

Boss Energy
Drilling Report for EL 20/2004
April 2007

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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 escavator 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.

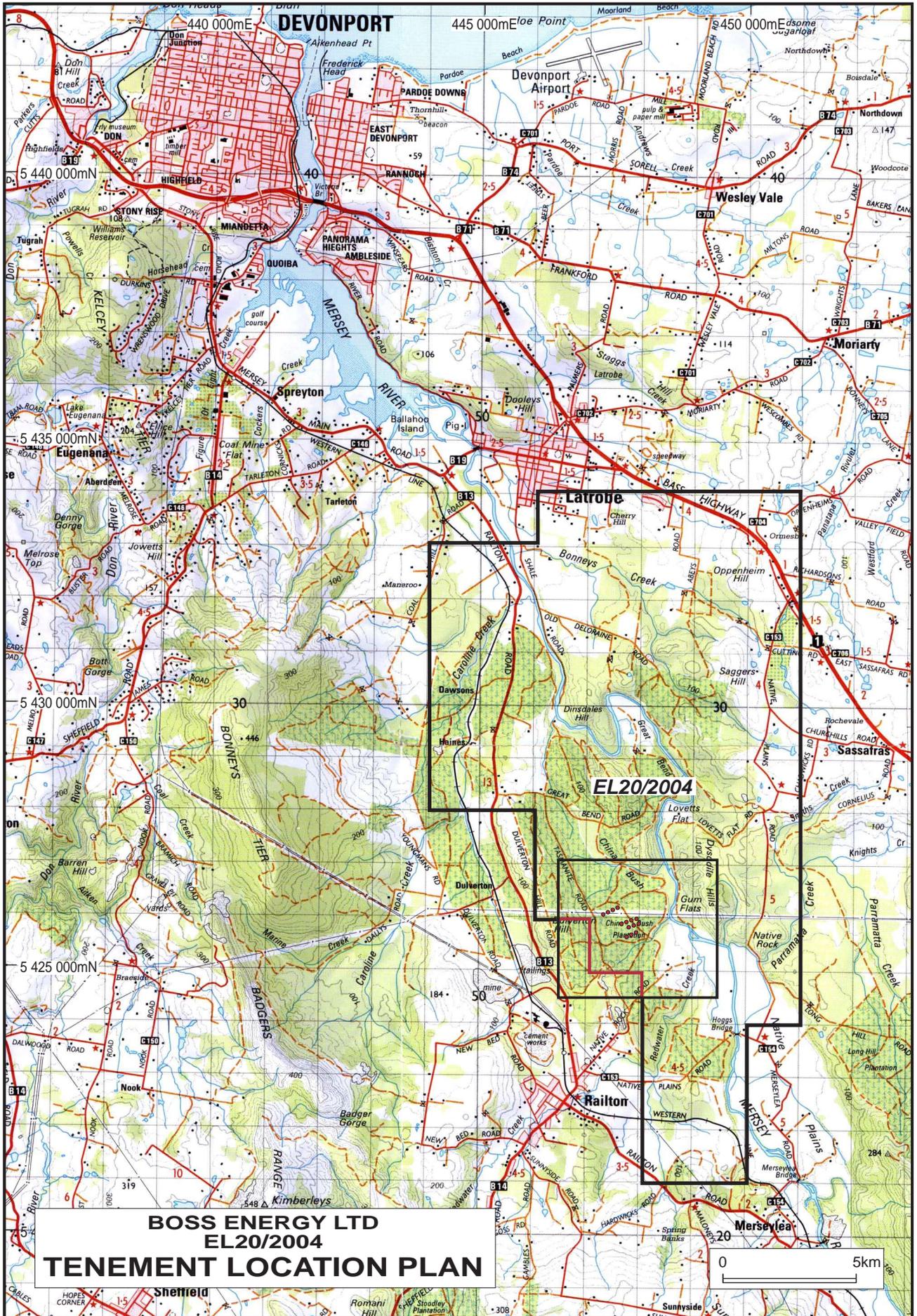
The most significant recent exploration in this area was conducted by CRA Exploration PTY. LTD. In 1981 over six zones of oil shale occurrence in the local area. The Boss Energy drilling program was conducted within an area named by CRAE as ‘North China Flat, Zone V’.

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



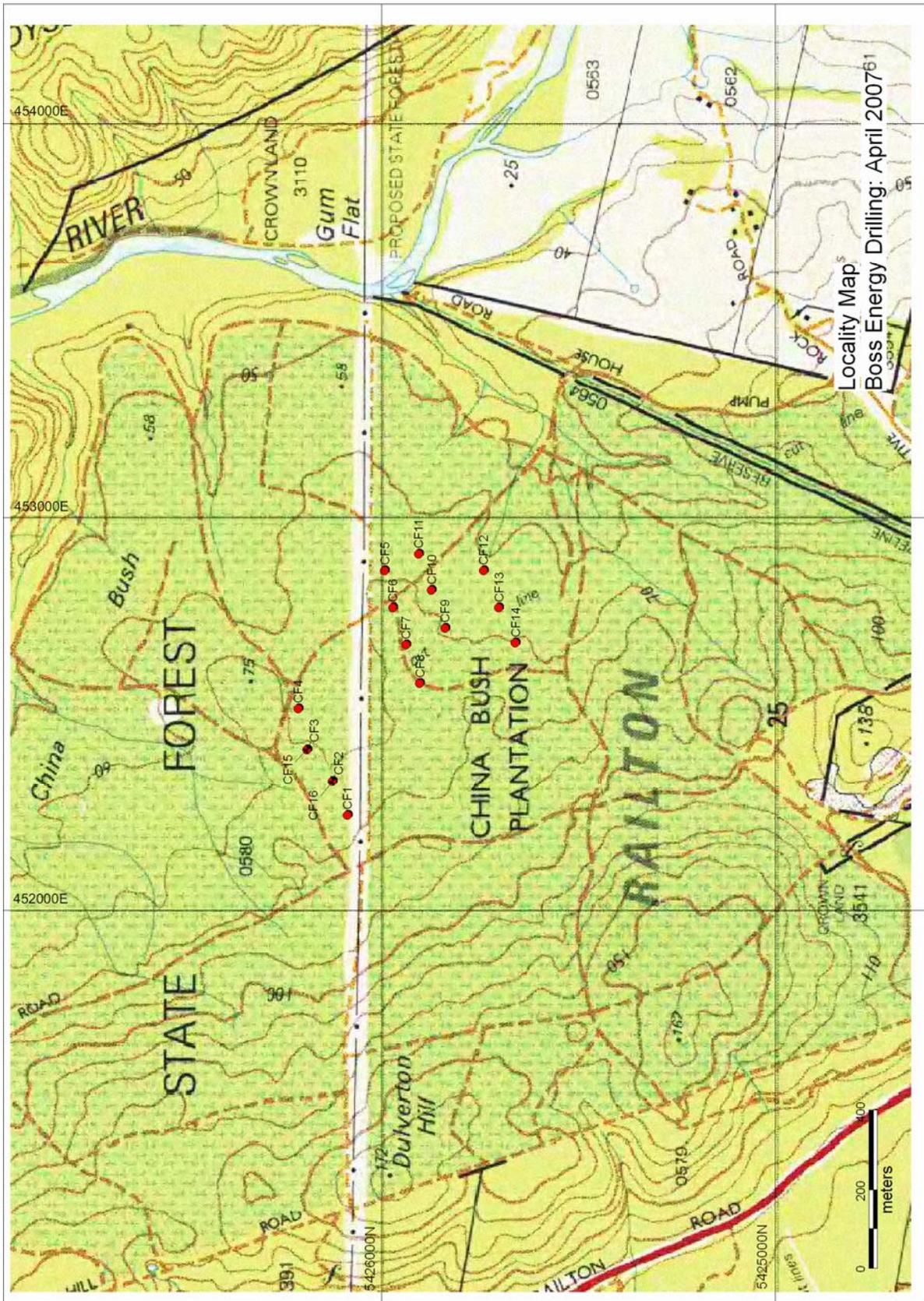


Fig 2. Drill hole locations

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 (tillite) 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-5f.



Fig 3. Drill site



Fig 4. GK850 drill rig



Fig 5a. Representative core samples BED97 CF15 (HQ core)
Tasmanite rich interval darkens when wet second and third row from top.
Tillite at end of hole bottom right (not necessarily basal tillite)



Fig 5b. Representative core samples BED97 CF16 (HQ core)
Tasmanite intervals darkened, tillite at bottom.



Fig 5c. Core samples from BED97 CF15 17.4-22.6m (HQ core)



Fig 5d. Core samples BED97 CF16 22.6-24.5m (HQ core).



Fig 5e. Core samples BED97 CF15 15.4-20.2m. (HQ core)



Fig 5f. Core samples BED97 CF16 20.2-22.0mm. (HQ core)

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.

Boss Energy PTY LTD							
Drilling Results							
Coordinates reported in AMG AGD66							
Hole ID	AMGE (m)	AMGN (m)	RL (m)	Intersection From	Intersection To	Thickness	Total Depth
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							

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
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: BECO7 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: 3M.

Depth (from - to)	Graphic	Lithology
0 - 3.6M	CLATS	weathered orange-brown clays with sub angular to sub rounded quartz & quartzite pebbles
5-4.7 M.	5	dark grey basalt/dolerite + orange brown clays
7-9 M	7	Mixed orange brown pebbly clays & s/d dolerite.
9-10	10	
10-13	10-13	orange brown red-brown & green clays with depth - 10% dolerite chips in green clays from 12-13
13-14	13	blue-grey dolerite.
14-17	15	Mixed dolerite + quartzite pebbles + fine sandstone
17-22	20	Fresh dolerite mixed with 10% indurated, brecciated f.g. quartz sandstone.
EOH	22	Hole ended at 22M in fresh dolerite. Interpreted as edge of dolerite intrusion

Boss Energy PTY LTD: Drill Log.

Hole No: BEC 07 CF2 (IC)

Tenement		Driller: Spauldings -		Collar: 452 330 E, S44E 124 N	Datum: AGD66
Prospect: China Flats		Geologist: M. Blake		RL:	
Sample No's	CF01 - CF05	Date Drilled:	12/4/01	AZM N/A	Total Depth: 28
		Hole Diam:	4 1/4	Dip: -90	Water Table: 4

DEPTH UNCERTAIN
PRESENT

Depth (from - to)	Graphic	Lithology
0 - 3		surface weathering with quartzite pebbles + indurated dark siliceous ? horizons Sandy. Yellow-brown clays
4 - 12 M		orange brown clays with pebbles of quartzite + sand
12 - 15 M.		greenish grey slightly silty thin wacke very pebbly midsize (10mm) soft
15 - 17		as above with low percentage of apparent heavy brown spots SS
17 - 18		TASMANIAN OIL SHALE fissile brownish grey shale with spherical spot coatings easily visible with hand lens
18 - 19		grey siltstone with low percentage of Tasmanian spot shaly
19 - 25		dominantly grey sandy siltstones + quartzite pebbles poor fissility, trace pyrite

probable high carbonation

CF01 15

CF05 20

Boss Energy PTY LTD: Drill Log.

Hole No: BEC 07 CFS

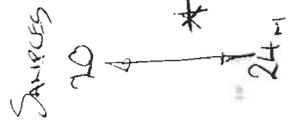
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E: 82 ACC: 5

Tenement	Driller: Spauldings -	Collar: 452411F 5426188N	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 82	
Sample No's	Date Drilled: 12/04/07	AZM N/A	Total Depth: 29m
	Hole Diam: 4 1/4 inch	Dip: -90	Water Table:

spade to 3 m
⇒ high

Depth (from - to)	Graphic	Lithology
0 - 4		orange-brown & pale grey clays with occasional clasts of soft weathered grey shale
4 - 22 m		MEDIUM grey poorly fissile medium grained siltstone well sorted. No Algal spores. Slightly micaceous becoming more shaly part of core - 13m
21 - 23		TASMANIAN ROCK CIL - SHALE - FISSILE. GRAYISH BROWN DRAB color. visible spore casings > 80% spores in shale.
23 - 28 FOH		medium grey poorly fissile siltstone. Fine sandstone slightly pebbly with fine pyrite around pebbles
		Hole ended at 28m, heavy panned through the
		ferromagnetic



Boss Energy PTY LTD: Drill Log.

Hole No: BEC07 CF4

Tenement	Driller: Spauldings -	Collar: 452 515 F, 5426211N	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

~~RECORDED~~
~~PRESENT~~

Depth (from - to)	Graphic	Lithology
0-2 M		Surface 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
18-19M		Tasmanite Slightly brownish grey siltstone with ~10% Tasmanite spots
19-20 M		Tasmanite OR shale Spore rich honey brown fissile shale mixed with grey siltstone or about ~40% Tasmanite
20-26 M		Tasmanite poor Medium grey fine sandstone with cream +10% mica & reddish pink quartzite pebbles.
		EOH @ 26M

Spade bit
0-3M
high content.

Tasmanite
thinned here

*

Boss Energy PTY LTD: Drill Log.

Hole No: BECO7 CFS (3A)

Tenement	Driller: Spauldings -	Collar: 452 866 E, 5425991	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 75M ASL	Acc: 15M
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 tan to moderate fissile medium grey fine sandstone / siltstone. Occasional quartz pebbles. Moderately soft, scratches easily
21-22M		fine sandstone as above with 2% heavy blown flattened Tasmanite spores distributed in matrix. Also 5% chips of 7-20% Tasmanite indicating slat of intersection with main body of oil shale
22-23M		TASMANITE ON SHALE. Gravelly heavy blown fissile shale with sub mm sized spore casings easily visible on cleavage surfaces & broken edges of chips. Irregular clast of chip edges. Chips generally contain 60 to 70% spores. 10% of chips contain no spores indicating total intersection is probably not more than 1M. Slightly more resistant scratching than sandy siltstone
23-28M		are well sorted fine sandstone with no laminar spores. Clays fissile, 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 CF6

(25)

Tenement	Driller: Spauldings -	Collar: 452771E, 5425991 N.	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 81M	ACC 5M.
Sample No's CF601-04	Date Drilled: 13/4/07	AZM N/A	Total Depth: 28
	Hole Diam:	Dip: -90	Water Table: 18m, 20-22

Depth (from - to)	Graphic	Lithology
0-4M		Surface clay. Orange-brown, crin. clay with grey, soft decomposed siltstone/sst
4-23		Medium grey, poorly fissile, wavy fine sandstone, slightly micaceous, slightly below top. (quite soft to 10m, gradating to surface weathering. Scratches easily below 10m depth. Rare flecks of coarse quartzite pebbles.
23-24		TASMANIAN OIL SHALE. # Brownish grey fissile shale with visible sub mm sized spore cones. Gash-like break on cleavage surfaces and as 'plucked' grains on broken edges.
24-25		Tasmanite concentration is high. Shale variable from 25% to 30% generally probably 60% Tasmanite spores.
24-25		20% Tasmanite, 60% Tasmanite poor grey fine sst.
25-28		Medium grey fine quartz sandstone as at 4-23M.
		TASMANIAN OIL SHALE

22-23
23-24
24-25 *
25-26

Boss Energy PTY LTD: Drill Log.

Hole No: BEC 07 CF7

Tenement	Driller: Spauldings -	Collar: H5267E 5425937 N	Datum: AGD66
Prospect: China Flats	Geologist: M. Blake	RL: 81M ACC 561	
Sample No's CF701-02	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	Soilicial weathering. Orange brown clay + clasts of soft grey decomposing siltstone. NB local topographic high - not a thick clay development as CF1-CF6
2-20m	siltst	low fossilifer. medium gr. very fine sandstone/siltstone generally shales easily but becoming harder below 15m. (no appreciable alteration of pyrite. Slightly micaceous - weak to moderate cleavage. 13-14% clayey - likely fissile clay
20-21m		Tosonite oil shale highly concentrated algal spore accumulation
21-22m		dark grey brown highly fissile shale with abundant visible sub-m. algal spores. 2% quartzite - slightly pebbly
22-23		as above, mixed with siltstone, perhaps 60% tosionite spores diluted
23-26m		Medium grey siltstone / oil sandstone 2% tosionite spores disseminated
		N.P. 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

zone

Boss Energy PTY LTD: Drill Log.

Hole No: BED OF 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: <u>NO</u>	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. Heavily bedded at a 90° to core axis => flat lying. Increasingly pebbly & slightly pyritic out 20 cm towards base with good casting textures.
20.95 - 21.7		Tasmanite oil shale / Tasmanite spar rich siltstone.
21.7 - 21.9		Dark grey siltstone with <10% Tasmanite spores. Includes 5cm quartz-cobble etc. core axis at 21.05m. Lower contact appears to be gradational out on scale.
21.9 - 21.96		Mid grey siltstone with <10% Tasmanite spores.
21.96 - 22.4		Tasmanite rich shale >50% spores, as above.
		Brownish-grey very fine sandstone with ~10% Tasmanite spores. Very fissile, fairly massive.

CF16 18.3-18.85
19.25-19.7

Boss Energy PTY LTD: Drill Log.

Hole No: **BED OF CF15**

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
22.46 - 23.14		medium grey, relatively hard, slightly pebbly sandstone to cobbly. competent with nodules to sub-rounded clasts of quartzitic shale common on scale defined laminae at top to core axis 2 cm pebble band at base. No visible fossiliferous spores
23.14 - 23.55		dark grey, crumbly, poorly sorted pebbly siltstone mudstone very soft & slightly micaceous
23.55 - 23.75		massive pale grey soft mudstone. micaceous, unbedded. competent, slightly pebbly
23.75 - 24.5		dark grey, soft crumbly mudstone to poorly sorted muddy (clay) conglomerate. clasts to sub rounded clasts mudstone siltstone. clasts generally fine quartzites & siltstone ~ 90% to core axis, slightly micaceous but not characteristically bedded.

Boss Energy PTY LTD: Drill Log.

Hole No: **BED 07 CF16**

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

Depth (from - to)	Graphic	Lithology
19.25 - 19.7		<p>Tasmanite "lower horizon" Brownish grey low density fissile shale as at 18.3 m. J.J. Tasmanite. Spores contains s.l.c.m. blebby pyrite aggregates notably is a 1cm thick band of blebs at 19.3 m. J sharp pebbly pyritic contact at base of J.J. with red clasts of pebbles in underlying siltsone/sandstone J.J.</p>
19.7 - 21.7		<p>Med grey poorly sorted fine sand pebbly to entirely very fine sandstone. No visible Tasmanite spores. Abundant wisp like conchoid bedding structures at high angle to core axis. Cabbies to 5 cm J.J. some sulphide rich s. generally pyritic around pebble fringes includes mesomorphic lenses of pebbles pale cream s. of pinkish quartzite + possible altered volcanics.</p>
21.7 - 27.0		<p>Chubby, soft med. grey med matrix cobbly mudstone, as in DRH CF15. Sharp contact at 3 mm carbonate vein. Moderately unbedded with Mn carbonate at 2.45 to v.c.a. Includes quartzite + weathered granitic clasts to 10 cm.</p>