Felton Clean Coal Demonstration Project

INITIAL ADVICE STATEMENT

DRAFT TERMS OF REFERENCE FOR THE FELTON CLEAN COAL DEMONSTRATION PROJECT ENVIRONMENTAL IMPACT STATEMENT

ML50245, ML50246 & AEF 3

December 2008

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1.0 INTRODUCTION

1.1 Company Details

The Project will be undertaken by Ambre Energy (Felton) Pty Ltd a wholly owned subsidiary of Ambre Energy Limited, an unlisted Australian public company based in Brisbane. Ambre Energy Limited was formed in June 2005 for the purpose of developing and commercializing new technologies for the more effective use of coal as a source of energy, and to develop complementary coal mining projects.

Ambre Energy has its head office at:

Level 27 AMP Place, 10 Eagle Street
Brisbane Qld 4000

1.2 Project Introduction

Ambre Energy is proposing to operate a 455tpd Di-Methyl Ether (DME) pilot plant to demonstrate existing and new catalyst technology and new reactor design for the production on DME. The technology has the potential to greatly reduce the capital and operating cost of DME manufacture.

The DME project will encompass the DME reactor, co generation of electricity and an open cut mine to provide the feed stock for the process. The mine will be developed in two stages; the initial stage will involve the extraction of 800,000 tpa with the second stage expanding to 3.8 Mtpa.

The proposed operation to be covered under a voluntary EIS and will encompass a:

- 150,000tpa Di-Methyl Ether (DME) pilot plant, and
- 3.8 Million tonne per annum open cut mine

DME has attracted much attention around the world because of the versatility and environmental benefits of this next-generation liquid fuel. There are a number of large scale DME production plants currently under construction and planned in the Middle East and China.

Of particular interest is DME's suitability as a fuel for compression ignition diesel engines, currently the most efficient engine technology available. Unlike diesel, gasoline or even ethanol, DME produces almost no particulates upon combustion; in other words, no smoke or soot. It contains no sulphur and produces very low NOx emissions. Prototype buses and heavy vehicles using DME have been built in China and Japan, and by Volvo in Europe.

Ambre Energy has claimed a stake in the development of this new clean fuel by funding a project at the University of Utah to develop a reactor and catalysts for the production of DME from coal (as well as biomass). The aim is to produce DME more simply and at a lower cost than will be produced at the plants currently being built in the Middle East and China.

The DME pilot plant to be built in SE Queensland will demonstrate, at a semi-commercial scale, Ambre's new technology for DME manufacture.

1.3 Project Name and Location

The Project is located at Felton, which lies in the Clarence Morton Basin in south-east Queensland to the west of the Great Dividing Range. The basin extends from northern New South Wales trending northwest to Dalby in Queensland and from Toowoomba in the east to Millmerran in the west. The Felton North deposit is approximately 30 km south west from Toowoomba and 10 km south east from Pittsworth. The project is location within the Felton North deposit see Figure 1**.**

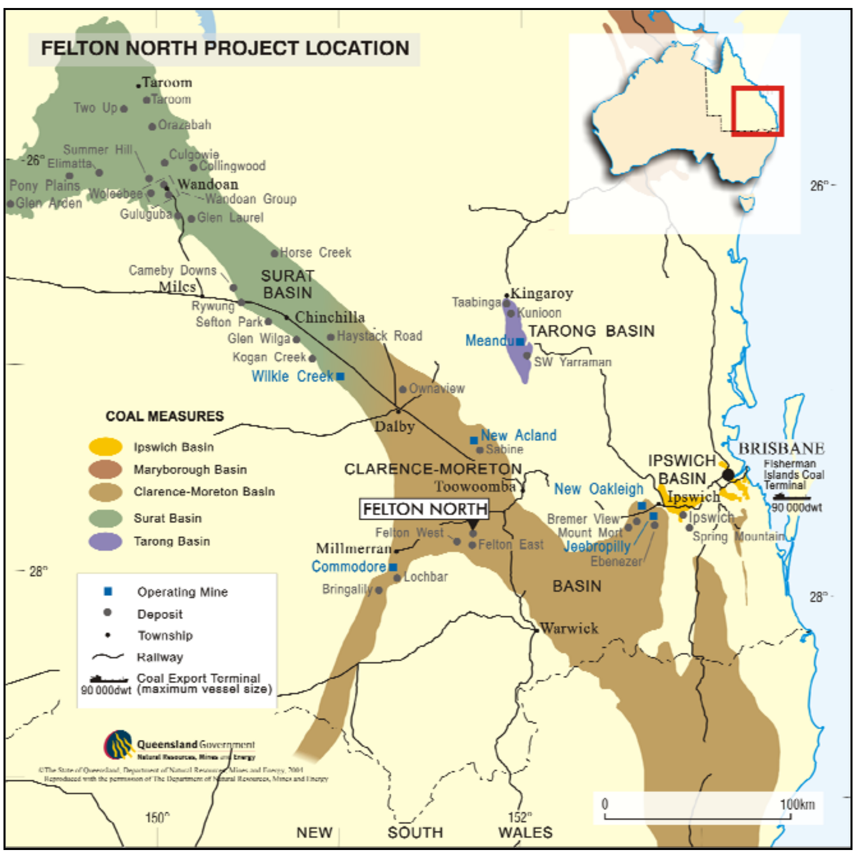

Figure 1, Felton Clean Coal Demonstration Project location

The DME Pilot Plant will be located on ML50245, to the north of the Pittsworth-Felton Road and abutting the northern edge of the proposed mining area on ML50246. The DME Pilot Plant will be placed in a location that has previously been drilled and determined to contain no economic coal reserves. The final configuration will depend on marketing off-take arrangements currently being pursued.

1.4 Project Components

The Project will be comprised of a number of components situated on three leases ML50245, ML50246 and AEF 3 (the third proposed mining lease), as follows (Figure 2):

- DME Pilot Plant and small Open Cut Mine on ML50245
- Open Cut Mine on ML50246
- Stage 2 Mine Expansion on AEF 3

The gas from the gasifier will be used to feed a once-through pilot scale dimethyl ether (DME) plant on ML50245.

The tail gas from the DME plant will be used to produce power for internal and export uses.

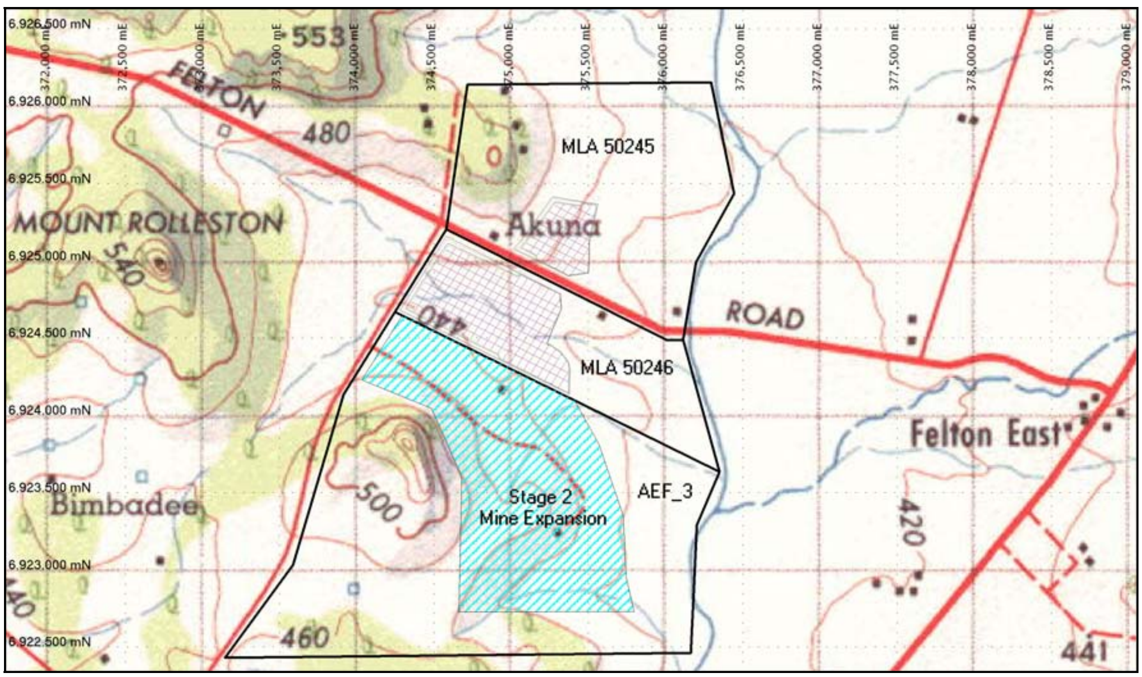

Figure 2, Mining Lease Application ML50245, ML50246 & AEF 3 location plan.

1.5 Tenures

Tenures covered by this Felton Clean Coal Demonstration Project are: ML50245, ML50246, EPC935 and EPP791.

The holder of ML50245, ML50246 and EPC935 is Ambre Energy (Felton) Pty Ltd

The holder of EPP791 is BNG Pty Limited.

AEF 3 is the third proposed mining lease to be taken out over a portion of EPC935

Under the conditions of grant of EPC935, Ambre Energy has the ability to access land covered by the tenure to conduct geological and environmental activities.

For locations of these mining and petroleum tenures refer to Figure 3**.**

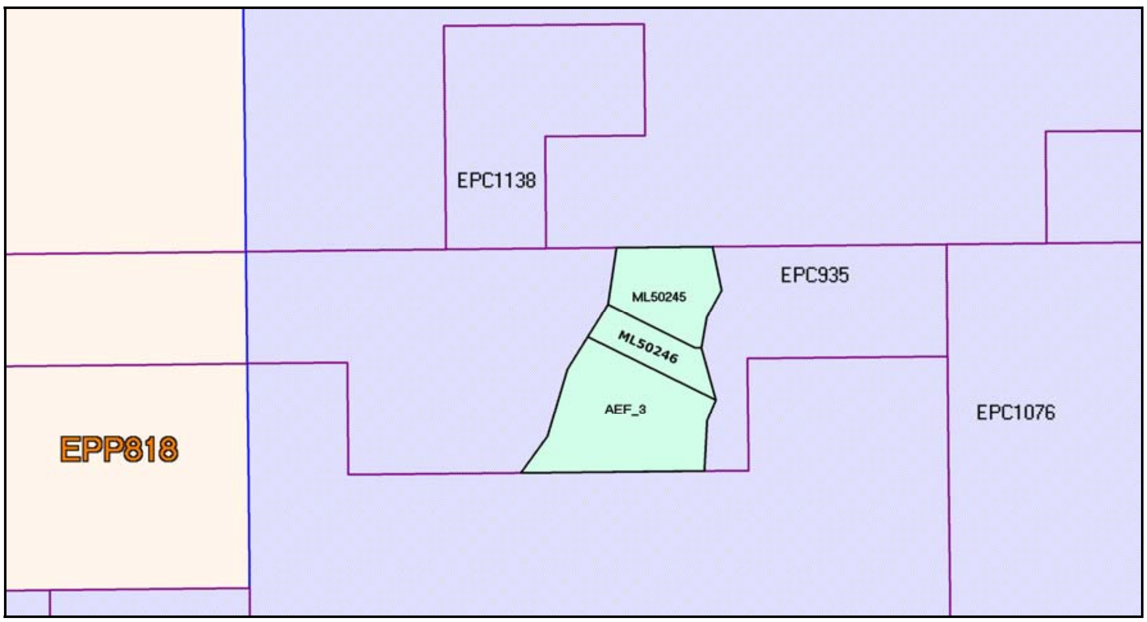

Figure 3, ATP and ML application lease location plan.

1.6 Description of Operational Land

Topography

The Project area includes the alluvial plains of Hodgson Creek rising to the low slopes of Walloon sandstones and finally to the steep slopes of the remnant basalt ridges and plateaus.

The Central Darling Downs Land Management Manual produced by the Department of Natural Resources and Water has identified the following Land Resources Areas (**LRA**) in the Project site:

- Older Alluvial Plains: Broad level plains of basaltic alluvium with open grasslands;

- Basaltic Uplands: Undulating rises and rolling low hills rising to steep hills with coolabah open woodlands; and
- Poplar Box Walloons: Undulating rises and low hills on Walloon sandstone with poplar box open woodlands.

Soils and Land Use Suitability

While the soils in the Project area may not have been specifically surveyed, the Land Management Manual lists the common and associated soils for the various LRAs mapped in the area. The common soils associated with the LRAs identified in the project area and their land use suitability is listed in the Table 1.

Table 1, Indicative Soils of the Project Area

Land Resource Area	Common Soils and Land Use Suitability
Older alluvial plains with black, self mulching cracking clays.	Waco soil is deep to very deep (100-180cm) fine, self mulching, dark cracking clay on basaltic alluvium. This soil is ideally suited to continual grain cropping with good nutrition and rotation for weed and disease control.
Basaltic uplands with black to dark brown clay or clay loams on decomposing basalt. Soil depth varies with position on the slopes. All the soils are susceptible to severe rill and gully erosion.	Craigmore and Irving soils occur on mid and lower slopes of basalt hills and rises. Typically the soils are deep to very deep (100-180cm) self mulching brown to brownish black cracking clays with red brown subsoil on either basalt or basalt colluvium. These soils are ideally suited to continual grain cropping with good nutrition and rotation for weed and disease control. Charlton soil occurs on the mid to upper slope on basalt rises and low hills. The soil is moderately deep (50-100cm), coarse self mulching, black cracking clay on basalt. The soil is suited to continual grain cropping with good nutrition and rotation for weed and disease control. Beauaraba soil occurs on upper slopes on low basalt hills and crests of ridges. The soil is very shallow (10-30cm), very dark, cracking clay overlying basalt. The soils is best suited to grazing of pastures with limited suitability for forage and field crops. Kenmuir soil occurs on steep hillsides and scarps on basalt. The soil is very shallow (5-25cm) gravelly or stony, brown loam or clay loam on basalt. The soil is best suited to native timber production and nature conservation.
Poplar Box Walloons with black self mulching cracking clays on Walloon sandstone. The soils are susceptible to severe sheet, rill and gully erosion.	Elphinstone soil occurs on slopes (2-6%) of gently undulating to undulating plains and rises. The soil is a deep (100-150cm), fine self mulching, black cracking clay on fine grained sandstone. The soil is suitable for continual grain and forage cropping.

Remnant vegetation

The majority of the land suited to cultivation has been cleared of vegetation. Remnant vegetation exists on the upper slope and crest of the basalt hills and plateaus and areas of Walloon sandstone soils.

The latest Regional Ecosystem map for the area lists a small area of dominant endangered ecosystem of 11.3.21 (Queensland bluegrass and there has been a recording north west of the proposed mining area of a rare plant, Digitaria porrecta, finger panic grass. With the prevailing drought conditions it is difficult to ascertain if these grasses still persist and vegetation surveys will be conducted to determine if these grasses are present within the project area.

Surface water

Hodgson Creek starts approximately 15 km south of Toowoomba and travels 30km before flowing south through the Project area where it is flanked by deep alluvial plains. Hodgson Creek then flows southwest for a further 15km to join the North Branch of the Condamine River. The catchment at Balgownie (approx 2km downstream from Felton) is approximately 560 km^2 with an annual discharge range of 333-154523Ml over an 18 year period. A preliminary flood study of Hodgson Creek has conducted by independent consultants Worley Parsons. A further study will be required to determine the location of levees to be constructed on the western side of Hodgson Creek to ensure that properties upstream and adjacent of the Project are not impacted adversely during flood events.

Ground water

The ground water sources in the Project area are the; alluvial plains of Hodgson Creek, the Walloon coal measures, the Hutton (Marburg) sandstones and the remnant basalts. All the groundwater resources in the area have been allocated for use by landholders. The exploration activities have located minimal groundwater within the lease area. 22 Piesometers have been installed to date to help understand the interaction between the 4 identified water sources.

Air Quality

The region surrounding the Project site is rural with intensive cropping, cattle grazing, lot feeding of cattle and intensive poultry farming. Emissions from these activities will be dust from cultivation and harvesting activities and odour from cattle lot feeding and poultry farming. The closest EPA monitoring site is Toowoomba North which may not be applicable to this area, as the land-use on the outskirts of Toowoomba may differ from the Felton area. Monitoring sites will be established at appropriate locations around the Project area.

Noise and Vibration

The agricultural practices in the Project area generate noise typical of a rural community and are generally accepted by the community. There are currently no industries in the area that generate the noise and vibration associated with mining activities.

Fauna

Typical of much of the Darling Downs, native fauna habitats have been greatly impacted by agricultural development in the Felton East area. Many natural habitats occur as remnants within this agricultural landscape, and some species of native fauna are able to exploit agricultural land to varying degrees. Some species are however, locally restricted to, or highly dependent on the remnants of the natural landscape.

Queensland Parks and Wildlife Service (EPA) records indicate the presence of the following threatened (rare, vulnerable or endangered) species within 25 km of Felton East, listed under the *Nature Conservation Act 1992* (Queensland) and/or *Environment Protection and Biodiversity Conservation Act 1999* (Australia):

> Grey Goshawk, Major Mitchell's Cockatoo, Glossy Black Cockatoo, Painted Honeyeater, Swift Parrot, Lewin's Rail, Powerful Owl, Black-breasted Button-quail, Bulloak Jewel (butterfly), Spotted-tailed Quoll, Brush-tailed Rock-wallaby, Koala (southeast Queensland), Long-legged Worm-skink.

These species above are generally associated with native vegetation, and so the remnant natural habitats around Felton East are of possible significance to them.

In contrast, however, a population of the Grassland Earless Dragon (*Tympanocryptis pinguicolla*) was discovered in recent years on the Darling Downs to the east of Pittsworth. This species had been considered extinct in Queensland until its rediscovery, and is now listed as Endangered (*Nature Conservation Act 1992*). All specimens are known from highly modified agricultural land, typically “small holdings devoted to strip-farming of mixed crops, such as cotton, sorghum, maize and sunflower interspersed with fallow land. Large areas of native and introduced grasses existing as headlands, and along drainage lines are a feature of the farmlands where the dragon exists” (EPA, 2008: www.epa.qld.gov.au). It is possible this species might also occur in the Felton East area.

1.7 Project Scope and Objectives

Mine layout and Infrastructure

The Felton North Coal Mine will be an 800,000 tonnes per year (tpy) open cut mining operation to be developed as part of the DME Pilot Plant. The mine layout and infrastructure are shown in Figure 4. With further design and mine planning the layout may change but basically depicts a realistic impression of the various operational centres required to extract and process the resource.

The mining operation will be based on the western side of Hodgson Creek where the coal will be initially extracted and crushed on ML50245. The mine schedule has the main extractive process moving to ML50246 on the southern side of the Pittsworth-Felton Road after plant commissioning (12 months). A Run of Mine (ROM) station will be established on this tenure and the crushed material will be transported by conveyor to the DME Pilot Plant on the Northern side of the Pittsworth-Felton Road (ML50245). The coal resource on ML50245, which will be mined to provide overburden for the foundations of the DME plant, as well as feed stock for the initial DME production. The coal from ML50245 will be either trucked to ML50246 for crushing or will be crushed in pit for conveyor transfer to the DME plant. Access between both leases will be via an overpass. Recycling of water will be a high priority for the Project. Runoff from the stockpile area and the pilot plant site will be collected in sediment sumps for recycling to the raw water storage dam.

A flood levee, designed to a 1:1000 flood event, will be constructed along the western side of Hodgson Creek on ML50246, which will protect the mining operation from floods and will ensure that runoff from the mining operations does not enter Hodgson Creek. A similar levee will be constructed on ML50245 to protect the mining operations as well as the pilot plant infrastructure and ensure runoff from the plant site does not enter Hodgson Creek. Both levees will channel runoff from the mining and processing areas to sediment sumps for recycling water into the process water dam, to be located on ML50245. Smaller sediment sumps will be located at the base of the outer slopes of the levees to collect runoff during construction and stabilising of the levees.

The mining operation will commence approximately 1km to the west of Hodgson Creek and progress to the west before moving to the south. Coal will be removed by conventional shovel and truck methods with dozer assist. A selective mining approach based on separating coal and waste plys down to 150mm will be adopted to produce a coal product with target ash of 35%. The coal will be transported directly to the ROM for crushing and delivery by conveyor to the DME Pilot Plant. The waste bands will be transported to the overburden dump along with the returning ash reject.

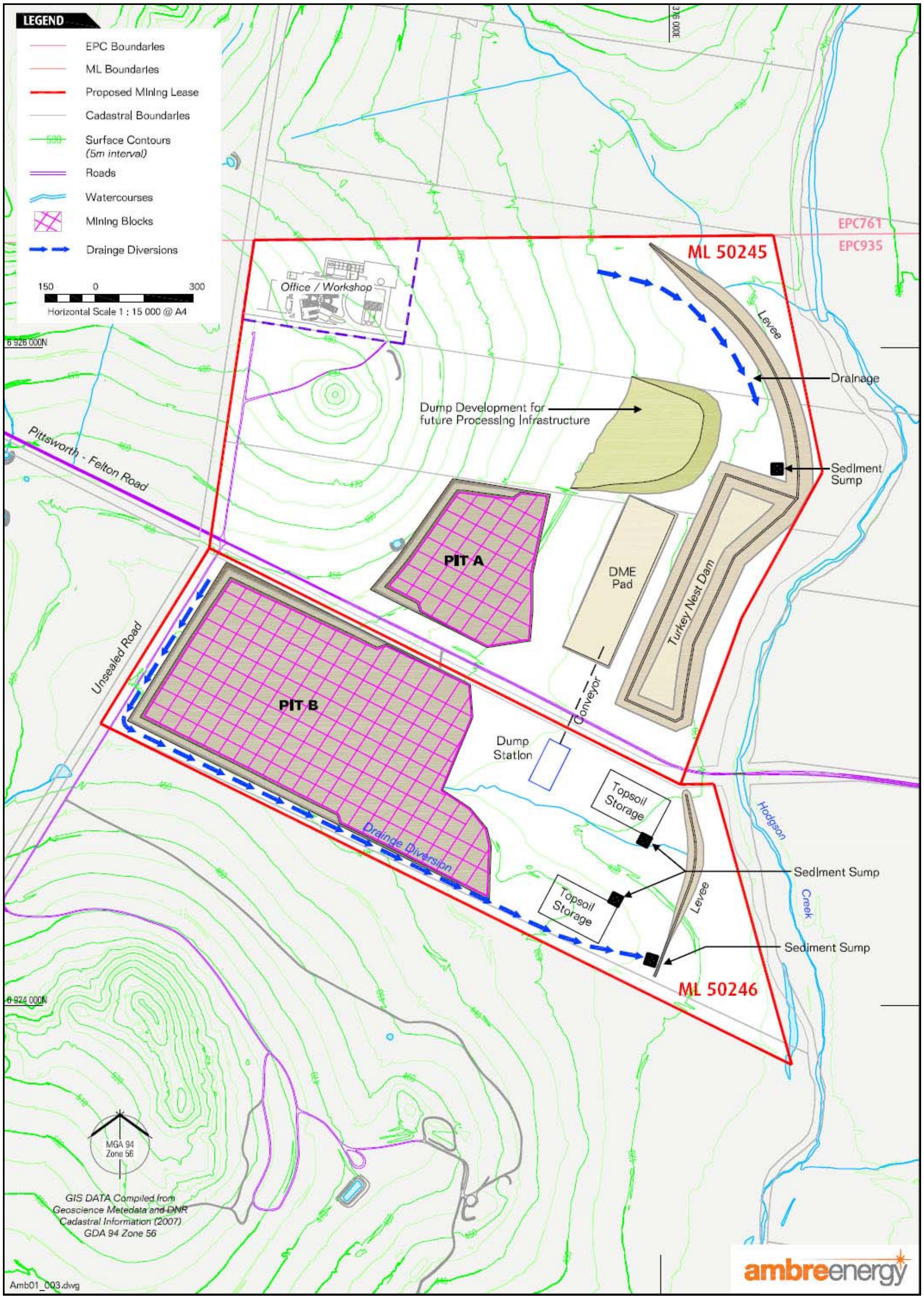

Figure 4, Demonstration Stage Mine and Infrastructure layout plan

DME Pilot Plant

DME will be produced by gasifying coal to produce syngas which in turn will react in Ambre's reactor and catalyst system to produce DME and a tail gas. A block diagram for the pilot plant process is shown below **Figure 5**:

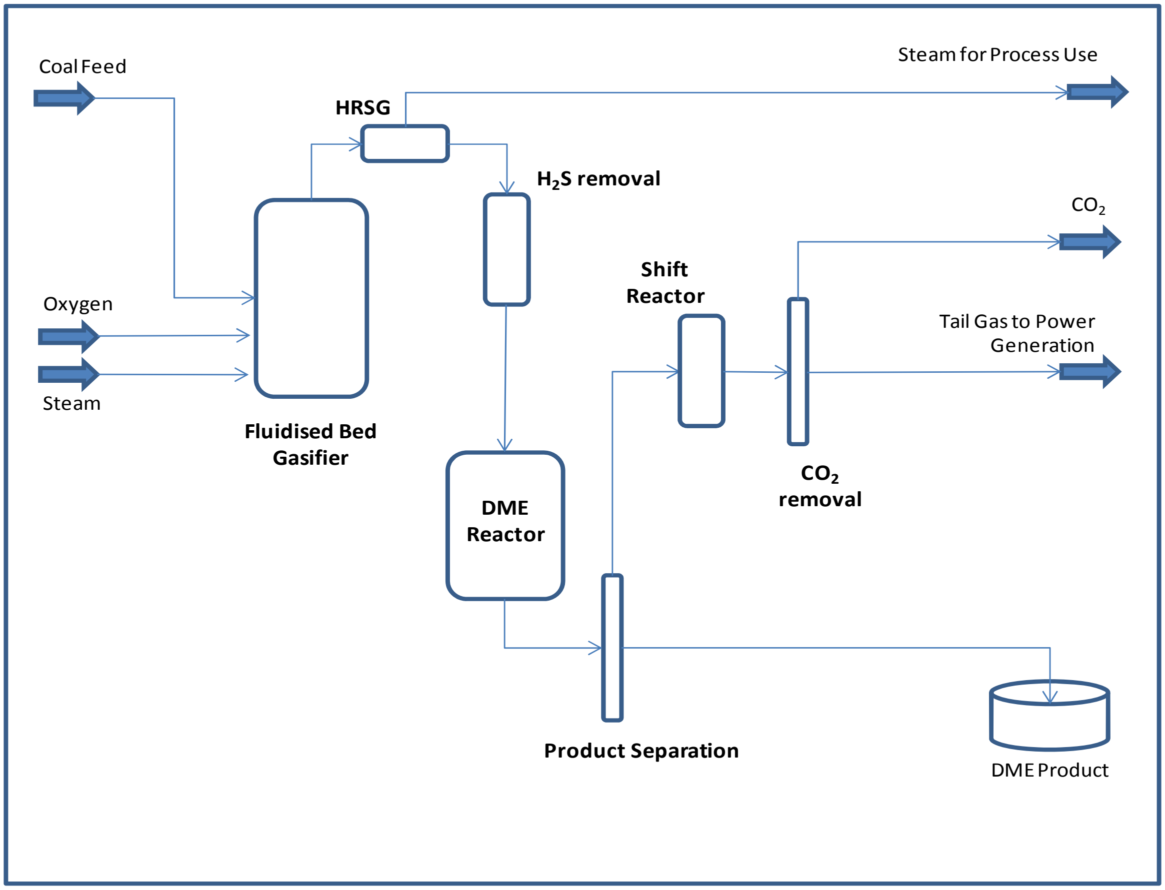

Figure 5, Pilot Plant Flow Diagram

The proposed pilot plant process can be described as follows:

Coal is sourced from the coal mine and crushed and sized to -10mm or as required giving a suitable feed to a fluid bed gasifier. The coal is reacted in the gasifier with oxygen from an Air Separation Unit (ASU) and steam. The operating conditions of the gasifier are adjusted to give H_2 to CO molar ratio of 1:1 in the feed to the DME reactor.

The gas from the gasifier (syngas) is cooled, allowing some steam production. The gas is then scrubbed and cooled, removing H_2S and water.

DME is produced in the reactor in a one step one pass reaction giving approximately 75% conversion of the hydrogen in the syngas. The DME is removed from the reactor outlet gas stream and then purified to produce the final DME product. The tail gas from purification is subjected to a shift reaction to convert CO to CO_2, thereby allowing additional CO_2 to be captured prior to burning the tail gas in a gas turbine to provide power for the process as well as some export power.

The process will be designed to capture CO_2 from the tail gas and will be designed to give a gas stream suitable for acceptable carbon dioxide intensity in the power generation section of the plant. The target for this will be 400 kg CO_2 per MW electricity generated – which is equivalent to or better than natural gas fired electrical generation equipment.

Further reduction on CO_2 intensity is possible via increased conversion of CO to CO_2 and H_2 in the tail gas and subsequent capture of CO_2.

Oxygen Plant

An air separation unit will be installed to provide the oxygen required for the gasification process. This unit will utilise proven technology from a recognised vendor of oxygen plants.

Waste Water Treatment

The waste water from the processing sections will be treated to a standard to allow addition of this water to the process water dam. Water from the sediment treatment ponds will be recycled for use in the mining operation or transferred to the process water dam.

1.8 Consultation with Interested and Affected Persons

Ambre Energy has started a consultative process with relevant interested parties. A key aspect of this process is discussions with landowners and community members directly affected by the Project to identify any areas of concern. This process will continue and includes identification of all stakeholders, discussion with Local, State and Federal Government representatives, communication plans and consultation and negotiation on measures required to address compliance and community concerns.

1.9 Environmentally Relevant Activities

The following activities may be undertaken at some stage during the life of the project:

ERA 6 (c) Chemical manufacturing (>100000t)

ERA 7 (a) Chemical storage (>1000m^3)

ERA 14 (c) Mining activities (throughput of 500,000t)

ERA 15 (b) Sewerage treatment (100-1500 equivalent persons)

ERA 25 (a) Metal surface coating

ERA 75 Waste management

ERA 78 Chemical or oil recycling

ERA 84 (b) (iv) Regulated waste storage (recycling, repossessing or reconditioning)

1.10 Sources of Water

Approximately 400ML/annum of water will be required for the mining processes such as dust suppression and approximately 600ML/annum for DME production. The water will be obtained from the following sources:

- Water harvest on site
- Recycled water from the Wetalla treatment plant
- Treated water from the coal seam gas fields

2.0 MINING ACTIVITIES

2.1 Description of Mining Activities

The main elements of the opencut operation are:

- Clearing of vegetation ahead of mining and selective stripping of the topsoil to be stockpiled for later use in the rehabilitation program;
- Overburden removal and coal mining by conventional truck/excavator fleets;
- Mining of the target seams;
- Processing of ROM coal through the crusher to produce conversion coal for treatment in the adjacent processing facilities;
- Reshaping of spoil dumps, replacement of topsoil and revegetation of all mined out and backfilled areas.

2.2 Mining Sequence

Mining Method

The mining operation will commence in Pit A on the northern side of the Pittsworth-Felton Rd within ML50245. The opening of Pit B boxcut on the southern side of the road within Ml50246 will commence in the 2^{nd} quarter of 2012. Coal will be removed by conventional shovel and truck methods with dozer assist. A selective mining approach based on separating coal and waste plys down to 150mm will be adopted to produce a coal product with target ash of 35%. The coal will be transported directly to the ROM for crushing and delivery by conveyor to the DME Pilot Plant. The waste bands will be transported to the overburden dumps along with the returning inert char.

Mining Schedule

Surface works are planned to commence in 2010 with first coal available for processing shortly after as the initial overburden is very thin. Table 2 lists the major production parameters for mining,

Table 2, Key Schedule Parameters

Year ending December	Overburden Mbcm	ROMt Mt	Quality Ash %
2011	1.56	0.265	33.3
2012	3.02	0.745	35.3
2013	3.00	0.830	37.6
2014	2.89	0.950	35.8
2015	1.46	0.400	35.6
TOTAL	**11.93**	**3.19**	**35.9**

2.3 Rehabilitation and Post Mining Land Use

The objective of the rehabilitation program is to return the same land suitability classes in the approximate proportion as exist pre mining. Any land not suited to a post mining land use of agriculture will be developed as native habitat. The rehabilitation program will involve the following:

Overburden Characterisation

As yet the overburden has not been characterised but initial observation of the Walloon sandstone and the basalts indicates that these materials weather to form good agricultural soils. The mining techniques will use truck placement of the overburden so that selective handling of overburden will be used to bury any material that may generate acid or undesirable levels of heavy metals that may be mobilised by leachate from the dumps. The overburden strata will be analysed to identify strata that requires selective handling and placement in the dumps.

Select overburden will be used to rock mulch the outer slopes of the flood levees. This material will be either basalt or Walloon sandstone or a combination. Initial wetting and drying tests on the Walloon sandstone indicate that this sandstone is resistant to breakdown by wetting and drying, an indication of high silica cementing compounds. The sandstone is not as resistant to breaking as is the basalt but will form an ideal rock to blend with basalt as it will provide erosion resistance whilst weathering into a soil. The soil component is essential to ensure that runoff remains on the surface of the rock mulch rather than eroding the subsurface below the rock.

Topsoil Management

Before development commences on the site, a soil survey will be conducted to identify the suitability classification of the various soil types as to their potential to produce the range of crops that have been grown in the past. One of the criteria used to determine the suitability class of a soil profile is the potential to store plant available water (easily extracted by plant roots) in the profile. The aim of the rehabilitation program is to return a landform on the mining areas with a similar proportion of suitability classes as existed pre mining. Thus returning the soil profile is an important first step.

During the mining operations more intense soil surveys will be conducted to plan topsoil stripping and storage operations. Topsoil and the subsoils to a depth indicated by the suitability classification will be stripped separately and replaced in the reverse order on the reshaped overburden dumps. Where possible the soil profiles will be directly replaced on reshaped spoil.

On the processing plant site generally only the topsoil layer will be removed for storage and eventual return as the pavement for the product storage area will be placed directly on the subsoil. Where geotechnical stability is an issue the subsoils may be removed for eventual return before the topsoil is respread during the rehabilitation of the plant infrastructure site.

Topsoil will be removed by scrapers and stockpiled separately from the subsoil, which will be removed either by scrapers or by shovel and truck. When an external overburden dump is sufficiently progressed the subsoil and topsoil will be directly respread or stored on the upper surface of the dump. Where topsoil and subsoil has to be stored the sides of the topsoil stockpiles will be shaped to a 4:1 gradient and the stockpile surface cultivated and planted with cereal/grass/legume mix to minimise erosion and to retain biological activity in the soil. The height of the stockpiles will be governed by the available of land, especially in the initial stages. As the rehabilitated areas will be farmed to return organic matter the depth of storage and subsequent loss of organic matter will not be an issue. However in general dump height will be limited to below 8m.

Overburden Removal and Landform Construction

Overburden will be removed by a conventional shovel and truck operation with the initial overburden being transported to an external dump**.** The height of the dump will be determined by a life of mine overburden balance which will determine the surplus of overburden that has to be placed in external dumps. The dump design and construction technique will ensure that the eastern face of the dump is built to final grade and rehabilitated as soon as the final shaping of the outer slope is completed. The dump will progress towards the open pit thus allowing the upper surface of the dump to be progressively rehabilitated. Sections of the dump will also be used for the separate storage of topsoil and subsoil. While the outer slope will be graded to a 10% slope the upper surface will be constructed to a near level grade of 0.5 to 1% to provide the better suitability classes of soil profiles with minimum erosion potential. An alternate to the 10% slope will be the construction of 1H:4V slopes in selected locations which will be rock mulched to ensure stability.

On the 10% outer slopes a 20m horizontal berm will be constructed at approximately 10-15m vertical intervals to produce a landform with a maximum slopes length of 100-150m to minimise the erosion potential during the initial re-vegetation phase to stabilise the slopes. The runoff from the upper surface dump will be initially discharged to natural ground via rock lined waterways. The final landform will ensure that this runoff is conveyed by low gradients grassed waterways to natural waterways on unmined adjacent slopes. If necessary these natural waterways will be augmented with rock mulch to handle increased flows.

The eastern faces of the flood levees is one such area which will be constructed to a gradient of approximately 1H:4V and rock mulched with rock and topsoil and grassed to provide erosion protection from flood flows and surface runoff. The top and western face will be grassed except for access tracks along the top of the levee that will be gravel. Runoff from the top of the levee and gravel track will be directed over the western slope.

Revegetation

As the soil profile is respread, care will be taken to reduce compaction from the spreading equipment by ripping, and to blend the subsoil with the reshaped spoil surface. Topsoil will then be respread and further ripping will remove compaction and blend the topsoil with the subsoil during the seeding process. A survey system will be implemented to ensure that the soils profiles, required to return a particular land suitability class, are accurately placed to ensure uniformity of placement and correct depth of the subsoil and topsoils.

Before placement the soil profiles will be analyses to ascertain the nutrient and organic matter status of the soil to determine losses during the storage of soil. The application of a combination of manure and fertilizer will be a management option if losses are insignificant and likely to impede the initial re-vegetation phase.

The initial surface treatment will be to control initial erosion by ripping and planting high rates of cereal cover crops as well as grasses and deep-rooted legumes. Depending on the season it may be necessary to hay mulch the surface, immediately after seeding, to both minimise erosion as well as provide shade to reduce water loss from the surface, which will extend the germination period. The aim is to produce a thick vegetative cover to effectively control erosion as well as to build up the organic carbon in the soil that would have been lost during storage.

This vegetative cover will remain for several years after which time cropping trials will be implemented. These trials will ascertain the ability of the various rehabilitated landforms to maintain acceptable erosion losses during fallow period with reduced standing stubble cover after the crops have been harvested. These trails will also measure the productivity of the soils for a range of crops. Both crop productivity and soil profile measurements will be sued to determine the success of the rehabilitation program.

Trees will be introduced in some areas only after the slopes have been stabilised with a vegetative cover. This will involve using seedlings and may require initial irrigation depending on the rainfall patterns. Experimentation will also be done with direct seeding on areas where rip lines pond rainfall runoff generated from adjacent tracks and flat areas. These tracks that generate runoff are generally constructed on the berms.