Vasse Coal Project

Vasse Coal Management Pty Ltd

Report and recommendations of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia

Report 1395
May 2011

Assessment on Proponent Information – Category B
Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
13 Oct 10	Referral received	
21 Mar 11	Level of assessment advertised	23
02 May 11	Publication of EPA report	6
16 May 11	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority did meet its timeline objective in the completion of the assessment and provision of a report to the Minister.

Dr Paul Vogel
Chairman
2 May 2011

ISSN 1836-0483 (Print)
ISSN 1836-0491 (Online)
Assessment No. 1877
Report 1395 Vasse Coal Proposal

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1. Introduction and background

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal by Vasse Coal Management Pty Ltd (VCM) to develop the Vasse Coal Project (VCP) consisting of an underground coal mine, a coal handling and preparation plant, transportation and associated mine infrastructure.

LD Operations Pty Ltd (LDO) has been charged by VCM to act on its behalf to facilitate the feasibility, approvals and development of the proposed VCP.

The VCP was referred to the EPA by a third party on 13 October 2010.

The EPA requested further information from LDO on 10 November 2010. LDO, acting on behalf of the proponent (VCM), provided referral information to the EPA on 30 November 2010.

The EPA opened the proponent's information for public comment from 2 – 15 December 2010, and 793 individual comments were received.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- The key environmental factors identified in the course of the assessment; and
- The EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The proponent has submitted information setting out the details of the proposal, potential environmental impacts and proposed commitments to manage those impacts.

The EPA considers that the proposal, as described in the proponent's documentation, cannot meet the EPA's environmental objectives.

The EPA has therefore determined under Section 40 of the EP Act that the level of assessment for the proposal is Assessment on Proponent Information (API) Category B (environmentally unacceptable), and this report provides the EPA advice and recommendations in accordance with Section 44 of the EP Act.

2. The proposal

The proposed mine site area for the VCP is located 260 kilometres (km) south of Perth and 15km east-northeast of the town of Margaret River in Western Australia (WA). See Figure 1.

The VCP proposal comprises three main components: minesite, coal handling and preparation plant (CHPP) and transport route.

Minesite

Development of the minesite involves underground mining of the Osmington Seam of the Sue Coal Measures.

The surface mine infrastructure and entrance to the underground would be located on an approximate 80 hectare (ha) parcel of land owned by the proponent, which is largely cleared agricultural land currently used for cattle grazing plus one dwelling. The proposed mine site area abuts the North-East Margaret River and Blackwood State Forests immediately to the north. Rezoning of the land may be required for development of the mine.

The proposed minesite would have a surface footprint of up to 40ha, with an extensive underground network of tunnels totalling 1200ha. See Figure 2.

The underground mine would be 160 – 500 metres (m) below the ground surface, some of which underlies the North-East Margaret River and Blackwood State Forests, as well as the Margaret River (including two of its permanent pools).

The proposed underground mining area would be located within the Sue aquifer, which is overlain by the Leederville aquifer.

The mine would produce between 1.0 – 1.5 million tonnes per annum of run of mine coal over a 15 – 20 year life of mine.

The proposal covers seven mining leases: ML70/393 which would contain the surface mine infrastructure, and ML70/394-395, ML70/275-277 and ML70/504 which cover the underground area.

The surface mine infrastructure includes two water dams, mine pump-out water treatment facility, enclosed conveyors, truck loop, land bridges workshop etc. The underground mine infrastructure includes road voids, a network of conveyors to the surface, surge bin, workshop etc. It is not proposed to stockpile coal on site at the surface.

Emissions such as dust, noise, light and waste products would be produced as a result of the mining and associated activities.

The emissions from the mine ventilation shaft have the potential to include low concentrations of fugitive general body methane liberated from the coal cutting process and dust.

Figure 1: Regional location

Vasse Coal Proposal
Areas within Conceptual Underground Mining Layout Footprint

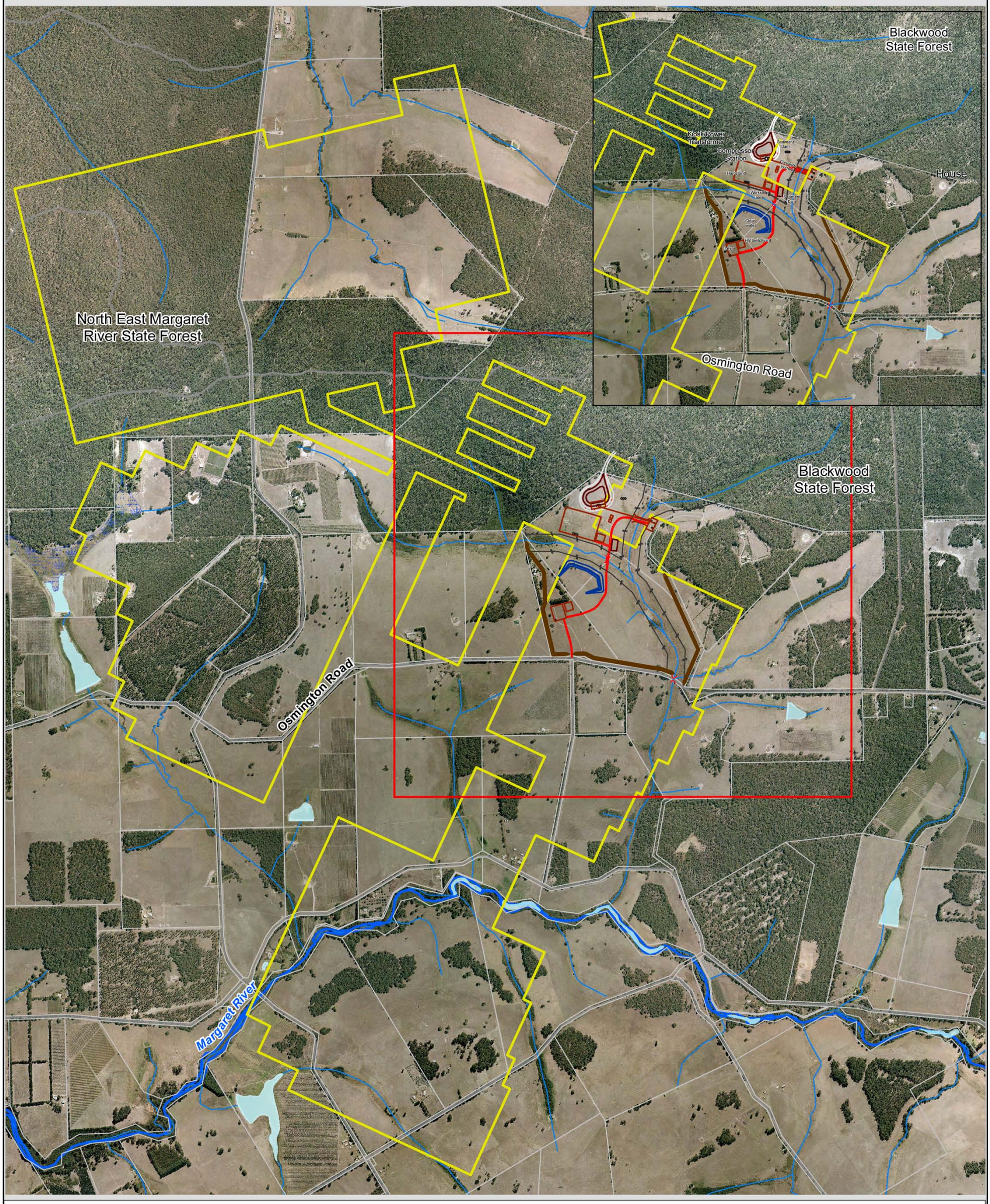

Figure 2: Minesite location

Coal Handling and Preparation Plant (CHPP)

The CHPP is proposed to be located approximately 5km north-east of the town of Capel in WA.

The CHPP is to be located on an approximate 64ha parcel of land owned by Iluka Resources Limited, and located within the existing industrial buffer-zone of the North Capel Synthetic Rutile Plant. Rezoning of the land may be required for development of the CHPP.

The CHPP would be located on largely cleared agricultural land that is currently being used for grazing cattle; however the site contains remnant vegetation in good condition.

The CHPP consists of a preparation plant, stockpiles, loading and unloading loops, tailings dams, clean water dam etc.

Emissions such as dust, noise, light and waste products would be produced as a result of the processing and associated activities.

Transport route

The proponent's preferred transport route from the mine site to the CHPP is along existing roads some of which traverse pine plantation and parts of the Blackwood State Forest (State Forest 22 Treeton Block).

The proposed transport route would require the upgrade of 22km of existing forestry roads (from the mine at Osmington Road through State Forest 22 Treeton Block) and also the upgrade of Cane Brake and Sabina Roads. The route would then utilise Sues Road and the Bussell Highway through to the CHPP at Capel.

The proponent has stated that eleven (11) alternate routes were considered before deciding on the preferred route, but the details of these other options have not been provided.

Upgrade of the existing roads for the proponent's preferred route would require the clearing of approximately 60ha of native vegetation and harvesting of 52ha of pine plantation. Some of the native vegetation along this route is in very good condition and contains species of conservation significance.

The proponent intends to transport processed coal products from the CHPP to the Port of Bunbury for export (the proponent is also considering options for transportation to domestic users).

The main characteristics of the proposal are summarised in Table 1.

Table 1: Summary of key proposal characteristics

Element	Description
General	
Project Life	15 – 20 years
Area of disturbance	Disturbance required (including vegetation clearing): • Surface mine, 20 – 40 ha • Underground mine, approx. 1200 ha • Coal Handling and Preparation Plant (CHPP), area not specified • Transport route, 112 ha
Resource	Osmington Seam of the Sue Coal Measures, 160 – 500 m underground
Mining/Processing	
Type/rate	Underground bord and pillar mining of 1.0 – 1.5 Mt/a of ROM coal
Processing	ROM coal at the CHPP at Capel
Infrastructure	
Material transportation	Via truck from the mine site through State Forest to the CHPP at Capel, then via road/rail from the CHPP to the Port of Bunbury
Site access	Via Osmington Road
Supporting infrastructure	• Water bores • Water dams • Mine pump-out treatment facility • Enclosed conveyors • Truck loop • Land bridges • Workshop and hardstand • Surge bin

Abbreviations:

approx.	approximately	Mt/a	million tonnes per annum
ha	hectare	ROM	run of mine
m	metre		

The potential impacts of the proposal are discussed by the proponent in the referral information (LD Operations Pty Ltd (2010) *Referral to the Environmental Protection Authority under section 38 of the Environmental Protection Act 1986*, prepared for Vasse Coal Management Pty Ltd, 10 November 2010).

Limited information was provided on the:

- CHPP footprint area;
- water source (mine and CHPP);
- water quantity (mine and CHPP);
- dewatering quantity;
- power source (mine and CHPP);
- waste rock quantity (minesite);
- waste rock storage/disposal area (minesite); and
- tailings quantity.

3. Key environmental factors

It is the EPA's opinion that the key environmental factor relevant to the proposal that requires evaluation is the surface and ground water and the environmental and social values that these water resources support.

This key environmental factor is discussed in Section 3.1. The description shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment is where the EPA decides whether or not a proposal meets the environmental objective for that factor.

There are a number of other important environmental factors that are relevant to the proposal however this report focuses on the factor that the EPA has identified at the referral stage as being central to its judgement that the proposal is environmentally unacceptable. Table 2 has information on these other important environmental factors.

3.1 Water and the values it supports

Description

The coal resource is 160 – 500m underground in the Sue aquifer. The Sue aquifer is overlain by the Leederville aquifer. The mine would require a shaft to be sunk through the Leederville aquifer and into the Sue aquifer to intersect the coal resource.

The Leederville aquifer has a known groundwater discharge feature to the Margaret River, which has a system of permanent groundwater pools that support active groundwater dependent ecosystems (GDEs). The pools only occur where the River incises into the Leederville sediments on the Vasse Shelf where the Leederville aquifer overlies the Sue aquifer (DoW, 2011a). Pools do not occur east of the Busselton Fault, which is east of the proposed minesite (DoW, 2011a). The underground mine footprint underlies at least two of these permanent groundwater pools.

The proposed mine site area would be located within the Proclaimed, Busselton-Capel Groundwater Area, Cowaramup Groundwater Subarea as well as the Proclaimed Margaret River Public Drinking Water Supply Area (PDWASA), Priority 3 Surface Water area.

Some of the underground mine would be below the Priority 1 Surface Water area, which is part of the catchment for the Ten Mile Brook Dam. The Ten Mile Brook Dam is utilised for the Margaret River and Cowaramup town water supplies.

The surface mine site area contains two creeks that are tributaries for the Margaret River. The proponent considers that at least one of the creeks appears to be ephemeral in nature.

The proponent stated that it completed an exploration drilling program in 2010 which included a hydrogeological study of the area, with installation of monitoring piezometers and pumping tests. The proponent has indicated that this information is to be used as inputs into the groundwater model to determine impacts on the groundwater system; however details have not been provided.

The proponent has asserted that its exploration hydrogeological study findings were consistent with earlier findings by the Department of Water (DoW), which is that one of the major regional aquifer in the study area is the Leederville aquifer and that there are a number of sub-aquifers i.e. Quindalup, Mowen and Vasse/Yelverton (DoW, 2008).

The proponent is of the view that the groundwater flow and interconnectivity between the Leederville and Sue aquifers is negligible. This assumption appears to be based, at least in part, on previous findings by the DoW (DoW, 2008) which had suggested the same.

The proponent has indicated that it intends to undertake additional investigations in conjunction with geotechnical and subsidence studies, and proposes to prepare a water balance study at the end of hydrogeological modelling.

The proponent has made several claims regarding the hydrogeology of the area such as "…the mine design will result in negligible risk of surface subsidence or hydraulic connection with the surface" and "underground mining operations will pose a negligible risk to groundwater dependent surface vegetation" and "…does not anticipate contamination of surface or groundwater resources is a likely result of the proposal" (LDO, 2010).

The proponent does not intend to use conventional longwall mining methods and large-scale extraction, rather, it proposes to use conservative bord and pillar mine design to minimise the potential for subsidence.

For these reasons, the proponent is of the view that this mine design would result in negligible risk of surface subsidence or hydraulic connection with the surface, and does not anticipate contamination of surface or groundwater resources to occur as a result of the proposal.

Public comments and Agency advice

Public

There was considerable public interest in the VCP proposal and 793 individual comments were received. Members of the public expressed strong concerns regarding the potential for adverse impact to Margaret River region.

The issues most frequently raised related to impact to the social surrounds of Margaret River, and concerns related to hydrogeology, aquifers, catchments and the Margaret River itself. The vast majority of the comments received opposed the proposal in its entirety, and less than half a percent of the comments were in support.

Agency

Recognising that understanding the hydrogeology was necessary to determining the potential environmental impacts, the EPA sought specialist advice from key Government Departments and other Agencies.

Department of Water

Advice from the DoW indicates that there is strong evidence to confirm interconnectivity between the Sue aquifer and the over lying Leederville aquifer at the northern portion of the Vasse Shelf, including Treeton Terrace, which contains the proposed underground mine footprint. This advice was made available to the

EPA and is being prepared in the bulletin *Geology and Hydrogeology of the Southern Perth Basin (in prep.)*.

The DoW advises that there are no known outcrops of the Sue Group where direct rainfall infiltration can occur, and since the Sue Group is entirely overlain by the Leederville Formation, the observed high potentiometric levels for the Sue aquifer must be derived from direct hydraulic connection with the Leederville aquifer.

The DoW also advises that water chemistry observations are consistent with a good hydraulic connection between the Sue and Leederville aquifers, as fresh water of similar total salinity to the Leederville aquifer extends to very considerable depths into the Sue aquifer in the Treeton Terrace area.

Monitoring bores that are screened in the Sue aquifer on the northern Vasse Shelf indicate that the Sue Group comprises weakly to well consolidated sandstones and shales which have been fractured.

Geological work has shown the Sue Group has been tilted to form an angular unconformity in the order of 8% with the relatively flat lying Leederville sediments, which results in considerable lateral variation in the Sue Group which subcrops beneath the Leederville sediments. Various small to large scale faults occur throughout the Sue Group in the area of proposed development.

The DoW provided to the EPA an extensive list of investigations and studies that the proponent would need to undertake in order to achieve a proper understanding of the proposal area, and to provide confidence in the predicted impacts of the mine. The DoW advised the EPA that it cannot provide a quantitative risk assessment of the VCP without modelling results and the findings of the above mentioned necessary investigations.

The DoW further advised the EPA that the proponent needs to undertake comprehensive hydrogeological investigations to evaluate whether or not the proposal could be managed. The following investigations would need to be undertaken as a minimum:

- installation of a network of monitoring bores at multiple levels within the Sue Group over the entire underground mining footprint;
- the bores need to be subject to long term pump tests to evaluate long term impacts;
- installation of data loggers in the network of bores as well as representative permanent pools to monitor water levels;
- collation of available seismic data into regional and local numerical groundwater models;
- development of a regional model to evaluate impacts of dewatering on the Leederville, Sue and Yarragadee aquifers in both the long and short term;
- a specific local model to evaluate dewatering operation during shaft construction and another specific model to evaluate the impact of dewatering on permanent pools and groundwater fed springs associated with the Margaret River;

- the development of model outputs to quantify the anticipated drawdown in the Sue and Leederville aquifers required during the proposed mining operations, which needs to include how the drawdown propagates laterally and vertically over time;
- a scientifically supported quantification of the effect drawdown would have on pools along the Margaret River;
- a scientifically supported quantification of the long term changes to the water balance in the Leederville, Sue and Yarragadee aquifers;
- long term modelling scenarios would need to include an estimate of increased bulk permeability surrounding the mine void due to stress relief fracturing; and
- all model predictions would need to include detailed statistical sensitivity and uncertainty analyses.

The DoW also advised the EPA that threatened fauna occurring within the vicinity of the VCP proposal included:

- Margaret River Burrowing Crayfish (*Euguewa pseudoreducta*) – listed as Critically Endangered under the Commonwealth, *Environment Protection Biodiversity Conservation Act 1999* (*EPBC Act*), and classified as Specially Protected Fauna (Schedule 1) under the WA, *Wildlife Conservation Act 1950* (*WC Act*);
- Margaret River Hairy Marron (*Cherax tenuimanus*) – listed as Critically Endangered under the *EPBC Act,* and as Specially Protected Fauna (Schedule 1) under the *WC Act*,
- Balston's Pygmy Perch (*Nannatherina balstoni*) – listed as Vulnerable under the EPBC Act, and as Specially Protected Fauna (Schedule 1) under the *WC Act*;
- Mud Minnow (*Galaxiella munda*) – listed as Specially Protected Fauna (Schedule 1) under the *WC Act*; and
- Pouched Lamprey (*Geotria australis*) – listed on the Department of Environment and Conservation's (DEC) threatened fauna register and listed as Priority Fauna, Priority 1.

The Margaret River Burrowing Crayfish is known to occur west of the proposed surface mine site area.

Additionally, the EPA notes that in the DoW's hydrogeological record series, Report No. HG38: *Groundwater resource assessment of the Western Busselton-Capel groundwater area*, the sensitivity of the Leederville aquifer in the Cowaramup subarea requires setting of rules for protection of the groundwater resource (DoW, 2009). The DoW considers the area where the mine underlies the Margaret River to be highly sensitive, and has recommended that no new groundwater licences be allocated within 1km of the River (DoW, 2009).

Department of Mines and Petroleum

The Department of Mines and Petroleum (DMP) advised the EPA that there are significant knowledge gaps in the geology and hydrogeology of the proposed

development area. The DMP also advises that there is the potential for surface subsidence to develop, however the nature of ground movement largely depends on the final mine design adopted and the various geotechnical properties/characteristics of the strata of the surrounding mine.

The DMP advises that should surface subsidence develop, it is usually shallow-trough form that poses a low risk for common surface structures, however exceptions to this general rule exists where large open faults, vugs etc are present within the caving zone and where specialist surface infrastructure with a low tolerance to tilt are present.

Department of Environment and Conservation

The DEC advised the EPA that the proposed transport route runs alongside the Rapids Conservation Park, and through other sections of the Blackwood State Forest and has the potential to affect the environmental values of these features.

Additionally, the EPA notes that the Rapids Conservation Park (Class A) surrounds Cane Brake Pool (part of the Margaret River headwaters), which contains one of the few habitat areas for the Margaret River Hairy Marron.

Department of Fisheries

The Department of Fisheries (DoF) advised the EPA that it has statutory responsibility under the *Fish Resources Management Act 1994* to protect fish and fish habitat in the WA aquatic environment. The responsibilities extend to both marine and freshwater environments.

Additionally, the EPA notes that the DoF has previously refused aquaculture proposals in the region on the basis that escaped stock could threaten native species, in particular the Margaret River Hairy Marron.

<u>Proponent response to agency advice</u>

Upon request from LDO, VCM was provided with a limited opportunity to address the agency advice. The EPA recognises that the time afforded limited the detail VCM could provide. LDO provided VCM's views on the EPA's process; the information provided by agencies, social aspects (LDO, 2011) and also provided professional opinions on:

- *Comments on Hydrogeological Issues – Vasse Coal Project,* which suggests the proponent, should be given the opportunity to obtain further hydrogeological information and model development. The opinion questions why the DoW finds it necessary to re-evaluate the conceptual hydrogeology of the area and disputes the DoW advice on the need for long-term pump testing (Cymod, 2011); and
- *Mine Design Strategies Appropriate to Meeting Defined Environmental Impact Outcomes, Vasse Coal Project,* which concludes that while the VCP area contains both sub-surface hydrogeological and surface impact concerns, there are no obvious impediments as to why a workable mining strategy and associated mine layout design cannot be developed that fully caters for the defined environmental constraints (Frith, 2011).

Assessment

The EPA's environmental objective is to protect the quality and quantity of surface and ground water in the Margaret River region, and the environmental values that it supports. These include:

- ecosystem function and maintenance;
- ecological function of permanent pools;
- ground water dependent ecosystems; and
- threatened fauna,

as well as other beneficial uses including:

- potable water supply;
- water for stock and agri/viticulture; and
- social surrounds such as recreational activities and aesthetics.

Risk to environmental values

The EPA notes that the VCP proposal has the potential to adversely impact on the above environmental values through:

- Dewatering:
  - changes to aquifer characteristics;
  - drawdown impacts;
  - disposal of excess dewater; and
  - contamination of surface and groundwater features.

- Fracturing of strata:
  - greater aquifer connectivity;
  - changes to aquifer characteristics; and
  - drainage of surface water systems.

- Subsidence:
  - loss of surface flows to the subsurface;
  - loss of standing pools;
  - adverse water quality;
  - development of iron bacterial mats; and
  - impact on aquatic ecology.

- Discharge of contaminated water:
  - overflow of retention ponds into surface water features; and
  - contaminated storm water flow into surface water features.

The EPA recognises the significance of the surface and groundwater resources in the area, and based on the information provided to the EPA, the proposal has the potential for serious, wide-spread or irreversible environmental consequences. In assessing the environmental acceptability of proposals, the EPA needs to make a judgement on the probability of certain events and their consequences. In order to make this judgement, good quality information is essential.

The EPA notes the advice that the Sue aquifer is one of the least understood in the Perth Basin. Various small to large scale faults exist throughout the Sue Group in the

area of proposed development which makes understanding the aquifer characteristics and potential impacts difficult.

In particular the EPA notes, the DoW's advice that further comprehensive hydrogeological investigations would be required to understand the environmental impacts. This would require the installation of a comprehensive network of monitoring bores at multiple levels within the Sue Group, including near the depth of the proposed mine void, and covering the 1200ha underground mining footprint. To adequately measure induced drawdown and change in saturation in the Leederville aquifer would likely require pumping tests of long duration (possibly years) (DoW, 2011b).

The EPA notes that the New South Wales (NSW) Government report: *Impacts of Underground Coal Mining on Natural Features in the Southern Coalfield* also recommends that a minimum of 2 year baseline data (collected at an appropriate frequency and scale) should be provided for significant natural features.

The EPA notes the professional opinions provided by VCM and where they differ from agency advice. The EPA considers that this illustrates the difficulty in obtaining a 'general consensus' prediction of the impacts for this complex system, and further adds to the uncertainty of likely environmental impacts.

In considering the VCP proposal, the EPA has drawn on its previous experience with assessing the potential environmental impacts on complex aquifers. In 2006 the EPA reported on the South West Yarragadee Water Supply Development (SWY) proposal (EPA Bulletin No. 1245). In that case, the DoW and the Water Corporation had undertaken extensive drilling, pump testing and other investigations in the region over more than 20 years in an effort to define the hydrogeology and aquifer parameters.

While the SWY hydrogeological investigations and groundwater model development were considered to be of the best standard possible at the time, the EPA considered that significant uncertainty remained in the predicted drawdowns and reductions in stream flows. To counter this uncertainty, an adaptive management approach was proposed by the proponent, which included modifying, reducing and ceasing pumping at points across the borefield.

The EPA acknowledged that the SWY proposal offered such a significant public benefit, that although the adaptive management approach was not ideal, it could be justified given the public benefits.

Minimal hydrogeological data for the VCP proposal has been provided by the proponent. Even if the proponent was to spend several years gathering the required data, the EPA considers that it is likely that significant uncertainty in the predicted environmental impacts would remain. However, unlike the SWY proposal the EPA considers that effective adaptive management measures would not be practical since a mine does not have the same flexible options to address impacts as a multi-well borefield.

The EPA is also cognisant that the SWY proposal was to provide a vital resource to the public of WA for generations, whereas the VCP is exploiting a relatively small quantity of a common resource for a maximum of 20 years.

In making its decision on setting level of assessment for LDO's Vasse Coal proposal, the EPA has had regard to the objects and principles of the EP Act and its Administrative Procedures 2010. In particular it has had regard for the precautionary principle that states:

'*Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions should be guided by:*

(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and
(b) an assessment of the risk-weighted consequences of various options.'

Even though some risks may be capable of being managed so as to reduce them to acceptable levels, the environmental consequences of some low probability events may be such (i.e. serious, widespread or irreversible) that the proposal, taken as a whole, on balance presents unacceptable risks to important environmental values.

In conclusion, it is the EPA's judgement that should the proposal be implemented, the serious risks to important environmental values in the Margaret River region, especially surface and groundwater and the consequential impacts on the social surroundings, render this proposal environmentally unacceptable.

The EPA is also of the view that a comprehensive environmental impact assessment whereby impact avoidance and risk reduction measures are fully explored following detailed technical and scientific investigations and modelling to predict impacts, is unlikely to provide the EPA with an adequate level of confidence about the likelihood of success of those measures to the extent necessary to enable it to recommend approval for implementation.

Table 2: Other issues for Government to consider

Issue	Description
Transport route	The proponent identified five vegetation complexes (as described by Mattiske and Havel (2002)) that would be impacted by vegetation clearing for a proposed route. These vegetation complexes are poorly represented in the conservation reserve system. There is the potential for fauna species to be directly impacted from the road widening activities and ongoing transport (i.e. vegetation (habitat) clearing, light, dust, noise, collisions with vehicles etc). The current knowledge of the general area of the proposed transport route suggests construction would present risks to a number of environmental values including: • vegetation associated with the Whicher Scarp; • Declared Rare and Priority flora species; • poorly represented and reserved vegetation complexes; • threatened fauna and habitat; • fauna habitat linkages; • introduction of dieback into unaffected areas; and • locally significant plant communities associated with the Margaret River headwaters. The DEC advises that there are other poorly represented vegetation complexes that could potentially be impacted from development of a transport route. The area potentially contains habitat for all three species of forest black cockatoos: • Carnaby's Cockatoo – listed as Endangered under the *EPBC Act*, and Specially Protected Fauna (Schedule 1) under the *WC Act*; • Baudin's Cockatoo – listed as Vulnerable under the *EPBC Act*, and Specially Protected Fauna (Schedule 1) under the *WC Act;* and • Red-tailed Black Cockatoo – listed as Specially Protected Fauna (Schedule 1) under the *WC Act.* Key environmental values associated with the Margaret River headwaters include:

Issue	Description
	• a largely uncleared catchment unaffected by salinisation which provides freshwater all year round to permanent pools and their associated ecological communities; • conservation significant flora and poorly represented vegetation complexes; • habitat for the endangered Margaret River Hairy Marron and Margaret River Burrowing Crayfish; and • five of south-west WA's eight endemic freshwater fish species, some of which are threatened. In addition to direct losses, development in the State Forest has the potential to cause secondary impacts (i.e. spread of dieback and weeds, dust deposition on vegetation, hydrocarbon spills etc). Assuming road registered vehicles carting 50 tonnes of ROM coal material from the mine to the CHPP (operating 365 days per year); there would be approximately 160 truck movements each day. The proponent's proposed coal transportation route through State Forests (past the Rapids Conservation Park), appears to have been designed mainly to avoid social impacts. The DEC is of the view that alternate transport routes with less impact to native vegetation exist.
Coal Handling and Preparation Plant	The CHPP would generate emissions such as dust and particulates, noise, solid and liquid waste and light spill. Wastewater and course rock/sandstone material (tailings) would be produced as a result of the coal washing process. The proponent intends to dispose of tailings via one of two methods: • conventional tailings dam and course reject emplaced on site or trucked to clean fill markets; or • tailings dried using filters, combined with dewatered coarse reject to form a dry tailings appropriate for disposal. The reject rock would need to be characterised to determine the chemical composition and the potential for acid and metal drainage. The DMP has advised that there may be issues associated with the location and design of the tailings storage facility which would need to be resolved. The proponent indicated that discharge of treated wastewater from the CHPP, into watercourses, may be required during wet weather conditions. The proponent stated that wastewater would be tested and treated to ensure it does not result in exceedence of background concentrations of the receiving watercourse. However, it is unclear how the

Issue	Description
	proponent would be able to test and treat wastewater to appropriate standards during a storm event. The proposed site for the CHPP is located within the Proclaimed Busselton-Capel Groundwater Area.
Port upgrade	The proponent has indicated that a significant upgrade at the Port of Bunbury may be required. This would likely add to the cumulative impacts from the Port (i.e. dust, noise etc).
Capel-Boyanup rail and road reserve	A route for coal transportation between the CHPP and the Bunbury Port has not been identified, however the proponent stated that both rail and road options were being considered. The DEC notes that the Capel-Boyanup rail and road reserve is in proximity and may be proposed for use. This is a significant environmental corridor that supports restricted vegetation complexes and several conservation significant species such as Priority and Declared Rare flora species, including two species that are ranked as critically endangered.
Power infrastructure	The proponent has indicated that a ~10MVA overland power supply to the mine is required, and that provision of power to the CHPP would likely be via a ~2MVA supply from existing infrastructure. Details of the infrastructure route and impacts have not been provided. However, there is potential for this to require the clearing of native vegetation with associated impacts.
Water supply	The proponent indicated that several options for water supply were being investigated i.e. a water storage dam for mine dewater and diversions to capture surface water runoff from disturbance areas at the minesite (for recycling/reuse). Estimated water consumption figures for the minesite include: • 80ML over the construction period • 0.5 – 1.0ML per day (approx. 280ML per annum) for the underground. The proponent has stated that a large percentage of the water used at the CHPP would come from recycling and estimates that the CHPP would require between 250 – 360ML per annum.

Issue	Description
Mining method	Bord and pillar mining – coal is excavated from bords (or rooms) between pillars (of coal), which are left in place to provide roof support. The bord and pillar spacing can be designed to prevent roof collapse, or if subsidence is not an issue, the pillars can be extracted following primary mining and roof collapse is then likely. Since the pillar to bord ratio must increase as mine depth increases, the recoverable resource also decreases (e.g. ~50% at 150m reducing to only ~20% at 500m). Longwall mining – coal is excavated in panels typically 150 – 400m wide, by 1 – 4km long. The excavation takes place under mobile self advancing supports (or chocks) which support a safe work environment, and roof collapse is likely after the mobile chocks move forward and no longer support the roof. This can then result in subsidence at the surface. The NSW Coal Review states "Safety, productivity and cost considerations dictate that *longwall mining* is now the only major, viable, high production mining method in the majority of Australian underground coal mines that operate at a depth greater than about 300m and in virtually all new coal mines (irrespective of depth)". The available information suggests that underground coal mines (using the bord and pillar method) can be designed and managed so that subsidence is not a significant issue. However, the more conservative the bord and pillar design is, the less productive the mine will be, and this can affect the economic viability. While the economic viability is not an environmental consideration, it may result in pressure to allow future resource recovery by pillar extraction, which could have environmental implications.
Greenhouse Gases	The mine would result in onsite fugitive emissions of methane (gas with 21 times the global warming potential of carbon dioxide) and the product (coal) is the most greenhouse gas intensive of the fossil fuels. The downstream use would thus result in significant emissions of carbon dioxide. Coal burning is the greatest contributor to human induced climate change and many climate experts such as Dr James Hansen, the director of the NASA Goddard Institute for Space Studies have called for a moratorium on all new coal mines.
Resource value	Coal is a resource that is not scarce and its use is a major contributor to climate change and air pollution. It should be noted that the proposal area is located approximately 130km south-west from well established coalfields in Collie. Downstream impacts from coal should also be considered.

4. Conclusions

The EPA has considered the proposal by VCM to develop the VCP consisting of an underground coal mine, a coal handling and preparation plant, transportation and associated mine infrastructure.

The EPA considers that there is likely to be significant impacts, or risks, from the proposal on the Leederville and Sue aquifers, and on significant environmental values, including the social surrounds of the Margaret River region, which these aquifers support.

Even though some of the significant impacts, or risks, may be presented as being manageable because of their low probability of occurring, the environmental consequences of some low probability events are such (i.e. serious, widespread or irreversible) that the proposal, taken as a whole, on balance, presents unacceptable risks to important environmental values, and thus makes the proposal environmentally unacceptable.

Based on its experience and knowledge of the complexity of matters of this kind, the EPA also formed the view that more detailed and longer term investigations were very unlikely to alter its position since uncertainty would still remain and adaptive management methodologies are not practical for the proposal.

The EPA considers that this proposal could not be reasonably modified to meet the EPA's objectives.

It is therefore the EPA's judgement that this proposal is environmentally unacceptable and the level of assessment is set as API category B (environmentally unacceptable).

5. Recommendations

The EPA submits the following recommendations to the Minister for Environment:

1. That the Minister considers the report on the key environmental factor of Water and the values it supports as set out in Section 3;
2. That the Minister notes that the EPA has concluded that the proposal cannot meet the EPA's environmental objectives for 'Water and the values it supports';
3. That the Minister notes that the EPA has not included in this Report conditions and procedures to which the proposal should be subject, if implemented, because the EPA has concluded that the proposal should not be implemented; and
4. That the Minister notes the EPA's other advice presented in Table 2 in relation to the other proposal components and considerations.

Appendix 1

References

CyMod Systems (2011), Memorandum from Neil Milligan, CyMod Systems Applied Numerical Modelling to Michael Callan, LD Operations Pty Ltd, dated **28 April 2011** entitled: *Comments on Hydrogeological Issues – Vasse Coal Project*.

DEC (2011), Letter from Kieran McNamara, Director General of the Department of Environment and Conservation to Dr Paul Vogel, Chairman of the Environmental Protection Authority, dated **24 January 2011** entitled: *Vasse Coal Project Referral – Further Information Relative to Proposed Haul Road*.

DoF (2011), Letter from Rae Burrows (Manager) on behalf Department of Fisheries, to Mark Jefferies (Manager) Office of the Environmental Protection Authority, dated **4 April 2011** entitled: *Proposed Vasse Coal Project*.

DMP (2011), Letter from Richard Sellers, Director General of the Department of Mines and Petroleum to Dr Paul Vogel, Chairman of the Environmental Protection Authority, dated **28 February 2011** entitled: *Notice requiring further information s38A of the Environmental Protection Act 1986 – Vasse Coal Project.*

DoW (2008), *Hydrogeology of the Leederville aquifer in the western Busselton-Capel Groundwater Area*, Department of Water Hydrogeological Record Series, Report No. HG31, August 2008.

DoW (2009), *Groundwater resource assessment of the Western Busselton-Capel groundwater area*, Department of Water Hydrogeological Record Series, Report No. HG38, November 2009.

DoW (2011a), Letter from Liz Western (A/Director) on behalf of the Department of Water, to Dr Paul Vogel Chairman of the Environmental Protection Authority, dated **20 January 2011** entitled: *Notice Requiring Further Information, Vasse Coal Project, Vasse Coal Management Pty Ltd*.

DoW (2011b), Letter from Maree de Lacey, A/Director General of the Department of Water, to Kim Taylor Director General of the Office of the Environmental Protection Authority, dated **16 March 2011** entitled: *Vasse Coal Project*.

EPA (2006), Environmental Protection Authority Report and Recommendations Bulletin No. 1245 – *South West Yarragadee Water Supply Development*, December 2006.

Frith Consulting (2011), Letter from Russell Frith, Principal of Frith Consulting Services and Steven Ditton, Principal of Ditton Geotechnical Services to Michael Callan, Mining Engineer of LD Operations Pty Ltd, dated **27 April 2011** entitled: *Mine Design Strategies Appropriate to Meeting Defined Environmental Impact Outcomes, Vasse Coal Project*.

LDO (2010), *Referral to the Environmental Protection Authority under section 38 of the Environmental Protection Act 1986*, prepared for Vasse Coal Management Pty Ltd, 10 November 2005.

LDO (2011), Letter from Peter Ross, Managing Director of LD Operations Pty Ltd to Dr Paul Vogel, Chairman of the Environmental Protection Authority, dated **28 April 2011** entitled: *Vasse Coal Project*.

NSW Government (2008), *Impacts of underground coal mining on natural features in the Southern Coalfield*: Strategic Review, State of New South Wales through the New South Wales Department of Planning, July 2008.

The references listed above along with a list of the public comments received (minus personal information) are available upon request.

Appendix 2

Issues Raised During Public Comment Period

Vasse Coal Project – Issues raised during public comment period

Approx. No. of times issue raised	Description of issues raised
376	Tourism, Green 'brand', recreation (land-use incompatibility)
258	Hydrogeological impacts i.e. water table, aquifers, catchments, the Margaret River
253	Agriculture / viticulture – general impact to industries
224	Social i.e. lifestyle, community, visual amenity
197	Flora / fauna, eco-system function
188	Air quality i.e. dust (mining and transport), GHG, methane
177	Contamination / pollution i.e. AMD, soil, ground and surface water, waste products
136	Inability to properly manage proposal i.e. impact predictions, rehabilitation, disposal
134	Future liability to State, long term issues similar with other coal mining areas in Australia
104	Increase transport / traffic – road safety
97	Want re-newables instead i.e. sustainable options to combat climate change
93	Town water supply
86	Water consumption / dewatering
68	Economic detriment
61	Noise – mining and infrastructure, traffic
49	Dewatering – impact on significant environmental values i.e. aquatic fauna, GDEs
42	Human health
41	Safety – minesite and surrounding residents / landuse
41	Proliferation of mining and infrastructure
35	Subsidence and aquifer collapse
33	Decline in land and property value
33	Clearing / development of infrastructure in State Forest
22	Increase salinity
8	Project inconsistent with the Precautionary Principle
6	Geological stability
5	Light over-spill
5	Increased pressure on the Bunbury Port
2	Economic benefit
2	Limitations of the EPA process
2	Indigenous heritage

Appendix 3

Identified Decision-making Authorities

Identified Decision-making Authorities

Section 45(1) of the *Environmental Protection Act 1986* (EP Act) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

Decision-making Authority	Approval
1. Minister for Water	Water extraction licence
2. Minister for Planning	Rezoning
3. Department of Water	Beds and Banks Permit
4. Department of Environment and Conservation	Works Approval and Licence and access to develop in State Forest
5. Department of Mines and Petroleum	Mining Approval and Dangerous Goods storage and transport
6. Department of Transport	Vehicle permits
7. Department of Fisheries	Fish Resources Management Act 1994
8. Shire of Augusta – Margaret River	Development approval

Note: In this instance, agreement is only required with DMAs #1 and 2 since these DMAs are Ministers.