Environmental Risk Assessment

APPENDIX 1

ACOL

Gas Drainage & Use Stage Two

(plus 2m.Diameter Shaft & Service Bore-holes)

Environmental Risk Register v2

1 PURPOSE & SCOPE

The purpose of the risk assessment is to identify the risks, and the controls required to be put in place, for the ACOL gas drainage stage two project (plus the smaller scale 2m. Diameter shaft & service bore-holes projects). The scope was limited to environmental and community risks, applicable to the built and natural environment (onsite and offsite), and including public safety (but not ACOL OHS risk or operational asset damage).

2 BACKGROUND

Three separate projects were assessed as part of this single risk process, namely –

1. Construction and operation of a Goaf / CH4 gas drainage plant;
2. Construction and use of a 2m. diameter ventilation shaft; and
3. Construction and use of 2 x service bores (narrow diameter shafts connecting to underground workings).

The objectives of the goaf gas drainage project in particular are to:

- Implement a system for the safe and controlled drainage of goaf gas in a cost effective manner (allowing for continued and efficient U/G mining);
- Safely capture, reticulate and manage the goaf gas;
- Prevent any adverse effects on cultural heritage as well as minimizing impacts to both natural and man-made environments;
- Minimise greenhouse gas (GHG) emissions; and
- Cost-effectively extract gas.

The proposal recommends the drainage of methane gas from the mining area to permit multi-seam longwall mining, utilising a range of strategies:

- Boreholes drilled vertically into the strata overlying the targeted coal seam;
- Main seals of the Pikes Gully seam via an underground pipeline; and
- Goaf Drainage Hole located at the backroad upcast shaft of the Pikes Gully seam.

The extracted goaf gas is proposed to be managed safely, if technically and economically feasible, via the following three options, in order of preference:

- Re-use for electricity generation;
- Onsite flaring; and
- Exhausting to the atmosphere (onsite venting).

A central gas extraction plant will provide controlled drainage of goaf gas via an overland polyethylene (PE) pipeline. The gas may then be reticulated to safely manage the gas.

The separate shaft project involves the construction of a 2 metre diameter upcast ventilation shaft and associated extraction fan and ancillary surface infrastructure at the rear of longwall one of the Upper Liddell seam.

In addition, ACOL proposes to construct and operate several service supply boreholes at some time in the future, for the delivery of necessary materials to the underground workings.

3 ASSESSMENT STEPS

The risk assessment was a team based methodology, making use of an existing ACOL / Wells Environmental Services template, which guided the following steps –

1. Identification of environmental ‘aspect’ categories (drawn from legislative requirements, existing permits and ‘typical’ mine-site operational Environmental Management areas;
2. Specification of possible ‘impacts’ (risks) applicable to each aspect (in the context of this project only);
3. Identification of the project stage(s) the impact applied to (typically ‘operations’, ‘construction’ or both);
4. Control measures which were intended to be applied;
5. Risk ranking in accordance with the ACOL risk matrix; and
6. Notation of actions to implement, improve or monitor risk controls, to ensure risks were (or would become after implementation) acceptable to ACOL.

4 KEY ASSUMPTIONS, LIMITATIONS & PARAMETERS

The following key points underpinned the risk assessment –

1. ACOL has existing systems for the management of environmental risks, and also has the capacity and resources to make changes to these systems if this need was identified in the risk assessment;
2. Risks would be reevaluated subsequent to the team session if changes were made to the project (scale, scope, purpose, design etc.), and regardless, periodically reviewed.
3. The register is dynamic in nature and must be kept 'alive' by project personnel, with updates following (as examples), changes to the effectiveness of controls, emergence of new risks, incidents etc.; and
4. Contractors and other project participants have obligations to conduct their own risk assessment(s) prior to commencing project work.

5 PARTICIPANTS

The following personnel participated in the risk assessment –

Person	Company	Specialisation
Robert Holmes	ACOL	Contract Ventilation Officer
John Gruhn	ACOL	Mining Engineer
Phil Fletcher	ACOL	Mining Engineer
Michael Moore	ACOL	Approvals management
Cassandra Ferguson	ACOL	Environmental Management
James Grebert	ACOL	Ventilation Officer
Alan Wells	Wells Environmental Services	Project – assistance
Neil Pennington	Spectrum Acoustics	Acoustics
David Lowe	SKM	Traffic Management
John-Paul King	Pacific Environmental Associates	Ecology
Liz Wyatt	Insite Archaeology	Indigenous Archaeology
Gabi Parke	Aecom	Visual amenity

6 RISK MATRIX

Risk analysis (R) is undertaken by assessing the consequence severity level (C) of an impact against the predicted frequency or probability (P) of the event occurring. For example, an issue with a high probability and high consequence severity has a High Risk while a low probability and low consequence severity has Negligible Risk.

Ashton Coal RISK MATRIX

Loss Type	Hazard Effect/ Consequence 1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
(P) Harm to People	Slight injury or health effects – first aid/ minor medical treatment level	Minor injury or health effects – restricted work or minor lost workday case	Serious bodily injury or health effects – major lost workday case/ permanent disability	Single fatality, permanent total disabilities.	Multiple fatalities
(E) Environmental Impact	**Environmental nuisance** – unreasonable interference with and environmental value or contamination or pollution with a cost less than $1,000	**Minor environmental harm** - not trivial or negligible, potential health risks for community or pollution or contamination with costs between $1,000 & $5,000	**Serious environmental harm** - high local impact or impacts to and area(s) of local conservation value, actual community health impacts or significance or pollution or contamination with a costs between $5k and $50k	**Major environmental harm** – high impact in district or actual impacts to an area of regional conservation significance, health statistics in community alter as a result of this incident or pollution or contamination with costs between $50k & $500k	**Extreme environmental harm** – irreversible harm to environmental values of extreme and widespread areas, impacts to conservation areas of national significance, community fatalities or pollution or contamination with costs greater than $500k
(A) Asset Damage & Other Consequential Losses	Slight damage <$0.1M or < 1 shift disruption to operation	Minor damage $0.1M to$1.0M. or 1 Shift – 1 day disruption to operation	Local damage $1.0M to$5.0M. 1day to 1week - disruption to operation	Major damage $5.0M to$30.0M. 1week – 1 month -Partial loss of operation	Extreme damage > $30.0M. > 1 month - Substantial or total loss of operation
(R) Impact on Reputation	Slight impact – public awareness may exist but no public concern	Limited impact – some local public concern	Considerable impact – regional public concern	National impact – national public concern	International impact – international public attention

Likelihood	Likelihood Examples (use only as a guide)	Risk Rating				
A (Almost certain)	Likely that the unwanted event could occur several times per year at this location	15 (M)	10 (H)	6 (H)	2 (Ex)	1 (Ex)
B (Likely)	Likely that the unwanted event could occur several times per year in the Australian mining industry; or could happen annually	19 (M)	14 (M)	9 (H)	4 (Ex)	3 (Ex)
C (Possible)	The unwanted event could well have occurred in the Australian mining industry at some time in the past 10 years	22 (L)	18 (M)	13 (H)	8 (H)	5 (Ex)
D (Unlikely)	The unwanted event has happened in the Australian mining industry at some time; or could happen in 50 years	24 (L)	21 (L)	17 (M)	12 (H)	7 (H)
E (Rare)	The unwanted event has never been known to occur in the Australian mining industry; or is highly unlikely that it could ever occur	25 (L)	23 (L)	20 (M)	16 (M)	11 (H)

Risk Rating	Risk Level	Guidelines for Risk Control Barriers
1 to 5	(E) – Extreme	Immediate intervention requied from Senior Management, do not proceed with activity. -
6 to 13	(H) – High	Imperative to eliminate or reduce risk by introduction of controls, do not proceed with activity until reviewed by Senior Management -
14 to 20	(M) – Medium	Corrective action to be determined, do not proceed without authorisation from Shift Coordinator -
21 to 25	(L) – Low	Safe to continue activity once hazards minimised -

Catastrophic Risks

ACOL Gas Drainage & Use Stage Two Environmental Risk Register v2

Issue	Hazard Type (refer to matrix)	Applies to… Construction and/or Operations	Controls / Measures during design and assessment	Risk Rating *C= Consequence* *P= Probability* *R= Risk Rating* *(See Table above)*		
				C	P	R
Aboriginal Heritage						
Impacts to known items of Aboriginal cultural heritage significance	Environmental	Construction Only	Avoidance of sites identified in previous environmental assessment Traffic management protocols – staying on tracks (and demarcation of tracks /sites (e.g. barrier tape). Archaeological inductions for all work crews (project specific) – emphasising 'no-go' zones. Permit to Disturb	3	D	17(M)
Impacts to previously unknown Aboriginal artefacts or similar from earthworks and/or traffic movements.	Environmental	Construction Only	Surveillance during construction stage by Aboriginal representatives. Existing Management Plans for artefact discovery/preservation, heritage management. Permit to Disturb.	3	D	17(M)
Acoustics						
Acoustic impacts from construction work.	Environmental	Construction Only	Distance from residential properties and existing background noise. Day time work only. Contingency – bunding / barrier if/as required.	2	D	21(L)
Acoustic impacts from gas drainage infrastructure during operation of equipment.	Environmental	Operations Only	Low density of residential receptors. Use of acoustical screens where required. Noise monitoring. Design of fans to minimise noise. Ability to make engineering changes.	2	D	21(L)
Air Quality						

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				C	P	R
Dust from construction work (civils & traffic).	Environmental	Construction Only	Use of water truck on a needs basis. No dust from drilling.	1	D	24(L)
Venting of gas (e.g. maintenance) – 95% methane.	Environmental	Operations Only	*Refer to stage 1 assessment*			
Flaring of gas (NoX small quant.).	Environmental	Operations Only	Distance from residential properties.	2	D	21(L)
Gas extraction plant emissions (mobile plant).	Environmental	Operations Only	*Refer to stage 1 assessment*			
Particulate emissions (dust & diesel).	Environmental	Operations Only	Distance from residential properties & low density. Low sulphur fuels.	2	D	21(L)
Community						
Community opposition to the Project (including due to lack of knowledge / awareness / understanding).	Reputation	Construction and Operations	Consultation with the local community through the Community Consultation Committee (CCC) & community newsletter.	2	C	18(M)
Active objection / protest / disruption (in absence of damage / vandalism).	Reputation	Construction & Operations	On private land. Located away from main roads (excluding external pipeline interface & realigned Lemington Rd.). Security fencing (compound) for goaf gas boreholes. Community complaints arrangements. Not high profile location. Inspections. Telemetry (pipe damage). Minimal goaf gas boreholes in use at time (1-2).	2	D	21(L)

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				C	P	R
Ecology						
Pipeline in VCA – disturbance to protected areas & legal consequences.	Environmental	Construction only	Previous assessments completed. Flexibility with line locations & corridors. Consider free venting as an option in VCA, in comparison to installing pipeline (comparative risk).	4	E	16(M)
Permanent pipeline clearances (access) – outside VCA.	Environmental	Construction & Operations	Part of survey.	2	D	21(L)
Fauna areas of significance (within & outside VCA) – nest sites particularly.	Environmental	Construction only	Previous assessments completed. Flexibility with line locations & corridors.	2	D	21(L)
2 metre shaft in VCA - disturbance to protected areas & legal consequences.	Environmental	Construction only	Subject to monitoring currently.	4	E	16(M)
Proposed areas of disturbance for pipeline corridors (<20m.), shaft/bore-hole infrastructure and access roads etc. which may contain threatened flora & fauna (outside VCA).	Environmental	Construction & Operations	Previous Environmental Assessments on the area. No clearing of trees required. Areas are included in monitoring surveys for coming year. Impact assessment report being prepared for inclusion.	2	D	21(L)

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				C	P	R
Greenhouse Gas						
Opportunity to reduce methane emissions. (Minor increase during construction).	Reputation	Operations Only	Flaring beneficial to ACOL emissions. Potential for end use on or off site.	1	D	24(L)
Ground Water						
Interaction with groundwater.	Environmental	Construction & Operations	Shaft locations away from known aquifers. Goaf gas boreholes lined to intersection with goaf. Ground Water Management Plan Water licences to manage U/G water make. No use of chemicals in drilling / boring.	2	D	21(L)
Hydrocarbons						
Diesel (20k/l & 2k/l) & oil use / storage.	Environment	Construction & Operations	Permanent electrical supply for operations. Daily inspection. Filling Procedure. Rapid-fill closed system. Spill kit onsite. FFP vessels, incl. self bunding pods. Environmental Standards & procedures. Sediment dam as contingency.	1	D	24(L)
Mine Closure and Rehabilitation						
Additional infrastructure requiring management during closure.	Asset	Operations Only	ACP mine closure plan.	1	C	22(L)

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				C	P	R
Socio-Economic						
Failure of Approval resulting in lower production and shorter life of mine and loss of jobs.	Asset	Construction & Operations	Development Approval Process. Demonstrated safety benefit. Improved business security and associated life of mine economics. Risk management principles applied – due diligence & sound project management.	5	D	7(H)
Soils						
Erosion of sediment from disturbed areas.	Environmental	Construction & Operations	Minimum area disturbed. Site selection process & experienced personnel undertaking earthworks. Sediment control fencing where required. Reuse of topsoil in site rehabilitation elsewhere. Utilisation of existing access roads.	2	D	21(L)
Soil / material removed for site levelling.	Environmental	Operations only	Several options for reuse onsite.	1	D	24(L)
Subsidence						
Damage to infrastructure Note – must be buried where possible for fire damage prevention.	Asset	Operations Only	Some infrastructure outside of subsidence zone. Mine owned infrastructure installed at ACOL expense and risk (no risk to third parties or cost to MSB).	2	C	18(M)
Surface Water						
Rainfall impact on construction (loss of time & sediment control).	Environmental	Construction Only	Erosion Sediment Control Management Plan (existing). Site Water Management Plan (catchment / drainage design).	2	D	21(L)

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				C	P	R
Management of water make from shaft / around site.	Environmental	Operations Only	Drainage design in line with site requirements / existing plans.	2	D	21(L)
Water use at central gas plant (including storage – dams vs. tanks) – insufficient quantities of water.	Environmental	Operational Only	To be established. Initial assessment suggests adequate water supplies and alternative sources.	1	D	24(L)
Theft / trespass						
Entry with intent of theft or vandalism (cost of damage).	Asset	Construction & Operations	Locked compound (post construction). Signage. Daily inspections. Video surveillance of 'Dairy Farm' track (pending).	2	D	21(L)
Entry with intent of theft or vandalism (injury to intruder – fire, falls from height, high pressure injection).	People	Construction & Operations	Locked compound. Signage. Daily inspections. Private land (majority sites ACOL owned). Not readily visible.	2	D	21(L)
Traffic and Transport						
Impacts to traffic on New England Highway (accident involving public vehicle on publically accessible roads).	People	Construction & Operations	Use of approved access point. Traffic management plan. D&A testing. Site Inductions.	4	D	12(H)

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				C	P	R
Cumulative traffic impacts owing to neighbouring projects (cumulative effect) – delay & disruption.	Environmental	Construction Only	Traffic management plan.	2	E	23(L)
Right of way (public) – loss of access.	Asset	Construction & Operations	Alternative access possible.	1	E	25(L)
Pipeline road crossings (ACOL) – disruption to access.	Asset	Construction	Project management & scheduling.	1	E	25(L)
Brunkers Lane as public road / realigned Lemington Road – lack of access / opening.	Asset	Construction & Operations	Traffic Management Plan.	2	E	23(L)
Use (legally or otherwise) of access tracks by the public – accident.	People	Construction and Operations	Signage (existing). Compound fencing. Right-of-Way protocols. Communication with landholders.	3	E	20(M)
Oversize loads – inability to transport.	Asset	Construction	Experienced interstate contractor.	2	D	21(L)
Proximity of compound to public road (e.g. Brunkers lane) – vehicle accident / impact.	Asset	Construction & Operations	Review alignment of proposed Lemington Road and proximity to goaf gas boreholes assets. (additional impact protection may be required).	4	E	16(M)

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				C	P	R
Utilities (rail/road/power/ communications						
Construction of access tracks to goaf gas boreholes & shafts – environmental impact.	Environmental	Construction Only	Use of existing tracks where possible - construction of minor tracks where required (e.g. if track conditions deteriorate). Suitable tracks identified and marked on plan. All weather tracks generally not required, given types and volume of vehicles. Likely future use of methane as fuel – eliminates refuelling.	2	D	21(L)
Contact with buried services (e.g. fibre optics). Telephone line known to exist in area.	Asset	Construction Only	Permit to Dig systems. Service plans available. No fibre optics in workzone.	1	E	25(L)
Power lines – clearances – easement gets in way.	Asset	Construction Only	Flexibility of location. All infrastructure clear of easement.	2	D	21(L)
Visuals						
Impacts from fans and associated infrastructure on the visual landscape / amenity (Hwy, realigned Lamington Road).	Environment	Construction & Operations	Minimal visual profile. Locations away from residential areas. Tree screen proposed / existing vegetation.	1	D	24(L)
Lighting impacts from lights at the fans & gas plant during operation.	Environment	Operations Only	Minimal lighting (consider sensor lighting).	2	D	21(L)

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				C	P	R
Waste						
Inadequate disposal options of cuttings while drilling bore hole (pilot holes / gas boreholes) / overflow.	Environment	Construction Only	All cuttings into sedimentation dam / sump & removed from site. Procedures and Standards for drilling (existing).	1	D	24(L)
Access to non-Ashton owned land – failure to achieve.	Asset	Construction & Operations	Contingency – manage via underground ventilation changes.	3	D	17(M)
END						