

MAP NO.

ASSESSMENT REPORT
PROSPECTUS X
CONFIDENTIAL X
OPEN FILE

DOCUMENT NO.:
MINING DISTRICT:
TYPE OF WORK:
I.S.N. 134650

092031
WHITEHORSE
GEOLOGICAL EVALUATION

115 I 1

REPORT FILED UNDER: Cyprus Anvil Mining Corporation

DATE PERFORMED: 1977

DATE FILED: February 1977

LOCATION: LAT.: 62°05'N

AREA: Tantalus Butte

LONG.: 136°15'W

VALUE \$:

CLAIM NAME & NO.: COAL MINING LEASES 2950-2983

WORK DONE BY: Roderic P. Hill

WORK DONE FOR: Cyprus Anvil Mining Corporation

DATE TO GOOD STANDING	REMARKS:
	#1 SOUTH TANTALUS
	#2 TANTALUS MINE
	#3 TANTALUS BUTTE

#00038

REPORT ON PRELIMINARY EVALUATION

092031

CARMACKS COAL PROJECT

Whitehorse Mining District

Yukon Territory

N.T.S. 115 I - 1

Latitude: 62⁰ 5' N

Longitude: 136⁰ 15' W

By:

Roderic P. Hill

CYPRUS ANVIL MINING CORPORATION

February, 1977.

SUMMARY

This study consisted of a preliminary evaluation of two groups of coal mining leases in the Carmacks area, Central Yukon. Methods employed included field-mapping, trenching and diamond drilling.

The coal seam mined at Tantalus Butte on the Carmacks North property is one of four within the Tantalus Formation of Upper Jurassic and/or Lower Cretaceous age. This seam is consistently the thickest, most persistent and best quality of the four. It is a fairly good-quality thermal bituminous coal which may be burned as mined. In this area proven and potential reserves total about 588,500 tons in place.

The coal seam exposed in trenches and intersected in drill holes on Carmacks South is apparently stratigraphically below the Carmacks North coal. It is within the top 100 feet of the Laberge Group of Lower to Middle Jurassic age and the coal is of slightly higher rank. Some of this coal shows good coking characteristics, but because of its high ash-content would require preparation plant facilities to produce either thermal or metallurgical coal. In this area potential reserves total about 7,118,500 tons in place.

It is concluded that appreciable reserves of coal are present, although much of it is of a quality which would be uneconomic to mine at present. A programme of continued exploration is proposed.

TABLE OF CONTENTS

<u>VOLUME I</u>	<u>Page</u>
SUMMARY	ii
LIST OF TABLES	iv
LIST OF ILLUSTRATIONS	iv
1. <u>INTRODUCTION</u>	1
1.1 Purpose of Study	1
1.2 Location and Access	1
1.3 Geography	2
1.4 Land Status	5
1.5 Markets	6
1.6 Previous Work	8
1.7 Outline of Present Exploration	11
2. <u>GEOLOGY</u>	13
2.1 Regional Setting	13
2.2 Carmacks North	15
2.2.1 Trenching	15
2.2.2 Open Pit Area	16
2.2.3 Diamond Drilling	16
2.3 Carmacks South	19
2.3.1 Trenching	20
2.3.2 Diamond Drilling	20
2.3.3 Geophysics	22
2.4 General Inferences	23
3. <u>COAL QUALITY</u>	25
3.1 Carmacks North	25
No. 1 Seam	25
No. 2 Seam	30
No. 3 Seam	30
3.2 Carmacks South	30
4. <u>RESERVES</u>	36
4.1 Carmacks North	36
4.2 Carmacks South	38
4.3 Summary	38
5. <u>CONCLUSIONS</u>	40
5.1 Results of 1976 Programme	40
5.2 Prospects for Development	40
6. <u>RECOMMENDATIONS</u>	42
7. <u>COST SUMMARY</u>	45
7.1 Expenditure in 1976	45
7.2 Proposed Expenditure in 1977	46
LIST OF REFERENCES	47
 <u>VOLUME II</u>	
Appendix I - Trench Plans, Carmacks North	
Appendix II - Drill Hole Logs, Carmacks North	
Appendix III - Trench Plans, Carmacks South	
Appendix IV - Drill Hole Logs, Carmacks South	
Appendix V - Analytical Data, Carmacks North	
Appendix VI - Analytical Data, Carmacks South	

092031

LIST OF TABLES

<u>TABLE</u>	<u>Page</u>
1. Coal Holdings in Carmacks Area	7
2. Stratigraphic Succession	14
3. Summary of Analyses Prior to 1976 - Carmacks North	26
4. Summary of Analyses, 1976 - Carmacks North	28
5. Classification of Carmacks North Coal by Rank	29
6. Summary of Analyses Prior to 1976 - Carmacks South	32
7. Summary of Analyses, Carmacks South	33
8. Classification of Carmacks South Coal by Rank	34

LIST OF ILLUSTRATIONS

<u>Figures</u>	<u>Page</u>
1. Location Map	3
2. Coal Leases in Carmacks Area, Y. T.	4
3. Core Testing for Carmacks Project	27

Maps

1. Geology of Carmacks Coal Lease Area	1" = ½ mile	In Pocket
2. Geological Map of Carmacks North Coal Lease Area	1" = 800'	In Pocket
3. Geological Map of Open Pit Area	1" = 40'	In Pocket
4. Geological Map of Tantalus Butte Coal Mine	1" = 200'	In Pocket
5. Geological Map of Carmacks South Coal Lease Area	1" = 800'	In Pocket

Sections

Carmacks North, Sections A - D	In Pocket
Carmacks South, Sections A - E	In Pocket

Cyprus Anvil Mining Corporation

330, 355 Burrard Street
Vancouver, British Columbia
V6C 2G8
Telephone (604) 687-2586

Telex 04508594

INTRODUCTION

1.1 Purpose of Study

Following a substantial increase in the cost of electric power to Yukon consumers, including the Anvil Mine, it was proposed that Cyprus Anvil consider the feasibility of generating its own power with a generating station at Faro, using coal from our leases in the Carmacks area. At the present, coal is used at Anvil for plant heating and concentrate drying, and there is a good probability of a market developing in the near future for coal for similar purposes at other proposed mining operations in the Yukon. As a result of these considerations, coupled with substantial general increases in the value of both thermal and metallurgical coals, an A. F. E. was approved for initial geological exploration of the Carmacks leases.

While the study was in progress it was discovered that the existing underground operation at Carmacks was in difficulty, and hence the short-term supply of coal for the Anvil Mine was not assured.

The purposes of this study have therefore been:

- a) To compile geological maps and cross-sections of the whole lease area, using all available data;
- b) To determine what further work is necessary in order to evaluate the development prospects of the property as a whole;
- c) To locate and, where possible, to evaluate readily accessible sources of coal to satisfy the immediate and long-term requirements of the Anvil Mine.

1.2 Location and Access

The property consists of two groups of coal mining leases at Carmacks in the Central Yukon; one group lies to the northeast of Carmacks at Tantalus Butte,

092031

CYPRUS ANVIL

and the other to the southeast (See Figures 1 and 2).

Access to the property is excellent; the Klondike Highway from Whitehorse to Dawson lies along the eastern edge of both lease groups, and the Campbell Highway from Carmacks to Faro and Watson Lake lies along the southern edge of the northern lease group.

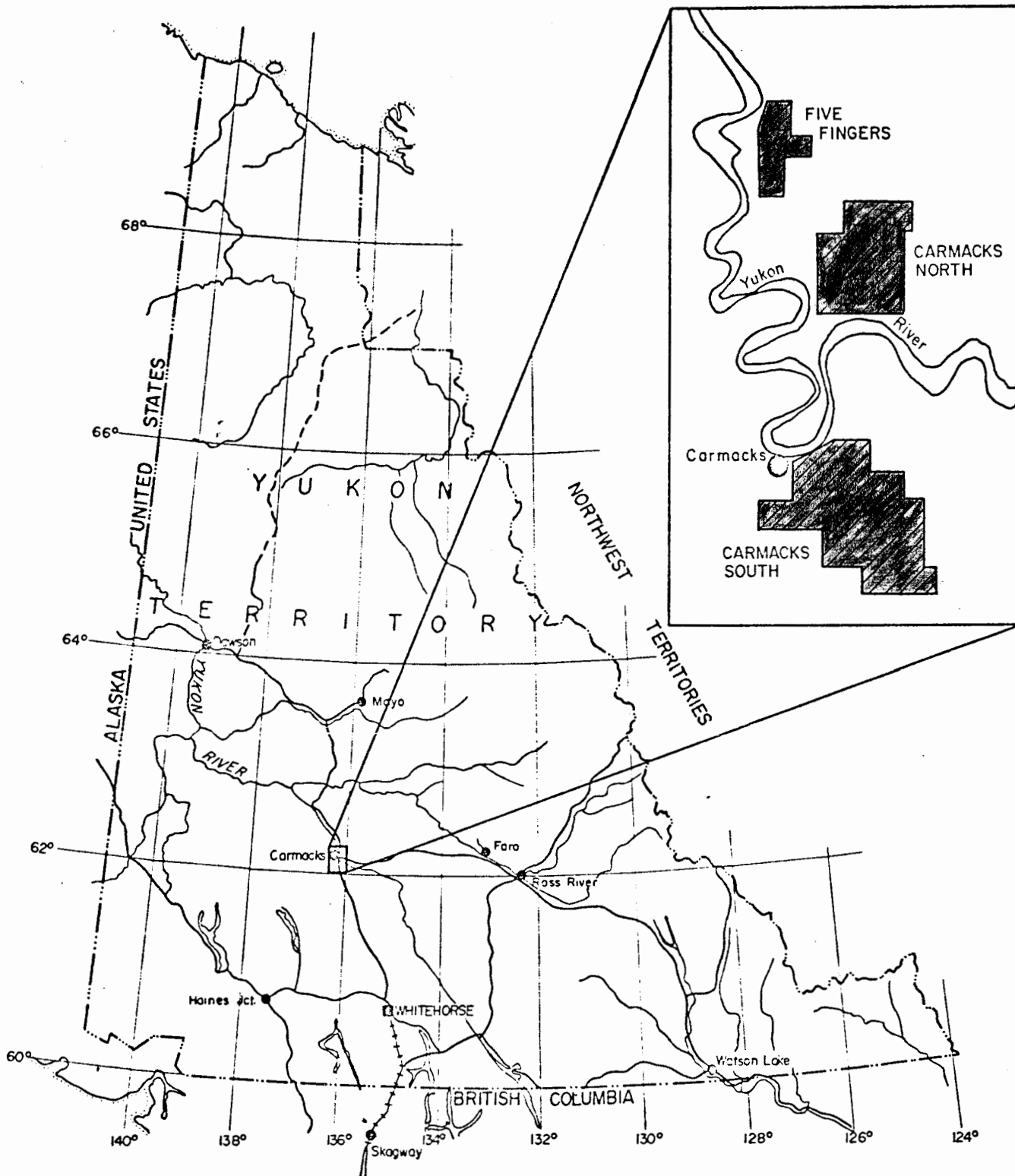
A dirt road leaves the Klondike Highway about four miles north of Carmacks and traverses the northern property from north to south, providing good access to the southern half of this property. A power line crossing the western and northern edges of the southern property, and a four-wheel-drive road south from Carmacks, provide good access to the northwest corner of this property. The remainder of both properties are accessible only on foot or by helicopter.

1.3 Geography

The properties are located within the Central Yukon plateau, and as such consist of undulating ridges and valleys, between about 1700 and 3200 ft. above sea level. Despite extensive glaciation of the area, there is a marked correspondence between bedrock geology and topography. For the most part, the highly siliceous pebble conglomerates of the Tantalus Formation, being the most resistant lithology in the area, form the ridges, while the intervening valleys are underlain by the relatively less resistant conglomerates and sandstones of the Laberge Group. Tantalus Butte, at the southern end of the northern property, forms a prominent local landmark.

The Yukon River, occupying a broad, U - shaped valley, flows from east to west, separating the two lease groups, before turning northwards near Carmacks. The area is noteworthy for the total absence of permanently-flowing streams.

Most of the area is covered with glacial till, which varies in thickness from a few feet at the tops of the ridges to twenty feet or more in the valley bottoms. The Yukon River valley is floored by fluvio-glacial and fluvial silts, sands and gravels, and these deposits extend in benches up

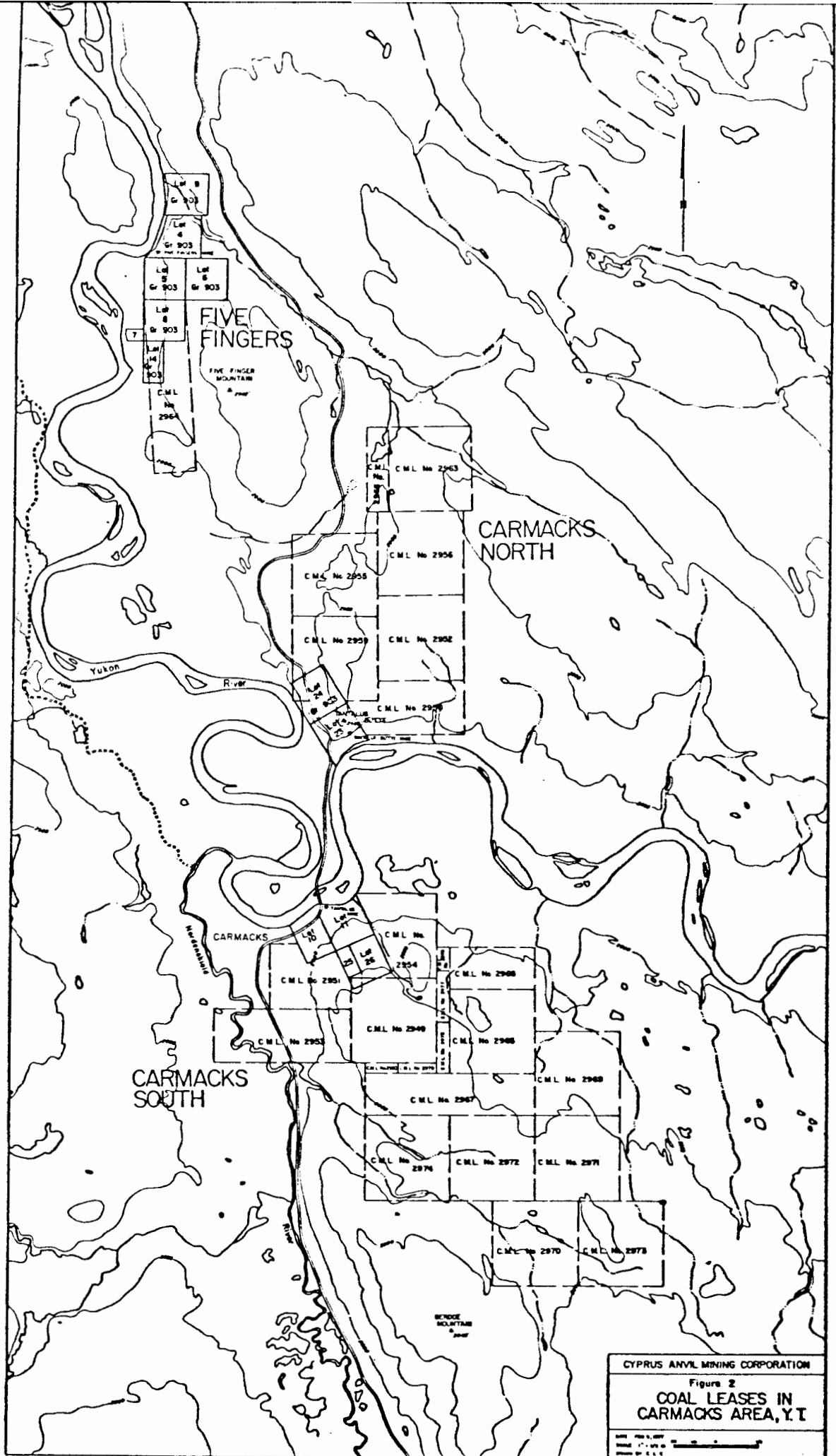


CYPRUS ANVIL MINING CORPORATION

Figure: 1
PROPERTY LOCATION MAP

YUKON
SCALE · 1" = 100 MILES

5703



CYPRUS ANVIL MINING CORPORATION
 Figure 2
**COAL LEASES IN
 CARMACKS AREA, Y.T.**

092031

the valley sides to as much as 200 feet above river level. Glacial deposition features such as drumlins were not recognised in the area, but gravel ridges (?moraines) are present on the river benches.

The area is largely tree-covered. In dry areas, particularly on higher ground, white spruce predominates, and where recent burns are evident they form a dense, almost impenetrable growth of short, very closely-spaced saplings. In the lower areas poplar and birch are more common. Small areas of bog and muskeg occupy some valleys and topographic lows.

The combination of relatively gentle topography, extensive till cover, and dense vegetation results in a general paucity of rock exposures over most of the area. Most natural exposures were found near the crests of ridges.

A plentiful supply of water is available from the Yukon River should preparation plant facilities be required. A number of small lakes is present on the property, but it is probable that most water required for drilling will have to be pumped from the River, resulting in water lines up to several miles in length with vertical lifts of up to 1500 feet.

The transmission line from Whitehorse to Faro is available to supply power.

1.4 Land Status

The original land holdings in the area, which included the Tantalus Butte Mine, and the sites of the old Five Fingers Mine and Tantalus Mine (see Figure 2), passed from the Five Fingers Coal Company to the Yukon Coal Company (a wholly owned subsidiary of Territorial Supply Company of Whitehorse, and managed by United Keno Hill Mines) in 1947. Yukon Coal staked an additional coal lease, number 2941 (renumbered #2959 in 1969) immediately north of the Tantalus Butte Mine.

In 1965, officers of Dynasty Explorations, on behalf of Anvil Mining Corporation Limited, staked eight coal mining leases on ground surrounding the Yukon Coal holdings; four adjacent to the Tantalus Butte Mine and four around the site of the old Tantalus Mine. Rental for such leases is one dollar per acre per

year, and such leases are normally 1 square mile (640 acres) in area.

The entire holdings of Yukon Coal were purchased by Anvil Mining Corporation on January 11, 1972.

Following brief exploration programmes in 1971 and 1973, Teslin Explorations Ltd. staked seven coal leases; one at Five Fingers, two north of the Anvil leases at Tantalus Butte, and four south and east of the Anvil leases at the old Tantalus Mine.

A further six leases, adjacent to the Teslin leases south of Carmacks, were staked by Cyprus Anvil in March, 1976, and an option agreement giving Cyprus Anvil control of all the Teslin leases was signed in June, 1976.

While fieldwork for this study was in progress it was discovered that substantial fractions existed between the original Anvil leases and the Teslin leases south of Carmacks, and five small leases have been staked to cover these fractions. In addition, a Land Title Search in July, 1976 revealed that Lot 25, originally covered by leases 2951 and 2954, staked in 1965, was transferred along with the coal rights from the Territorial Government to the Crown in 1967. An additional lease to cover this area was staked in August, 1976. It should also be noted here that title to Lot 26 has never been issued, hence coal rights for this area are covered by leases 2951 and 2954.

In addition to the above coal lands, Cyprus Anvil is in possession of surface lease #1312, without coal rights, covering the area around the mine dry and the foreman's residence. This lease has expired owing to late payment of rent, and negotiations are presently underway to re-instate the lease.

Cyprus Anvil's coal holdings in the Carmacks area are summarised in Table 1.

1.5 Markets

a) Anvil Mine

The present consumption of coal at Anvil for plant heating and concentrate

TABLE 1 COAL HOLDINGS IN CARMACKS AREA

LOTS IN FEE SIMPLE, INCLUDING COAL RIGHTS

Five Fingers Area: Lot 4 - 159.76 acres
 Lots 5 & 6 - 320 acres

Carmacks Area: Lot 10* - 119.38 acres
 Lot 11** - 160.43 acres
 Lot 23 - 160 acres
 Lot 24 - 160 acres

* Including Parcel A, but excluding all of Lot 10 north of the Highway apart from Parcel A

** Including Parcel A.

COAL MINING LEASES

LEASE	AREA (ACRES)	STAKED BY	DATE RECORDED	STATUS	RENTAL PAID, OR ASSESSMENT FILED IN LIEU OF RENTAL, UNTIL-
2949	640	Anvil Mining Corp.	Dec. 14, 1965	Owned by Cyprus Anvil	Dec. 14, 1977
2950	548	"	Dec. 10, 1965	"	Dec. 10, 1977
2951	540	"	Dec. 10, 1965	"	Dec. 10, 1977
2952	640	"	Dec. 2, 1965	"	Dec. 2, 1977
2953	640	"	Dec. 14, 1965	"	Dec. 14, 1977
2954	640	"	Dec. 3, 1965	"	Dec. 3, 1977
2955	640	"	Dec. 13, 1965	"	Dec. 13, 1977
2956	640	"	Dec. 8, 1965	"	Dec. 8, 1977
2959	530	"	Mar. 9, 1969	"	Mar. 9, 1978
2963	640	Teslin Exploration	Jan. 1, 1974	On option to Cyprus Anvil	Jan. 1, 1982
2964	640	"	"	"	"
2965	640	"	"	"	"
2966	640	"	"	"	"
2967	640	"	"	"	"
2968	640	"	"	"	"
2969	640	"	"	"	"
2970	640	Cyprus Anvil	Mar. 24, 1976	Owned by Cyprus Anvil	Mar. 24, 1982
2971	640	"	"	"	"
2972	640	"	"	"	"
2973	640	"	"	"	"
2974	640	"	"	"	"
2975	40	"	June, 1976	Details still in hands of Mining Recorder	
2976	29	"	Sept. 1976	"	"
2977	59	"	"	"	"
2978	59	"	"	"	"
2979	33	"	"	"	"
2980	33	"	"	"	"

092031

drying is approximately 25,000 tons per year. At the present time, stock in hand and proven reserves within the present underground operation at Tantalus Butte are sufficient to supply this demand for a maximum of three years.

b) Other Potential Mine Customers

Cyprus Anvil has received overtures from Kerr-Addison Mines and Asarco-Silver Standard, indicating that these companies may be interested in purchasing coal for similar purpose for the Grum Deposit and the Minto Deposit respectively. Assuming that these developments will require similar tonnage to Anvil, there exists an immediate potential for the sale of an additional 50,000 tons per year. Before recent price-increases for fuel oil, Adamson (1976) calculated, on cost-per-B.T.U. basis, that the equivalent cost for oil (delivered at Carmacks) was about \$60 per ton of coal. Thus if coal can be mined at Carmacks with an operating profit of (say) \$10 to \$20 per ton, and sold at a price substantially below \$60 per ton, there exists an immediate potential for an annual profit of between \$500,000 and \$1 million.

c) Power Generation

Adamson (1976) has calculated that a thermal power station at Faro, installed with sufficient capacity to supply Faro townsite, the Anvil Mine and the Grum deposit, would require approximately 120,000 tons of coal per year.

As outlined above, present and potential demand exists for a minimum annual production of 195,000 tons of thermal coal. Work carried out as part of this study has indicated the possibility of proving substantial reserves of both thermal and metallurgical coal in the Carmacks area (see sections 3 and 4). If this should prove to be the case, there exists the possibility of attracting a railway through Carmacks to Faro, thus opening up foreign markets for coal and reducing the cost of shipping Anvil concentrates.

1.6 Previous Work

Coal has been known in the area since the earliest reconnaissances of G.M. Dawson (1888). The first shipments from the Tantalus Mine, at the northern edge of the southern lease group, were made in 1904. This mine produced more-or-less continuously until 1922, when the underground workings reached a

fault which cut off the coal. The Tantalus Butte Mine, at the southern edge of the northern lease group, was opened in 1922 and has produced from 1923 to 1938 and since 1947.

The first geological mapping of the Tantalus coal district was undertaken by D. D. Cairnes of the Geological Survey between 1905 and 1908, at a scale of 2 miles to the inch (Cairnes, 1910). Subsequently Bostock (1936) completed the Carmacks 4-mile sheet, and his memoir included a revised 2-mile map of the Tantalus district. The Carmacks 4-mile sheet has recently been up-dated by Tempelman-Kluit (1974).

The work of Cairnes (1910) established the presence of at least three coal seams beneath Tantalus Butte. Only the middle seam, which varies in thickness up to 14 feet ("the main seam") has been mined. The two other seams ("footwall seam" and "hanging wall seam") lie approximately 150 feet below and above the "main seam", appear to be thinner and less continuous, and may not be of commercial quality. Cairnes also described the presence of three seams in the old Tantalus Mine, but the upper and lower seams were separated from the middle seam by only seven and four feet of rock respectively. Only the two lower seams were mined.

A search of the files in the Vancouver office has revealed that very little geological work, apart from underground observations, was undertaken by previous owners. Copies of the following brief, early reports are available: Birch (1943), Dick (1947) and Ignatieff (1947). Mapping of the main entry of the Tantalus Butte Mine was undertaken by United Keno Hill, on behalf of its subsidiary Yukon Coal (Carmichael, 1953; Woodridge, 1954). Wade (1964) of Keno Hill undertook surface mapping of a small area immediately above the underground workings, and underground mapping of part of the main entry and raises 16 and 20.

During 1966 Archer, Cathro and Associates Ltd. were engaged by Anvil Mining Corporation to begin exploration of the southern lease group. This study consisted of field mapping and bulldozer trenching (Cathro 1966a, b, c). During this work a coal seam thirty feet wide was uncovered in two trenches 300 feet apart, approximately one mile southeast of the site of the portal

of the old Tantalus Mines. Four trenches cut in the intervening distance between the discovery trenches and the portal failed to penetrate overburden. Trenching was continued in this area the following year by M.O. Hampton of Anvil, who traced this seam for a further 2500 feet along strike to the southeast. Five airtrac drill holes positioned up to 100 feet down-dip from the seam outcrop indicated an average seam thickness of about 20 feet, and an average northeasterly dip of about 45° (Hampton, 1968).

In 1969, P.A. Hacquebard of the Geological Survey collected column samples from three sites within the Tantalus Butte Mine separated by faulting, and from an exposure near the portal of the old Tantalus Mine. Petrographic profiles of these samples suggested that all came from a single seam (Hacquebard, 1970;1972).

An attempt to locate the main seam at the surface, above and north of the Tantalus Butte underground workings, was made by Gondi (1971), using a geophysical method. Although not all his results appear to have survived, an examination of the available data indicate that this method (C.E.M.) enjoyed some success in locating approximately coal seam subcrops.

Following the geophysical survey, Jansons (1972) located the outcrop of the "hanging wall seam" by trenching above Tantalus Butte, and Jennings (1973a) traced the outcrop of the "main seam" for about 3200 feet northwards beyond the northern limit of the underground workings. In three of the 1973 trenches, thickening of the seam to as much as 53 feet was indicated (but see section 2.2 of this report). Limited underground mapping and diamond-drilling were also undertaken in 1972 and 1973 (Jansons, 1972; Jennings, 1973b).

During 1971 and 1973 Teslin Explorations were conducting preliminary exploration in the area, which included several diamond drill holes, and this work led to their staking several leases. One of their holes, sited 5000 feet southeast of the most southerly of the 1967 trenches containing coal, hit several thin coal seams at about 170 feet depth. Analysis of this coal indicated coking characteristics. Much of this information has been passed to Cyprus Anvil (Phillips, 1973).

1.7 Outline of Present Exploration

The first part of this study commenced in late May, 1976, with detailed field-mapping of both lease blocks, at a scale of 800 feet to the inch. Owing to the very limited amount of rock-exposure in most of the area, the mapping was completed in about a month. This was followed by bulldozer-trenching, in an attempt to increase the known strike-length of coal seams traced in 1966 and 1967 on the southern lease block (Cathro, 1966c; Hampton, 1968) and in 1973 on the northern lease block (Jennings, 1973a).

After work commenced on the northern block it became apparent that the geological structure was far more complicated than was anticipated, and hence most of the trenching carried out in this area involved deepening of the 1973 trenches. One new trench was cut to the north, but failed to hit coal.

On the southern block, some time was spent cleaning out and deepening some of the existing trenches, most of which were filled in. Three new trenches were cut to the north, each penetrating the coal seam. Working southwards, three of Hampton's trenches, which in 1967 failed to penetrate overburden, were deepened sufficiently to expose the coal. A fourth failed to cut through the overburden, which was frozen. Thus in this area the known strike length of the coal seam was extended from 2800 feet to 6600 feet.

Concomitant with the trenching on the north side, fifteen short airtrac holes were drilled in the small open pit begun the previous summer, in order to test the feasibility of extracting more coal. All of this work was completed by late July, 1976. (During August, approximately 20,000 tons of coal were extracted from the open pit in a 10 day mining operation).

Commencing in early August, an extensive diamond drilling programme was undertaken (completed in late October). On the north side, seven holes (total of 5,203 feet) were drilled to test the possible down-dip extent of the "main seam" between the present adit level and the level of the Yukon River. In addition two holes (total 667 feet) were drilled adjacent to the open pit in order to help define the geological structure, and hence to assess the possibility of extending the pit in 1977 or 1978 to maintain the supply of coal to the Anvil Mine.

On the south side, seven holes (total 4200 feet) were drilled adjacent to the existing and new trenches, in order to test the down-dip extent of this seam and to allow a calculation of indicated reserves to be made. These holes were spaced between 1,000 and 1,500 feet apart along the trend, for a total strike length of about 3,700 feet.

During late October D. MacQuarrie, working for M.G. Berretta, consulting geophysicist, on behalf of Kerr Addison Mines, visited the Carmacks area and experimented with several geophysical methods of locating coal seam subcrops. Indications are that these experiments were not too successful (Berretta, 1976).

Data collected during this work are presented in greater detail in section 2.

2. GEOLOGY

2.1 Regional Setting

The rocks of the Central Yukon Plateau include a basement of old metamorphic rocks, the Yukon Group, and early intrusives. This basement is overlain by areas of Mesozoic sediments; these sediments, and the basement, are cut by large and small bodies of intrusive rocks, largely of granitic composition and mainly of Mesozoic age. Large areas are covered by volcanics and sediments of Tertiary to Recent age, including glacial drift.

The area studied is underlain by sediments of Jurassic and Cretaceous age (Laberge Group and Tantalus Formation), Tertiary volcanics (Carmacks Group) and glacial drift. The Mesozoic sediments were deposited in the Whitehorse Trough, which during its early development was a typical eugeosyncline, but later developed more like an epieugeosyncline. According to Wheeler (1961), widespread emergence of the southern Yukon in the late Triassic produced an island arc system in the area of the Coast Range, with moderate uplands in the area of the Big Salmon Range. Vulcanism on the western side of the trough ceased in late Triassic time, resulting in deposition of marine limestone (Lewes River Group). The marine facies diminished in area during mid-Jurassic time, when coarse clastics overlapped westwards, covering formerly emergent areas (Laberge Group). By early Cretaceous time the Trough appears to have evolved into a shallow, non-marine basin, cut off from the remainder of the trough by uplift near the Yukon-British Columbia border. The clastic fragments vary from a mixed volcanic, granitic and sedimentary lithology in the early stages, to mainly granitic types near the end, and finally to chert pebbles (Tantalus Formation). This suggests a stable tectonic situation, slower rate of deposition, and a warm climate favouring chemical weathering, all favourable for coal swamp development.

The geology of the Carmacks area is shown on Map 1 (in pocket), which is modified after Bostock (1936), and the stratigraphic succession is summarised in Table 2.

According to Cairnes (1910) two coal-bearing horizons occur in the region: one within the Tantalus Formation (mined at Tantalus Butte) and one near the top of the Laberge Group (formerly mined at the old Five Fingers Mine).

TABLE 2
STRATIGRAPHIC SUCCESSION

AGE	UNIT	THICKNESS	LITHOLOGY
PLEISTOCENE AND RECENT	--	up to 200'	Glacial and Fluvio-glacial gravels, sands, silts, volcanic ash.
----- unconformity -----			
EOCENE OR YOUNGER	CARMACKS GROUP	up to 2,000'	Basaltic, andesitic, dacitic, trachytic and rhyolitic flows, breccia and tuffs.
----- unconformity -----			
LOWER CRETACEOUS and / or UPPER JURASSIC	TANTALUS FORMATION	up to 1,000'	Quartz- and chert- pebble conglomerate; minor sandstone, siltstone, mudstone and carbonaceous mudstone; coal seams.
----- unconformity -----			
LOWER AND MIDDLE JURASSIC	LABERGE GROUP	up to 9,000'	Upper Part: Sandstone and arkose, tuffaceous arkose; minor mudstone and coal; minor cobble conglomerate. Middle Part: Shale, cobble conglomerate. Lower Part: Cobble conglomerate, tuffaceous sandstone and arkose; minor shale.

092031

One of these horizons was also mined at the old Tantalus Mine; available evidence indicates that this was the upper (Tantalus Formation) horizon. At the commencement of this study, all available data (e.g. Cairnes, 1910; Bostock, 1936) indicated that all known and potential coal within the Carmacks lease areas was to be found in the upper horizon. Information obtained during this study indicates, however, that both horizons may be present, and the disparity between Map 1 and the map of Bostock (1936) reflects this new information.

2.2 Carmacks North

The geology of Carmacks North coal lease area is shown on Map 2 (1 inch = 800 feet). The ridge trending northwards from Tantalus Butte is underlain by Tantalus Formation conglomerates, which contain sandstone-mudstone-coal horizons. In simple terms these rocks, together with the underlying Laberge Group, form a homocline which dips west at 40° to 60° beneath the Carmacks Volcanics. This homocline is probably the northward continuation of the east limb of a syncline present on the southern lease block (See Map 1). Data from a few outcrops at the extreme northern end of the property could be interpreted to indicate that the homocline forms the west limb of an anticline, with a syncline adjacent to the east. Since there are no exposures over most of the eastern area this interpretation remains hypothetical, and owing to a thick cover of overburden can only be verified by geophysics or drilling.

2.2.1 Trenching

- Several of the existing trenches were cleaned out and deepened. Geological plans of those trenches containing rock exposures are presented in Appendix I. As a result of this work it became apparent that the geological structure in the central part of the property is more complicated than was anticipated, including high-angle strike-faulting with accompanying drag-folding, and northerly-trending folds. One new trench was cut in the north (Trench No. 27) but encountered thick, frozen overburden, and did not penetrate coal.

2.2.2 Open Pit Area

Detailed mapping and Airtrac drilling in the open pit prior to the 1976 mining operation led to the discovery that the pit itself occupies a narrow syncline (See Map 3). Further mapping, together with two diamond drill holes, subsequent to mining have indicated that this syncline plunges south at about 10° , is very tight, and is complicated by high-angle, dip-slip strike-faulting. The syncline extends for several hundred feet to the south, and may be accompanied on the west by an anticline (See Map 4).

2.2.3 Diamond Drilling

Nine holes were drilled on the northern block; seven of these are plotted on Sections A to D, and the two in the open pit area are plotted on Sections on Map 3. Drill hole and section locations are shown on Map 4, and lithologic logs are presented in Appendix II.

Four holes were sited to test the down-dip extent of the "main seam" beneath the present underground workings at Tantalus Butte. On Section A, approximately 600 feet south of the Main Entry adit, hole C-76-15 penetrated this seam in the expected position at a depth of 275.5 feet. This indicates a westerly dip of about 50° and a true seam thickness of about nine feet. About 140 feet (stratigraphically) above the main seam a carbonaceous mudstone horizon was intersected, and this probably represents the "hanging wall seam".

On Section B, approximately 550 feet north of the adit, hole C-76-11 intersected the main seam at a depth of 690.5 feet. This indicates a westerly dip of about 53° and a true seam thickness of 5 feet. About 145 feet above and 135 feet below (stratigraphically) carbonaceous mudstone horizons were intersected, and these probably represent the hanging wall and footwall seams respectively. In addition, a thin coal seam was penetrated near the top of hole C-76-11, and this is evidently a previously unknown seam. A coaly mudstone horizon was found outcropping at the top of Tantalus Butte near the site of C-76-11, and

this is evidently the new seam.

On Section C, approximately 1,600 feet north of the adit, two holes were drilled beneath a faulted zone within the underground workings, where it is known that the main seam is sliced up by faulting. The steeper of the two holes, C-76-2, is interpreted to have intersected the main seam at 628 feet, where the seam is apparently split by a rock lens about 10 feet thick. Coal seams were intersected about 200 feet above and 125 feet below (stratigraphically) the main seam and these are presumed to be the hanging wall and footwall seams respectively. On this section both appear to consist predominantly of coal rather than of carbonaceous mudstone as on Sections A and B. It is known from surface trenching (Trench No. 2) that the hanging wall seam lies 205 feet above the main seam at this location. In hole C-76-1 the hanging wall seam was intersected at 385.5 feet, below which three seams were penetrated. This hole evidently passed through a complex fault zone, and all three lower intersections are interpreted to be faulted repetitions of the main seam. Thus in this area the main seam is present between main entry level and river level, but not as a single, continuously-dipping horizon. The new seam was intersected near surface in both C-76-1 and C-76-2.

Three holes were drilled on Section D, about 110 feet north of the present northward limit of the main entry, in an attempt to elucidate the structure and assess the feasibility of an continued northward advance of the workings. Several alternative structural hypotheses are possible. The favoured hypothesis indicates that in hole C-76-5 the new seam was hit at 47 feet, three hanging wall seams at 438 feet, 477 feet and 484 feet, and the main seam at 881 feet. The main seam appears to be accompanied by two thin riders at 841 feet and 845 feet. In hole C-76-3 it is interpreted that the main seam with four riders was intersected between 291 feet and 363 feet with a thin lower seam at 442 feet. A similar situation was encountered in hole C-76-14, where reversed dips were apparently encountered. It is interpreted that holes

C-67-3 and C-76-14 are separated from the end of the main entry and hole C-76-5 by a steeply-dipping oblique reversed fault with a southerly downthrow of about 300 feet. A thick muddy layer at 21-26 feet in C-76-3 may indicate that the fault was crossed near the top of this hole. A thin coaly horizon at 411.5 feet in C-76-14 may be the footwall seam.

The main coal seam has been traced at the surface more-or-less continuously from the adit northwards for about 7,000 feet. The geology of this area is shown at a scale of 200 feet to the inch on Map 4.

At the southern end a strike length of about 3,600 feet has been mined between main entry level (about 2,050 feet A.S.L.) and the surface. In the central portion of the mine and north of the "north cross-cut" (between 12,600 N and 13,100 N and north of 14,600 N respectively) difficulty was experienced in mining because of the presence of fault zones. Information from drilling has indicated that the main seam probably extends down dip to river level for most of the length of the underground workings, but that these fault zones also extend below main entry level. Hence a lower adit would experience the same difficulties at the same locations, but in a predictable fashion.

In the area immediately north of the end of the main entry the structure becomes very complicated, and indications are that a continued northward advance underground would not be possible. It is probable that the syncline in the open pit area extends at least as far south as Section D, accounting for the easterly dips interpreted in hole C-76-14. It is also probable that the syncline is accompanied on the west by an anticline, resulting in a resumption of westerly dips on the main seam north of the open pit area. Relative positions of the counter and main entry on the limbs of these folds, which have been complicated by faulting, appears to account for the reversal of dips and difficulty of mining north of the north cross-cut.

North of the open pit area the main seam has been traced, dipping west, over a strike length of about 1,400 feet. It is possible that in this area the syncline levels and reverses plunge (towards the north), to account for the coal exposed in the east end of Trench 16 (See Map 3).

A new seam, stratigraphically above the three known seams, was discovered during this study. Hereinafter all seams are described numerically from the highest to the lowest, as follows:

- No. 1 Seam - New Seam
- No. 2 Seam - Hanging Wall Seam(s)
- No. 3 Seam - Main Seam (+ riders)
- No. 4 Seam - Footwall Seam

It has been interpreted that the seam exposed in the open pit is No. 3 Seam, although this has not been conclusively proven. If this is correct, it is apparent that throughout the area No. 3 Seam is consistently the thickest, the most persistent and has the best quality of the four seams.

Comparing Sections A to D it is apparent that the thicknesses of rock intervening between the coal seams increases northwards, and this may be taken as an indication that the Tantalus Formation itself thickens in this direction. If this is the case, it can be expected that the coal seams may also thicken northwards, beneath the Carmacks volcanics.

2.3 Carmacks South

The geology of Carmacks South coal lease area is shown on Map 5 (1 inch = 800 ft). Owing to the very limited exposure over most of the area, Map 5 and the following discussion remain open to alternative interpretation.

The ridge trending southeast from the site of the old Tantalus Mine is underlain by Tantalus Formation conglomerates. Beneath the conglomerates to the west are coarse, white feldspathic and (locally) calcareous sandstones of the Laberge Group. The known coal-mudstone horizon occurs between the two, apparently within the top 100 feet of the Laberge. The Laberge and Tantalus rocks are folded by an anticline-syncline pair, with the coal seam lying on the northeasterly-dipping western limb of the syncline. The syncline is apparently locally overturned towards the northeast, particularly at depth; the eastern limb has not been located, and may be present beyond the eastern limit of the property. The anticline brings Tantalus conglomerates to outcrop on its western limb in the cliffs east of the Klondike Highway,

but so far coal has not been found here. The very limited outcrop data are interpreted to indicate a gentle southerly plunge, with outcrop of the synclinal closure within the south eastern part of the property. Owing to a thick overburden cover this can only be verified by geophysics or drilling.

2.3.1 Trenching

Several of the existing trenches were cleaned out and deepened to expose the coal. Three new trenches were cut to the north at approximately 600 foot intervals, each penetrating coal. Working southwards, three of the 1967 trenches which failed to penetrate overburden were deepened sufficiently to expose the coal. A new trench about 600 feet to the southeast failed to cut through the overburden, which was frozen from surface. Thus the known strike length of coal in trenches was extended from 2,800 feet to about 6,600 feet. Geological plans of those trenches containing exposed rock are presented in Appendix III.

Trenching in this area proved time-consuming, and hence expensive, owing to the cover of frozen overburden. Also disturbance and partial melting of the permafrost resulting from the trenching caused considerable surface damage. For these reasons the writer recommends against further trenching in this area.

2.3.2 Diamond Drilling

Seven holes (total of 4,200 feet) were drilled adjacent to the existing and new trenches, in order to test the down-dip extent, thickness and quality of the known coal seam. These holes were spaced between 1,000 and 1,500 feet apart along strike, for a total strike length of about 3,700 feet. Locations of drill holes and section lines are shown on Map 5, and lithologic logs are presented in Appendix IV.

Holes on Section A, the furthest north, were the last to be drilled. Hole C-76-13 was sited on the assumption that the seam dips west, as on the other sections. However, it was found that the bedding was essentially

vertical or dipped steeply west, indicating overturning. Hole C-76-14 was then sited west of the seam outcrop, inclined to the northeast, and the coal was intersected at 155 feet. In this hole the top of the seam lies approximately 10 feet stratigraphically below the base of the lowest typical Tantalus pebble conglomerate.

On Section B, hole C-76-4 intersected a thick seam from 261 feet to 297 feet, indicating a true thickness of about 25 feet, with a thin seam below. The top of the thick seam lies approximately eight feet stratigraphically below the base of the lowest Tantalus conglomerate. In hole C-76-7 no coal was found, but a carbonaceous mudstone horizon was intersected beneath the lowest Tantalus conglomerate, and this may be the lateral equivalent of the coal seam.

On Section C, hole C-76-6 intersected five coal seams with an aggregate true thickness of about 60 feet. The top of the highest seam lies approximately 40 feet stratigraphically below the base of the Tantalus. In C-76-10, two thin muddy coal bands were intersected at 579 feet, immediately below the conglomerate. At 660 feet this hole re-entered Tantalus conglomerates, and examination of the core suggests reversal of dip direction below about 610 feet, indicating overturning. Between holes C-76-6 and C-76-10 the coal seams thin rapidly down-dip, either as a result of reduced depositional thickness or as a result of pre-Tantalus erosion, or both.

On Section D, hole C-76-12 intersected a coal seam with a true thickness of about seven feet at a depth of 239 feet. The top of this seam lies approximately 80 feet stratigraphically below the base of the lowest typical massive Tantalus conglomerate. A few pebbly horizons above the seam may represent a transition between Laberge lithologies and Tantalus lithologies. The sandstone below the coal locally contains rounded cobbles of acid igneous

rocks, which are a characteristic feature of the Laberge Group.

Section E shows holes 71-2 and 73-1, drilled by Teslin Explorations. These holes were drilled to the east, and have been projected approximately on to a NE cross-section. The holes intersected two thin seams at about 172 feet and 217.5 feet. Two interpretations of bedding measurements are possible; the seams may dip either 55° to the southwest or 5° to the northeast. Information from nearby outcrops favours a southwesterly dip at this location. The top of upper seam lies approximately 110 feet stratigraphically below the Tantalus conglomerate at the top of the hole. The writer has examined the core from 73-1, and noted that the lithologies below the conglomerate do not resemble either Tantalus or Laberge lithologies seen at outcrop, in trenches or in drill holes on the southern property. They do, however, resemble Tantalus lithologies seen in the area around the open pit on the northern property. Therefore it cannot be determined whether the seams in the Teslin holes belong to the same horizon found in the other holes in this area, or belong to an upper horizon within the Tantalus. The writer is inclined to believe the latter.

2.3.3 Geophysics

During late October, D. MacQuarrie, working for M. G. Berretta on behalf of Kerr Addison Mines, visited the property and experimented with several geophysical methods of locating coal seam outcrops along lines adjacent to four of the trenches. These methods were V.L.F. electromagnetic (EM 16), total count scintillometer, anomalous vertical field magnetometer, frequency domain induced polarization and resistivity. Indications are that these experiments were not too successful, although Berretta (1976) suggests that V.L.F. - E.M. may be useful when coupled with scintillometer or magnetometer surveys.

Data from the 1976 programme are interpreted to indicate that the known coal horizon on Carmacks South is within the uppermost 100 feet of the Laberge,

rather than within the Tantalus as on Carmacks North. In addition, it is indicated that the Tantalus Formation is in unconformable contact with the underlying Laberge. Hacquebard (1972) has postulated from petrographic studies that samples from the seam mined in the old Tantalus Mine and from the main seam at Tantalus Butte probably came from the same seam. Consequently, it is probable that the horizon trenched on Carmacks South is not the same horizon as that formerly mined in the old Tantalus Mine but is some distance stratigraphically below it. It is therefore likely that the fault which cut off the coal in the old Tantalus Mine, resulting in its closure in 1922, is a major structure with a southerly downthrow of several hundred feet. This structure has coincidentally brought the outcrop of the lower horizon south of the fault to lie approximately along trend with the upper horizon north of the fault.

Examination of Map 1 shows that the Laberge coal horizon on Carmacks South is approximately along trend with the Laberge horizon formerly mined at the Five Finger Mine. At the latter locality the coal horizon is about two to three hundred feet below the base of the Tantalus Formation (Cairnes, 1910).

2.4 General Inferences

The most important single result of the 1976 exploration programme has been the discovery that both coal horizons described by Cairnes (1910) appear to be present within the Carmacks coal leases. The lower horizon, close to the top of the Laberge Group, is present beneath the trenched and drilled area on Carmacks South, and the upper horizon, within the Tantalus Formation, occurs beneath Tantalus Butte and near the old Tantalus Mine.

The potential therefore exists for locating the lower horizon on Carmacks North and the upper horizon beneath the remainder of Carmacks South. If the lower horizon is present on the northern property it should outcrop just below the Laberge/Tantalus contact in the low ground to the east of Tantalus Butte. If the upper horizon is present on the southern property it should outcrop on both limbs of the syncline, east of the known seam outcrop, and on the western limb of the anticline, near the Klondike Highway south of

Carmacks. This upper horizon may have been penetrated in Teslin Exploration's holes 71- 2 and 73-1.

The potential also exists for locating thick coal seams within other Laberge outcrops in the vicinity, many of which have only been cursorily examined in the past.

3. COAL QUALITY

3.1 Carmacks North

A selection of the analytical data available prior to commencement of this study is shown in Table 3. In general, these data indicated that coal from Carmacks North is high-volatile bituminous.

During the 1976 programme coal from selected drill hole intersections was sampled in five foot lengths, a channel sample was taken across the open pit, and a representative sample was taken from the stockpile of coal removed from the open pit in August. Analytical work included proximate analysis (moisture, ash, volatile matter, fixed carbon), sulphur, calorific value (in B.T.U. /lb.), coking ability (free-swelling index, F.S.I.), and washability and flotation tests. Five foot core samples were combined as composites to give an "average" analysis of individual seams (see Figure 3). Seam composites were then float-sunk to yield approximately 8% ash in the floats, in order to simulate washing the coal, and the floats analysed. Complete analytical data are presented in Appendix V and summarized in Table 4.

A good method for comparing coal quality data is to determine rank, which is a function of the ratio of fixed carbon to volatile matter on an ash-free basis and varies with depth of burial. Ranks of the analysed composites according to A.S.T.M. specifications are shown in Table 5. Rank is not a criterion for coking ability, but all coking coals fall in the bituminous category. With one exception all composites from Carmacks North are bituminous coals, but all lack coking characteristics.

No. 1 Seam

Only a single composite from the newly-discovered seam was analysed, number T-6 from hole C-76-5. This composite yielded very high moisture and ash values, and low fixed carbon and calorific values. It could not be washed to 8% ash. This coal is subbituminous, and in fact is barely above lignite rank. These data indicate that No. 1 seam is not a commercial thermal coal at this time.

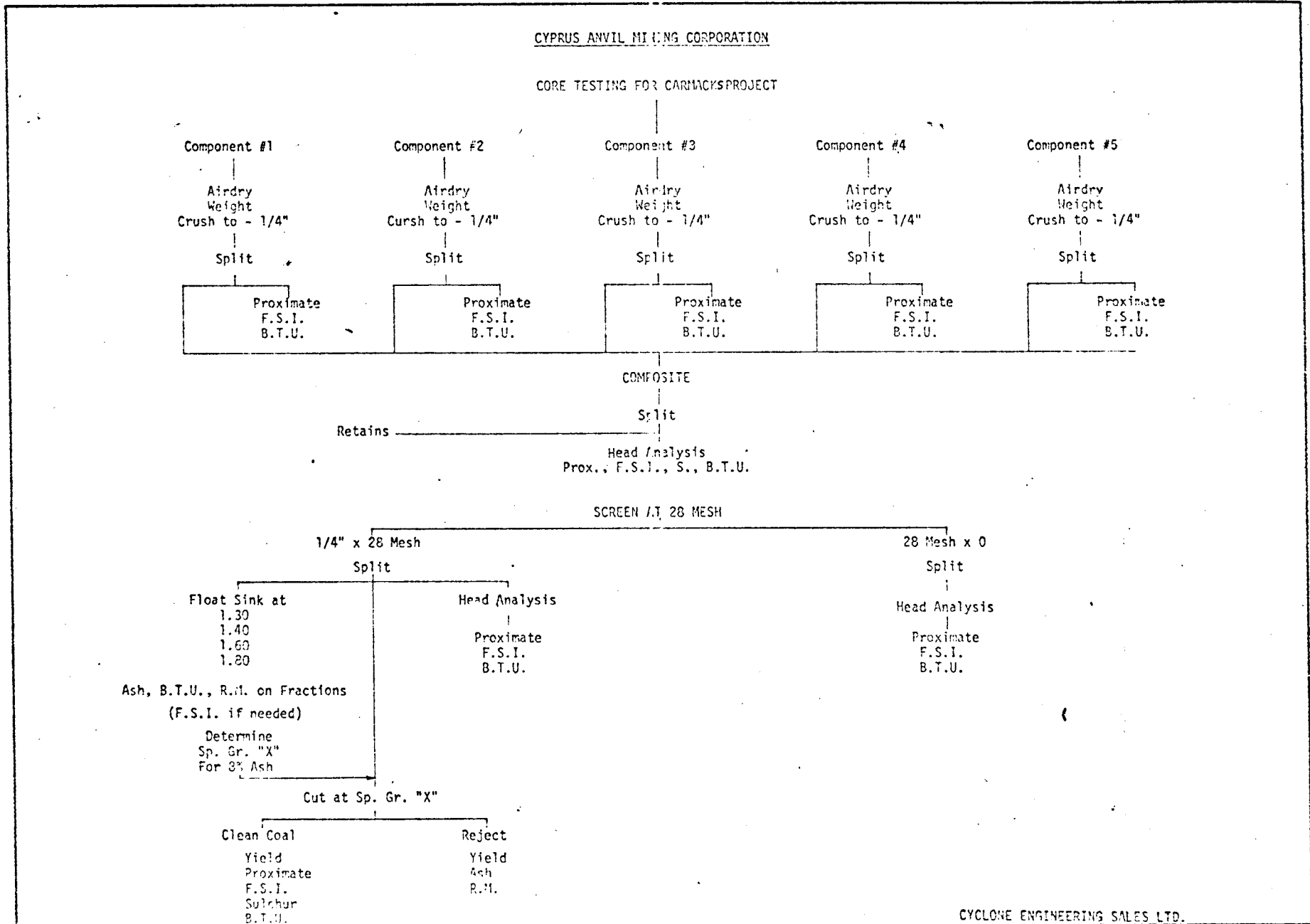
TABLE 3

SUMMARY OF ANALYSES PRIOR TO 1976 - CARMACKS NORTH

Seam	Type of Analysis	Moisture %	Ash %	Volatile %	Fixed Carbon %	Sulphur %	BTU/lb	F.S.I.	Source of Data
H. W.	As Received	13.64	2.69	31.83	51.84	-	-	-	Cairnes, 1910; p. 53
Main	"	16.32	9.83	31.72	42.13	-	-	-	"
F. W.	"	12.87	5.90	31.72	49.51	-	-	-	"
Main	As Received	6.1	8.9	31.2	53.8	-	11,800	-	Bostock, 1936; p. 61
	Dry Basis	-	9.5	33.2	57.3	-	12,500	-	"
Main	As Received	5.6	11.3	33.7	49.4	-	11,840	-	"
	Dry Basis	-	12.0	35.7	52.3	-	12,550	-	"
Main	As Received	6.6	10.9	31.3	51.2	0.4	10,940	-	Dick, 1947; p.9, #28,834
Main	"	4.2	18.7	29.9	47.2	0.3	10,510	-	" #28,835
Main	"	4.9	20.7	29.3	45.1	0.3	10,040	-	" #28,836
Main	"	3.8	11.0	32.0	53.2	0.3	11,980	-	" #28,837
Main	"	4.2	13.4	30.1	52.3	0.3	11,330	-	" #28,838
Main	"	4.7	10.9	31.5	52.9	0.3	11,630	-	" #28,839
Main	"	3.5	9.8	31.0	55.7	0.5	12,250	-	" #28,840
Main	"	6.2	16.7	29.9	47.2	0.4	10,520	-	" #28,841
Main	As Received	3.0	9.6	35.1	52.3	-	12,200	1	Research Council of
	Dry Basis	-	9.9	36.1	54.0	-	12,580	-	Alberta-April 11, 1960
Main	As Received	4.0	13.5	31.7	50.8	0.9	11,440	0	Fuels Div. Dept. of
	Dry Basis	-	14.1	33.0	52.9	0.9	11,920	-	Mines-Oct. 17, 1966.

092031

FIGURE 3



092031

TABLE 4 SUMMARY OF ANALYSES, 1976 - CARMACKS NORTH

Seam No.	Hole No.	Footage	Sample No.	Lab. Composite No.	Type of Analysis**	Moisture %	Ash %	Volatiles %	Fixed Carbon %	Sulphur %	BTU/lb	F.S.I.	Float-Sink for 8% Ash S.G.	Yield %
1	C-76-5	47.0-53.5 53.5-60.0 Composite Composite	C-19- C-20 T-6 T-6	T-6 T-6 T-6 T-6	A. R. A. R. A. R. F - S	10.06	32.88	25.77	31.29	-	5,420	-		
						10.54	35.77	26.92	26.77	-	5,340	-		
						10.37	35.74	26.94	26.95	0.48	5,350	-		
						11.43	12.60	38.00	37.97	0.52	7,800	-	1.60	28.62
2	C-76-1	386.0-394.0	C-3 T-1	T-1 T-1	A. R. F - S	4.87	11.90	33.02	50.21	0.66	11,250	-		
						4.35	7.30	35.69	52.66	0.66	12,050	-	1.80	92.79
2	C-76-2	411.0-416.0	C-6	A-1	A. R.	1.81	12.86	32.57	52.76	-	12,350	-		
2	C-76-5	438.0-447.0	C-21	A-2	A. R.	1.95	30.43	28.87	38.75	-	9,500	1		
3	C-76-1	668.5-674.5 674.5-681.5 Composite Composite	C-4 C-5 T-2 T-2	T-2 T-2 T-2 T-2	A. R. A. R. A. R. F - S	1.48	14.15	27.83	56.54	-	12,210	½		
						1.59	13.68	28.39	56.34	-	12,230	1		
						1.50	14.59	28.35	55.46	0.52	12,220	1		
						1.53	8.17	29.53	60.77	0.60	13,210	1	1.54	82.99
73R	C-76-3	311.0-320.0	C-8 T-3	T-3 T-3	A. R. F - S	1.38	62.43	17.57	18.62	-	4,680	-		
						1.68	7.97	34.47	55.98	0.80	13,260	1½	1.41	7.60
3	C-76-3	350.0-356.5 356.5-363.0 Composite Composite	C-10 C-11 T-4 T-4	T-4 T-4 T-4 T-4	A. R. A. R. A. R. F - S	1.70	14.29	29.70	54.31	-	12,050	½		
						1.54	19.25	28.09	51.12	-	11,000	½		
						1.68	16.70	29.23	52.39	0.45	11,380	½		
						2.00	8.18	30.52	59.30	0.40	12,970	1	1.62	73.50
3	C-76-5	891.0-896.0 896.0-901.0 901.0-906.0 906.0-911.0 911.0-915.0 Composite Composite	C-38 C-39 C-40 C-41 C-42 T-11 T-11	T-11 T-11 T-11 T-11 T-11 T-11 T-11	A. R. A. R. A. R. A. R. A. R. A. R. F - S	1.16	22.75	30.69	45.40	-	10,600	1		
						1.38	13.98	32.96	51.68	-	11,760	1		
						1.30	15.44	32.66	50.60	-	11,460	1		
						1.25	11.43	30.69	56.63	-	12,320	1		
						1.19	19.64	29.35	49.82	-	11,190	1		
						1.28	16.77	31.59	50.56	0.62	11,380	1		
1.76	7.90	32.42	57.92	0.63	13,300	1	1.53	65.00						
3	Open Pit Channel	C-1	C-1 C-1	C-1 C-1	A. R. F - S	2.31	8.65	30.21	58.83	0.50	12,570	½		
						2.19	8.20	30.15	59.46	0.46	12,620	½	-	100.00
3	Open Pit Stockpile	C-2	C-2 C-2	C-2 C-2	A. R. F - S	2.49	15.20	29.89	52.42	0.40	11,390	-		
						2.24	7.95	30.38	59.43	0.48	12,709	-	1.66	83.40

* 1 = New Seam
2 = "Hanging wall seam"
3 = "Main Seam"
R = Rider

** A. R. = As received, air-dried, crushed to ½" topsize.
F - S = Float-sink of ½" x 28 mesh fraction for 8% ash in floats.

TABLE 5

CLASSIFICATION OF CARMACKS NORTH COAL BY RANK (A.S.T.M. SPECIFICATIONS)

Seam No.	Composite No.	Moisture % (raw coal)	Ash % (raw coal)	Fixed Carbon % (raw coal)	BTU/lb (raw coal)	Fixed Carbon % (dry, ash-free)	BTU/lb (moist, ash-free)	A.S.T.M. RANK
1	T - 6	10.37	35.74	26.95	5,350	49.6	8,388	Subbituminous C
2	T - 1	4.87	11.90	50.21	11,250	60.0	12,865	High Volatile C Bituminous
2	A - 1	1.81	12.86	52.76	12,350	61.8	14,173	High Volatile A Bituminous
2	A - 2	1.95	30.43	38.75	9,500	57.3	13,655	High Volatile B Bituminous
3	T - 2	1.50	14.69	55.46	12,220	66.0	14,412	High Volatile A Bituminous
3R	T - 3	1.38	62.43	18.62	4,680	51.5	12,457	High Volatile C Bituminous
3	T - 4	1.68	16.70	52.39	11,380	65.4	13,899	High Volatile B Bituminous
3	T - 11	1.28	16.77	50.56	11,380	61.4	13,774	High Volatile B Bituminous
3	C - 1	2.31	8.65	58.83	12,570	66.4	13,835	High Volatile B Bituminous
3	C - 2	2.49	15.20	52.42	11,390	63.5	13,432	High Volatile B Bituminous

No. 2 Seam

Three composites from the "hanging wall seam" were analysed. Composite A-2 contains a high ash-content (30%), but the other two yielded very similar results to those from the main seam (see below). All three are high-volatile bituminous. As indicated in Section 2.2.3, it is probable that this seam passes laterally into carbonaceous mudstone to the south; the fact that A-2 is the most northerly of the samples tested may indicate that this happens to the north also. In some locations, given sufficient seam thickness and a favourable mining situation, No. 2 seam could yield commercial thermal coal equal in quality to that from No. 3 seam.

No. 3 Seam

Five composites from the "main seam", and one rider, were analysed. The rider (T-3) yielded an ash value of 62%, which is indicative of a very carbonaceous mudstone rather than coal, and therefore is of no commercial value. Composites from the main seam are all high-volatile bituminous, have a range of ash-contents of 8.7% to 16.8%, and calorific values in the range of 11,380 to 12,570 B.T.U/lb in the raw state. It should be noted that the channel sample from the open pit (C-1) contained 8.7% ash while the sample from the stockpile (C-2) contained 15.2% ash, thus some waste mudstone was probably introduced into the coal during mining.

Washing coal from No. 2 and No. 3 seams to 8% ash did not significantly improve calorific values, hence no real advantage would be gained from installation of preparation facilities. These data indicate that Carmacks North coal is a fairly good-quality thermal coal which can be burned as mined, provided that boiler grates can be suitably designed to handle ash-content up to about 17%.

3.2 Carmacks South

A selection of the analytical data available prior to the commencement of this study is shown in Table 6. According to Cairnes (1910) samples from the old Tantalus Mine produced a "firm coherent coke". Samples from Teslin Exploration's drill hole 73-1 gave high F.S.I. values ($5\frac{1}{2}$ to 9), but with low yields.

Phillips (1973) postulated that the high proportion of carbonate minerals within the coal may have released carbon dioxide on coking, thus artificially increasing F.S.I. values. The samples were then treated with hydrochloric acid and the coking tests repeated, giving rather lower F.S.I. values. However, other data are available which indicate that carbonate-content does not affect F.S.I., and that many types of coal show a reduction of F.S.I. when treated with aqueous acid or salt solutions (Brian Wong, Cyclone Engineering; personal communication 1977). Hence it may be that the F.S.I. values obtained in 1973 are real, or that some of the inert components of the coal were lost during coring.

Complete analytical results obtained on six composites from two holes in 1976 are presented in Appendix VI and summarized in Table 7, and A.S.T.M. rank designations are shown in Table 8. Tests performed were identical to those performed on Carmacks North coal (see Figure 3).

In general, Carmacks South coal proved to be somewhat higher in ash (22% to 51%) and lower in calorific values (6,290 to 11,420 B.T.U./lb.) in the raw state than samples from No. 2 and No. 3 seams on Carmacks North. Washing these composites to 8% ash significantly improved calorific values to a fairly uniform 14,000 B.T.U./lb., but with low yields (14% to 55%). Thus compared with Carmacks North coal, in the raw state this coal is of significantly poorer quality, but when washed to 8% ash is of significantly better quality.

Three composites are high-volatile bituminous while the other three are medium-volatile bituminous, indicating that Carmacks South coal is of slightly higher overall rank than Carmacks North coal. Hacquebard (1972) postulated that this difference may have been brought about by an increased thickness of the overlying Carmacks volcanics on the southern property. However, the writer is inclined to believe that the higher rank of Carmacks South coal reflects its lower stratigraphic position (uppermost Laberge Group) compared with the Carmacks North coal (Mid-Tantalus Formation).

One very interesting feature of the analytical data (Table 7) is that some composites have good coking characteristics (F.S.I. 4 to $6\frac{1}{2}$) in the raw state and others do not (F.S.I. $\frac{1}{2}$). Washing the composite to 8% ash significantly improved F.S.I. values for the coking varieties (to a range of $6\frac{1}{2}$ to $8\frac{1}{2}$), but only slightly improved F.S.I. values for the non-coking varieties (to $1\frac{1}{2}$).

TABLE 6

SUMMARY OF ANALYSES PRIOR TO 1976 - CARMACKS SOUTH

Seam	Type of Analysis	Moisture %	Ash %	Volatiles %	Fixed Carbon %	BTU/lb	F.S.I.	Source of Data
Bottom	As Received	0.75	20.43	23.61	55.21	-	-	Cairnes, 1910; p. 52
Middle	"	0.76	15.90	24.74	58.60	-	-	"
Top	"	0.82	8.03	25.12	66.03	-	-	"
Bottom	Dry Basis	-	16.2	27.8	56.0	12,220	-	Cairnes, 1910; p. 63
	Washed, Dry Basis	-	12.7	28.1	59.2	12,980	-	"
Middle	Dry Basis	-	19.2	26.7	54.1	11,360	-	"
	Washed, Dry Basis	-	14.0	25.7	60.3	12,730	-	"
Top	Dry Basis	-	17.0	25.0	58.0	12,060	-	"
	Washed, Dry Basis	-	13.8	26.3	59.9	12,800	-	"
Hole 73 - 2								
180.0 -								
190.0'	As Received	0.48	37.06	19.37	43.09	-	5½	Phillips, 1973
192'	"	0.51	35.24	20.60	43.65	-	9	"
195.6'	"	0.29	1.51	28.71	69.78	-	6½	"
211.6'	"	0.54	11.64	26.49	61.17	-	9	"

092031

TABLE 7

SUMMARY OF ANALYSES, 1976 - CARMACKS SOUTH

Hole No.	Footage	Sample No.	Lab. Composite No.	Type of Analysis*	Moisture %	Ash %	Volatiles %	Fixed Carbon %	Sulphur %	BTU/lb	F.S.I.	Float-Sink for 8% Ash	
												S.G.	Yield %
C-76-4	261.0-266.0	C-12	T --5	A. R.	0.84	16.24	22.56	60.36	-	12,050	1		
	266.0-271.0	C-13	T - 5	A. R.	0.94	26.35	23.17	49.54	-	9,980	1		
	271.0-276.0	C-14	T - 5	A. R.	0.99	11.23	20.23	67.55	-	13,000	½		
	276.0-281.0	C-15	T - 5	A. R.	0.85	28.51	19.11	51.53	-	9,970	1		
	281.0-286.0	C-16	T - 5	A. R.	0.80	21.57	21.58	56.05	-	11,110	½		
	286.0-291.0	C-17	T - 5	A. R.	0.78	21.63	20.07	57.52	-	11,020	1		
	291.0-297.0	C-18	T - 5	A. R.	0.76	28.92	21.20	49.16	-	9,650	½		
	Composite		T - 5	A. R.	0.81	23.06	21.46	54.67	0.63	11,040	½		
	Composite		T - 5	F - S	0.91	7.81	22.11	69.17	0.75	14,000	1½	1.46	54.96
C-76-6	294.0-299.0	C-24	T - 7	A. R.	0.83	19.49	22.56	57.12	-	12,180	7		
	299.0-304.5	C-25	T - 7	A. R.	0.94	23.75	21.80	53.51	-	10,840	4½		
	Composite		T - 7	A. R.	0.93	21.91	21.84	55.32	0.53	11,420	6		
	Composite		T - 7	F - S	0.93	8.07	22.26	68.74	0.67	14,080	6½	1.46	52.00
C-76-6	308.0-313.0	C-26	T - 8	A. R.	0.51	27.71	21.02	50.76	-	10,750	7		
	313.0-318.0	C-27	T - 8	A. R.	0.50	29.86	20.97	48.67	-	10,180	7		
	318.0-323.0	C-28	T - 8	A. R.	0.54	27.94	21.98	49.54	-	10,600	7½		
	323.0-328.0	C-29	T - 8	A. R.	0.53	30.54	21.03	47.90	-	10,160	5½		
	328.0-333.0	C-30	T - 8	A. R.	0.56	32.68	19.81	46.95	-	9,720	5½		
	333.0-339.0	C-31	T - 8	A. R.	0.56	28.17	21.88	49.39	-	10,500	7		
	Composite		T - 8	A. R.	0.54	29.00	22.12	48.34	0.69	10,270	6½		
	Composite		T - 8	F - S	0.57	7.98	24.49	66.96	0.78	14,200	8	1.40	39.27
C-76-6	352.0-357.0	C-32	A - 3	A. R.	0.49	27.02	21.26	51.23	-	10,710	6½	-	-
C-76-6	363.0-368.0	C-33	T - 9	A. R.	0.52	52.52	17.16	29.80	-	6,390	2½		
	368.0-373.0	C-34	T - 9	A. R.	0.46	19.01	22.82	57.71	-	12,510	7½		
	373.0-378.0	C-35	T - 9	A. R.	0.41	42.07	17.77	39.75	-	7,830	2		
	Composite		T - 9	A. R.	0.46	40.35	18.04	41.15	0.74	8,310	4		
	Composite		T - 9	F - S	0.45	7.96	23.77	67.82	0.80	14,310	8½	1.46	30.00
C-76-6	393.0-398.0	C-36	T - 10	A. R.	0.51	62.89	15.60	21.00	-	4,300	-		
	398.0-403.0	C-37	T - 10	A. R.	0.67	43.70	17.36	38.27	-	7,450	½		
	Composite		T - 10	A. R.	0.58	51.13	16.55	31.74	0.65	6,290	½		
	Composite		T - 10	F - S	0.83	7.96	21.13	68.08	0.74	14,010	1½	1.43	14.00

(*) A. R. = As received, air dried, crushed to ¼"

F - S = Float-sink of ¼" x 28 mesh fraction for approximately 8% ash in float.

TABLE 8

CLASSIFICATION OF CARMACKS SOUTH COAL BY RANK (A.S.T.M. SPECIFICATIONS)

Composite No.	Moisture % (raw coal)	Ash % (raw coal)	Fixed Carbon % (raw coal)	BTU/lb (raw coal)	Fixed Carbon % (dry, ash-free)	BTU/lb (moist, ash-free)	F.S.I	A.S.T.M. RANK	
T - 5	0.81	23.06	54.67	11,040	71.6	-	½	Medium Volatile	Bituminous
T - 7	0.93	21.91	55.32	11,420	71.5	-	6	Medium Volatile	Bituminous
T - 8	0.54	29.00	48.34	10,270	68.3	14,606	6½	High Volatile A	Bituminous
A - 3	0.49	27.02	51.23	10,710	70.7	-	6½	Medium Volatile	Bituminous
T - 9	0.46	40.35	41.15	8,310	69.1	-	4	Medium Volatile	Bituminous
T - 10	0.58	51.13	31.74	6,290	65.3	13,040	½	High Volatile B	Bituminous

Particularly remarkable is the fact that composites T-5 and T-7, from holes about 1,200 feet apart, have strikingly similar proximate analyses but differ markedly in F.S.I. ($1\frac{1}{2}$ and $6\frac{1}{2}$ respectively at 8% ash). This may indicate that while the chemical components of the coal are identical the respective proportions of the coal macerals present may be quite different. Also of note is the fact that four of the five seams intersected in hole C-76-6 are coking while the fifth (and lowest) is non-coking. Thus the data do not permit a direct correlation of the seam in C-76-4 with any of the five seams in C-76-6, but the proximate analyses indicate that T-5 and T-7 may be laterally equivalent. Petrographic analysis may shed some light on these problems, and such work is planned for 1977.

The above information indicates that both thermal and coking coals are present on Carmacks South. Washing the coking varieties to 8% ash produced what may well be a good quality metallurgical coal. However, the yields on washing are rather low (30% to 52%), hence production of metallurgical coal would probably be uneconomical at present. Similarly, the high ash-contents indicate that preparation facilities would be required to produce a marketable thermal coal from any of the composites tested, which also would probably be uneconomic at present. It should be pointed out that only two drill holes have been tested in what could be a rather large coal basin. Washing the coal to (say) 15% ash rather than 8% would greatly increase yields (e.g. from 55% to 80% for composite T-5). Such reserves may prove very valuable in the future if coal-prices increase sufficiently to allow economic processing of high-ash coals.

4. RESERVES

The level of drill hole information available at present is somewhat limited, hence only approximate calculations of in-situ reserves can be made. The following reserve terminology, used by major U.S. Coal producers, is employed:

Reserves	Definition	Confidence Limits	Drill Hole Spacing
Measured	Thickness and quality predictable	$\pm 10\%$	1000 ft. or less
Indicated	Thickness and quality predictable	$\pm 30\%$	$\frac{1}{2}$ mile or less
Inferred	Seams are assumed to be continuous	$\pm 50\%$	1 mile or less
Hypothetical	Outcrop data only	$\pm 100\%$	None
Speculative	No coal proven	None	None

All tonnage figures quoted in this report are short tons (2,000 lbs).

4.1 Carmacks North

Measured Reserves

The only measured reserves within the property consist of developed coal within the present underground workings, which have been estimated at 30,000 tons (M.O. Hampton, personal communication).

Indicated Reserves

The Main Seam (No. 3 Seam) between the main entry and the Yukon River is sufficiently continuous and of sufficiently predictable quality to be classed as indicated reserves.

- Assuming:
- strike length of 4,000 feet
 - average seam dip of 55°
 - down-dip length of 430 feet
 - average seam thickness of 8 feet
 - coal density of 1.1 tons/cubic yard

092031

Reserves in place are approximately 560,600 tons. With 50% underground recovery, this indicates recoverable reserves of 280,300 tons.

Inferred Reserves

Inferred reserves have been calculated for a possible southerly extension of the open pit, 290 feet along the trend of the syncline. The reserves have been calculated by measuring approximately the area of coal on cross-sections 5+00, 4+00 and 3+00 on Map 3, and assuming that each section has an influence extending half-way to the next section. A coal density of 1.1 tons/cubic yard is assumed.

Section	Area of coal (sq. ft.)	Strike length (ft.)	Volume (cu. yd.)	Tonnage
5+00	680	90	2,267	2,493
4+00	3,088	100	11,437	12,580
3+00	4,648	100	17,214	18,936
			TOTAL	34,009

Assuming an 80% pit recovery, yield would be approximately 27,200 tons. On section 3+00, the most adverse, stripping ratio would be about 2.2:1.

Hypothetical Reserves

In the area to the north of the open pit it has been assumed that No. 3 seam resumes a regular westerly dip, although this has not been proved.

In this area hypothetical reserves may be calculated, assuming:

- strike length of 1,400 feet
- average seam dip 65°
- down-dip length of 1,100 feet
- average seam thickness of 8 feet
- coal density of 1.1 tons/cubic yard

Reserves in place - 501,926 tons. Assuming an underground recovery of 50%, recoverable reserves are approximately 251,000 tons. An open pit extending 100 feet down-dip with 80% recovery could yield about 36,000 tons at a stripping ratio of about 10:1.

092031

4.2 Carmacks South

Inferred Reserves

With the present limit of structural information, and lack of data concerning seam thicknesses, continuity and quality, inferred reserves may be calculated using the following assumptions:-

- strike length of 6,600 feet
- average seam dip 70⁰ to northeast
- down-dip length of 200 feet
- average seam thickness of 20 feet
- coal density of 1.1 tons/cubic yard
- pit highwalls of 45⁰ above and below seam
- pit recovery of 80%

In-place reserves - 1,075,555 tons.

Recoverable reserves - 860,500 tons at a stripping ratio of 10.7:1.

Hypothetical Reserves

The total strike length of the known coal seam is not known. If this seam trends around the southern closure of the syncline and northwards along its eastern limb, there exists the potential for an additional strike length of 40,000 feet. If the seam is present along the western limb of the anticline, there exists the potential for an additional strike length of 8,000 feet. This additional strike length, using the assumptions made above, gives the potential for further in-place reserves of 7,822,000 tons (recoverable reserves of 6,258,000 tons at a stripping ratio of 10.7:1).

4.3 Summary

With the present extent of information, the total recoverable reserves of coal within both Carmacks properties may be summarised as follows:-

- Measured Reserves - 30,000 tons (within present underground mine).
- Indicated Reserves - 280,300 tons (beneath present workings).
- Inferred Reserves - 27,200 tons (open pit area, northern property)
- 860,500 tons (open pit coal on southern property).

- Hypothetical Reserves - 251,000 tons (additional strike length,
northern property)
- 6,258,000 tons (additional strike length,
southern property).
- Speculative Reserves - Unknown. Includes potential for presence of
lower horizon in north and upper horizon in
south.
- Total potential recoverable reserves = 7,707,000 tons.

5. CONCLUSIONS

5.1 Results of 1976 Programme

1. To assure supplies of coal for the Anvil Mine over the next 10 years an additional 175,000 tons must be proven, i.e. raised from the indicated category to the measured category. At the present, the most promising locations where there is sufficient favourable information are down-dip from the present underground workings and in the open pit area of Carmacks North.
2. To assure supplies of coal for the Grum and Minto deposits, an additional 500,000 tons must be proven, i.e. raised from inferred and hypothetical categories to the measured category.
3. To assure supplies of coal for the proposed power station at Faro, an additional 1,200,000 tons must be proven, i.e. raised to measured category.
4. Present information is sufficient to indicate a high probability that the requirements outlined in 1 to 3 above can be met, given sufficient additional exploration.
5. Present information on coal quality indicates
 - a) that Carmacks North coal from No. 3 Seam, and locally also from No. 2 Seam, is a good quality thermal coal which may be burned as mined;
 - b) that Carmacks South coal is higher in rank, and that some shows coking characteristics. This coal is also much higher in ash, indicating that preparation plant facilities may be required to produce either metallurgical or thermal coal (but the information is restricted to two drill-holes).

5.2 Prospects for Development

Prospects for future exploration and development of the Carmacks coal lease area are summarised in the following list of advantages and disadvantages

Advantages

- 1) Continued economy in plant heating and concentrate drying operations at Anvil, compared with equivalent cost for oil.

- 2) Possibility of annual operating profit resulting from sales to other mining operations.
- 3) Possibility of reduced cost for electricity at Anvil should a thermal generating station be installed.
- 4) Possibility of attracting a rail extension from Whitehorse through Carmacks to Faro if a coal mine is developed.
- 5) Relatively thick coal seams (average 8 feet for No. 3 Seam on Carmacks North, average about 20 feet for Laberge coal on Carmacks South).
- 6) Coking characteristics of some Carmacks South coal.
- 7) Ease of access to the area by existing highways.
- 8) Abundant supply of water from the Yukon River should preparation facilities be required.
- 9) Abundant supply of power from N.C.P.C. transmission line.
- 10) Cyprus Anvil holds 100% equity in most of the property, and an option agreement with a royalty clause on the remainder.

Disadvantages

- 1) Lack of information. Further exploratory drilling over such a large area would be very expensive.
- 2) Long haulage distances from extremities of property (up to 5 miles), and steep gradient of haulage roads out of valley of Yukon River.
- 3) Steep dips of coal seams in most of the area (55 to 90°).
- 4) High ash-contents, particularly in Carmacks South coal, which may necessitate preparation facilities even for coal for thermal use.

6. RECOMMENDATIONS

An extensive exploration programme for 1977 is proposed, consisting of the following work:-

1. Photogrammetry

Some additional photogrammetry is required to upgrade the standard of topographic mapping in the areas of active exploration. This will enable accurate location of trenches and drill holes completed in 1976, and also resolve present uncertainties regarding location of some of the lease corner posts and boundaries.

2. Geophysics

Lack of exposure over most of the property would result in a very considerable expense in diamond drilling to provide the necessary information, hence every effort must be made to employ geophysical methods to locate coal seam suboutcrops and help outline structures. Of the methods which have been tried to date, C.E.M. appears to offer the most potential, and V.L.F.-E.M., and scintillometer surveys may give promising results. Methods which have not yet been tried are seismic and gravity surveys. An extensive programme of geophysical experimentation and surveying is proposed.

3. Staking

Depending upon the outcome of the geophysical results, three additional leases may be staked adjacent to Carmacks South to cover the eastern limb of the syncline.

4. Drilling

Total contract cost for diamond drilling in 1976 was slightly under \$30 per foot, and this is considered to be very high for the amount of information obtained. Thus an attempt will be made to substitute rotary-percussion drilling for diamond drilling, at least for a large part of the work. Such a move should result in a lowering of drilling costs by at least 50%. Geophysical logs would be run on rotary holes, resulting in a comparatively small loss of information

brought about by the loss of core, and the coal seams themselves could still be cored for analytical work.

A programme of exploratory drilling is proposed, primarily concerned with outlining measured reserves for the short-term supply of coal for Anvil, and secondarily concerned with increasing structural and stratigraphic control over larger areas of the property.

- a) Six holes in the open pit area (total 1,200 feet) to test the width, depth and southerly extent of the syncline and to assess the feasibility of extending the pit. These holes must be drilled this year in order to determine whether or not this area can produce coal when the present supply is exhausted.
- b) One additional hole on the section immediately north of the present underground workings (850 feet), to resolve present uncertainty about the geological structure and assess the feasibility of a northward advance of the existing underground workings. Since stratigraphic information is critical at this location, diamond drilling is proposed for this hole.
- c) Two additional holes to test the down-dip extent of the main seam beneath the underground workings (1,400 feet). These holes would be particularly necessary if the drilling outlined in 1 and 2 above should fail to locate readily accessible coal. If it should be decided before the summer that a second, lower portal is not feasible, then this footage could very usefully be employed in the open pit area since it is possible that the syncline is accompanied by an anticline on the west which may yield additional surface reserves.
- d) On the southern property, drilling information is confined to a strike length of 3,600 feet over a narrow width. The most satisfactory method of exploring this property further

is to step away from this area, and probe a larger prospective area with holes at spacings of approximately 2,000 to 4,000 feet. Siting of such holes would be contingent upon satisfactory geophysical results.

092031

7. COST SUMMARY7.1 Expenditure in 1976

Total expenditure during 1976, including all field programmes and office work, was as follows:-

<u>Account Code</u>	<u>Code Description</u>	
01	Salaries and Wages	\$ 27,320
02	Staking	5,262
07	Topographic Surveys	11,328
08	Drilling	305,238
09	Trenching	24,028
10	Roads	660
11	Analysis and Testing	5,091
12	Field Equipment and Supplies	457
13	Accommodation	6,037
14	Fuel	232
15	Rotary Wing	205
16	Fixed Wing	258
17	Miscellaneous Transportation	11,686
33	Property Maintenance	3,170
		<hr/>
		\$ 400,972
		<hr/> <hr/>

7.2 Proposed Expenditure in 1977

Total expenditure proposed during 1977 has been outlined in A.F.E. No. 77-2020.

<u>Account Code</u>	<u>Code Description</u>	
01	Salaries	\$ 15,000
02	Staking	1,200
04	Line Cutting	5,000
06	Geophysical Surveys	40,000
07	Topographic Surveys	20,000
08	Drilling	160,000
11	Analysis and Testing	4,000
12	Field Equipment and Supplies	100
13	Accommodation	2,000
14	Fuel	200
17	Miscellaneous Transportation	3,000
33	Property Maintenance	6,900
		<hr/>
		\$ 257,400
		<hr/> <hr/>

LIST OF REFERENCES

- Adamson, T. J. 1976. Carmacks Coal Project, Yukon Territory, A.F.E.
- Berretta, M. G. 1976. Report on Geophysical tests on Carmacks Coal Deposit, Yukon Territory, for Kerr Addison Mines.
- Birch, D. C. 1943. Report for J. Gordon Turnbull and Sverdrup & Parcel, on behalf of Standard Oil Company of California.
- Bostock, H. S. 1936. Carmacks District, Yukon. Geological Survey of Canada, Memoir 189.
- Cairnes, D. D. 1910. Preliminary Memoir on the Lewes and Nordenskiöld Rivers Coal District, Yukon Territory. Geological Survey of Canada, Memoir 5.
- Carmichael, A.D. 1953. Yukon Coal Company - Tantalus Butte Mine. Interoffice correspondence, June 14, 1953, United Keno Hill Mines Ltd.
- Cathro, R. J. 1966a. Preliminary Report, Mesozoic Coal Deposit, Carmacks-Whitehorse District, Yukon. Archer and Cathro, consulting geological engineers, Whitehorse; February 5, 1966.
- 1966b. Carmacks and Porter Mountain Coal Districts - Progress Report. Archer, Cathro and Associates Ltd., Whitehorse; July 8, 1966.
- 1966c. Correspondence to C. H. MacDonald, Anvil Mining Corporation; Archer, Cathro and Associates Ltd, Whitehorse; Aug. 30, 1966.
- Dawson, G. M. 1888. Report on Exploration in the Yukon District, N.W.T., and adjacent northern portions of British Columbia, 1887. Geological Survey of Canada, Annual Report 1887-1888, Part B, page 147.
- Dick, W. J. 1947. Report on the Tantalus Butte Coal Mine, Y. T. Consultant's Report.
- Gondi, J. 1971. A Geological and Geophysical Appraisal of Coal Seams of Tantalus Formation and Recommendations on Testing the continuity of Tantalus Butte Mine Coal Seam. Anvil Mining Corporation, Interoffice memo; August 30, 1971.
- Hacquebard, P.A. 1970. The Correlation of the Main Seam in the Tantalus Butte Coal Mine at Carmacks, Y. T.; Geological Survey of Canada, Topical Report, No. 140.
1972. Petrographic Correlation of the Tantalus and Tantalus Butte Coal Seams at Carmacks, Y. T.; Geological Survey of Canada, Technical Report 115 I/1-3.
- Hampton, M. O. 1968. Carmacks Coal - Preliminary Calculations. Anvil Mining Corporation; Interoffice memo, Vancouver, Feb. 20, 1968.
- Ignatieff, A. 1947. Report on Examination of Tantalus Butte Mine, Carmacks, Y. T. Fuels Division, Bureau of Mines, Ottawa; F.R.L. No. 81.

092031

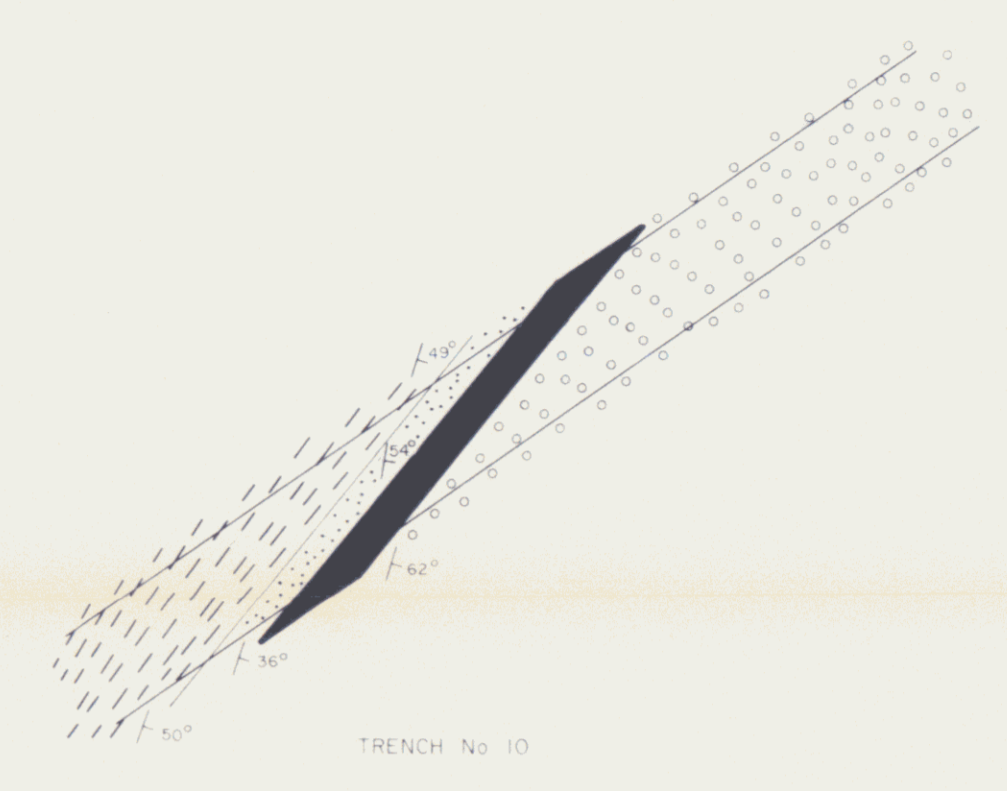
- Jansons, U. 1972 Surface Trenching for #2 Coal Seam at Tantalus Butte, Carmacks, Y. T. Anvil Mining Corporation; Faro, Interoffice memo; June 12, 1972.
- Jennings, D. S. 1973a 1973 Trenching Program at Tantalus Butte, Anvil Mining Corporation; Interoffice memo; November 21, 1973.
- 1973b Underground Exploration Drilling Program at Tantalus Butte. Anvil Mining Corporation; Interoffice memo, December 18, 1973.
- Phillips, M. P. 1973 Report on 1973 Diamond Drilling Program, Carmacks Coal. Archer, Cathro and Associates Ltd., Whitehorse.
- Tempelman-Kluit, D. J.
; 1974 Carmacks, Yukon Territory, Geological Survey of Canada; Open File 200.
- Wade, E. J. 1964 Yukon Coal Co., Carmacks, Y. T. - Tantalus Butte Property. United Keno Hill Mines Ltd., Interoffice correspondence, July 28, 1964.
- Wheeler, J. O. 1961 Whitehorse Map-Area, Y. T. Geological Survey of Canada; Memoir 312.
- Woodridge, L.C. 1954 Report of Diamond Drilling and Geological Work at Tantalus Butte Coal Mine. United Keno Hill Mines Ltd.

~~XXXXXXXX~~

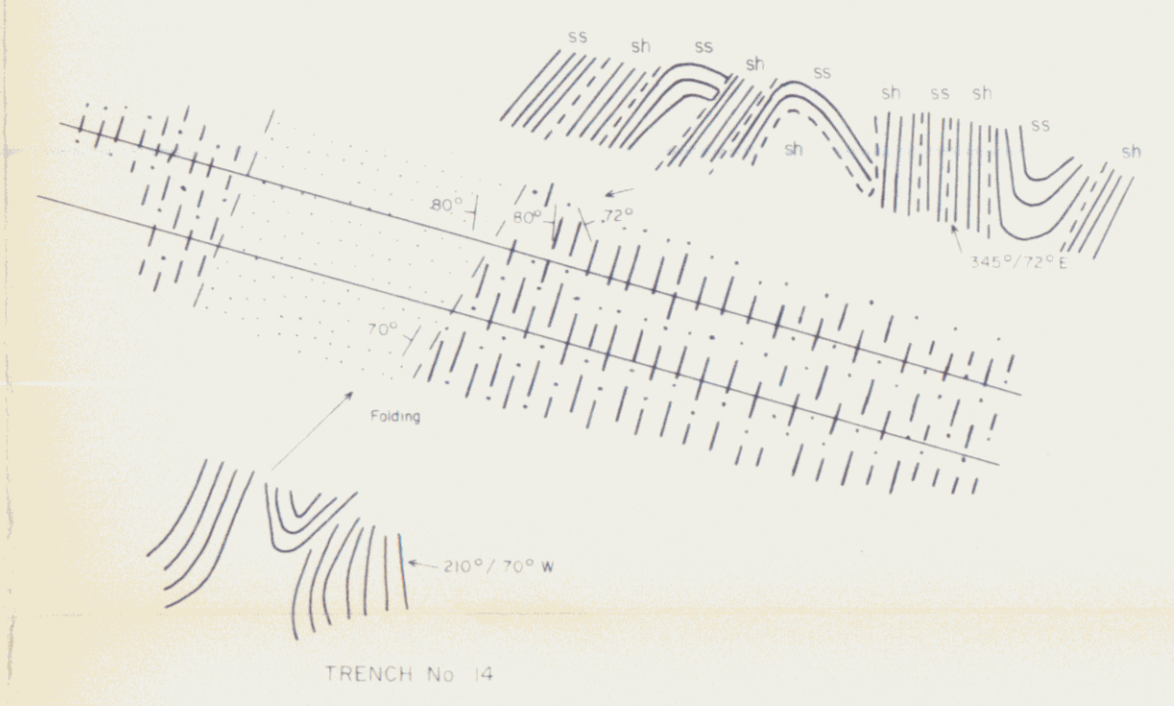
APPENDIX I

092031

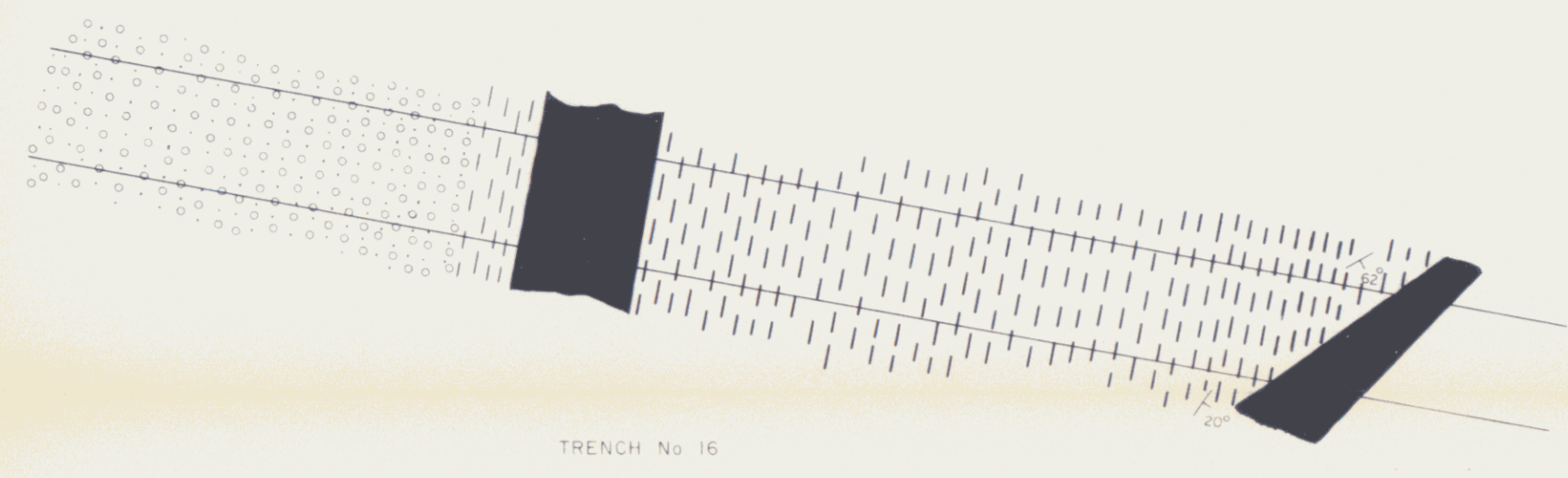
TRENCH PLANS, CARMACKS NORTH



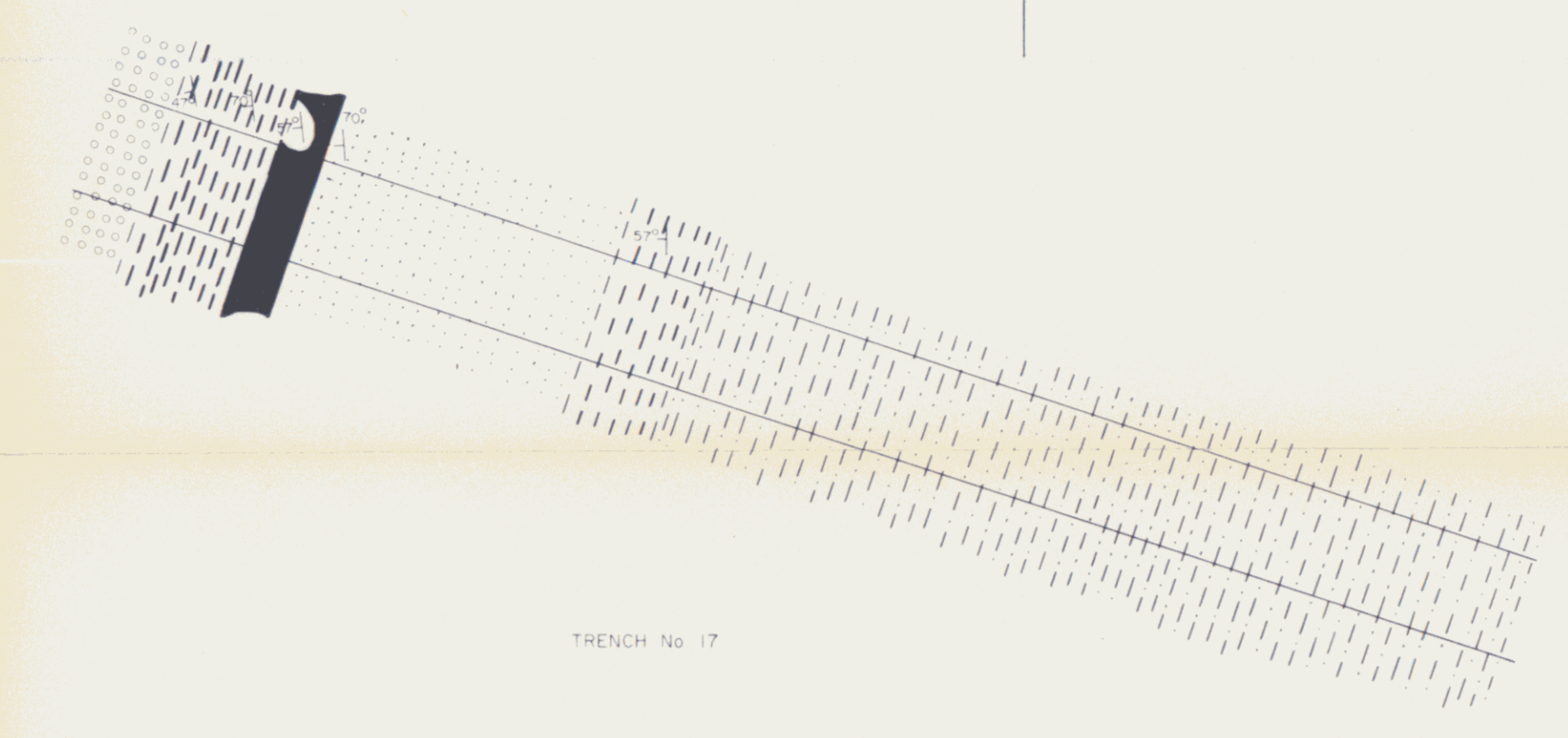
TRENCH No. 10



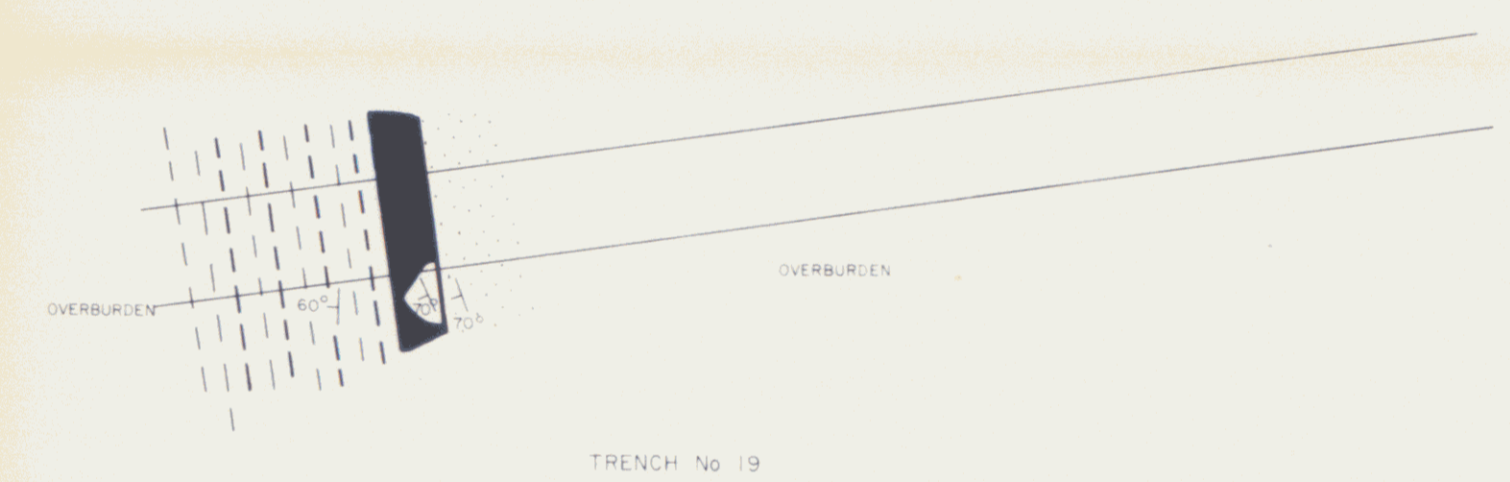
TRENCH No. 14



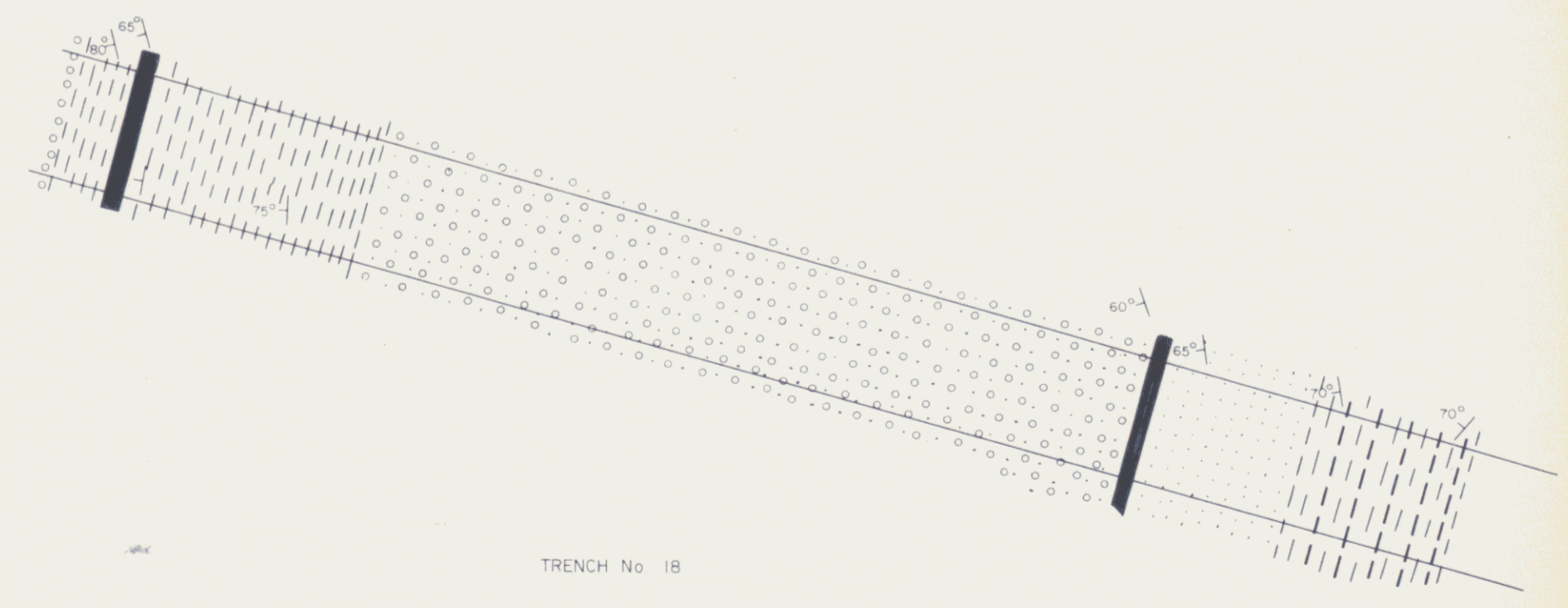
TRENCH No. 16



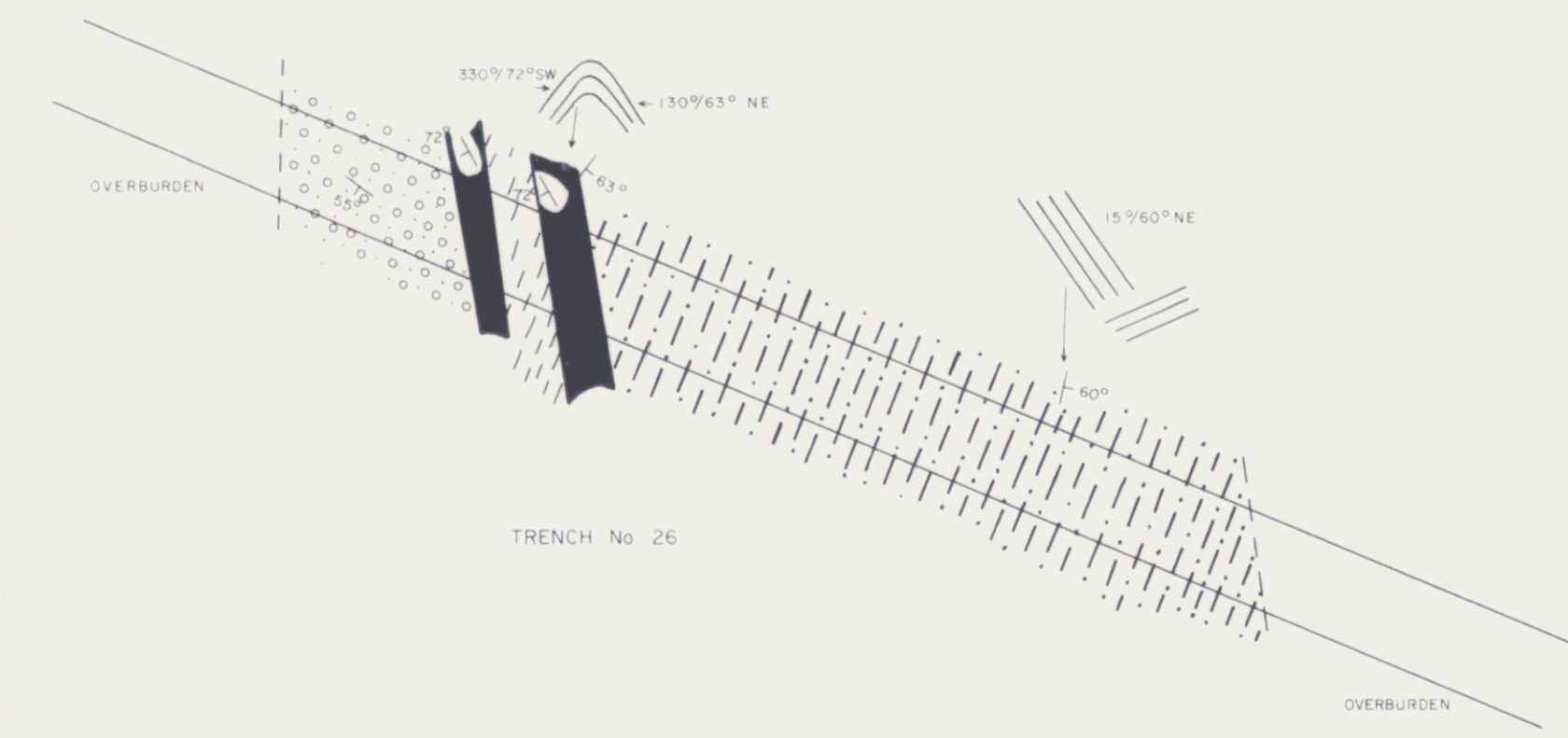
TRENCH No. 17



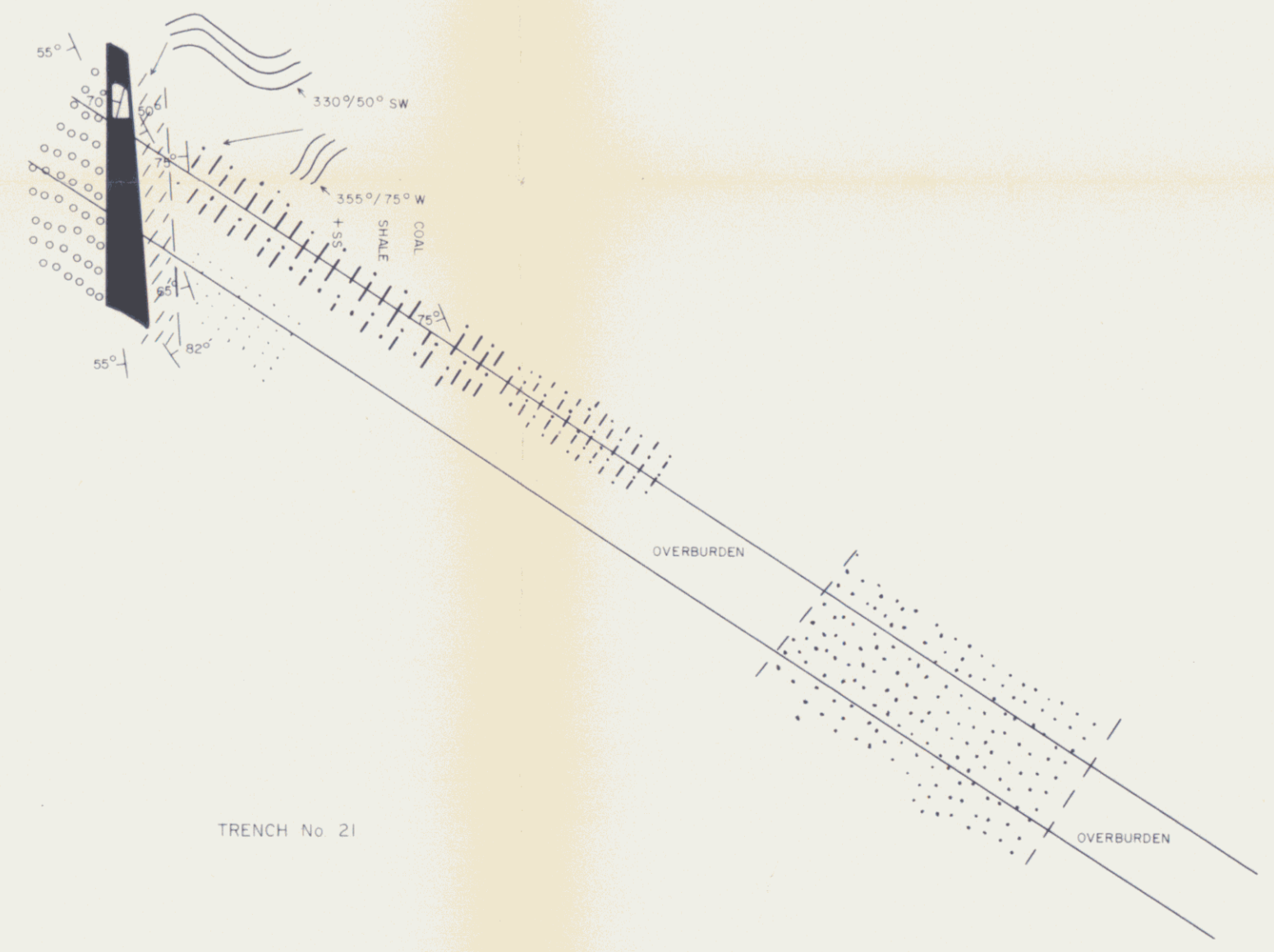
TRENCH No. 19



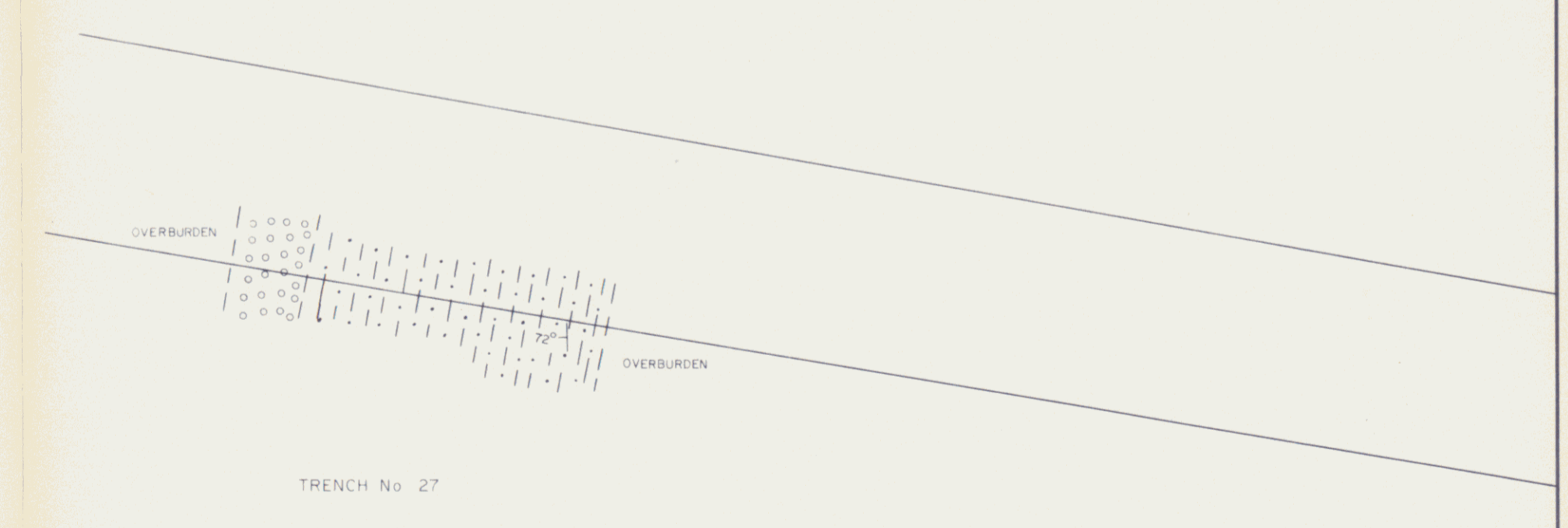
TRENCH No. 18



TRENCH No. 26



TRENCH No. 21



TRENCH No. 27

CARMACKS COAL
Key to Trenches - Lithological Symbols

	PEBBLE CONGLOMERATE
	PEBBLY SANDSTONE
	SANDSTONE
	SILTSTONE
	MUDSTONE
	CARBONACEOUS MUDSTONE
	COAL

CYPRUS ANVIL MINING CORPORATION

092031 CARMACKS NORTH
TRENCH PLANS

DATE: MARCH 27, 1977
SCALE: 1" = 40'
DRAWN BY: C. L. C. MAP REF. DESIGNED BY: R. P. H.

DRILL HOLE LOGS, CARMACKS NORTH

Diamond Drill Record

COLLAR: <u>Not Surveyed</u>		HOLE SURVEY		
DEPTH	<u>27,860</u>	FOOTAGE	AZIMUTH	DIP
EAST	<u>12,240</u>	<u>Collar</u>	<u>285°</u>	<u>-50°</u>
ELEVATION				
LOGGED BY	<u>M. P. Phillips</u>			
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME Teslin Exploration Ltd.
 PROPERTY NAME Carmacks North
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>73-2</u>
CLAIM NAME	_____
COMMENCED	<u>October 21, 1973</u>
FINISHED	<u>October 25, 1973</u>
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	10.0		Overburden.										
10.0	18.5		Conglomerate - well to loosely packed, subangular to subrounded pebbles up to 1". Pebbles black, brown and green. Black chert-speckled calcareous grit matrix.										
18.5	32.0		Mudstone - black to dark brown, highly fractured and broken, with coal partings common. Core angle at 22' = 10°.										
32.0	42.0		Andesite - light green, fine grained, with fragments and lenses of coal. (N.B. This looks like light brown sandstone to me. R.P.H.)										
42.0	51.0		Sandstone - grey, fine-grained with black laminations common, and narrow bands of mudstone with coal partings. Core angle at 46' = 0°.										
51.0	60.0		Sandstone - light grey, fine to medium grained, clean, massive, occasional mudstone fragments, coal partings common. Core angle at 54' = 10°, at 60' = 10°.										
60.0	92.0		Mudstone - black, highly weathered and decomposed, minor coal and carbonaceous shale partings. Core angle at 65' = 10-20°, at 80' = 10-20°.										
92.0	119.0		Mudstone - black, massive, khaki-colored along fractures and bedding planes, partings and lenses up to 1/2" thick of black shiny coal. Core angle at 107' = 10-20°. 99.5-107.0' - slightly silty.										

100200

Diamond Drill Record

COLLAR:		HOLE SURVEY		
DEPTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>73-2</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
119.0	126.5		Siltstone - dark grey to black, shaly. Often grading into narrow, poorly defined bands of very fine grained sandstone. Rare carbonaceous shale and coal partings. Core angle at 122' = 10°.										
126.5	130.4		Mudstone - black and dark grey, interbedded and interlaminated.										
130.4	144.4		Conglomerate - well packed, pebbles up to 1/2", subangular to subrounded. Pebbles of black and light brown chert and white quartz. Calcareous grit matrix. Core angle at 144.4' = 20°.										
144.4	153.0		Mudstone - black to dark grey, slightly silty, minor silt partings. Core angle at 150' = 20°.										
153.0	157.0		Conglomerate.										
157.0	162.0		Grit - yellow, feldspathic, black chert speckled; scattered subrounded subangular pebbles up to 1". Core angle at 162' = 20°.										
162.0	165.5		Siltstone - black to dark grey, grading into a black mudstone.										
165.5	178.0		Conglomerate - often grading into a pebbly feldspathic grit.										
178.0	180.0		Black sand (?fault).										
180.0	181.5		Conglomerate.										
181.5	187.0		Mudstone - black to dark grey, often silty, occasional narrow bands of siltstone. Core angle at 185' = 25°.										
187.0	204.0		Siltstone - partings and laminations of mudstone becoming common towards bottom contact. Rare partings of coal. Core angle at 193' = 35°, at 204' = 20°.										

190250

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	73-2
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
204.0	220.5		Sandstone - dark grey, very fine grained with numerous narrow bands, partings and laminations of black siltstone and mudstone. Core angle at 210' = 20°.										
220.5	236.0		Mudstone - black with narrow silty bands and partings. Core angle at 236' = 20°.										
236.0	240.0		Grit - dark blue. Numerous 1/2" pebbles (locally up to 1"), and loosely packed conglomerate bands.										
240.0	252.5		Conglomerate - loose to well packed, with occasional narrow pebbly blue grit bands 245.0 - 252.5'. Partings and lenses of coal and carbonaceous shale common.										
252.5	262.0		Grit. 252.5 - 255.5' - lenses and bands up to 1/2" of coal. T.D. 262'.										

092031

Diamond Drill Record

COLLAR: Not surveyed		HOLE SURVEY		
NO. 1111	12,650	FOOTAGE	AZIMUTH	DIP
EAST	9,700	collar	061 ⁰	-52 ⁰
ELEVATION		300'	059 ⁰	52 ⁰
LOGGED BY	T. Adamson	700'	056 ⁰	53 ⁰
DATE LOGGED				
MAP REFERENCE NO.		METHOD: Sperry-Sun		

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS COAL NORTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER Cyclone Engineering
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-1</u>
CLAIM NAME	_____
COMMENCED	<u>Aug. 9, 1976</u>
FINISHED	<u>Aug. 25, 1976</u>
PROJECT NO.	_____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	9	0	OVERBURDEN										
9	19	60%	Grey gritty mudstones; abundant plant debris; indistinct bedding; poorly indurated; core very broken.										
19	27	20%	Very poor recovery; interbedded coarse sandstones and mudstones.										
27	41	60%	Mudstone; fine grained; brown to grey; very minor plant debris; top finely laminated; sandy interbeds increasing with depth with sand beds 2"-3" thick; core angles very variable 30 ⁰ -70 ⁰ .										
41	42		Black shale, coaly.										
42	51		Same as 27-41 but increasingly sandy with depth.										
51	51.5		6" breccia zone. Sandstone, shale, sand matrix.										
51.5	56	95%	Sandstone, medium grained, light grey; massive; indistinct bedding; core angle ≈ 60 ⁰ .										
56	96	80%	Tantalus conglomerate; chert, quartz, shale pebbles to 1" diameter; conglomeratic sandstone from 56-59; bedding indistinct; Core angle ≈ 70 ⁰ ; 85 - 85.5' - sandstone; 86.5 - 90' - conglomeratic sandstone, then very minor COAL stringers.										
96	96.5	90%	Conglomeratic sandstone.										
96.5	105	5%	Only 6" COALY shale recovered; water return black, very soft, probably COAL.										
105	111	50%	Black COALY mudstone; crumbly; poor recovery; indistinct bedding; poorly consolidated.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-1</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
111	115	100%	Fine grained massive grey mudstone.										
115	142	90%	Mudstone with sandy lenses and pods; very fine-grained sandy lenses increase with depth; mudstone light grey; sandy lenses brownish grey; Core angle at 125' ~ 50°; Core angle at 141' ~ 80°. Minor rusty and white carbonate veining.										
142	157	90%	Sandstone; some conglomerate towards 157'; brownish grey; very fine grained - medium-grained; 147' - ½" COAL; core angle at 147' - 80°. 151' - 152' - conglomerate.										
157	186	90%	Conglomerate. Medium-grained sandstone at 167-170; 180-181; 185'. COAL in thin beds 174-180 and at 181'; COAL very broken in coaly sections.										
186	195	90%	Sandstone; medium-grained to coarse-grained; grey to brownish, minor pebbles; minor thin COALY layers; core angle at 195' = 80°.										
195	196	80%	Mudstone; brown to black; finely laminated; soft; brown coarser silty horizons throughout.										
196	200	100%	Sandstone; coarse-grained; brown to brownish grey; scattered small pebbles; thin conglomerate horizon at 199'.										
200	311	90+	Conglomerate. 201-201.5 - Sandstone. 227' - minor COAL bed. 229' - 4" sandstone, fine grained, brown; Core angle 90°. 243' - 3" sandstone. 247' - core angle 90°; coarse grained sandy horizon. 257-258' - coarse grained brown sandstone. 263-265' - conglomeratic sandstone										

----continued.

0520250

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NO. III		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-1
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
200	311	90%+	265 - 289' - coarse-grained conglomerate with minor isolated COAL nodules.										
		contd	289 - 290 - mudstone; medium grey to brownish grey. core angle 85°										
			297 - 297.5 - sandstone.										
311	312	25%	Black to brown COALY shale.										
312	317	60%	Dark brown mudstone, COALY in places; bedding indistinct.										
317	341	75-90%	Mudstone; brownish grey to medium grey; bedding distinct in places; Core angle at 320' = 70°; some very minor COAL scattered throughout. Sandier with increasing depth core angle at 339' = 70°; some sections of core very broken.										
341	345	20%	Poor recovery; COALY siltstone and very fine-grained sandstone; black to light brownish grey; core very broken.										
345	358	25%	Very poor recovery; no core 347'-351'; conglomerate.										
358	385	50%	358-366 Conglomerate; muddy matrix; minor irregular COAL stringers and blebs;										
		90%	366-385 372-374 conglomeratic sandstone; no bedding visible.										
385	385.5		Soft brown massive mudstone.										
385.5	394	90%	COAL; vitrainous, blocky, crumbly; clean.	386.0	394.0	8.0	C-3			T 1			
394	396	90%	Medium grey COALY mudstone; white to brown calcareous stringers; core angle 70°.										
396	397	90%	Black COALY shale.										
397	400	90%	Medium grey mudstone; very thin COAL beds.										

092081

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NGIIIH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-1</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
400	409	90%	Sandstone; very fine-grained to fine-grained; brownish grey to light grey; 405' thin shale lenses; 406' - core angle 90°.										
409	419	80%	Conglomerate; core angle ≈ 90°										
419	421	90%	Conglomeratic sandstone; bedding indistinct; minor COALY blebs.										
421	453	90%	Conglomerate; 422 - 4" brown medium-grained sandstone. 437-448 - coarse-grained; pebbles to 2" diameter. 450' - 2" conglomeratic sandstone. 453' - 1" COAL.										
453	461	75%	Conglomeratic sandstone; pebbles 0-20%, to 1" diameter:										
461	466	25%	Coarse-grained conglomerate; poor recovery.										
466	477	90%	Conglomeratic sandstone; light grey medium-grained; Thin conglomerate beds at 468, 471, 477, with pebbles to 2" diameter; 2" COAL at 467'.										
477	523	90%	Conglomerate; medium-grained sandy matrix. 487' - coarse-grained sandy matrix, 50% pebbles, 491 - 4" sandstone, 492 - 1" COALY. 508-512 - coarse sand matrix, vuggy. 518' - 2" sandstone.										
523	529	90%	Conglomeratic sandstone, core angle 90°; medium-grained; medium grey 524' - 2" conglomerate, 527' - 1" conglomerate, 528'-4" conglomerate.										
529	534	90%	Conglomerate. 533-534' - pebbles to 1/8" maximum.										
534	538	50%	Conglomeratic sandstone; medium-grained, brownish to medium grey; Percentage of pebbles - 5%.										
538	543	20%	Conglomerate. 540' - reduce from HQ to NQ.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE _____	AZIMUTH _____	DIP _____	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-1</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
619	625.5	90%	sections. 625.5' - 2" COAL.										
625.5	666	90%	Primarily sandstone; very fine-grained to coarse-grained; some finely laminated; minor sections of very fine-grained massive grey mudstone; sandstone generally with muddy matrix; some poor consolidated and breaks up in water; many mud seams; minor quartz veining; minor thin (fraction of an inch) COAL beds? and lenses throughout, mostly associated with coarse-grained sandstone; all medium to light grey; core angle 80-85°; increasingly coarse-grained and conglomeratic 661'-666'.										
666	668.5	95%	Massive fine-grained medium grey mudstone; sandier towards 667.5'; Core angle 85°.										
668.5	681	669-673 50%	COAL: main seam, blocky, no obvious dirt partings; 12½'; core angle 85°	668.5	674.5	6.0	C-4	}	T 2				
		673-676 80%		674.5	681.0	6.5	C-5						
		676-681 80%											
681	686	95%	Fine-grained massive; medium-grained siltstone.										
686	795	95%	Randomly and gradationally interbedded dark grey siltstone, light grey mudstone, and medium to light grey, fine-grained to medium-grained thinly bedded sandstone. Core angle at 700'=75°, 719' - ½" COAL, 722' - 3" COAL, 722' - core angle = 65°, 741' - 6" COALY shale, 744' - 6" COALY shale, 749' - 2" COAL, 754' - core angle 75°										

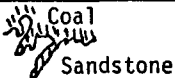
092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	EAST _____	FOOTAGE _____	AZIMUTH _____	DIP _____
ELEVATION _____	LOGGED BY _____			
DATE LOGGED _____	MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-1</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS						
				FROM	TO	WIDTH	NO.							
686	795	95%	761' - core angle 70°, 763' - 3" COAL; 767' - core angle 85°; 773' - core angle 90°, 774' - core angle 50°, 777' - core angle 70°. - 2" COAL bands, strange irregular contacts.											
														
			785' - core angle 90°, 790' - prominent cross-bedding in sandstone, 795' - core angle 85°.											
795	811	95%	Medium-coarse-grained, light grey, well bedded sandstone, minor very thin COALY coatings on bedding planes. Core angle 85°- 90°.											
			797-798 } fine-grained medium 799-800 } grey finely laminated 805-806 } mudstone.											
			806 - 3" mud seam; 806-807' sand only recovered.											
811	816	95%	Massive coarse-grained conglomeratic sandstone.											
816	830	95%	Gradational contact with above. Clean conglomerate. 828 - 1/2" COAL.											
830	831		Massive light grey medium-grained sandstone.											
831			END OF HOLE.											

092031

Diamond Drill Record

COLLAR: Not surveyed.		HOLE SURVEY		
NORTH	12,650	FOOTAGE	AZIMUTH	DIP
EAST	9,700	Collar	061°	-67°
ELEVATION		400'	060°	-65°
LOGGED BY	T. J. Adamson	630'	060°	-65½°
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS NORTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER Cyclone Engineering
 PURPOSE OF HOLE _____

HOLE NO. C-76-2
 CLAIM NAME _____
 COMMENCED Aug. 28, 1976
 FINISHED Sept. 7, 1976.
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	10	0	OVERBURDEN.										
10	21	30%	Mudstone; gritty, brownish grey; abundant plant debris.										
21	32	15%	Medium-grained muddy sandstone.										
32	42	20%	Gritty dark brownish grey mudstone. Core angle increases from 10° at 18' to 50° at 42'.										
42	47	80%	Arkosic sandstone; medium-grained, muddy, poorly consolidated; Core angle 45°.										
47	65	80%	Dark brownish grey mudstone; becoming sandy and finely laminated with increasing depth. Core angle 45° increasing to 60°.										
65	68		Sandstone; medium-grained, light grey, well bedded.										
68	110.5	90%	Massive, medium coarse-grained Tantalus conglomerate, minor thin sandstone or conglomerate sandstone horizons. Core angle 75°.										
110.5	111		Unconsolidated brownish-black clay.										
111	113	95%	COAL; very slickensided.										
113	114		No recovery.										
114	118	50%	Dark grey, fine-grained COALY mudstone.										
118	121.5	80%	COAL and COALY mudstone; very sharp contact with conglomerate below. Core angle 45°.										
121.5	149	70%	Muddy, fine-grained conglomerate; some yellowish rusty colouration; minor conglomeratic sandstone.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-2</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
149	155		Interbedded brownish grey mudstone and black COALY shale.										
155	182	80%	Light grey to dark grey, fine-grained gritty mudstone. 175' - core angle 55°; 178.5' - 2" COAL and COALY shale.										
182	190	80%	Muddy sandstone; fine-grained, light to brownish grey; some finely laminated; core angle 55°.										
190	193		Black COALY mudstone or shale.										
193	200	80%	Medium-grained Tantalus conglomerate.										
200	207	80%	Interbedded, dark grey to black, mudstone, shale, COAL (a number of beds to 3 - 4" thick); slickensided throughout; core angle 65°.										
207	225	90%	Very fine-grained dark grey mudstone, grading progressively with depth to light grey medium-grained sandstone at 225'. Core angle 213' - 60°; 223' - 65°.										
225	229	90%	Medium-grained light grey sandstone.										
229	242	90%	Conglomeratic, light grey, medium to coarse-grained sandstone.										
242	260	90%	Conglomerate.										
260	276		Fine to medium-grained, light grey, silicious conglomeratic sandstone to sandstone. 272' - core angle 60°.										
276	279	90%	Fine-grained, dark grey, muddy, finely laminated sandstone. Core angle - 60°.										
279	281	90%	Medium-grained sandstone.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-2</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
281	409	95%	Medium to coarse-grained conglomerate, minor sandstone horizons to 1 foot thick. 320.5' - 1" bright clean COAL; 320.5 - 321' - minor irregular COAL "blebs" in conglomerate.										
			340' - . a few 1/4" COALY layers.										
			347' } very minor thin										
			353' } COALY beds in sandstone.										
			375 - 381'- numerous irregular COAL "blebs" (fraction of an inch) in conglomerate; core very broken.										
409	410		No core.										
410	410.5		COAL.										
410.5	411	Medium	grey fine-grained mudstone.										
411	416	70%	Clean bright COAL.	411.0	416.0	5.0	C-6	A 1					
416	425.5	85%	Fine-grained, finely laminated, dark brownish grey to medium grey sandy mudstone; becoming sandier with depth; organic debris on bedding planes; gradational contact with below; core angle 65°.										
425.5	433	90%	Medium-grained, light grey sandstone.										
433	450	90%	Conglomerate.										
450	464	90%	Conglomeratic sandstone and medium-grained light grey sandstone.										
464	587	95%	Medium-grained conglomerate; scattered beds to 1 foot thick conglomeratic sandstone and medium grey massive sandstone.										

---Continued

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-2</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
464	587	95%	496-497'- fine-grained, poorly consolidated, muddy sandstone; organic debris on bedding planes; core angle 70°, 547-552'- conglomerate, slight limonitic, muddy, poorly consolidated.										
587	593	95%	Conglomeratic sandstone.										
593	609	95%	Medium-grained to fine-grained conglomerate; some sections with white vein quartz matrix.										
609	616	95%	Gritty mudstone, fine-grained; medium to dark grey; some laminated; minor organic debris.										
616	622	40%	Interbedded bright COAL, black COALY shale and dark grey COALY mudstone.										
622	628	40%	Black COALY shale and COALY grey mudstone-minor COAL.										
628	630	50%	COAL.										
630	638	80%	Dark grey COALY mudstone with abundant plant debris. Locally thin COAL beds up to 1" thick. Core angle at 631'=60°.										
638	641.5	95%	Fine-grained light to dark grey finely laminated sandstone.										
641.5	643	95%	COAL -bright and clean.										
643	661	95%	Finely laminated, medium to dark grey gritty mudstone, becoming increasingly sandy with depth. Core angle 60°. Plant debris throughout.										
			648' - 2" COAL. 653' - 1" COAL, 656' - 3" COALY mudstone.										
661	669	100%	Fine to medium grained-medium grey sandstone. Gradational contact with above. Core angle at 668' = 60°.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-2
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
669	767	90%	Conglomerate and pebbly sandstone. 680.5 - COALY partings;										
			694.0 - 694.5 - Abundant COALY partings; 713.0' - 1" COAL;										
			714' - 716.5 - Brown mudstone partings and COALY partings - zone of										
			fracturing and shearing; 723.5-725.5 - Brown silty mudstone.										
			Core angle at 680.5=80°, 960'=68°, 711=57°, 721.5=64°, 731'=60°, 767'=63°.										
767	773.5	100%	Thinly interlaminated. Black mudstone and light grey sandstone.										
773.5	776	100%	Grey pebbly sandstone with carbonaceous partings.										
776	777	90%	Black mudstone with 3" COAL band. Core angle at 776'=65°.										
777	777.5	100%	Conglomerate.										
777.5	781	80%	COAL. Fairly hard, bright, platy. Contains mudstone partings and										
			abundant calcite veinlets.										
781	783	100%	Medium grey siltstone.										
783	805	95%	Dark grey silty mudstone with carbonaceous partings. At 799' - 6" dirty										
			calcareous COAL. Core angle at 786'=57°, 799'=70°.										
805	810	100%	Dark grey muddy siltstone, locally with carbonaceous partings. Abundant										
			plant remains.										
810	812	100%	Coarse-grained light grey sandstone with dark grey mudstone partings and										
			carbonaceous partings. Core angle at 811'=65°.										
812	813	100%	Carbonaceous mudstone and dirty COAL.										

092031

Diamond Drill Record

COLLAR: Not surveyed		HOLE SURVEY		
NORTH	15,200	FOOTAGE	AZIMUTH	DIP
EAST	9,400	Collar	082°	-60°
ELEVATION		300'	077°	-61°
LOGGED BY	P. Hannigan	600'	074°	-62°
DATE LOGGED				
MAP REFERENCE NO.		METHOD:	Sperry-Sun	

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS NORTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER Cyclone Engineering
 PURPOSE OF HOLE _____

HOLE NO. C-76-3
 CLAIM NAME _____
 COMMENCED Sept. 9/76 Finished Sept 15/76
 Re-entered: Sept. 23/76 Completed Sept 25/76
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	6	0%	Overburden.										
6	21	~60%	Conglomerate- pebbles vary in size up to 1½" in diameter; shale, quartzite and chert pebbles; subrounded; poorly sorted, sandy matrix; vuggy in parts, bedding indistinct.										
21	26	20%	Muddy layer, very poor recovery 20%, COALY.										
26	35.5		Conglomerate - As 6 - 21.										
35.5	56	~75%	Mudstone and fine-grained sandstone; mudstone - grey, fine-grained sandstone - brownish grey. Mudstone - crumbly, 51'-56' - rusty colouring present; Core angle ~35°.										
56	65	~70%	Pebbly sandstone grading into conglomerate at 61'-62' and back to pebbly sandstone. Percentage of pebbles ~10-20%; up to ½" in diameter; very coarse sandy matrix; light grey; somewhat vuggy in parts; bedding indistinct.										
65	73.5	~80%	Sandstone- fine-grained to medium-grained; reddish brown to medium grey - grey mudstone layers in parts, pebbly layers at 73' - vuggy and crumbly in parts - core angle ~35°.										
73.5	92	~90%	Conglomerate - as above- up to 1" in diameter; Percentage of pebbles ~70%; 40% in parts; indistinct bedding.										
92	102	~90%	Pebbly sandstone - coarse-grained, brownish-grey. Percentage pebbles 0-10%; conglomerate layers at 100' and 101'; core angle at 101' ~50°.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____

PROPERTY NAME _____

DRILLING CONTRACTOR _____

ASSAYER _____

PURPOSE OF HOLE _____

HOLE NO. <u>C-76-3</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
102	116	~80%	Conglomerate - Pebbles up to 1/2" in diameter. Percentage of pebbles - ~80% - sandstone layer at 106'; vuggy in parts.										
116	121	0	Mud washout.										
121	127	~90%	Interbedded sandstone and conglomerate; sandstone layers - grey to brownish-grey, free of pebbles - medium-grained to coarse-grained; Core angle ~50° at 121'. Conglomerate as above.										
127	145	~90%	Conglomerate - as above; pebbles up to 3/4" in diameter. Percentage of pebbles - 90%; vuggy in parts; bedding indistinct.										
145	148	~90%	Sandstone- medium grey; medium-grained; clean, indistinct bedding.										
148	241	~80%	Conglomerate with sandstone layers - as above. 148'-156' - conglomerate - up to 1/2" in diameter - Percentage of pebbles - 70%. 156'-160' - pebbly sandstone - Percentage of pebbles-10% -medium grained. 160-166'- conglomerate- diameter up to 1"; percentage- 80%; 166-168'-pebbly sandstone. Percentage - 10%. 168-175' - conglomerate - diameter up to 1/2"-60% pebbles 175-176'-pebbly, dark brown, ~10% pebbles. 176-181'-conglomerate - diameter up to 1" -80% pebbles. 181-185'-clean, 1% pebbles, medium-grained 185-196' -sandstone and conglomerate. 196-205'-pebbly sandstone; 0 - 20% pebbles. 205-227' - conglomerate and sandstone inbedded. 227-241'- conglomerate - diameter up to 1"; 90% pebbles, vuggy in parts. Core angle at 168'=45°, 191'=60°, 210'=50°, 223'=35°.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-3</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
241	263	~70%	Mudstone and very fine-grained sandstone-dark grey to brownish-grey; COALY lenses present; crumbly in parts.										
263	271	~90%	Conglomerate - diameter up to 1".~90% pebbles.										
271	275	~90%	Mudstone - medium grey to brownish grey - contact gradational to conglomerate at 275' - core angle at 275'=30°.										
275	291	~90%	Conglomerate - as above; Pebbles up to 1" in diameter, 60 - 70% pebbles, sandy matrix.										
291	294	~80%	COAL - lustre- shiny; soft to medium hard; blocky; dirty in parts, friable										
294	302	~90%	Carbonaceous mudstone with COAL partings, dark grey to black, core angle at 297' =20°.										
302	303	?	COAL - somewhat dull lustre; medium hard, fissile, friable crumbly, relatively clean.										
303	311	80-90%	Carbonaceous mudstone with minor COAL partings, medium gray in colour Core angle at 306' = 30°.										
311	320	90%	COAL with mudstone layers interbedded; COAL is shiny and brittle; blocky, dirty in parts; dark grey to black mudstone layers; soft.	311.0	320.0	9.0	C-8	T 3					
320	344	~90%	Mudstone - carbonaceous with COAL partings; medium grey in colour; minor calcite (?) stringers and lenses - no relation to bedding; core angle at 326'~30°, 344'~40°.										
344	347	~80%	COAL-shiny lustre; brittle and soft; friable, blocky.	344.0	347.0	3.0	C-9	Not assayed					

782031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-3</u>
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
347	350	~80%	Mudstone - minor carbonaceous stringers at 350'; medium grey in colour; soft.										
350	363	~70%	COAL - varies from shiny to dull lustre; clean to somewhat dirty; blocky friable; soft to medium hard; crumbly core.	350.0	356.5	6.5	C-10	T 4					
				356.5	363.0	6.5	C-11						
363	381	~90%	Sandstone-very fine-grained; carbonaceous in parts; minor mudstone layers interbedded; calcite stringers present; minor rip-up clasts of dark grey mudstone at 371' and 380', also calcite layers present at 376'; carbonaceous stringers at 380'; core angle at 366'=50°.										
381	396	~90%	Mudstone- dark grey; carbonaceous in parts; calcite stringers medium hard; minor fine-grained medium grey sandstone layers- increase with depth. Core angle at 385'~50°.										
396	425	~90%	Sandstone- light grey; medium-grained to coarse-grained, almost white; could be calcareous; medium hard; a few pebbles present in parts; shale pebbles predominant; bedding not distinct; at 424-425'- more mudstone pebbles present-about 10% pebbles; minor carbonaceous layers; could be rip-up clastics also; core angle at 400'~30°.										
425	431	~90%	Mudstone-dark grey; carbonaceous in parts, also COAL partings soft to medium hard; minor calcite stringers and lenses. Core angle at 429'~50°.										
431	442	~90%	Sandstone with mudstone layers interbedded; also minor COAL layers; sandstone-fine-grained to minor medium-grained; carbonaceous; few mudstone										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
	NORTH _____	FOOTAGE _____	AZIMUTH _____
	EAST _____		DIP _____
	ELEVATION _____		
	LOGGED BY _____		
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-3</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
431	442	~90%	clasts present near mudstone contacts; calcite stringers; carbonaceous										
		Contd	clasts at upper contacts of COAL layers; mudstone-dark grey; calcite stringers; COAL layers - shiny lustre; brittle; friable.										
442	443	~80%	COAL - shiny; soft; and brittle; friable; clean; platy.										
443	462	~90%	Sandstone-fine-grained; light grey; carbonaceous; COAL layers present; calcite (?) stringers; vuggy in parts; mudstone layers present; Core angle at 446' = 40°.										
462	498	~90%	Mudstone-dark grey; carbonaceous with COAL partings; calcareous stringers and lenses; light grey fine-grained sandstone present as layers. Core angle at 466' = 20°; 486' = 5°.										
498	532	~90%	Sandstone-fine-grained light grey; carbonaceous; mudstone (dark grey) layers; calcareous (?) stringers and lenses. Core angle at 506' ~ 0°; 527' ~ 15°.										
532	602	~80%	Mudstone- light grey to black, carbonaceous; calcareous stringers abundant; minor light grey fine-grained sandstone beds carbonaceous; mudstone clasts found in sandstone bed; Core angle at 546' ~ 20°, 566' ~ 20°, 586' ~ 15°.										
602	608	~90%	Sandstone- light grey; carbonaceous; fine-grained; calcareous lenses rare; Core angle at 606' = 20°; minor mudstone layers.										
608	612	~90%	Mudstone and siltstone-mudstone dark grey; siltstone-muddy grey and carbonaceous.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-3</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
612	615	~90%	Mudstone-carbonaceous with COAL partings-dark grey to black; calcareous stringers abundant; COAL is shiny and brittle.										
615	623	~96%	Siltstone and sandstone-light grey to medium grey; carbonaceous in parts; calcareous lenses; rip-up clasts of mudstone present at 623'; sandstone is fine-grained and carbonaceous.										
623	631	~80%	Mudstone and siltstone-minor fine-grained sandstone; mudstone-dark grey; siltstone-medium grey; fine-grained sandstone-light grey; carbonaceous; clasts of mudstone and siltstone in sandstone matrix at 626'. Core angle at 626' ~15°.										
631	634	~80%	Mudstone-carbonaceous with COAL partings; calcareous stringers; dark grey to black.										
634	644	~90%	Mudstone and siltstone grading to fine-grained sandstone with depth; carbonaceous; calcite stringers.										
644	647.5	~90%	Mudstone-very carbonaceous; hard; calcareous stringers; COAL partings; COAL is shiny and brittle; Core angle at 646'=15°.										
647.5	650	~90%	Mudstone and fine-grained sandstone.-carbonaceous, calcareous lenses.										
650			Hole re-started.										
650	651		Cavings.										
651	656	~80%	Mudstone-dark grey, soft, non carbonaceous; core angle at 656' ~30°; calcareous lenses and stringers in parts.										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-3</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
656	659	~80%	Sandstone and mudstone interbedded; sandstone-light grey, fine-grained to medium-grained; distinct bedding in parts; mudstone -as 651'-656'; carbonaceous in parts.										
659	662	~80%	Siltstone-light grey to medium grey; medium to hard; calcareous stringers and lenses; non carbonaceous; indistinct bedding.										
662	699	~80%	Sandstone-white to light grey; coarse-grained to medium-grained; pebbly in parts; carbonaceous in parts; bedding indistinct except in carbonaceous sections; few calcareous stringers not related to bedding; sandstone pebble free and clean from 682'-699'; core angle at 675'~30°; at 696'~40°.										
699	703	~90%	Pebbly sandstone- light grey; shale; chert, and quartzite pebbles; diameter up to 1"; 10-20% pebbles.										
703	707	~90%	Conglomerate-mudstone, quartzite and chert pebbles in a sandy matrix; pebbles are subrounded and poorly sorted; bedding indistinct; pebble diameter up to 1/2"; 60-70% pebbles.										
707	710	~80%	Pebbly sandstone and conglomerate interbedded; light grey to white; As above.										
710	717	~90%	Sandstone-light grey to white; relatively pebble free; medium-grained to coarse-grained; bedding indistinct; Core angle at 715'~30°.										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-3</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
717	720	~80%	Sandstone and conglomerate interbedded; as 710-717'; sandstone -light grey to white; medium to coarse-grained; conglomerate - 80% pebbles; pebbles diameter up to 1".										
720	730	~90%	Pebbly sandstone-light grey to white; coarse-grained; 40% pebbles; diameter of pebbles up to 1"; carbonaceous in parts; bedding indistinct; calcareous lenses and stringers present in parts.										
730	731	~90%	Mudstone- dark grey; soft; indistinct bedding.										
731	737	~90%	Pebbly sandstone-light grey to white; coarse-grained; 0-10% pebbles; pebbles up to 1/2" in diameter. carbonaceous in parts; bedding indistinct; Core angle at 734'~40°.										
737	739	~90%	Mudstone-dark grey to black; medium hard; carbonaceous; indistinct bedding.										
739	760	~80%	Pebbly sandstone- light grey to white; medium to coarse-grained; 0-40% pebbles; few thin conglomerate layers; diameter of pebbles up to 1" indistinct bedding; core angle at 755'~40°.										
760	763	~90%	Mudstone-medium grey, soft; non-carbonaceous; indistinct bedding.										
763	766	~90%	Sandstone- light grey to brownish-grey; coarse-grained; few pebbles; indistinct bedding.										
766	771	~90%	Mudstone-dark grey to black; medium hard; carbonaceous; vuggy in parts.										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-3
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
771	785	~90%	Sandstone-fine-grained; light grey; vuggy in parts; few calcareous stringers; core angle at 775' ~ 20°.										
785	791	~90%	Mudstone-soft; slightly carbonaceous; dark grey; crumbly in parts.										
791	793	~80%	Mudstone grading into fine-grained light grey sandstone slightly carbonaceous; few calcareous stringers; Core angle at 792' ~ 20°.										
793	794	~80%	Sandstone-coarse-grained; light grey to white; mudstone clasts; carbonaceous stringers and blebs; no distinct bedding.										
794	796	~80%	Mudstone-soft, medium grey; no distinct bedding; slightly carbonaceous.										
			END OF HOLE.										

092031

Diamond Drill Record

COLLAR: <u>Not surveyed</u>		HOLE SURVEY		
NORTH <u>15,200</u>	FOOTAGE	AZIMUTH	DIP	
EAST <u>9,400</u>	Collar	<u>082°</u>	<u>-80°</u>	
ELEVATION	<u>300'</u>	--	<u>-80°</u>	
LOGGED BY <u>P. Hannigan</u>	<u>600'</u>	--	<u>-83°</u>	
DATE LOGGED				
MAP REFERENCE NO.	METHOD: <u>Acid</u>			

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS NORTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER Cyclone Engineering
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-5</u>
CLAIM NAME _____
COMMENCED <u>September 16, 1976</u>
FINISHED <u>September 22, 1976.</u>
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	7	0	Overburden.										
7	9	~40%	Conglomerate-light grey; mudstone, chert and quartzite pebbles in a coarse-grained sandy matrix; 90% pebbles, diameter up to 1/2"; vuggy; Core angle at 9'~35°.										
9	16	~60%	Sandstone-light grey; medium grained; soft and crumbly; carbonaceous in parts; pebbles rare; non-calcareous.										
16	47	85%	Conglomerate, pebbles up to 1" diameter. 60-90% pebbles; Interbeds of sandstone 18-20'; pebbly sandstone 41-46'										
47	60	~50%	COAL-dirty, very soft; dull lustre; crumbly, friable; poor recovery because of softness. Core angle at 45'~35°.	47.0	53.5	6.5	C-19	T 6					
				53.5	60.0	6.5	C-20						
60	61	~90%	Mudstone-light grey; soft, slightly carbonaceous.										
61	63	~90%	Sandstone-fine-grained, medium grey to light grey; bedding indistinct; non carbonaceous.										
63	66	~80%	Mudstone and siltstone; light grey; soft, non carbonaceous.										
66	72	~90%	Sandstone-fine-grained- brown to brownish-grey to light grey; medium hard to soft non carbonaceous, core angle at 72'~25°.										
72	108	~80%	Siltstone and mudstone; dark grey to medium grey, indistinct bedding; very few pebbles; non carbonaceous; few fine-grained sandstone lenses present. Core angle at 89'~40°; 108'~50°.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-5</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
108	114	~90%	Conglomerate - brown to brownish-grey; pebbles of mudstone, chert and quartzite; subrounded, poorly sorted; pebbles up to 1" in diameter; ~50-90% pebbles; pebbles in a coarse-grained sandy matrix.										
114	153	~75%	Pebbly sandstone-coarse-grained; light grey; 0-50% pebbles; some minor conglomerate layers; indistinct bedding; carbonaceous in parts; core angle at 141'~45°.										
153	160	~90%	Conglomerate and pebbly sandstone interbedded; conglomerate as above; pebbles up to 2" in diameter; 50-90% pebbles.										
160	167	~90%	Sandstone-brown to grey; coarse-grained; pebble free, carbonaceous in parts; hard; core angle at 161'~20°.										
167	216	~90%	Conglomerate-as above; pebbles up to 1" in diameter; 50-90% pebbles; minor pebbly sandstone layers, vuggy in parts; bedding indistinct; Core angle at 180'~20°; at 210'~60°.										
216	234	~90%	Pebbly sandstone- coarse-grained to very coarse-grained; 0-30% pebbles; light grey in colour; pebbles up to ½" in diameter. Minor mudstone layers-carbonaceous; soft; core angle at 222'=50°.										
234	251	~80%	Conglomerate-as above; pebbles up to ½" in diameter; ~70% pebbles; also pebbly sandstone layers present-10-20% pebbles. Core angle at 240'~40°.										
251	257	~90%	Sandstone-medium-grained; light grey; carbonaceous in parts; some parts soft; bedding indistinct-relatively free of pebbles.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-5
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
257	261	~80%	Conglomerate- pebbles up to ½" in diameter; 70 - 90% pebbles.										
261	273	~80%	Pebbly sandstone; medium to coarse-grained; light to grey; 0-20% pebbles pebbles up to 1" in diameter; non carbonaceous; core angle at 263'=45°.										
273	332	~70%	Conglomerate-as above; pebbles up to 2" in diameter; 80-90% pebbles; non carbonaceous; minor pebbly sandstone layers and one minor mudstone layer; bedding indistinct; change to NQ at 301'; core angles at 278' =55°, at 301'~25°, at 324'~30°.										
332	345	~90%	Sandstone-medium-grained to coarse-grained light grey; relatively pebble free; indistinct bedding; minor carbonaceous bands; core angle at 340' ~25°; ½" COAL b and at 340'; shiny lustre; brittle; blocky; friable; medium hard.										
345	411	~80%	Conglomerate-as above; pebbles up to 1" in diameter; 70-90% pebbles; vuggy in parts; core angle at 378'~50°; at 430'~25°; 380-383'-pebbly sandstone; brownish-grey; fine to medium-grained; pebbles up to ½"; approximately 20%.										
411	420	~80%	Mudstone-carbonaceous with COAL partings; dark grey; hard; COAL-hard; shiny lustre; blocky; dirty.										
420	423	~90%	Mudstone-slightly carbonaceous; medium grey; light grey; fine-grained sandstone beds appear at 422-423'; core angle at 422'~30°.										

100200

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-5</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
423	431	~90%	Sandstone-fine-grained; light grey; carbonaceous; bedding indistinct; hard; calcareous stringers not related to bedding; thin layers of dark grey mudstone.										
431	434	~90%	Siltstone-dark grey; carbonaceous; indistinct bedding										
434	438	~70%	Mudstone-carbonaceous with COAL partings; dark grey; hard in core angle 438'~40°.										
438	447	~70%	COAL, bright, hard, blocky; somewhat dirty.	438.0	447.0	9.0	C-21	A 2					
447	470	~90%	Mudstone-dark dull grey; carbonaceous with soft muddy COAL partings; bedding indistinct; medium hard and soft layers; core angle at 468'~20°.										
470	477	~90%	Sandstone-fine-grained, light grey; carbonaceous with medium grey siltstone layers and dark grey mudstone layers; mudstone clasts in sandstone at 473'.										
477	481	~60%	COAL - bright, medium hard to soft; clean; blocky.	477.0	481.0	4.0	C-22	Not assayed					
481	482	~80%	Mudstone-dark grey, soft; carbonaceous, indistinct bedding.										
482	484	~80%	Sandstone-light grey with COAL partings; carbonaceous; distinct bedding.										
484	488	~80%	COAL- bright, medium hard to soft; clean; blocky.	484.0	488.0	4.0	C-23	Not assayed					
488	503	~90%	Mudstone-medium grey; carbonaceous stringers; fine-grained sandstone beds present; soft; 6" COAL bed at 491'; core angle at 490'~30°.										
503	507	~90%	Sandstone-medium-grained; light grey to white; carbonaceous and mudstone layers present; calcareous; core angle at 507'~50°.										

092081

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-5</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
507	516	~70%	Mudstone-dark grey; carbonaceous; soft; bedding indistinct.										
516	548	80%	Sandstone, medium to coarse-grained, light grey, carbonaceous partings. Calcite veinlets, locally calcareous matrix. COALY partings at 534'. Core angle at 530'=40°, at 548'=30°.										
548	633	90%	Interbedded conglomerate and pebbly sandstone. 548-562' - conglomerate-pebbles up to 1/4"; locally carbonaceous; core angle at 548'=30°; 562-567' - pebbly sandstone; pebbles up to 1/4"; core angle at 546'=35°; 567-589' conglomerate-pebbles up to 2"; 585' - 2" mudstone band. Core angle at 585'=40°. 589-592'-very coarse-grained pebbly sandstone pebbles up to 1/4"; 592-598'-conglomerate-pebbles up to 2"; 598-610'- pebbly sandstone-pebbles up to 1"; core angle at 609'=35°; 610-615'-conglomerate-pebbles up to 1"; 615-621' - pebbly sandstone with thin conglomerate layers; pebbles up to 1"; core angle at 620'=45°. 621-624'-conglomerate, pebbles up to 2"; 624-626'-pebbly mudstone, medium grey; slightly carbonaceous; pebbles up to 1/4"; 626-629'-very coarse-grained pebbly sandstone, with thin conglomerate layers. Pebbles up to 1"; 629- 633'-conglomerate. Pebbles up to 1".										
633	648	~90%	Sandstone-fine-grained to medium-grained; carbonaceous in parts; medium grey to light grey; calcareous stringers and lenses; conglomerate layer.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-5
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
			present at 634' and 639'; pebble free; core angle at 640'~50°.										
648	650	~90%	Mudstone-carbonaceous- dark grey; crumbly; soft.										
650	655	~90%	Siltstone-carbonaceous, medium -hard; calcareous stringers-medium to dark grey.										
655	662	~90%	Sandstone-fine-grained, medium grey; carbonaceous; calcareous stringers and lenses not related to bedding; core angle at 656'~30°.										
662	696	~90%	Sandstone- fine-grained to very coarse-grained; increases in grain size with depth; carbonaceous near top of this sequence; more calcareous with depth; calcareous lenses and stringers throughout; indistinct bedding except in carbonaceous parts; core angle at 682'~35°.										
696	841	90%	Conglomerate, with interbeds of sandstone and pebbly sandstone.										
			696-714 - conglomerate; pebbles up to 1". Core angle at 701'=40°.										
			714-717 - Pebbly sandstone. Pebbles up to 1/2".										
			717-719 - Medium-grained sandstone; slightly carbonaceous; core angle at 719'=30°.										
			719-731 - Conglomerate; pebbles up to 1"; Locally carbonaceous.										
			731-735 - Fine to coarse-grained pebbly sandstone with conglomerate layer										
			Local COALY partings.										
			735-738 - Conglomerate; pebbles up to 1"; Locally carbonaceous.										

-Continued-

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____

PROPERTY NAME _____

DRILLING CONTRACTOR _____

ASSAYER _____

PURPOSE OF HOLE _____

HOLE NO. <u>C-76-5</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
696	841	90%	738-742 - Medium to coarse-grained sandstone, locally carbonaceous; -Contd Core angle at 741'=30°										
			742-744 - Conglomerate, pebbles up to ½".										
			744-748 - Medium-grained to very coarse-grained pebbly sandstone; thin conglomerate layers; pebbles up to 1".										
			748-751 - Interbedded siltstone and fine-grained sandstone, light to dark grey, carbonaceous.										
			751-753 - Sandstone - medium-grained, light grey, slightly carbonaceous.										
			753-756 - Pebbly sandstone, pebbles up to ½".										
			756-790 - Conglomerate; pebbles up to 1"; core angle at 760'=30°; core angle at 776'=35°.										
			790-791 - Fine-grained sandstone, light grey.										
			791-841 - Conglomerate; pebbles up to 2"; core angle at 801'=45°; core angle at 822'=40°; carbonaceous locally; core angle at 841'=50°.										
841	842	~20%	COAL - dull lustre, moderately hard, blocky; clean, poor recovery.										
842	845	~40%	Mudstone-carbonaceous with COAL partings; brownish-grey to black.										
845	849	~60%	COAL - dull lustre; relatively dirty; moderately hard; poor recovery; very crumbly.										
849	881	~60%	Mudstone and siltstone-medium grey to dark grey; carbonaceous with COAL partings; soft; poor core recovery in parts; crumbly in parts;										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-5
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
849	881	~60%	Core angle at 864'~20°; core angle at 880'~30°.										
881	882	~90%	COAL - bright, soft, blocky, friable; clean.										
882	887	~90%	Siltstone and mudstone; light grey; carbonaceous; bedding distinct; calcareous stringers in part.										
887	889	~90%	COAL - soft, dull lustre, dirty.	891.0	896.0	5.0	C-38						
889	891	~80%	Mudstone - light grey; soft, carbonaceous.	896.0	901.0	5.0	C-39						
891	915	~70%	COAL - bright, moderately hard; friable; blocky; core angle at 901'~40°	901.0	906.0	5.0	C-40			T 11			
915	918	~80%	Mudstone and siltstone - dark grey to light grey; carbonaceous with COAL partings; bedding distinct.	906.0	911.0	5.0	C-41						
				911.0	915.0	4.0	C-42						
918	920	~80%	COAL - dull lustre; soft, crumbly.										
920	946	~90%	Sandstone, fine to medium-grained, light grey, locally carbonaceous, locally containing mudstone clasts; core angle at 921'=45°.										
			938'=50°; 936' - 6" black carbonaceous mudstone with calcareous veinlets.										
			941' = 6" soft, black carbonaceous mudstone.										
			END OF HOLE.										

1802031

COLLAR: Not surveyed		HOLE SURVEY		
NORTH	15,930	FOOTAGE	AZIMUTH	DIP
EAST	9,840	Collar	--	90°
ELEVATION		250'	311°	89½°
LOGGED BY	P. Hannigan			
DATE LOGGED				
MAP REFERENCE NO.		METHOD: Sperry-Sun		

Diamond Drill Record

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS NORTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-8
 CLAIM NAME _____
 COMMENCED Sept. 26, 1976
 FINISHED Sept. 30, 1976
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	18	--	OVERBURDEN.										
18	20	~70%	Sandstone - fine-grained; medium grey with rust spots; calcareous stringers; soft; indistinct bedding; core angle at 19'~50°.										
20	21	~80%	Mudstone - dark grey to black; soft, non carbonaceous; crumbly core.										
21	26	~80%	Sandstone - fine-grained; light grey to medium grey; calcareous stringers and lenses; bedding distinct in parts.										
26	32	~80%	Mudstone - dark grey to black with rust coloured partings and lenses; soft; bedding not distinct; non carbonaceous.										
32	36	~90%	Sandstone and siltstone - fine-grained; light grey to medium grey; soft; non carbonaceous.										
36	36.5	~80%	Siltstone - medium-grained; soft; non carbonaceous.										
36.5	37.5	~90%	Sandstone - fine-grained; light grey; soft; indistinct bedding; core angle at 37'~50°.										
37.5	40	~90%	Mudstone and siltstone - medium grey to dark grey; non carbonaceous; soft.										
40	47	~90%	Sandstone - fine-grained; light grey; distinct bedding in parts; soft; few calcareous stringers; slightly carbonaceous in parts.										
47	52	~90%	Mudstone and siltstone - medium grey; carbonaceous in parts; indistinct bedding; soft.										
52	55	~90%	Sandstone - fine-grained; medium grey; medium hard; indistinct bedding.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-8</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
55	60	~70%	Sandstone - white to light grey; very soft in parts - poor recovery; hard in parts; coarse-grained; carbonaceous; indistinct bedding.										
60	65	~90%	Sandstone - fine-grained; dark grey; distinct bedding in parts; calcareous stringers rare; medium hard; slightly carbonaceous in parts; core angle at 65'~50°.										
65	71	~90%	Sandstone - white to light grey; coarse-grained; hard; carbonaceous with COAL partings.										
71	76	~90%	Mudstone and siltstone and fine-grained sandstone interbedded; carbonaceous with COAL partings; soft; distinct bedding in parts.										
76	84	~90%	Sandstone - medium-grained, light grey; very carbonaceous with COAL partings; deformation noted in this section - bedding deformed; core angle at 84'~20°.										
84	84.5	~90%	Mudstone - carbonaceous with COAL partings; soft; indistinct bedding.										
84.5	113	~80%	COAL - shiny lustre; soft to medium hard; friable; blocky; relatively clean; core angle at 113'~30°.										
113	152	~90%	Sandstone - light grey; fine-grained to medium-grained; bedding indistinct; calcareous bands and stringers not related to bedding; non carbonaceous; core angle at 135'~50°.										
152	156	~80%	Mudstone and sandstone interbedded; mudstone - dark grey, soft and carbonaceous in parts, sandstone as above; core angle at 154'~55°.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-8</u>
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
156	157	80%	Sandstone - light grey; fine-grained; bedding indistinct; non carbonaceous.										
157	158	80%	Mudstone - dark grey; soft; non carbonaceous; calcareous stringers.										
158	164	80%	Sandstone - as above.										
164	166	90%	Mudstone and siltstone - medium grey; indistinct bedding; soft; non carbonaceous.										
166	180	80%	Sandstone - as above; medium hard; distinct bedding in parts; calcareous stringers; core angle at 176' 35°.										
180	181	90%	Mudstone - medium grey to dark grey; soft to hard.										
181	185	90%	Sandstone - as above.										
185	186	90%	Mudstone - as above.										
186	188	80%	Sandstone - as above.										
188	192	80%	Mudstone - medium grey to dark grey; soft; carbonaceous in parts; core angle at 190' 40°.										
192	215	90%	Sandstone - light grey to medium grey; fine-grained; indistinct bedding; calcareous stringers and lenses; core angle at 210' 60°.										
215	226	90%	Interbedded mudstone and siltstone- dark grey to medium grey; soft to hard; carbonaceous in parts; calcareous stringers in parts.										
226	229	90%	Sandstone - as above.										
229	231	90%	Mudstone - dark grey; calcareous stringers; soft to hard; core angle at										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-8</u>
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
229	231	~90%	228'~40°.										
231	232	~90%	Sandstone - light grey; medium-grained; mudstone lenses with pods present; no distinct bedding.										
232	236	~80%	Mudstone - dark grey; indistinct bedding; soft; non carbonaceous; non calcareous.										
236	241	~90%	Sandstone - light grey to white; fine-grained; carbonaceous; distinct bedding.										
241	242	~90%	Mudstone - hard; dark grey; calcareous lenses and stringers; indistinct bedding.										
242	245	~90%	Sandstone - as above; core angle at 243'~60°.										
245	252	~90%	Sandstone - light grey; fine-grained; indistinct bedding; medium hard; non carbonaceous.										
252	261	~90%	Mudstone - dark grey; soft; indistinct bedding.										
261	273	~80%	Sandstone - light grey; fine-grained to medium-grained; indistinct bedding; core angle at 263'~50°.										
273	283	~90%	Mudstone and siltstone - dark grey; soft; indistinct bedding; calcareous lenses and stringers; core angle at 283'~40°.										
283	287	~90%	Sandstone - as above.										
287	296	~90%	Sandstone and mudstone interbedded; indistinct bedding; as above.										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
	NORTH	FOOTAGE	AZIMUTH
EAST			
ELEVATION			
LOGGED BY			
DATE LOGGED			
MAP REFERENCE NO.	METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-8</u>
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
296	311	~80%	Sandstone - fine-grained; carbonaceous in parts; light grey to medium grey; calcareous stringers and lenses; core angle at 303; ~50°.										
311	313	~80%	Mudstone - dark grey; soft; carbonaceous; calcareous stringers.										
313	313.5	~80%	Sandstone - medium-grained; white to light grey; non distinct bedding; core angle at 313' ~40°.										
313.5	321	~80%	Mudstone and siltstone - medium grey to dark grey; carbonaceous in parts indistinct bedding.										
321	324	~90%	Sandstone - light grey; fine-grained; carbonaceous; bedding distinct; mudstone layer present at 322' - dark grey; carbonaceous; calcareous stringers.										
324	325	~80%	COAL - hard to soft; bright, relatively dirty; blocky.										
325	335	~90%	Mudstone and sandstone and siltstone interbedded; as above; carbonaceous with COAL partings; distinct bedding in sandstone; core angle at 334' ~50°.										
335	348	~80%	Mudstone - soft to medium hard; medium grey to dark grey; carbonaceous with COAL partings; bedding indistinct.										
348	362	~80%	Mudstone and sandstone interbedded; as above; carbonaceous with COAL partings; distinct bedding in sandstone; core angle at 354' ~45°.										
362	363	~90%	COAL - bright; hard; blocky; dirty.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE _____	AZIMUTH _____	DIP _____	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-B</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
363	406	~90%	Mudstone and sandstone interbedded; carbonaceous with COAL partings and layers; COAL layers and partings increase in frequency and width with depth; COAL not more than 1 foot wide; bedding distinct in sandstone; mudstone predominate over sandstone; core angle at 374'~80°; 396'~55°; 406'~40°.										
406	411	~90%	Mudstone - medium hard; dark grey; slightly carbonaceous; no COAL partings; bedding indistinct.										
411	423	~90%	Sandstone and mudstone interbedded; mudstone - dark grey; medium hard; non carbonaceous; calcareous stringers and lenses not related to bedding; indistinct bedding; sandstone - light grey to medium grey; fine-grained; non carbonaceous; indistinct bedding; few calcareous stringers.										
423	453	~80%	Sandstone - medium-grained to coarse-grained; light grey to white; few pebbles; few calcareous stringers; indistinct bedding; core angle at 426'~25°; 444'~65°.										
453	456	~90%	Pebbly sandstone - light grey; medium-grained to coarse-grained; mudstone, chert and quartzite pebbles; pebbles are subrounded and poorly sorted; 0-40% pebbles up to 1/2" diameter; no distinct bedding.										
456	470	~50%	Sandstone - medium-grained to coarse-grained; light grey to white; few pebbles; carbonaceous in parts; core angle at 459'~55°.										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-8</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
470	472	~90%	Conglomerate - mudstone, chert and quartzite pebbles in a sandy matrix; pebbles are subrounded and poorly sorted; ~90% pebbles up to 1/2" diam.										
472	472.5	~90%	Mudstone - dark grey to black; hard; carbonaceous.										
472.5	474	~90%	Sandstone - fine-grained; light grey; indistinct bedding; non carbonaceous.										
474	477	~90%	Mudstone - dark grey to black; carbonaceous with COAL partings; hard; core angle at 470'~70°.										
477	485	~90%	Siltstone and sandstone - minor mudstone; carbonaceous in parts; indistinct bedding.										
485	501	~90%	Mudstone and siltstone - minor sandstone layers; carbonaceous in parts; indistinct bedding; core angle at 450'~55°.										
			END OF HOLE.										

002031

COLLAR: Not surveyed		HOLE SURVEY		
NORTH	16,220	FOOTAGE	AZIMUTH	DIP
EAST	9,790	Collar	090 ⁰	-50 ⁰
ELEVATION		163'	082 ⁰	-50 ⁰
LOGGED BY	P. Hannigan			
DATE LOGGED				
MAP REFERENCE NO.		METHOD:	Sperry-Sun	

Diamond Drill Record

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS NORTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-9
 CLAIM NAME _____
 COMMENCED Sept. 30, 1976
 FINISHED Oct. 1, 1976
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	16	--	OVERBURDEN.										
16	26	--	COAL - No core - sludge samples.										
26	30	~80%	Sandstone - medium-grained; light grey to brownish-grey; carbonaceous; indistinct bedding.										
30	31	~70%	Mudstone and siltstone; medium grey; soft; indistinct bedding.										
31	46	~80%	Sandstone - light grey; fine-grained; carbonaceous; distinct bedding; core angle at 31'~15 ⁰ .										
46	54	~80%	Siltstone - brownish-grey to light grey; slightly carbonaceous; indistinct bedding; core angle at 50'~15 ⁰ .										
54	65	~90%	Sandstone - light grey; fine-grained; carbonaceous; distinct bedding.										
65	76	~80%	Siltstone and mudstone - medium grey to dark grey; carbonaceous; hard to medium hard; crumbly core in parts; thin sandstone layers interbedded; core angle at 71'~50 ⁰ .										
76	82	~90%	Sandstone - light grey; fine-grained; slightly carbonaceous.										
82	86	~80%	Mudstone and siltstone - light grey to dark grey; medium hard; indistinct bedding; carbonaceous in parts.										
86	92	~90%	Siltstone - dark grey to light grey; medium hard; carbonaceous in parts; minor mudstone beds; core angle at 91'~40 ⁰ .										
92	107	~90%	Sandstone - light grey; fine-grained; carbonaceous in parts; medium hard bedding distinct in parts.										

092081

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NO. _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-9</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
107	110	~90%	Siltstone and mudstone; medium grey; carbonaceous in parts; minor sandstone beds at depth.										
110	117	~90%	Sandstone - light grey to medium grey; fine-grained; carbonaceous in parts; mudstone clasts at 114'; minor mudstone layers; core angle at 110' ~40°.										
117	135	~80%	Mudstone - medium grey; soft; non carbonaceous; calcareous stringers and lenses; indistinct bedding; core angle at 130' ~50°.										
135	136	~50%	Mudstone - very carbonaceous with COAL partings; black; medium hard.										
136	147	~70%	COAL - shiny lustre; soft; blocky and crumbly; friable; clean.										
147	148	~70%	Mudstone - dark grey to black; indistinct bedding; carbonaceous.										
148	166	~90%	Sandstone - light grey; fine-grained; carbonaceous in parts; core angle at 151' ~75°.										
			END OF HOLE.										

18026

COLLAR: Not surveyed	HOLE SURVEY		
NORTH 11,920	FOOTAGE	AZIMUTH	DIP
EAST 9,960	Collar	090°	-70°
ELEVATION	458'	088°	-80°
LOGGED BY P. Hannigan	819'	086°	-68°
DATE LOGGED			
MAP REFERENCE NO.	METHOD: Sperry-Sun		

Diamond Drill Record

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS NORTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-11
 CLAIM NAME _____
 COMMENCED October 3, 1976
 FINISHED October 11, 1976.
 PROJECT NO. _____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	6	~20%	OVERBURDEN.										
6	12	~60%	Conglomerate - chert, mudstone and quartzite pebbles in a sandy matrix; pebbles are subrounded and poorly sorted; bedding indistinct; vuggy in parts, ~80% pebbles, up to 2" diameter; poorly consolidated in parts; poor recovery in parts.										
12	19	~40%	Pebbly sandstone - light grey; coarse-grained; bedding indistinct; 10% pebbles, up to 1/8" in diameter; poorly consolidated in parts; core angle at 13'~60°.										
19	32	~60%	Conglomerate - as above; ~60%-90% pebbles, up to 1" diameter; vuggy in parts.										
32	34	~70%	Sandstone - coarse-grained, light grey; carbonaceous; relatively pebble-free; vuggy in parts; core angle at 33'~60°.										
34	63	~70%	Conglomerate - as above; ~90% pebbles, up to 1" diameter; core angle at 54'~40°; carbonaceous in parts; vuggy in parts; poorly consolidated in parts.										
63	65	~90%	Sandstone - light grey; medium-grained, pebble-free; bedding indistinct.										
65	66	~50%	Conglomerate and sandstone interbedded; both as above.										
66	67	~70%	Carbonaceous mudstone with COAL partings; dark grey to black; soft.										
67	70	~80%	Mudstone - soft; carbonaceous in parts; brownish grey.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVLY		
NORTH		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-11</u>
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
70	74	~90%	COAL - bright; soft; platy; friable; dirty in parts.										
74	76	~90%	Mudstone - medium grey; soft; core angle at 76'~60°.										
76	88	~90%	Mudstone with sandstone interbeds; mudstone - dark grey; carbonaceous in parts; sandstone - medium grey; medium hard; fine-grained; carbonaceous; distinct bedding.										
88	109	~80%	Sandstone - light grey, fine-grained; carbonaceous in parts; mudstone layers interbedded; distinct bedding in parts; core angle at 96'~60°.										
109	112	~90%	Interbedded sandstone and conglomerate; beds 1 foot thick; fine to coarse-grained; light grey. Conglomerate. ~90% pebbles, up to 1/4" diameter. Local carbonaceous partings.										
112	123	~90%	Sandstone - as above; fine-grained to coarse-grained; bedding indistinct; core angle at 116'~60°.										
123	129	~80%	Conglomerate - as above; ~80% pebbles, up to 1/2" diameter; carbonaceous in parts.										
129	136	~90%	Pebbly sandstone and sandstone interbedded; fine-grained to coarse-grained light grey; ~0 - 40% pebbles, up to 1/8" diameter; carbonaceous in parts; bedding indistinct.										
136	137	~90%	Conglomerate - as above; ~80% pebbles, up to 2" diameter; core angle at 136'~50°.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-11
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
137	142	~90%	Pebbly sandstone - light grey; coarse-grained; ~0-20% pebbles, up to ½" diameter; non carbonaceous; bedding indistinct.										
142	172	~80%	Conglomerate - as above; ~70-90% pebbles, up to ½" diameter; few pebbly sandstone layers near upper contact; carbonaceous in parts; core angle at 156' ~ 50°.										
172	179	~90%	Sandstone; pebbly in parts; coarse-grained; light grey; bedding indistinct; carbonaceous in parts; core angle at 175' ~ 60°.										
179	188	~80%	Conglomerate - as above; ~70% pebbles, up to 1" diameter.										
188	191	~90%	Pebbly sandstone and sandstone interbedded; - as above; carbonaceous in parts.										
191	194	~90%	Conglomerate - as above; ~60-80% pebbles, up to ½" diameter.										
194	200	~90%	Pebbly sandstone - as above; 0-40% pebbles, up to ½" diameter; core angle at 195' ~ 65°.										
200	201	~90%	Conglomerate - as above; ~90% pebbles, up to ½" diameter.										
201	202	~90%	Pebbly sandstone - as above; ~0-40% pebbles, up to ½" diameter.										
202	209	~90%	Conglomerate - as above; ~80-90% pebbles, up to 1" diameter; carbonaceous in parts; thin sandstone layer at 207' ~ about 2" thick.										
209	212	~90%	Sandstone - medium-grained, light grey to brownish-grey; relatively pebble-free; indistinct bedding.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-11</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
212	219	~90%	Pebbly sandstone - light grey; medium-grained; ~5-10% pebbles, up to 1" diameter; carbonaceous locally; core angle at 215' ~ 50°. Locally core poorly consolidated.										
219	233	~40%	Conglomerate - as above; very poor recovery; ~70-90% pebbles, up to 1" diameter; very crumbly core in parts.										
233	241	~50%	Pebbly sandstone; brown to brownish-grey; coarse-grained; ~0-5% pebbles, up to 1/8" diameter; carbonaceous locally; bedding indistinct.										
241	251	~80%	Mudstone - dark grey; soft; carbonaceous in parts with COAL partings; core angle at 243' ~ 40°.										
251	252	~90%	Siltstone - dark brownish-grey; soft; carbonaceous.										
252	259	~90%	Mudstone - dark grey; soft; carbonaceous in parts with COAL partings; bedding distinct in parts.										
259	261	~90%	Siltstone - dark brownish-grey; muddy in parts; soft.										
261	270	~90%	Mudstone - dark grey to black; soft; carbonaceous in parts with COAL partings; core angle at 265' ~ 20%.										
270	271	~90%	Sandstone and mudstone interbedded; mudstone as above; sandstone- medium-grained - brownish-grey; bedding indistinct; carbonaceous in parts.										
271	281	~90%	Mudstone and siltstone with lenses of brown; fine-grained sandstone; calcareous lenses and stringers also present; mudstone and siltstone - dark grey to brownish-grey; soft; carbonaceous in parts.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-11</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
281	283	~ 90%	Sandstone - fine-grained; brownish-grey; carbonaceous; bedding distinct; core angle at 282' ~ 35°.										
283	301	90%	Interbedded conglomerate and pebbly sandstone. Pebbles mostly 1/4" - 1/2" diameter; locally up to 1 1/2". Individual beds up to 5 feet thick.										
			283' - 286' - conglomerate.										
			286' - 290' - pebbly sandstone.										
			290' - 292' - conglomerate.										
			292' - 297' - pebbly sandstone.										
			297' - 298' - conglomerate.										
			298' - 299' - pebbly sandstone.										
			299' - 301' - conglomerate.										
301	317	60%	Pebbly sandstone - pebbles up to 1/2"; pebbles up to 40%; core angle at 302' = 50°.										
317	352	90%	Conglomerate - pebbles up to 1/2"; 330' - 332' - pebbly sandstone.										
352	382	90%	Interbedded conglomerate and pebbly sandstone. Beds up to about 3 feet thick; pebbles mostly 1/4" to 1/2" diameter. core angle at 361' = 50°;										
			381' = 70°.										
382	419	90%	Conglomerate - pebbles up to 1" ; 70-90% pebbles; thin pebbly sandstone beds locally; core angle at 400' = 30°.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-11</u>
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
419	424	~90%	Pebbly sandstone and sandstone interbedded; medium-grained; light grey to brownish-grey; ~0-40% pebbles, up to 1" diameter; core angle at 421' ~50°.										
424	440	~90%	Conglomerate ~80-90% pebbles, up to 3" diameter; few minor pebbly sandstone and sandstone thin beds.										
440	450	~90%	Siltstone - medium grey; bedding distinct; medium hard; core angle at 440' ~60°; also mudstone and sandstone layers present.										
450	451	~90%	Pebbly sandstone and sandstone interbedded; light grey; medium-grained to coarse-grained; 0-10% pebbles, up to 1" diameter.										
451	452	~90%	Conglomerate ~80-90% pebbles, up to 1" diameter.										
452	452.5	~90%	Mudstone - dark grey; carbonaceous; distinct bedding; soft.										
452.5	453	~90%	Sandstone - light grey; medium-grained; few pebbles; carbonaceous in parts; indistinct bedding.										
453	453.5	~90%	Siltstone - dark grey; carbonaceous; indistinct bedding.										
453.5	459	~90%	Sandstone - light grey; medium-grained; relatively pebble-free; indistinct bedding.										
459	459.5	~90%	Mudstone - dark grey; soft; indistinct bedding.										
459.5	467	~90%	Sandstone - as above; mudstone layers interbedded; core angle at 461' ~60°										
467	476	~90%	Mudstone - dark grey; soft; bedding distinct in parts; slightly carbonaceous.										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-11</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
476	489	~70%	Mudstone - carbonaceous with abundant COAL partings; mudstone - dark grey; soft; COAL -dirty, dull lustre; platy and crumbly; core angle at 482' ~60°										
489	499	~80%	Mudstone - carbonaceous in parts; no major COAL partings; bedding indistinct; medium grey to dark grey.										
499	501	~90%	Siltstone - light grey to medium grey; carbonaceous in parts; mudstone layers interbedded.										
501	503	~90%	Sandstone - light grey; medium-grained; carbonaceous in parts; bedding indistinct; core angle at 503' ~60°.										
503	512	~90%	Mudstone - carbonaceous with major COAL partings; dark grey to black; indistinct bedding in parts; minor siltstone layers.										
512	515	~90%	Siltstone with minor carbonaceous mudstone layers; medium grey to dark grey; bedding indistinct; calcareous stringers and lenses.										
515	521	~90%	Mudstone - dark grey; soft; slightly carbonaceous.										
521	523	~90%	Siltstone - medium grey; medium hard; non carbonaceous; core angle at 523' ~60°.										
523	530	~90%	Sandstone, mudstone and siltstone interbedded; fine-grained; brownish-grey to light grey; non carbonaceous; distinct bedding in parts; mudstone and siltstone as above.										
530	534	~90%	Sandstone and siltstone interbedded; sandstone - medium-grained to coarse-grained; percentage decreases with depth; slightly carbonaceous.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVLY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-11</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
530	534	90%	in parts.										
534	586	75%	Conglomerate, with interbeds of coarse-grained pebbly sandstone. 546-548' very poor recovery. core angle at 565.5' = 75°.										
586	588.5	80%	Interbedded light brownish-grey coarse-grained sandstone, locally pebbly, and dark grey mudstone with carbonaceous partings; core angle at 586.5' = 50°.										
588.5	643	90%	Conglomerate, pebbles mostly 1/2", a few up to 1 1/2"; with thin interbeds of pebbly sandstone. Core angle at 607' = 65°. 627' = 42°.										
643	664	90%	Black carbonaceous mudstone with COALY partings. core angle at 647' = 55°.										
664	665.5	90%	Dark grey sandy siltstone with thin interbeds of light grey medium-grained sandstone.										
665.5	672	100%	Light to dark grey fine to medium-grained sandstone with carbonaceous partings. Bedding irregular and swirled locally - soft sediment slumping? core angle at 669' = 50°.										
672	674.5	100%	Very coarse-grained light grey pebbly sandstone with carbonaceous partings										
674.5	690.5	100%	Light to dark grey fine to medium-grained sandstone, locally pebbly, locally with mudstone clasts, with abundant carbonaceous partings. Core angle at 687' = 60°.										
690.5	696	80%	COAL with black carbonaceous mudstone bands and calcite veinlets. COAL is fairly hard, platy, moderately bright.										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-11</u>
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
696	800	90%	Thinly interbedded light grey sandstone, medium grey siltstone and dark grey mudstone, 727', 738.8, 743, 749, 761-762, 776-77.5, & 784 - bands of black carbonaceous mudstone with COALY partings; 719-720, 721-725 - pebbly sandstone bands; core angle at 707' = 55°; 727' = 65°; 747' = 70°; 767' = 60°.										
800	840.5	90%	Light grey, fine to coarse-grained sandstone with dark grey mudstone interbeds, also locally large mudstone clasts in sandstone, and carbonaceous partings and fragments. Core angle at 807' = 55°; 827' = 70°.										
840.5	855	90%	Conglomerate, medium-grained - most pebbles around 1/4", a few up to 1/2".										
855	871	90%	Black carbonaceous mudstone, 863' - 2" muddy COAL, 864'-864.5' - 6" muddy COAL with calcite veinlets. core angle at 856' = 70°.										
871	875	100%	Medium grey fine-grained sandstone with abundant carbonaceous lamination; and a few thin interbeds of black carbonaceous mudstone. core angle at 874' = 65°.										
875	878	90%	Medium grey coarse-grained sandstone with COALY partings containing calcite veinlets.										
878	887	90%	Very coarse-grained sandstone with interbeds of conglomerate. Pebbles up to 1/4".										
			END OF HOLE.										

092031

Diamond Drill Record

COLLAR: <u>Not Surveyed</u>		HOLE SURVEY		
NORTH: <u>15.210</u>	FOOTAGE	AZIMUTH	DIP	
EAST: <u>9.550</u>	<u>Collar</u>	<u>085°</u>	<u>-50°</u>	
ELEVATION: _____	<u>606'</u>	<u>076°</u>	<u>-52½°</u>	
LOGGED BY: <u>R. P. Hill</u>				
DATE LOGGED: _____				
MAP REFERENCE NO. _____	METHOD: <u>Sperry-Sun</u>			

COMPANY NAME CYPRUS ANVIL MINING CORPORATION
 PROPERTY NAME Carmacks North
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-14
 CLAIM NAME _____
 COMMENCED October 12, 1976
 FINISHED October 16, 1976
 PROJECT NO. _____

FROM:	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	22		Overburden.										
22	38	50	Light grey, very coarse grained pebbly sandstone.										
38	66	70	Light grey, coarse grained sandstone, locally with thin dark grey mudstone bands, also locally mudstone clasts. Bedding swirled locally - soft sediment structures? Core angle at 46' = 60°, at 67' = 15°.										
66	102	90	Dark grey mudstone and siltstone, with a few light grey sandy beds. Core angle at 85' = 20°.										
102	112	90	Dark brown mudstone, with 6" muddy COAL at 110.5'. Core angle at 107' = 30°.										
112	114	90	Muddy COAL.										
114	116	90	Very coarse grained light grey sandstone.										
116	131	90	Dark brown mudstone, with coaly beds at 123', 127-129'. Core angle at 131' = 15°.										
131	141	90	Thinly interlaminated dark grey siltstone and light grey sandstone, with carbonaceous partings. Core angle at 141' = 15°.										
141	146	80	Black carbonaceous mudstone.										
146	156	70	COAL soft, platy, moderately bright. Core angle at 147' = 15°.										
156	166	90	Dark grey mudstone.										
166	167.5	80	Muddy COAL.										
167.5	175	90	Medium grey mudstone. Core angle at 173' = 32°.										

092031

Diamond Drill Record

COLLAR.	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-14</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
175	201	100	Medium to coarse grained light grey sandstone with dark grey mudstone partings. Core angle at 195' = 25°.										
201	232	70	Conglomerate - modal pebble size 1/2" - a few up to 1". Poorly consolidated - poor recovery. Conglomerate locally contains large angular mudstone clasts.										
232	237	80	Finely interlaminated dark grey mudstone and light grey mudstone. Core angle at 232' = 30°.										
237	240	70	Very coarse grained pebbly sandstone - broken up core.										
240	244	90	COAL very soft, crumbly, moderately bright.										
244	258	90	Black carbonaceous mudstone with interbeds of dark grey, very coarse grained carbonaceous sandstone. Core angle at 255' = 0°. (May be fractures).										
258	292	90	Medium grained, light grey sandstone with thin black mudstone interbeds. Becomes gradually coarser over last few feet. Core angle at 261' = 25° at 281' = 50°.										
292	411.5	80	Conglomerate. Pebbles mostly < 1/2", locally reaching 1 1/2". Interbeds up to a couple of feet thick of very coarse grained sandstone, locally pebbly. Below 390' - conglomerate contains a large proportion of green chert pebbles. 390-410' - conglomerate contains COAL partings and a few large COAL fragments. 316-317' - dark grey mudstone with										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-14
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
			carbonaceous partings. Core angle at 316' = 60°, at 337' = 50°, at 356' = 65°, 377' = 53°, 405' = 70°.										
411.5	413	?	Band of coaly, sandy mud. ? Fault.										
413	528	80	Interbedded dark grey siltstone and light grey, fine-grained sandstone with carbonaceous partings, with beds a couple of feet thick of black mudstone. Thin carbonaceous partings throughout. 462' - 4" coal; 486.5' - 3" coal; 488-499' - 1 foot coal; 506.5' - 6" coal. Each of these contains veinlets of calcite. Core angle at 426' = 70°; at 451' = 75°; at 471' = 50°; at 493' = 80°; at 513' = 60°.										
528	592	90	Interbedded light grey, coarse grained sandstone, light grey pebbly, very coarse grained sandstone and conglomerate. Beds of each up to 10 feet thick. Core angle at 534' = 60°; at 554' = 60°; at 574' = 60°.										
592	606	70	Black mudstones and siltstones, with thin interbeds of light grey, coarse grained sandstone containing mudstone clasts. 592-600' - very sheared up. Core angle at 603' = 65°.										
606	621	90	Coarse grained to very coarse grained light grey sandstone, locally pebbly (pebbles up to 2½", up to approx. 50%). Core angle at 620' = 60°.										
			T.D. 621'.										

092031

Diamond Drill Record

COLLAR: Not surveyed		HOLE SURVEY		
SOUTH	10,760	FOOTAGE	AZIMUTH	DIP
EAST	9,900	Collar	090 ⁰	-65 ⁰
ELEVATION		300'	083 ⁰	-60 ⁰
LOGGED BY	R. P. Hill			
DATE LOGGED				
MAP REFERENCE NO.		METHOD: Sperry-Sun		

COMPANY NAME CYPRUS ANVIL MINING CORPORATION
 PROPERTY NAME Carmacks North
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-15
 CLAIM NAME _____
 COMMENCED October 18, 1976
 FINISHED October 22, 1976
 PROJECT NO. _____

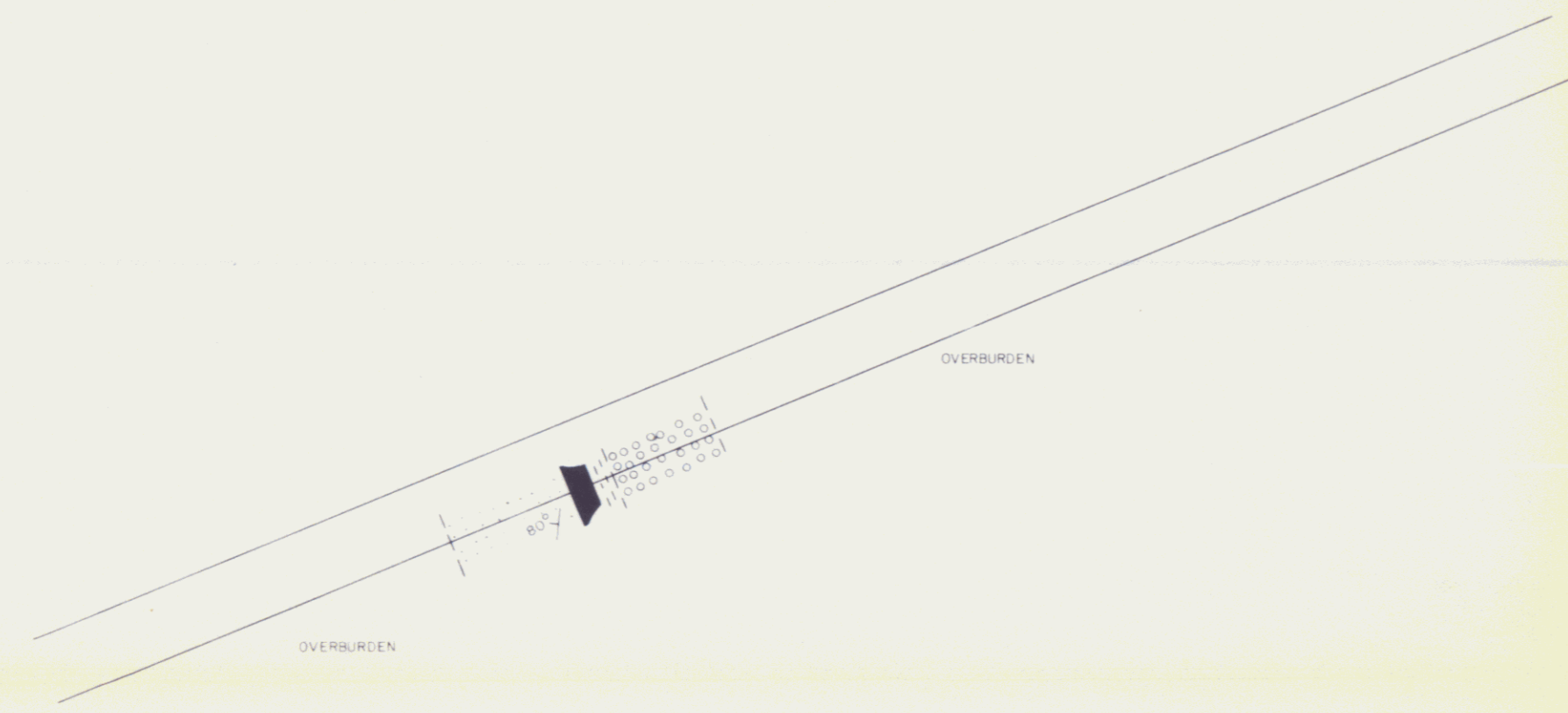
FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	82		Overburden.										
82	95.5	90	Interbedded conglomerate and pebbly sandstone. Pebbles average 1/4" diameter. Core angle at 85' = 70 ⁰ .										
95.5	139.5	70	Interbedded dark brown mudstone and medium grey siltstone, locally with a few light grey sandstone interbeds. 101-102'; 105-106'; 120-121' - black carbonaceous mudstone. Core angle at 105' = 72 ⁰ ; at 132' = 65 ⁰ .										
139.5	246	95	Conglomerate, with interbeds up to 4 feet thick of pebbly sandstone. Pebbles mode 1/2", a few up to 1". Core angle at 214' = 55 ⁰ .										
246	260	90	Dark brownish grey mudstone, locally slightly silty. Massive - bedding indistinct. Local carbonaceous partings. Core angle at 247' = 55 ⁰ .										
260	263.5	100	Very coarse grained, light grey sandstone, locally pebbly, with thin partings of dark grey to black mudstone, and coaly partings.										
263.5	275.5	100	Medium grey siltstone. Core angle at 269' = 80 ⁰ .										
275.5	285.5	90	COAL, probably rather dirty. Moderately bright, very hard, platy to massive.										
285.5	287	90	Dark brown mudstone, locally carbonaceous.										
287	301	100	Interbedded dark brown to dark grey mudstone and light grey, fine to medium grained sandstone, both with carbonaceous partings. Beds up to 4 feet thick. Core angle at 289' = 60 ⁰ .										
			T.D. 301'.										

092031

APPENDIX III

TRENCH PLANS, CARMACKS SOUTH

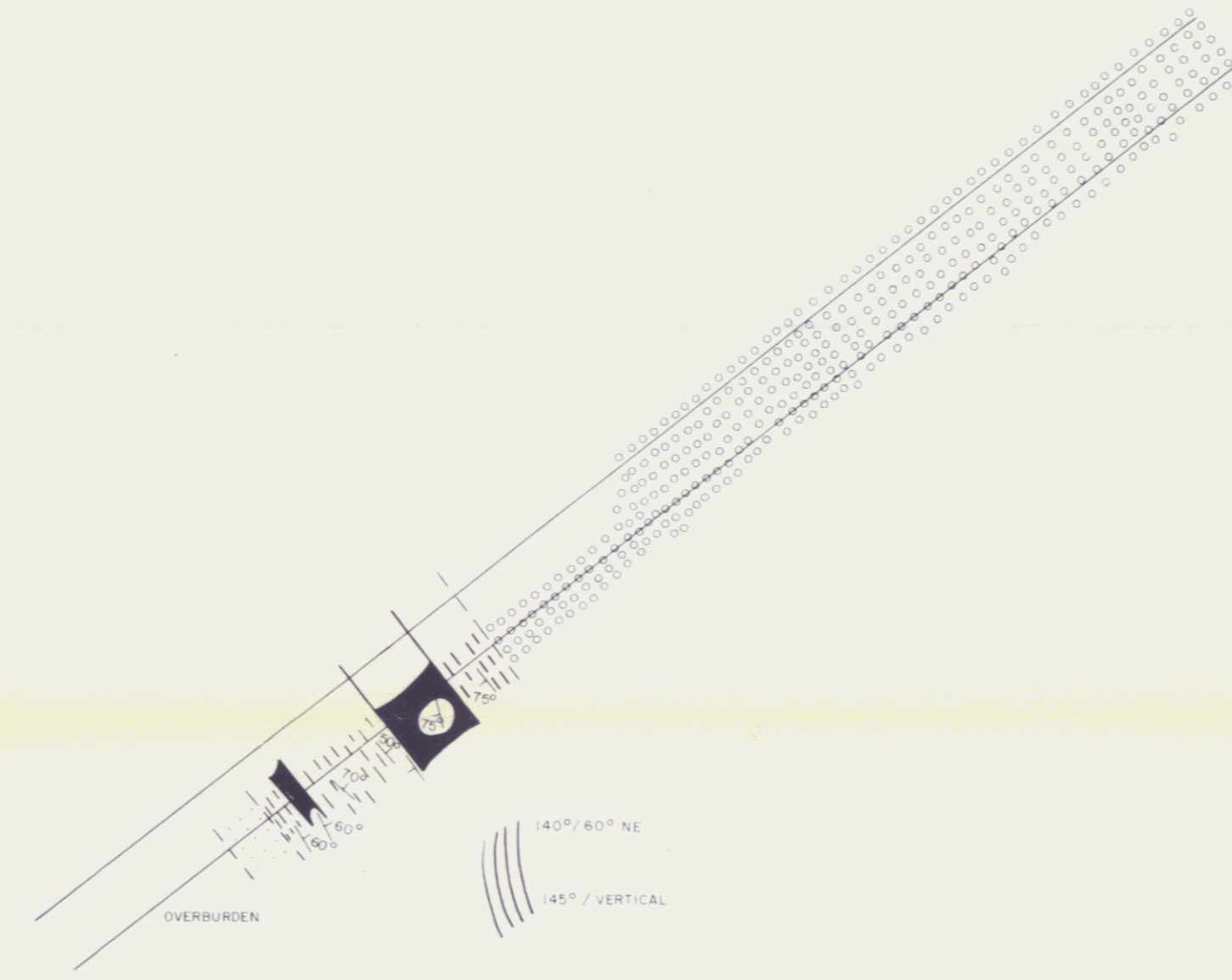
092031



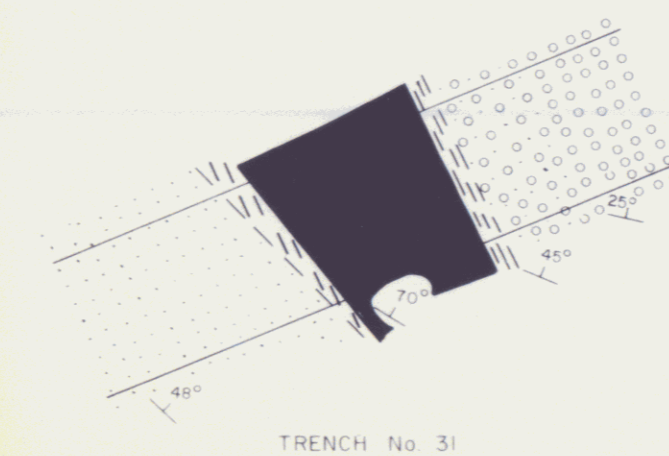
TRENCH No. 28



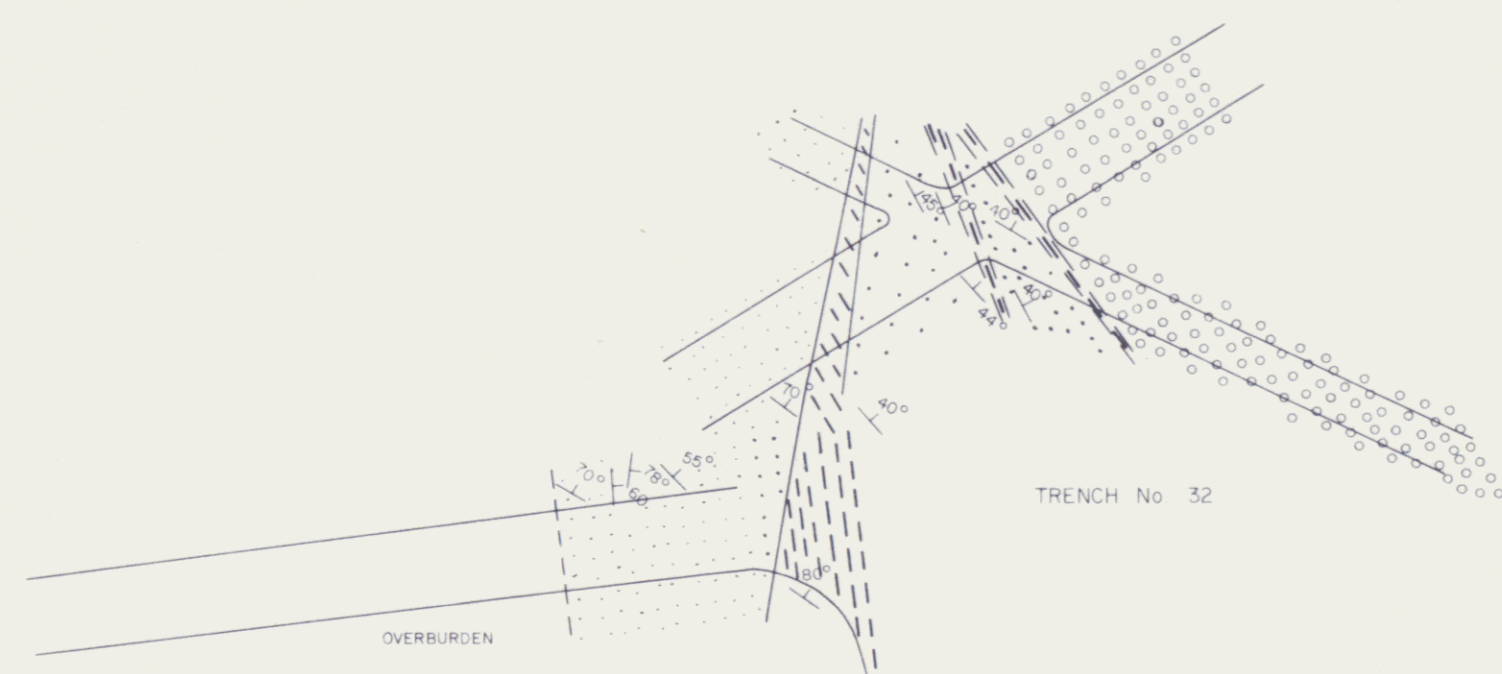
TRENCH No. 29



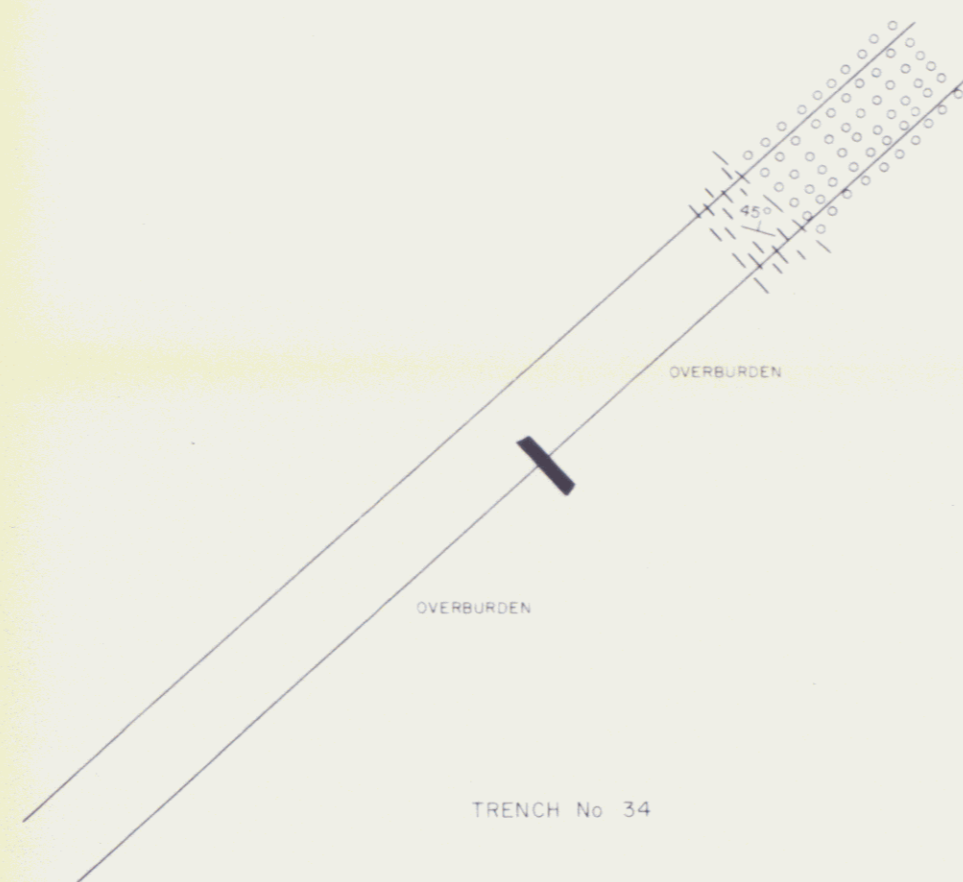
TRENCH No. 30



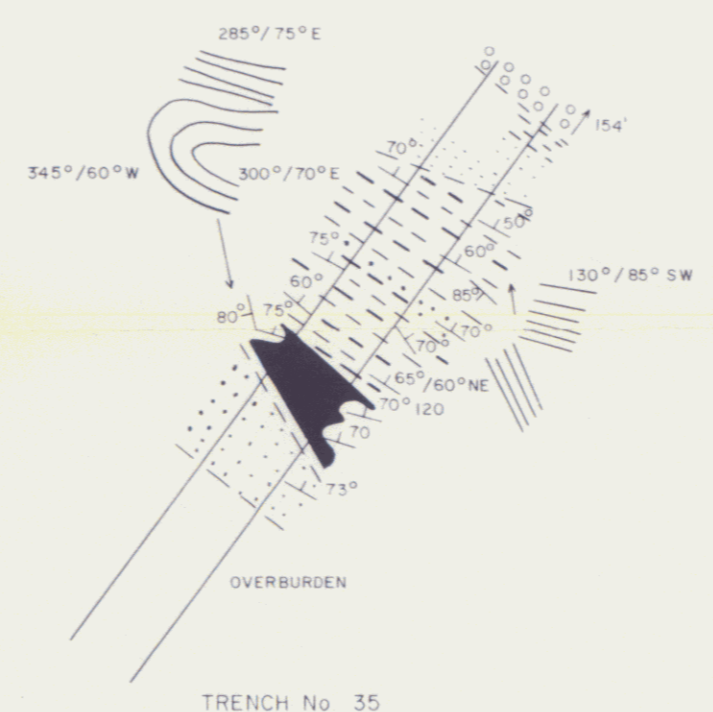
TRENCH No. 31



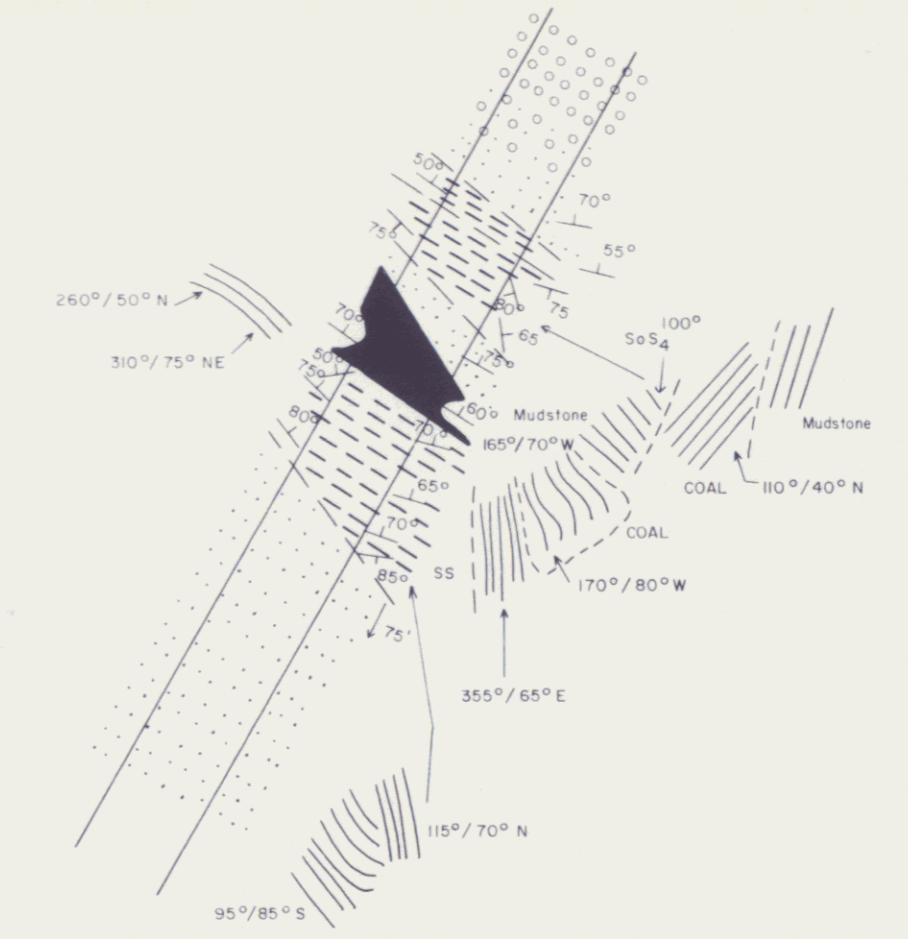
TRENCH No. 32



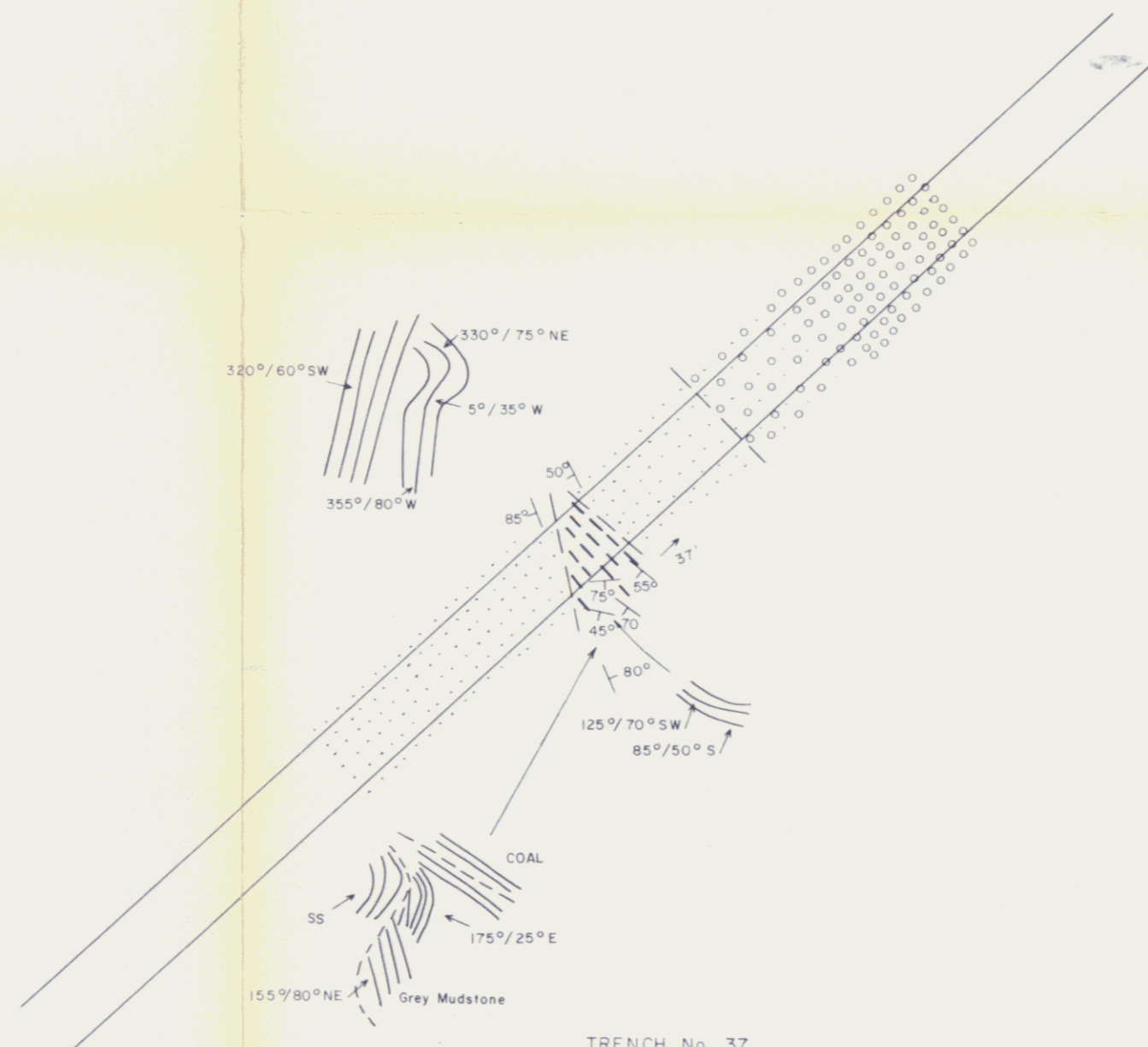
TRENCH No. 34



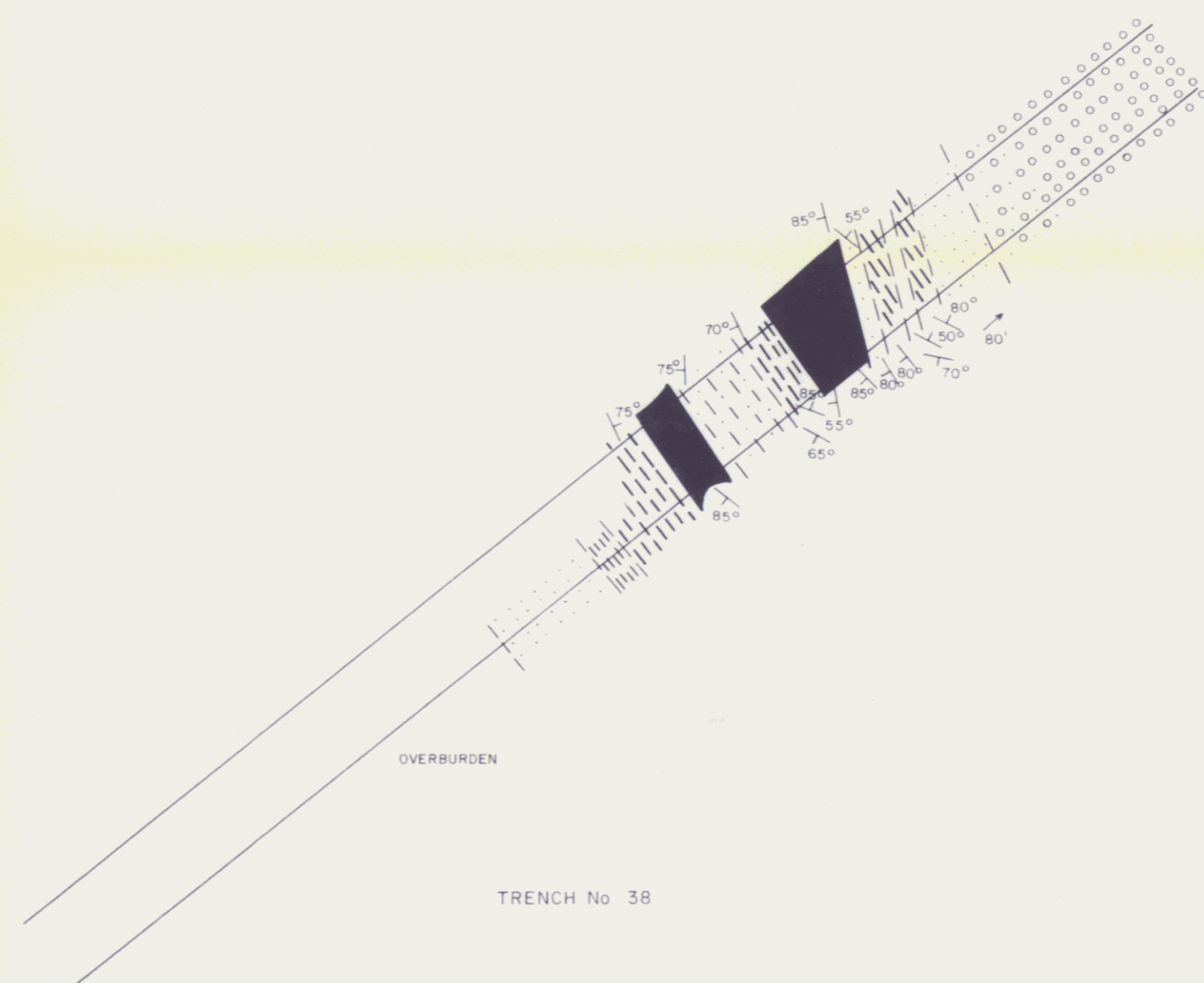
TRENCH No. 35



TRENCH No. 36



TRENCH No. 37



TRENCH No. 38

CARMACKS COAL
Key to Trenches - Lithological Symbols

	PEBBLE CONGLOMERATE
	PEBBLY SANDSTONE
	SANDSTONE
	SILTSTONE
	MUDSTONE
	CARBONACEOUS MUDSTONE
	COAL

CYPRUS ANVIL MINING CORPORATION

CARMACKS SOUTH
092031 TRENCH PLANS

DATE MARCH 31, 1977
SCALE 1" = 40'
DRAWN BY C. L. C. MAP REF. DESIGNED BY R. P. H.

DRILL HOLE LOGS, CARMACKS SOUTH

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>71-2</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
86	91.2		Sandstone - fine grained quartz with some silt size grains, medium uniform grey color, soft, fractures, thick bedded.										
91.2	93		Mudstone - black color, argillaceous, carbonaceous, broken. Polished black fracture faces that feel greasy and chloritic - slickenside faces at 92'. Very broken and soft. Some siltstone at 94'.										
93	103.5		Siltstone - banded, soft, fractures along bands, medium grey color, black colored bands - Core angle - 50°.										
103.5	113		Shale - more hard rock than previous mudstone, competent, more continuous core, black color, carbonaceous, argillaceous. In parts at 109' siltstone bands; silt sized quartz grains.										
113	123		Siltstone and in parts shale. Siltstone - argillaceous quartz silt grains, black color, banded, core angle - 130°. In parts hard black colored shale beds. Interbedded rock, no sharp dimension.										
123	141		Mudstone - soft, argillaceous, black color, carbonaceous. Friable at 138 - 138.5', polished slickensides.										
141	145.3		Sandstone - medium to coarse grained quartz grains, banded core angles, medium grey color.										
145.3	149		Siltstone - banded, silt sized quartz grains, argillaceous. Minor shale bands of black carbonaceous material. Slickensides at 147'. Core angle - 40°.										

180280

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>71-2</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
149	151		Shale - hard, black color, argillaceous, carbonaceous.										
151	154		Siltstone - banded, medium grey color, quartz grains and argillaceous. Core angle - 60°. Minor shale band at 153'.										
154	172		Shale - in most parts broken and friable, short sections competent and hard, slickensides - highly polished at 155.4 - 156.5' and at 162' - nearly concoidal. Coal in appearance but argillaceous in composition. Sandstone seam at 161.5'. Coaly washings.										
172	174.8		Sandstone - fine grained, dark buff grey color, medium hard.										
174.8	190.5		Shale - friable and broken, black color, argillaceous, carbonaceous polished slickensides throughout sandstone seam at 181.6-182.6'. Very poor core recovery, ground core noted at 180.5'. Coaly washings. At 190' - coal seam - not possible to determine thickness (core recovery between 182.6 and 190' is only 2'), quite possible the coal was completely ground out. Estimated coal seam to be 2 - 4 feet thick. Coal seam may be located 184.5 to 190.5'.										
190.5	192.3		Shale - black color, argillaceous. At 192' - Coal seam - core angle - 55° - coal with shale wallrock. 0.3' of coal in corebox. (Core recovery between 192 and 194' is 1:3'). Possible width of seam is 1 foot.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE _____	AZIMUTH _____	DIP _____	
EAST _____	_____	_____	_____	
ELEVATION _____	_____	_____	_____	
LOGGED BY _____	_____	_____	_____	
DATE LOGGED _____	_____	_____	_____	
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>71-2</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS						
				FROM	TO	WIDTH	NO.							
192.3	195.6		Shale - black color, argillaceous, carbonaceous, polished black colored slickensides, fairly hard and good core recovery.											
			At 195.6 - Coal seam - only 0.2' in thickness (core recovery about right and no grinding evident). Coal shed.											
195.6	211.6		Shale - hard, competent black color, argillaceous, carbonaceous, in parts black polished slickensides. Poor core recovery, broken shale.											
211.6	212.7		Coal seam - appears to be 1 foot thick with all core recovered.											
212.7	237		Shale - competent hard, argillaceous, broken in parts, good core recovery, carbonaceous. In parts some minor silt.											
237	239		Siltstone - banded, medium grey color with black colored bands.											
239	256.5		Shale - broken, in parts friable, black color, carbonaceous, argillaceous.											
255.5	263		Sandstone/siltstone - silt and sand sized grains quartz, in parts broken where siltstone is prevalent.											
263	310		Shale - black color, argillaceous, carbonaceous, in parts polished black colored slickensides, hard and heavy competent rock, good core recovery. Some siltstone at 287-289' and at 295-296'. T.D. 310'.											
			Note: from surface to last coal occurrences 0-211.7' the mudstone and shale beds were fairly soft, below the last coal the beds were more competent with better core recovery.											

190260

COLLAR Not Surveyed.		HOLE SURVEY		
NORTH <u>South</u> 8,850	FOOTAGE	AZIMUTH	DIP	
EAST 17,550	Collar	090 ⁰	-60 ⁰	
ELEVATION	240'	-	-60 ⁰	
LOGGED BY <u>M. P. Phillips</u>				
DATE LOGGED				
MAP REFERENCE NO.	METHOD: Acid			

Diamond Drill Record

COMPANY NAME Teslin Exploration Ltd.
 PROPERTY NAME Carnacks South
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. 73-1
 CLAIM NAME _____
 COMMENCED October 14, 1973
 FINISHED October 19, 1973
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS											
				FROM	TO	WIDTH	NO.												
0	14.5		Overburden.																
14.5	28.5		Conglomerate - well packed, angular to subrounded pebbles up to 1" in a gritty, calcareous matrix. Pebbles chiefly white quartz and black chert.																
28.5	32.5		Sandstone - grey, medium grained, massive. Black chert speckled. Slightly calcareous and feldspathic.																
32.5	50.3		Mudstone - black, often weathered to a dark grey mud, with narrow bands of interlaminated siltstone and mudstone. Local coaly partings. Core angle at 34' = 70 ⁰ , at 42' = 75 ⁰ .																
50.3	96.5		Mudstone and siltstone - bands of black to grey mudstone and siltstone with bands of grey, fine-grained massive to cross-bedded sandstone. Coal partings and laminations common. 91.3 - 92.0' - carbonaceous shale grading into black shiny coal. Core angle at 63' = 80 ⁰ , at 82' = 60 ⁰ .																
96.5	132.8		Siltstone - dark grey to black; massive. Often grades into bands of silty black mudstone. Local narrow bands of sandstone. Core angle at 111' = 50 ⁰ , at 133' = 40 ⁰ .																
132.8	166.1		Mudstone - black, massive; occasional narrow, poorly defined bands of siltstone. 163.0' - 4" coal. Core angle at 152' = 60 ⁰ , at 166' = 60 ⁰ .																

052081

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>73-1</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
166.1	171.9		Mudstone - black, massive. Numerous partings, lenses and narrow bands of coal.										
171.9	176.5		COAL.										
176.5	217.5		Mudstone - grey to black, with poorly defined dark grey, narrow siltstone bands and zones.										
217.5	218.3		COAL with mudstone partings.										
218.3	223.0		Mudstone (as 176.5 - 217.5').										
223.0	224.0		Mudstone with coal partings grading into a coal band.										
224.0	240.0		Mudstone - with bands of black siltstone and grey, fine grained bedded sandstone. Core angle at 236.5' = 70°.										
			T.D. 240.0'										

190260

COLLAR: Not surveyed	HOLE SURVEY		
SOUTH 4,200	FOOTAGE	AZIMUTH	DIP
EAST 11,700	Collar	225 ⁰	-60 ⁰
ELEVATION	250'	--	-60 ⁰
LOGGED BY P. Hannigan	510'	--	-61 ⁰
DATE LOGGED			
MAP REFERENCE NO.	METHOD: Acid		

Diamond Drill Record

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS SOUTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER Cyclone Engineering
 PURPOSE OF HOLE _____

HOLE NO. C-76-4
 CLAIM NAME _____
 COMMENCED Sept 11/76
 FINISHED Sept. 19/76
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS						
				FROM	TO	WIDTH	NO.							
0	8	0	Overburden.											
8	222	90%	Conglomerate-chert and quartzite pebbles up to 2" diameter, local mudstone pebbles, local carbonaceous partings. 89-90' - pebbly sandstone, light grey to brownish-grey, fine to medium-grained. 141-144' - Sandstone, light to medium grey, carbonaceous partings; 160-163' - Interbedded medium brownish-grey siltstone and dark grey mudstone, carbonaceous; 207-209' - No core recovery (SAND). 218-221' - Interbedded black siltstone and light grey or very fine-grained sandstone; rust stained locally. Core angles at 41'=10 ⁰ ; 73'=40 ⁰ ; 82'=40 ⁰ ; 141'=30 ⁰ ; 162'=20 ⁰ ; 182'=40 ⁰ ; 197'=30 ⁰ ; 219'=35 ⁰ .											
222	229	30%	Sandstone-soft, poorly indurated, medium to coarse-grained, light grey, slightly carbonaceous.											
229	231	0	No recovery (SAND).											
231	235	40%	Pebbly sandstone- soft, poorly indurated, as 222-229'; with approximately 20% pebbles, up to 1/2" diameter.											
235	251	80%	Conglomerate, pebbles up to 1", locally carbonaceous, Core angle at 239' =50 ⁰ . **N.B. 251' probably represents base of Tantalus Formation, with Laberge Formation below.											
251	255	~90%	Sandstone- mottled light grey and white, fine-grained; carbonaceous; indistinct bedding; pebble free.											

052031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-4
 CLAIM NAME _____
 COMMENCED _____
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS			
				FROM	TO	WIDTH	NO.				
255	256	~50%	Mudstone-carbonaceous; crumbly; poor recovery.	261.0	266.0	5.0	C-12				
256	260	~90%	Sandstone-as above; fine-grained to coarse-grained; carbonaceous; indistinct bedding; core angle at 260'= $\sim 30^{\circ}$.	266.0	271.0	5.0	C-13				
				271.0	276.0	5.0	C-14				
260	261	~70%	Mudstone-carbonaceous with COAL partings; soft.	276.0	281.0	5.0	C-15	T 5			
261	297	~90%	COAL - bright, dirty in part, flaky, soft and crumbly. Core angle at 280'= $\sim 30^{\circ}$.	281.0	286.0	5.0	C-16				
				286.0	291.0	5.0	C-17				
297	304	~70%	Mudstone and siltstone- dark grey; carbonaceous with COAL partings; white limestone fragments. Core angle at 300'= $\sim 55^{\circ}$.	291.0	297.0	6.0	C-18				
304	306	~90%	COAL - bright, soft and crumbly.								
306	315	~80%	Mudstone and siltstone; dark grey to black; carbonaceous with COAL partings; white limestone fragments, indistinct bedding.								
315	480	~90%	Sandstone-light grey to white, white limestone fragments, fine-grained to medium-grained; free of pebbles, non carbonaceous, indistinct bedding; core angle at 317'= $\sim 35^{\circ}$; 360'= $\sim 20^{\circ}$; 380'= $\sim 30^{\circ}$; 400'= $\sim 20^{\circ}$; 425'= $\sim 20^{\circ}$; 438'= $\sim 20^{\circ}$; 449'= $\sim 45^{\circ}$; 462'= $\sim 25^{\circ}$; 480'= $\sim 25^{\circ}$; minor calcareous lenses. Minor mudstone layers- dark grey; one at 389'=4" wide and at 397' =6" wide, - also sandstone-fine-grained in this layer.								
480	484	~90%	Sandstone-light grey to medium grey, carbonaceous; mudstone layers present; distinctive bedding; fine-grained.								

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-4</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
484	488	~90%	Sandstone-white to light grey; white limestone fragments; slightly carbonaceous; indistinct bedding; medium-grained.										
488	496	~90%	Siltstone and mudstone interbedded with fine-grained sandstone layers; carbonaceous; distinctive bedding; calcareous stringers; medium-grained white speckled sandstone layer present as 490'; core angle at 496'~45°.										
496	509	~90%	Sandstone-mottled light grey and white; medium-grained; calcareous lenses and stringers; interbedded dark grey sandstone and siltstone layers-carbonaceous blebs and stringers.										
509	511	~90%	Sandstone-medium grey with dark grey mudstone bands; Calcareous lenses and stringers; mudstone layers relatively soft; bedding distinctive.										
511	516	~80%	Sandstone- mottled medium grey and white, no distinct bedding; medium-grained to coarse-grained.										
516	517	~90%	Sandstone-medium grey; slightly carbonaceous; mudstone layers present; distinctive bedding.										
			END OF HOLE.										

002034

SOLAR: Not surveyed		HOLE SURVEY		
TYPE SOUTH 5,320		FOOTAGE	AZIMUTH	DIP
EAST 12,400		Collar	230 ⁰	-60 ⁰
ELEVATION		259'	234 ⁰	-62 ⁰
LOGGED BY P. Hannigan		519'	233 ⁰	-62 ⁰
DATE LOGGED		METHOD: Sperry-Sun		
MAP REFERENCE NO.				

Diamond Drift Record

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS SOUTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER Cyclone Engineering
 PURPOSE OF HOLE _____

HOLE NO. C-76-6
 CLAIM NAME _____
 COMMENCED Sept. 20, 1976.
 FINISHED Sept. 23, 1976.
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	5		OVERBURDEN.										
5	11	~90%	Conglomerate - shale, quartzite and chert pebbles in a coarse-grained sandy matrix; no distinct bedding; pebbles are subrounded and poorly sorted; ~80% pebbles up to ½" diameter.										
11	12	~80%	Sandstone; coarse-grained, pebbly; no distinct bedding; 5% pebbles up to ¼" diameter; core angle at 12'~40°.										
12	23	~70%	Conglomerate- as above; ~80% pebbles up to ½" diameter; sandy layers present-very soft and crumbly; slightly carbonaceous..										
23	26	--	Sand - no core recovery.										
26	38	~70%	Pebbly sandstone- fine-grained to coarse-grained; medium grey to white; calcareous; 0-10% pebbles; carbonaceous in parts; indistinct bedding; pebbles up to 1" in diameter; core angle at 32'~50°.										
39	53	~80%	Conglomerate - as above; ~70% pebbles up to 1" diameter.										
53	57	~50%	Sandstone - fine-grained; brown; pebbly in parts; carbonaceous in parts; soft in parts, hard in others; indistinct bedding; core angle at 57'~50°										
57	99	~90%	Conglomerate-as above; ~70% pebbles up to 1" diameter; sandstone layer at 79' - 3" wide; core angle at 79'~60°; soft, crumbly layer at 90'; vuggy in parts; carbonaceous in parts.										
99	104	~90%	Sandstone - medium-grained to coarse-grained, light grey to medium grey; carbonaceous with COAL and mudstone partings; core angle at 102'~55°.										

10020

Diamond Drill Record

CORNER:		HOLE SURVEY		
NORTH _____	FOOTAGE _____	AZIMUTH _____	DIP _____	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-6
 CLAIM NAME _____
 COMMENCED _____
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
104	111	~90%	Pebbly sandstone- light grey to brownish-grey; medium-grained to coarse-grained; carbonaceous with thin COAL partings; 0 -20% pebbles; conglomerate layer at 109'.										
111	123	~90%	Conglomerate - as above; pebble diameter up to 1"; 80% pebbles; core angle at 123'~15°.										
123	127	~25%	Sandy conglomerate and sand; very poor recovery.										
127	137	~80%	Conglomerate - as above; ~80-90% pebbles up to 1" diameter.										
137	140.5	~90%	Mudstone-carbonaceous with COAL partings; thin sandstone interbeds; core angle at 138'~50°.										
140.5	158	~70%	Conglomerate- as above; ~70% pebbles up to 2" diameter; soft sand layers interbedded.										
158	160	~80%	Mudstone - light grey to dark brown; pebbles present; carbonaceous; core angle at 159'~60°.										
160	192	~70%	Conglomerate - as above; 70-80% pebbles up to 2" diameter; soft sand layers interbedded; poor recovery of sand layers; carbonaceous in parts; core angle at 192'~50°.										
192	196	~90%	Pebbly sandstone with interbeds of conglomerate; coarse-grained; carbonaceous; ~20% pebbles up to ½" diameter; vuggy in parts.										
196	203	~80%	Conglomerate - as above; 90% pebbles up to 2" diameter.										
203	205	~80%	Pebbly sandstone-light grey; coarse-grained/vuggy in parts; ~5% pebbles.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____

PROPERTY NAME _____

DRILLING CONTRACTOR _____

ASSAYER _____

PURPOSE OF HOLE _____

HOLE NO.	C-76-6
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
205	238	~80%	Conglomerate - 60 - 100 pebbles up to 1" diameter; vuggy in parts; sandstone layers present; carbonaceous in parts; core angle at 210'~30°; at 236'~50°.										
238	239	~50%	Sandstone-medium grey; fine-grained; carbonaceous; bedding distinct; mudstone layer present as well.										
239	251	~70%	Conglomerate - as above; ~70% pebbles up to ½" diameter; vuggy in parts.										
251	252	~80%	Sandstone - coarse-grained; light grey; indistinct bedding; pebble-free.										
252	260	~90%	Mudstone and siltstone; dark grey; soft; indistinct bedding; core angle at 260'~60°.										
260	262	~90%	Sandstone - fine-grained; light grey; distinct bedding.										
262	278	~90%	Sandstone - coarse-grained; white; indistinct bedding; slightly carbonaceous in parts; calcareous cement.										
278	279	~90%	Interbedded sandstone and mudstone; medium grey; slightly carbonaceous; non-calcareous; core angle at 279'~75°.										
279	293	~90%	Sandstone - coarse-grained; white; indistinct bedding; carbonaceous in parts - increases with depth, calcareous, mudstone and calcareous clasts in part.										
293	294	~80%	Mudstone and fine-grained sandstone with mudstone layers; carbonaceous with COAL partings; light grey to dark grey, to black; non-calcareous.										

092031

Diamond Drill Record

COLOR: _____		HOLE SURVEY		
		FOOTAGE	AZIMUTH	DIP
NORTH _____				
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-6
 CLAIM NAME _____
 COMMENCED _____
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
294	304.5	~75%	COAL - dull lustre, fairly soft, relatively clean. mudstone layer at 299' 4" thick; core angle at 300'~50°.	294.0	299.0	5.0	C-24	T 7					
				299.0	304.5	5.5	C-25						
304.5	308	~90%	Sandstone - fine-grained; light grey; slightly carbonaceous; calcareous stringers; bedding distinct; pebble-free.	308.0	313.0	5.0	C-26						
				313.0	318.0	5.0	C-27						
308	339	~70%	COAL - shiny lustre; soft; crumbly; clean; carbonaceous mudstone layers present; core angle at 321'~40°.	318.0	323.0	5.0	C-28	T 8					
				323.0	328.0	5.0	C-29						
339	343	~90%	Sandstone- coarse-grained, light grey to white; calcareous; carbonaceous in parts; core angle at 340'~40°.	328.0	333.0	5.0	C-30						
				333.0	339.0	6.0	C-31						
343	345	~90%	Mudstone - medium grey; soft; fine-grained sandstone layers interbedded; carbonaceous in parts.										
345	349	~90%	Sandstone - very coarse-grained; light grey to white; calcareous; mudstone layers present; calcareous stringers; indistinct bedding.										
349	352	~90%	Mudstone - dark grey; carbonaceous; calcareous stringers; light grey sandstone beds interbedded; calcareous stringers present; medium hard to soft.										
352	357	~90%	COAL - shiny lustre; soft to hard; clean; crumbly and friable; blocky; minor mudstone layer at 355'.	352.0	357.0	5.0	C-32	A 3					
357	363	~80%	Mudstone - soft, dark grey; carbonaceous with COAL partings; indistinct bedding; core angle at 360'~50°.										

092031

Diamond Drill Record

DOLLAR:		HOLE SURVEY		
		FOOTAGE	AZIMUTH	DIP
NORTH _____				
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____

PROPERTY NAME _____

DRILLING CONTRACTOR _____

ASSAYER _____

PURPOSE OF HOLE _____

HOLE NO. <u>C-76-6</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS			
				FROM	TO	WIDTH	NO.				
363	378	~60%	COAL - shiny lustre, soft to medium hard; crumbly and blocky; friable;	363.0	368.0	5.0	C-33				
			mudstone layer at 375' - about 6"; core angle at 380'~50°.	368.0	373.0	5.0	C-34	T 9			
378	393	~80%	Mudstone - carbonaceous with COAL partings; dark grey to black; soft.	373.0	378.0	5.0	C-35				
393	403	~80%	COAL - shiny lustre; soft to medium hard; crumbly and blocky; friable;	393.0	398.0	5.0	C-36	T 10			
			clean; core angle at 403'~50°.	398.0	403.0	5.0	C-37				
403	413	~90%	Mudstone - carbonaceous with COAL partings; dark grey to black; soft to medium hard; indistinct bedding.								
413	519	~80%	Sandstone - fine-grained to coarse-grained; light grey to white; calcareous; carbonaceous in parts; indistinct bedding; core angle at 420'~20°;								
			440'~50°; 460'~35°; 500'~35°; 519'~35°; thin mudstone layers at 480' and 515'.								
519	519.5	~90%	Mudstone - dark grey; carbonaceous; soft; bedding distinct.								
519.5	522	~90%	Sandstone; coarse-grained; calcareous; indistinct bedding; non carbonaceous; light grey to white.								
			END OF HOLE.								

092031

Diamond Drill Record

COLLAR: Not surveyed		HOLE SURVEY		
DEPTH SOUTH 4,070	FOOTAGE	AZIMUTH	DIP	
EAST 11,860	Collar	225 ⁰	-60 ⁰	
ELEVATION	494'	225 ⁰	-62 ⁰	
LOGGED BY P. Hannigan	814'	226 ⁰	-61 ⁰	
DATE LOGGED				
MAP REFERENCE NO.	METHOD: Sperry-Sun			

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS SOUTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-7</u>
CLAIM NAME _____
COMMENCED <u>Sept 24, 1976</u>
FINISHED <u>October 5, 1976</u>
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	12	-	OVERBURDEN.										
12	17	~90%	Pebbly sandstone - light grey; medium-grained to coarse-grained; Percentage of pebbles increases with depth; 0-10% pebbles; pebbles consist of mudstone, quartzite and chert; carbonaceous in parts; bedding indistinct.										
17	20	~90%	Conglomerate - light grey to brownish-grey; chert, mudstone, and quartzite pebbles in coarse-grained sandy matrix; diameter of pebbles up to 1/2" in diameter; subrounded; poorly sorted; ~70-80% pebbles; carbonaceous in parts; COAL band at 18' ~ about 2" wide; shiny lustre; friable; soft, platy; core angle at 18' ~ 55 ⁰ ; soft sand layers present at 19' and 20'; poor core recovery in soft sand layers.										
20	23	~90%	Pebbly sandstone - as above; ~20% pebbles up to 1/2" diameter; carbonaceous in parts.										
23	24	~90%	Conglomerate - as above; ~70% pebbles up to 1/2" in diameter.										
24	27	--	Sand - no core recovery.										
27	32	~10%	Conglomerate - as above; ~70% pebbles up to 1/2" diameter; poor recovery due to presence of sand.										
32	71	~70%	Conglomerate with interbeds of pebbly sandstone; as above; 20-90% pebbles up to 1" diameter; carbonaceous in parts; core angle at 38' ~ 50 ⁰ ; at 58' ~ 50 ⁰ .										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	EAST _____	FOOTAGE	AZIMUTH	DIP
ELEVATION _____	LOGGED BY _____			
DATE LOGGED _____	MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-7
 CLAIM NAME _____
 COMMENCED _____
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
71	85	~80%	Sandstone and interbeds of pebbly sandstone; medium-grained to coarse-grained; carbonaceous in parts; bedding indistinct; 0-10% pebbles up to ½" diameter. Core angle at 85'~70°.										
85	95	~30%	Conglomerate with soft sand layers interbedded that give little or no recovery; conglomerate - as above; ~70% pebbles up to ½" diameter.										
95	100	~90%	Pebbly sandstone - coarse-grained; light grey; carbonaceous in parts; 0-40% pebbles up to ½" diameter.										
100	109	~80%	Conglomerate - as above; 70-100% pebbles up to ½" diameter; core angle at 104'~40°.										
109	110	~90%	Sandstone - dark grey; medium to coarse-grained; carbonaceous in parts; also conglomerate layer present; sandstone itself is relatively pebble-free.										
110	116	~90%	Conglomerate - as above; ~90% pebbles up to ½" diameter.										
116	125	~90%	Pebbly sandstone - light grey to white; coarse-grained; bedding indistinct; ~10% pebbles up to ½" diameter. Core angle at 124'~65°.										
125	133	~90%	Conglomerate - as above; ~90% pebbles up to ½" diameter; carbonaceous in parts.										
133	134	~90%	Sandstone - light grey; medium-grained no distinct bedding; pebble-free.										
134	137	~90%	Conglomerate - as above; ~90% pebbles up to 1" diameter.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE _____	AZIMUTH _____	DIP _____	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-7</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
137	141	~90%	Pebbly sandstone - light grey; coarse-grained; ~0-20% pebbles up to 2" diameter; carbonaceous in parts.										
141	155	~90%	Conglomerate with pebbly sandstone beds interbedded; as above; up to 90% pebbles up to 1/2" diameter; carbonaceous in parts; core angle at 144' ~45°.										
155	164	~90%	Pebbly sandstone with interbeds of conglomerate; white; very coarse-grained; pebbles up to 1/4" diameter; 0-20% pebbles in sandstone; 90% in conglomerate.										
164	195	~80%	Conglomerate - as above; ~80-90% pebbles up to 2" diameter; carbonaceous in parts; core angle at 164' ~65°; at 134' ~35°.										
195	198	~90%	Sandstone - pebbly as depth increases; dark grey; fine-grained; carbonaceous in parts.										
198	224	~90%	Conglomerate - as above; ~70-90% pebbles up to 1"; carbonaceous in parts; indistinct bedding; core angle at 203' ~20°; at 224' ~30°.										
224	236	~85%	Pebbly sandstone - small layers of conglomerate interbedded; coarse-grained; light grey; ~20% pebbles up to 1/2" diameter; non carbonaceous.										
236	238	~90%	Conglomerate - as above; ~90% pebbles up to 1/2" diameter; non carbonaceous.										
238	240	~80%	Pebbly sandstone - ~5% pebbles up to 1/2" diameter; non carbonaceous.										
240	242	~80%	Conglomerate - as above; ~80% pebbles up to 1/2" diameter; indistinct bedding.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD: _____			

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-7
 CLAIM NAME _____
 COMMENCED _____
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
242	257	~80%	Pebbly sandstone; as 240-242; 20% pebbles up to 1" diameter; core angle at 240'~30°; conglomerate layers present.										
257	278	~90%	Conglomerate - as above; ~80% pebbles up to 1" diameter; core angle at 265'~60°.										
278	282	~40%	Sand - poor recovery; brown to light grey; soft.										
282	295	~80%	Conglomerate - as above; 80-90% pebbles up to 2" diameter; core angle at 287'~20°.										
295	295.5	~90%	Sandstone - fine-grained; soft; brownish-grey; no distinct bedding.										
295.5	328	~90%	Conglomerate - as above; 70-90% pebbles up to 2" diameter; core angle at 307'~65°; at 327'~60°.										
328	337	~90%	Pebbly sandstone - light grey; coarse-grained; 0-40% pebbles up to 2" diameter; small conglomerate layer present.										
337	345	~90%	Conglomerate - as above; ~90% pebbles up to 2" diameter.										
345	346	~90%	Pebbly sandstone - light grey; medium grained; 5% pebbles up to 1" diameter; core angle at 345'~40°.										
346	353	~90%	Conglomerate - as above; ~70% pebbles up to 1/2" diameter.										
353	358	~90%	Pebbly sandstone and conglomerate interbedded; both lithologies as above; 0-90% pebbles up to 1/2" diameter.										
358	367	~80%	Pebbly sandstone - medium-grained to coarse-grained; light grey; indistinct bedding; carbonaceous at 365' only; 0-10% pebbles up to 2" diameter.										

092031

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE _____	AZIMUTH _____	DIP _____	
EAST _____	_____	_____	_____	
ELEVATION _____	_____	_____	_____	
LOGGED BY _____	_____	_____	_____	
DATE LOGGED _____	_____	_____	_____	
MAP REFERENCE NO. _____	METHOD: _____			

Diamond Drill Record

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-7
 CLAIM NAME _____
 COMMENCED _____
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
358	367	~80%	core angle at 365'~35°.										
367	377	~90%	Conglomerate - as 358-367'; ~70% pebbles up to 4" diameter.										
377	378	~90%	Pebbly sandstone - as above.										
378	387	~90%	Conglomerate - as above- ~70-80% pebbles up to 1/2" diameter; core angle at 387'~45°.										
387	389	~90%	Sandstone - coarse-grained to very coarse-grained; light grey to white; vuggy in parts; indistinct bedding.										
389	396.5	~90%	Conglomerate - as above; ~90% pebbles up to 2" diameter; carbonaceous at 396' only.										
396.5	397.5	~90%	Sandstone and mudstone interbedded; carbonaceous with COAL partings; medium hard; medium-grey to dark grey; sandstone is medium-grained.										
397.5	415	~80%	Conglomerate - as above; ~80-90% pebbles up to 1" diameter; core angle at 411'~50°.										
415	416	~90%	Mudstone - dark grey; soft; non carbonaceous; indistinct bedding.										
416	458	~90%	Conglomerate - as above; 70-90% pebbles up to 3" in diameter; core angle at 431'~30°; at 451'~30°.										
458	470	~90%	Sandstone - medium grey to white; medium-grained to coarse-grained; indistinct bedding; carbonaceous in parts; calcareous stringers; relatively pebble-free; core angle at 462'~40°.										
470	492	~40%	Conglomerate - as above; 70-90% pebbles up to 1" diameter;										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____

PROPERTY NAME _____

DRILLING CONTRACTOR _____

ASSAYER _____

PURPOSE OF HOLE _____

HOLE NO. <u>C-76-7</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
470	492	~ 40%	Core angle at 482'~55°.										
492	493	~90%	Sandstone - light grey; coarse-grained; indistinct bedding; pebble-free.										
493	515	~90%	Conglomerate - as above; ~80-90% pebbles up to 2" diameter; core angle at 503~55°.										
515	519	~70%	Sandstone - light grey; coarse-grained; pebble-free; indistinct bedding.										
519	522	~90%	Conglomerate - as above; ~70-90% pebbles up to 1" diameter.										
522	523	~50%	Sandstone - as above; core angle at 523'~30°.										
523	525	~60%	Conglomerate - as above; 90% pebbles up to 1/2" in diameter.										
525	526	~90%	Pebbly sandstone - coarse-grained; 0-40% pebbles up to 1/2" in diameter.										
526	530	~90%	Conglomerate - as above; ~90% pebbles up to 1/2" diameter.										
530	537	~90%	Pebbly sandstone - light grey; medium-grained; 0-20% pebbles up to 1/2" diameter.										
537	571	~90%	Conglomerate - as above; ~70% pebbles up to 1" diameter; core angle at 538'~50°; at 563'~40°.										
571	585	~70%	Mudstone - dark grey; hard; carbonaceous; bedding indistinct; core angle at 581'~50°.										
585	604	~90%	Mudstone - calcareous; limestone fragments; indistinct bedding; hard; dark grey; carbonaceous in parts; core angle at 601'~60°.										
604	817	~90%	Sandstone - fine-grained to medium-grained; medium grey to light grey; limestone fragments locally non carbonaceous; indistinct bedding;										

-Continued-

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
	FOOTAGE	AZIMUTH	DIP
NORTH _____			
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
PROPERTY NAME _____
DRILLING CONTRACTOR _____
ASSAYER _____
PURPOSE OF HOLE _____

HOLE NO. C-76-7
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS						
				FROM	TO	WIDTH	NO.							
604	817	~90%	Core angle at 627'~55°; at 647'~30°; 667'~35°; 686'~50°; 709'~60°;											
		Contd	722'~40°; 742'~55°; 762'~50°; 782'~55°; 801'~65°.											
			END OF HOLE.											

092031

COLLAR: Not surveyed	HOLE SURVEY		
NORTH- SOUTH 5,320	FOOTAGE	AZIMUTH	DIP
EAST 12,400	Collar	--	-90°
ELEVATION			
LOGGED BY T.J. Adamson & R. Hill			
DATE LOGGED			
MAP REFERENCE NO.	METHOD:		

Diamond Drill Record

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS SOUTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-10
 CLAIM NAME _____
 COMMENCED Aug. 29, 1976
 FINISHED Sept. 10, 1976
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	16	--	OVERBURDEN.										
16	45	85%	Massive Tantalus conglomerate; fine-grained to medium-grained; silicious sand matrix; 34' - 35' limonite sand matrix.										
45	48	80%	Conglomeratic sandstone - thin COALY and carbonaceous lenses along bedding; Core angle at 46' = 45°.										
48	100	90%+	Massive fine-grained to coarse-grained Tantalus conglomerate; 48' - 70' - muddy sand matrix; some poor consolidation, some limonite; 70' - 100' - clean, hard, silicious matrix.										
100	102.5	90%	Conglomeratic sandstone; gradational upper contact.										
102.5	104	90%	Medium-grained conglomerate.										
104	109	90%	Interbedded sandstone and conglomerate; numerous thin COALY lenses along bedding (fraction of an inch). core angle at 104' = 45°.										
109	123	109-116 80%	Medium-grained conglomerate; limonite muddy sand matrix.										
		116-123 50%											
123	126	85%	Muddy sandstone; medium-grained; brownish-grey; scattered thin irregular COALY lenses to 1/2".										
126	141	80%	Medium-grained massive conglomerate; core angle at 132' = 55°.										
141	143	80%	Medium-grained muddy sandstone; numerous thin randomly oriented bright COAL lenses.										
143	147	85%	Conglomerate.										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	<u>C-76-10</u>
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
147	159	85%	Medium-grained sandstone; some sections limonitic matrix with 6" very limonitic at 150'; thin, "wispy" consolidated bright COAL lenses throughout (all 1/8"); core angle 45°.										
159	231	85%	Medium to coarse-grained conglomerate; some slightly limonitic. 162' - 2" COALY shale - core angle 50°. 171' - 172' - medium-grained sandstone - core angle 50°. 166' - 167' - sandstone. 180' - 185' - coarse-grained sandstone - core angle 45°. 202' - 203' - medium-grained sandstone; irregular COAL lenses and fragments.										
231	238	90%	Dark brown to black; fine-grained; mudstone; some gritty; massive to finely laminated; some very slickensided. 231.5' - 1" COAL.										
238	347	95%	Medium-grained to coarse-grained massive Tantalus conglomerate; 292' - 1' core lost; 343' - 2" COALY shale; core angle 40°.										
347	350	95%	Coarse-grained light grey sandstone.										
350	351		Light grey; massive, soft mudstone.										
351	356	60%	Very broken, soft, crumbly, COALY, brownish conglomerate.										
356	359		Mudstone.										
359	372	90%	Coarse-grained, poorly consolidated muddy arkosic sandstone; 372' - 2" COAL; core angle at 372' = 60°.										

092031

COLLAR:		HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP	
EAST _____				
ELEVATION _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____	METHOD:			

Diamond Drill Record

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-10</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
372	400	90%	Medium to fine-grained conglomerate - sheared and brecciated; brownish to medium grey; quartz matrix.										
400	572	95%	Medium to coarse-grained conglomerate with grey sand matrix. Pebbles up to 1"; core angle at 420' = 60°; 456' - 456.5 - COALY partings and fragments; 462'-463.4' - COAL partings and fragments; 482'-483' - COAL partings and fragments; core angle at 483' = 35°; 525' = 40°; 547' - COAL partings; core angle at 552' = 40° - COAL partings.										
572	574	95%	Coarse-grained grey sandstone with COALY partings and fragments; core angle at 573' = 40°.										
574	576.5	100%	Conglomerate - pebbles up to 1/2".										
576.5		90%	COAL partings.										
576.5	577.5	100%	Coarse-grained light grey sandstone with carbonaceous partings; possibility of reversed grading.										
577.5	578	100%	Black carbonaceous mudstone.										
578	580.5	50%	Impure COAL - fairly bright, hard.										
580.5	583	75%	Black carbonaceous mudstone.										
583	585	60%	Impure COAL - fairly bright, hard.										
585	594.5	100%	Light to medium grey, medium-grained sandstone; locally contains mudstone clasts, and local mudstone partings; core angle at 592' = 15°.										

US 2081

Diamond Drill Record

COLLAR:	HOLE SURVEY		
DEPTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-10</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
594.5	636.5	95%	Coarse to very coarse, white to light grey sandstone, locally pebbly. Calcareous matrix. core angle at 624' - 21°; white limestone fragments.										
636.5	639.5	95%	Coarse-grained light to medium grey sandstone with calcareous matrix, and partings of black carbonaceous mudstone. Core angle at 637.5' = 20°; white limestone fragments.										
639.5	642	20%	COAL, dirty, fairly bright, hard.										
642	652	75%	Black, very carbonaceous mudstone with COALY partings. core angle at 651' = 30°.										
652	660	95%	Dark brown to black, slightly carbonaceous mudstone.										
660	665	100%	White to light grey conglomerate - pebbles up to ¼"; carbonaceous matrix, also some white limestone fragments.										
665	667	75%	Dark brown to black, slightly carbonaceous mudstone.										
667	669	75%	White to light grey conglomerate - pebbles up to ¼"; calcareous matrix.										
669	734	95%	Pebble conglomerate, pebbles up to 1", becoming coarse downwards (up to 2" near base); Silicious cement.										
734	756	75%	As above, but poorly consolidated; fractured and broken up.										
756	771.5	100%	As 669-734, with a few beds a foot or so thick of pebbly coarse-grained grey sandstone. Core angle at 767' = 35°.										
771.5	775	90%	Black carbonaceous siltstone; core angle at 772' = 32°; at 774' bedding becomes vertical, then turns over - ie broad fold-hinge.										

092031

DOLLAR:	HOLE SURVLY		
NORTH	FOOTAGE	AZIMUTH	DIP
EAST			
ELEVATION			
LOGGED BY			
DATE LOGGED			
MAP REFERENCE NO.	METHOD:		

Diamond Drill Record

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-10
 CLAIM NAME _____
 COMMENCED _____
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
775	782	80%	Conglomerate containing abundant carbonaceous partings and fragments; Core angle at 775' = 25° the other way.										
782	787	90%	Core runs approximately parallel to bedding; Interbedded black; carbonaceous siltstone and dark grey carbonaceous sandstone. Core angle at 786' = 5°.										
787	790	100%	Core runs approximately parallel to bedding; Core shows conglomerate, thin (1") band of black siltstone, then dark grey sandstone.										
790	799.5	90%	Black siltstone with thin interlaminations of medium grey sandstone; locally with thin carbonaceous mudstone partings. Abundant calcite veinlets - fracture filling: Core angle at 799' = 5°.										
799.5	810	75%	Black carbonaceous mudstone with COAL partings. Rather soft. Core angle at 810' = 30° - undulatory.										
810	812	100%	Dark brown silty mudstone with carbonaceous partings.										
812	814	100%	Coarse-grained conglomerate.										
814	828	95%	Coarse-grained medium grey pebbly sandstone with abundant COALY partings and fragments.										
826	846	100%	Coarse-grained conglomerate. Core angle at 830' = 30°.										
846	849	50%	Pebbly sandstone with abundant carbonaceous fragments and partings.										
849	854	100%	Coarse-grained conglomerate. Core angle at 850' = 40°.										
854	857	95%	Dark grey silty mudstone.										

082031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH		FOOTAGE	AZIMUTH	DIP
EAST				
ELEVATION				
LOGGED BY				
DATE LOGGED				
MAP REFERENCE NO.		METHOD:		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO.	C-76-10
CLAIM NAME	_____
COMMENCED	_____
FINISHED	_____
PROJECT NO.	_____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS						
				FROM	TO	WIDTH	NO.							
857	863	95%	Black silty mudstone containing thin COAL partings and bands. Core angle at 861' = 36°.											
863	869	90%	Medium grey sandstone with abundant COALY partings and fragments. Locally pebbly.											
869	967	90%	Pebble conglomerate - pebbles up to 1". Also couple of 1" pebbly sandstone bands. Core angle at 953' = 45°.											
			END OF HOLE.											

700200

Diamond Drill Record

COLLAR: Not surveyed		HOLE SURVEY		
DEPTH SOUTH	13,080	FOOTAGE	AZIMUTH	DIP
EAST	6,060	Collar	230°	-60°
ELEVATION		259'	231'	-61°
LOGGED BY	P. Hannigan			
DATE LOGGED				
MAP REFERENCE NO.		METHOD:	Sperry-Sun	

COMPANY NAME Cyprus Anvil Mining Corporation
 PROPERTY NAME CARMACKS SOUTH
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER Cyclone Engineering
 PURPOSE OF HOLE _____

HOLE NO. C-76-12
 CLAIM NAME _____
 COMMENCED October 6, 1976
 FINISHED October 9, 1976
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	13	-	OVERBURDEN.										
13	55	~90%	Conglomerate - chert, mudstone and quartzite pebbles in light grey fine-grained to coarse-grained sandy matrix; pebbles are subrounded and partly sorted; 80-90% pebbles, up to 2" diameter, core angle at 18'~45°; at 39'~35°.										
55	61	~60%	Sandstone - light grey; medium-grained to coarse-grained; bedding indistinct; non carbonaceous; core angle at 56'~60°.										
61	97	~80%	Conglomerate - as above; ~70-90% pebbles, up to 3" diameter; core angle at 68'~35°; at 92'~55°; carbonaceous in parts; vuggy in parts.										
97	100	~90%	Sandstone - coarse-grained, brown to grey; some pebbles present; carbonaceous in parts.										
100	111	~90%	Conglomerate - as above; ~90% pebbles, up to 1" diameter; vuggy in parts.										
111	113	~90%	Sandstone - light grey; medium-grained to coarse-grained; bedding indistinct; carbonaceous in parts; some pebbles present; core angle at 113'~60°.										
113	133	~80%	Conglomerate - ~70-90% pebbles, up to 2" diameter.										
133	136	~50%	Pebbly sandstone - very coarse-grained; carbonaceous locally; core angle at 136'~40°.										
136	155	~60%	Conglomerate - ~60-70% pebbles, up to 3" diameter; pebbles are larger and more rounded than above. core locally poorly consolidated.										

092051

Diamond Drill Record

COLLAR:	HOLE SURVLY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-12
 CLAIM NAME _____
 COMMENCED _____
 FINISHED _____
 PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
155	177	~90%	Sandstone - light grey to white calcareous sandstone; coarse-grained; no distinct bedding; locally with carbonaceous and COALY mudstone partings; white dolomite (?) fragments throughout; pebble-free; core angle at 155'~65°; at 176'~50°.										
177	179	~90%	Sandstone - fine-grained to medium-grained; medium grey, locally carbonaceous; locally contains a few pebbles.										
179	183	~90%	Pebbly sandstone - medium-grained to coarse-grained; light grey; ~0-40% pebbles, up to 1/2" diameter.										
183	189	~90%	Sandstone - medium-grained to coarse-grained; slightly calcareous locally; locally carbonaceous.										
189	192	~90%	Conglomerate - ~70% pebbles, up to 1/4" diameter; carbonaceous in parts; sandstone layers interbedded.										
192	194	~90%	Pebbly sandstone - ~20% pebbles, up to 1/4" diameter; carbonaceous in parts.										
194	196	~90%	Conglomerate - ~90% pebbles, up to 1/4" diameter; carbonaceous in parts.										
196	203	~90%	Sandstone - calcareous; hard; white to light grey; coarse-grained; white dolomite (?) fragments; no distinct bedding; carbonaceous in parts; core angle at 198'~50°.										
203	205	~90%	Conglomerate - calcareous pebbles and fragments in a sandy matrix; white to light grey; ~70% pebbles, up to 1" diameter; pebbles are subrounded and poorly sorted.										

T.C.C.

Diamond Drill Record

COLLAR:	HOLE SURVEY:		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-12</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
205	209	~90%	Sandstone - calcareous; white to light grey; coarse-grained; white dolomite (?) fragments; no distinct bedding; non carbonaceous.										
209	213	~90%	Sandstone - fine-grained to medium-grained; medium grey to light grey; carbonaceous in parts; distinct bedding in parts; slightly calcareous locally.										
213	217	~90%	Sandstone and pebbly sandstone interbedded; calcareous; white to light grey; white dolomite (?) fragments; no distinct bedding; carbonaceous in parts.										
217	220	~90%	Conglomerate and sandstone interbedded; both calcareous; core angle at 218' ~ 40°.										
220	221	~90%	Sandstone and siltstone interbedded; fine-grained; medium grey to dark grey; carbonaceous; distinct bedding; non calcareous.										
221	222	~90%	Sandstone - calcareous; medium-grained.										
222	224	~90%	Conglomerate - calcareous; ~90% pebbles, up to 1" diameter.										
224	230	~90%	Sandstone and mudstone interbedded; sandstone - light grey; medium-grained; carbonaceous in parts; mudstone - dark grey; soft; bedding distinct.										
230	232	~90%	Mudstone - dark grey; soft; carbonaceous in parts; indistinct bedding.										
232	234	~90%	Sandstone - light grey to white; calcareous; coarse-grained; white dolomite (?) fragments; indistinct bedding; carbonaceous in parts.										

092031

Diamond Drill Record

COLLAR:	HOLE SURVEY		
NORTH _____	FOOTAGE	AZIMUTH	DIP
EAST _____			
ELEVATION _____			
LOGGED BY _____			
DATE LOGGED _____			
MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-12</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
234	237	~90%	Sandstone - carbonaceous with COAL partings; some mudstone layers; light grey; calcareous; as 232' - 234'.										
237	239	~90%	Mudstone - carbonaceous with COAL partings; soft; indistinct bedding; core angle at 238' ~30°.										
239	250	~90%	COAL - bright; clean; soft; friable.	239.0	245.0	6.0	C-43	} <i>Not analyzed</i>					
250	251	~90%	Mudstone - carbonaceous with COAL partings; indistinct bedding.	245.0	250.0	5.0	C-44						
251	253	~90%	Sandstone - soft; poor recovery; coarse-grained; no bedding.										
253	257	~90%	Sandstone - fine-grained; medium grey to light grey; carbonaceous in parts; broken up core.										
257	259	~90%	Mudstone - dark grey to black; carbonaceous with COAL partings; calcareous in parts; some sandstone layers interbedded; core angle at 257' ~50°.										
259	261	~90%	Sandstone - coarse-grained; light grey to brown; calcareous; no distinct bedding.										
261	266	~70%	Mudstone - carbonaceous with COAL partings; dark grey to black; soft to hard; non calcareous; few sandstone layers at upper contact.										
266	327	~90%	Sandstone - coarse to very coarse-grained; white to medium grey. Locally calcareous cement, locally with white dolomite (?) fragments up to 1/4" diameter. Indistinct bedding. Core-angle at 278'=35°; at 313'=35°.										
327	334	~90%	Pebbly sandstone - coarse-grained; angular chert pebbles up to 1/2" diameter. Pebbles ~40%; locally contains white dolomite (?) fragments										

092031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____	EAST _____	FOOTAGE	AZIMUTH	DIP
ELEVATION _____	LOGGED BY _____			
DATE LOGGED _____	MAP REFERENCE NO. _____	METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-12</u>
CLAIM NAME _____
COMMENCED _____
FINISHED _____
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS											
				FROM	TO	WIDTH	NO.												
327	334	~ 90%	Core angle at 332' = 20°.																
334	524	~ 90%	Sandstone - coarse to very coarse-grained; white to medium grey; fine sandy matrix; locally calcareous cement. Mottled appearance.																
**			**Contains cobbles of white quartz, pink aplite, and grey calcareous acid igneous rocks (?), up to 3" diameter, mostly well rounded, high sphericity - cobbles are isolated within sandstone. Present between 372' and 387' and 488' to 524'. Also angular cobbles 437'-441'; and dark grey mudstone clasts, angular up to 2" diameter; present at 493'-498'.																
			Core angle at 372' = 25°; at 395' = 30°; at 418' = 45°; at 449' = 30°; at 468' = 45°; at 494.5 = 50°; and at 521' = 40°.																
			NOTE Conglomerate and pebbly sandstones between 179 and 225' are not typical Tantalus conglomerates - most pebbles are angular. Base of Tantalus Formation probably at 155'.																
			END OF HOLE.																

182031

Diamond Drill Record

COLLAR: <u>Not Surveyed</u>		HOLE SURVEY		
SOUTH <u>3,140</u>		FOOTAGE	AZIMUTH	DIP
EAST <u>11,410</u>		Collar	230 ⁰	-60 ⁰
ELEVATION _____		384'	233 ⁰	-62 ⁰
LOGGED BY <u>R. P. Hill</u>		567'	231 ⁰	-62 ⁰
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: <u>Sperry-Sun</u>		

COMPANY NAME CYPRUS ANVIL MINING CORPORATION
 PROPERTY NAME Carmacks South
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. C-76-13
 CLAIM NAME _____
 COMMENCED October 10, 1976
 FINISHED October 18, 1976
 PROJECT NO. _____

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	17		Overburden.										
17	68.5	80	Conglomerate, pebbles up to 1/2", with beds of pebbly sandstone up to 1' thick.										
68.5	88.5	95	Light grey coarse grained sandstone, locally contains a few pebbles up to 1/2" diameter. Core angle at 78' = 30 ⁰ . Coaly partings at 86'.										
88.5	365	90	Conglomerate. Modal pebble size 1/2" - a few up to 1 1/2". A few beds of pebbly sandstone a few feet thick. Coaly partings at 100', 187-189', 319-321'. Core angle at 158' = 35 ⁰ ; at 188' = 40 ⁰ . 232-235' core sub-parallel to bedding. Core angle at 234' = 7 ⁰ , at 285' = 30 ⁰ , at 304' = 20 ⁰ ; at 318' = 30 ⁰ ; at 326' = 25 ⁰ .										
365	434	90	Pebbly sandstone, coarse to very coarse grained, light grey, pebbles up to 1/2", pebbles up to approximately 25%. Fairly abundant calcite veins up to 1/2" thick. 399-400' - large limestone clasts (2"). Core sub-parallel to bedding - core angle at 375' = 10 ⁰ ; at 416' = 10 ⁰ .										
434	467	90	Conglomerate, with interbeds a couple of feet thick of very coarse grained pebbly sandstone. Pebbles in conglomerate up to 2". Core angle at 438' = 30 ⁰ .										
467	499	80	Interbedded conglomerate and very coarse grained, pebbly sandstone, beds approximately 2-4 feet thick. Carbonaceous fragments and partings throughout. All rather sheared up, somewhat brecciated.										

132031

Diamond Drill Record

COLLAR:		HOLE SURVEY		
NORTH _____		FOOTAGE	AZIMUTH	DIP
EAST _____				
ELEVATION: _____				
LOGGED BY _____				
DATE LOGGED _____				
MAP REFERENCE NO. _____		METHOD: _____		

COMPANY NAME _____
 PROPERTY NAME _____
 DRILLING CONTRACTOR _____
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. _____	C-76-13
CLAIM NAME _____	
COMMENCED _____	
FINISHED _____	
PROJECT NO. _____	

FROM	TO	RECOVERY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
			Core angle at 473' = 50°; at 494' = 20°.										
499	594	80	Conglomerate, somewhat sheared up, pebbles mostly up to approx. 1/2", a few up to 2". Locally contains COAL fragments, also carbonaceous partings. Core angle at 518' = 40°; at 538' = 30°, at 571' = 22°. Also a couple of very coarse grained sandstone beds a couple of feet thick.										
594	637	90	Interbedded conglomerate and very coarse grained pebbly sandstone, locally sheared and brecciated. (Beds of each 2-3' thick). Pebbles mostly 1/2" to 1" diameter. 594-602' - Abundant carbonaceous partings. Core angle at 596' = 35°; at 628' = 50°. T.D. 637'.										

092031

Diamond Drill Record

COLLAR: Not Surveyed		HOLE SURVEY		
DEPTH: <u>South 3,360</u>		FOOTAGE	AZIMUTH	DIP
EAST: <u>10,640</u>		Collar	050 ⁰	-50 ⁰
ELEVATION: _____		200'	051 ⁰	-50 ⁰
LOGGED BY: <u>R. P. Hill</u>				
DATE LOGGED: _____				
MAP REFERENCE NO. _____		METHOD: <u>Sperry-Sun</u>		

COMPANY NAME CYPRUS ANVIL MINING CORPORATION
 PROPERTY NAME Carmacks South
 DRILLING CONTRACTOR Caron Diamond Drilling
 ASSAYER _____
 PURPOSE OF HOLE _____

HOLE NO. <u>C-76-16</u>
CLAIM NAME _____
COMMENCED <u>October 18, 1976</u>
FINISHED <u>October 20, 1976</u>
PROJECT NO. _____

FROM	TO	RECOVY	DESCRIPTION	SAMPLE				ASSAYS					
				FROM	TO	WIDTH	NO.						
0	22	0	Overburden.										
22	139	95	Coarse grained to very coarse grained light grey mottled sandstone. Very massive - bedding invisible except locally. 22- 60' - rust stained. At 47', 68' and 71' - large angular medium grey mudstone clasts. 114-115' - large rounded red-brown siltstone cobbles. 126' - 4" band of dark grey silty mudstone. Core angle at 45' = 55 ⁰ ; at 69.5' = 55 ⁰ ; at 113.5' = 60 ⁰ .										
139	155	75	Dark brown silty mudstone. Massive - bedding indistinct. Possibly tuffaceous.										
155	156.5	60	COAL - soft, moderately bright.										
156.5	158	100	Very coarse grained light grey sandstone (resembles 22-139'). Core angle at 158' = 55 ⁰ .										
158	176	80	COAL - hard, bright to very bright, platy. Thin coaly mudstone partings.										
176	188	80	Dark brown silty mudstone (as 139-155'). Black carbonaceous mudstone partings. Core angle at 180' = 55 ⁰ .										
188	190	50	Coaly mudstone.										
190	212	95	Tantalus pebble conglomerate. Pebbles up to 1" - modal 1/2". Local carbonaceous partings. Core angle at 199.5' = 55 ⁰ . T.D. 212'.										

092031

ANALYTICAL DATA, CARMACKS NORTH

COMPOSITE NO.: T6
HOLE NO.: C-76-5
SEAM: 1

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-19	32.88	10.06	25.77	31.29	5,420	N.A.
Footage: 47-53.5						
Weight: 1,392 gms.						

Number: C-20	35.77	10.54	26.92	26.77	5,340	N.A.
Footage: 53.5 - 60						
Weight: 4,536 gms.						

Number:
Footage:
Weight:

Number:
Footage:
Weight:

Number:
Footage:
Weight:

092031

COMPOSITE NO.: T6

HOLE NO.: C-76-5

SEAM: 1

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	35.74
R.M. %	10.37
V.M. %	26.94
F.C. %	26.95
S. %	0.48
B.T.U./LB.	5,350
F.S.I.	N.A.

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	47.94
28 M. x 0	52.06
<hr/>	
Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	41.05	31.71	36.18
R.M. %	8.57	11.16	9.92
V.M. %	25.48	28.66	27.13
F.C. %	24.90	28.47	26.77
B.T.U./LB.	4,910	5,690	5,320
F.S.I.	N.A.	N.A.	N.A.

092031

COMPOSITE NO.: T6

HOLE NO.: C-76-5

SEAM: 1

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	0.00	--	--	--
1.30 - 1.40	0.00	--	--	--
1.40 - 1.60	28.62	11.43	12.60	7,800
1.60 - 1.80	27.20	9.99	28.88	6,040
+ 1.80	44.18	4.92	68.70	2,460

TOTAL

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	0.00	--	--	--	
- 1.40	0.00	--	--	--	NOT REQUIRED
- 1.60	28.62	11.43	12.60	7,800	
- 1.80	55.82	10.73	20.53	6,940	
TOTAL	100.00	8.16	41.81	4,960	

092031

COMPOSITE NO.: T6

HOLE NO.: C-76-5

SEAM: 1

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
	Wt. %	Ash %	Floats		Sinks	
			Wt. %	Ash %	Wt. %	Ash %
- 1.30	--	--	--	--	--	--
1.30 - 1.40	--	--	--	--	--	--
1.40 - 1.60	28.62	12.60	28.62	12.60	100.00	41.81
1.60 - 1.80	27.20	28.88	55.82	20.53	71.38	53.53
+ 1.80	44.18	68.70	100.00	41.81	44.18	68.70
Total	100.00	41.81				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T6
HOLE NO.: C-76-5
SEAM: 1

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.60
Yield of Floats: 28.62 %

Analysis of Floats:

Ash % 12.60
R.M. % 11.43
V.M. % 38.00
F.C. % 37.97
S. % 0.52
B.T.U./Lb. 7,800
F.S.I. N.A.

Analysis of Sinks:

Ash % 53.53
R.M. % 6.85

092031

COMPOSITE NO.: T-1
HOLE NO.: C-76-1
SEAM: 2

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-3	11.90	4.87	33.02	50.21	11,250	N. A.
Footage: 386-394						
Weight: 4,870						

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: T-1
 HOLE NO.: C-76-1
 SEAM: 2

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	11.90
R.M. %	4.87
V.M. %	33.02
F.C. %	50.21
S. %	0.66
B.T.U./LB.	11,250
F.S.I.	N. A.

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	80.56
28 M. x 0	19.44
<hr/> Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	11.86	12.18	11.92
R.M. %	4.44	6.03	4.75
V.M. %	32.77	32.95	32.80
F.C. %	50.93	48.84	50.53
B.T.U./LB.	11,310	11,220	11,300
F.S.I.	N.A.	N.A.	N.A.

092031

COMPOSITE NO.: T-1
HOLE NO.: C-76-1
SEAM: 2

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	0.00	--	--	--
1.30 - 1.40	65.21	4.21	3.05	13,200
1.40 - 1.60	22.79	6.12	11.75	9,990
1.60 - 1.80	4.79	2.95	43.44	6,360
+ 1.80	<u>7.21</u>	<u>1.71</u>	<u>79.03</u>	<u>2,330</u>
TOTAL	100.00	4.40	12.44	11,360

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	0.00	--	--	--	--
- 1.40	65.21	4.21	3.05	13,200	--
- 1.60	88.00	4.70	5.30	12,370	Not Require
- 1.80	<u>92.79</u>	<u>4.61</u>	<u>7.27</u>	<u>12,060</u>	
TOTAL	100.00	4.40	12.44	11,360	

092031

COMPOSITE NO.: T-1

HOLE NO.: C-76-1

SEAM: 2

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
	Wt. %	Ash %	Floats		Sinks	
			Wt. %	Ash %	Wt. %	Ash %
- 1.30	0.00	--	--	--	--	--
1.30 - 1.40	65.21	3.05	65.21	3.05	100.00	12.44
1.40 - 1.60	22.79	11.75	88.00	5.30	34.79	30.06
1.60 - 1.80	4.79	43.44	92.79	7.27	12.00	64.82
+ 1.80	7.21	79.03	100.00	12.44	7.21	79.03
Total	100.00	12.44				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T-1
HOLE NO.: C-76-1
SEAM: 2

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.80

Yield of Floats: 92.79 %

Analysis of Floats:

Ash % 7.30

R.M. % 4.35

V.M. % 35.69

F.C. % 52.66

S. % 0.66

B.T.U./Lb. 12,050

F.S.I. N.A.

Analysis of Sinks:

Ash % 78.93

R.M. % 1.71

092031

FIGURE

COMPANY CYPRUS ANVIL MINING CORP.

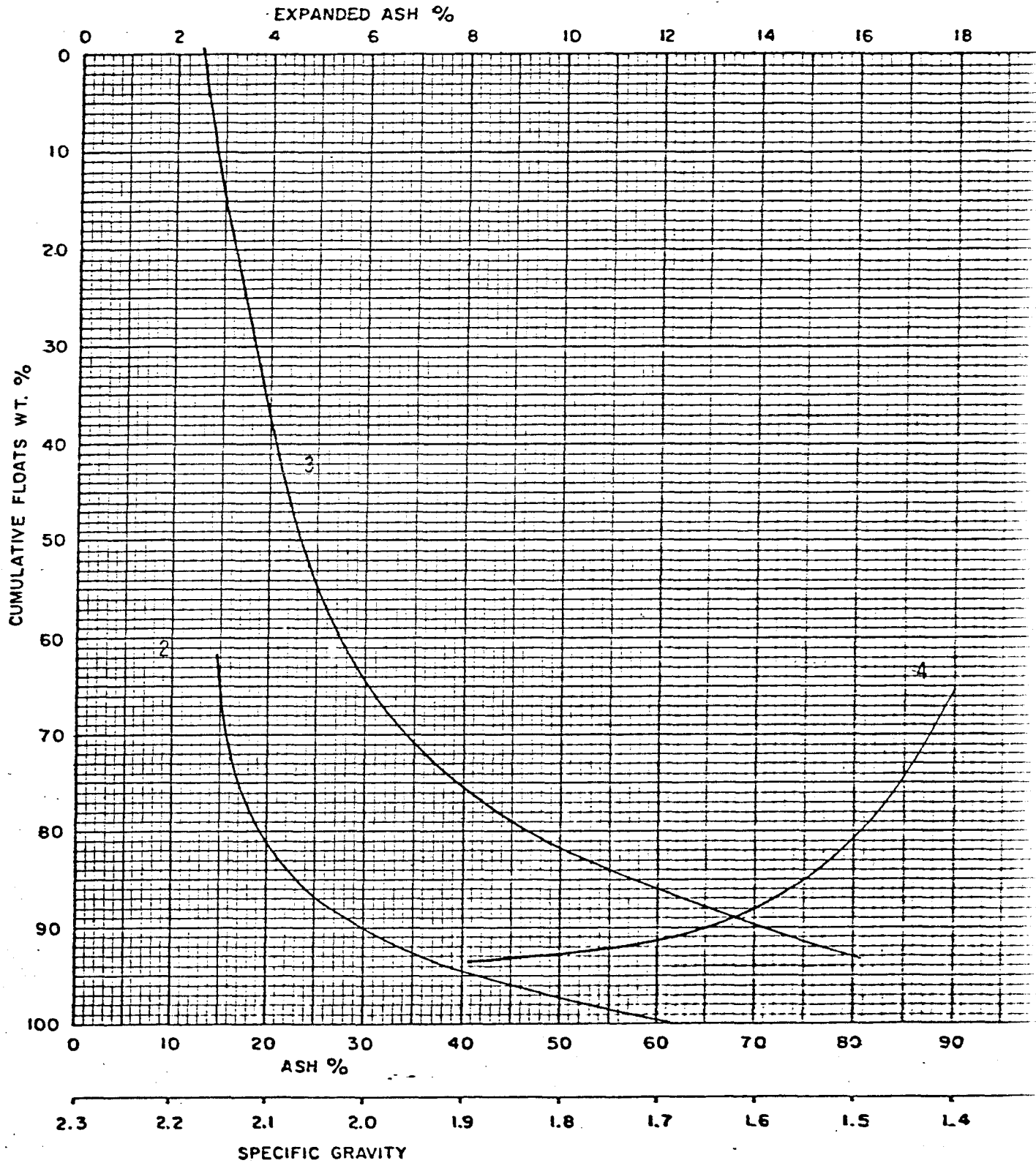
SAMPLE T-1

Size 1/4" x 28 Mesh

WASHABILITY CURVES

CURVE LEGEND

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL



092031

DATE

CYCLONE ENGINEERING SALES
EDMONTON ALBERTA CANADA

COMPOSITE NO.: A1
HOLE NO.: C-76-2
SEAM: 2

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-6	12.86	1.81	32.57	52.76	12,350.	1
Footage: 411 - 416						
Weight: 3,982 gm.						

End of Analysis

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: A2
HOLE NO.: C-76-5
SEAM: 2

T A B L E 1. COMPONENTS AND ANALYSIS

<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
30.43	1.95	28.87	38.75	9,500	1

Number: C-21
Footage: 438 - 447
Weight: 4,436 gm.

End of Analysis

Number:
Footage:
Weight:

Number:
Footage:
Weight:

Number:
Footage:
Weight:

Number:
Footage:
Weight:

092031

COMPOSITE NO.: T2
 HOLE NO.: C-76-1
 SEAM: 3

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-4	14.15	1.48	27.83	56.54	12,210	½
Footage: 668.5 - 674.5						
Weight: 1,556 gms.						

Number: C-5	13.68	1.59	28.39	56.34	12,230	1
Footage: 674.5 - 681						
Weight: 3,244						

Number:
 Footage:
 Weight:

Number:
 Footage:
 Weight:

Number:
 Footage:
 Weight:

092031

COMPOSITE NO.: T2
 HOLE NO.: C-76-1
 SEAM: 3

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	14.69
R.M. %	1.50
V.M. %	28.35
F.C. %	55.46
S. %	0.52
B.T.U./LB.	12,220
F.S.I.	1

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	85.80
28 M. x 0	<u>14.20</u>
<u>Total</u>	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	14.76	11.60	14.31
R.M. %	1.51	1.53	1.51
V.M. %	28.95	28.63	28.90
F.C. %	54.78	58.24	55.28
B.T.U./LB.	12,190	12,580	12,250
F.S.I.	1	1	1

092031

COMPOSITE NO.: T2

HOLE NO.: C-76-1

SEAM: 3

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	23.11	1.74	3.38	14,060
1.30 - 1.40	39.96	1.57	6.66	13,730
1.40 - 1.60	24.82	1.53	18.40	11,560
1.60 - 1.80	7.32	1.33	39.71	7,550
+ 1.80	<u>4.79</u>	<u>1.05</u>	<u>65.00</u>	<u>4,340</u>
TOTAL	100.00	1.56	14.03	12,360

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	23.11	1.74	3.38	14,060	
- 1.40	63.07	1.63	5.46	13,850	
- 1.60	87.89	1.60	9.11	13,200	NOT REQUIRED
- 1.80	95.21	1.58	11.47	12,770	
TOTAL	100.00	1.56	14.03	12,360	

092031

COMPOSITE NO.: T2

HOLE NO.: C-76-1

SEAM: 3

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
			Floats		Sinks	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
- 1.30	23.11	3.38	23.11	3.38	100.00	14.03
1.30 - 1.40	39.96	6.66	63.07	5.46	76.89	17.23
1.40 - 1.60	24.82	18.40	87.89	9.11	36.93	28.67
1.60 - 1.80	7.32	39.71	95.21	11.47	12.11	49.71
+ 1.80	4.79	65.00	100.00	14.03	4.79	65.00
Total	100.00	14.03				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T2

HOLE NO.: C-76-1

SEAM: 3

T A B L E 8. F L O A T - S I N K O F 1 / 4 " x 2 8 M E S H F O R 8 % A S H I N F L O A T S

Specific Gravity: 1.54

Yield of Floats: 82.99%

Analysis of Floats:

Ash % 8.17

R.M. % 1.53

V.M. % 29.53

F.C. % 60.77

S. % 0.60

B.T.U./Lb. 13,210

F.S.I. 1

Analysis of Sinks:

Ash % 45.04

R.M. % 1.16

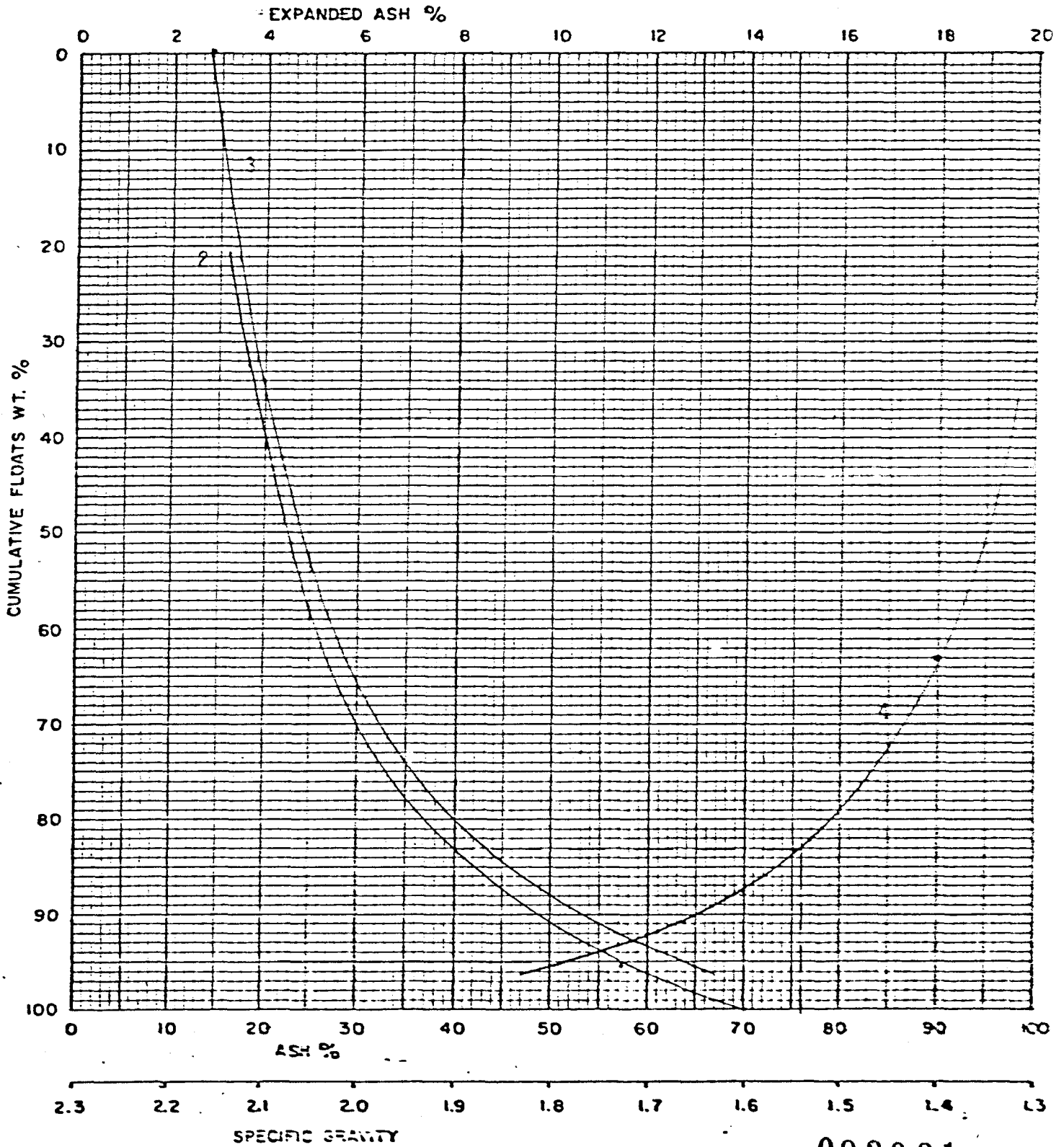
092031

FIGURE

COMPANY CYPRUS ANVIL MINING CORP.
 SAMPLE C-76-1 Composite T2
 Size 1/4" x 28 Mesh

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL

WASHABILITY CURVES



092031

DATE

CYCLONE ENGINEERING SALES LTD
 EDMONTON ALBERTA CANADA

COMPOSITE NO.: T-3

HOLE NO.: C-76-3

SEAM: 3R

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-8	62.43	1.38	17.57	18.62	4,680	N.A.
Footage: 311 - 320						
Weight: 14,346 gms.						

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: T-3
HOLE NO.: C-76-3
SEAM: 3R

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	62.43
R.M. %	1.38
V.M. %	17.57
F.C. %	18.62
S. %	0.82
B.T.U./LB.	4,680
F.S.I.	N.A.

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	95.16
28 M. x 0	4.84
<hr/> Total	<hr/> 100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	63.06	51.75	62.51
R.M. %	1.38	1.37	1.38
V.M. %	17.61	21.53	17.80
F.C. %	17.95	25.35	18.31
B.T.U./LB.	4,650	6,070	4,720
F.S.I.	N.A.	½	N.A.

092031

COMPOSITE NO.: T-3

HOLE NO.: C-76-3

SEAM: 3R

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	2.93	1.97	2.83	14,130
1.30 - 1.40	4.56	1.67	10.83	12,810
1.40 - 1.60	9.68	1.36	29.27	9,930
1.60 - 1.80	12.59	1.36	45.29	7,530
+ 1.80	70.24	1.26	76.17	2,540
TOTAL	100.00	1.32	62.61	4,690

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>P.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	2.93	1.97	2.83	14,130	
- 1.40	7.49	1.79	7.70	13,330	NOT REQUIRED
- 1.60	17.17	1.55	19.86	11,410	
- 1.80	29.76	1.47	30.62	9,770	
TOTAL	100.00	1.32	62.61	4,690	

092031

COMPOSITE NO.: T10
HOLE NO.: C76-6
SEAM:

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-36	62.89	0.51	15.60	21.00	4,300	N.A.
Footage: 393-398						
Weight: 3,357						
Number: C-37	43.70	0.67	17.36	38.27	7,450	½
Footage: 398-403						
Weight: 5,394						
Number:						
Footage:						
Weight:						
Number:						
Footage:						
Weight:						

092031

COMPOSITE NO.: T10

HOLE NO.: C76-6

SEAM:

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	51.13
R.M. %	0.58
V.M. %	16.55
F.C. %	31.74
S. %	0.65
B.T.U./LB.	6,290
F.S.I.	$\frac{1}{2}$

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	83.82
28 M. x 0	16.18
<hr/> Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	54.35	34.03	51.06
R.M. %	0.59	0.69	0.61
V.M. %	16.00	18.17	16.35
F.C. %	29.06	47.11	31.98
B.T.U./LB.	5,680	9,080	6,230
F.S.I.	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

092031

COMPOSITE NO.: T10

HOLE NO.: C76-6

SEAM:

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	0.33	-*	2.47	14,920
1.30 - 1.40	11.64	0.83	6.51	14,240
1.40 - 1.60	15.37	0.70	22.08	11,380
1.60 - 1.80	13.23	0.65	38.77	8,250
+ 1.80	59.43	0.49	74.07	2,080
TOTAL	100.00	0.58	53.31	5,780

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	0.33	-*	2.47	14,920	
- 1.40	11.97	0.83	6.40	14,260	Not
- 1.60	27.34	0.76	15.21	12,640	Required.
- 1.80	40.57	0.72	22.90	11,210	
TOTAL	100.00	0.58	53.31	5,780	

* Not determined due to small sample.

092031

COMPOSITE NO.: T10

HOLE NO.: C76-6

SEAM:

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
	Wt. %	Ash %	Floats		Sinks	
			Wt. %	Ash %	Wt. %	Ash %
- 1.30	0.33	2.47	0.33	2.47	100.00	53.31
1.30 - 1.40	11.64	6.51	11.97	6.40	99.67	53.48
1.40 - 1.60	15.37	22.08	27.34	15.21	88.03	59.69
1.60 - 1.80	13.23	38.77	40.57	22.90	72.66	67.64
+ 1.80	59.43	74.07	100.00	53.31	59.43	74.07
Total	100.00	53.31				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T10

HOLE NO.: C76-6

SEAM:

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.43
Yield of Floats: 14.00 %

Analysis of Floats:

Ash % 7.96
R.M. % 0.83
V.M. % 23.13
F.C. % 68.08
S. % 0.74
B.T.U./Lb. 14,010
F.S.I. 1½

Analysis of Sinks:

Ash % 59.36
R.M. % 0.51

092031

FIGURE

COMPANY CYPRUS ANVIL MINING CORP.

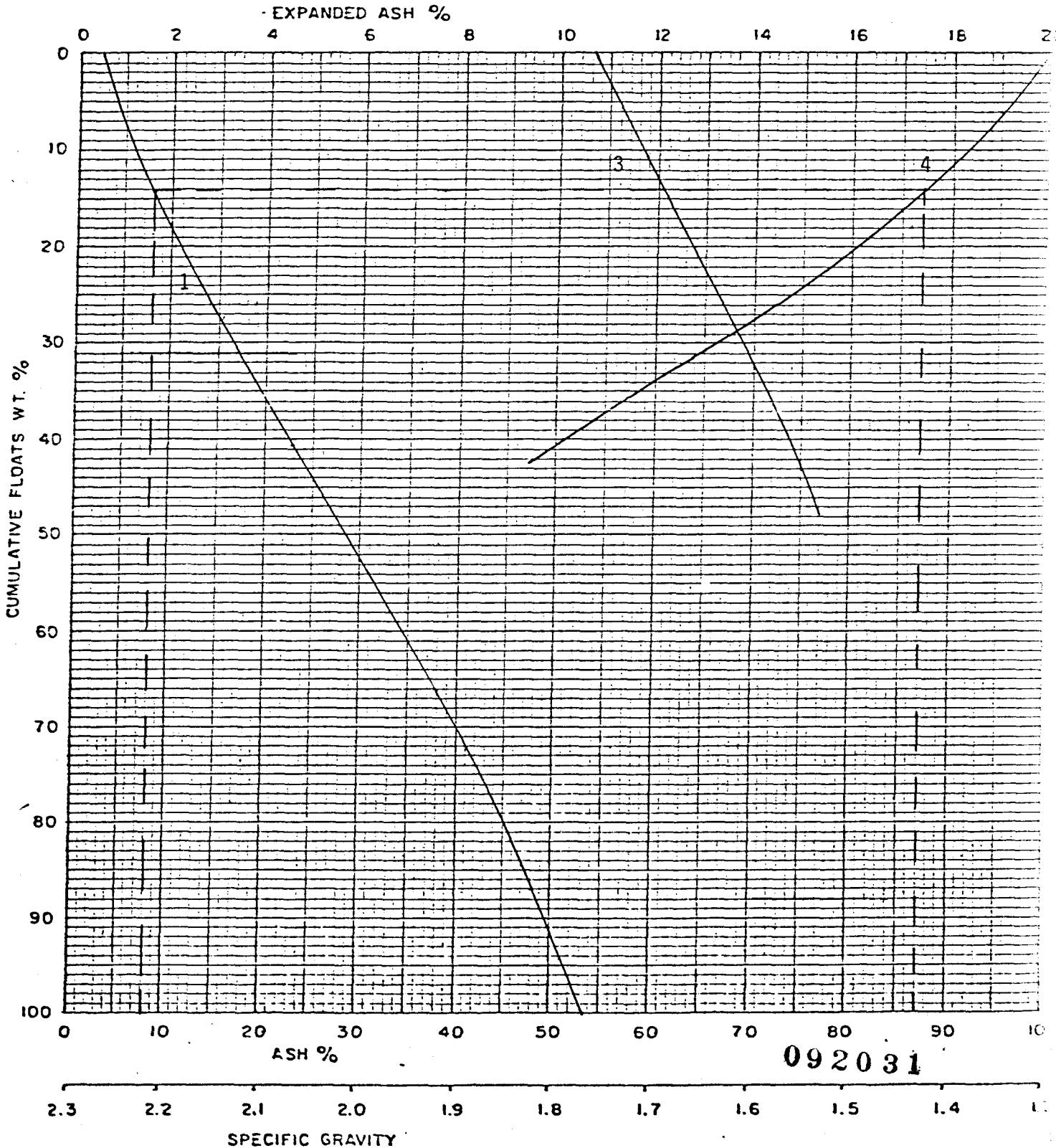
SAMPLE C76-6 Composite T10

Size 1/4" x 28 Mesh

WASHABILITY CURVES

CURVE LEGEND

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL



092031

COMPOSITE NO.: T-3

HOLE NO.: C-76-3

SEAM: 3R

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
			Floats		Sinks	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
- 1.30	2.93	2.83	2.93	2.83	100.00	62.61
1.30 - 1.40	4.56	10.83	7.49	7.70	97.07	64.42
1.40 - 1.60	9.68	29.27	17.17	19.86	92.51	67.06
1.60 - 1.80	12.59	45.29	29.76	30.62	82.83	71.48
+ 1.80	70.24	76.17	100.00	62.61	70.24	76.17
Total	100.00	62.61				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T-3
HOLE NO.: C-76-3
SEAM: 3R

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.41%

Yield of Floats: 7.60%

Analysis of Floats:

Ash % 7.87

R.M. % 1.68

V.M. % 34.47

F.C. % 55.98

S. % 0.80

B.T.U./Lb. 13,260

F.S.I. 1½

Analysis of Sinks:

Ash % 67.10

R.M. % 1.30

092031

FIGURE

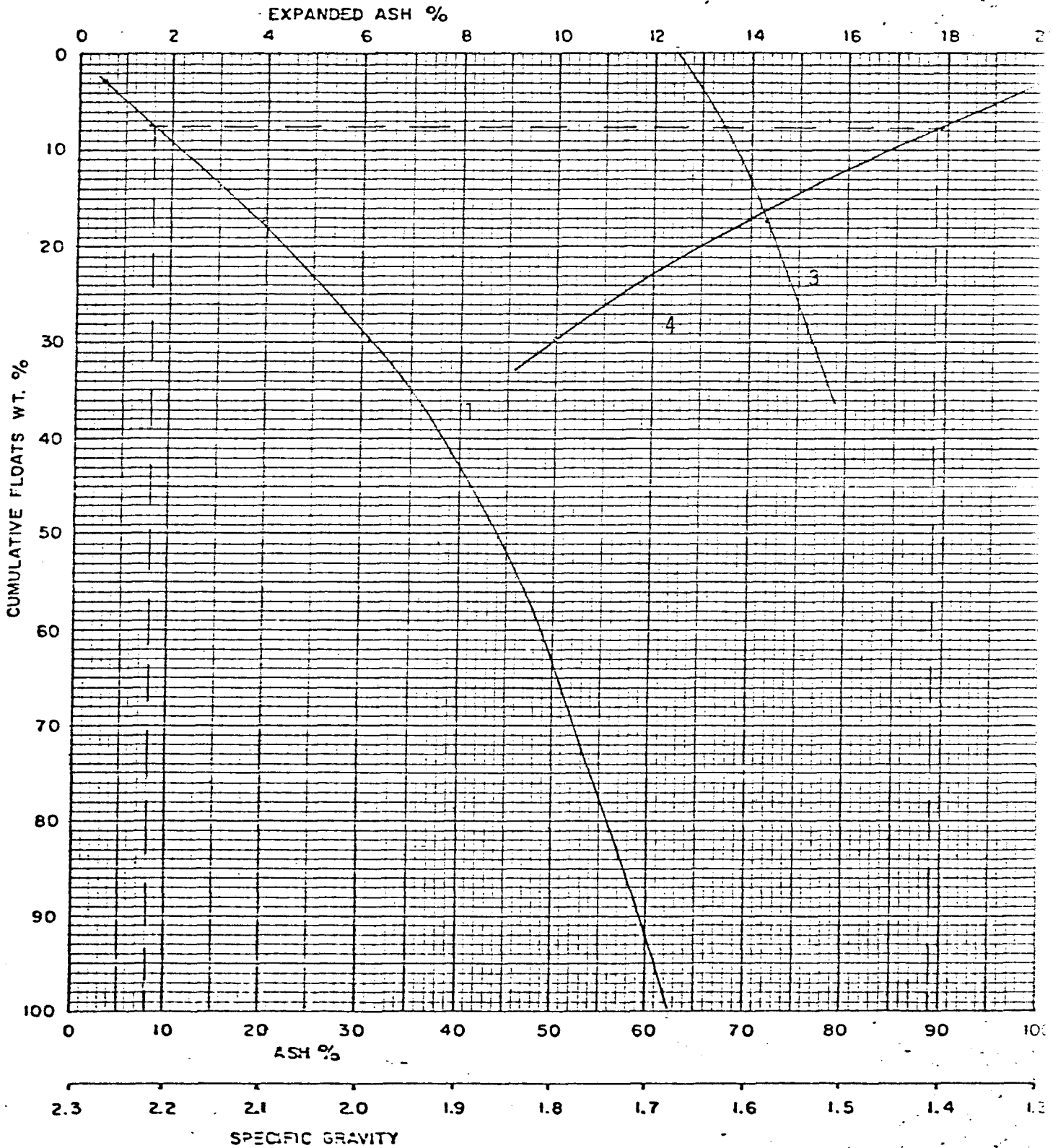
COMPANY CYPRUS ANVIL MINING CORP.

SAMPLE T-3

Size 1/4" x 28 Mesh

WASHABILITY CURVES

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL



092031

DATE

CYCLONE ENGINEERING SALES LTD.
EDMONTON ALBERTA CANADA

COMPOSITE NO.: T4
HOLE NO.: C-76-3
SEAM: 3

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-10	14.29	1.70	29.70	54.31	12,050	½

Footage: 350 - 356.5

Weight: 5,112 gms.

Number: C-11	19.25	1.54	28.09	51.12	11,000	½
--------------	-------	------	-------	-------	--------	---

Footage: 365.5 - 363

Weight: 4,710 gms.

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: T4
 HOLE NO.: C-76-3
 SEAM: 3

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash % 16.70
 R.M. % 1.68
 V.M. % 29.23
 F.C. % 52.39
 S. % 0.45
 B.T.U./LB. 11,380
 F.S.I. ½

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	73.38
28 M. x 0	<u>26.62</u>
<u>Total</u>	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	18.83	11.64	16.92
R.M. %	1.65	1.61	1.64
V.M. %	29.15	28.98	29.10
F.C. %	50.37	57.77	52.34
B.T.U./LB.	10,970	12,440	11,360
F.S.I.	½	½	½

092031

COMPOSITE NO.: T4
 HOLE NO.: C-76-3
 SEAM: 3

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	18.80	1.93	3.40	14,000
1.30 - 1.40	35.24	1.83	5.93	13,430
1.40 - 1.60	18.36	1.87	15.70	11,380
1.60 - 1.80	9.89	1.85	28.80	8,350
+ 1.80	17.71	0.91	62.94	3,790
TOTAL	100.00	1.70	19.61	10,950

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	18.80	1.93	3.40	14,000	
- 1.40	54.04	1.86	5.05	13,630	NOT REQUIRED
- 1.60	72.40	1.87	7.75	13,060	
- 1.80	<u>82.29</u>	<u>1.86</u>	<u>10.29</u>	<u>12,490</u>	
TOTAL	100.00	1.70	19.61	10,950	

092031

COMPOSITE NO.: T4

HOLE NO.: C-76-3

SEAM: 3

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
	Wt. %	Ash %	Floats		Sinks	
			Wt. %	Ash %	Wt. %	Ash %
- 1.30	18.80	3.40	18.80	3.40	100.00	19.61
1.30 - 1.40	35.24	5.93	54.04	5.05	81.20	23.37
1.40 - 1.60	18.36	15.70	72.40	7.75	45.96	36.74
1.60 - 1.80	9.89	28.88	82.29	10.29	27.60	50.74
+ 1.80	17.71	62.94	100.00	19.61	17.71	62.94
Total	100.00	19.61				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T4

HOLE NO.: C-76-3

SEAM: 3

T A B L E 8. F L O A T - S I N K O F 1 / 4 " x 2 8 M E S H F O R 8 % A S H I N F L O A T S

Specific Gravity: 1.62

Yield of Floats: 73.50

Analysis of Floats:

Ash % 8.18

R.M. % 2.00

V.M. % 30.52

F.C. % 59.30

S. % 0.40

B.T.U./Lb. 12,970

F.S.I. 1

Analysis of Sinks:

Ash % 51.50

R.M. % 1.03

092031

CYCLONE ENGINEERING SALES LTD.

FIGURE

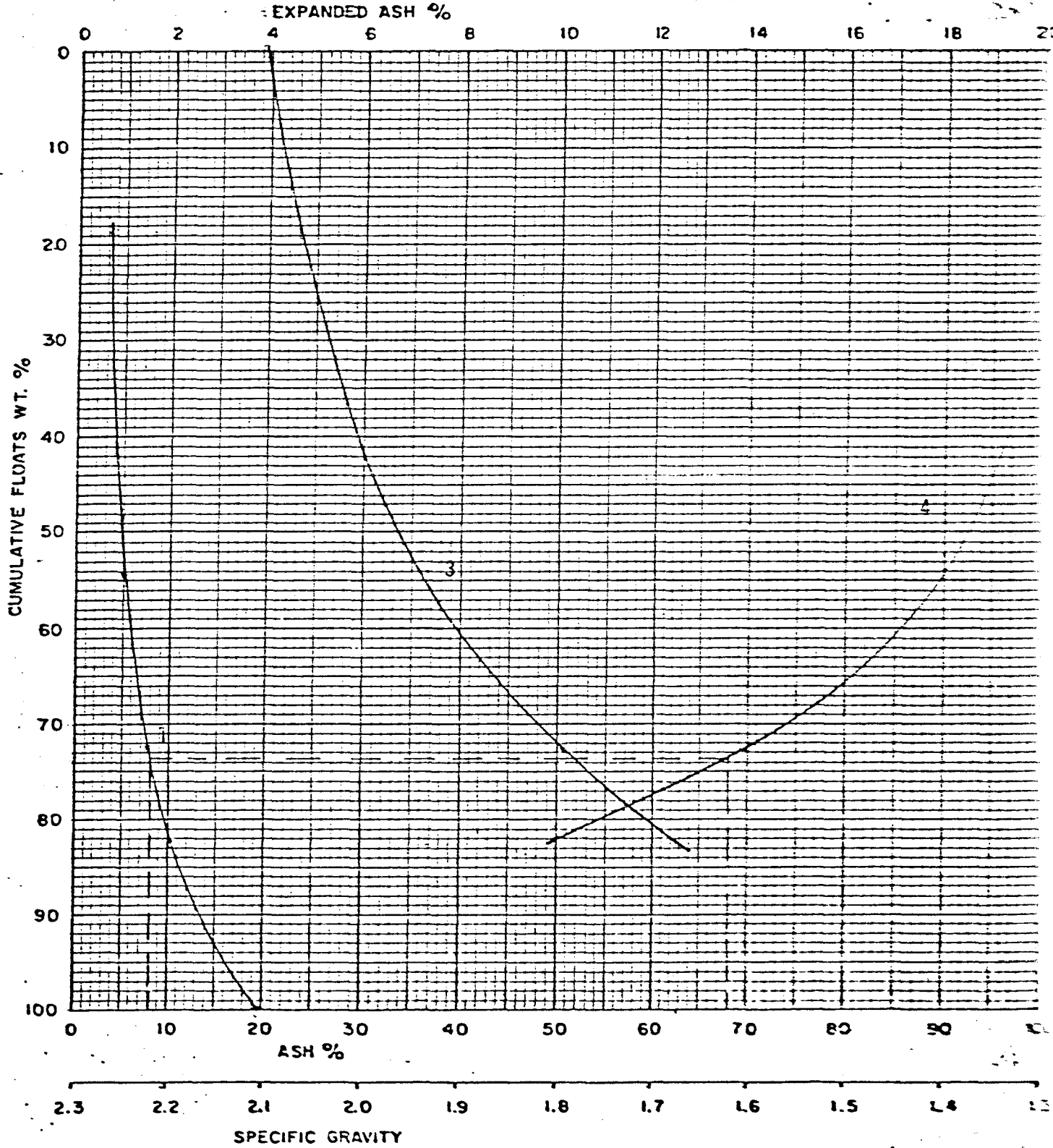
COMPANY CYPRUS ANVIL MINING CORP.

SAMPLE C-76-3 Composite T4

Size 1/4" x 28 Mesh

WASHABILITY CURVES

- CURVE LEGEND
- 1 - FLOATS
 - 2 - EXPANDED FLOATS
 - 3 - SINKS
 - 4 - SPECIFIC GRAVITY
 - 5 - ELEMENTARY ASH
 - 6 - NEAR GRAVITY MATERIAL



092031

DATE

CYCLONE ENGINEERING SALES LTD.
EDMONTON ALBERTA CANADA

COMPOSITE NO.: T-11

HOLE NO.: C-76-5

SEAM: 3

T A B L E 1. COMPONENTS AND ANALYSIS

		<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number:	C-38	22.75	1.16	30.69	45.40	10,600	1
Footage:	891-896						
Weight:	2,739						
Number:	C-39	13.98	1.38	32.96	51.68	11,760	1
Footage:	896-901						
Weight:	2,192						
Number:	C-40	15.44	1.30	32.66	50.60	11,460	1
Footage:	901-906						
Weight:	2,628						
Number:	C-41	11.43	1.25	30.69	56.63	12,320	1
Footage:	906-911						
Weight:	2,086						
Number:	C-42	19.64	1.19	29.35	49.82	11,190	1
Footage:	911-915						
Weight:	2,036						

092031

COMPOSITE NO.: T-11

HOLE NO.: C-76-5

SEAM: 3

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	16.77
R.M. %	1.28
V.M. %	31.59
F.C. %	50.56
S. %	0.62
B.T.U./LB.	11,380
F.S.I.	1

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	59.51
28 M. x 0	40.49
<hr/>	<hr/>
Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	20.91	10.25	16.59
R.M. %	1.31	1.27	1.29
V.M. %	30.63	31.93	31.16
F.C. %	47.15	56.55	50.96
B.T.U./LB.	10,730	12,500	11,450
F.S.I.	1	1	1

092031

COMPOSITE NO.: T-11

HOLE NO.: C-76-5

SEAM: 3

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	13.03	1.49	3.43	14,150
1.30 - 1.40	30.99	1.82	5.97	13,480
1.40 - 1.60	26.47	1.53	16.86	11,450
1.60 - 1.80	10.21	1.21	30.85	8,420
+ 1.80	19.30	0.73	56.59	4,200
TOTAL	100.00	1.30	20.83	10,720

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	13.03	1.49	3.43	14,150	Not
- 1.40	44.02	1.72	5.22	13,680	Required
- 1.60	70.49	1.65	9.59	12,840	
- 1.80	80.70	1.44	12.28	12,280	
TOTAL	100.00	1.30	20.83	10,720	

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T-11

HOLE NO.: C-76-5

SEAM: 3

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
			Floats		Sinks	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
- 1.30	13.03	3.43	13.03	3.43	100.00	20.83
1.30 - 1.40	30.99	5.97	44.02	5.22	86.97	23.44
1.40 - 1.60	26.47	16.86	70.49	9.59	55.98	33.11
1.60 - 1.80	10.21	30.85	80.70	12.28	29.51	47.68
+ 1.80	19.30	56.59	100.00	20.83	19.30	56.59
Total	100.00	20.83				

092031

COMPOSITE NO.: T-11

HOLE NO.: C-76-5

SEAM: 3

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.53
Yield of Floats: 65.00 %

Analysis of Floats:

Ash % 7.90
R.M. % 1.76
V.M. % 32.42
F.C. % 57.92
S. % 0.63
B.T.U./Lb. 13,300
F.S.I. 1

Analysis of Sinks:

Ash % 44.04
R.M. % 0.86

092031

FIGURE

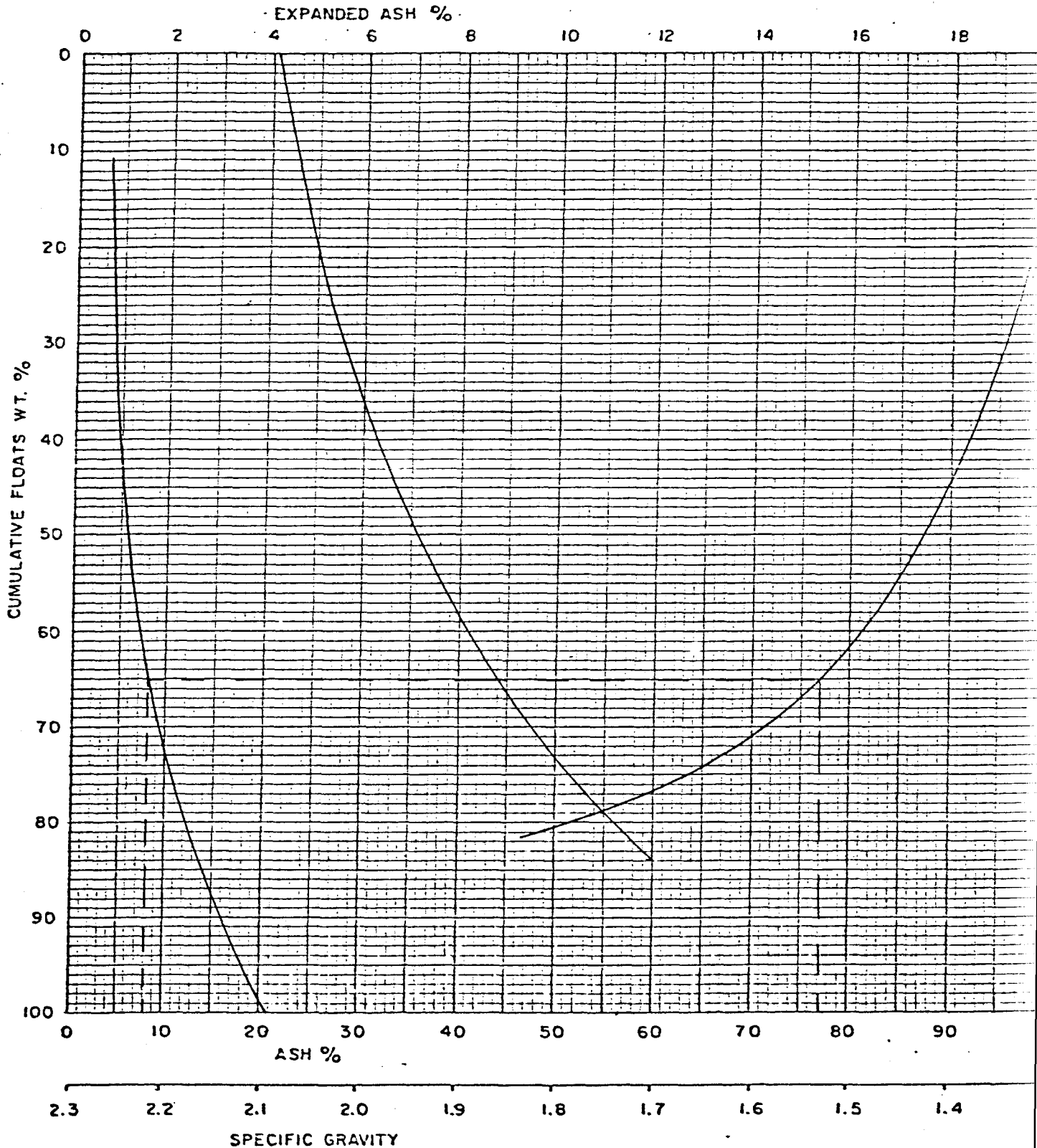
COMPANY CYPRUS ANVIL MINING CORPORATION

SAMPLE T-11

Size 1/4" x 28 Mesh

WASHABILITY CURVES

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL



092031

CYCLONE ENGINEERING SALES LTD

DATE

COMPOSITE NO.: C-1
HOLE NO.: Open Pit Channel Sample
SEAM: 3

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-1	8.65	2.31	30.21	58.83	12,570	½
Footage: -						
Weight: 8,146. gms.						

Number:
Footage:
Weight:

Number:
Footage:
Weight:

Number:
Footage:
Weight:

Number:
Footage:
Weight:

092031

COMPOSITE NO.: C-1
HOLE NO.: Open Pit Channel Sample
SEAM: 3

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	8.65
R.M. %	2.31
V.M. %	30.21
F.C. %	58.83
S. %	0.50
B.T.U./LB.	12,570
F.S.I.	$\frac{1}{2}$

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	75.33
28 M. x 0	24.67
<hr/> Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	8.20	9.85	8.61
R.M. %	2.19	2.99	2.39
V.M. %	30.15	31.05	30.37
F.C. %	59.46	56.11	58.63
B.T.U./LB.	12,620	12,170	12,510
F.S.I.	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

092031

COMPOSITE NO.: C-1
HOLE NO.: Open Pit Channel Sample
SEAM: 3

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	16.58	2.38	2.91	13,950
1.30 - 1.40	57.28	2.31	4.03	13,480
1.40 - 1.60	18.22	2.53	13.39	11,420
1.60 - 1.80	4.17	1.96	29.75	7,930
+ 1.80	3.75	1.13	50.84	4,420
TOTAL	100.00	2.31	8.38	12,610

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	16.58	2.38	2.91	13,950	
- 1.40	73.86	2.34	3.78	13,580	
- 1.60	92.08	2.38	5.68	13,160	
- 1.80	96.25	2.36	6.72	12,930	
TOTAL	100.00	2.31	8.38	12,610	

092031

COMPOSITE NO.: C-1
HOLE NO.: Open Pit Channel Sample
SEAM: 3

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
	Wt. %	Ash %	Floats		Sinks	
			Wt. %	Ash %	Wt. %	Ash %
- 1.30	16.58	2.91	16.58	2.91	100.00	8.38
1.30 - 1.40	57.28	4.03	73.86	3.78	83.42	9.46
1.40 - 1.60	18.22	13.39	92.08	5.68	26.14	21.37
1.60 - 1.80	4.17	29.75	96.25	6.72	7.92	39.74
+ 1.80	3.75	50.84	100.00	8.38	3.75	50.84
Total	100.00	8.38				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: C-1
HOLE NO.: Open Pit Channel Sample
SEAM: 3

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: -
Yield of Floats: 100.00 %

Analysis of Floats:

Ash % 8.20
R.M. % 2.19
V.M. % 30.15
F.C. % 59.46
S. % 0.46
B.T.U./Lb. 12,620
F.S.I. ½

Analysis of Sinks:

Ash % -
R.M. % -

092031

FIGURE

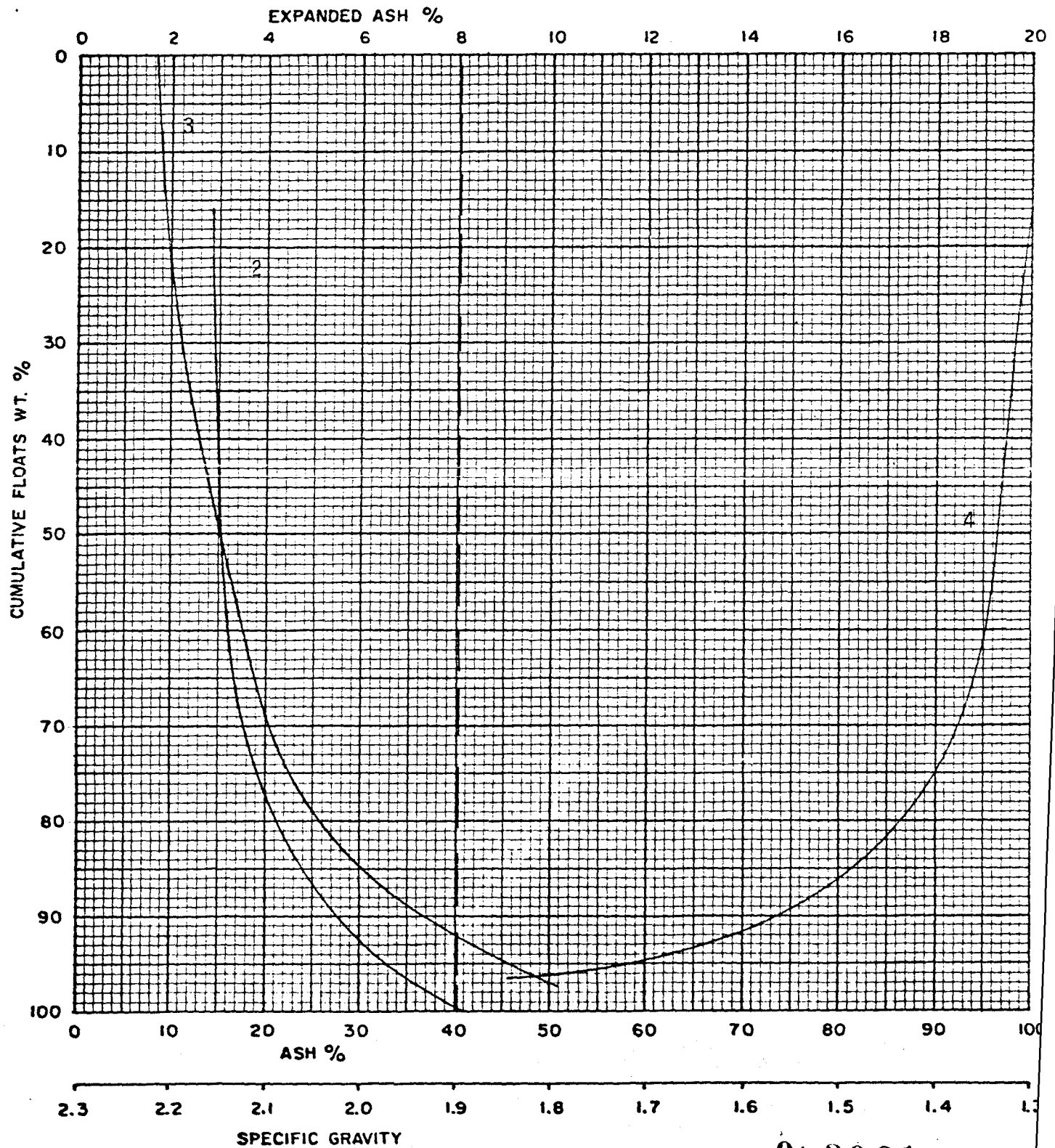
COMPANY Cyprus Anvil Mining Corporation

SAMPLE C-1 1/4" x 28 m

CURVE LEGEND

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL

WASHABILITY CURVES



092031

DATE

CYCLONE ENGINEERING SALES LTD
EDMONTON ALBERTA CANADA

COMPOSITE NO.: C-2
HOLE NO.: Open Pit Stockpile
SEAM: 3

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-2	15.20	2.49	29.89	52.42	11,420	N.A.
Footage: -						
Weight: 10,100 gms.						

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: C-2
HOLE NO.: Open Pit Stockpile
SEAM: 3

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	15.20
R.M. %	2.49
V.M. %	29.89
F.C. %	52.42
S. %	0.40
B.T.U./LB.	11,390
F.S.I.	N.A.

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	72.72
28 M. x 0	27.28
<hr/> Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	15.03	15.35	15.12
R.M. %	2.30	2.86	2.45
V.M. %	30.14	30.88	30.34
F.C. %	52.53	50.91	52.09
B.T.U./LB.	11,410	11,310	11,380
F.S.I.	N.A.	N.A.	N.A.

092031

COMPOSITE NO.: C-2
HOLE NO.: Open Pit Stockpile
SEAM: 3

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	12.96	1.88	3.21	13,780
1.30 - 1.40	45.35	2.30	5.31	13,130
1.40 - 1.60	23.45	2.28	14.36	11,330
1.60 - 1.80	5.83	1.80	27.55	8,240
+ 1.80	12.41	1.29	65.71	2,930
TOTAL	100.00	2.09	15.95	11,130

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	12.96	1.88	3.21	13,780	
- 1.40	58.31	2.21	4.84	13,280	
- 1.60	81.76	2.23	7.57	12,720	
- 1.80	87.59	2.20	8.90	12,290	
TOTAL	100.00	2.09	15.95	11,130	

092031

COMPOSITE NO.: C-2
HOLE NO.: Open Pit Stockpile
SEAM: 3

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
	Wt. %	Ash %	Floats		Sinks	
			Wt. %	Ash %	Wt. %	Ash %
- 1.30	12.96	3.21	12.96	3.21	100.00	15.95
1.30 - 1.40	45.35	5.31	58.31	4.84	87.04	17.85
1.40 - 1.60	23.45	14.36	81.76	7.57	41.69	31.49
1.60 - 1.80	5.83	27.55	87.59	8.90	18.24	53.51
+ 1.80	12.41	65.71	100.00	15.95	12.41	65.71
Total	100.00	15.95				

092031

COMPOSITE NO.: C-2
HOLE NO.: Open Pit Stockpile
SEAM: 3

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.66
Yield of Floats: 83.40 %

Analysis of Floats:

Ash % 7.95
R.M. % 2.24
V.M. % 30.38
F.C. % 59.43
S. % 0.48
B.T.U./Lb. 12,709
F.S.I. N.A.

Analysis of Sinks:

Ash % 56.24
R.M. % 1.56

092031

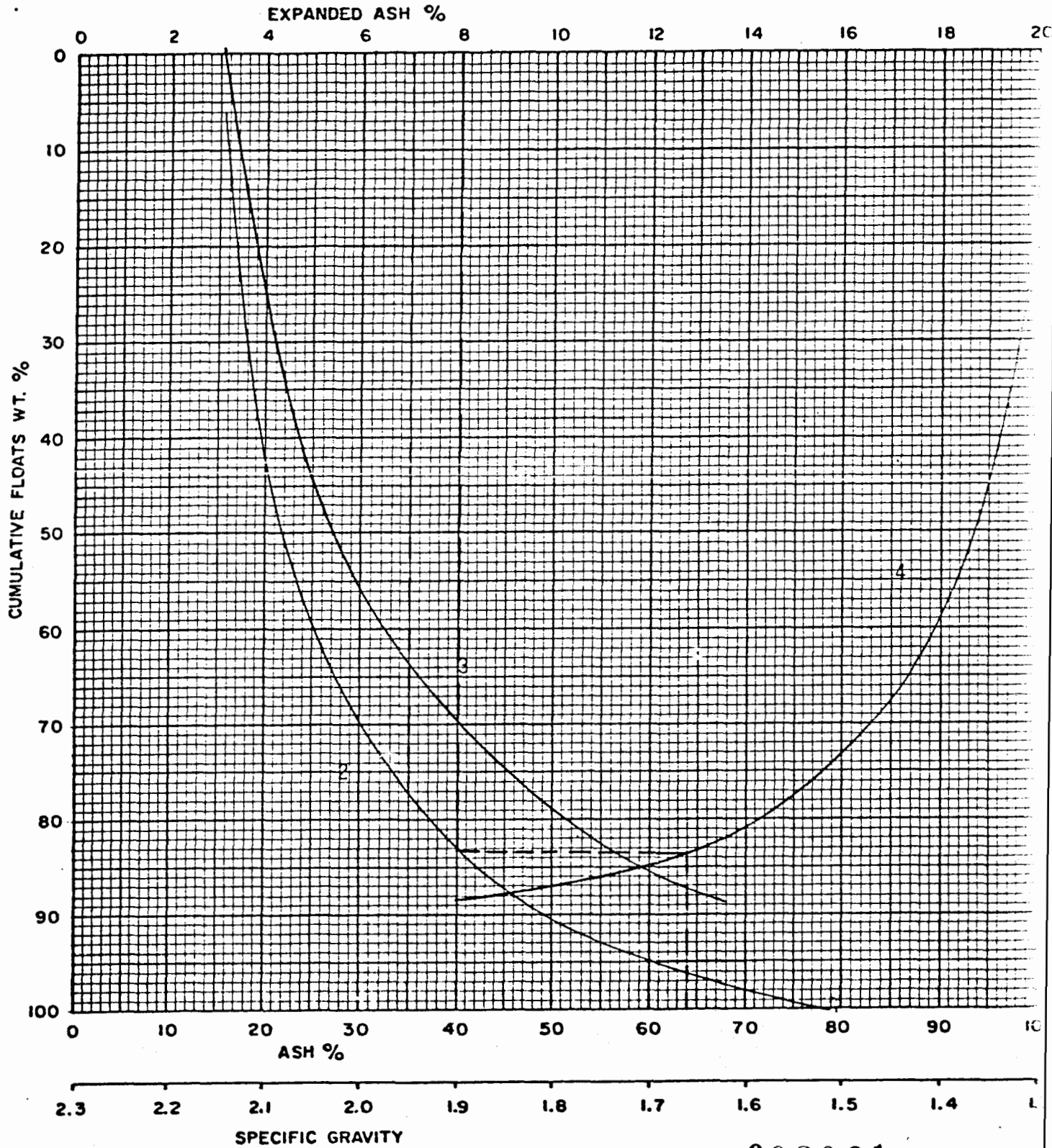
FIGURE

COMPANY Cyprus Anvil Mining Corporation

SAMPLE C-2 1/4" x 28 m

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL

WASHABILITY CURVES



092031

DATE

CYCLONE ENGINEERING SALES LTD
EDMONTON ALBERTA CANADA

APPENDIX VI

ANALYTICAL DATA, CARMACKS SOUTH

092031

COMPOSITE NO.: T5
 HOLE NO.: C-76-4
 SEAM:

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-12	16.24	0.84	22.56	60.36	12,050	1
Footage: 261-266						
Weight: 6,885 gms.						
Number: C-13	26.35	0.94	23.17	49.54	9,980	1
Footage: 266-271						
Weight: 6,187 gms.						
Number: C-14	11.23	0.99	20.23	67.55	13,000	½
Footage: 271-276						
Weight: 5,868 gms.						
Number: C-15	28.51	0.85	19.11	51.53	9,970	1
Footage: 276-281						
Weight: 5,545 gms.						

Number:
 Footage:
 Weight:

092031

COMPOSITE NO.: T-5

HOLE NO.: C-76-4

SEAM:

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-16	21.57	0.80	21.58	56.05	11,110	½
Footage: 281-286						
Weight: 3,612 gms.						
Number: C-17	21.63	0.78	20.07	57.52	11,020	1
Footage: 286-291						
Weight: 5,504 gms.						
Number: C-18	28.92	0.76	21.20	49.12	9,650	½
Footage: 291-297						
Weight: 7,266						

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: T-5
HOLE NO.: C-76-4
SEAM:

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	23.06
R.M. %	0.81
V.M. %	21.46
F.C. %	54.67
S. %	0.63
B.T.U./LB.	11,040
F.S.I.	$\frac{1}{2}$

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	68.53
28 M. x 0	31.47
<hr/> Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	28.16	14.19	23.76
R.M. %	0.86	0.67	0.80
V.M. %	21.24	22.57	21.66
F.C. %	49.74	62.57	53.78
B.T.U./LB.	10,410	12,540	11,080
F.S.I.	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$

092031

COMPOSITE NO.: T-5
HOLE NO.: C-76-4
SEAM:

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	2.47	0.89	2.67	14,970
1.30 - 1.40	39.67	1.10	6.36	14,180
1.40 - 1.60	26.84	0.98	18.97	12,130
1.60 - 1.80	7.69	0.88	40.61	8,180
+ 1.80	23.33	0.66	73.94	2,150
TOTAL	100.00	0.94	28.05	10,380

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	2.47	0.89	2.67	14,970	NOT REQUIRED
- 1.40	42.14	1.09	6.14	14,230	
- 1.60	68.98	1.05	11.13	13,410	
- 1.80	76.67	1.03	14.09	12,890	
TOTAL	100.00	0.94	28.05	10,380	

092031

COMPOSITE NO.: T5

HOLE NO.: C-76-4

SEAM:

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
			Floats		Sinks	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
- 1.30	2.47	2.67	2.47	2.67	100.00	28.05
1.30 - 1.40	39.67	6.36	42.14	6.14	97.53	28.70
1.40 - 1.60	26.84	18.97	68.98	11.13	57.86	44.01
1.60 - 1.80	7.69	40.61	76.67	14.09	31.02	65.68
+ 1.80	23.33	73.94	100.00	28.05	23.33	73.94
Total	100.00	28.05				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T-5
HOLE NO.: C-76-4
SEAM:

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.46
Yield of Floats: 54.96%

Analysis of Floats:

Ash % 7.81
R.M. % 0.91
V.M. % 22.11
F.C. % 69.17
S. % 0.75
B.T.U./Lb. 14,000
F.S.I. 1½

Analysis of Sinks:

Ash % 53.60
R.M. % 0.98

092031

FIGURE

COMPANY CYPRUS ANVIL MINING CORP.

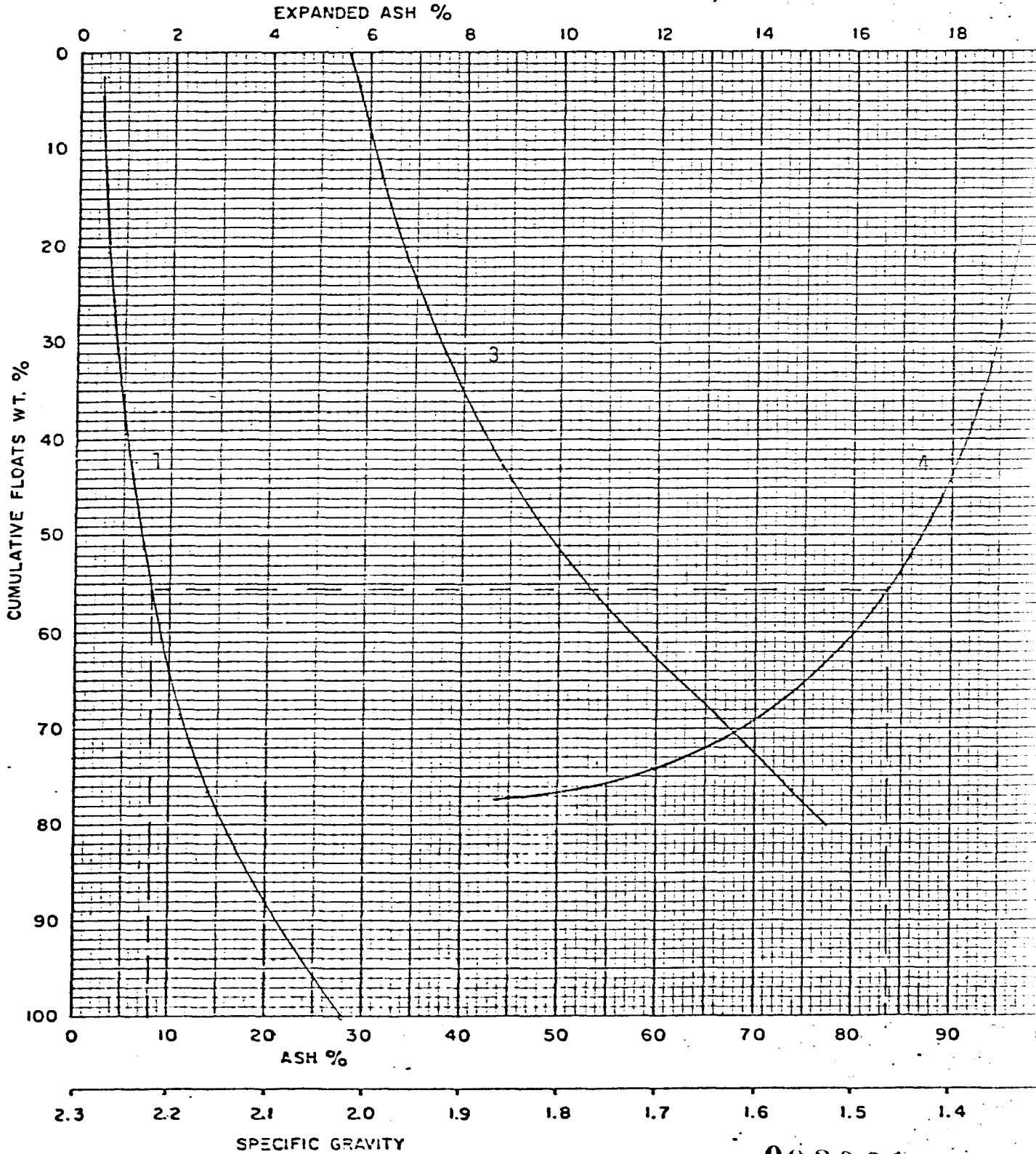
SAMPLE T-5

Size 1/4" x 28 Mesh

WASHABILITY CURVES

CURVE LEGEND

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL



092031

DATE

CYCLONE ENGINEERING SALES LTD
EDMONTON ALBERTA CANADA

COMPOSITE NO.: T7

HOLE NO.: C-76-6

SEAM:

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-24	19.49	0.83	22.56	57.12	12,180	7
Footage: 294 - 299						
Weight: 4,036						

Number: C-25	23.75	0.94	21.80	53.51	10,840	4½
Footage: 299 - 304.5						
Weight: 6,395						

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: T7

HOLE NO.: C-76-6

SEAM:

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	21.91
R.M. %	0.93
V.M. %	21.84
F.C. %	55.32
S. %	0.53
B.T.U./LB.	11,420
F.S.I.	6

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	63.47
28 M. x 0	36.53
<hr/>	<hr/>
Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	23.68	16.54	21.07
R.M. %	0.87	0.87	0.87
V.M. %	21.21	23.50	22.05
F.C. %	54.24	59.09	56.01
B.T.U./LB.	10,620	12,700	11,380
F.S.I.	6	7	6

092031

COMPOSITE NO.: T7
 HOLE NO.: C-76-6
 SEAM:

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	12.27	0.86	3.07	15,240
1.30 - 1.40	28.71	1.00	7.84	14,150
1.40 - 1.60	25.79	1.01	20.68	11,860
1.60 - 1.80	9.92	0.89	38.12	8,540
+ 1.80	23.31	0.94	71.17	2,880
TOTAL	100.00	0.96	28.33	10,510

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	12.27	0.86	3.07	15,240	8½
- 1.40	40.98	0.96	6.41	14,480	6½
- 1.60	66.77	0.98	11.92	13,470	5
- 1.80	76.69	0.97	15.31	12,830	4½
TOTAL	100.00	0.96	28.33	10,510	4

092031

COMPOSITE NO.: T7

HOLE NO.: C-76-6

SEAM:

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
	Wt. %	Ash %	Floats		Sinks	
			Wt. %	Ash %	Wt. %	Ash %
- 1.30	12.27	3.07	12.27	3.07	100.00	28.33
1.30 - 1.40	28.71	7.84	40.98	6.41	87.73	31.87
1.40 - 1.60	25.79	20.68	66.77	11.92	59.02	43.55
1.60 - 1.80	9.92	38.12	76.69	15.31	33.23	61.30
+ 1.80	23.31	71.17	100.00	28.33	23.31	71.17
Total	100.00	28.33				

092031

COMPOSITE NO.: T7

HOLE NO.: C-76-6

SEAM:

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.46
Yield of Floats: 52.00 %

Analysis of Floats:

Ash % 8.07
R.M. % 0.93
V.M. % 22.26
F.C. % 68.74
S. % 0.67
B.T.U./Lb. 14,080
F.S.I. 6½

Analysis of Sinks:

Ash % 49.53
R.M. % 0.93

092031

FIGURE

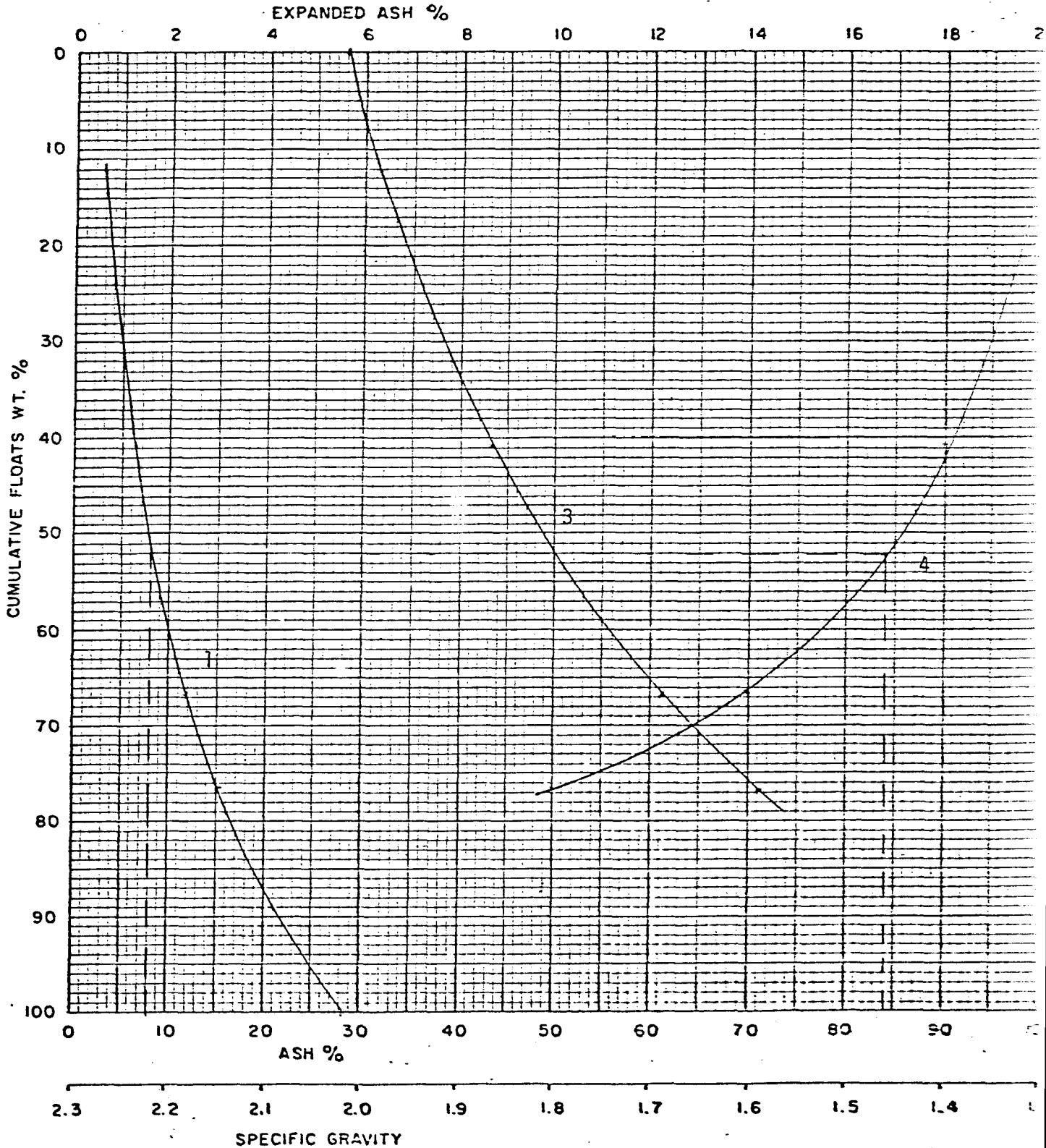
COMPANY CYPRUS ANVIL MINING CORP.

SAMPLE T-7

Size 1/4" x 28 Mesh

WASHABILITY CURVES

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL



092031

DATE

CYCLONE ENGINEERING SALES LTD
EDMONTON ALBERTA CANADA

COMPOSITE NO.: T-8

HOLE NO.: C-76-6

SEAM:

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-26	27.71	0.51	21.02	50.76	10,750	7
Footage: 308-313						
Weight: 2,812						
Number: C-27	29.86	0.50	20.97	48.67	10,180	7
Footage: 313-318						
Weight: 5,168						
Number: C-28	27.94	0.54	21.98	49.54	10,600	7½
Footage: 318-323						
Weight: 4,813						
Number: C-29	30.54	0.53	21.03	47.90	10,160	5½
Footage: 323-328						
Weight: 5,836						
Number: C-30	32.68	0.56	19.81	46.95	9,720	5½
Footage: 328-333						
Weight: 4,460						

092031

COMPOSITE NO.: T-8

HOLE NO.: C-76-6

SEAM:

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-31	28.17	0.56	21.88	49.39	10,500	7
Footage: 333-339						
Weight: 6,554						

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: T-8

HOLE NO.: C-76-6

SEAM:

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	29.00
R.M. %	0.54
V.M. %	22.12
F.C. %	48.34
S. %	0.69
B.T.U./LB.	10,270
F.S.I.	6½

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	70.89
28 M. x 0	29.11
<hr/>	<hr/>
Total	100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	32.36	21.37	29.16
R.M. %	0.56	0.53	0.55
V.M. %	21.84	22.61	22.06
F.C. %	45.24	55.49	48.23
B.T.U./LB.	9,630	11,760	10,250
F.S.I.	6	7	6

092031

COMPOSITE NO.: T-8

HOLE NO.: C-76-6

SEAM:

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	10.05	0.49	3.30	15,010
1.30 - 1.40	29.22	0.63	9.60	14,340
1.40 - 1.60	19.86	0.53	22.77	11,550
1.60 - 1.80	9.61	0.66	39.48	8,130
+ 1.80	31.26	0.84	70.70	2,610
TOTAL	100.00	0.66	33.55	9,590

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	10.05	0.49	3.30	15,010	9
- 1.40	39.27	0.59	7.98	14,510	8½
- 1.60	59.13	0.57	12.95	13,520	7½
- 1.80	68.74	0.58	16.66	12,760	7
TOTAL	100.00	0.66	33.55	9,590	6

092031

COMPOSITE NO.: T-8

HOLE NO.: C-76-6

SEAM:

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
			Floats		Sinks	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
- 1.30	10.05	3.30	10.05	3.30	100.00	33.55
1.30 - 1.40	29.22	9.60	39.27	7.98	89.95	36.93
1.40 - 1.60	19.86	22.77	59.13	12.95	60.73	50.09
1.60 - 1.80	9.61	39.48	68.74	16.66	40.87	63.36
+ 1.80	31.26	70.70	100.00	33.55	31.26	70.70
Total	100.00	33.55				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T-8

HOLE NO.: C-76-6

SEAM:

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity: 1.40
Yield of Floats: 39.27 %

Analysis of Floats:

Ash % 7.98
R.M. % 0.57
V.M. % 24.49
F.C. % 66.96
S. % 0.78
B.T.U./Lb. 14,200
F.S.I. 8

Analysis of Sinks:

Ash % 50.09
R.M. % 0.58

092031

FIGURE

COMPANY CYPRUS ANVIL MINING CORP.

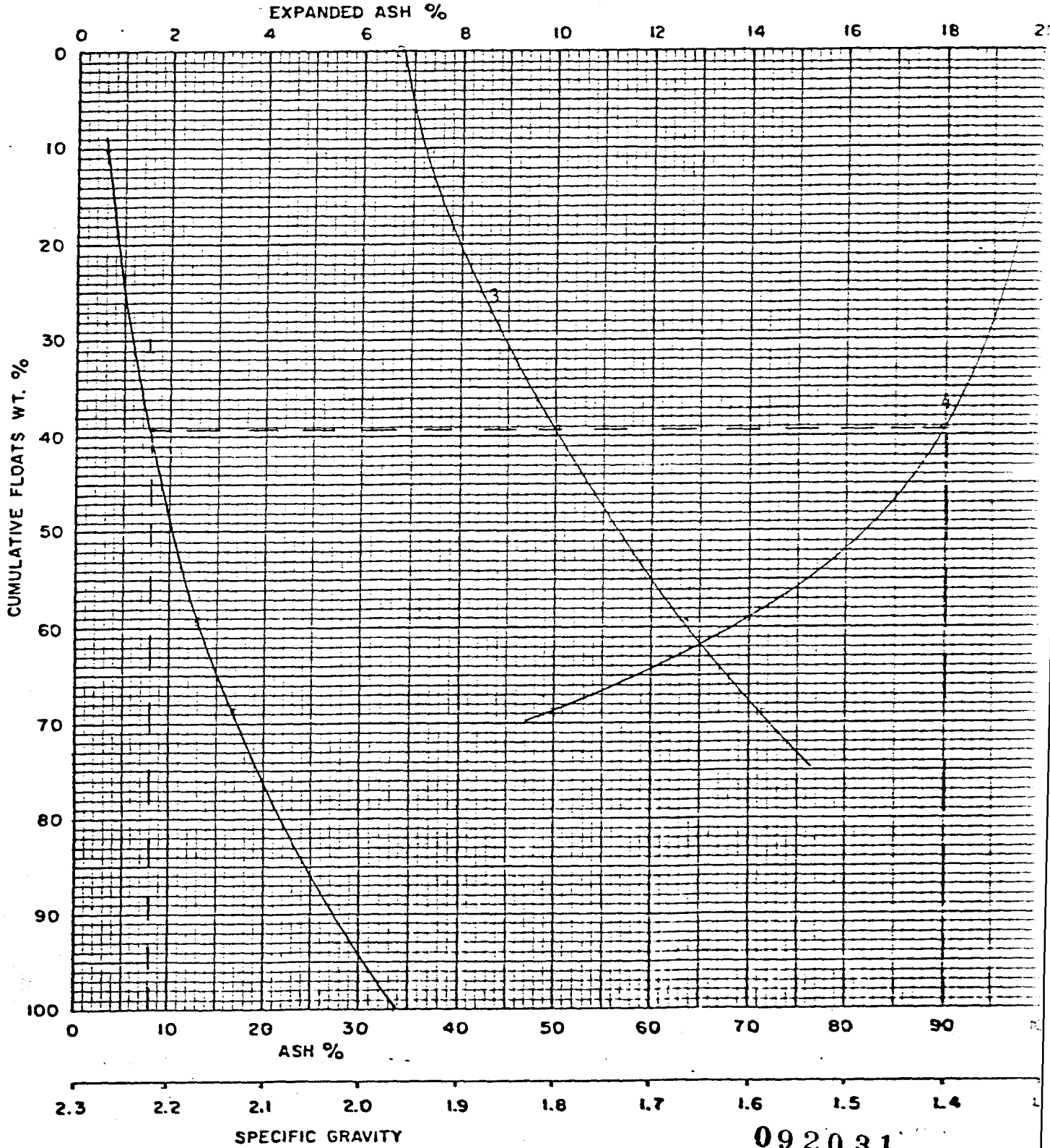
SAMPLE T - 8

Size 1/4" x 28 Mesh

WASHABILITY CURVES

CURVE LEGEND

- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL



092031

DATE

CYCLONE ENGINEERING SALES LTD
EDMONTON ALBERTA CANADA

COMPOSITE NO.: A3
HOLE NO.: C-76-6
SEAM:

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-32	27.02	0.49	21.26	51.23	10,710	6½
Footage: 352 - 357						
Weight: 5,674 gm.						

End of Analysis

Number:
Footage:
Weight:

Number:
Footage:
Weight:

Number:
Footage:
Weight:

Number:
Footage:
Weight:

092031

COMPOSITE NO.: T-9

HOLE NO.: C-76-6

SEAM:

T A B L E 1. COMPONENTS AND ANALYSIS

	<u>Ash %</u>	<u>R.M %</u>	<u>V.M. %</u>	<u>F.C. %</u>	<u>B.T.U./LB.</u>	<u>F.S.I.</u>
Number: C-33	52.52	0.52	17.16	29.80	6,390	2½
Footage: 363-368						
Weight: 3,131						
Number: C-34	19.01	0.46	22.82	57.71	12,510	7½
Footage: 368-373						
Weight: 2,212						
Number: C-35	42.07	0.41	17.77	39.75	7,830	2
Footage: 373-378						
Weight: 4,384						

Number:

Footage:

Weight:

Number:

Footage:

Weight:

092031

COMPOSITE NO.: T-9

HOLE NO.: C-76-6

SEAM:

T A B L E 2. ANALYSIS OF COMPOSITE HEAD SAMPLE

Ash %	40.35
R.M. %	0.46
V.M. %	18.04
F.C. %	41.15
S. %	0.74
B.T.U./LB.	8,310
F.S.I.	4

T A B L E 3. SIZE CONSIST OF COMPOSITE HEAD SAMPLE

<u>Size</u>	<u>Wt. %</u>
1/4" x 28 M.	75.05
28 M. x 0	24.95
<hr/> Total	<hr/> 100.00

T A B L E 4. ANALYSIS OF SIZE FRACTIONS

	<u>1/4" x 28 M.</u>	<u>28 M. x 0</u>	<u>Total</u>
Ash %	47.05	22.43	40.91
R.M. %	0.46	0.45	0.46
V.M. %	17.43	21.08	18.34
F.C. %	35.06	56.04	40.29
B.T.U./LB.	7,120	11,350	8,180
F.S.I.	3½	6½	4

092031

COMPOSITE NO.: T-9

HOLE NO.: C76-6

SEAM:

T A B L E 5. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Fractional Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>
- 1.30	12.63	0.41	3.38	15,270
1.30 - 1.40	12.00	0.52	8.67	14,200
1.40 - 1.60	13.85	0.50	22.53	11,570
1.60 - 1.80	8.00	0.49	40.34	8,500
+ 1.80	53.52	0.51	73.99	2,380
TOTAL	100.00	0.50	47.41	7,190

T A B L E 6. FLOAT-SINK AND ANALYSIS OF 1/4" x 28 MESH
(Cumulative Basis)

<u>Sp. Gr.</u>	<u>Wt. %</u>	<u>R.M. %</u>	<u>Ash %</u>	<u>B.T.U./Lb.</u>	<u>F.S.I.</u>
- 1.30	12.63	0.41	3.38	15,270	9
- 1.40	24.63	0.46	5.96	14,750	9
- 1.60	38.48	0.48	11.92	13,600	7½
- 1.80	46.48	0.48	16.81	12,720	6½
TOTAL	100.00	0.50	47.41	7,190	3½

002031

COMPOSITE NO.: T-9

HOLE NO.: C-76-6

SEAM:

T A B L E 7. WASHABILITY FOR 1/4" x 28 MESH FRACTION

Sp. Gr.	Fractional		Cumulative			
			Floats		Sinks	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
- 1.30	12.63	3.38	12.63	3.38	100.00	47.41
1.30 - 1.40	12.00	8.67	24.63	5.96	87.37	53.78
1.40 - 1.60	13.85	22.53	38.48	11.92	75.37	60.96
1.60 - 1.80	8.00	40.34	46.48	16.81	61.52	69.61
+ 1.80	53.52	73.99	100.00	47.41	53.52	73.99
Total	100.00	47.41				

092031

CYCLONE ENGINEERING SALES LTD.

COMPOSITE NO.: T-9

HOLE NO.: C-76-6

SEAM:

T A B L E 8. FLOAT-SINK OF 1/4" x 28 MESH FOR 8% ASH IN FLOATS

Specific Gravity:	1.46
Yield of Floats:	30.00 %

Analysis of Floats:

Ash %	7.96
R.M. %	0.45
V.M. %	23.77
F.C. %	67.82
S. %	0.80
B.T.U./Lb.	14,310
F.S.I.	8½

Analysis of Sinks:

Ash %	63.55
R.M. %	0.44

092031

CYCLONE ENGINEERING SALES LTD.

FIGURE

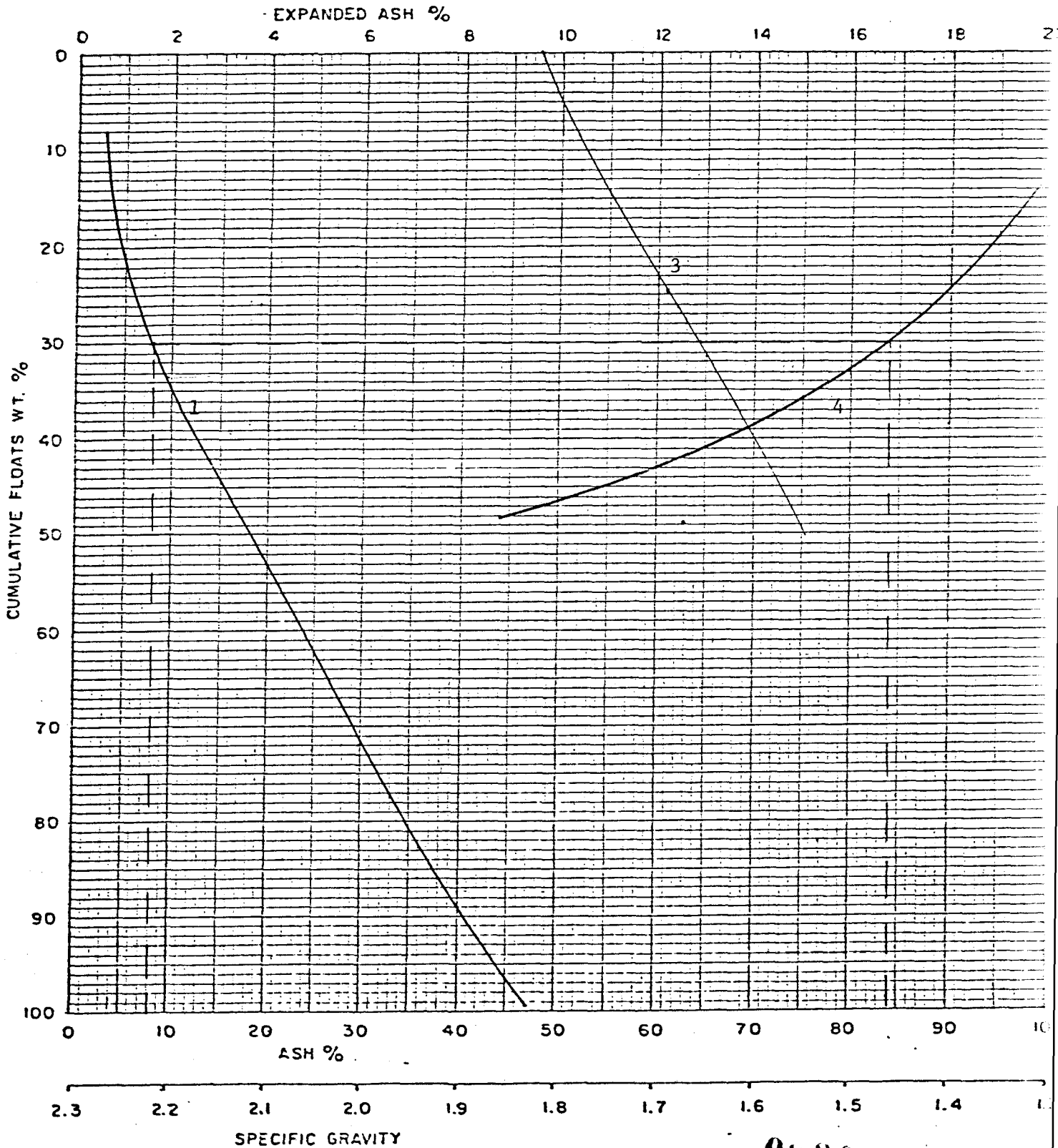
COMPANY CYPRUS ANVIL MINING CORP.

SAMPLE T-9

Size 1/4" x 28 Mesh

WASHABILITY CURVES

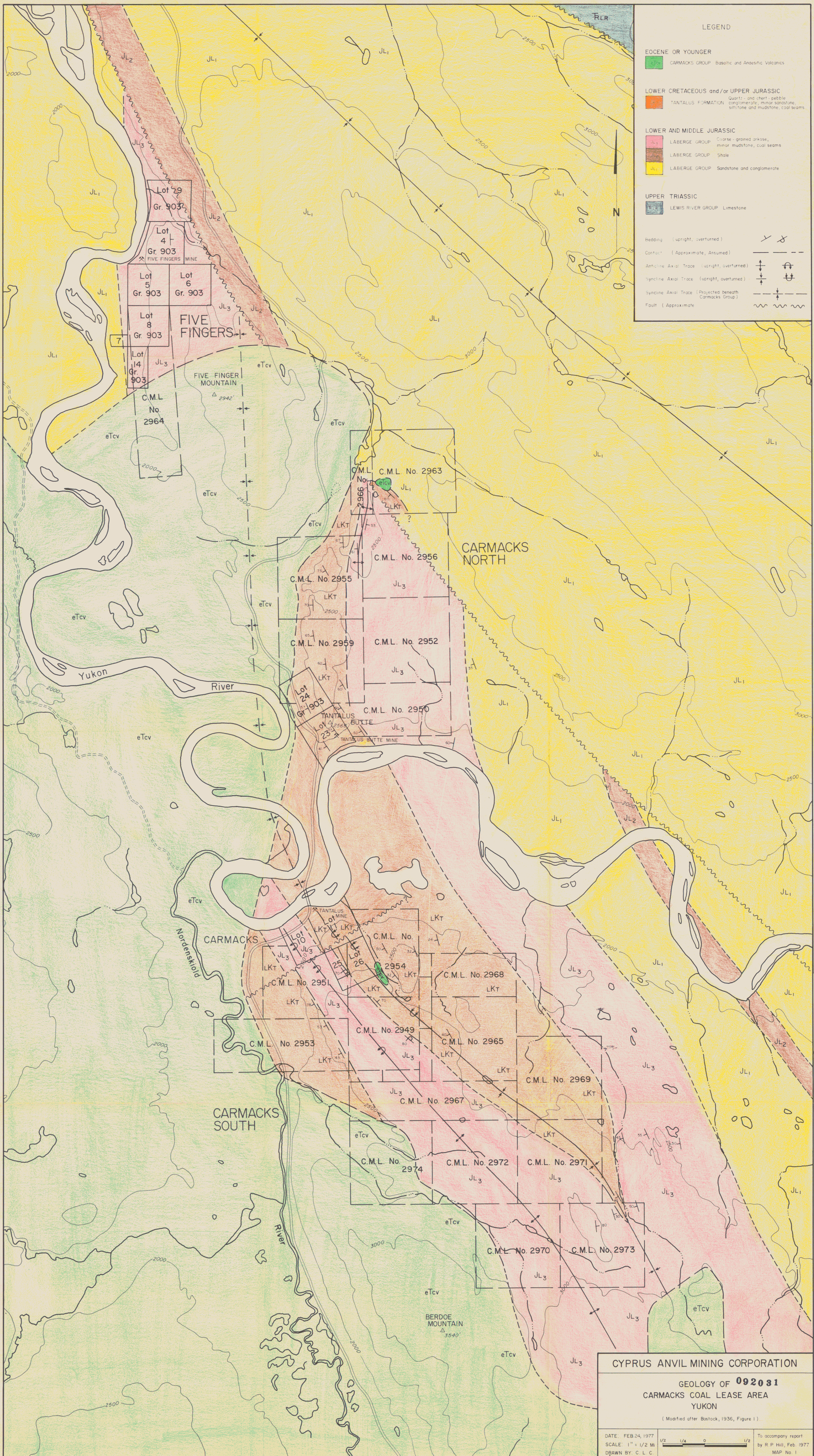
- 1 - FLOATS
- 2 - EXPANDED FLOATS
- 3 - SINKS
- 4 - SPECIFIC GRAVITY
- 5 - ELEMENTARY ASH
- 6 - NEAR GRAVITY MATERIAL



092031

DATE

CYCLONE ENGINEERING SALES LTD
EDMONTON ALBERTA CANADA



LEGEND

EOCENE OR YOUNGER
 CARMACKS GROUP Basaltic and Andesitic Volcanics

LOWER CRETACEOUS and/or UPPER JURASSIC
 TANTALUS FORMATION Quartz- and chert-pebble conglomerate, minor sandstone, siltstone and mudstone, coal seams

LOWER AND MIDDLE JURASSIC
 LABERGE GROUP Coarse-grained arkose, minor mudstone, coal seams
 LABERGE GROUP Shale
 LABERGE GROUP Sandstone and conglomerate

UPPER TRIASSIC
 LEWIS RIVER GROUP Limestone

Bedding (upright, overturned)

Contact (Approximate, Assumed)

Anticline Axial Trace (upright, overturned)

Syncline Axial Trace (upright, overturned)

Syncline Axial Trace (Projected beneath Carmacks Group)

Fault (Approximate)

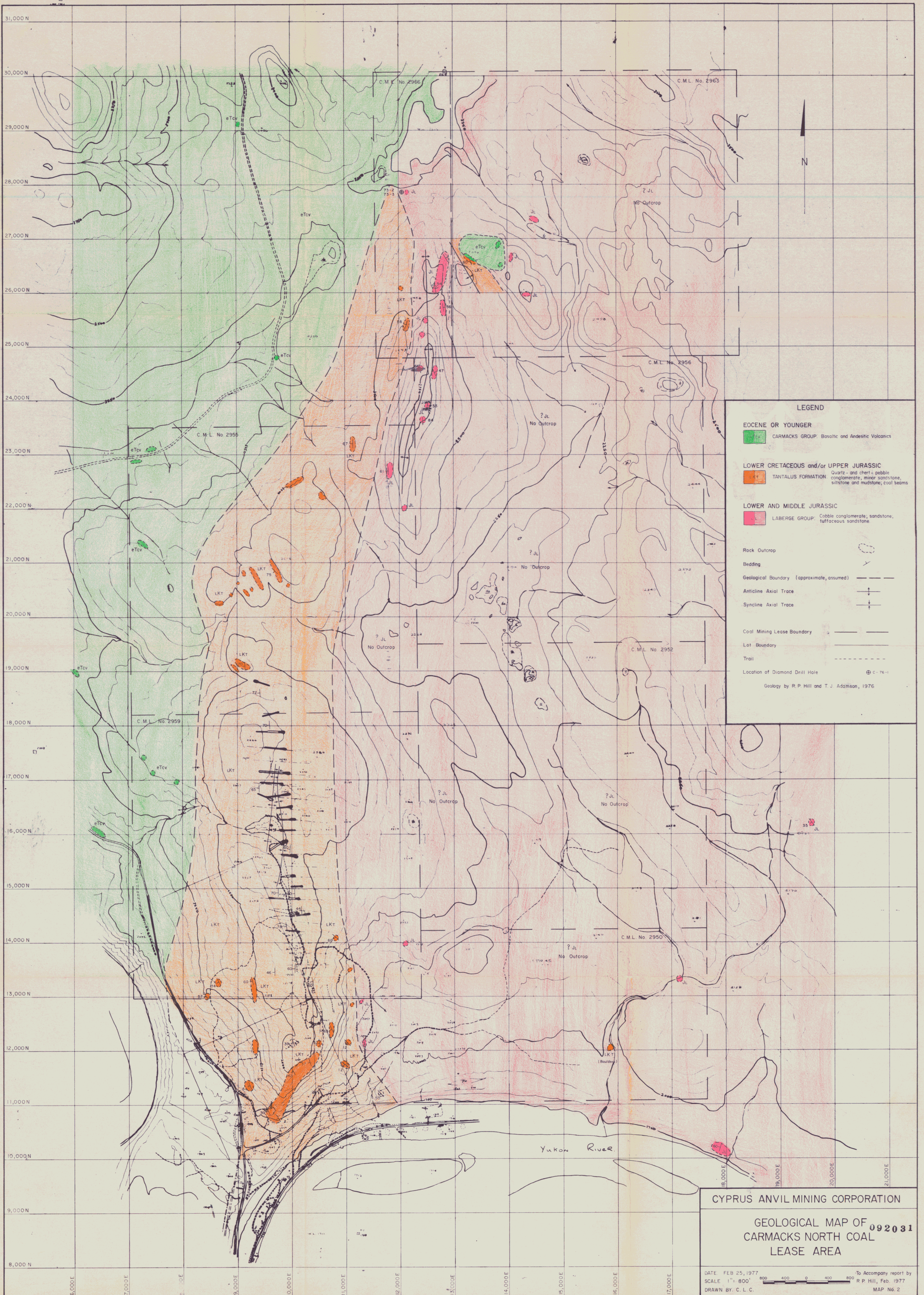
CYPRUS ANVIL MINING CORPORATION

GEOLOGY OF 092031
CARMACKS COAL LEASE AREA
YUKON

(Modified after Bostock, 1936, Figure 1.)

DATE: FEB 24, 1977
 SCALE: 1" = 1/2 MI
 DRAWN BY: C. L. C.

To accompany report
 by R. P. Hill, Feb 1977
 MAP No. 1



LEGEND

EOCENE OR YOUNGER
 CARMACKS GROUP: Basaltic and Andesitic Volcanics

LOWER CRETACEOUS and/or UPPER JURASSIC
 TANTALUS FORMATION: Quartz- and chert- pebble conglomerate, minor sandstone, siltstone and mudstone; coal seams

LOWER AND MIDDLE JURASSIC
 LABERGE GROUP: Cobble conglomerate; sandstone, tuffaceous sandstone

Rock Outcrop

Bedding

Geological Boundary (approximate, assumed)

Anticline Axial Trace ↑

Syncline Axial Trace ↓

Coal Mining Lease Boundary

Lot Boundary

Trail

Location of Diamond Drill Hole ⊕ C-76-1

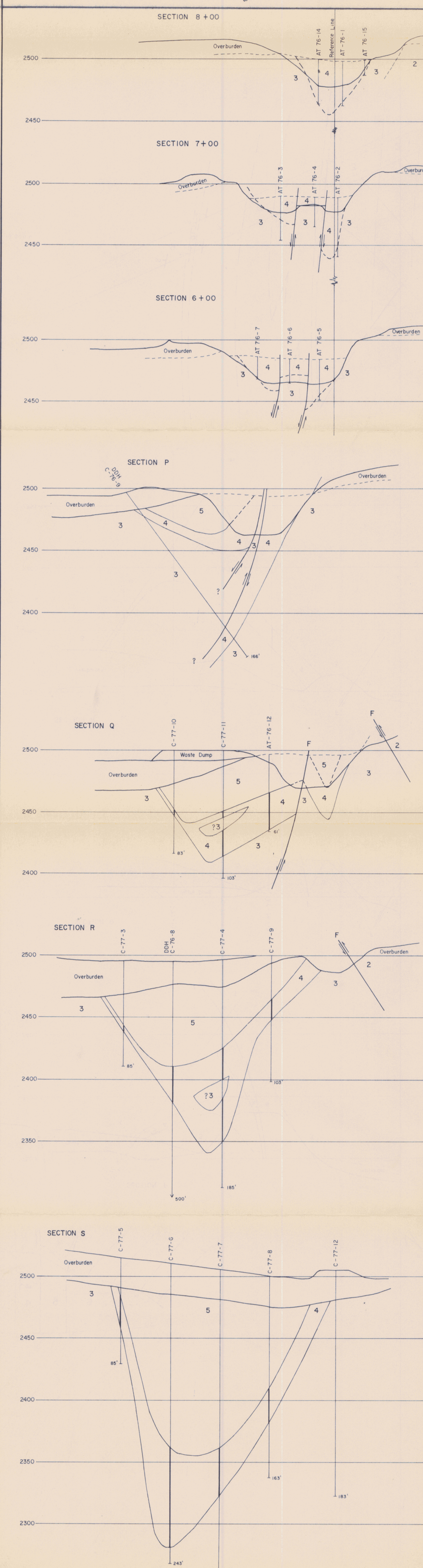
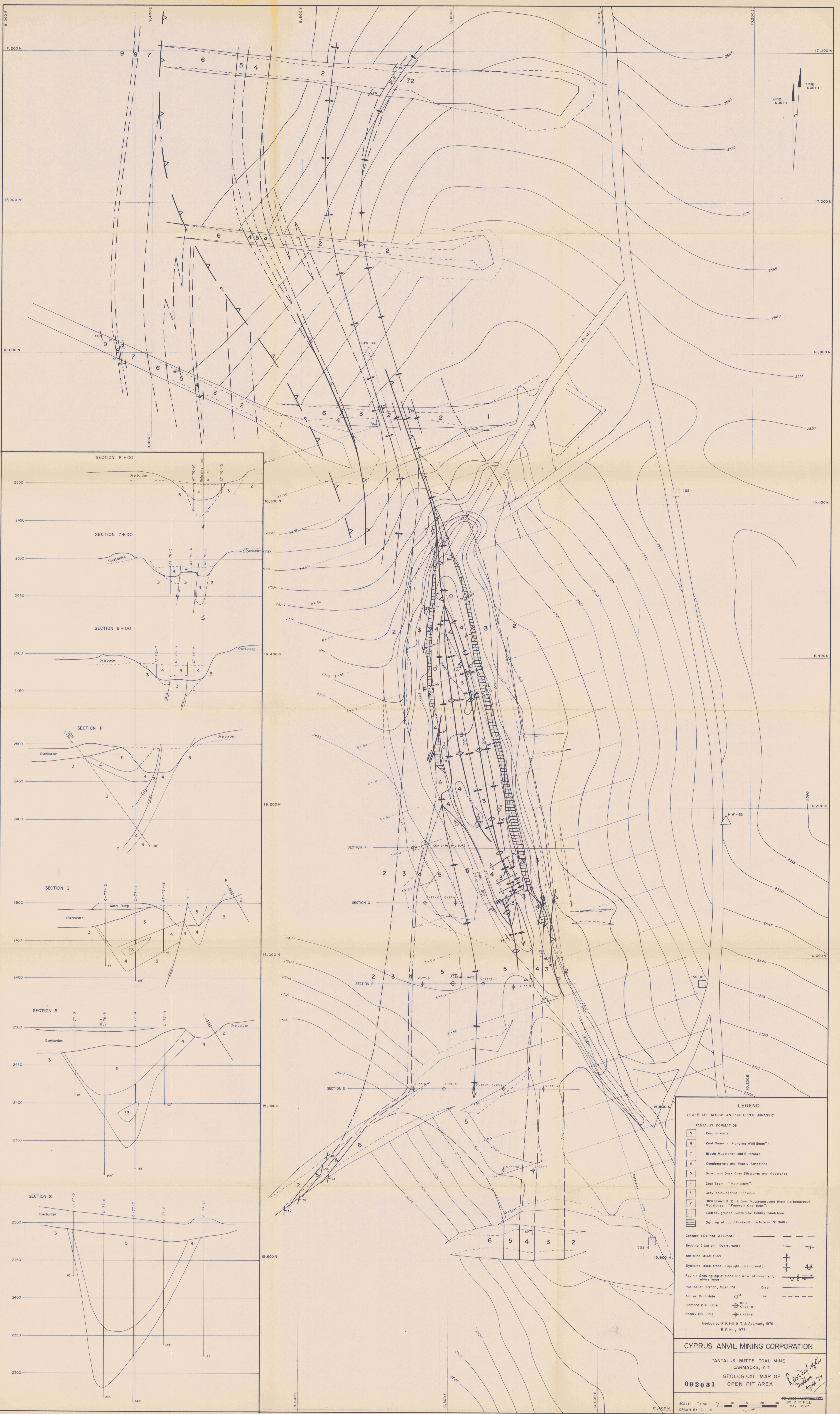
Geology by R.P. Hill and T.J. Adamson, 1976

CYPRUS ANVIL MINING CORPORATION

GEOLOGICAL MAP OF 092031
CARMACKS NORTH COAL LEASE AREA

DATE: FEB 25, 1977
 SCALE: 1" = 800'
 DRAWN BY: C. L. C.

To Accompany report by R.P. Hill, Feb. 1977
 MAP No. 2



LEGEND

LOWER CRETACEOUS AND/OR UPPER JURASSIC

TANTALUS FORMATION

- 9 Conglomerate
- 8 Coal Seam ("Hanging Wall Seam")
- 7 Brown Mudstones and Siltstones
- 6 Conglomerate and Pebble Sandstone
- 5 Brown and Dark Grey Siltstones and Mudstones
- 4 Coal Seam ("Main Seam")
- 3 Grey, thin-bedded Sandstone
- 2 Dark Brown to Dark Grey Mudstones, and Black Carbonaceous Mudstones ("Fairwell Coal Beds")
- 1 Coarse-grained Sandstone Pebbly Sandstone
- Outline of coal / Fairwell interface in Pit Walls

Contact (Defined, Assumed) ———

Bedding (Upright, Overturned) ———

Anticline axial trace ———

Syncline axial trace (Upright, Overturned) ———

Fault (Showing dip of plane and sense of movement, where shown) ———

Outline of Trench, Open Pit ———

Airrac Drill Hole —○—

Diamond Drill Hole —◇—

Rotary Drill Hole —⊕—

Geology by R. P. Hill & T. J. Adomson, 1976
R. P. Hill, 1977

CYPRUS ANVIL MINING CORPORATION

TANTALUS BUTTE COAL MINE
CARMACKS, Y.T.

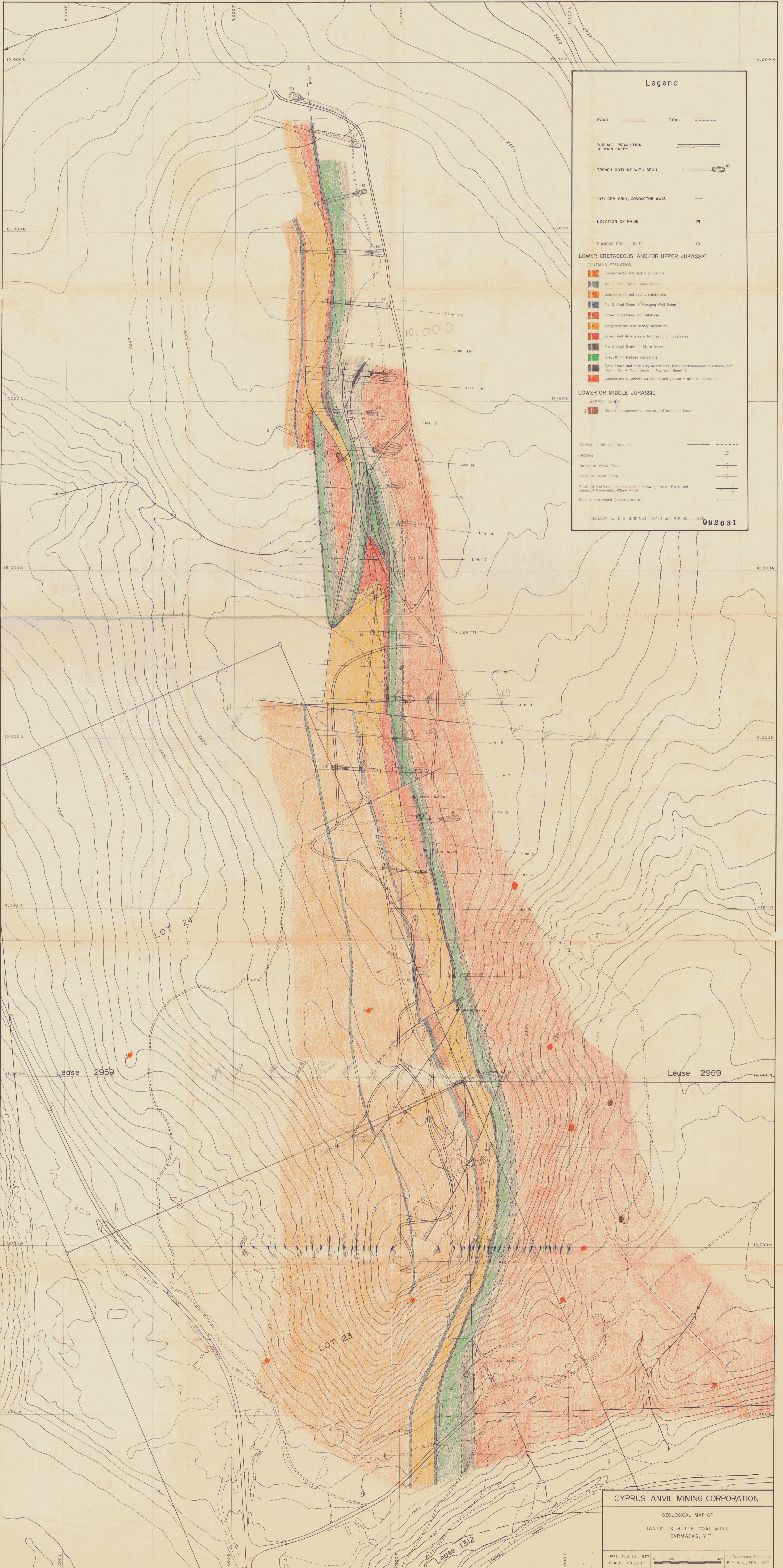
092031

GEOLOGICAL MAP OF
OPEN PIT AREA

Scale: 1" = 40'

BY R. P. HILL
MAY 1977

*Revised after
Drilling
April 1977*



Legend

ROAD TRAIL

SURFACE PROJECTION OF MAIN ENTRY

TRENCH OUTLINE WITH SPOIL

1971 CEM GRID, CONDUCTOR AXIS

LOCATION OF RAISE

DIAMOND DRILL - HOLE

LOWER CRETACEOUS AND/OR UPPER JURASSIC

TANTALUS FORMATION

- Conglomerate and pebbly sandstone
- No. 1 Coal Seam (New Seam)
- Conglomerate and pebbly sandstone
- No. 2 Coal Seam ("Hanging Wall Seam")
- Brown mudstones and siltstones
- Conglomerate and pebbly sandstone
- Brown and dark grey siltstones and mudstones
- No. 3 Coal Seam ("Main Seam")
- Grey, thin-bedded sandstone
- Dark brown and dark grey mudstones, black carbonaceous mudstones, and coal - No. 4 Coal Seam ("Footwall Seam")
- Conglomerate, pebbly sandstone and coarse-grained sandstone

LOWER OR MIDDLE JURASSIC

LABERGE GROUP

- Cobble conglomerate, arkose, tuffaceous arkose

Contact (Defined, Assumed)

Bedding

Anticline Axial Trace

Syncline Axial Trace

Fault at Surface (approximate, Showing Dip of Plane and Sense of Movement Where Known)

Fault Underground (approximate)

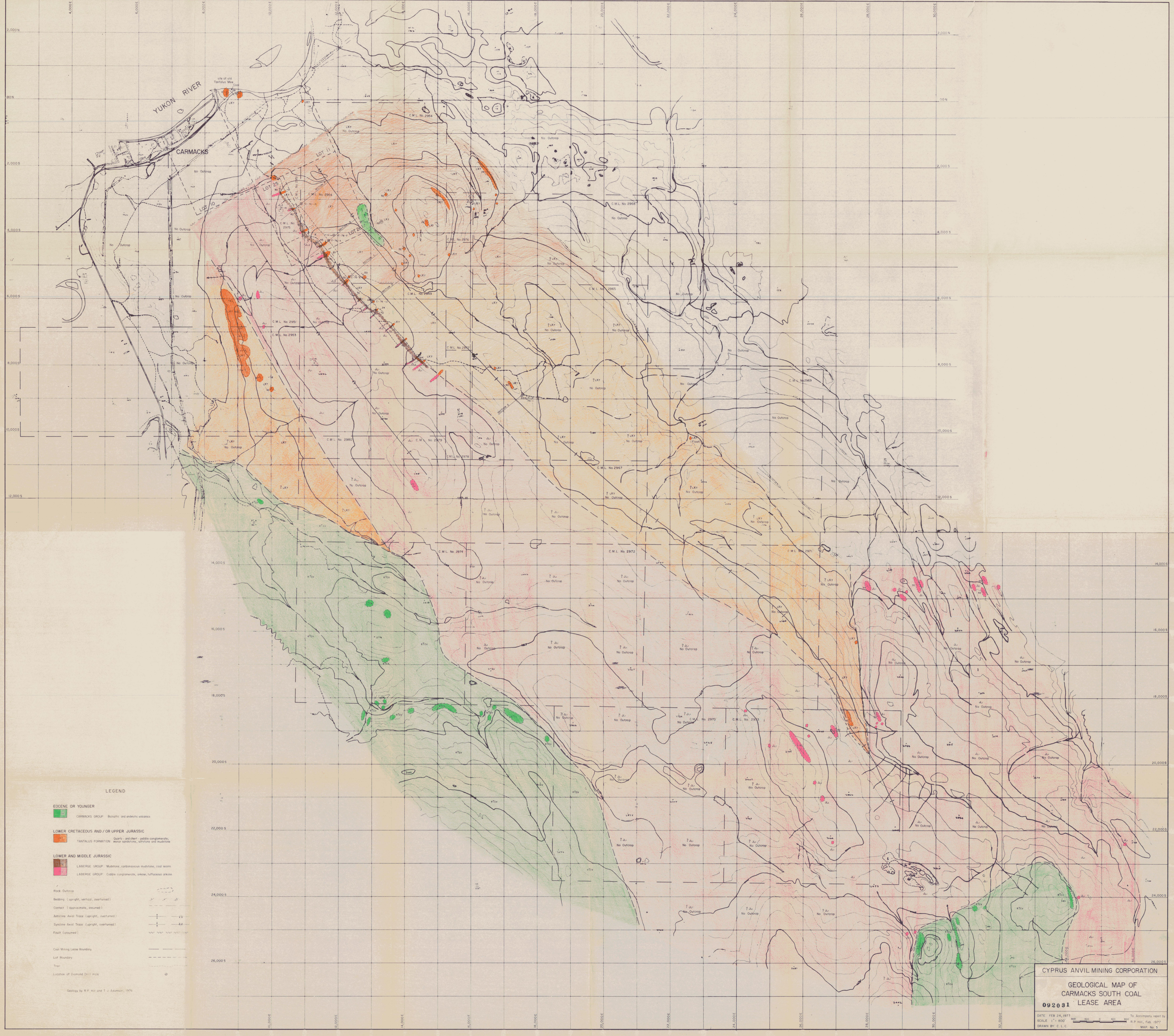
GEOLOGY by D. S. JENNINGS (1973) and R. P. HILL (1976) **092031**

CYPRUS ANVIL MINING CORPORATION

GEOLOGICAL MAP OF
TANTALUS BUTTE COAL MINE
CARMACKS, Y.T.

DATE FEB 13, 1977
SCALE 1"=200'
DRAWN BY C. L. C.

To Accompany Report by
R. P. HILL, FEB. 1977
MAP No. 4



LEGEND

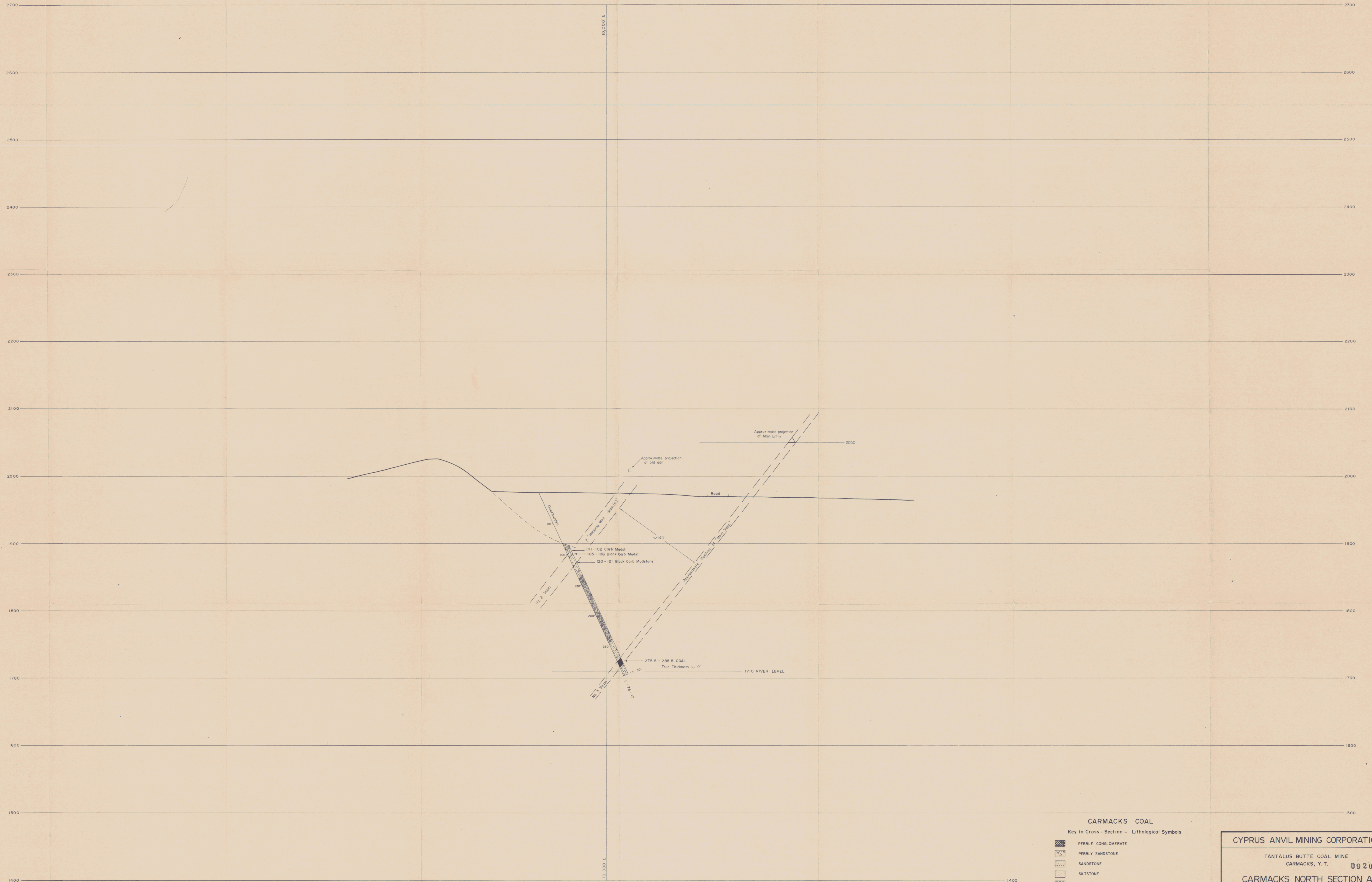
- Eocene or Younger**
- CARMACKS GROUP** Basaltic and andesitic volcanics
- LOWER CRETACEOUS AND/OR UPPER JURASSIC**
- TANTALUS FORMATION** Quartz- and chert-pebble conglomerate, minor sandstone, siltstone and mudstone
- LOWER AND MIDDLE JURASSIC**
- LABERGE GROUP** Mudstone, carbonaceous mudstone, coal seams
- LABERGE GROUP** Cobble conglomerate, arkose, buffaceous arkose
- Rock Outcrop
- Bedding (upright, vertical, overturned)
- Contact (approximate, assumed)
- Anticline Axial Trace (upright, overturned)
- Syncline Axial Trace (upright, overturned)
- Fault (assumed)
- Coal Mining Lease Boundary
- Lot Boundary
- Trail
- Location of Diamond Drill Hole

Geology by R.P. Hill and T.J. Aspinall, 1976

CYPRUS ANVIL MINING CORPORATION
 GEOLOGICAL MAP OF
 CARMACKS SOUTH COAL
 LEASE AREA

DATE: FEB 24, 1977
 SCALE: 1" = 800'
 DRAWN BY: C.L.C.
 To accompany report by R.P. Hill, Feb. 1977
 MAP No. 5

CARMACKS NORTH SECTION A



CARMACKS COAL
Key to Cross-Section - Lithological Symbols

	PEBBLE CONGLOMERATE
	PEBBLY SANDSTONE
	SANDSTONE
	SILTSTONE
	MUDSTONE
	CARBONACEOUS MUDSTONE
	COAL

CYPRUS ANVIL MINING CORPORATION
TANTALUS BUTTE COAL MINE
CARMACKS, Y. T. 092031
CARMACKS NORTH SECTION A

DATE: FEB 10, 1977
SCALE: 1" = 50'
DRAWN BY: C. L. C.
MAP REF: 100
DESIGNED BY: R. P. H.

CARMACKS NORTH SECTION B



CARMACKS COAL
Key to Cross-Section - Lithological Symbols

	PEBBLE CONGLOMERATE
	PEBBLY SANDSTONE
	SANDSTONE
	SILTSTONE
	MUDSTONE
	CARBONACEOUS MUDSTONE
	COAL

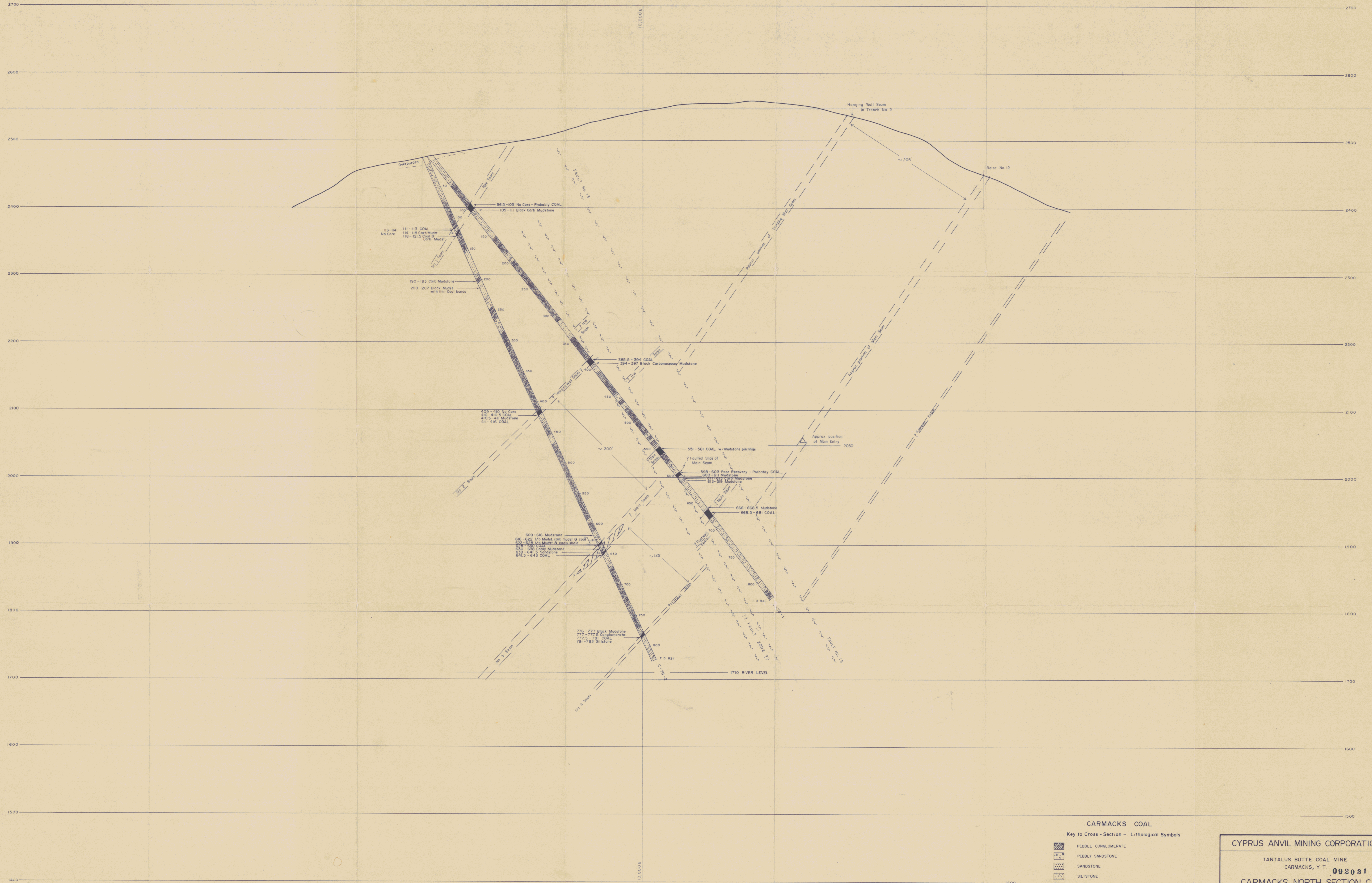
CYPRUS ANVIL MINING CORPORATION

TANTALUS BUTTE COAL MINE
CARMACKS, Y. T. 092031

CARMACKS NORTH SECTION B

DATE: FEB 10, 1977
SCALE: 1" = 50'
DRAWN BY: C. L. C. MAP REF. DESIGNED BY: R. P. H.

CARMACKS NORTH SECTION C



CARMACKS COAL
Key to Cross-Section - Lithological Symbols

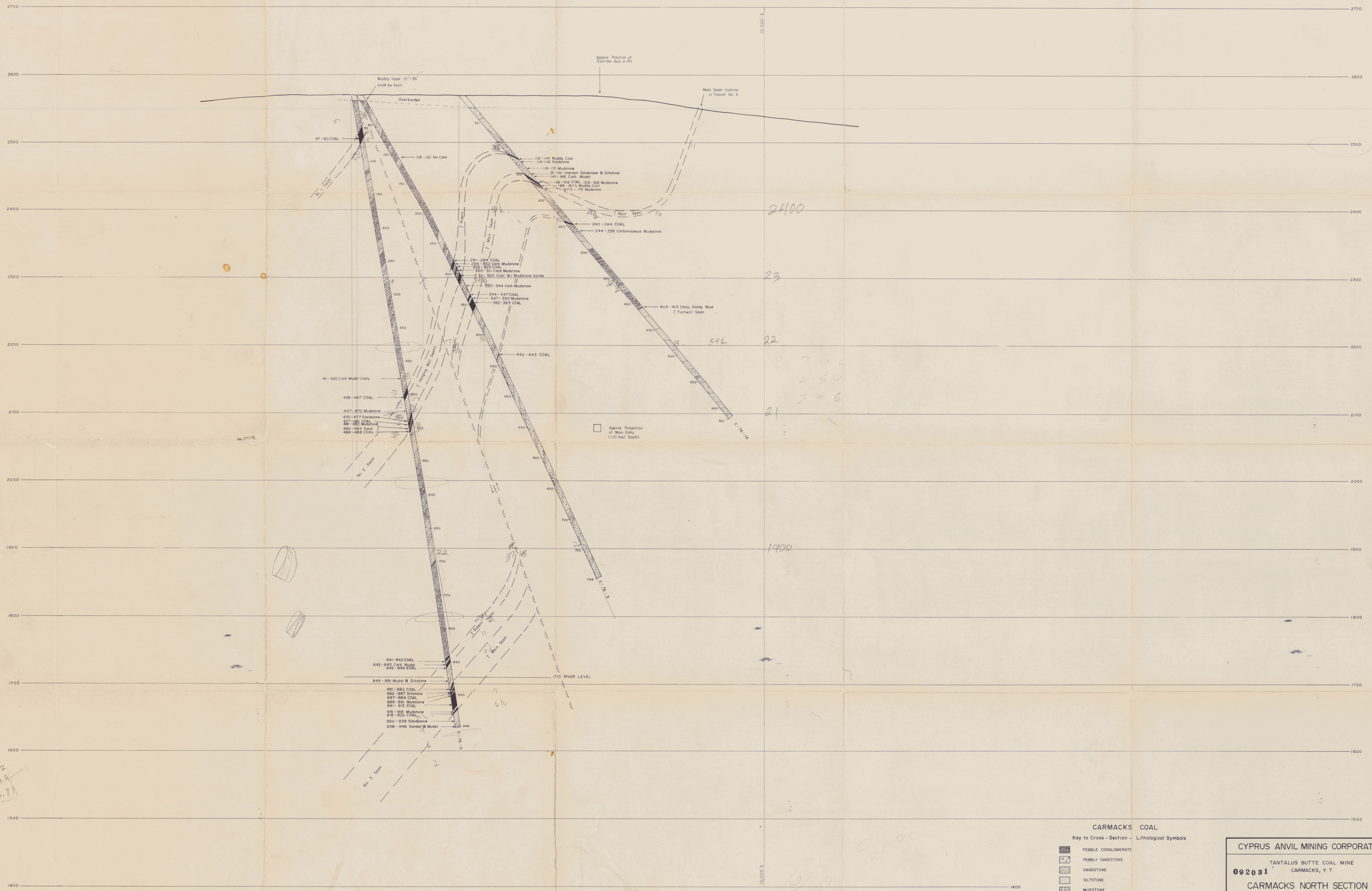
- PEBBLE CONGLOMERATE
- PEBBLY SANDSTONE
- SANDSTONE
- SILTSTONE
- MUDSTONE
- CARBONACEOUS MUDSTONE
- COAL

CYPRUS ANVIL MINING CORPORATION
TANTALUS BUTTE COAL MINE
CARMACKS, Y. T. 092031
CARMACKS NORTH SECTION C

DATE: FEB 9, 1977
SCALE: 1" = 50'
DRAWN BY: C. L. C.

MAP REF. DESIGNED BY: R.P.H.

CARMACKS NORTH SECTION D



1741.72
358.49
553.71

CARMACKS COAL	
Key to Cross-Section	Lithological Symbols
	PEBBLE CONGLOMERATE
	PEBBLY SANDSTONE
	SANDSTONE
	SILTSTONE
	MUDSTONE
	CARBONACEOUS MUDSTONE
	COAL








CYPRUS ANVIL MINING CORPORATION
 TANTALUS BUTTE COAL MINE
 CARMACKS, Y. T.
092031
 CARMACKS NORTH SECTION D

DATE FEB 10, 1977
 SCALE 1" = 50'
 DRAWN BY C. L. C. MAP REF. DESIGNED BY R.P.H.

CARMACKS SOUTH SECTION A



CARMACKS COAL
Key to Cross - Section - Lithological Symbols

-  PEBBLE CONGLOMERATE
-  PEBBLY SANDSTONE
-  SANDSTONE
-  SILTSTONE
-  MUDSTONE
-  CARBONACEOUS MUDSTONE
-  COAL

CYPRUS ANVIL MINING CORPORATION
TANTALUS BUTTE COAL MINE
CARMACKS, Y. T.
092031
CARMACKS SOUTH SECTION A

DATE JAN 25, 1977
SCALE 1" = 50'
DRAWN BY C. L. C.

MAP REF.
DESIGNED BY R.P.H.

CARMACKS SOUTH SECTION B



CARMACKS COAL
Key to Cross-Section - Lithological Symbols

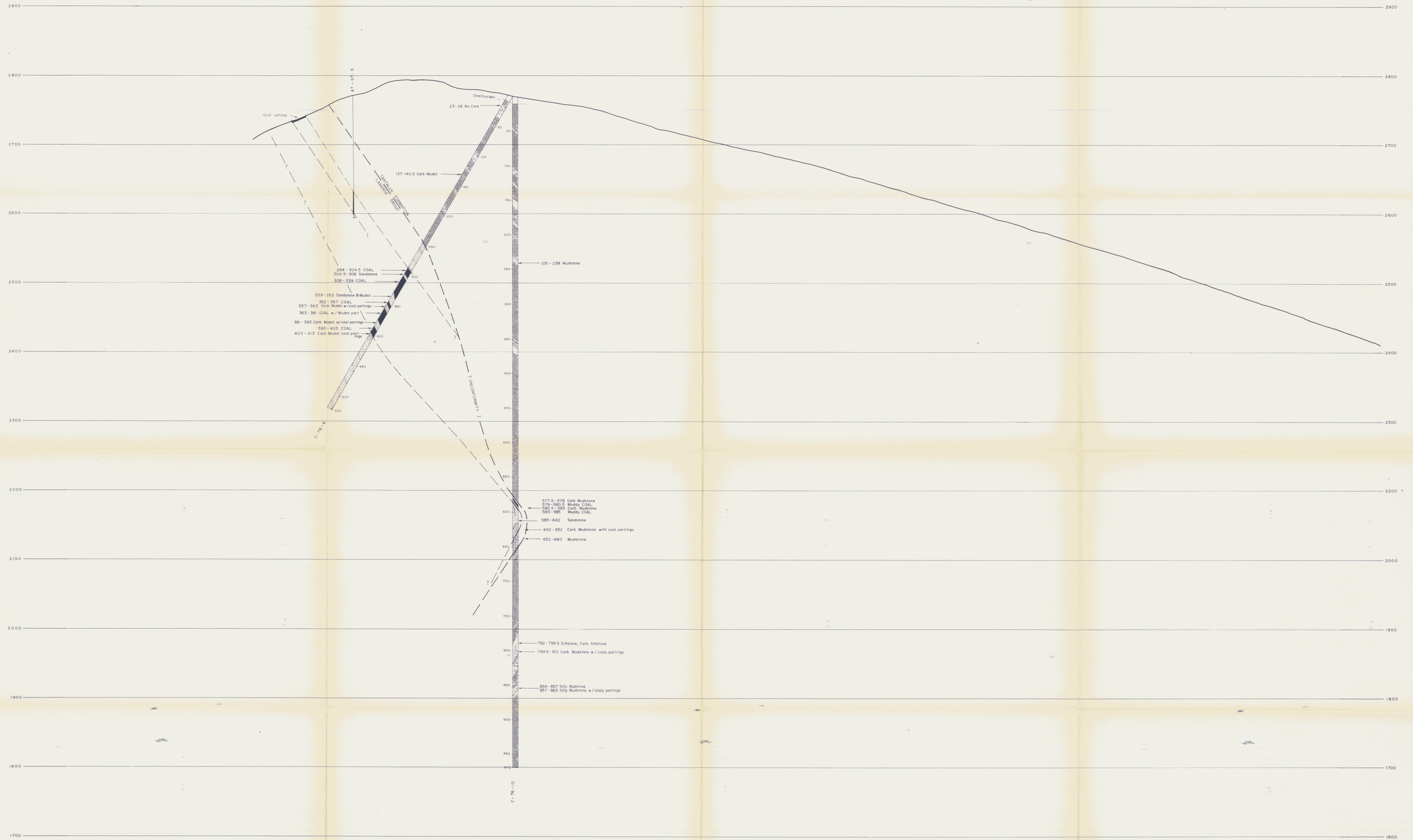
	PEBBLE CONGLOMERATE
	PEBBLY SANDSTONE
	SANDSTONE
	SILTSTONE
	MUDSTONE
	CARBONACEOUS MUDSTONE
	COAL

CYPRUS ANVIL MINING CORPORATION
TANTALUS BUTTE COAL MINE
CARMACKS, Y. T.
092031
CARMACKS SOUTH SECTION B

DATE JAN 24, 1977
SCALE 1" = 50'
DRAWN BY C. L. C.

MAP REF. 100
DESIGNED BY R. P. H.

CARMACKS SOUTH SECTION C



CARMACKS COAL

- Key to Cross-Section - Lithological Symbols
- PEBBLE CONGLOMERATE
 - PEBBLY SANDSTONE
 - SANDSTONE
 - SILTSTONE
 - MUDSTONE
 - CARBONACEOUS MUDSTONE
 - COAL

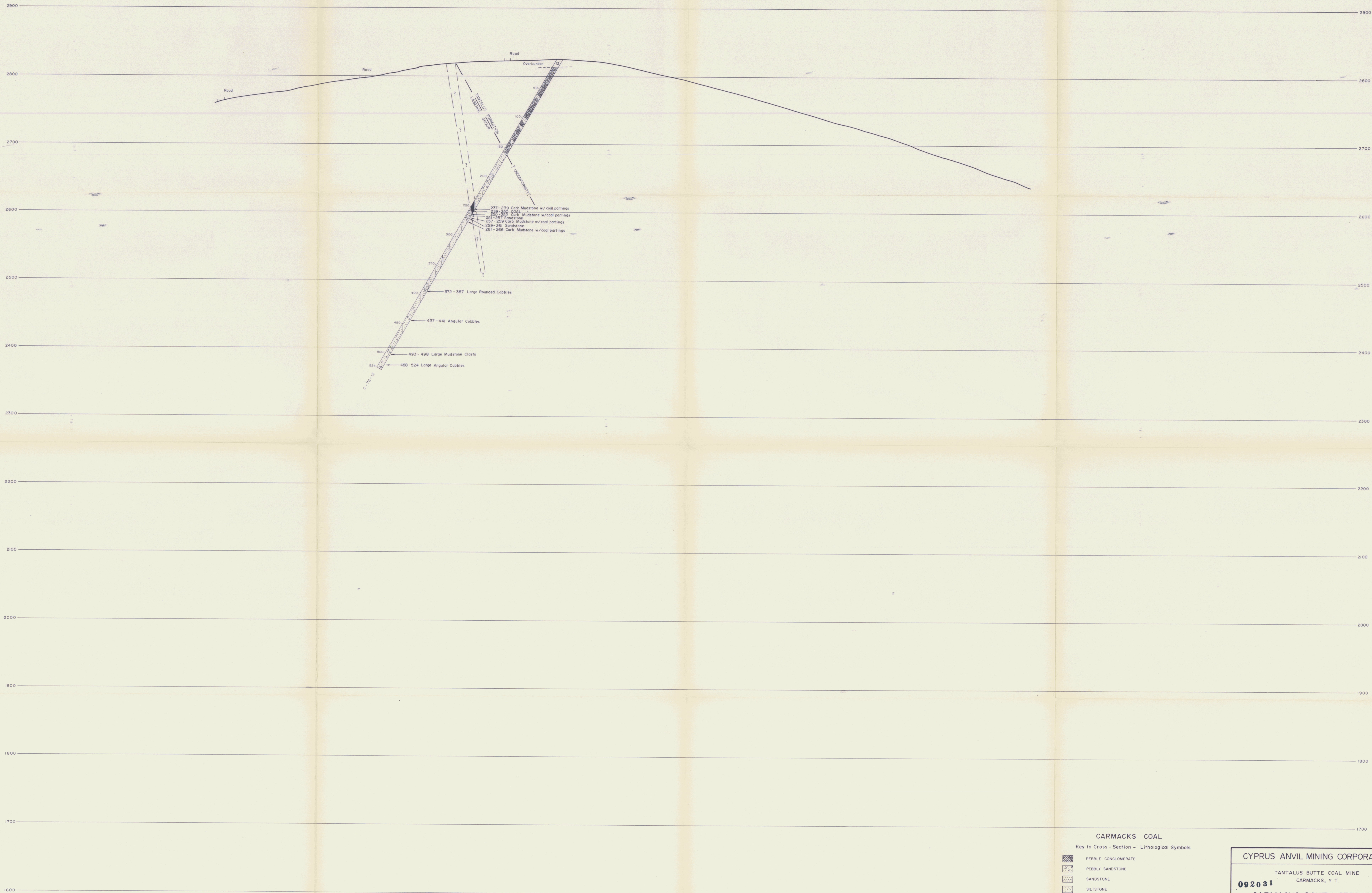
CYPRUS ANVIL MINING CORPORATION

TANTALUS BUTTE COAL MINE
CARMACKS, Y. T.

092031
CARMACKS SOUTH SECTION C








DATE: JAN. 24, 1977
SCALE: 1" = 50'
DRAWN BY: C. L. C. MAP REF. DESIGNED BY: R. P. H.

CARMACKS SOUTH SECTION D



CARMACKS COAL

Key to Cross-Section - Lithological Symbols

-  PEBBLE CONGLOMERATE
-  PEBBLY SANDSTONE
-  SANDSTONE
-  SILTSTONE
-  MUDSTONE
-  CARBONACEOUS MUDSTONE
-  COAL

CYPRUS ANVIL MINING CORPORATION

TANTALUS BUTTE COAL MINE
CARMACKS, Y. T.

092031
CARMACKS SOUTH SECTION D

DATE: JAN 25, 1977
SCALE: 1" = 50'
DRAWN BY: C. L. C. MAP REF. DESIGNED BY: R. P. H.

CARMACKS SOUTH SECTION E



CARMACKS COAL
 Key to Cross - Section - Lithological Symbols

- PEBBLE CONGLOMERATE
- PEBBLY SANDSTONE
- SANDSTONE
- SILTSTONE
- MUDSTONE
- CARBONACEOUS MUDSTONE
- COAL

CYPRUS ANVIL MINING CORPORATION

TANTALUS BUTTE COAL MINE
 CARMACKS, Y. T.

092031

CARMACKS SOUTH SECTION E

DATE: JAN 25, 1977
 SCALE: 1" = 50'
 DRAWN BY: C. L. C. MAP REF. DESIGNED BY: R. P. H.