



Welcomes Joe Woodward PSM, Paul Forward and Dr Andrew Stoeckel

PAC Merits Review 2 Site Inspection

Russell Vale Colliery Underground Expansion Project

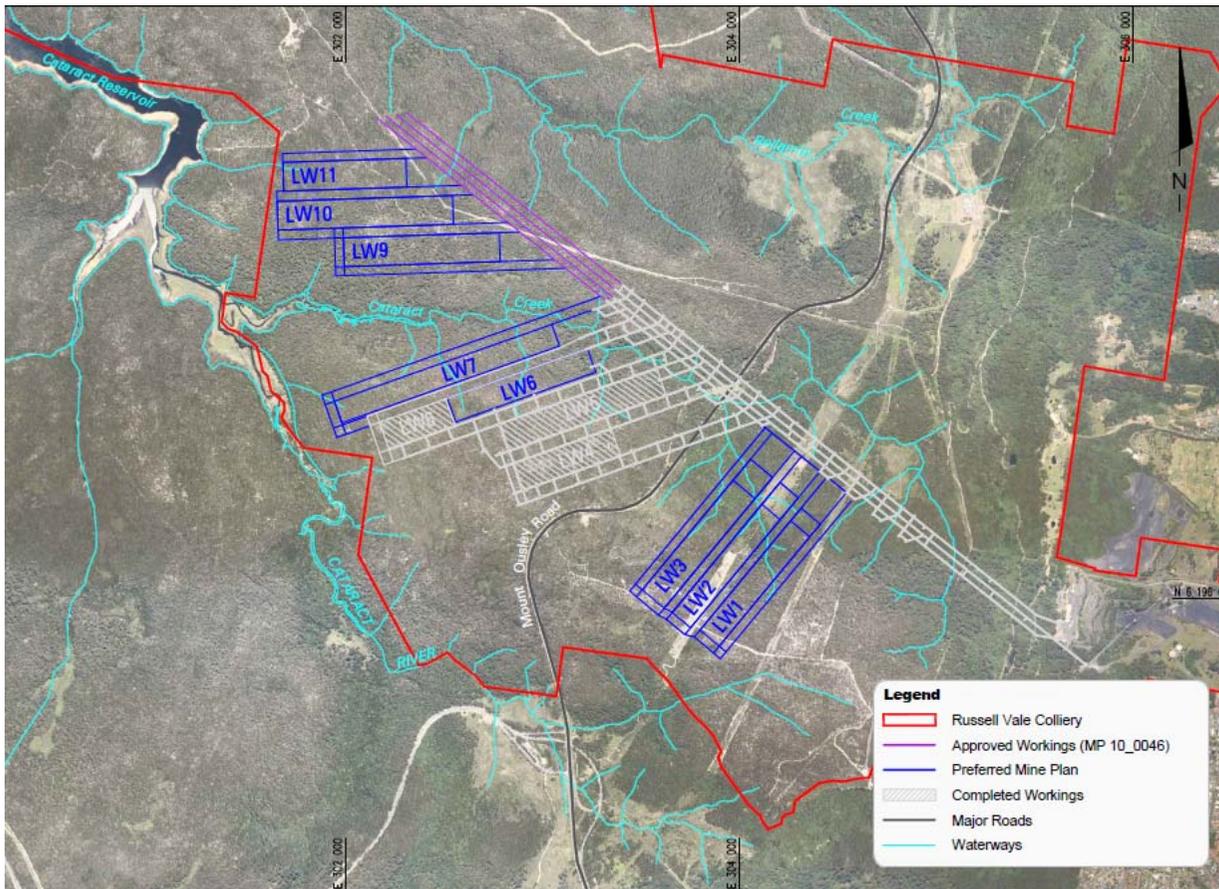
8 December 2015

Slide 1

Agenda

1. The UEP
2. Approvals Process
3. Terms of Reference
4. PAC Recommendations
5. Conclusion

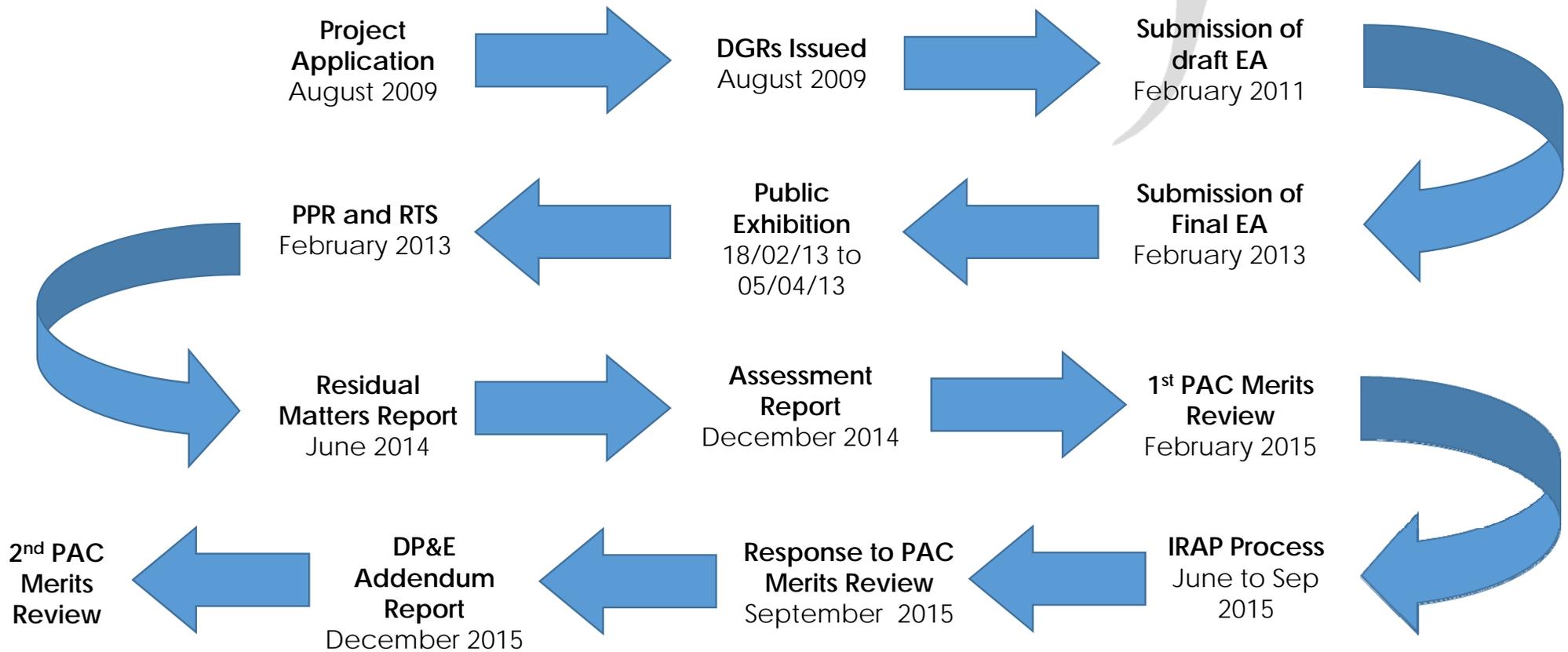
The UEP



Russell Vale Colliery Underground Expansion Project (UEP) comprised of:

- ✓ Coal extraction from 8 LW panels
- ✓ Resource of 4.7 Mt ROM (max. annual rate of 3 Mtpa)
- ✓ Continuing use and upgrade of Russell Vale site infrastructure

Approvals Process



2nd PAC Merits Review TORs

- Undertake a review of the UEP considering:
 - ✓ The Mining SEPP (as amended 2 September 2015)
 - ✓ DP&E Addendum Report and Recommended Project Approval Conditions
 - ✓ Likely economic, environment and social impacts of the development in the locality, region and State
 - ✓ Submissions made to the PAC as part of the public hearings to be held
 - ✓ Any submissions made by the applicant to the PAC on the matters the subject of this review

PAC Recommendations

- 1 Subsidence, surface water, groundwater, swamps
- 2 – 4 Swamps
- 5 – 6 Economics
- 7 Noise
- 8 – 10 Air Quality
- 11 Flooding
- 12 – 13 Coal Transportation
- 14 Road Noise
- 15 Infrastructure Capacity

Recommendation 1

The **establishment of a risk assessment panel**, constituted by an independent chair, Water NSW, the Dams Safety Committee, the Division of Resources and Energy and the proponent to **oversee an integrated risk assessment**, particularly focusing on links between subsidence and water (both groundwater and surface water) impacts of the proposal.

This risk assessment, including associated work **rerunning the groundwater modelling** as recommended by Dr Mackie; and **addressing the issues raised by the relevant agencies and experts** (as highlighted in this report), needs to be completed before the application can be determined.

Recommendation 1 – Process

Independent Risk Assessment Panel (IRAP)

- ✓ Led by Independent Chair
- ✓ DP&E approved members and reviewed Terms of Reference
- ✓ Approved the methodology
- ✓ Reviewed Integrated Risk Assessment (including supporting information)
- ✓ Reviewed responses to regulator and expert issues

Integrated Risk Assessment (3 month process)

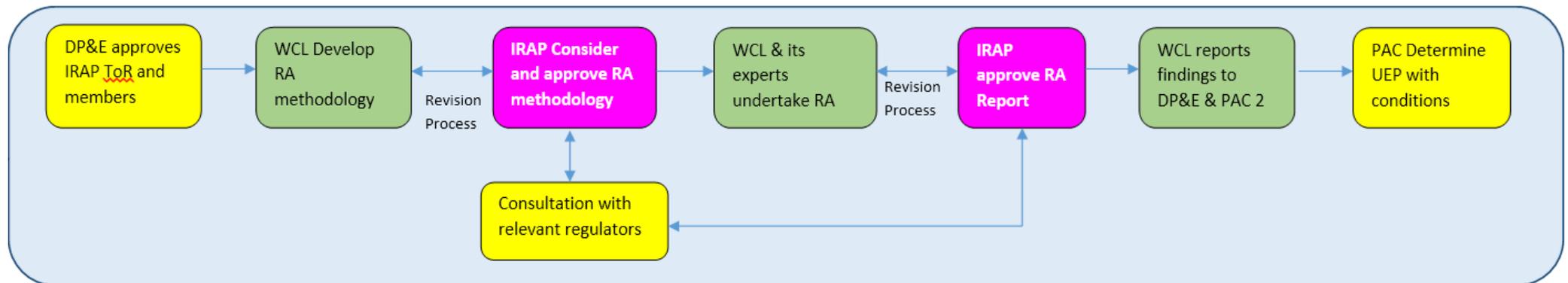
- ✓ Led by Dr Dale Cooper (expert in Risk Assessment)
- ✓ Extensive consultation with DP&E, DSC, DRE and WaterNSW
- ✓ Assessed and ranked potential risks to water resources associated with subsidence, surface water and groundwater

Recommendation 1 – Process

- **Integrated Risk Assessment**

- ✓ Methodology consistent with *ISO 31000:2009 Risk Management – Principles and guidance*
- ✓ Used detailed event trees to consider all feasible consequences of underground mining

- IRAP Process for Project Approval Process



Recommendation 1 – Methodology

- Integrated Risk Assessment Process
 - ✓ Segregated project into three series of LW panels (LWs 1-3, 6-7 and 9-11)
 - ✓ 110 potential risks identified
- Project-specific likelihood and consequence scales considered for each risk in accordance with Broadleaf’s tailored ‘Level of Risk’ Matrix

Likelihood rating	A	Yellow	Yellow	Light Red	Light Red	Red
	B	Light Green	Yellow	Light Red	Light Red	Red
	C	Light Green	Yellow	Yellow	Light Red	Light Red
	D	Dark Green	Light Green	Yellow	Yellow	Light Red
	E	Dark Green	Dark Green	Light Green	Yellow	Yellow
		1	2	3	4	5
Consequence rating						

Classification:	Negligible risk	Low risk	Medium risk	High risk	Extreme risk
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Recommendation 1 – Findings

- Likelihood and consequence combined to provide overall risk ratings:
 - 61 negligible risks
 - 18 low risks
 - 29 medium risks
 - 2 high risks
- 0 extreme risks were identified
- 2 high risks (both related to impacts to CCUS4)
- Most of the medium risks have **high probabilities** of occurrence, but **low or negligible consequences**
- Where high or medium risks (with higher consequences) were identified, additional controls were developed consultation with WCL specialists, regulators and the IRAP

Recommendation 1 – Controls

Risk	Description	L	C	Risk	Additional Controls
BS1113	Surface fracturing causing cracking of bedrock leading to drying of swamp CCUS4, leading to a detrimental effect on swamp ecosystems from mining of LWs 6-7	A	4	High	<ul style="list-style-type: none"> • SOC <ul style="list-style-type: none"> ✓ Ongoing consultation with IMP ✓ Extensive swamp and water monitoring program • Draft Conditions <ul style="list-style-type: none"> ✓ \$500k bond ✓ Detailed performance measures ✓ Offsets if impacts to CCUS4 are greater than negligible ✓ Monitoring data to be provided to the IMP
BS1213	Surface fracturing of controlling rockbars causing the drying of swamp CCUS4, leading to a detrimental effect on swamp ecosystems from the mining of LW 6	A	4	High	<ul style="list-style-type: none"> • As above
CT121	Tilting causing changes to swamp water regimes leading to detrimental effects on swamp ecosystem BCUS4 from mining of LWs 9-11	C	3	Medium	<ul style="list-style-type: none"> • As above • Draft Conditions <ul style="list-style-type: none"> ✓ Preparation of Upland Swamp MP in consultation with OEH, NOW and SCA to determine compliance with performance measures

Recommendation 1 – Controls

Risk	Description	L	C	Risk	Additional Controls
AS212	Reduced baseflow to streams due to depressurisation of the regional aquifer (LWs 1-3)	A	2	Medium	<ul style="list-style-type: none"> • SOC – <ul style="list-style-type: none"> ✓ Water MP ✓ Additional monitoring to confirm conservatism of estimated 'take' ✓ Hold water licences • Draft Conditions – Water MP
BH111	Changes to the groundwater regime increasing groundwater flows into deeper strata or mine voids leading to a reduced quantity of water in Cataract Reservoir (LWs 6-7)	A	2	Medium	<ul style="list-style-type: none"> • SOC – <ul style="list-style-type: none"> ✓ Water MP ✓ Ongoing monitoring to confirm conservatism of estimated impact ✓ Hold water licences • Draft Conditions – Water MP
BS212	Reduced baseflow to streams due to depressurisation of the regional aquifer (LWs 6-7)	A	2	Medium	As per AS212
CS212	Reduced baseflow to streams due to depressurisation of the regional aquifer resulting from mining (LWs 9-11)	A	2	Medium	As per AS212

Recommendation 1 – IRAP Conclusion

*“It is the IRAP’s opinion that the risk assessment has been **conducted by appropriately qualified experts** in the fields of mine subsidence engineering, groundwater, surface water and ecology. It is understood that the WCL experts worked on the project together for a considerable period of time, which provided them the **experience and knowledge required to conduct the ‘integrated’ risk assessment**, which aims to ensure that the risks associated with underground mining on the quantity and quality of groundwater and surface water as well as upland swamps have been assessed and appropriate controls are identified” (IRAP)*

*“Following an extensive review of the risk assessment and the relevant documentation, **it is the opinion of IRAP that the risk assessment is ‘integrated’** and has been based upon an **approach that is sufficiently detailed and at an appropriate level** to evaluate the risks to the swamps, streams, groundwater and the waters of Cataract Reservoir.” (IRAP)*

Recommendation 1 – Groundwater

Groundwater

- Conservative re-modelling addressed Dr Mackie's recommendations:
 - ✓ Groundwater modelling was re-run using the 'Pseudo Soil' option for simulating the unsaturated zone
 - ✓ Use of variable drainable porosity for different strata layers
 - ✓ Assessment of post-mining steady state flow systems (up to 200 years after mining)
- Use of latest groundwater monitoring data for model calibration
- Peer reviewed by Dr Noel Merrick
- Model was reviewed by the IRAP

Outcomes

- Reduction in baseflow due to depressurisation = 0.041 ML/day
- Seepage from Cataract Reservoir = 0.00024 ML/day (240 L/day)
- Mine inflows of up to 3.3 ML/day

Recommendation 1 – Geology

Corrimal Fault & Dyke D8

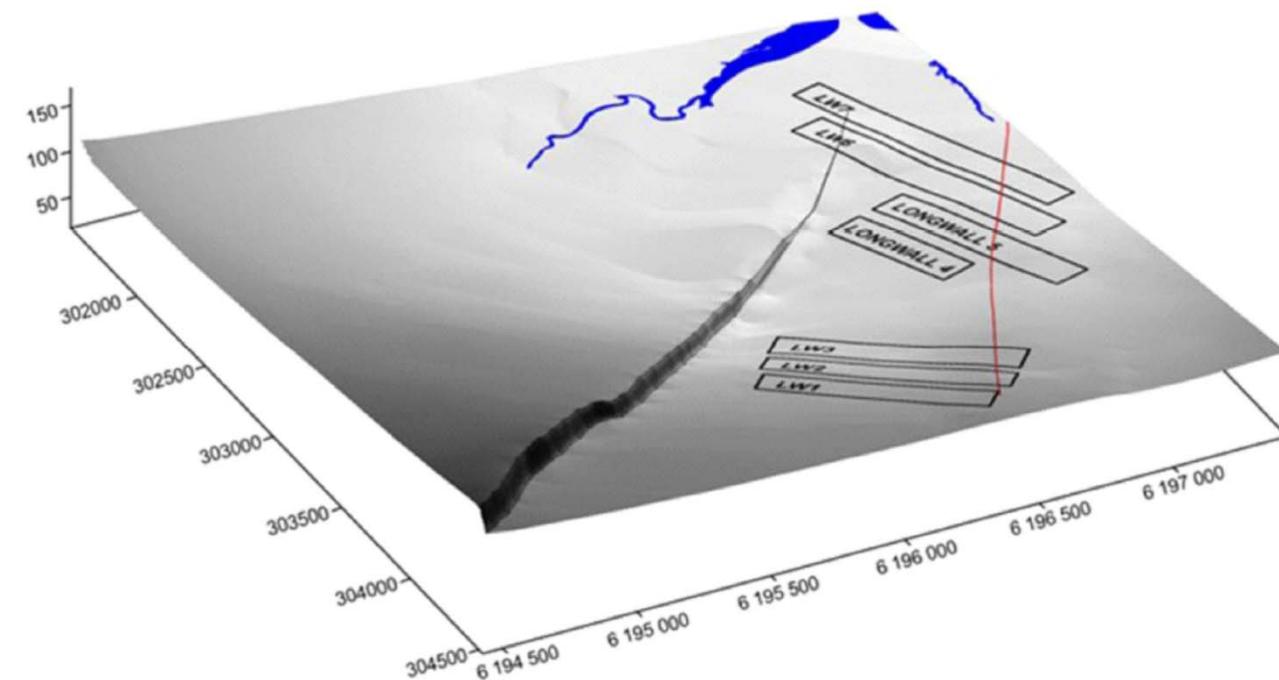
- SCT has assessed the risks associated with the Corrimal Fault and Dyke D8, as raised by Professor Galvin

Outcomes

- Corrimal Fault tapers to a throw of less than 1 m at a distance of 540 m from Cataract Reservoir
- Previous intersections of the Corrimal Fault have indicated that the fault is not water bearing
- Dyke D8 is not hydraulically conductive
- Mining does not the potential to enhance the conductivity of these structures

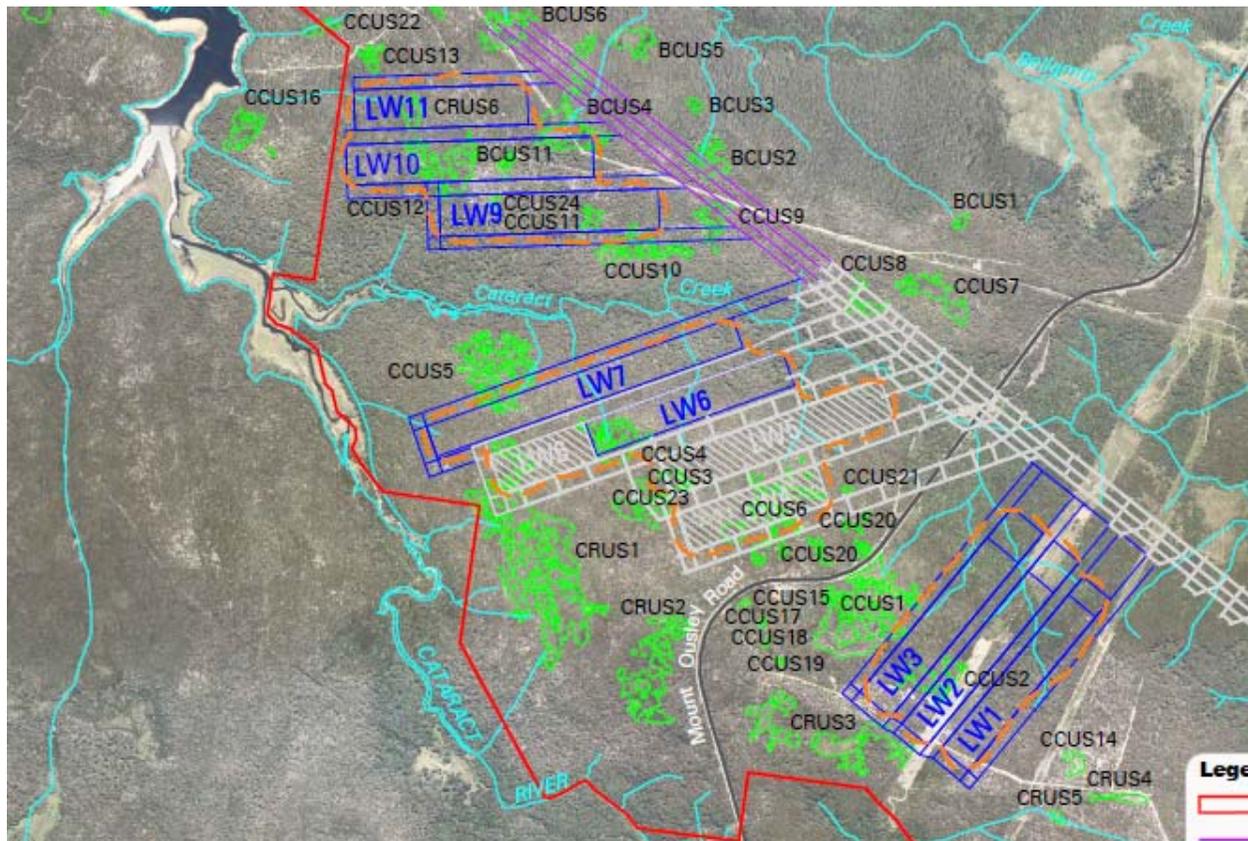
Recommendation 1 – Geology

- 3-dimensional projection of the Corrimal Fault developed based on information gathered during previous intersections of this structure (Bulli and Balgownie Seams)



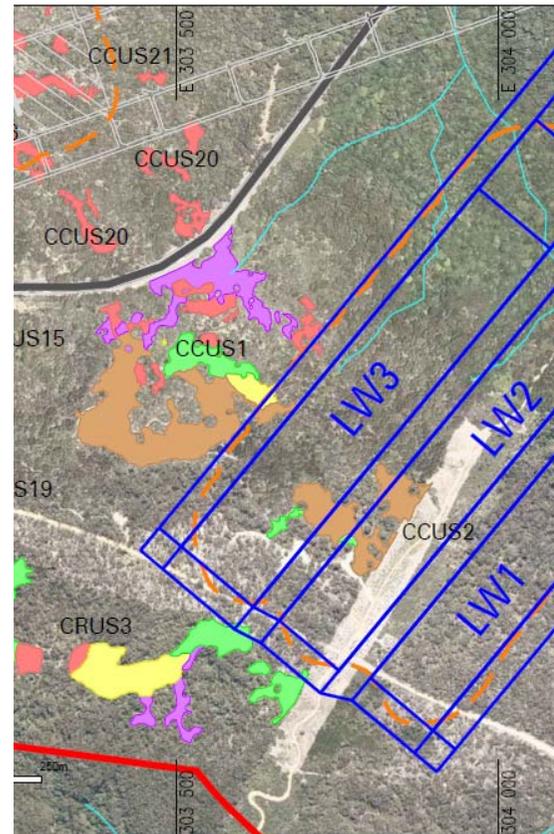
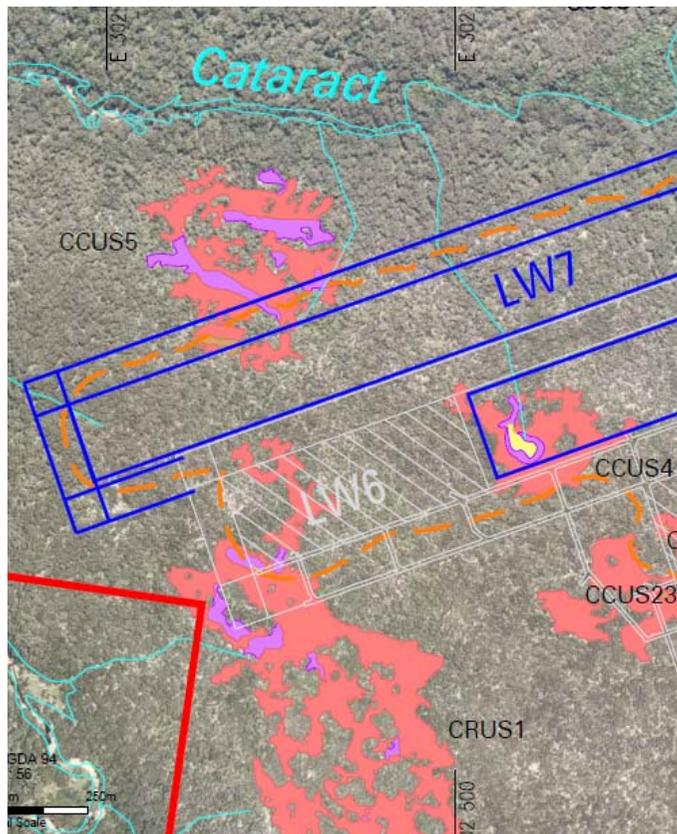
- *“DSC would have no difficulty in approving extraction of longwall 7 if the Corrimal Fault is absent, or can be demonstrated to be terminating at longwall 7”* (DSC Submission)
- SOC – If the Corrimal Fault is intersected by MG 7, LW7 will be truncated in consultation with DSC

Recommendation 1 – Swamps



- Comprehensive risk assessment undertaken in consultation with IRAP
- Analysis of the interaction between root depth, groundwater and vegetation composition
- Where piezometric data was not available, swamps with similar characteristics were used to determine presence of groundwater
- Additional piezometers will be installed

Recommendation 1 – Swamps



Swamps

- Subsidence and fracturing to a small area of a swamp does not necessarily place the entire swamp at risk (e.g. CRUS1)
- Only small areas of some swamps are to be subsided (e.g. CCUS1)

Recommendation 1 – Regulator Conclusions

- *“WaterNSW is satisfied the Part 2 Report has **addressed most of the matters** raised in our email ...” (WaterNSW email 16/10/15). Residual issues addressed in recommended conditions.*
- *“ESU is **satisfied** with the Risk Assessment Panel and its Risk Assessment findings” (DRE letter dated 22/10/15)*
- *“DSC staff are satisfied with the Integrated Risk Assessment that has been undertaken on behalf of WCL and feel that **the process undertaken was as rigorous and far reaching as is possible** given the nature of the risks being assessed” (DSC)*

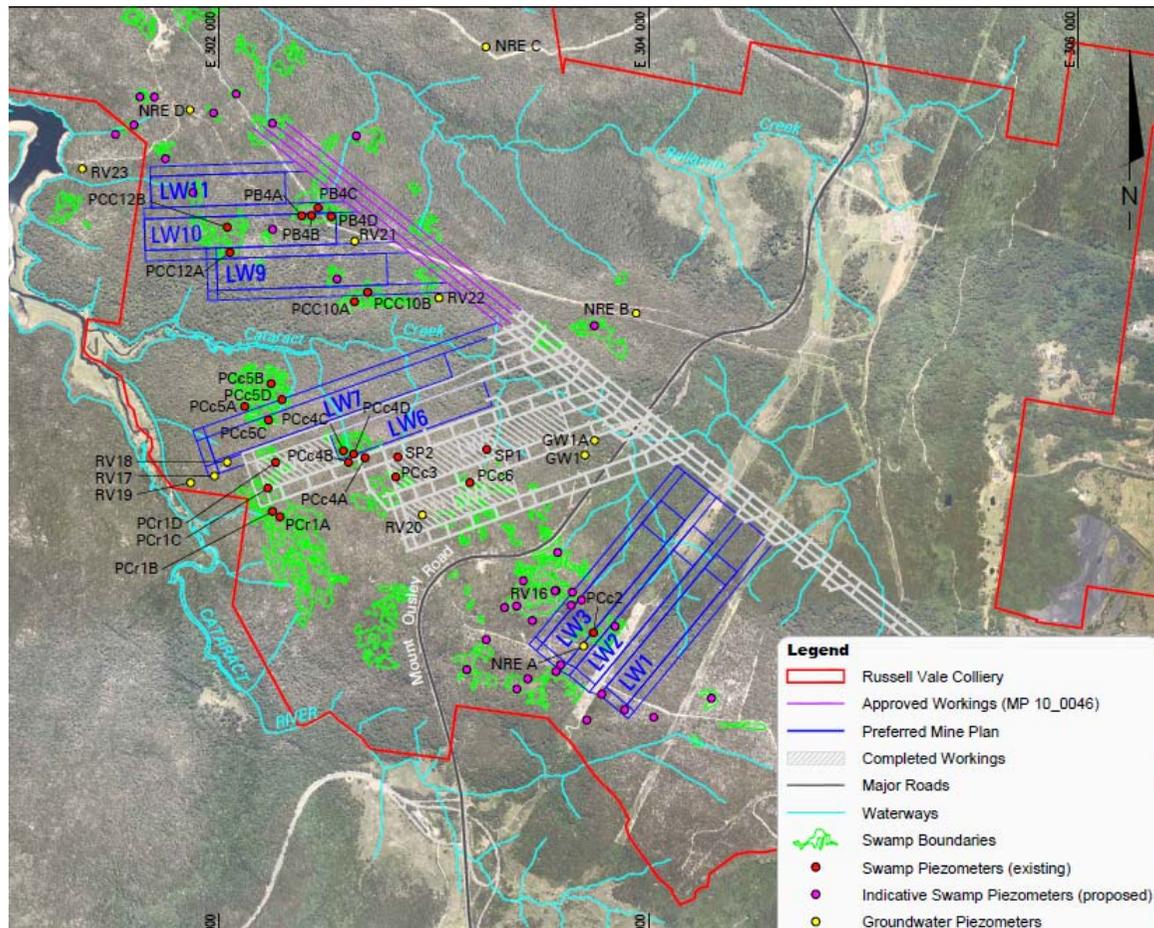
Recommendation 2

The **establishment of a network of piezometers** within and surrounding the upland swamps, the establishment of this network should be **guided by the relevant authorities** (i.e. Office of Environment & Heritage, Water NSW, the Dams Safety Committee and the Department of Planning & Environment)

This network will collect additional baseline data and monitor the impacts to the swamps, through changes to the groundwater supporting the swamps, from the mining

This monitoring **data should be made available to the independent risk assessment panel**

Recommendation 2



- IRAP provided with surface water and piezo data from existing network of 25 swamp piezos
- SOC for additional 30 piezos
- Further approvals will be sought from WaterNSW and DRE as part of REF process
- Sch 3, Cond 12 of draft consent requires IMP to be established by DP&E
- Monitoring data will be made available to the IMP and WaterNSW

Recommendation 3

Any more **definitive policy developed** regarding triggers for offsets and mitigation measures under the

“**Policy** Framework for Biodiversity Offsets for Threatened Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence”

should be made available for **consideration** by the independent risk assessment panel (see Recommendation 1)

Recommendation 3

- NSW Government Recommendation
- The draft Swamp Policy was released in May 2015
- Subject to extensive consultation
- Expected to be finalised in the coming months
- Made available to the IMP when available
- Management Plans will be consistent with any Consent

Recommendation 4

Any **potential offset policy** should address key elements including:

- a. the potential delayed onset of subsidence and associated hydrogeological and **ecological impacts** to swamps;
- b. potential ecological and structural **tipping points**; and
- c. **mechanisms** to adequately **secure** offset sites (with consideration of the current land tenure and exploration licence and mining lease tenements of the proposed offset site; and the need for site specific offset management plans).

Recommendation 4

- NSW Government recommendation
- Requirements stipulated in draft Consent include:
 - ✓ Prior to mining the remainder of LW6, lodge a \$500,000 bond
 - ✓ Following commencement of mining, demonstrate that WCL can obtain offsets for 7 additional swamps (if greater than negligible environmental consequences occur)
 - ✓ Offsets will not be required if monitoring indicates that no greater than negligible environmental consequences have occurred
 - ✓ If performance measures exceeded and remediation not feasible or effective, an offset will be provided

Recommendation 5 - 6

*The proponent's economic assessment, in particular the estimated costs and benefits, should be **updated to reflect the current economic climate***

*The final assessment and determination of the project should be informed by an **independent analysis of the economic costs and benefits** of the project, including any additional information/updated economic assessment provided by the Applicant.*

*The independent analysis should be managed by the Department of **Planning & Environment***

Recommendation 5 – 6

- Gillespie Economics assessed economic benefits of the UEP using projected coal prices and foreign exchange rates for 2016-2020
- Gross revenue of \$323 M
- Royalties of \$23 M
- Project may also generate unquantified company tax benefits and non-market employment benefits

- Regional economic impacts (p.a.):
 - ✓ \$114 M in direct and indirect output
 - ✓ \$96 M in direct and indirect household income
 - ✓ 1,498 direct and indirect jobs
- UEP will generate jobs and economic activity in a region where the unemployment rate is high (Wollongong LGA 7% is higher than state average)

Recommendation 5 – 6

- Revised Economic Assessment was independently reviewed by the Centre for International Economics (CIE)
- Review was commissioned by DP&E
- CIE concluded that:
 - ✓ “... it is reasonable to expect royalties to be above \$AU 23M ...
 - ✓ “Additional benefits arising from company tax are also likely... Therefore, the royalty stream should be interpreted as the minimum net production benefits that can be expected”

Recommendation 7

*The Commission recommends that further consideration of the **noise impacts** of the project needs to be provided including consideration of further noise mitigation measures as recommended by the **EPA***

*Detailed **justification** should be provided for any deviations from the existing **noise limits** in current planning approval*

*Also clarification should be provided on the outcomes and applicability of the **noise audit** required in the **2011** approval*

Recommendation 7

- **Existing Noise Limits**

- ✓ Revised based on long-term noise monitoring and actual sound power levels from site (including adverse meteorological conditions)
- ✓ Previous modelling based on calm conditions

- **Noise Audit**

- ✓ Results from 2012 audit differ from 2015 modelling (worst case)
- ✓ 2015 model is conservative and worst case
- ✓ The noise limits prescribed by DP&E are based on the model results, which assume the simultaneous operation of all equipment at full capacity.
- ✓ The measured noise levels during the audit are lower because the equipment is not necessarily operating at full capacity

Recommendation 7

- WCL assessed the noise controls recommended by EPA and has committed to all measures that are reasonable and feasible
- **Existing** noise controls:
 - ✓ All conveyors joined using vulcanised joints
 - ✓ Cladding on the walls of conveyor drives
 - ✓ Enclosure of the motor room for conveyor RC1
 - ✓ Real time noise monitoring
- **Proposed** noise controls:
 - ✓ Fitting conveyors with poly rollers
 - ✓ Maintaining a minimum level of coal in the loading bin

Recommendation 7

Commitments

- ✓ The truck loading bin will replace the current practice of Front End Loaders to load trucks
- ✓ Undertake a trial to determine whether tripper automation results in a reduction in noise levels
- ✓ Noise barriers would only provide a material benefit to some receivers in Russell Vale
- ✓ Noise monitoring will be undertaken to determine whether a barrier is warranted

"The majority of the EPA's recommendations for noise mitigation measures have been accepted and implemented ... Other specific EPA recommendations for noise control have been accepted and will be implemented" (EPA letter dated 20/08/15)

"The EPA has reviewed the information provided and does not have any further comments" (EPA letter dated 8/10/15)

Recommendation 8 - 10

*The **PM_{2.5}** emissions from the proposal need to be **assessed** prior to any determination of the application*

***Consideration of best practice standards** needs to be provided to demonstrate that **air emissions** would be minimised and to justify the proposed increase in coal handling capacity*

*The mine's existing **monitoring and reporting systems** should be **strengthened** to clearly demonstrate compliance with current conditions, environmental standards and reporting goals (i.e. for **PM_{2.5}** emissions)*

Recommendation 8 -10



- Two real time air quality Monitors provide continuous monitoring of PM_{10} and $PM_{2.5}$
- $PM_{2.5}$ monitoring results will be reported in Annual Reviews and on the WCL website
- *“The EPA acknowledges the community’s interest in fine particulates and supports this proposal [to report $PM_{2.5}$ emissions]” (EPA letter 20/08/15)*

Recommendation 8 – 10

- PM_{2.5} modelling undertaken with no exceedances of the NEPM advisory standards predicted
- WCL will implement the following best practice dust controls:
 - ✓ New truck loading facility
 - ✓ Two new conveyors with enclosures
 - ✓ Underground reclaim
 - ✓ Secondary sizer building
 - ✓ Water sprays on moving tripper
 - ✓ Upgrade fleet from 34 t trucks to 44 t trucks
- WCL will pave the internal haul road and trial chemical agents to further reduce dust emissions

"The revised modelling was undertaken with EPA approved methods and indicates that all sensitive receivers are predicted to experience PM_{2.5} concentrations below the current national NEPM criteria" (EPA letter dated 20/08/15)

Recommendation 11

*Any new approval should retain the existing requirement to **realign Bellambi Creek** or a **full justification** why this is no longer necessary to provide protection to the creek downstream from the pit top surface area*

Recommendation 11

- The proposed flood mitigation strategy is more effective at containing flood waters within the site and requires less land disturbance than the original open channel diversion

Parameter	Proposed Controls	Open Channel Diversion
Reduction in flood impacts to residential properties	Up to 100 year ARI event	Up to 10 year ARI event
Reduction in coal washouts to Bellambi Lane	Up to 100 year ARI event	Up to 10 year ARI event
Stormwater Treatment	Yes	Yes, sediment dams to be sized

"It is recommended that should the PAC ultimately support the Project, a condition of consent be imposed requiring the carrying out of appropriate flood mitigation works as per the recommendations contained in the Cardno 2015 Bellambi Gully Flood Study" (WCC Letter dated 14/10/15)

Recommendation 12 – 13

*The proponent should negotiate with Council and Roads & Maritime Services regarding **maintenance contributions** to **mitigate impacts** from the increase in **truck movements** along the haulage route*

*Consideration should be given to **further limiting** the hours of **truck movements***

Recommendation 12 – 13

- WCL is negotiating a VPA with WCC including a contribution towards maintenance of Bellambi Lane (proportionate to the UEP's usage of the road)
- Truck movements will be limited to the previously-approved haulage hours:
 - ✓ 7 am to 10 pm on weekdays
 - ✓ 8 am to 6 pm on weekends and public holidays
- The proposed increase in trucks (22 to 34 per hour) has been estimated to increase the current road traffic noise levels by up to 1.7 dBA (during the day only)
- This is considered negligible, particularly within the historical context of noise levels generated on Bellambi Lane until 2009
- SOC - a "driver code of conduct" will be enforced to avoid risks to public safety

Recommendation 14

Proponent should **investigate and cost** a number of options to **reduce** the **noise impacts** to the most effected residents along Bellambi Lane, particularly those near the intersections with the Princes Highway and the Northern Distributor

Options to be considered by the proponent, should include, but not be limited to:

- a. construction of a **coal truck parking area** (for trucks to wait prior to the commencement of haulage hours) within the mine boundary;
- b. construction of a **noise barrier** near the intersections of Bellambi Lane/Princes Highway and Bellambi Lane/Northern Distributor; and
- c. use of **pavement modifications** along Bellambi Lane to reduce truck/trailer banging.

Recommendation 14

- A **truck parking area** with sufficient capacity within the mine infrastructure area is proposed and will be constructed
- The **pavement of Bellambi Lane** was previously upgraded by RMS
- If further pavement modifications are required, WCL will consult with WCC regarding contributions to this work (as part of the VPA)
- **Noise barrier** - Assessment was undertaken by Wilkinson Murray (2015) which demonstrated that:
 - ✓ Any noise barrier would provide limited and barely discernible reductions for the majority of the site
 - ✓ Trucking to contribute 1.7 dBA to Bellambi Lane (which is considered minor)
 - ✓ A noise barrier would be potentially visually intrusive and 'unreasonable' from a cost perspective

Recommendation 14



Bellambi Lane / Northern Distributor Intersection



Bellambi Lane / Princes Highway Intersection

Recommendation 15

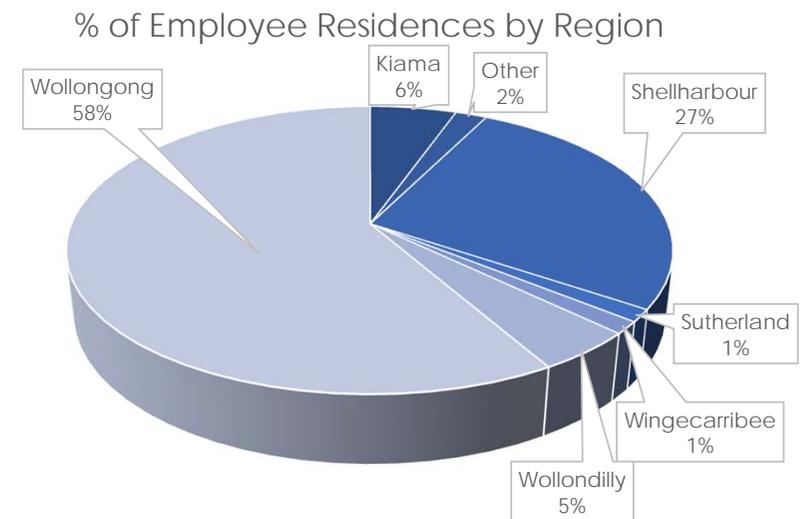
*No increase in the currently approved **maximum rate** of extraction should be approved without clear demonstration that **facilities can handle the additional volume** without unacceptable impacts for local residents*

Recommendation 15

- Simulation undertaken by Hatch which confirmed that the Russell Vale surface infrastructure can accommodate a throughput of 3 Mtpa
- Air Quality and Noise assessments have been undertaken for the maximum production rate of 3 Mtpa
- *"The revised modelling was undertaken with EPA approved methods and indicates that all sensitive receivers are predicted to experience $PM_{2.5}$ concentrations below the current national NEPM criteria" (EPA letter dated 20/08/15)*
- *"The Department considers that the implementation of these measures, in conjunction with best practice particulate matter control, would allow the pit-top facilities to operate within relevant dust criteria, despite the proposed increase in coal handling capacity" (DP&E Addendum Report)*

WCL in the Community

- Russell Vale Colliery remains an integral part of the local community in which it has operated in excess of 100 years
- Positive impact on the Local Community and Wollongong LGA work force through increasing employment over the life of the project for ~ 300 employees
- Other positive social impacts:
 - ✓ Potential future expansion of businesses with increased local spending on goods and services
 - ✓ Ensuring ongoing employment in the mining sector across WCL operations in the Illawarra
 - ✓ Improved environmental management of air quality, noise, water, traffic and dust impacts
 - ✓ Continue to identify and support development programs in the local and regional community



Conclusion

- WCL has carefully considered and responded to the 15 Recommendations made by the PAC
- Extensive monitoring within the water supply catchment will be undertaken to improve understanding of mining impacts on water resources
- The approval of the UEP will ensure:
 - ✓ The continuity of operations at Russell Vale Colliery for an additional 5 years
 - ✓ Employment for up to 300 personnel
 - ✓ Socio-economic benefits to the region and state including \$23 M in royalties