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Dendrobium Mine Extension Project (SSD-8194)

Resource & Economic Assessment

Division of Resources & Geoscience

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More information

Assessment Coordination Unit, Resource Assessments – Division of Resources & Geoscience
assessment.coordination@planning.nsw.gov.au or 02 4063 6534

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Executive summary

Determination

The Division of Resources and Geoscience (the Division) assessed the Dendrobium Mine Extension Project (Dendrobium Project or the Project).

The Division determined the Project will:

- ensure continued operations at the Dendrobium Mine until 2048.
- without the Project the existing Dendrobium Mine would cease operations in 2024.
- improve resource recovery and be an efficient use of resources.
- ensure an appropriate return to the NSW Government including;
    - $680 million royalties (current dollars)
    - $10.4 billion total revenue (current dollars)
- ensure continued employment for the around 500 strong workforce at the existing Dendrobium Mine.
- Continue to supply the majority (along with blended coal from the Appin mine) of the coking coal to the nearby BlueScope steelworks.

The project

The Dendrobium Mine Extension Project (SSD 8194) entails an underground mining operation proposed to extract approximately 77.6 million tonnes (Mt) of Run-of-Mine (ROM) coal over 23 years, until 2048, at a maximum of 5.2 million tonnes per annum (Mtpa) ROM coal. The Project will utilise existing infrastructure owned by the proponent, which includes the Dendrobium Pit Top, Kemira Valley Coal Loading Facility, Dendrobium Coal Preparation Plant and shafts. Product coal will be transported to the Port Kembla Steelworks or Port Kembla Coal Terminal (PKCT).

Introduction

State significant development is regulated under the *Environmental Planning and Assessment Act 1979*, which requires a proponent to apply to the Department of Planning, Industry and Environment for development consent, supported by an Environmental Impact Assessment (EIS).

This Resource & Economic Assessment (REA) conducted by the Division assessed:

- the social and economic benefits to NSW including royalties, capital investment, revenues and jobs.
- the resource/reserve estimates stated in the proponent's EIS.
- if the Proposal is an efficient development of the resource, that resource recovery is optimised and waste minimised.
- if the Proposal will provide an appropriate return to the state of NSW.

The objects of the *Mining Act 1992* are to encourage and facilitate the discovery and efficient development of mineral resources in NSW.

Of particular relevance to this REA are section 3A Objects:

- to recognise and foster the significant social and economic benefits to NSW that result from the efficient development of mineral resources.
- to ensure an appropriate return to the State from mineral resources.

The relevant section of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 is Part 3, Clause 15: Resource Recovery requires that resource recovery is efficient, optimised and minimises waste.

Project overview

The Dendrobium Project is located about 8 kilometres west of Wollongong in the Southern Coalfield of NSW. The Project is operated by Illawarra Coal Holdings Pty Ltd, a wholly owned subsidiary of South32 Limited (South32 or the Proponent).

The Project entails an underground mining operation proposed to extract approximately 77.6 Mt ROM coal, at a maximum of 5.2 Mtpa ROM coal, specifically from Areas 5 and 6 (see figure 1 below) within Consolidated Coal Lease 768 (Act 1973). The Project is proposed to extend the Dendrobium Mine life until 2048. The project will utilise existing infrastructure at the Dendrobium Mine, which includes pit tops, coal preparation plant, coal loading facility and rail facilities. The Project will involve the augmentation of current infrastructure and development of additional infrastructure.

The Project plans to extract coal from the Bulli and Wongawilli Seams using longwall mining methods, maximising resource recovery. While the mining method maximises resource recovery South32 has reduced the mining footprint in order to not impact on subsidence sensitive surface features while maintaining commercial viability. In some areas, longwall length has been reduced (from both the commencing and finishing ends) and other areas will be left unmined. Coal resources in these unmined areas will not be commercially viable once mining of the longwall panels is complete, resulting in the sterilisation of remaining coal.

The Dendrobium Mine is currently operating longwalls in Area 3B. The next operating area, Area 3C, has high levels of carbon dioxide gas. The geological conditions within the area mean there is significant lead time to drain gas in Area 3C to a safe level. Mining Area 5, while working to make Area 3C safe, is critical to allow continued operations at Dendrobium Mine.

The Project would also continue to supply a large proportion of the coal that is exported from the PKCT. This coal export facility has been running under capacity for many years and without the coal supplied from the Project, the coal terminal would be placed in further decline.

Given the constraints outlined in the Proponent's EIS, the Division considers the Project to be an efficient development of coal resources that provides an appropriate return to the NSW Government.

If the Project is not approved, production at Dendrobium Mine will cease in about 2024.

The Division notes that this REA has been undertaken in accordance with commercial-in-confidence resource and mine schedule data supplied by the Proponent in relation to the Project.

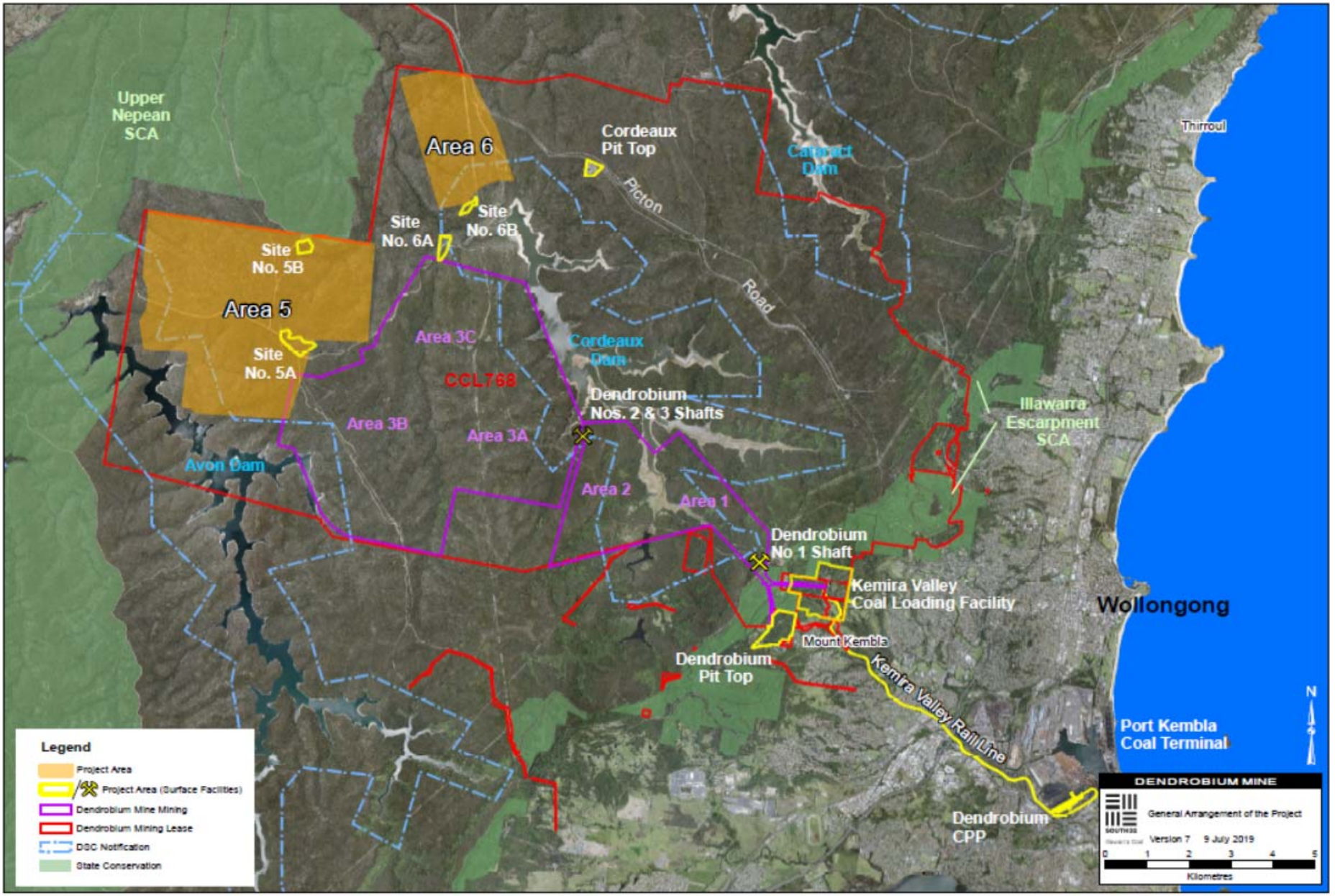


Figure 1. Dendrobium Project layout

Size and quality of the resource

The Dendrobium Mine is located within the Southern Coalfield of the Sydney Basin. Coal resources are contained within the Bulli and Wongawilli Seams of the Illawarra Coal Measures. These seams are the major contributors to coal production in the Southern Coalfield which is predominantly coking coal.

The Division has verified that the Dendrobium Project will produce 77.6 Mt of ROM coal and 64.2 Mt of product coal. This is in addition to 34.7 Mt ROM coal production in the currently approved in Dendrobium Area 3 (DA 60-03-2001).

The Proponent has completed coal resource and reserve estimations for the Project in accordance with the Australasian Code for Reporting Exploration results, Mineral Resources and Ore Reserves (the JORC Code). The JORC Code is an industry-standard professional code of practice that sets minimum standards for public reporting of minerals exploration results, mineral resources and ore reserves.

The Proponent will continue to sell coal from the Project to their coking and thermal coal customers. Up to 50% of the hard coking coal product will be sold to the Port Kembla Steelworks. The remaining coking coal and thermal coal products will be exported.

Raw ash levels necessitate washing of the ROM coal to meet export market specifications and maximise product value. All coal will be processed at the existing CHPP then transported to Port Kembla for export or use in steel manufacture.

The Bulli and Wongawilli Seams have complimentary characteristics that when blended produce a prime hard coking coal. Both seams also produce a thermal coal fraction when beneficiated. The Wongawilli Seam typically has a lower yield of coking coal and higher yield of thermal coal than the Bulli Seam. The Project will produce about 90% metallurgical coal and 10% thermal coal.

A review of coal quality data confirms the proposed product quality, market split, and yield are achievable.

Project approval vital to mine continuity

The Dendrobium Mine is currently operating longwalls in Area 3B. Area 3C has high levels of carbon dioxide gas. Geological conditions mean there is significant lead time to drain gas in Area 3C to a safe level. Mining Area 5, while working to make Area 3C safe, is critical to allow continued operations at Dendrobium Mine.

If the Project is not approved, production at Dendrobium Mine will cease in about 2024.

Resource recovery

The Proponent assessed several mine designs and determined the proposed Dendrobium Project mine design is most appropriate. Many factors constrain a mine plan and extraction methodology and therefore also the resource recovery including geological features, environmental constraints, and commercial viability.

The Bulli and Wongawilli Seams are the only commercially viable mining targets at the Dendrobium Mine. Other seams such as the Balgownie and Tongarra are too thin or high in ash content to be commercially viable.

The Bulli Seam will be extracted in Area 5 with the Wongawilli Seam being affected by igneous intrusions in this area, hence will not be mined here. The entire Bulli Seam will be extracted with mining height ranging up to about 3 metres.

The Wongawilli Seam will be extracted from Area 6. The Bulli Seam is high in raw ash content in this area and will not be mined here. The Wongawilli Seam in this area ranges up to about 10 metres thick and contains numerous bands of non-coal partings. The working section of the Wongawilli Seam is the basal 3 to 5 metres currently mined at Dendrobium Mine. This is typical of the Wongawilli Seam across the Southern Coalfield.

A maximum working section of 3.9 metres is proposed for the Project. This is consistent with the design of recent longwalls mined in Area 3B. Limiting the mining height to 3.9 metres has reduced resource recovery and potential economic benefits to the State. The mining height was reduced to manage impacts to subsidence sensitive surface features.

Coal resources will be extracted using underground longwall mining methods, maximising resource recovery. While the mining method maximises resource recovery the Proponent has reduced the mining footprint in order to not impact on subsidence sensitive surface features. In some areas, longwall length has been reduced (from both the commencing and finishing ends) and other areas will be left unmined. Coal resources in these unmined areas will not be commercially viable once mining has finished, meaning they will be sterilised.

The Proponent has reduced resource recovery to manage subsidence sensitive surface features while maintaining commercial viability. Given the constraints outlined in the Proponent's EIS, the Division considers the Project an efficient development of coal resources that provides an appropriate return to the NSW Government.

Economic benefits of the resource

Over the life of the Dendrobium Project, assuming the majority of production is sold on the export and domestic coking coal markets and a smaller proportion on the export thermal market, the Division estimates the value of the coal produced would be around A$10.4 billion in current dollars. The net present value of this revenue stream is around A$3.9 billion, at a real discount rate of 7%.

Export income is vital for the health of both the NSW and Australian economies. Export income also contributes to the Nation's balance of trade, providing benefits to state and federal credit ratings, plus it generally has a positive impact on the value of the Australian dollar exchange rate. If approved, the additional export income from the Project would contribute to the A$19.7 billion (2017-18 total) of coal exports annually from NSW.

The Project if approved would also continue supplying coking coal to the BlueScope steelworks at PKCT, near the Dendrobium Mine. The Dendrobium Mine has supplied coal, for many decades, to the steelworks, which is blended with coal from the neighbouring Appin Mine, also owned by South32.

Coal from the Project would continue the existing arrangements that South32 has with BlueScope for supply of coking coal to the Port Kembla Steelworks. If coking coal from the Project was not available to blend with coal from the Appin Mine, South32 could not continue to supply the coal product that the steelworks currently uses. There could be adverse implications for this important industrial facility, which has been a vital part of the economic fabric of the Illawarra region for many decades. The Division has not conducted a detailed analysis into the impact of the Project not being approved on the BlueScope steelworks, however any disruption to coking coal supply could place uncertainty over the future financial viability of the plant.

Also, the Project would continue to supply a large proportion of the coal that is exported from the PKCT. This coal export facility has been running under capacity for many years and without the coal supplied from the Project, the coal terminal would be placed in further decline. In 2017-18 PKCT had a throughput of 4.3 Mt, which is significantly below the PKCT maximum rated capacity of 18 Mtpa. Export throughput has improved in 2018-19 to be around 6.7 Mt, although still less than 50% of capacity.

The Project, if approved, would continue to provide up to 500 full time operational jobs from the existing Dendrobium Mine. Without the Project the existing Dendrobium Mine would close at the end of 2024. The Division estimates that these direct mine jobs would result in around an additional 2000 indirect jobs, in both mine and non-mine related services. Total capital investment for the Project is approximately A$732 million.

The Division also notes from the Economic Assessment prepared by the Proponent's economic consultant (Cadence Economics) that the Project would deliver a net benefit to NSW in NPV terms of A$1,073 million.

Coal royalty calculation

The Dendrobium Project is a proposed underground mine therefore a royalty rate of 7.2% applies to saleable production, extracted from areas less than 400 metres depth and 6.2% for areas greater than 400 metres depth. These rates are applicable to the net disposal value. Net disposal value is the price received per tonne minus any allowable deductions. The main allowable deduction is for coal beneficiation, which is either $3.50 per tonne for coal subjected to a full washing cycle, $2.00 per tonne for coal subjected to a simple washing process, or $0.50 per tonne for coal that is washed and screened.

As a majority of the ROM coal is subject to the full washing cycle, a deduction of $3.50 per tonne from the value of coal produced applies. A deduction for levies also applies which amounts to no more than $1.00 per tonne. Hence allowable deductions for royalty for the Project are $4.50 per tonne.

One of the most important assumptions in the calculation of future royalty is the estimate of a future coal price. Coal from the Project is expected to be sold mainly into the export and domestic coking coal markets and a smaller proportion into the export thermal market. A review of coal quality information by the Division suggests this is achievable.

Coal price forecasting is inherently difficult and over the project life variations in coal prices are expected. The average price, used by the Division, is around A$170 per tonne for export and domestic coking coal, and around A$90 for the export thermal coal.

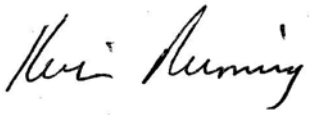
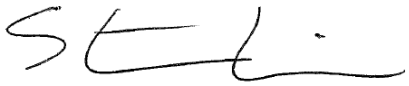
Another important aspect of future royalty calculation is estimating future annual production. The Division has estimated that if the Project is approved, around 64 Mt of product coal would be able to be economically mined from the Project over the lifetime.

Using the above parameters, the Division has calculated that the State will receive around A$680 million, in current dollars, and around A$254 million in NPV terms (real discount rate of 7%) in royalty from the Project. The average royalties payable to NSW Government from the Project is around A$23 million per year.

Departmental Assessment

Assessed by	Unit	Branch
Assessing Officer: Tully Matthews A/Manager Coal Resource Assessment	Strategic Resource Assessment & Advice	Geological Survey of NSW
Assessing Officer: Bryan Whitlock Senior Resources Analyst	Resource Economics	Resources Policy, Planning & Programs
Assessing Officer: Adam W. Banister Senior Advisor	Assessment Coordination Unit – Resource Assessments	Resource Operations

Approvals

Approved by	Signature	Date
Approving Officer: Dr Kevin Ruming Director Strategic Resource Assessment & Advice		17/09/2019
Approving Officer: Tamsin Martin Director Resources Planning & Programs	 *See note in CM9	10/09/2019
Endorsing Officer: Stephen Wills Executive Director Resource Operations		18/09/2019