2.2.c. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed)	(Pb)	(F)	(M)	prior to the end of 2011 to understand the impacts on the project layout 26. If offsets are required; discuss with CEY whether any offset opportunities are available (at what ratio).
5. Aboriginal and European heritage	There is a risk to Springvale UG from ∴ Unavoidable impact to known or unknown Aboriginal / European sites ∴ Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: A change to the preferred project layout, e.g.: alignment of infrastructure corridor and/or bore.	5.1.a. Specialist consultant has been engaged 5.1.b. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed) 5.1.c. Stakeholder engagement strategy 5.1.d. Consultation has commenced in accordance with the ACHCRs 5.1.e. Six-monthly meetings held with the Gundungarra	D (Pb)	3 (F)	17 (M)	27. Review the project layout to minimise any interactions with the known Aboriginal sites (following survey) - complete by the end of Jan 2012.
5. Aboriginal and European heritage	There is a risk to Springvale UG from ∴ Failure to obtain community support ∴ Caused by: Inadequate consultation / impacts Resulting in: Failure to obtain approval.	5.2.a. Specialist consultant has been engaged 5.2.b. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed) 5.2.c. Stakeholder engagement strategy 5.2.d. Six-monthly meetings held with the Gundungarra 5.2.e. Consultation has commenced in accordance with the ACHCRs	D (Pb)	3 (F)	17 (M)	28. Confirm that the scope of works for RPS includes considerations for European heritage.
8. Ground Water	There is a risk to Springvale UG from ∴ Failure to meet dewatering expectations ∴ Caused by: Inadequate assessment and update	8.1.a. Existing groundwater model 8.1.b. Groundwater monitoring network	D (D)	3 (BI)	17 (M)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	of the groundwater model Resulting in: Interruption to production.					
9. Greenhouse Gas	There is a risk to Springvale UG from ::: Greater than expected GHG emissions ::: Caused by: Increase release of gas due to construction and installation of bore and associated infrastructure. Resulting in: Requirement to consider alternate abatement (particularly in lieu of the carbon price).	9.2.a. Current NGERs reporting	D (Pb)	3 (F)	17 (M)	29. Engage specialist consultant to undertake a GHG assessment and provide advice on mitigation options
		9.2.b. Corporate awareness of issues.				30. Consider the flow on cost effects in the business case for the mine.
13. Waste Management general/recyclable - (to include bore hole cuttings)	There is a risk to Springvale UG from ::: Inadequate management of waste material during construction and operation ::: Caused by: waste generated during construction Resulting in: Impact on local community / environment.	13.1.a. Management of cuttings from existing dewatering bores	C (Pb)	4 (E)	18 (M)	17. Construction management plan to address management of drill cuttings.
15. Community identification and engagement	There is a risk to Springvale UG from ::: Vocal community opposition (e.g. active NGOs) ::: Caused by: Inadequate identification and engagement of the appropriate stakeholders Resulting in: Damage to the company's reputation or failure to obtain approval.	15.1.a. Stakeholder engagement strategy 15.1.b. Active engagement strategy already in place (regular scheduled meetings)	B (Pb)	5 (R)	19 (M)	31. Ensure stakeholder engagement plan is executed
2. Ecology	There is a risk to Springvale UG from ::: Failure to identify all endangered/threatened species within project area :::	2.3.a. Specialist consultant has been engaged to undertake ecological assessment 2.3.b. Good understanding of the ecology of the area due to	E (Pb)	3 (F)	20 (L)	

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Caused by: Inadequate survey effort	previous projects				
	Resulting in: Failure to obtain workable approval.	2.3.c. Area being assessed is greater than required (i.e. 10m road/corridor with 60m being assessed)				
3. Traffic and transport	There is a risk to Springvale UG from ::: Temporary increase in traffic into project area ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: Damage to local roads or unacceptable impacts on current forestry operations and the local community.	3.1.a. Existing traffic management plan for operations on the Newnes Plateau 3.1.b. Existing relationship with Forests NSW (Western region) regarding track maintenance	D (Pb)	4 (R)	21 (L)	6. Notify Forests NSW when drill rigs are to be moved into project area. 7. Review and update existing traffic management plan. Include commitment to abide by Forests NSW traffic management procedures i.e.: two way radio contact on entering area.
7. Surface Water	There is a risk to Springvale UG from ::: Discharge of sediment laden water from the bore hole site ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor (civil works) Resulting in: Unacceptable impacts on the environment.	7.1.a. Known industry guidelines for sediment control 7.1.b. Conditions relating to erosion and sediment control within Occupation Permit	D (Pb)	4 (E)	21 (L)	11. Inspection regime during construction 12. Document erosion and sediment controls, include in commitment in EA
7. Surface Water	There is a risk to Springvale UG from ::: Discharge of sediment laden water from the bore hole site ::: Caused by: Drilling activities (boreholes only) Resulting in: Unacceptable impacts on the environment.	7.2.a. Previous experience 7.2.b. Drilling sump design review undertaken by Aurecon 7.2.c. Known existing industry guidelines for sediment control 7.2.d. Allowing for larger drill pad for increased sump capacity	D (Pb)	4 (E)	21 (L)	16. Develop a sump management procedure, including possibility of installing pipeline to take water from sumps to bore 5
8. Ground Water	There is a risk to Springvale UG from ::: Unacceptable impacts on the	8.2.a. No other known significant users	D (D)	4 (R)	21 (L)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project. 14. Conduct bore licence search to confirm presence of regional groundwater

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	regional groundwater system (other users) ::: Caused by: Inadequate assessment and update of the groundwater model Resulting in: Community opposition to the project or Failure to obtain approval.					users
8. Ground Water	There is a risk to Springvale UG from ::: Unacceptable impacts on the regional groundwater dependant ecosystems (hanging swamps). ::: Caused by: Inadequate assessment and update of the groundwater model Resulting in: Failure to obtain approval or the need to establish substantial offsets.	8.3.a. Extensive monitoring system in place. 8.3.b. Good understanding of interactions between surface aquifers and groundwater dependant ecosystems 8.3.c. Good understanding of long-term impacts of mining on groundwater dependant ecosystems 8.3.d. New dewatering bore will be fully lined and grouted, therefore no direct connectivity	D (Pb)	4 (E)	21 (L)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.
8. Ground Water	There is a risk to Springvale UG from ::: New groundwater model indicates substantial increase in water make requiring an increase in volume allocation ::: Caused by: Review and update of groundwater model Resulting in: Need to seek new increased licence allocation.	8.6.a. Existing groundwater model 8.6.b. Spare capacity within existing licence allocation 8.6.c. Trend analysis	D (D)	4 (F)	21 (L)	13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.
12. Bushfire	There is a risk to Springvale UG from ::: Bushfire ::: Caused by: Construction, installation and operation of bore and associated infrastructure Resulting in:	12.1.a. Bushfire management plan 12.1.b. Hot work permit system 12.1.c. Guidelines from Forests NSW regarding bushfire preparedness 12.1.d. Fire fighting capabilities will be installed at dewatering sites, including water fill points.	D (Pb)	4 (R)	21 (L)	8. Confirm required asset protection zone around infrastructure. 9. Confirm assessments (ecology and archaeology) cover required asset protection zone as soon as possible.

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Damage to the company's reputation or Impact on local community / environment.	12.1.e. Fire fighting capabilities at existing dewatering bores, as well as dams for fire fighting.				
		12.1.f. Previous experience and safety record - no bushfire related incidents to date				
14. Rehabilitation and closure	There is a risk to Springvale UG from ::: Failure to adequately rehabilitate the site once no longer required ::: Caused by: Inadequate rehabilitation effort Resulting in: Damage to the company's reputation.	14.1.a. Bore is temporary and rehabilitation commitments are to return the site to as similar to the previous land use as possible 14.1.b. Centennial have experience in rehabilitation of drilling and bore hole sites on the plateau 14.1.c. Stakeholder engagement strategy	D (Pb)	4 (R)	21 (L)	
1. Land Tenure/ownership	There is a risk to Springvale UG from ::: Failure to identify crown roads within project area ::: Caused by: Inadequate assessment of project area Resulting in: Failure to meet project timelines.	1.3.a. Cadastre layers are available	E (Pb)	4 (F)	23 (L)	1. Confirm presence of crown roads in project area - source cadastre layers if required from land and Property Management Authority.
4. Noise	There is a risk to Springvale UG from ::: Exceedance of noise criteria at the nearest sensitive receptors ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: Onerous development consent conditions imposed or Potential impacts on local community.	4.3.a. No sensitive receptors in vicinity of new bore site. Nearest receptors are approximately 9 km away. 4.3.b. Short term construction duration. 4.3.c. Noise levels limited by OH&S noise limits	D (D)	5 (R)	24 (L)	19. Construction noise to be included in Noise Assessment.
6. Air Quality	There is a risk to Springvale UG from ::: Exceeding Air Quality Criteria :::	6.2.a. Availability of water in the area 6.2.b. Short term construction duration.	D (D)	5 (R)	24 (L)	21. Construction Management Plan 22. Engage specialist consultant to undertake Air Quality Assessment

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: Unacceptable impacts on the community.	6.2.c. Watercart				
9. Greenhouse Gas	There is a risk to Springvale UG from ::: Greater than expected GHG emissions ::: Caused by: Increase release of gas due to construction and installation of bore and associated infrastructure. Resulting in: Community opposition to the project.	9.1.a. Current NGERs reporting 9.1.b. Stakeholder engagement strategy 9.1.c. Corporate awareness of issues.	D (Pb)	5 (R)	24 (L)	29. Engage specialist consultant to undertake a GHG assessment and provide advice on mitigation options
10. Visual Amenity	There is a risk to Springvale UG from ::: Unacceptable impact on the visual amenity of the area ::: Caused by: Construction and installation of bore and associated infrastructure Resulting in: Onerous development consent conditions imposed.	10.1.a. No sensitive receptors in vicinity of new bore site. Nearest receptors are approximately 9 km away. 10.1.b. Site located in the forest away from residential areas 10.1.c. Minor temporary buildings and infrastructure which are coloured to blend into the surroundings	D (Pb)	5 (R)	24 (L)	
11. Land Use / Land Capability	There is a risk to Springvale UG from ::: Current land use compromised (Ag land, etc) ::: Caused by: Construction and installation of bore and associated infrastructure Resulting in: Onerous development consent conditions imposed.	11.1.a. Site currently used as a State Forest, it is not suitable for agriculture 11.1.b. Bore is temporary and rehabilitation commitments are to return the site to as similar to the previous land use as possible 11.1.c. Centennial have experience in rehabilitation of drilling and bore hole sites on the plateau	D (Pb)	5 (E)	24 (L)	
6. Air Quality	There is a risk to Springvale UG from	6.1.a. Watercart 6.1.b. Availability of water in the	E (D)	5 (E)	25 (L)	21. Construction Management Plan 22. Engage specialist consultant to undertake Air Quality Assessment

Step	Potential Incident	Current Controls	L	MRC	RR	Recommended Control
	::: Exceeding Air Quality Criteria ::: Caused by: Construction activities associated with the new bore and associated infrastructure corridor Resulting in: Onerous development consent conditions imposed.	area 6.1.c. Short term construction duration.				

Recommended Controls	Place(s) Used	Allocated To	Required By Date	Pulse User No.	PULSE Ref. No.
Do NOT enter additional Recommended Controls on this sheet.		(Only one SITE person for each Recommended Control)			
1. Confirm presence of crown roads in project area - source cadastre layers if required from Land and Property Management Authority.	Events: 1.3				
2. Forests NSW require spatial information and the Project Approval from DP&I.	Events: 1.1				
3. Finalise stakeholder engagement strategy for the Project	Events: 1.1, 1.2, 8.4, 8.5				
4. Investigate possibility of obtaining an MPL over project area following granting of Project Approval from DP&I.	Events: 1.4				
5. Include consultation with DPI (titles) in stakeholder consultation strategy	Events: 1.4				
6. Notify Forests NSW when drill rigs are to be moved into project area.	Events: 3.1				
7. Review and update existing traffic management plan. Include commitment to abide by Forests NSW traffic management procedures i.e.: two way radio contact on entering area.	Events: 3.1				
8. Confirm required asset protection zone around infrastructure.	Events: 12.1, 12.2				
9. Confirm assessments (ecology and archaeology) cover required asset protection zone as soon as possible.	Events: 12.1				
10. Supply spatial information to Forest NSW detailing location of infrastructure on a regular basis (six monthly) and as part of EA process.	Events: 12.2				
11. Inspection regime during construction	Events: 7.1				
12. Document erosion and sediment controls, include in commitment in EA	Events: 7.1				
13. Engage specialist consultant to peer review existing groundwater model to assess regional groundwater impacts associated with the project.	Events: 8.1, 8.2, 8.3, 8.4, 8.6				
14. Conduct bore licence search to confirm presence of regional groundwater users	Events: 8.2				
15. Engage and consult with the NSW Office of Water regarding transfer of water allocation	Events: 8.5				
16. Develop a sump management procedure, including possibility of installing pipeline to take water from sumps to bore 5	Events: 7.2				
17. Construction management plan to address management of drill cuttings.	Events: 13.1				

Recommended Controls	Place(s) Used	Allocated To	Required By Date	Pulse User No.	PULSE Ref. No.
Do NOT enter additional Recommended Controls on this sheet.		(Only one SITE person for each Recommended Control)			
18. Undertake noise assessment targeting specific sources to recommend mitigation measures based on current monitoring.	Events: 4.2				
19. Construction noise to be included in Noise Assessment.	Events: 4.3				
20. Undertake noise assessment targeting specific sources to recommend mitigation measures based on current monitoring	Events: 4.1				
21. Construction Management Plan	Events: 6.1, 6.2				
22. Engage specialist consultant to undertake Air Quality Assessment	Events: 6.1, 6.2, 6.3				
23. Engage specialist consultant to undertake Air Quality Assessment	Events: 6.4				
24. Review the project layout to minimise any interactions with endangered/listed species	Events: 2.1				
25. Undertake a review of the preliminary outcomes of the ecology assessment prior to the end of 2011 to understand the impacts on the project layout	Events: 2.1, 2.2				
26. If offsets are required; discuss with CEY whether any offset opportunities are available (at what ratio).	Events: 2.2				
27. Review the project layout to minimise any interactions with the known Aboriginal sites (following survey) - complete by the end of Jan 2012.	Events: 5.1				
28. Confirm that the scope of works for RPS includes considerations for European heritage.	Events: 5.2				
29. Engage specialist consultant to undertake a GHG assessment and provide advice on mitigation options	Events: 9.1, 9.2				
30. Consider the flow on cost effects in the business case for the mine.	Events: 9.2				
31. Ensure stakeholder engagement plan is executed	Events: 15.1				

RISK MANAGEMENT STANDARD

Management Standard-004

CENTENNIAL RISK MATRIX							Likelihood					Description (D)
Rating	Consequence						A Certain	B Probable	C Possible	D Remote	E Improbable	
	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)	

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

THIS DOCUMENT IS UNCONTROLLED UNLESS VIEWED ON THE INTRANET

BOW TIE ANALYSIS - Control Effectiveness Matrix									
TYPE OF CONTROL	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