NSW GOVERNMENT | Planning & Environment
Resources & Geoscience

Vickery Coal Extension Project

Division of Resources & Geoscience

Resource & Economic Assessment

October 2018

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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 and Environment for development consent, supported by an Environmental Impact Statement (EIS).

This Resource & Economic Assessment conducted for the Vickery Coal Extension Project (the Project) by the Division of Resources & Geoscience (the Division) is designed to review the resource/reserve estimates stated in the proponent's EIS to assess whether the Project will deliver significant social benefits and an appropriate economic return to New South Wales from the development of the resource, and if resource recovery is optimised and waste minimised. As part of this assessment, the Division has conducted an independent calculation of the royalty to be generated over the life of the Project.

The objects of the *Mining Act 1992* are to encourage and facilitate the discovery and efficient development of coal resources in New South Wales. Of particular relevance to this Resource & Economic Assessment are:

Section 3A Objects:

(a) to recognise and foster the significant social and economic benefits to New South Wales that result from the efficient development of coal resources, and

(d) 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 Vickery Coal Extension Project is 100 percent owned by Whitehaven Coal Limited (Whitehaven or the Proponent). The Project is located in New South Wales about 20 kilometres north of Gunnedah. Whitehaven is the third largest exporter of coal in the state and the Project, if approved, would be one of the largest producing mines in its portfolio of New South Wales operations, all of which are located in the Gunnedah Basin.

An approval for the Vickery Coal Project was granted by the New South Wales Government in September 2014, for an open cut mine to produce at a maximum run-of-mine (ROM) rate of 4.5 million tonnes per annum (Mtpa). There has been no construction or production to date following the 2014 approval. Whitehaven is seeking a new Development Approval for an extension of open cut mining operations at Vickery, with a maximum ROM production rate of ten Mtpa.

The Project is east of the Boggabri Ridge in the Maules Creek sub-basin of the Gunnedah Basin. The Gunnedah Basin is one of the Sydney-Gunnedah Basin's five major coalfields. There is a long history of coal mining in the Gunnedah Basin. Six open cut coal mines and one underground coal mine currently operate in the Basin. These mines produce thermal and metallurgical coal.

Saleable coal production from the Gunnedah Basin has increased significantly in the past ten years from around three Mtpa in 2007 to around 28 Mtpa in 2017. Whitehaven produced 77 percent of the 28 Million tonnes (Mt) produced in 2017. The Gunnedah Basin currently produces around 15 percent of total New South Wales saleable coal production.

If approved, the Project will:

- Be a new large scale open cut coal mine in the Gunnedah Basin.
- Provide an additional eight Mtpa of saleable coal in a typical year at full production.
- Be the second largest coal mine in the Gunnedah Basin.
- Result in the region producing close to 20 percent of total New South Wales coal production.

Only the most recently approved Whitehaven mine in the region, the Maules Creek open cut mine, will have a higher production rate, with around ten Mtpa of saleable coal produced in 2017-18.

The Vickery Mine was previously owned, operated and rehabilitated by Rio Tinto Limited. Underground Mining commenced in 1986 and ceased after approximately six years. Open cut operations began in 1991, on a small scale for eight years, producing approximately four Mt of product coal. Rehabilitation activities began in 1998 and are now complete. The site is currently in care and maintenance.

Whitehaven propose to develop a new Coal Handling and Preparation Plant (CHPP), rail loop and load out and all necessary infrastructure on-site to support the Project. Once operational, the life of the Project will be approximately 25 years. All coal from the Project will be transported by rail to the Port of Newcastle for export.

Whitehaven has extensive open cut coal mining experience in the Gunnedah Basin. Whitehaven currently operate six of the seven mines in the Gunnedah Basin: five open cut mines (Maules Creek, Tarrawonga, Werris Creek, Rocglen and Sunnyside) and one underground mine (Narrabri).

Size & Quality of the Resource

The Division has verified that the Project will provide approximately 179 Mt of ROM coal and 159 Mt of product coal. The Proponent has completed a coal resource and reserve estimation 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 Project's targeted coal seams are high volatile bituminous in rank, and suitable for export thermal, Pulverised Coal Injection (PCI) and semi-soft coking markets. Coals from the Maules Creek sub-basin are typically very low in ash and sulfur content. The Project will produce a semi-soft coking coal product and a low ash thermal coal product. Whitehaven estimates 70 percent of product will meet the export coking coal markets, split between an estimated six percent ash semi soft coking coal product and a PCI coal. The remaining 30 percent product would be sold into export thermal coal markets as a ~15 percent medium ash product.

Raw ash levels within the coal necessitate washing to meet export market specifications. Approximately 60 percent of coal will be processed by the new CHPP prior to transport for export, with remaining ROM coal bypassing the CHPP. A review of coal quality data suggests the proposed product quality, target export market split and yield are achievable. The Division considers that a total of approximately 159 Mt of saleable product coal from the Project is feasible.

The number of products, their specifications and contribution to export products at the Project may be modified depending on market requirements and pricing. Whitehaven may also blend coal from the Project with coal from the Rocglen and Tarrawonga Coal Mines at the CHPP on-site, or with other Whitehaven coal products at the Port of Newcastle. The new CHPP and its ability to process and blend coals from nearby Whitehaven owned mines would be of significant economic benefit to both the Project and to Whitehaven in general, as it provides additional market flexibility to export customers.

Resource Recovery

Whitehaven has assessed many potential mine designs and determined the mine design in the Project proposal is the most appropriate. Many factors constrain the mine plan and extraction methodology, and therefore the resource recovery at the Project. These include geological features, environmental constraints and commercial viability. Consistent with most open cut operations, a major constraint to resource recovery at the Project is strip ratio. The life of mine strip ratio is approximately 10:1 banked cubic metres/tonne ROM.

Coal resources are proposed to be extracted using truck and excavator methods. All seams amenable to mining will be extracted in the open cut. Minor coal plies too thin to be viably recovered with open cut mining equipment have been excluded from the mine design as have coal seams affected by weathering.

Given the matters outlined in the Proponent's EIS, the Division's Strategic Resource Assessment & Advice unit considers the Project mine plan to adequately recover coal resources and provide an appropriate return to the State within the mine footprint, giving due consideration to the particular constraints of the location.

Final landform

The Project if approved will result in waste rock emplacement reaching an elevation of approximately 370 metres Australian Height Datum (AHD) (*Vickery Extension Project EIS, p 5-15*). This is similar to the height of the currently consented mine plan, and approximately 100 metres higher than the pre-mining topography.

Improvements to the approved mine landform include the incorporation of micro-relief (allowing the replication of natural drainage) and macro-relief (reducing visual impacts by more closely following the surrounding landforms).

The Proponent's submission outlines a number of changes to the previously approved mine plan, which should reduce the overall environmental impact of the Project including:

- Removal of the Eastern Emplacement from the Project, which Whitehaven asserts will improve integration of the Project final landform with the surrounding landscape.
- Improved visual amenity by the avoidance of the Eastern Emplacement being left as a permanent feature of the final landform.
- A single final void (in addition to the existing Blue Vale void), improving the current landform which includes five final voids and the approved mine landform which included Northern and Southern final voids.

Consideration of other options for the Project final landform was undertaken by Whitehaven as outlined in section 6.1.10 of the Project EIS. The environmental benefit outlined by Whitehaven of the final void acting as a groundwater sink, "limiting the flow of water from waste rock emplacement areas to the Upper Namoi Alluvium" (*Vickery Extension Project EIS, p 6-15)* is consistent with the Development Consent for the mine.

An estimate of $4 per cubic metre for overburden to be rehandled to partially or fully fill the final void has been quoted in the Project EIS. This estimate is in line with current industry costs. The total cost estimated by the Proponent to partially or fully fill the final void is around $440 to $600 million.

The document does not detail other costs for filling the void such as a re-designed dumping strategy in the final years of the Project's life. Length of truck haul distance for out-of-pit overburden emplacement is a critical cost component for any open cut coal mine.

The assessment of measures to mitigate environmental impacts associated with the Project is a matter for the Resources Regulation Division. The Division has examined the final

landform for the Project outlined in the EIS and does not dispute the mining method proposed.

It is, however, recommended that if time permits consideration is given to an independent expert examination of the proposal be carried out, focusing on whether the final landform is the best alternate option, in the context that there is an existing project approval.

Economic Benefits of the Resource

Over the life of the Project, assuming all production is sold on the export thermal (30 percent) and metallurgical (70 percent) coal markets, the Division has estimated that the value of the coal produced would be around $20 billion in current dollars, with the net present value of this revenue stream of around $9 billion at a real discount rate of seven percent.

Export income is vital for the health of both the New South Wales and Australian economy. Export income also contributes to the Nation's balance of trade, which provides benefits to both the state and Australian 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 around $19.7 billion (2017-18 total) of coal exports annually from New South Wales. Coal exports are the largest value export from New South Wales, representing around 45 percent of the state's merchandised goods exports.

The Project, if approved, would provide 450 full time operational jobs. The Division estimates that these direct mine jobs would result in around an additional 1800 indirect jobs in both mine and non-mine related services. Capital investment for the Project would be of the order of $717 million. Operating expenditure for the Project would be of the order of $5.4 billion over the Project life. As a large proportion of the operating expenditure over the life of a mine is wages paid to mine workers, a significant amount of this expenditure would be spent in the regional economy for Gunnedah and surrounding localities.

The Division also notes from the Economic Assessment prepared by the Proponent's economic consultant (AnalytEcon) that the Project would deliver the following net benefits to NSW in NPV terms, if approved:

- Incremental disposable income payments of $271 million to New South Wales residents.
- Incremental company income tax payments to New South Wales of $121 million.
- Incremental profits accruing to New South Wales shareholders of Whitehaven of $53 million.

- Other incremental benefits to New South Wales, comprising of personal income taxes and Medicare payments, payroll taxes, land taxes and local government rate payments, amounting to $91 million.
- AnalytEcon has also estimated royalties to the New South Wales Government of $671 million in Net Present Value (NPV) terms, which is slightly less than the independent royalty calculation conducted by the Division (see later section – Coal Royalty Calculation). The difference relates to slightly higher coal price assumptions used by the Division.

Coal Royalty Calculation

The Project is a proposed open cut mine therefore a royalty rate of 8.2 percent pplies to all saleable production. This rate is 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 ROM coal from the operation 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 would amount 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 over the life of a project. Coal from the Project is expected to be sold into the export thermal (30 percent) and metallurgical markets (70 percent). A review of coal quality information by the Division suggests this is achievable.

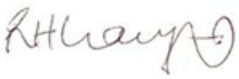
Coal price forecasting is inherently difficult and over the project life variations in coal prices are expected. An average price of around A$110 per tonne for the export thermal coal, and around A$130 per tonne for the metallurgical coal from the Project have been used by the Division. The Division considers these prices to be conservative and at the bottom end of potential coal price scenarios.

Another important aspect of future royalty calculation for a proposed coal project is estimation of future annual production. The Division has estimated that if the Project is approved, around 159 Mt of product coal would be able to be economically mined from the Project.

Using the above parameters, the Division has calculated that the State will receive around $1.54 billion in current dollars, and around $695 million in NPV terms (real discount rate of 7 percent) in royalty from the Project. In a typical year at full production the New South Wales Government would receive around $80 milllion in royalties from the Project.

Assessment Approvals

Table 1 – Divisional Approvals

Position	Signature or CM9 approval	Date
Approving Officer: Rob Larkings Manager Coal Resource Assessment		11/10/2018
Approving Officer: Bryan Whitlock A/Manager Resource Economics	Approved in CM9	11/10/2018
Endorsing Officer: Dr Mark Armstrong A/Director Strategic Resource Assessment (02) 4063 6708		12/10/2018
Endorsing Officer: Tamsin Martin Director Resources Planning & Programs (02) 4063 6584	Approved in CM9	17/10/2019
Endorsing Officer: Dr Kevin Ruming A/Executive Director Resource Operations (02) 4063 6689	Approved in CM9	18/10/2019