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SML 726

MOORLANDS

PROGRESS REPORTS TO LICENCE EXPIRY/SURRENDER FOR THE PERIOD 29/6/1972 TO 28/6/1973

Submitted by
Sawax Pty Ltd
1974

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Government of South Australia
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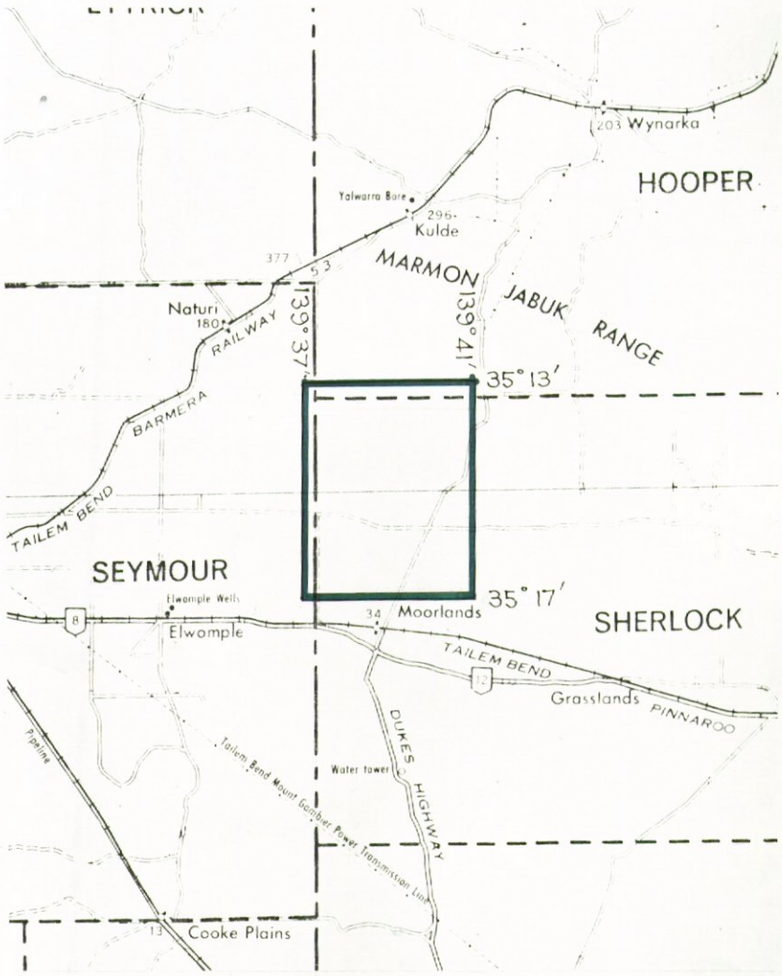

SCALE 1:250000

SAWAX PTY. LTD.

:OCKET DM 530/72 AREA 17 SQ MILES

:250000 PLANS PINNAROO

LOCALITY

S.M.L. No. 726 EXPIRY DATE 28.6.73

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TENEMENT: S.M.L. 726 - Moorlands.

TENEMENT HOLDER: Sawax Pty. Ltd.

SAWAX PTY. LTD.

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QUARTERLY REPORT No. 1

FOR THE FIRST QUARTER PERIOD ENDING

29th SEPTEMBER, 1972

S.M.L. 726, MOORLANDS AREA

SOUTH AUSTRALIA

BY

L. G. NIXON

L.G.B. NIXON & ASSOCIATES

SAWAX PTY. LTD.

QUARTERLY REPORT No. 1

FOR THE FIRST QUARTER PERIOD ENDING

29th SEPTEMBER, 1972

S.M.L. 726, MOORLANDS AREA

SOUTH AUSTRALIA

BY

L.G. NIXON

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ATTACHMENTS	SCALE
Plan of S.M.L. 726	1:250,000
FIG. 1 Lignite Fields in South Australia	12.5 miles = 1 inch
FIG. 2 Moorlands Sawax Bores & Lignite	½ mile = 1 inch
FIG. 3 Moorlands. Correlated Logs of Sawax Bores	
FIG. 4 Moorlands, Diagrammatic Section through areas A,F, & E	1666ft. = 1 inch

TABLE I Results of wax extraction.

TABLE II Western Australian Mines Dept.Chemical Laboratories' report.

L.G. NIXON

19th October, 1972

SAWAX PTY. LTD.

QUARTERLY REPORT No.1

FOR THE FIRST QUARTER PERIOD ENDING

29th SEPTEMBER, 1972

S.M.L. 726, MOORLANDS AREA

SOUTH AUSTRALIA

BY

L. G. NIXON

SUMMARY

Three holes were drilled at Moorlands to obtain samples of lignite for testing for montan wax content. Areas A, C and D were tested in this programme with one hole in each area.

Total footage amounted to 277ft. 4ins. including coring.

The cored lignite was submitted to AMDEL and later to the Western Australian Government Laboratories for wax extraction tests. Results of these tests are contained in this report. In addition a representative section of the cores was forwarded to Hoechst Aust. for commercial extraction tests. Results from Hoechst are not expected for some time.

INTRODUCTION

Application for a Special Mining Lease was made by SAWAX in May, 1972 and was approved on 29th June, 1972.

Since no suitable lignitic material was available for wax extraction tests, a drilling and coring programme involving three holes was prepared to obtain samples from the lignite seams in areas A, C and D, (See

Fig. 2 attached).

The drilling was carried out by W.A. Juett, Drilling Contractors of Adelaide, South Australia using a cable tool plant.

Geological logging was done initially by D.Trail of L.G.B. Nixon and Associates and later by R.I. Chugg of General Minerals Investigations Pty. Ltd.

All the core was split three ways, one third being given to the Mines Department for their records, one third taken by SAWAX for wax extraction tests, and one third sent to Germany for commercial extraction tests.

RESULTS

Hole C.1 was drilled to a depth of 74'4" (22.66 m). Overburden was 50ft. thick and the lignite seam 24'4" thick. The detailed geological log is appended to this report. Wax extraction test on a representative sample over the entire cored section yielded 5.78% crude wax and 0.79% hexane soluble wax. In addition the core was sampled in five feet sections and the hexane extractable wax content determined. The detailed results are contained in Table I attached.

Hole D.1 was drilled to 106ft. 6 inches (32.46 m). Overburden penetrated was 75ft. and the lignite seam 31ft. 6 inches. For details of this hole see the geological log attached.

Wax extraction tests on a representative portion of the bulked sample yielded 7.59% crude and 1.38% n-hexane soluble wax. The core was also sampled in five feet

sections for determination of the hexane extractable wax content, these results are tabulated in Table I attached. In addition a one hundred and forty eight pound sample of lignite core was sent to the Western Australian Government Chemical Laboratories for wax extraction tests and to provide sufficient crude wax for testing the properties of the extracted material. The Western Australian Government Chemical Laboratories' report on Sample D.1 Lab. number 8346/72 is attached (See Attachment II).

Core from this hole has been sent to Hoechst Farbwerke in Germany for commercial extraction tests. Their results are not expected for some months.

29.41m. Hole A.1 This hole was drilled to a depth of 96ft. 6ins. Overburden was 66ft. 6ins. and lignite 33ft. thick. The core was bulked and a representative of the bulk sampled yielded 4.23% crude wax and 0.53% n-hexane soluble wax. Detailed geological logs are appended to this report.

FURTHER WORK

Further exploration and testing work in this area will depend on the results obtained by Hoechst and the marketability of the extracted material.

TABLE 1

RESULTS OF WAX EXTRACTION - SAWAX INVESTIGATIONS, MAY, 1972

COAL-FIELD & DRILLING	SAMPLE INTERVAL		SAMPLE		W.A.MINES DEPT.CHEM.LAB.	
			CRUDE WAX %	HEXANE-EXTRACTABLE WAX %	INITIAL WAX CONTENT	RESIDUAL WAX CONTENT OF EXTRACTED MATERIAL, %
MOORLANDS						
C.1	50'0"	-72'0"	5.78	0.78 avg		
	50'0"	-55'0"		0.5		
	55'0"	-60'0"		0.64		
	60'0"	-65'0"		0.75		
	65'0"	-70'0"		0.75		
	70'0"	-72'0"		1.25		

TABLE II

Sample D.1 Lab. No. 8346/72

Weight as received	148 lbs
Moisture as received	50.7 per cent
Initial wax content	7.65 per cent dry basis
Residual wax content of extracted material	1.41 per cent dry basis
Predicted wax yield	4.6 lbs
Actual wax yield	Result not yet available (3.7 lb)

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LOG OF PERCUSSION BORE HOLE NO. A.1

PROJECT: MOORLANDS MONTAN WAX INVESTIGATIONS. PLAN REF: FIG.

LOCATION: Sec. 53, Hd. Sherlock, Co.Buccleuch

DIRECTION & ANGLE: Vertical DEPTH OF HOLE: 96'6"

HOLE LOGGED BY: R.I. CHUGG

CONSULTANT GEOLOGISTS: L.G.B. Nixon & Associates

DRILLING CONTRACTORS: W.A. Juett DRILL OPERATORS: W.JUETT

DRILL PLANT: CABLE TOOL

OBJECTS: To test the thicknesses of overburden and lignite and to obtain fresh lignite for montan wax determinations.

RESULTS: Overburden 66'6". Lignite 33 feet thick. Bulk analysis yielded 4.23% crude wax and 0.53% n-hexane soluble wax.

FROM	TO	DESCRIPTION	REMARKS
0'0"	2'0"	SAND Fine-grained sub-rounded poorly graded quartz sand. Light brown.Aeolian	
2'0"	5'0"	LIMESTONE, sandy. sub-rounded fine-quartz sand in well cemented limestone. Light brown. Calcrete.	
5'0"	8'0"	LIMESTONE, sandy and clayey (marly).Sub-rounded fine quartz sand in variably cemented limestone. Clayey in part. Light brown.	
8'0"	14'0"	CLAY (MARL) Highly calcareous slightly sandy clay with some hard limestone fragments. Light brown.	
14'0"	18'0"	CLAY (MARL) Highly calcareous sandy clay with hard limestone fragments. Slightly greenish (?glauconitic) brown.	
18'0"	22'0"	CLAY (MARL) Highly calcareous fine sandy clay. Light brown.	
22'0"	33'0"	CLAY (MARL) Highly calcareous fine sandy clay. Light, slightly greenish (?glauconitic) yellowish brown.	
33'0"	40'0"	CLAY, Calcareous clay with scattered sub-rounded coarse quartz and some calcareous grains. Scattered bryozoa. Brown with dark grey (carbonaceous)streaks.	
40'0"	44'0"	CLAY, Presumably calcareous clay with scattered sub-rounded coarse quartz sand grains. Greyish brown.	
44'0"	46'0"	CLAY,Clay with scattered well-rounded and polished coarse (3/16")quartz sand grains. Medium to dark grey (carbonaceous).	
46'0"	50'0"	CLAY,Clay with scattered limestone fragments. Dark grey (carbonaceous).	

SAWAX PTY.LTD. MOORLANDS BOREHOLE No.A.1

FROM	TO	DESCRIPTION	REMARKS
50'0"	60'0"	CLAY, Carbonaceous clay with scattered marcasite concretions. Dark grey.	
60'0"	62'0"	LIMESTONE, Argillaceous limestone with some sand grains. Scattered marcasite incrustations. Grey with some light brown.	
		NOTE: Crystalline gypsum fragments from tailings from approximately this depth.	
62'0"	65'0"	CLAY, Fine sandy very carbonaceous clay. Black.	
65'0"	66'6"	LIGNITIC CLAY, Scattered fine to coarse sand grains and small limestone fragments in lignitic clay. Dark reddish brown to black.	
66'6"	67'8"	LIGNITIC CLAY, Very dark brownish grey carbonaceous clay. Scattered woody fragments becoming more abundant at base. Thin pale grey silty clay laminae top 3" and bottom 2". Few hard pale grey limestone fragments at base. Woody fragments top 3" are hard - partly replaced or indurated with marcasite, Moisture content is above the plastic limit.	Bulk sample separately.
67'8"	69'0"	LIGNITE. Very dark reddish brown oxidising to black. Some woody texture. Scattered small patches of leaf fragments. A few coarse sand grains. Low moisture in content. Brittle to friable.	Start of bulk sample at 5' intervals $\frac{1}{3}$ core sampled in bags
69'0"	71'0"	LIGNITE: Very dark reddish brown oxidising to black. Some woody texture. Scattered small patches of leaf fragments. Low moisture content. Brittle to friable.	
71'0"	72'0"	CLAY: 90%. Dark reddish brown carbonaceous. Scattered lignite fragments 10% with patches of leaf fragments. Moisture content above the plastic limit.	
72'0"	73'0"	CLAY 80%: Dark reddish brown. Carbonaceous. Scattered lignite patches 20% containing small patches of leaf fragments. Clay plastic. Lignite brittle. Slickenside in clay.	
73'0"	75'0"	LIGNITE: Very dark reddish-brown. Numerous small leaf fragments. Some woody structure. Moisture content low. Brittle to friable.	
75'0"	76'0"	LIGNITE: Very dark grey to reddish brown with yellowish brown patches. Some woody structure. Numerous very small leaf fragments. Low moisture. Brittle to friable.	

SAWAX PTY.LTD. MOORLANDS BOREHOLE No. A.1

FROM	TO	DESCRIPTION	REMARKS
76'0"	78'0"	LIGNITE: Very dark grey to reddish brown. A little woody structure. Scattered fine leaf fragments. Low moisture. Friable.	Sampling interval 8" to 12"
78'0"	81'0"	LIGNITE: Very dark grey to reddish brown. A little woody structure. Patches of fine leaf fragments. Very low moisture. Brittle to fragile. Friable.	" " "
81'0"	84'0"	LIGNITE: Very dark reddish brown to very dark grey. Some woody structure. Scattered small leaf fragments. Very low moisture. Brittle to friable.	" " "
84'0"	86'6"	LIGNITE: Very dark reddish brown to very dark grey. Some woody structure. Sparse small $\frac{1}{8}$" resinous grains. Moderate leaf fragments. Very low moisture. Brittle to friable.	" " "
86'6"	88'0"	LIGNITE: Very dark reddish brown to very dark grey. Moderate woody structure. Sparse small $\frac{1}{8}$" to 3/16" hard resinous grains. Scattered leaf fragments. Low moisture. Brittle to friable.	" " "
88'0"	88'9"	LIGNITE: Very dark reddish brown to very dark grey. Some woody structure. Sparse scattered leaf fragments. Sparse small $\frac{1}{8}$" hard resinous grains. Scattered small patches of marcasite. Low moisture. Brittle to friable.	
88'9"	89'6"	LIGNITE: Very dark reddish brown to very dark grey. A little woody structure. Sparse scattered leaf fragments. Very low moisture. Brittle to friable.	Very slow penetration
89'6"	90'3"	LIGNITE: Very dark reddish brown to very dark grey. A little woody structure. Very sparse small leaf fragments. Very low moisture. Brittle to friable.	" " "
90'3"	91'0"	LIGNITE: Very dark reddish brown to black. A little woody structure. Sparse leaf fragments. Very low moisture. Brittle to friable.	" " "
91'0"	91'9"	LIGNITE: Very dark yellowish to reddish brown. Moderate woody structure. Scattered small leaf fragments. Very low moisture. Brittle to friable.	Very slow penetration.
91'9"	93'0"	CLAY 85%: Brown. Moisture content above the plastice limit. Slickensides. LIGNITE 15%: Thin layers and patches in clay. Considerable woody texture. Slightly more lignitic towards base of interval. Brittle.	" " "

SAWAX PTY. LTD. MOORLANDS BOREHOLE No.A.1

FROM	TO	DESCRIPTION	REMARKS
93'0"	93'8"	CLAY 60%: Brown. Moisture content above the plastic limit. Slickensides. LIGNITE 40%: Very dark reddish brown to black in thin layers and patches. Brittle. Moderate woody structure. Sparse resinous grains $\frac{1}{8}$". Streaks and small patches of marcasite - pyrite.	Very slow penetration " " "
93'8"	94'3"	LIGNITE 80%: Very dark reddish brown to black. Considerable woody texture. Very little leaf. Sparse resinous grains $\frac{1}{8}$". Brittle to friable. CLAY 20%: Brown in thin layers and patches.	" " "
94'3"	95'6"	CLAY 90%: Brown. Moisture content above the plastic limit. Hard. LIGNITE 10%: Very dark reddish brown to black occurring in patches. Woody texture.	
95'6"	96'6"	LIGNITE 50%: Thinly interbedded with CLAY. More clayey tip of interval and more lignite at bottom. Small seams of marcasite at top.	

END OF BORE

Static Water Level. 43'8"

SAWAX PTY. LTD.

LOG OF PERCUSSION BORE HOLE No. C.1

PROJECT: MOORLANDS MONTAN WAX INVESTIGATIONS PLAN REF: FIG.

LOCATION: Sec. 6, Hd. Sherlock, Co.Buccleuch DEPTH OF HOLE: 74'4"

DIRECTION & ANGLE: Vertical

HOLE LOGGED BY: D.S. Trail

CONSULTANT GEOLOGISTS: L.G.B. Nixon & Associates

DRILLING CONTRACTORS: W.A. Juett DRILL OPERATORS: W.Juett

DRILL PLANT: CABLE TOOL

OBJECTS: To test the thicknesses of overburden and lignite and to obtain fresh lignite for montan wax determination.

RESULTS: Overburden 50ft. Lignite 24'4" thick. Bulk analysis yielded 5.78% crude wax and 0.79% n-hexane soluble wax.

FROM	TO	DESCRIPTION	REMARKS
0'0"	2'6"	LIMESTONE: creamy-brown, fine-grained to medium-grained, even-grained, massive, forms large nodules or boulders in CLAY light to mid-brown soft and weak, with abundant carbonised rootlets.	0900 set up 1230-drilling slowly in limestone. 1800 cease drilling at 5'0" set up clutch. 0900 drilling.
2'6"	6'0"	80% LIMESTONE, as above. 20% CLAY, creamy brown, moderately tough.	
6'0"	7'6"	60% LIMESTONE, creamy to mid-brown, as above. 40% CLAY, white, fairly tough, silty with common round medium size quartz grains and angular grains brown feldspar or limestone?	
7'6"	9'6"	20% LIMESTONE, mid reddish brown, small angular fragments, fine-grained, as above. 80% CLAY, white, soft to slightly tough, silty with a sand fine and silt size quartz grains. A few fragments, carbonised plant material.	1530
9'6"	11'8"	60% CLAY, white, silty, soft and wet. 30% CLAY, light greenish grey, moderately tough, with abundant silt and fine size quartz grains. 10% LIMESTONE, light brown, fine-grained, as above.	
11'8"	14'0"	100% CLAY, light greenish grey, soft and wet only slightly silty, scattered small limestone fragments.	
14'0"	17'0"	100% CLAY, light brown, abundant silt - well sorted.	

SAWAX PTY.LTD. MOORLANDS BOREHOLE No.C.1

FROM	TO	DESCRIPTION	REMARKS
17'0"	22'0"	40% SANDSTONE, light brown to light greenish grey, fine-grained and silty, moderately well-sorted, with scattered carbonaceous fragments, moderately soft. 20% CLAY, light greenish-grey, silty, fairly tough.	
22'0"	27'0"	95% CLAY, light brown, silty. 5% SANDSTONE, fragment, light brown as above and scattered angular quartz grains (possibly thin sand).	
		Salt water entering hole (25'-26')	Base of clay ?
27'0"	30'0"	90% SANDSTONE, mid-brown, fine-grained large angular fragments. Both moderately hard and soft types. 10% CLAY, blue-green, silty and fine sandy.	1830 stop at 30'
		OVERNIGHT STAND - WATER LEVEL 20ft.8ins.	0900 start drilling
27'0"	31'6"	100% SANDSTONE, mid-brown to golden brown, hard and compact, fine-grained and even-grained.	
31'6"	32'9"	100% ? CLAY, white silty and sandy, soft.	
		COPIOUS FLOW OF SALT WATER INTO HOLE: BALING MADE LITTLE IMPRESSION.	
		Soft fragments carbonized wood and possibly small sandstone concretions, in clay above?	
32'9"	33'6"	100% SANDSTONE, mid-brown, fine-grained, compact and moderately hard.	
33'6"	35'0"	100% CLAY, light greenish brown to mid-brown, soft to moderately tough, silty.	
		Water level dropped + 10 feet in hole.	
35'0"	37'0"	100% CLAY, greenish brown as above ?	
37'0"	40'0"	100% SAND/CLAY, distinctive olive-green glauconitic clay with abundant silt to coarse size grains glauconite, quartz and shell fragments.	
40'0"	44'0"	100% SAND/CLAY, olive-green, glauconitic as above - microfossils? Water back to 20ft. in hole. - Above rock type is actually: 37' to 44' 90% CLAY, bright mid-green, glauconitic, sandy with abundant fragments bryozoa, lamelli-branchs, and whole small foraminifera, scattered angular quartz grains. 10% SANDSTONE, brown, fine-grained, moderately hard.	SAMPLE

SAWAX PTY.LTD. MOORLANDS BOREHOLE No.C.1

FROM	TO	DESCRIPTION	REMARKS
44'0"	47'0"	75% CLAY, deep reddish brown, ferruginous, very soft and wet, silty and sandy with shell fragments. 15% SHELL SAND, Granule size fragments bryozoa, lamellibranchs, and calcareous algae, also granules angular glauconite, hematite, and rare quartz 10% PYRITIC, CARBONACEOUS CLAY, black dry, moderately tough, contains shell fragments and glauconite granules, composed of very fine dark material with abundant disseminated small crystals and veins of pyrite.	
47'0"	48'0"	70% CLAY, black, carbonaceous, pyritic. 30% SHELL SAND, granule-size shell fragments as above. Abundant coarse-size grains of pyrite (aggregates) in washed residues.	
48'0"	49'0"	50% MUDSTONE, black with light grey clay pellets and coarse-size grains of coal?, and scattered large and small crystals of pyrite; and quartz grains. 50% CLAY, black, pyritic, laminated even-grained (little silt). - the mudstone is quite hard, calcareous?	Base of clay top of mudstone at 48'6".
49'0"	50'0"	50% MUDSTONE, black, hard as above (too hard to core). 50% BROWN COAL OR LIGNITIC CLAY, -soft black clay with abundant large wood fragments.	-stop drilling 1545
CORING 50'0"	51'0"	LIGNITE, black and very dark brown, dry and friable with wood fragments clearly visible, up to 1½" long, otherwise homogeneous. Scattered crystals and small thin aggregates of pyrite.	start coring 0800 TOP OF SAMPLE 90% Recovery
51'0"	52'0"	LIGNITE, as above. Small scattered black particles (1 mm) hydrocarbons or wood fragment?	100% Recovery
52'0"	53'0"	LIGNITE, as above with small thin scattered lenses clay, and scattered particles. RESIN to 3mm. across. Some masses resin - 1½" across. At 52'0" - 52'3" this core is rich in red-brown waxy or resinous material	100% Recovery
53'0"	54'0"	LIGNITE, very dark brown, homogeneous, with leaf fragments small pyrite aggregates.	CORING 100% Recovery
54'0"	55'0"	LIGNITE, as above; but drier and harder	90% Recovery Contamination at bottom of core.

SAWAX PTY.LTD. MOORLANDS BOREHOLE No.C.1

FROM	TO	DESCRIPTION	REMARKS
55'0"	56'0"	LIGNITE: as above, fairly dry and relatively hard with abundant waxy (?) thin leaf fragments.	100% Recovery
56'0"	57'0"	LIGNITE: dark brown, fairly dry as above with a few small 3-5mm sub-spherical bodies dark red translucent and brittle resin or wax at 56'0"	" "
57'0"	58'0"	LIGNITE: very dark brown with specks waxy ? leaf fragments.	90% Recovery
58'0"	59'0"	LIGNITE:as above	90% "
59'0"	60'0"	LIGNITE:as above	100% "
60'0"	61'0"	LIGNITE:as above, rare 2mm fragments, blood-red, translucent brittle wax (?) or resin (?). Aggregates and thin short veins pyrite common.	90% Recovery Low recovery is possible due to compression in extractor.
61'0"	62'0"	LIGNITE:dark brown, dry,friable,scattered to common diffuse layers waxy (?) leaf fragments.	100% Recovery
62'0"	63'0"	LIGNITE: as above.	100% Recovery
63'0"	64'0"	LIGNITE: Rare spindle-shaped bodies about $\frac{1}{2}$ - $\frac{3}{4}$" long, of red brittle translucent wax (?) or resin (?),also leaf fragments pyrite,as above.	90% "
64'0"	65'0"	LIGNITE: as above.	100% Recovery
65'0"	66'0"	LIGNITE: dark brown - reddish brown on crushing. Laminae has abundant shiny waxy (?) leaf material, also scattered small dark (2mm) wax ? particles.	85% recovery probably due to compaction. Possible loss off top in extruder.
66'0"	67'0"	LIGNITE: dark brown to black, harder and increasingly compact with depth? Scattered leaf fragments laminae,pyrite.	85% Recovery
67'0"	68'0"	LIGNITE: harder than above, probably lower water content, rare red spindle-shaped bodies,leaf fragments.	100% Recovery
68'0"	69'4"	LIGNITE: hard and tough, with large fragments pyritised fossilwood.	100% Recovery
69'4"	70'8"	LIGNITE: very dark brown, woody structure evident throughout, hard and tough with a poor shaly parting. leaf fragments rare predominately wood, possibly some clay.	100% Recovery
70'8"	71'10"	LIGNITE: dark brown, very tough - slickensides form on extrusion - dry and hard. Mostly wood or homogeneous material. No obvious leaf fragments or waxy bodies.	100% Recovery

SAWAX PTY.LTD. MOORLANDS BOREHOLE No. C.1

FROM	TO	DESCRIPTION	REMARKS
71'10"	72'0"	LIGNITE: as above.	100% Recovery
72'0"	73'0"	CLAY, light brown, slightly silty, with abundant bodies carbon-rich material, probably roots, trunks, branches etc.	BOTTOM OF SAMPLE
73'0"	74'4"	CLAY: as above with abundant coaly material.	
		TOTAL DEPTH 74'4"	

WATER LEVEL 20'0" IN COMPLETED HOLE

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LOG OF PERCUSSION BORE HOLE No. D.1

PROJECT: MOORLANDS MONTAN WAX INVESTIGATIONS PLAN REF: FIG.

LOCATION: Sec. 51, Hd. Sherlock, Co. Buccleuch

DIRECTION & ANGLE: Vertical DEPTH OF HOLE: 106'6"

HOLE LOGGED BY: D.S. Trail , R.I. Chugg

CONSULTANT GEOLOGISTS: L.G.B. Nixon and Associates

DRILLING CONTRACTORS: W.A. Juett DRILL OPERATORS: W.Juett

DRILL PLANT: CABLE TOOL

OBJECTS: To test the thicknesses of overburden and lignite and to obtain fresh lignite for montan wax determinations.

RESULTS: Overburden 75ft. Lignite 31'6" thick. Bulk analysis yielded 7.59% crude wax and 1.38% n-hexane soluble wax.

FROM	TO	DESCRIPTION	REMARKS
0'0"	6'0"	SAND, mid-brown, medium-grained, very well-sorted sub-rounded quartz grains in sparse brown clay.	Move & set-up. start drilling 1300
6'0"	10'8"	70% sandy clay, white medium and fine sized sub-angular quartz grains in moderately tough white clay matrix. 30% Limestone salmon-pink, fine-grained with scattered quartz grains.	
10'8"	15'0"	50% Sandy clay, as above. 50% Limestone, salmon-pink to cream, as above.	Base of limestone at 13ft.
15'0"	18'0"	100% Sand light greenish-grey, fine-grained, sub-angular quartz, grains in stiff matrix clay and silt.	
18'0"	22'0"	100% Clay, light greenish grey, moderately tough, in abundant silt-size quartz and scattered flakes muscovite.	
22'0"	32'0"	100% Silt creamy-brown to mid-brown mottled, angular silt-size quartz in clay matrix with scattered round fine-size green and black grains glauconite?	Flow of salt water into hole at this interval.
32'0"	38'0"	30% Silty clay, white with fine-size quartz grains 70% Sandstone white and mid-brown and pink fine-size quartz in calcareous or ferruginous matrix, moderately hard. (soft to drill).	Possibly sandstone aquifer but poor porosity
38'0"	40'0"	100% Concretionary Sand mid-brown, sub-cylindrical concretions of fine-grained sandstone probably in a matrix of water-soaked clayey brown sand.	Hole caving Sample of Aquifer
		WATER LEVEL SETTLED AT 20 FEET	Ream hole for cavity finish

SAWAX PTY.LTD. MOORLANDS BOREHOLE No. D.1

FROM	TO	DESCRIPTION	REMARKS
38'0"	40'0"	CONTINUED	1730 hours.Waiting for casin. Arrived 1200
40'0"	45'0"	70% Clay, mottled dark purplish grey to dark greenish grey,silty and possibly carbonaceous, very tough. 25% Sandstone fragments light to mid-brown concretionary sandstone as above. 5% Mudstone red, ferruginous, thin layers ± 3mm forms hard flakes in clay.	Start casing 0800.Drilling 0900 probably clay with layers red mudstone. Only concretionary sand.
45'0"	47'6"	85% Clay dark purplish grey, carbonaceous, tough even-grained, with fragments dark reddish brown mudstone. 15% Sandstone fragments,white to mid-brown as above.	This clay has a fairly high content.
47'6"	50'0"	90% Clayshale dark grey to black, silty in places, very tough clay with lamination. 10% Sandstone/mudstone fragments as above.	Carbon content tops off still carbonaceous, but also silty.
50'0"	52'0"	85% Clayshale carbonaceous as above, slightly softer. 15% Mudstone yellow-brown to black fragments possible concretions in the clayshale.	Like concretionary ironstone, of Scottish carboniferous?
52'0"	55'0"	Clayshale and Mudstone as above. Some sandstone? fragments.	
55'0"	58'0"	Clayshale carbonaceous and fragments ferruginous mudstone.	
58'0"	60'0"	Clayshale, black to dark greenish grey, generally even-grained, with silty lenses? carbonaceous with very small scattered crystals pyrite.	
60'0"	61'0"	Clayshale as above, silty to sandy in places, with a few nodules sandy limestone.	
61'0"	69'0"	Clayshale, black,carbonaceous,as above.	
69'0"	71'0"	90% Clayshale as above. 10% Mudstone, black,hard,even-grained, calcareous?	
71'0"	75'0"	20% Mudstone dark greenish grey, sand flaky fragments, very hard, calcareous with lowellibionds. 20% Sand light grey¼ coarse-size sub-rounded to sub-angular quartz grains and shell fragment. 60% LIGNITE:soft dark brown and structureless mud.	Hard to drill. (Calcareous mudstone) Cease drilling 1700. Rig up

SAWAX PTY.LTD. MOORLANDS BOREHOLE No. D.1

FROM	TO	DESCRIPTION	REMARKS
71'0" (CONTINUED)	75'0"	C O R I N G	for coring. Start coring 1800
75'0"	76'0"	LIGNITE: very dark brown to black, homogeneous with no visible woody material, scattered yellow-green leaf fragments, small pyrite lens at top. - large 3" fragments calcareous mudstone at top of core.	Coring 1100 Mudstone/limestone. freshwater? low-ellibionds (smooth shell)
76'0"	77'0"	LIGNITE: as above, scattered small (-5mm) rounded bodies dark brown to black resin or wax. Also wood fragments - 4" long common.	1230: Core barrel stripped off in hole. 1700 fished out barrel.
77'0"	78'0"	LIGNITE: very dark brown, prominent impressions wood, and preserved wood fragments. Scattered yellow-green leaf remnants.	Reset casing by 1830
78'0"	79'4"	LIGNITE: as above.	0800 start coring.
79'4"	80'4"	LIGNITE: very dark brown, dry and friable with abundant yellow leaf remnants. A thin (5mm) layer of dark red resinor wax bodies - 5mm long occurs at 79'8". Smaller bodies are also scattered in the core, and a few larger, and are common between 79'8" and 80'2". Core is contaminated with gravel at 80'4" (bottom of core).	Core hammer cracked about. 0930 to Tailem Bend for welding. 1300 begin coring again.
80'4"	81'4"	LIGNITE: very dark brown with scattered leaf fragments and long pieces of wood up to 10mm thick.	Core barrel sticking.
81'4"	82'4"	LIGNITE: with scattered 5mm. spindle-shaped bodies resin or wax.	Contamination from calcareous mudstone small pebbles-caused sticking above.
82'4"	83'4"	LIGNITE: very dark brown, uniform and homogeneous with a few very thin lenses limonitic (?) material and leaf fragments.	RECOVERY 90-100% throughout D.1 1830 halt.
83'4"	84'6"	LIGNITE: dark brown as above; mid-brown or rusty-brown in thin bands with abundant leaf fragments.	0800 to A.1 site 0900 start drilling.
84'6"	85'6"	LIGNITE: dark reddish brown, very dry. A friable with leaf fragments in places.	
85'6"	86'6"	LIGNITE: as above.	

SAWAX PTY.LTD. MOORLANDS BOREHOLE No.D.1

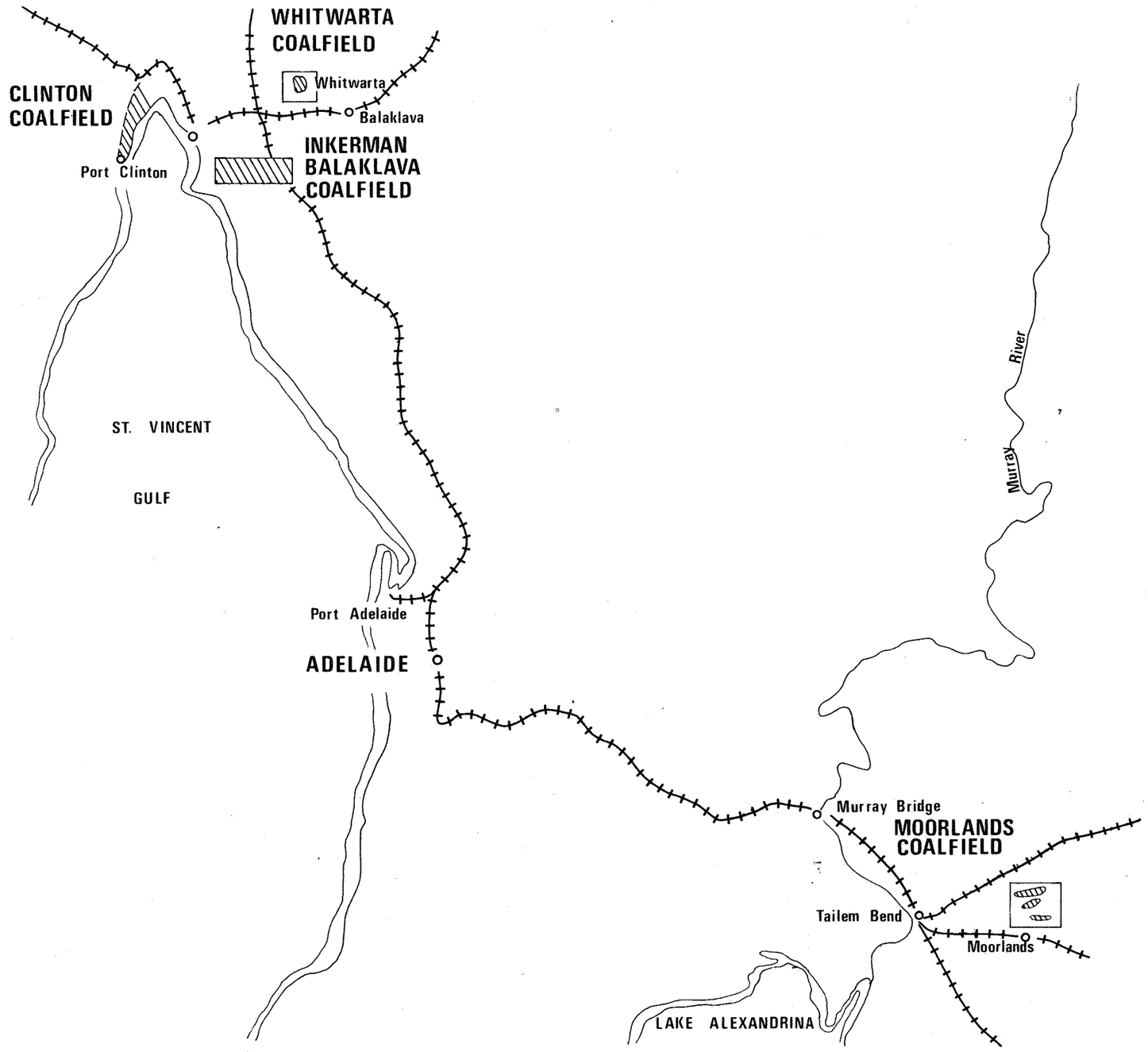
FROM	TO	DESCRIPTION	REMARKS
86'6"	87'6"	LIGNITE: very dark brown, homogeneous with some woody structure and small leaf fragments.	Progress slow.
87'6"	88'6"	LIGNITE: very dark reddish brown. Numerous leaf fragments. Friable to brittle.	
88'6"	89'6"	LIGNITE: very dark reddish-brown. Some woody structure. Small patches of leaf fragments. Friable to brittle. Apparent low moisture content.	
89'6"	90'7"	LIGNITE: very dark reddish brown. Considerable woody texture. Scattered small leaf fragments. Friable to brittle. Traces of marcasite. Apparent low moisture content. Small resin patch $\frac{1}{8}$" at 90'4".	End of day. modified on cutting slope.
90'7"	91'7"	LIGNITE: dark reddish brown. Considerable woody texture. Scattered small leaf fragments. Apparent low moisture content. Brittle to friable.	Start after delay getting new cutting shoes. 9am.
91'7"	93'0"	LIGNITE: dark reddish brown. Abundant woody texturei Thin carbonaceous clay layer 91(10". Scattered small leaf fragments. Low moisture content. Brittle to friable.	
93'0"	93'11"	LIGNITE: dark reddish brown. Some woody texture. Scattered small leaf fragments. Low moisture content. Brittle to friable.	
93'11"	94'7"	LIGNITE: dark reddish brown. Some woody texture. Scattered small leaf fragments. Low moisture content. Brittle to friable.	
94'7"	95'7"	LIGNITE: dark reddish brown. Abundant woody texture. Scattered small leaf fragments. Low moisture content. Brittle to friable.	
95'7"	96'0"	LIGNITE: dark reddish brown. Some woody texture. Sparse small leaf fragments. Low moisture content. Brittle to friable.	
96'0"	96'8"	LIGNITE: dark reddish brown. Considerable woody texture. Sparse leaf fragments. Low moisture. Brittle to friable.	
96'8"	97'4"	LIGNITE: dark reddish brown. Moderate woody texture. Sparse small leaf fragments. Low moisture. Brittle to ftiable.	

SAWAX PTY.LTD.

MOORLANDS BOREHOLE No.D.1

FROM	TO	DESCRIPTION	REMARKS
97'4"	98'4"	LIGNITE: dark reddish brown. Considerable woody texture. Very sparse leaf fragments. Very low moisture. Brittle to friable.	
98'4"	99'1"	LIGNITE: dark reddish brown. Considerable woody texture. Very sparse leaf fragments. Very low moisture. Brittle to friable.	
99'1"	100'0"	LIGNITE: dark reddish brown. Considerable woody texture. Very sparse leaf fragments. Very low moisture. Brittle to friable.	End day 630pm
100'0"	100'6"	LIGNITE: dark reddish brown. Considerable woody texture. Almost no leaf. Very low moisture. Brittle to friable.	
100'6"	101'4"	LIGNITE: dark reddish brown. Moderate woody texture. Almost no leaf. Very low moisture. Brittle to friable.	
101'4"	101'9"	LIGNITE 50%: Reddish brown abundant woody texture. No leaf. Low moisture. Brittle 50%. Brown carbonaceous clay of low plasticity.	
101'9"	102'6"	LIGNITE 90%: as above with traces of brown clay in very thin layers.	
102'6"	103'3"	LIGNITE 30%: as above interlayered with 70% brown crumbly clay.	
103'3"	103'10"	LIGNITE 80%: dark reddish brown. Moderate woody texture. Traces of fine leaf fragments. Low moisture. Brittle. 20% brown crumbly clay.	Separate Total bulk sample bag below 103'10". Bag3.
103'10"	104'3"	CLAY 85%: greyish brown. LIGNITE 15% Reddish brown. Woody texture, almost no leaf. Low moisture. Brittle.	
104'3"	105'5"	LIGNITE 70%: reddish brown. considerable woody texture. No leaf. Low moisture. Brittle. CLAY 70%. Dark brown-grey interbedded. Few quartz grit grains.	
105'5"	106'6"	CLAY 90%: greyish brown, very stiff. LIGNITE 10% reddish brown. Woody texture occurring as layers $\frac{1}{4}$" to $\frac{1}{2}$" thick.	

HOLE FINISHED 1155 a.m.

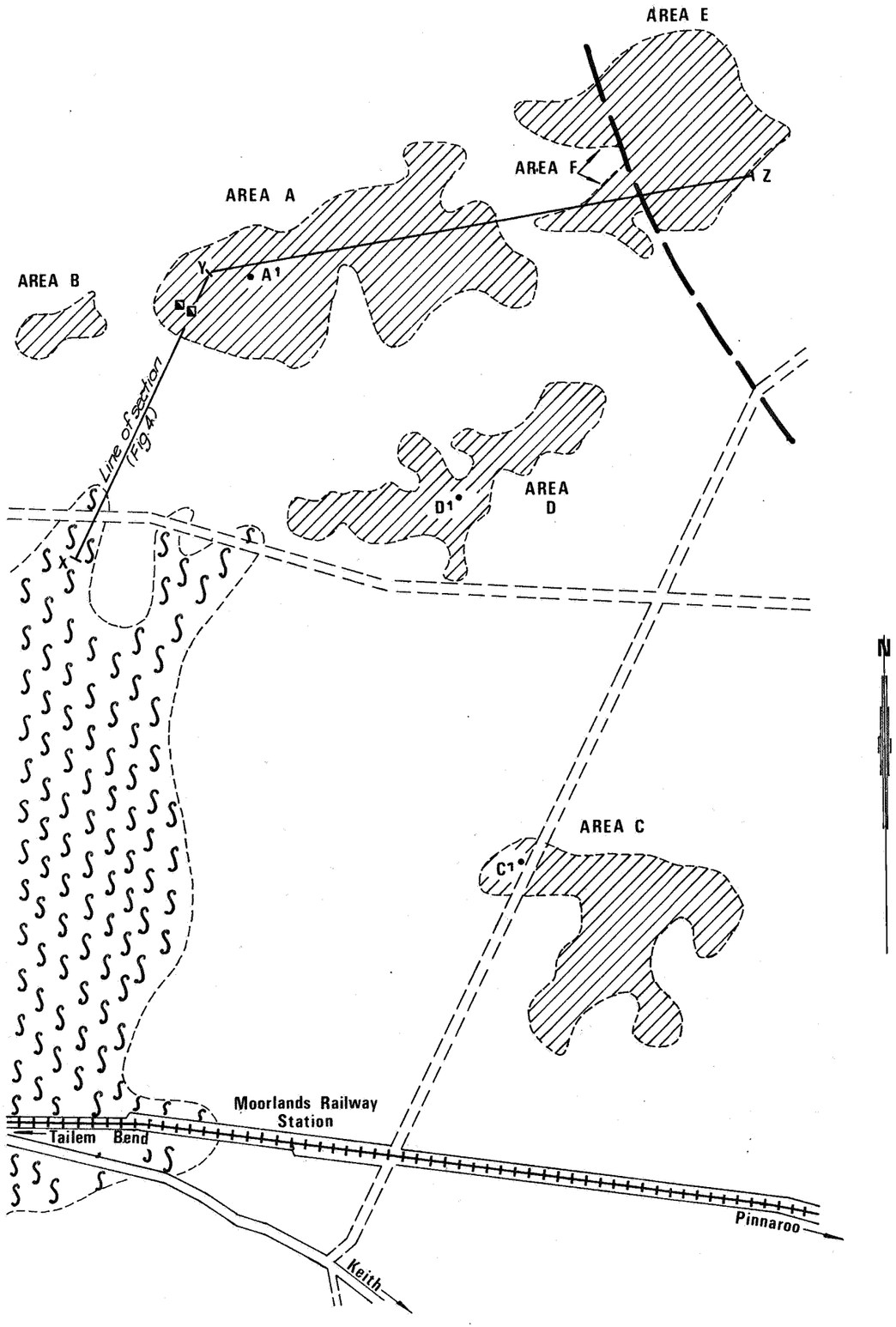


SCALE

0 5 10 15 20 Miles

ENV 2135-1

L.G.B. NIXON & ASSOCIATES	
DRAWN:	SAWAX PTY. LTD.
TRACED:	LIGNITE FIELDS IN S.A.
REVISED:	FIG. 1.



LEGEND

Lignite, subsurface.

Precambrian outcrop.

A1 • SAWAX Bore.

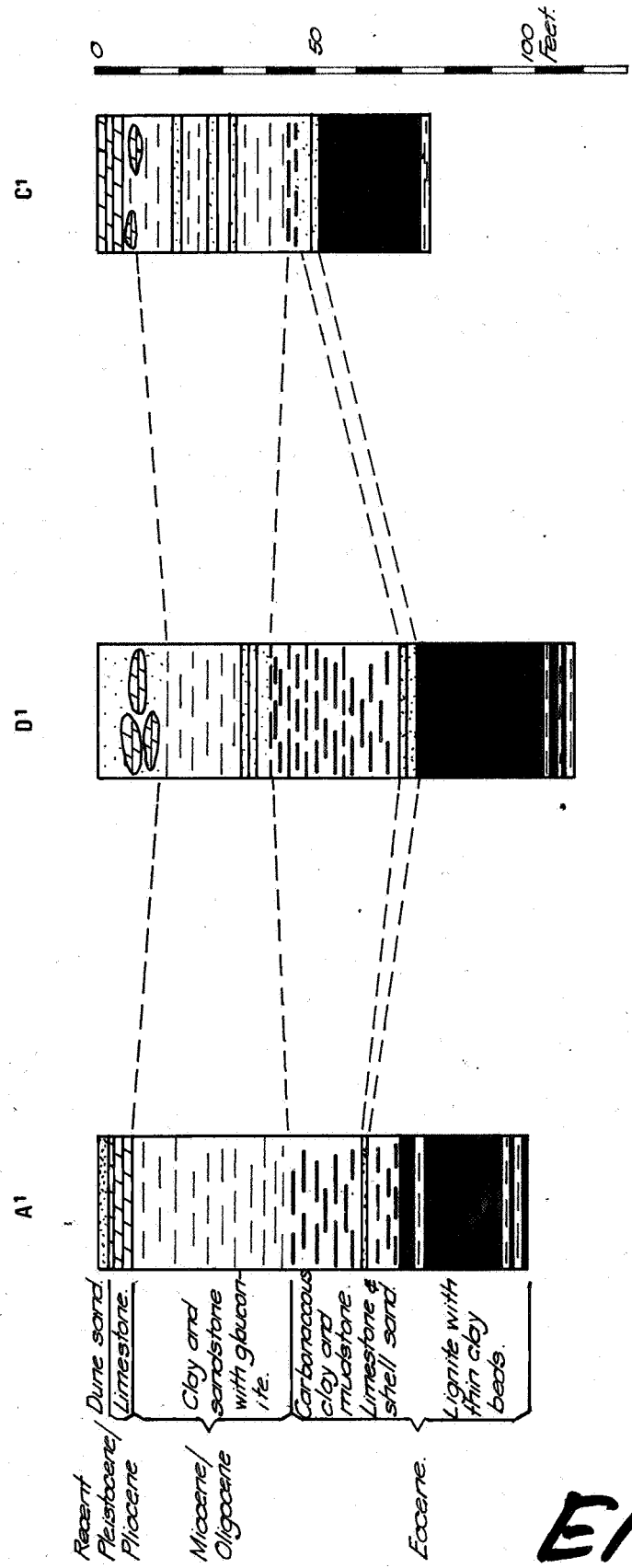
SCALE

0 ½ 1 Mile

0 1 Km

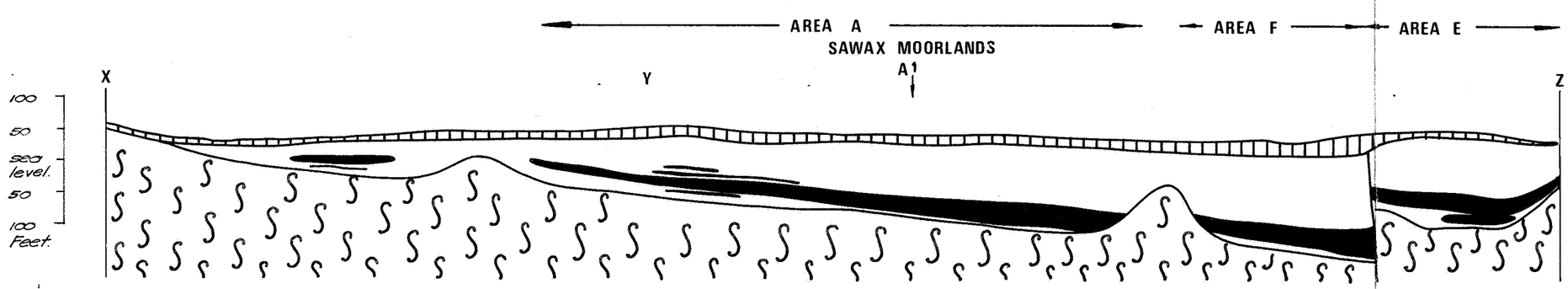
ENV 2135-2

L.G.B. NIXON & ASSOCIATES	
DRAWN:	SAWAX PTY. LTD.
TRACED:	**MOORLANDS**
REVISED:	SAWAX BORES & LIGNITE, (AFTER Mc GARRY 1953) FIG. 2.



ENV2135-3

L.G.B. NIXON & ASSOCIATES	
DRAWN:	SAWAX PTY. LTD.
TRACED:	MOORLANDS
REVISED:	CORRELATED LOGS OF SAWAX BORES
	FIG. 3



SCALE

2000 1000 0 ½ 1
Feet Mile

LEGEND

- Nodular limestone.
- Clay, sand, minor limestone.
- Lignite
- Basement rocks.

ENV 2135-4

L.G.B. NIXON & ASSOCIATES	
DRAWN:	SAWAX PTY. LTD.
TRACED:	**MOORLANDS**
REVISED:	DIAGRAMMATIC SECTION THROUGH AREAS A, F, & E, (FROM Mc GARRY 1953) FIG. 4

SAWAX PTY. LTD.

S.M.L.'S 725, 726, 727

QUARTERLY REPORT FOR PERIODS ENDING

29th March, 1973 and 29th June, 1973

by

L.G. NIXON

General Statement

Work Done

S.M.L. 725

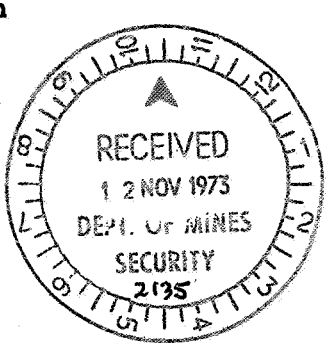
S.M.L. 726

S.M.L. 727

Expenditures

Attachments

1. Letter from Hoechst Australia Limited
2. Laboratory results of wax extraction tests carried out by Farbwerke Hoechst A.G. in Gersthofen.



S.M.L. 725

No field work was carried out in this concession during the period under review. The work done was of a general nature as discussed in the General Section of this report.

S.M.L. 726

No field work was carried out in this concession during the period under review. The work done was of a general nature as discussed in the General Section of this report.

S.M.L. 727

During this period hole No. 31 was radiometrically logged using an Austral M.B.L. 250 radiometric mini logger.

No anomalous radioactive zones were found and no other work was done on this concession.

Sawax was waiting for results of wax extraction tests being carried out by Farbwerke Hoechst A.G. in Germany, before doing any more work on the core from hole 31. These results, which were not available during the period ending 29th March, 1973, were received on 25th May, 1973.

In view of the comments made in Hoechst's report, no further wax extraction tests are planned. Future work is to be directed to investigating the feasibility of upgrading the quality of the wax obtained from the lignites and the cost of upgrading the wax to a marketable product.

SAWAX PTY. LTD.

S.M.L.'s 725, 726, 727

QUARTERLY REPORTS FOR PERIOD ENDING 29TH MARCH,1973 and 29TH JUNE,197

by

L.G. NIXON

General Statement:

During the period under review Sawax was involved in radiometric logging of hole No. 31 at Inkerman, investigating the possibility of joint venture evaluation of the concession areas, and in correspondence with montan wax users and marketers.

Results of tests carried out by Farbwerke Hoechst A.G. in Germany were received but were not encouraging.

Following advice from Hoechst, Sawax initiated inquiries into the feasibility of upgrading the waxes from the South Australian lignites and the costs of upgrading. These investigations are under way at the present time.

Work Done:

General

Sawax supplied Kiwi Australia Limited with samples of crude wax extracted from lignites obtained from Clinton and Moorlands, for testing for use in the manufacture of shoe polish. Kiwi reported that the wax, as supplied, was not suitable for this use, but that some refining of the wax may yield a product suitable for commercial use.

Two bulk lignite core samples were sent to Hoechst Australia Limited in Melbourne, for forwarding to Farbwerke Hoechst A.G. in Germany for wax extraction tests. A copy of the results of the extraction tests carried out in Germany is attached. The wax extracted was found to be of very poor quality, being high in iodine and resin and of an unsatisfactory brown colour.

Sawax contacted Technical Waxes Australia Pty. Ltd. of Sydney in connection with testing the waxes but got no response.

One large overseas company inquired about the wax content in the lignites but did not follow up the inquiry.

A letter to Tennant Traders seeking their interest was ignored.

HOECHST AUSTRALIA LIMITED, INC. IN A.C.T.
HEAD OFFICE: 606 ST. KILDA ROAD,
MELBOURNE, VIC., AUSTRALIA.

TELEPHONE: 51 0321
TELEX: AA30367
CABLE ADDRESS: "HOECHST", MELBOURNE

CORRESPONDENCE:
P.O. BOX 4300, MELBOURNE,
VICTORIA, 3001.

Hoechst Australia Limited

Mr. L.G. Nixon
SAWAX PTY. LTD.
6 Dequetteville Terrace
KENT TOWN, S.A. 5067

YOUR REFERENCE:

OUR REFERENCE: JWP.em.

DATE: 25th May, 1973

Dear Sir,

LIGNITE

Further to our letter of the 23rd March, 1973, we are pleased to attach two photocopies of the laboratory tests carried out in Gerst-hofen.

After you have studied these results and discussed them with the Department of Mines, we would be interested receiving your comments thereon.

We trust we have been of assistance to you.

Yours faithfully,
HOECHST AUSTRALIA LIMITED

(J.W. PEAKE)
Commercial Manager

Enc.

Dear Sirs,

The two samples of lignite supplied by Sawax Pty. Ltd. were evaluated in our wax laboratory with the following results:

Sample designation		D 1	C 23	Specification +)
Lignite moisture	%	45	45	
Crude montan wax				
Extraction yield	%	2.8	2.5	
Acid number	mg KOH/g	44.8	33.6	10 - 50
Saponification number	mg KOH/g	88.2	74.9	75 min.
Iodine number	g I/100 g	78.4	54.7	30 max.
Resin content (benzene/ethanol method)	%	56.7	45.2	25 max.
Asphalt content (Isopropanol insoluble)	%	0.7	1.3	10 max.
Melting pint / Drop point	°C	77/79	80/81	84/86

+) for crude montan wax suitable for our purposes

The samples were dried to a moisture content of 10 - 11 % and extracted with toluene. The percentage figures of the crude montan wax yields are based on dried lignite. We do not believe that wax extraction from a lignite with a wax content of less than 9 - 10 % would be economically feasible.

The crude wax extracted from the two Sawax samples is of very poor quality as the high figures of the iodine numbers and of the resin contents clearly indicate. A bleaching test carried out with the crude wax extracted from sample D 1 resulted in a product of an unsatisfactory brownish colour although a much higher than usual amount of bleaching agent had to be applied, thus confirming the poor quality of the extractable crude wax.

We regret that we cannot report to you more promising results.

Department of Mines, Western Australia

GOVERNMENT CHEMICAL LABORATORIES

30 Plain St., Perth, Western Australia, 6000. Tel. 25 5544

Address all correspondence to the Director.

Correspondents should confine each letter to one subject. Write on one side of the paper only.

Secretary
Sawax Pty Ltd
6 Dequetteville Terrace
KENT TOWN 5067
South Australia

0 03

7 January 1974 AB

OUR REF:

YOUR REF:

MATERIAL: Additional work on three lignite samples, as below.

LAB. No. 8344-46/72.

FROM WHOM RECEIVED AND DATE: Sawax Pty Ltd, on 23rd May 1972.

RESULT OF EXAMINATION: The samples as received had an odour of the solvent used for extraction of wax. To avoid the error due to residual solvent the samples were dried in an oven at 110°C prior to determination of ash and calorific value. The following results therefore refer to dry material.

Mark	C23	W1	D1
Lab. No. (1972)	8344	8345	8346
Analysis			
Ash - per cent	18.1	54.0	29.0
Gross calorific value			
- Btu per lb	9100	4710	8000
- MJ per kg*	21.2	10.9	18.6

* This value is calculated by multiplying the calorific value in Btu per lb by 2.326×10^{-3}. It is the preferred method of expression of gross energy values in SI units commonly referred to as the metric system.

There was insufficient sample left of the other samples for analysis.

B. Goodheart.

B. GOODHEART
CHIEF
ENGINEERING CHEMISTRY DIVISION