Boss Energy Limited
Annual report for EL 20/2004
Latrobe Oil Shale Project

Michael Blake, November 2010

Boss Energy: Annual Report, EL 20/2004

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Boss Energy: Annual Report for EL 20/2004, Latrobe Oil Shale Project

Summary

Exploration for the year to 26 November 2010 for EL 20/2004 has concentrated on process testing of oil extraction technologies at Dalmat Engineering in Johannesburg, Fushun Mining in China, and environmental programs.

Results from the 500kg Fushun process retort test in China indicate that the Tasmanite Oil Shale is suitable for Fushun's retort technology, producing 93.3kg/dry tonne of oil shale. The oil is classified as a wax free crude with a light crude fraction of 10% and a diesel fraction of 50%, and can be used directly as fuel oil. Initial results from the Dalmat Carbonisation and Energy System trial in South Africa have been encouraging, and will be repeated. Environmental remediation works were carried out to remove dumped material from the shale stockpile site and prevent further access. A water sampling program was initiated to assess water quality leaving the shale bulk sample site. Preliminary data does not suggest there is an issue with diluted discharged waters.

In 2011 Boss energy hope to send up to 500T of oil shale to Fushun Mining for a production trial run, and a further bulk sample for testing at Queensland Energy Resources' Paraho II test plant in Queensland. A drilling program is proposed for 2011 to increase the certainty of shallow shale occurrences and sample untested areas for shale occurrence.

Introduction and tenement information

EL 20/2004 is a 61 square kilometre tenement encompassing an area to the east and west of the Mersey River between Railton and Latrobe in North Western Tasmania (figure 1). The tenement was acquired from Daley Resources PTY. LTD. in July 2007. Tenure consists of low density residential areas, freehold agricultural land, forest plantation and forest reserves. Access across the tenement is good with all year round access via established vehicular roads, tracks and short distance walking. The tenement covers the largest area of known shallow oil shale occurrences in Tasmania

Geology Overview

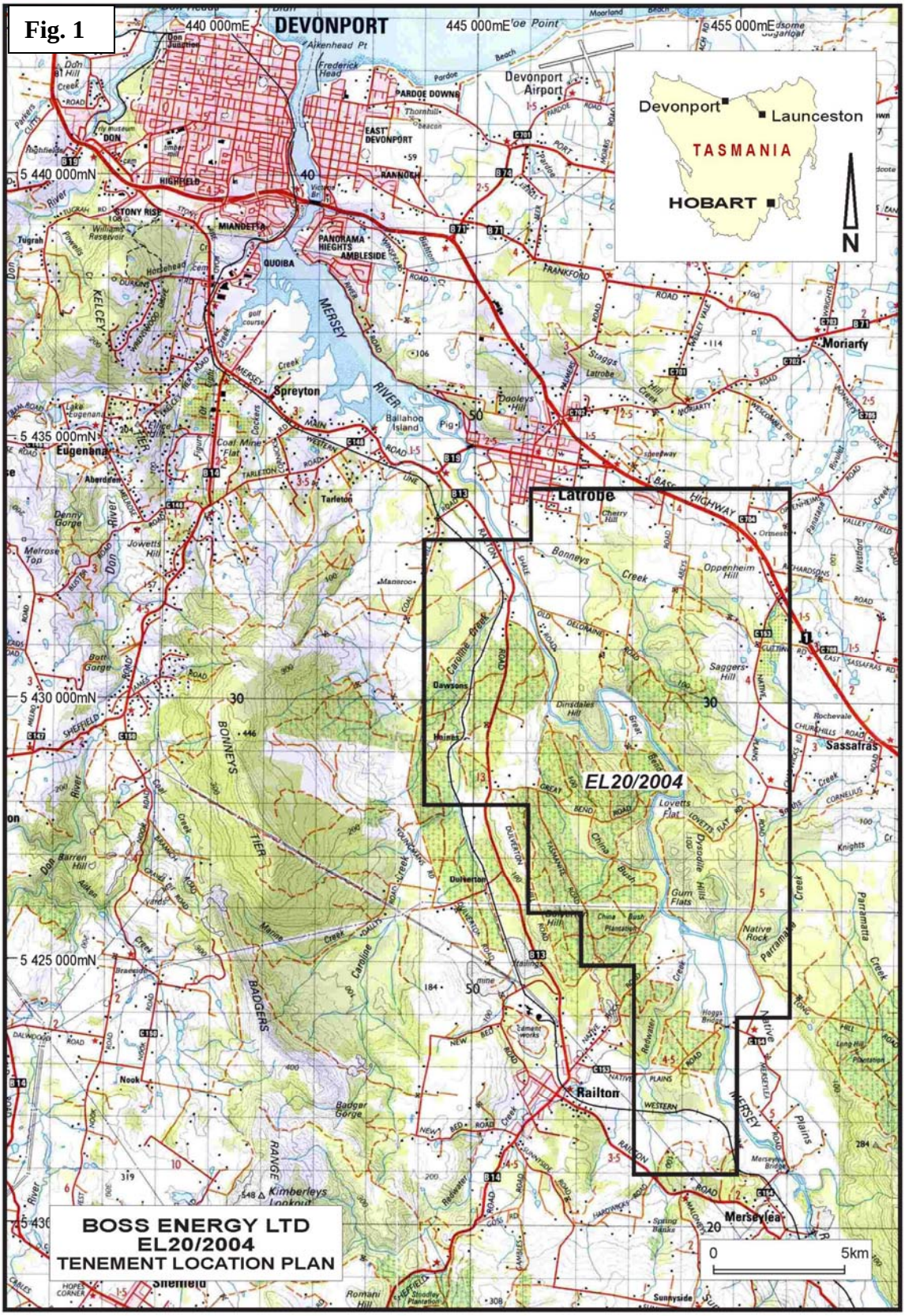
The Tasmanite oil shale occurs in Tasmania within the Parmeener Supergroup, which includes marine and freshwater sedimentary sequences of Upper Carboniferous to Early Triassic age (Burrett and Martin, 1989). The sequence was deposited in the Tasmania basin which has a broad axis stretching from Cygnet in southern Tasmania, to Latrobe in northern Tasmania. The Tasmanite horizon is located within Upper Carboniferous to Early Permian Lower Parmeener Supergroup rocks just above the boundary between basal tillites and overlying glacio-marine pebbly mudstones of the Quamby formation and correlates (Bacon Et al, 2000). At Latrobe, the formation is known locally as the Spreyton Beds. The Quamby Formation is overlain by a sequence of richly fossiliferous siltstone, sandstone and minor limestone known as the Bundella Formation, which is in turn succeeded by a freshwater sequence known locally near Latrobe as the Mersey Coal Measures (Bacon Et al, 2000).

The Tasmanite Oil Shale, comprising accumulations of likely algal spore casings, known as Tasmanites Punctatus, occurs in the Latrobe disitrict as a horizon of 1.5m average thickness, comprising two to three distinct Tasmanite rich horizons. Tasmanite rich

horizons (up to 45% kerogen) are separated by silt rich beds (around 5% kerogen) of 10-20cm thickness. (Clementson, 1981).

The oil shale horizon is known to be generally flat lying to dipping gently at 5-6 degrees. At tenement scale the position of the shale horizon is affected by block faulting resulting in displacements of over 75m, and at local scale over tens of meters is commonly displaced 0.3-6m (Bujtor and Waldrum, 1982). Distribution of the shale may be affected by depositional basin morphology, erosion, gentle folding, and local dolerite intrusions. Permian Shale bearing lithologies may be concealed locally by Tertiary basalt flows, and Quaternary cover.

Fig. 1


DEVONPORT
Devonport
Launceston
TASMANIA
HOBART
N
EL20/2004
Latrobe
Railton
Sassafras
Moriarty
Spreyton
Eugenana
Merseylea
Sheffield
Sunnyside
Nook
Dulverton
Kimberleys Lookout
0
5km
BOSS ENERGY LTD
EL20/2004
TENEMENT LOCATION PLAN

Previous Work

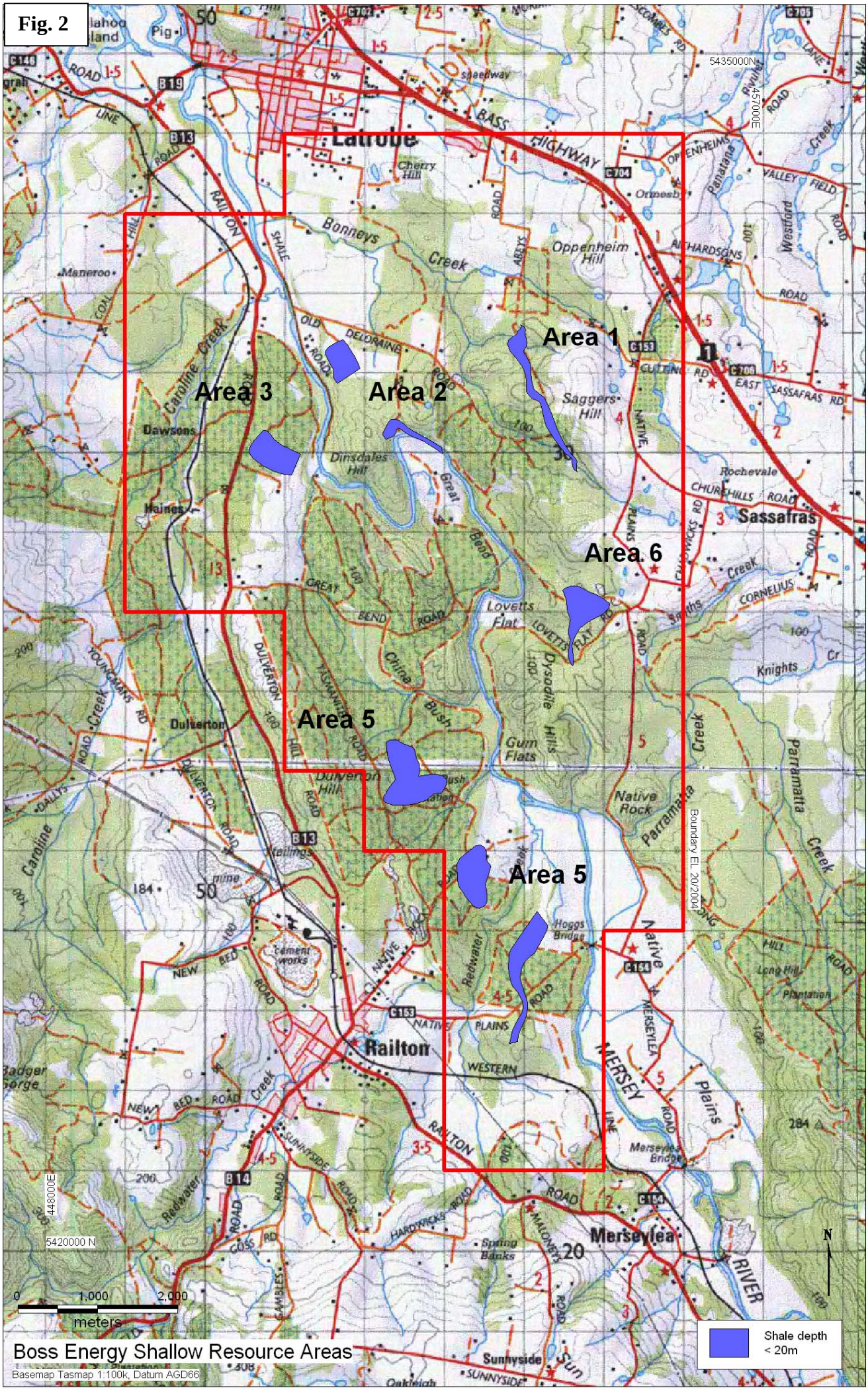
There is an extensive history of early work conducted on the Tasmanite oil shale, including historical production of 1.13 ML of oil from mines near the Mersey River's Great Bend . Bacon, 1986, and Bacon et al, 2000, should be referenced for an analysis of early work. Relatively recent exploration work is detailed in Table 1 below.

In 1987 the Tasmanian Hydro Electric Commission conducted extensive research and reported on the production of liquid fuels from oil shale in Tasmania. Their study concluded that it is technically feasible to produce a full range of transport fuels at a production rate of 2MT of shale/year over 20 years, yielding 286 megalitres of shale oil per year.

Table 1: Recent exploration work

Company	Year	Report	Authors	Work completed	Results/Conclusions
Endeavour Oil Co	1975	EL 4/74	Hunt, F.L.	Feasibility study oil shale as a bitumen resource	Uneconomic at time Recommend further development work for hotmix usage
Endeavour Oil CO	1975	EL 4/74	Nixon, L.G.	drilled 38 holes	possible indication of 42MT of shale
Endeavour Oil CO/CRAE	1981-82	EL 4/74	Clementson, I.M.	drilled 135 holes	42MT of shale indicated
CRAE	1982	EL 4/74	Bujtor and Waldrum	Project evaluation mining and bitumen production	Uneconomic Market penetration issues product acceptance time lag 3 yrs
Endeavour Oil CO/CRAE	1983	EL 4/74	Clementson et al	Investigation of Tasmanite as Anode Carbon source Investigated use as Bitumen binder	Further work recommendation only if economics improve
Boss Energy Pty Ltd	2008	EL 20/2004	Blake, M.D.	14 RC and 2 Dyiamond holes drilled at China Bush Plantation April 2007	Identification of 968,000 tonnes of shale at depth <20m
Boss Energy Pty Ltd	2008	EL 20/2004	Blake, M.D.	1000T Bulk sample of shale extracted At China Bush Plantation	Test work in progress: Dalmat Engineering-South Africa, Fushun Mining-China.

Fig. 2


Area 1
Area 2
Area 3
Area 5
Area 6
Area 5
Latrobe
Railton
Sassafras
Merseylea
Dulverton
Boundary EL 20/2004
5435000N
457000E
5420000 N
448000E
0
1,000
2,000
meters
N
Shale depth
< 20m
Boss Energy Shallow Resource Areas
Basemap Tasmap 1:100k, Datum AGD66

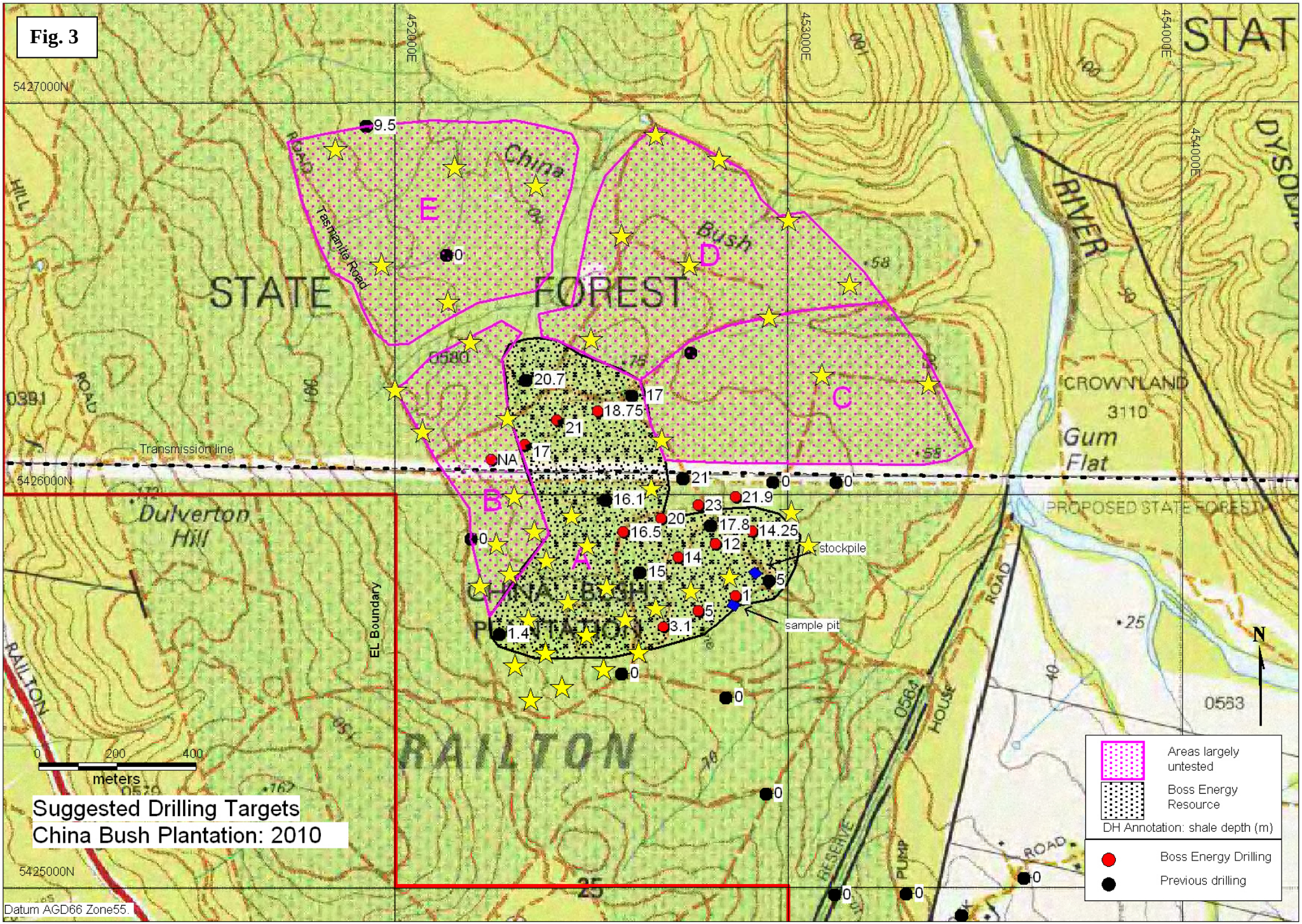


Fig. 3
5427000N
452000E
453000E
454000E
STATE FOREST
China Bush Plantation
Tasmanilla Road
RIVER
CROWNLAND 3110
Gum Flat
Transmission line
5426000N
Dulverton Hill
EL Boundary
RAILTON
stockpile
sample pit
PROPOSED STATE FOREST
0583
0580
0381
0564
5425000N
0
200
400
meters
Suggested Drilling Targets
China Bush Plantation: 2010
Datum AGD66 Zone55.
Areas largely untested
Boss Energy Resource
DH Annotation: shale depth (m)
Boss Energy Drilling
Previous drilling
N

Work Completed for the year to 26 November 2010

Dalmat technologies testing

Two 200 litre drums containing crushed oil shale were shipped to Dalmat engineering in Johannesburg for laboratory testing using the Dalmat Carbonization and Energy System scaled vertical retort processing (VRT) technology (Appendix 2, Blake, 2009). Results are expected to be available in early 2011.

Fushun Mining Testing

In July 2010, 500kg of shale in 'as mined' state from the shale stockpile at China Bush was shipped to Fushun Mining in China for test work. A summary of results is provided in Appendix 3. Boss Energy is awaiting translation of the full test report.

Key findings of the Fushun oil shale test are:

- The physical / chemical parameters of Tasmanian oil shale of the Latrobe project are similar to Fushun's oil shale and hence it can be processed and treated using Fushun Retort technology
- In the sample sent, the oil content is 93.3 kg/dry tonne of oil shale, which compares favourably with other Australian oil shales and Fushun oil shale.
- Oil from Latrobe oil shale can be classified as a wax-free crude oil with light crude fraction of 10% and diesel fraction of 50%
- Oil from Latrobe oil shale has a low pour point (-22^{o}C) and a heating value of 42.4 MJ/kg (conventional crude oil is 42.7 MJ/kg)
- Light crude content of the oil is high and it can be used directly as a fuel oil
- The tests indicate that Latrobe oil shale can be retorted at lower temperatures than standard retorting temperatures, which are about 450^{o}C; majority of the oil was released between 170 and 480^{o}C
- The process has sufficient energy to be self sustaining
- Tasmanian oil shale would produce less gas than Fushun oil shale, but has a significantly higher heating value (a little over 20 MJ/m^{3})
- The water content (11.2%) was lower than the threshold moisture content for the Fushun process (15%), implying that external drying would not be required prior to retorting
- Low dust is produced during crushing operations owing to moisture content

The Fushun Process is a vertical retort technology where shale is added to the top of the retort, spent shale is removed from the bottom, and products from multiple retorts are passed to an oil recovery system. Hot recycled gases and air are injected into the base of the retort to combust char from spent shale, providing heat for pyrolysis of fresh shale (Appendix 5, Blake 2009).

Analytical results

Preliminary results from Dalmat Engineering are summarized below, with a full report expected in December 2010. Dalmat have tested one batch of fine material (as delivered) in their mini-retort without pre-drying, and intend to repeat the test on a pre-dried basis. Material sent for analysis was <20mm crushed material including upper and lower kerogen rich bands, as well as the lower yielding central band of the Tasmanite horizon The results in table 2 represent yield from a scaled down fully operational retort.

Table 2:
Dalmat Engineering mass balance results (17/06/2010)
Wet sample from sealed container

Oil Shale	49 kg (100 %)
Char	38 kg (78 %)
Feedstock/char mass difference	11 kg (22 %)
Oil	3.5 kg (7 %)
Water	5.2 kg (10.5 %)
Gas (by difference)	2.3 kg (4.5 %)

Test observations

- There appears to not be enough volatile gas for a self sustaining process in a full scale retort, unless some additional heat source could be introduced.

- The remaining fines char did not fuse together and is similar to the feed material strength-wise. The crushed material does not appear to be suitable for the retorts in their current configuration. However the Dalmat retort can be modified to accept the fine material and friable char (residue solids).

- The test result is indicative of approximately 0.4 - 0.6 barrel oil per ton of feedstock material, subject to repeat test.

Environment

An inspection of the rehabilitated bulk sample site was made during winter 2008, and spring 2009 to assess the progress of natural re-vegetation. The site was found to be progressing well with re-stocking with dominantly native vegetation within a pine plantation. No re-seeding was carried out, and the area is to be re-planted with pines by managers Timberlands Pacific. Photos of re-vegetation progress are shown in figures 4-7.

Fig. 4. view across bulk sample pit rehabilitation site, August 2008

Fig 5. native plants, bulk sample rehabilitation site, August 2008

Fig. 6. view across bulk sample pit rehabilitation site, November 2009

Fig 7. native plants, bulk sample rehabilitation site, November 2009

Waste Dumping

In July 2010, a visit to the shale stockpile at China Bush Plantation revealed that an area adjacent to the bulk sample pile was being used as a convenient waste dumping site by locals. Waste was removed by Boss Energy using a truck and excavator, and was disposed of at a local council landfill site at Dulverton. To prevent further dumping at the site, large rocks were placed across the access to the shale stockpile.

Fig. 8. Waste soil, concrete, steel and rubbish dumped at the shale site

Fig 9. Stone barrier placed to prevent access

Water quality monitoring

A water sampling program has been initiated at the China Bush oil shale bulk sample site to monitor runoff waters from the shale stockpile and rehabilitated bulk sample area. Samples have been tested for hydrocarbons and acid mine drainage contaminants. Initial results show that no hydrocarbons are present in runoff waters from the shale. Most acid mine drainage suite elements are within suggested limits for waters discharged from the bulk sample site, however concentrations of Zn are slightly elevated. Static water adjacent to the shale stockpile has no hydrocarbon contamination, but has relatively elevated levels of metals compared to the waters discharged from the bulk sample area. The preliminary data does not suggest that there is an issue with combined discharged water quality at the bulk sample site. Results are presented in detail in Appendix 1.

Expenditure

The breakdown of expenditure for EL 20/2004 is shown in Table 3 below.

Table 3: Expenditure.

Category	Expenditure
Geology	$17,023
Feasibility/Process Testing	$75,920
Administration	$1237
Other	$0
Total	$94,180

Proposed forward exploration program

Boss Energy hope to follow up the successful small scale Fushun mining test with a production run test of 20 tonnes/day over two to three weeks, involving a shipment from the bulk sample stockpile of up to 500 tonnes.

Queensland Energy Resources (QER) is constructing a Paraho II shale oil demonstration plant at Yarwun, Queensland. Boss energy is in discussion with QER regarding testing of a bulk sample of Tasmanite oil shale in mid 2011.

A drilling program will be carried out at the China Bush site to increase the certainty of the presence of shallow oil shale in preparation for JORC compliance and to sample untested areas. This work was not completed in the current year due to focus on retort test work. The suggested drill locations are indicated in figure 3. Further drilling to test for shallow shale extensions at Saggers Hill and in the southern part of the tenement will be proposed.

References

Bacon, C.A., 1986, A summary of the oil shale resources of Tasmania, Mineral Resources Tasmania report UR1986_61

Bacon et al, 2000, The petroleum potential of onshore Tasmania, Mineral Resources Tasmania Geological Survey Bulletin 71.

Blake, M., 2009, Annual report for EL 20/2004 Latrobe Oil Shale Project, Annual tenement report to Mineral Resources Tasmania

Burrett and Martin, 1989, Geology and mineral resources of Tasmania, Geological Society of Australia special publication 15

Clementson, I.M., 1981, Railton E.L. 4/74, Interim report on 1081 drilling, CRA Exploration PTY LTD., MRT report 82_1707

Clementson, I.M., 1982, Railton EL 4/74 Final report on 1982 drilling, CRA Exploration PTY. LTD., MRT report 82_1789

Maynard, A and Assoc., 2007, Independent report on mineral assets, Boss Energy LTD Prospectus.

Appendix 1

Environmental monitoring program, EL20/2004

Appendix 2

Water sampling results, Analytical Services Tasmania

Appendix 3

Fushun Mining test results summary