

Boss Energy  
Drilling Report for EL 20/2004  
April 2007

Prepared by  
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Dragonfly Workshop

## Introduction

This report describes a drilling program undertaken by Boss Energy Pty LTD in April 2007 on EL20/2004 near Latrobe in North West Tasmania. Fourteen RC holes and two diamond holes were drilled in the China Bush Plantation area, also Known as China Flats, in the vicinity of Tasmanite Road, near the Great Bend of the Mersey River. Thirteen of the fourteen RC holes , and both diamond holes successfully intersected the Tasmanite oil shale at depths ranging from one to twenty three meters below surface.

## Locality and Access

The China Bush Plantation is accessed from the Railton Road via Big Bend and Tasmanite roads, approximately 8 km from Latrobe (see inset box on Tenement Location Plan Fig1). China Bush is a mature pine plantation which had been partially harvested at the time of this program, providing excellent access to the site, shown in Fig 3. Minor preparation of the harvested ground was required by an excavator to provide clear 4WD access to drill sites.

Fig 2 shows detail of the drill hole locations plotted on 1:25000 contour base.

## Geology

The Tasmanite oil shale occurs within the upper part of the marine Spreyton Beds of Lower Permian age. The stratigraphy is well described by Clementson, 1981, consisting of mudstones and siltstones with glacial dropstones and argillitic conglomerates, hosting two thin associated layers of algal spore rich oil shale.

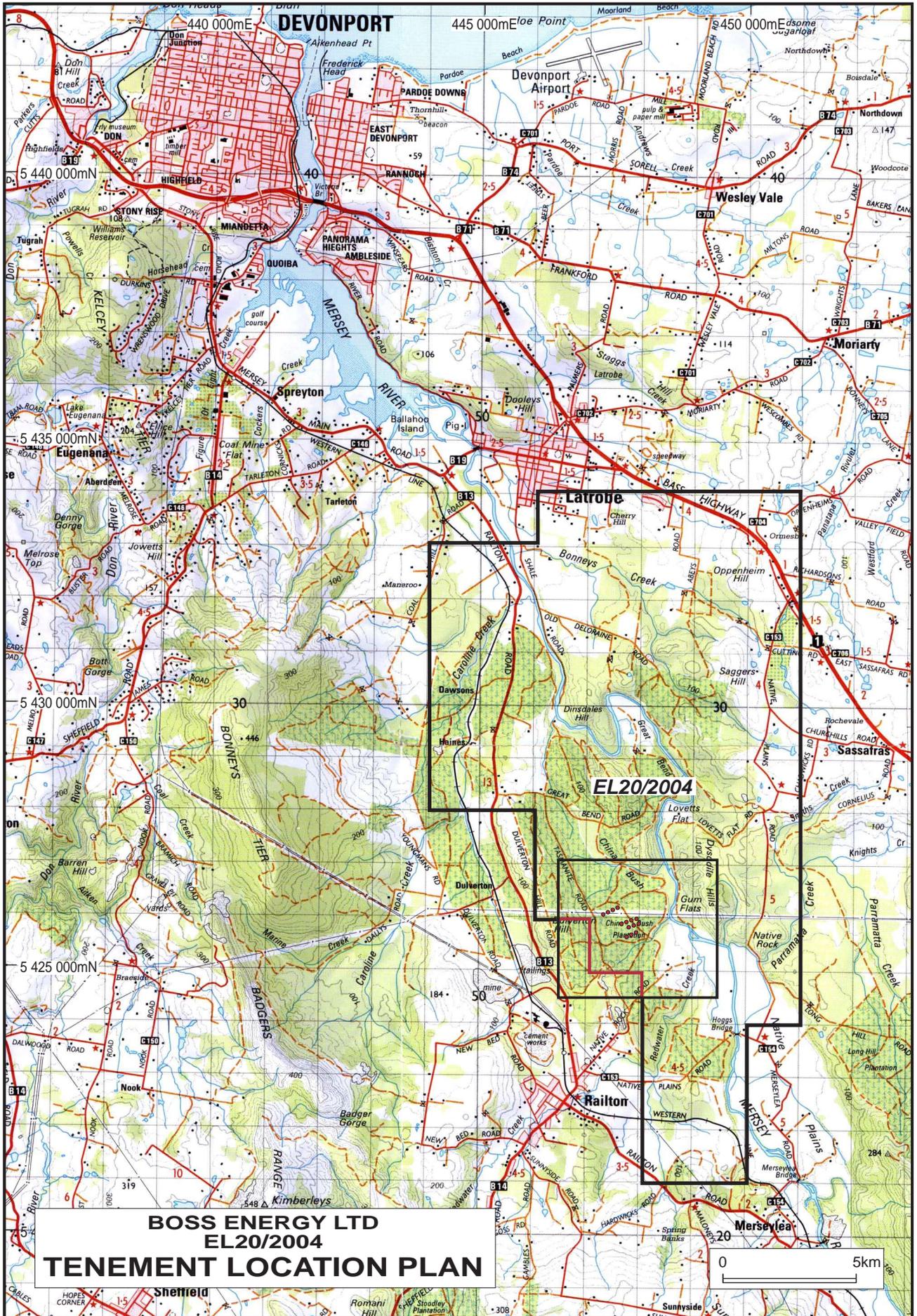
The most significant recent exploration in this area was conducted by CRA Exploration PTY. LTD. In 1981 over six zones of oil shale occurrence in the local area. The Boss Energy drilling program was conducted within an area named by CRAE as ‘North China Flat, Zone V’.

## Methods

All holes were drilled with Gerald Spalding Drillers PTY LTD GK850 multi purpose drill rig Fig 4. RC holes were drilled with a 4.5 inch hammer, and diamond holes were drilled NQ, with an RC pre collar to save repetition and drill time. Water only was used as drilling lubricant.

Samples of approx 15kg were collected from the RC cyclone into a plastic bag from which a sieved sample was taken and logged in an RC chip tray. After logging, samples of interest were put through a 3 tier riffle splitter, producing a ~2kg split into a calico bag. A spear sample was taken from the calico split into a paper sample bag with wire tie top, providing a sub-sample of approx 100g for potential laboratory analysis. Drill core was wrapped in aluminium foil after logging.

Fig 1 Location Map



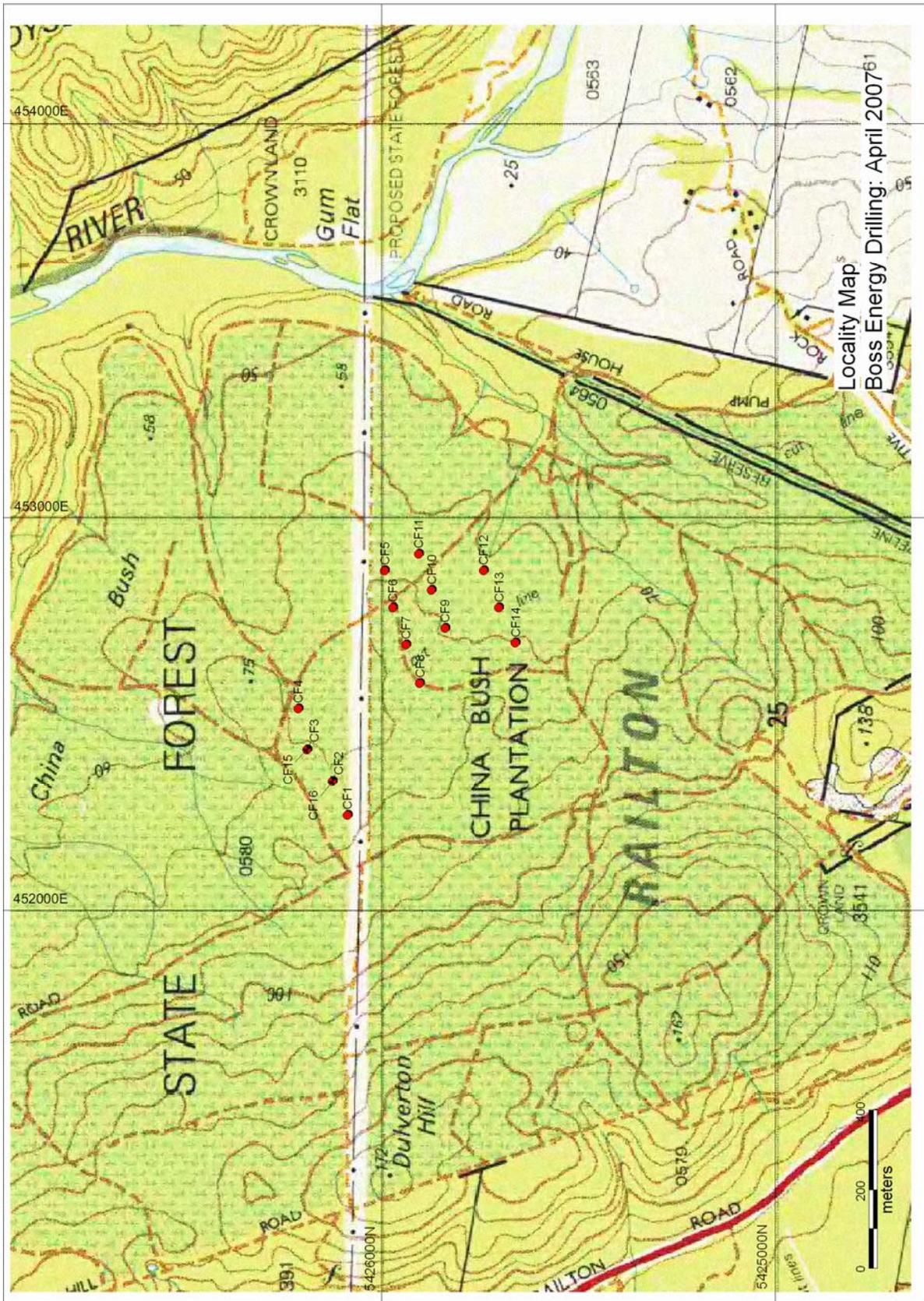


Fig 2. Drill hole locations

## Results

Intersections of the Tasmanite shale proved easily identifiable in RC chip samples, in the context of enclosing sediments. It was noticed that intersection with the shale caused a colour change in the sample as it was collected from the cyclone, thus the intercept was able to be estimated to 0.25m for some holes.

The rock type observed immediately above the oil shale was a medium grey, slightly micaceous very fine sandstone to siltstone with occasional siliceous pebbles. This unit was generally poorly fissile, faintly bedded, and slightly pyritic downhole towards the contact with oil shale.

The Tasmanite horizons were observed as a greyish to honey brown, low density, highly fissile shale consisting of 80% plus algal spores. The Tasmanite spores are clearly visible on cleavage surfaces and broken chip edges with hand lens as sub mm flattened translucent honey brown ovoid spore casings. The flattened spores are aligned, giving the shale a distinctive cleavage. As noted in previous literature, the shale is difficult to break across cleavage.

Immediately below the oil shale is a medium grey, slightly pyritic pebbly to cobbly fine sandstone. This unit is competent, slightly micaceous, poorly fissile and slightly pyritic. This unit is underlain by a distinctive dark grey, crumbly, soft, cobbly mudstone with angular pink and cream quartzite clasts.

A summary of drilling results is shown in Table 1, and sampling details in Table 2  
Detailed logs of all intersections are provided in Appendix 1  
Drill Core Photographs of Diamond holes BED07 CF15 and BED07 CF16 are shown in Fig 5a and 5b.



Fig 3. Drill site



Fig 4. GK850 drill rig

Fig 5a. Core Photos BED97 CF15



Fig 5b. Core Photos BED97 CF16



## References

Bacon, C.A., 1986, A summary of the oil shale resources of Tasmania, Mineral Resources Tasmania document UR1986\_61

Burrett, C.F., and Martin, E.L., 1989, Geology and mineral resources of Tasmania

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

Table 1

<b>Boss Energy PTY LTD</b>							
<b>Drilling Results</b>							
Coordinates reported in AMG AGD66							
<b>Hole ID</b>	<b>AMGE (m)</b>	<b>AMGN (m)</b>	<b>RL (m)</b>	<b>Intersection From</b>	<b>Intersection To</b>	<b>Thickness</b>	<b>Total Depth</b>
BEC07 CF1	452244	5426086	91	NA	NA	NA	22
BEC07 CF2	452330	5426124		17	18	1	28
BEC07 CF3	452411	5426188	82	21	23	2	28
BEC07 CF4	452515	5426211	70	18.75	20	1.25	26
BEC07 CF5	452866	5425991	75	21.9	22.9	1	28
BEC07 CF6	452771	5425971	81	23	24.2	1.2	28
BEC07 CF7	452677	5425937	81	20	21.6	1.6	26
BEC07 CF8	452580	5425902	82	16.5	17.4	0.9	21
BEC07 CF9	452720	5425838	76	14	15.5	1.5	20
BEC07 CF10	452816	5425872		12	13.1	1.1	18
BEC07 CF11	452908	5425905	74	14.25	15	0.75	18
BEC07 CF12	452866	5425740	67	1	2.1	1.1	10
BEC07 CF13	452772	5425701		5	6	1	10
BEC07 CF14	452682	5425659	87	3.1	4.4	1.3	10
BED07 CF15	452411	5426188	82	Upper 20.95 Lower 21.9	Upper 21.7 Lower 21.96	Combined 1.1	24.5
BED07 CF16	452330	5426124		Upper 18.3 Lower 19.25	Upper 18.85 Lower 19.7	Combined 1.4	22
NB Holes CF1-CF14 are RC drilled intersections CF15 and CF16 are Diamond Holes with RC Pre-Collars. Reported intersections are dominated by Tasmanite rich shale							

Table 2

**Boss Energy****RC Sampling sheet**

**Prospect: China Flats**  
**geologist: Mike Blake**  
**Sampler Adrian Grey**

Samples collected from RC cyclone into Green Plastic bag, then put through 3 tier splitter producing a ~2kg sample in calco bag.

All samples for analysis speared from ~2kg split in calico bag into paper bag with wire tie top

Sample number	Hole No	Depth from	Depth to	Type	Comment
CF2-01	CF2	15	16	Split 3T	
CF2-02	CF2	16	17	Split 3T	
CF2-03	CF2	17	18	Split 3T	
CF2-04	CF2	18	19	Split 3T	
CF2-05	CF2	19	20	Split 3T	
CF3-01	CF3	19	20	Split 3T	
CF3-02	CF3	20	21	Split 3T	
CF3-03	CF3	21	22	Split 3T	
CF3-04	CF3	22	23	Split 3T	
CF3-05	CF3	23	24	Split 3T	
CF4-01	CF4	17	18	Split 3T	
CF4-02	CF4	18	19	Split 3T	
CF4-03	CF4	19	20	Split 3T	
CF4-04	CF4	20	21	Split 3T	
CF5-01	CF5	20	21	Split 3T	
CF5-02	CF5	21	22	Split 3T	
CF5-03	CF5	22	23	Split 3T	
CF5-04	CF5	23	24	Split 3T	
CF6-01	CF6	22	23	Split 3T	
CF6-02	CF6	23	24	Split 3T	
CF6-03	CF6	24	25	Split 3T	
CF6-04	CF6	25	26	Split 3T	
CF7-01	CF7	19	20	Split 3T	
CF7-02	CF7	20	21	Split 3T	
CF7-03	CF7	21	22	Split 3T	
CF7-04	CF7	22	23	Split 3T	
CF7-05	CF7	23	24	Split 3T	
CF8-01	CF8	15	16	Split 3T	
CF8-02	CF8	16	17	Split 3T	
CF8-03	CF8	17	18	Split 3T	
CF8-04	CF8	18	19	Split 3T	
CF9-01	CF9	13	14	Split 3T	
CF9-02	CF9	14	15	Split 3T	
CF9-03	CF9	15	16	Split 3T	
CF9-04	CF9	16	17	Split 3T	
CF10-01	CF10	11	12	Split 3T	
CF10-02	CF10	12	13	Split 3T	
CF10-03	CF10	13	14	Split 3T	
CF10-04	CF10	14	15	Split 3T	
CF11-01	CF11	13	14	Split 3T	
CF11-02	CF11	14	15	Split 3T	
CF11-03	CF11	15	16	Split 3T	
CF12-01	CF12	0	1	Split 3T	
CF12-02	CF12	1	2	Split 3T	
CF12-03	CF12	2	3	Split 3T	
CF12-04	CF12	3	4	Split 3T	

**Boss Energy**

**RC Sampling sheet**

**Prospect: China Flats**  
**geologist: Mike Blake**  
**Sampler Adrian Grey**

Samples collected from RC cyclone into Green Plastic bag, then put through 3 tier splitter producing a ~2kg sample in calco bag.

All samples for analysis speared from ~2kg split in calico bag into paper bag with wire tie top

<b>Sample number</b>	<b>Hole No</b>	<b>Depth from</b>	<b>Depth to</b>	<b>Type</b>	<b>Comment</b>
CF13-01	CF13	4	5	Split 3T	
CF13-02	CF13	5	6	Split 3T	
CF13-03	CF13	6	7	Split 3T	
CF14-01	CF14	2	3	Split 3T	
CF14-02	CF14	3	4	Split 3T	
CF14-03	CF14	4	5	Split 3T	
CF14-04	CF14	5	6	Split 3T	

**Boss Energy PTY LTD: Drill Log.**

**Hole No:** BEC 07 CF1 (1D)

Tenement	Driller: Spauldings -	Collar: 0452244E, 5426086N	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 91m ASL	
Sample No's —	Date Drilled: 11/4/07	AZM N/A	Total Depth: 22
	Hole Diam: 4 1/2 INCH.	Dip: -90	Water Table: 8m.

Depth (from - to)	Graphic	Lithology
0 - 3.6m		weathered orange-brown clays with sub angular to sub rounded quartzite & quartzite pebbles
3.6 - 5m		dark grey basalt/dolerite + orange brown clays
5 - 7.9m		Mixed orange brown pebbly clays & s/z dolerite.
7.9 - 9m		
9 - 10		
10 - 13		orange brown, red-brown & green clays with depth 10% dolerite chips in green clays from 12-13
13 - 14		blue-grey dolerite
14 - 17		Mixed dolerite + quartzite pebbles + fine sandstone
17 - 22		Fresh dolerite mixed with 10% indurated, brecciated f.g. quartz sandstone.
EOH		22

**Boss Energy PTY LTD: Drill Log.**

Hole No: BEC 07 CF2

(1c)

Tenement	Driller: Spauldings -	Collar: 452 330 E, 5426 124 N	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL:	
Sample No's CF01 - CF05	Date Drilled: 12/4/07	AZM N/A	Total Depth: 28
	Hole Diam: 4 1/2 inch	Dip: -90	Water Table: ← PRESENT

DEPTH UNCERTAIN

Depth (from - to)	Graphic	Lithology
0 - 3		Sufficial weathering @ yellow-brown ^ clays with quartzite pebbles + indurated dark siliceous ? horizons
4 - 12 M		orange brown clays with pebbles of quartzite + sand
12 - 15 M.		greenish grey slightly pyritic lithic wacke (pebbly) midsize (fairly soft)
CF01 15 15 - 17		as above with trace brown spots ←
17 - 18		TASMANIAN OIL SHALE fissile brownish grey shale with spherical spore casings easily visible with hand lens
CF05 20 18 - 19		grey siltstone with low percentage of Tasmanite spore casings ~ 2%
19 - 28		dominantly grey sandy siltstones + quartzite pebbles poor fissility, trace pyrite

} probable high contamination

CF01 15

CF05 20

**Boss Energy PTY LTD: Drill Log.**

**Hole No:** BEC 07 CFS

E: 82 ACC: 5

Tenement	Driller: Spauldings -	Collar: 452411E 5426188N	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 82 ACC 5	
Sample No's	Date Drilled: 12/04/07	AZM N/A	Total Depth: 28m
	Hole Diam: 4 1/2 INCH	Dip: -90	Water Table:

L. M. M. M.

Depth (from - to)	Graphic	Lithology
0 - 4		orange-brown & pale cream clays with occasional clasts of soft weathered grey shale
4 - 22 m		medium grey poorly fissile medium grained siltstone with silted No Algal spores slightly micaceous becoming more shaly part - 18m
<del>21</del> <del>22</del> 21-23		TASMANIAN Rich oil shale: Fissile, green honey brown color. visible sparse casings > 80% spores in shale.
<del>23</del> 23 - 28 EOH		medium grey poorly fissile siltstone & fine sandstone slightly pebbly with trace fine purple around pebbles
		Hole ended at 28m, having passed through the Tasmanite horizon.

spade to 3 m  
=> high

SAMPLES  
20  
4  
\*  
24m

**Boss Energy PTY LTD: Drill Log.**

Hole No: BEC07 CF4

Tenement	Driller: Spauldings -	Collar: 452 515 F, 5426211 N	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 70M. ACCS	
Sample No's	Date Drilled:	AZM N/A	Total Depth: 26M.
	Hole Diam: 4 1/2 inch - COLLARED	Dip: -90	Water Table: ~10

~~RET~~  
~~DELETED~~  
~~RET~~ ~~PRESENT~~

Depth (from - to)	Graphic	Lithology
0-2 m		Surfaceal Orange brown clays
2-4m		Orange brown clay, reddish pink quartzite, grey siltstone
4-6 m		weathered grey siltstone
6-18 m		Medium grey slightly micaceous well sorted siltstone Poor fissility
18-19 m		TASMANITE Slightly brownish grey siltstone with ~10% Tasmanite spores
* 19-20 m		TASMANITE on shale Sparse mic's honey brown fissile shale mixed with grey siltstone or above ~40% tasmanite
20 - 26 m		Tasmanite poor medium grey fine sandstone with cream, tan, red & reddish pink quartzite pebbles.
		EQH @ 26m

} Spade bit  
0-3m  
high contom.

} Tasmanite  
thinned here

\*

**Boss Energy PTY LTD: Drill Log.**

Hole No: BEC07 CFS (3A)

Tenement	Driller: Spauldings -	Collar: 452866E, 5425991	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 75m Asc Acc: 5m	
Sample No's CFS 01-04	Date Drilled: 12/4/07	AZM N/A	Total Depth: 28m
	Hole Diam: 4 1/2 INCH-	Dip: -90	Water Table: ~13m

Depth (from - to)	Graphic	Lithology
0-3m	CLAY	orange brown & cream surficial clays
3-6m		soft, moderately weathered grey siltstone
6-21m		slightly micaceous well sorted low to moderately fissile medium grey fine sandstone / siltstone. Observed: quartz pebbles. Moderately soft, scratches easily
21-22m		fine sandstone as above with 2% honey brown flattened Tasmanite spores distributed in matrix. Also 5% chips of > 20% Tasmanite, indicating start of intersection with main body of oil shale
22-23m		TASMANITE OIL SHALE Greyish honey brown fissile shale with sub mm quard spore casings easily visible on cleavage surfaces & broken edges of chips. Translucent character at chip edges. Chips generally contain 60 to 90% spores. 10% of chips contain no spores indicating total intersection is probably not more than 1m. Slightly more resistant to scratching than sandy siltstone quartz.
23-28m		grey, well sorted fine sandstone with no Tasmanite spores. Good fissility, slightly micaceous as from 6-21m. Moderately soft.

SAMPLES  
 20-21  
 21-22  
 22-23 \*  
 23-24



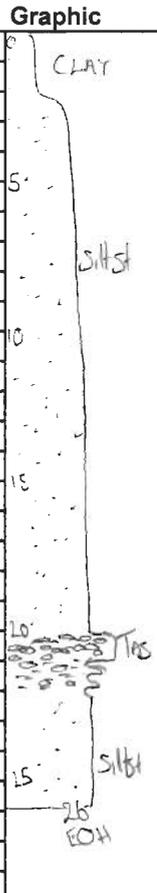
**Boss Energy PTY LTD: Drill Log.**

Hole No: **BEC 07 CF7**

Tenement	Driller: Spauldings -	Collar: 452 677 E 5425937 N	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 81m ACC 5m.	
Sample No's CF 701-05	Date Drilled: 13/4/07	AZM N/A	Total Depth: 26
	Hole Diam: 4 1/2 inch	Dip: -90	Water Table: 21-22

Depth (from - to)	Graphic	Lithology
0-2m	CLAY	Surface weathering. Orange brown clays + clasts of soft grey decomposing siltstone. NB local topographic high - not as much clay development as CF1-CF6
2-20m	siltst	low fissility medium grey very fine sandstone/siltstone generally shales easily but becoming harder below 15m. No appreciable alteration or pyrite. Slightly micaceous. => weak to moderate cleavage 13-14m clayey - likely fractured zone
20-21m		Tasmanite oil shale highly concentrated algal spore accumulation
21-22m		dark honey brown highly fissile shale with abundant visible algal spores. 2% quartzite - slightly pebbly
22-23m		as above, diluted
23-26m	siltst	medium grey siltstone/v.f. sandstone 2% tasmanite spores disseminated
		v.f. sandstone as described 2-20m slightly pyritic (occasional clasts rich in fine grained pyrite)
		25-26m includes some grey clay - fractured zone.

SAMPLES  
19-20  
\* 20-21  
\* 21-22  
22-23  
23-24

















**Boss Energy PTY LTD: Drill Log.**

Hole No: **BED 07 CF15**

Tenement	Driller: Spauldings -	Collar:	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL:	
Sample No's	Date Drilled:	AZM N/A	Total Depth: 24.5
	Hole Diam: <b>NO</b>	Dip: -90	Water Table:

Depth (from - to)	Graphic	Lithology
17.4 - 20.95		Medium grey slightly micaceous siltstone with occasional angular to sub angular pebbles & cobbles of siltstone & medium quartz sandstone to 5cm. Fairly bedded at ~90° to core axis => flat lying. Increasingly pebbly & slightly pyritic over 20cm towards base with block casting textures.
20.95 - 21.7		Tasmanite oil shale / Tasmanite spar rich siltstone. Distinctively brownish grey fissile shale with variable spar content. >30% spars. Appears to be richest in spars over top 20cm. Includes 5cm quartz-arenite <del>etc</del> <sup>crists</sup> and pyritic ? conditions to 3cm elongate with bedding 90° to core axis at 21.05m. Lower contact appears to be gradational over cm scale.
21.7 - 21.9		Mid grey siltstone with <10% Tasmanite spars
21.9 - 21.96		Tasmanite rich shale >50% spars, as above.
21.96 - <del>22.4</del> 22.4		Brownish-grey very fine sandstone with ~10% Tasmanite spars. low fissility, fairly massive.



**Boss Energy PTY LTD: Drill Log.**

**Hole No: BRD 07 CF16**

Tenement	Driller: Spauldings -	Collar:	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL:	
Sample No's	Date Drilled:	AZM N/A	Total Depth:
	Hole Diam:	Dip: -90	Water Table:

Depth (from - to)	Graphic	Lithology
15.4 - 18.3	0	Medium grey compact medium hardness very fine sandstone. faintly bedded @ 90° with occasional pale quartzite pebbles coarse sandy lenses. Flecked with sub mm black shale clasts slightly pebbly base over 5 cm with pyrite
	0	Irregular bedding structures. faint & wispy over 60cm towards base. wispy interbedding over 5 cm with Tasmanite
18.3 - 18.85	0	Tasmanite "upper horizon"
	0	noticeably low density brownish grey highly fissile shale with > 80% honey brown sub-parallel Tasmanite spores - ovoid & aligned producing strong cleavage.
	0	Ovoid spores easily visible on broken core surfaces.
	0	*Core grinding from 18.3 - 18.5 resulting in 45-50% core volume loss
18.85 - 19.25	0	Medium grey Moderately soft very fine sandstone with 15-5% Tasmanite spores interbedded decreasing in abundance downhole.
	0	* 15cm core loss + 30% core volume loss due to grinding

**Boss Energy PTY LTD: Drill Log.**

Hole No: **BED 07 CF16**

Tenement	Driller: Spauldings -	Collar:	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL:	
Sample No's	Date Drilled:	AZM N/A	Total Depth:
	Hole Diam:	Dip: -90	Water Table:

Depth (from - to)	Graphic	Lithology
19.25 - 19.7	1	Tasmanite "lower horizon" Brownish grey low density fissile shale as at 18.3 m. $\cup \cup \sim 80\%$ Tasmanite spores. Contains $< 1$ cm blebby purple aggregates, notably in a 1 cm thick band of blebs at 19.3 m. Sharp pebbly purple contact at base of 2 cm with sand / clasts of pebbles in underlying siltstone/sandstone
19.7 - 21.7	5	Med grey possibly soiled <del>very fine</del> pebbly to cobbly very fine sandstone. No visible Tasmanite spores. Abundant wisp like conchoidal bedding structures at high angle to core axis. Cabbles to 5 cm some sulphide rich & generally auriferous around pebble fringes. Includes med. sized pebbles pale cream & pinkish quartzite + possible altered volcanics.
21.7 - 27.0		Crumbly, soft med. grey med. <del>matrix</del> cobbly mudstone, as in DDH CF15. Sharp contact at 3 m carbonate vein. Moderately veined with Mn carbonate at $\sim 45^\circ$ to v.c.a. Includes quartzite + weathered granite clasts to 10 cm.