Geological and Diamond Drilling Report

Hungerford Township

Lots 29, 30 Concession XII

Ram Petroleums Limited
130 Adelaide Street West
Suite 916
Toronto, Ontario

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Consulting Geologist

February 14, 1986.

Summary

A program of prospecting, geological mapping and diamond drilling was undertaken during the fall of 1985 to investigate and subsequently test the extent and economic potential of the metapelites on the Courneyour property for use as an industrial filler. Interest in the area was aroused as a result of the discovery and testing of the Aimko muscovite schist deposit along the same stratigraphic horizon further northwards along strike.

The geological mapping indicates that the muscovite-rich schist zones are interlayered with more biotite (locally garnetiferous) and sillimanite-bearing schists in a major folded zone that closes to the southeast of the property. Horizons with extensive development of sillimanite nodules up to 30 % over several feet occur locally. Diamond drilling of 2 holes (total 518 feet) to test the metapelites along an unbiased representative cross-section have shown several thin muscovite schist horizons. The largest of these sections show only 49 ft. of intersection up to the property border and suggests thicker sequences along strike and on different parts of the property.

Preliminary beneficiation studies of the drill core material and a representative surface grab sample are in progress at the Ontario Research Foundation in order to assess the recoverability and quality of a potential muscovite product. The presently available information suggests that there is limited potential for any large tonnage, open pit operation for an industrial muscovite product solely on the Courneyour property, although the laboratory studies may not preclude exploration on adjacent properties.

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1.0 Introduction

Geological mapping, prospecting, and diamond drilling were carried out on portions of a prospective muscovite-bearing metapelite schist horizon on Lots 29/30 Concession XII in Hungerford Township. Field work including placement of grid lines, geological mapping, and logging of drill holes was conducted by the author alone in the periods October 27-30, November 19-22, and December 10-12, 1985. Geological mapping was originally based on regional scale mapping and correlation by Verschuren (1983). Favourable horizons were later tested by 518 feet of BX core diamond drilling in November/ December 1985.

2.0 Location and access

The properties that were studied lie within Lots 29 and 30, Concession XII of Hungerford Township. The area is situated southwest of the town of Kaladar and east of the town of Tweed and Sulphide. Access to the area is afforded by several gravel farm access roads from Highway 7 and by a paved highway and farm access road east of the town of Tweed. An abandoned railway embankment provides partial access southwest from Kaladar. The same embankment runs parallel to a farm access road from the settlement of Otter Creek (Sulphide).

3.0 Property Holders

Both the mineral rights and the land for Lots 29/30 Convession 12 are presently patented and owned by the following:

Ram Petroleums Limited - Lot 30 Concession XII North (South)? part, and

Mr. Henri Turcotte (RR #1, Tweed, Ontario)- Lot 29, Concession XII, Hungerford Township.

4.0 Topography

The property and the region in general show a series of fault and/or stratigraphically controlled outcrop ridges that trend north to northeasterly. The intermittent areas are grasslands or marsh, often flooded in the autumn of 1985, minor grassy farm pasturelands near the access roads, and a winding swamp/marshland that borders the West Fork of the Otter Creek. Much of the creek on the Courneyour property has been flooded due to extensive rainfall in late 1985 and numerous beaver dams.

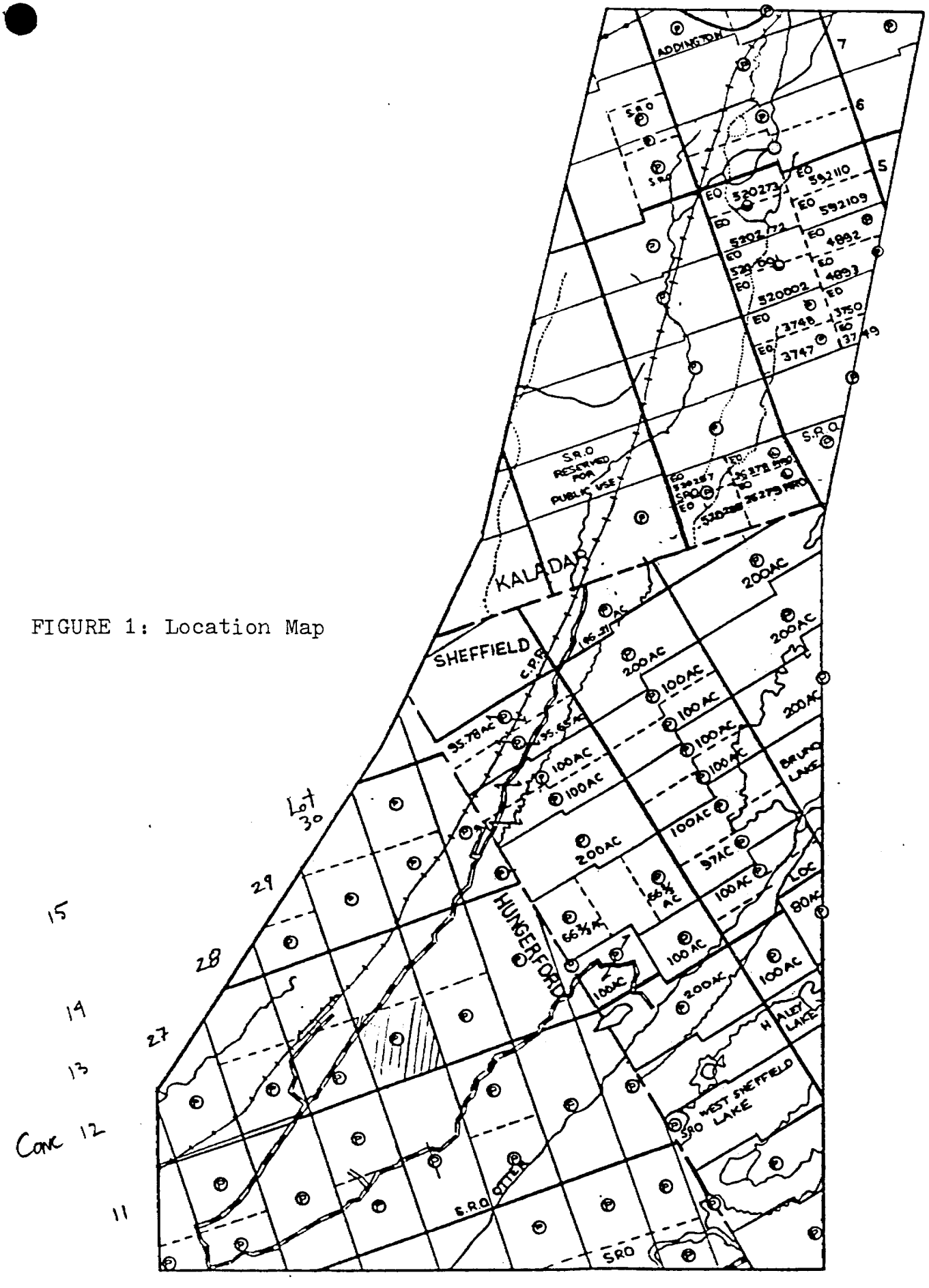

FIGURE 1: Location Map

5.0 Regional Structure

The regional geology of the area has been mapped by Verschuren (1982, 1983, Report of Resident Geologists, Tweed, Ministry of Natural Resources) with emphasis on the definition of the muscovite-rich pelitic schists that may be utilized for the mineral filler industry in Ontario. The region forms part of the Clare River Synform that trends northeast from the town of Sulphide to Kaladar. Bright (1985) later correlated the package of metasedimentary and metavolcanic schists/gneisses and minor carbonates that form part of the Clare River Synform through the regional area. The units strike to the northeast with steep dips to the southeast and a major closure in the vicinity of Otter creek at the south end of the mapped area. Bright (1985) describes the fold as being overturned to the northwest as a result of a later episode of northeasterly trending folds.

6.0 Geology

6.1 General Geology

The general geology of the area, as mapped by Verschuren (1983), comprises 13 recognizeable units within that portion of the Clare River Synform. In general the stratigraphy consists of metapelitic sediments, biotite and/or muscovite-rich, metasiltstone, marbles (dolomitic, calcitic), mafic to intermediate gneisses of volcanosedimentary affinities, minor calc-silicate paragneisses and variable quartz monzonite and pegmatite intrusions. Verschuren's (1983) work concentrated on the study of the metapelitic schist horizons that hosted the Kozoumi (Aimko deposit) muscovite occurrence and its possible regional extensions. Figure 2 outlines the results of his mapping; the muscovite schist (up to 60 % muscovite locally) occurs throughout the length of the synform in a folded pattern. Biotite-garnet-(staurolite)-bearing schists with lesser muscovite (up to 25 %) are interlayered with the muscovite rich zones. The biotite rich zones show characteristic garnets, sillimanite clots (fibrolite) locally, and have a reddish weathered surface.

The present geological mapping has shown a major fold pattern closing to the southwest with local evidence of refolding, shown on the accompanying geological map. Much of the properties is underlain by a varied mixture of biotite and muscovite metapelites, very fine grained amphibolitized metavolcanics and tuffs. Granitic gneiss border the eastern part of the area. Minor tan coloured banded dolomitic marbles occur on the western limb of the muscovite schist zone near the farm access road.

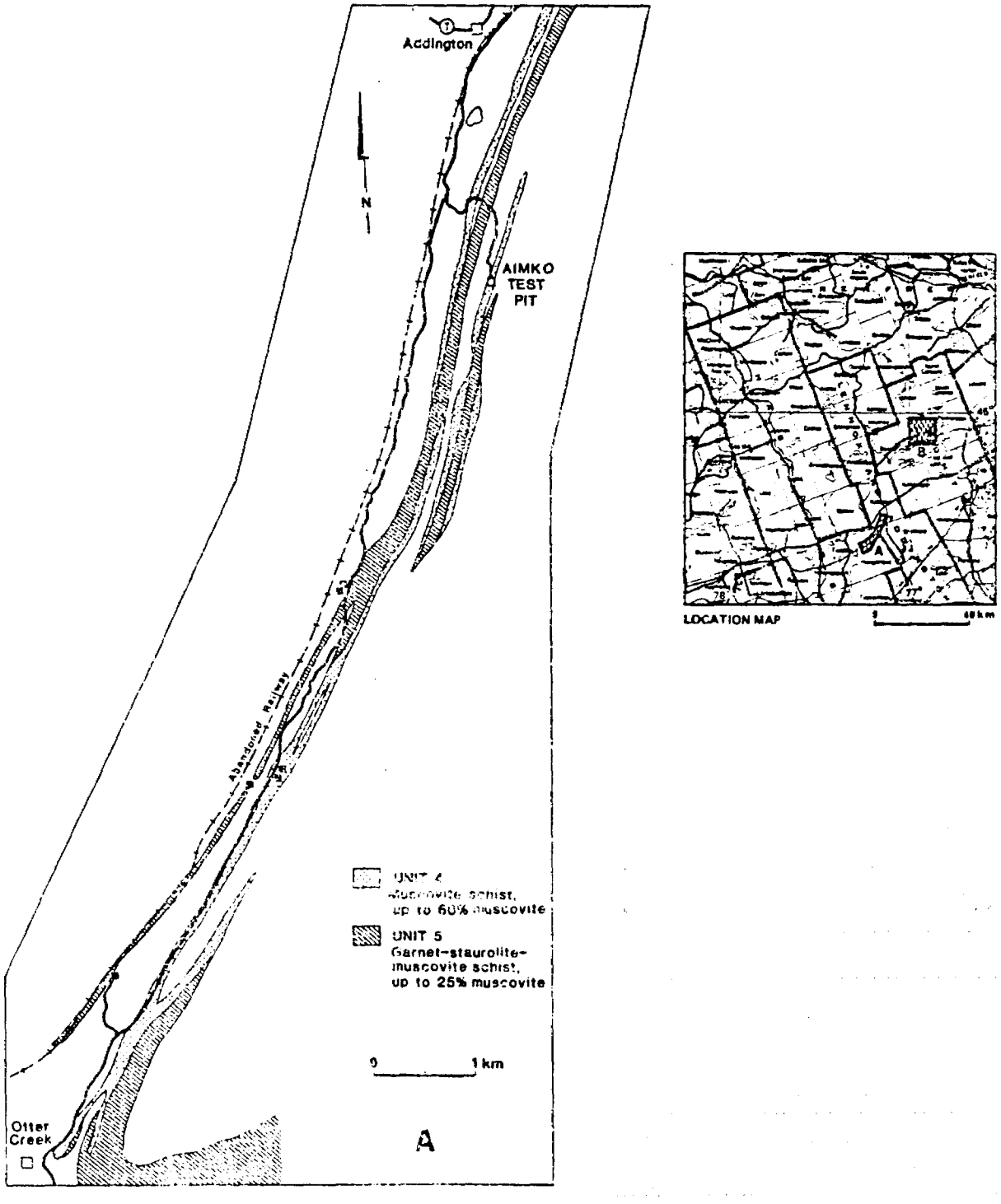

FIGURE 2:
Outline of Muscovite Schist;
Claire River Structure

6.2 Field relationships

Initial field observations in the area were based on reconnaissance geological mapping by Verschuren (1983) who identified 2 main geological units that host the muscovite deposits in the area. The main zone of muscovite schist that has been identified and partially developed in the area occurs within a muscovite-quartz schist (>25% muscovite) near a biotite-garnet- (muscovite-bearing) quartz schist. Muscovite layers up to 50-60% muscovite are typical within the muscovite-quartz schist but also occur as discrete thin horizons a few centimetres to several metres in width in the predominantly biotite-quartz schists.

Field observations on several lots along the formation indicate that the muscovite rich units as previously mapped also contain appreciable amounts of biotite-quartz schist; thicknesses of 25 metres of muscovite schist may be interbedded with nearly equal thicknesses of biotite-rich (muscovite <10%) schists. The interbedded nature of the two units also suggests that the variation reflect original chemical differences or facies within the sediments prior to metamorphism. On one lot (Turcotte property) the 25 metre wide (82 feet) muscovite-rich zone is interlayered with similar widths of biotite-garnet-(sillimanite)-quartz schists. Another 75 metre (246 feet) wide zone adjacent to the muscovite-biotite schists shows no exposures along strike; however, the suggestion exists that muscovite-rich schists, which are strongly associated with marshy zones along the West Fork of Otter Creek, may underlie this area.

Samples of both muscovite-quartz schist and biotite-garnet-quartz schist show extensive interlayering of each other. Muscovite-rich zones may range from a few centimetres to several metres in width. Nevertheless, the main zone of muscovite-bearing schists appears to occur on the western limb of the major fold alongside the main access road and is best exposed on the adjacent property owned by Mr. Turcotte. Areas along strike are overlain by the creek floodplain, marshy areas, and grassy fields without any significant outcrops. The biotite-garnet-(sillimanite)-quartz schists occur as predominantly semi-barren rocky ridges at least 140 metres (460 feet) wide which trend approximately 030 degrees.

6.3 Petrographic study

The muscovite-quartz schist are composed of relatively simple mineralogy: muscovite with minor biotite, quartz, alkali feldspar, magnetite, and trace amounts of tourmaline and chlorite. The muscovite content is variable over a few feet even in the high-grade zones; similar samples on the Turcotte property showed a range from 37 to 60% within a single outcrop. The muscovite grains occur as relatively large flakes ranging in size from 0.45 to 6.75 mm, and averaging

1.54 mm. (approximately 12 USS mesh). Minor amounts of dark brown coloured biotite occurs as smaller flakes intergrown with the muscovite and/or as alteration rims around some of the opaques (magnetite) minerals. Both the magnetite and trace amounts of tourmaline are considered as contaminants in a fine mica product. The magnetite inclusions range in size from approximately 0.1 to 0.4 mm in size, although rare metacrysts up to 1/2 in. in diameter have been noted in examination of drill core. The dark green coloured tourmaline grains normally are 0.1 mm or finer in size and occur throughout the schist in trace amounts particularly in association with very fine quartz veins. Trace amounts of staurolite porphyroblasts have also been noted.

The biotite-quartz schist have a similar mineral assemblage with characteristically more iron-rich minerals. The schist often can be distinguished from the muscovite schist on weathered surfaces by its characteristically brownish and mottled or nodular weathered surface. The schist is rich in biotite (>>30%) with only minor amounts of muscovite flakes. Red garnet porphyroblasts and white-coloured sillimanite clasts or nodules are common throughout the unit in this area by apparently not in the vicinity of the Kaladar Aimko muscovite deposit which occurs within a zone of less intense metamorphism. The sillimanite nodules can range up to 1/2 inch in diameter and occur within concentrations of up to 40% in units a few inches to several feet in width. Garnet porphyroblasts occur throughout the unit and locally may attain 30-40% in beds of similar thicknesses. The groundmass typically consists of anhedral clear to dusty quartz grains and alkali feldspars that are ridden with inclusions. Chalcedony (?) occurred in one rock sample as an alteration product of an unknown mineral, possibly large kyanite metacrysts. The variation in mineralogy, particularly the distribution of erratic lenses of muscovite and bands rich in sillimanite and/or garnet is believed to reflect a metamorphic overprint of original chemical differences in the sediments.

7.0 Exploration work

7.1 Previous work

No previous exploration work on the property has been documented. Several old pits shallow pits and trench on muscovite bearing pegmatites have been noted in the field. The main material sought apparently was large books of muscovite, often up to 1 foot in diameter, that occurred along the muscovite-quartz pegmatite veins that cropped out along the northern ridge nearest the banks of Otter Creek.

7.2 Present work

The present exploration work conducted includes prospecting, placement of grid lines, geological mapping and sampling, and diamond drilling. A total of 1100

metres of grid line was cut, chained (hip chain) and picketed at 25 metre intervals. An additional 450 metres of a second base-line was established along 1+00 metres East due to the flooded areas that parallel the lines and hinder access. Cross lines were chained and flagged at 25 metre intervals in the course of geological mapping and sampling. Geological mapping was conducted by pace and compass and by the grid system.

A total of 518 feet of BX rock core was drilled by Eastern Ontario Diamond Drilling (Sharbot Lake, Ontario) from November 19 to December 4, 1985. Much of the drilling was delayed due to extensive rainfall and flooding which hindered access to the drill platforms. All casing was pulled at the end of the project. The core was logged, split and sampled, and samples forwarded to Ontario Research Foundation for preliminary beneficiation (recovery) and analytical testing. Results of the testing were still pending at the time of writing. The remaining diamond drill core was stored at the Core Storage Library at Tweed, Ontario.

8.0 Conclusions and recommendations

The geological mapping on the property and investigations on the adjacent land and in the region suggests that the muscovite-rich horizons are interbedded with the biotite-rich metapelites and gradations may occur locally. The metapelite horizons appear to close to the southwest. The muscovite-bearing metapelites on the Courneyour property form a fold closure near the southern boundary and this area has been tested by diamond drilling withour any substantial intersections. The largest intersection, however, is only 49 feet and occurs at the property boundary. No further information is known to the true width of this unit since outcrops are sparse in the vicinity of the Otter Creek and it flooded marshlands. Sections along strike on the adjacent property show observed apparent widths on surface of nearly 75 metres. The southern limb throughout the Courneyour property is limited and if indeed the muscovite schist occurs along the extension of Otter Creek, its width would be limited to 100 feet or less.

The geological mapping and diamond drilling did not outline any substantial accumulation of muscovite (high-grade) schist that may warrant large tonnage, open pit mining operation on the Courneyour property. The drilling did however indicate that a portion of the muscovite schist band occurs on the southern part of the property although a test of its true width was not possible. No further work is recommended on the southern part of the property. Contingent on the results of potential muscovite product from the Ontario Research Foundation and on the availability of land, further exploration may be warranted on the adjacent lands and on the zones of the Courneyour property.

List of References

Bright, E.G., 1985, Precambrian Geology of the Mellon Lake area, Hastings, Lennox and Addington, and Frontenac Counties: Ontario Geological Survey, Geological Series, Prelim. Map P-2648, scale 1:15,840 or 1 inch to 1/4 mile. Geology 1984.

Verschuren, C., 1983, No. S62. Flake muscovite potential of Eastern Ontario: Report of Resident Geologists, 1983.

QUALIFICATIONS

I, Mark Michael H. Waychison, having a residence at 1110- 73 Widdicombe Hill Boulevard, Weston (Etobicoke), Ontario, do hereby declare that :

1. I am a professional geologist who has been working in the mineral industries or for government geological mapping surveys since 1971.

2. I have obtained an M.B.A. degree in 1984 from the University of Toronto, Faculaty of Management Studies.

3. I have obtained a Masters of Science degree in 1976 from McGill University with a specialization in petrology and mineral (geo-) chemistry.

4. I have obtained a Bachelor of Science (honours) degree in 1972 from McGill University.

5. I am a Fellow of the Geological Association of Canada.

6. I am a Member of the Association of Exploration Geochemists.

7. I am a Member of the Canadian Institute of Mining and Metallurgy.

8. I do not presently and have never been a shareholder of Ram Petroleums Limited nor of any of its subsidiaries or associated companies.

9. I have not received nor expect to receive any benefit, financial or otherwise, other than my regular consulting fees for services rendered, for the writing of this report and recommendations, from Ram Petroleums Limited or any of its associated companies.

10. The conclusions in this report are based on my personal field observations on the property and on other properties in the region, on compilations of available published and unpublished literature, on discussions with industry and government geologists, and on my personal accrued knowledge from experience and training.

11. I allow Ram Petroleums Limited all rights to the use of this report for assessment or government (grant assistance) programs but not for any advertising.

Dated at Etobicoke, Ontario, this 14th. day of February, 1986.

Mark M. Waychison,
MBA, M.Sc., F.G.A.C.

Ministry of Natural Resources
Ontario

Diamond Drilling Log

RE OM85-9-C-179

Fill in on every page

Hole No.	Page No.
85-1	1

Drilling Company	Collar Elevation	Bearing of hole from true North	Total Footage	Dip of Hole at	Location of hole in relation to a fixed point on the claim.	Map Reference No.	Claim No.
Eastern Ontario Diamond Drilling			248 ft.	0' Collar 30°			
Date Hole Started	Date Completed	Date Logged	Logged by	100 Ft. 30°		Location (Twp., Lot, Con. or Lat. and Long.)	
	Nov. 20/85	Nov. 22/85	M. Waychison	125 Ft. 31°		Humgerford Township Lot. 30/Conc. XII, Spart	
Exploration Co., Owner or Optionee	Date Submitted	Submitted by (Signature)		240 Ft. 31.5°		Property Name	
Kam Kotica Mines Ltd.		M. Waychison		Ft.			

Footage From	Footage To	Rock Type	Description Colour, grain size, texture, minerals, alteration, etc.	Planar Feature Angle *	Core Specimen Footage †	Your Sample No.	Sample Footage From	Sample Footage To	Sample Length	Assays †
0	23		CASING							
22	23	Siltstone	Grey coloured, finely laminated, gneissic biotite-bearing siltstone CA ∩ gneissosity 24°	24°						
23	46	Bio-Musc schist	Biotite (muscovite) schist; minor chloritic, green-coloured bands that are more muscovite rich; knotted texture on weathered surface							
		35-46	Muscovite-chloritic quartz schist; minor reddish siltstone, stringers muscovite 10-15 % @ 43 ft, CA ∩ bedding(?) 46°	46°						
46	59	Musc. schist	Medium, greenish grey coloured muscovite-quartz schist, muscovite = 15-20 % @ 54 ft. CA ∩ schistosity 54°	54°						
59	199	Biotite (garnet) schist	Dark grey to black, mottled red and white; biotite-garnet-silliminite quartz schist; variable amounts of sillimanite (fibrolite) nodules and leaf accumulations of red garnet porphyroblasts .1 to .2 in.; generally billimanite 5-15 % (up to 40 %) red garnets up to 30 %, averaging 0-10 % (?) @ 59 ft. 3 in. Quartz vein and biotite bands 60-61 ft. Muscovite schist 63-65 ft. Broken core; quartz veins, minor hematite stained and pyrite coatings on fractures							

783 (82/1)

* For features such as foliation, bedding, schistosity, measured from the long axis of the core.

† Additional credit available. See Assessment Work Regulations.

Ministry of Natural Resources
Ontario

Diamond Drilling Log

Fill in on every page

Hole No. 83-1 | Page No. 2

Drilling Company	Collar Elevation	Bearing of hole from true North	Total Footage	Dip of Hole at	Location of hole in relation to a fixed point on the claim.	Map Reference No.	Claim No.
				Collar ° Ft. ° Ft. ° Ft. ° Ft. °			

Date Hole Started	Date Completed	Date Logged	Logged by	Location (Twp., Lot, Con. or Lat. and Long.)

Exploration Co., Owner or Optionee	Date Submitted	Submitted by (Signature)	Property Name
Ram Petroleums Ltd.			

Footage From	Footage To	Rock Type	Description Colour, grain size, texture, minerals, alteration, etc.	Planar Feature Angle *	Core Specimen Footage †	Your Sample No.	Sample Footage From	Sample Footage To	Sample Length	Assays †
		71-75	same biotite-garnet-sillimanite-quartz schist; 40-50% sillimanite; ∴ 2 in. wide quartz vein							
		75-79.75	Biotite-muscovite quartz schist; muscovite occurs in bands from ≈5% to 15%							
		84-90	Biotite-muscovite-quartz schist; muscovite flakes ≥ 5 mm.; 10-15%							
		90-92	Muscovite quartz schist; muscovite high grade (>30%) 2 in. mafic layer is a xenolith that is schistosity parallel							
		96.5-132	Nodular biotite, sillimanite-~~biotite~~-garnet-quartz schist; sillimanite fibrolite nodules 10-20%, garnets 10-20% @ 96 ft. CA foliation 62°	62°						
		132-135.5	Garnet-rich biotite schist as above; garnets ≈40%							
		135.5-199	same as 96.5-132; Nodular biotite schist; sillimanite 10-20%; garnets 10-20%							
199	299		Light grey to blue coloured, muscovite (biotite)-quartz schist; minor quartz veins; ~~muscovite~~ garnets up to 30% or more, averaging 15%-20%; some sillimanite nodules @ 200 ft. 2-5 mm. muscovite flakes, 10-20% @ 205 ft. ≈ 30% muscovite							

783 (82/1)

* For features such as foliation, bedding, schistosity, measured from the long axis of the core.

† Additional credit available. See Assessment Work Regulations.

Ministry of Natural Resources
Ontario

Diamond Drilling Log

Fill in on every page → Hole No. 83-1 | Page No. 3

Drilling Company		Collar Elevation	Bearing of hole from true North	Total Footage	Dip of Hole at Collar	Location of hole in relation to a fixed point on the claim.	Map Reference No.	Claim No.
Date Hole Started	Date Completed	Date Logged	Logged by		Ft. °		Location (Twp., Lot, Con. or Lat. and Long.)	
Exploration Co., Owner or Optionee: Ram Petroleums Ltd.		Date Submitted	Submitted by (Signature)		Ft. °		Property Name	
					Ft. °			
					Ft. °			

Footage From	Footage To	Rock Type	Description (Colour, grain size, texture, minerals, alteration, etc.)	Planar Feature Angle *	Core Specimen Footage †	Your Sample No.	Sample Footage From	Sample Footage To	Sample Length	Assays †
			@ 214 ft. CA / bedding 58°	58°						
			@ 215 ft. muscovite 730%							
			@ 216-216.5 quartz-mch muscovite schist gneiss							
			@ 217.5 2in. mch quartz vein							
			@ 219.5 4in. mch quartz vein							
			@ 220.5 4in. mch quartz vein							
			@ 225 muscovite 40-50%							
			@ 230 muscovite 20%							
			@ 233 9in. quartz vein							
~~235~~		233-246	Sillimanite (≤10%) muscovite quartz schist; muscovite 10%							
			@ 240 ft. muscovite 10-20%							
			@ 246 ft. CA / bedding 64°	64°						
		~~246~~								
246	ft.		End of hole							

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* For features such as foliation, bedding, schistosity, measured from the long axis of the core.

† Additional credit available. See Assessment Work Regulations.

Ministry of Northern Affairs and Mines
Ontario

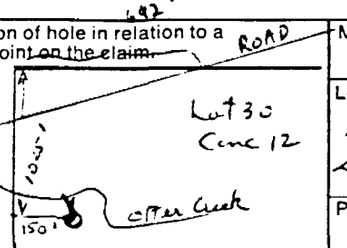
Diamond Drilling Log

RE: OM 85-9-C-179

Fill in on every page → Hole No. 85-2 | Page No. 1

Drilling Company: Eastern Ontario Diamond Drilling	Collar Elevation	Bearing of hole from true North: 300°	Total Footage: 270	Dip of Hole at: 0 Collar 30°	Map Reference No.
Date Hole Started: Nov. 21/85	Date Completed: Dec. 4/85	Date Logged: Dec. 11/85	Logged by: M. Waychison	100 Ft. 31°	Claim No.
Exploration Co., Owner or Optionee: Ram Petroleums Ltd.		Date Submitted	Submitted by (Signature): M. Waychison	260 Ft. 31.5°	Location (Twp., Lot, Con. or Lat. and Long.): Hungerford Twp. Lot 30 Conc. 12
				Ft.	Property Name

Location of hole in relation to a fixed point on the claim:



Footage ft. From	To	Rock Type	Description (Colour, grain size, texture, minerals, alteration, etc.)	Planar Feature Angle *	Core Specimen Footage †	Your Sample No.	Sample Footage From	To	Sample Length	Assays †
0	5		CASING; BX core		330					
5	22.5	Muscovite bio-quartz schist	Muscovite-rich biotite quartz schist, large (1-5 mm) muscovite flakes up to 40% in sections							
5	9		Broken core (ground core from 7-8.5 ft)							
5	17		muscovite ≈ 35-40%							
18	19		muscovite ≈ 25%							
19.5	22.5		muscovite < 10%							
			@ 23 ft.	58°						
22.5	49.75	Nodular muscovite biotite quartz schist	1-2 in wide muscovite-rich schist zones interlayered with muscovite-poor, biotite quartz schists; white millimetre nodules 10-30% often with hematized rims on nodules; muscovite generally ≤ 10%							
			Muscovite-rich (>30%) schist zones from 33.5-34.							
			35-36.							
			42-43.5							
			@ 46'	58°						
49.75	54.25	Biotite (garnet) quartz schist	Brownish-grey laminated, biotite (garnet) quartz schist; rare millimetre dots; lower contact is gradational to muscovite-biotite schist; garnets 5-10%, up to 5 mm in diameter							

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* For features such as foliation, bedding, schistosity, measured from the long axis of the core.

† Additional credit available. See Assessment Work Regulations.

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Diamond Drilling Log

Fill in on every page → Hole No. 85-2 | Page No. 2

Drilling Company: Eastern Ontario Diamond Drilling	Collar Elevation	Bearing of hole from true North: 300°	Total Footage: 270	Dip of Hole at Collar	Location of hole in relation to a fixed point on the claim.
Date Hole Started	Date Completed	Date Logged	Logged by	Ft. °	Map Reference No. / Claim No.
Exploration Co., Owner or Optionee: Ram Petroleums Ltd.		Date Submitted	Submitted by (Signature)	Ft. °	Location (Twp., Lot, Con. or Lat. and Long.)
				Ft. °	Property Name
				Ft. °	

Footage From	Footage To	Rock Type	Description (Colour, grain size, texture, minerals, alteration, etc.)	Planar Feature Angle *	Core Specimen Footage †	Your Sample No.	Sample Footage From	Sample Footage To	Sample Length	Assays †
59.25	68.75	Fine - bio - quartz schist	Wispy bands of muscovite at upper contact;			#401	60	85	25'	
			@ 66' muscovite 10% @ 61 - 68.75 muscovite 40% silvery grey clouded muscovite bands with locally disturbed sections and pegmatite veins at 65'5" to 65'7"							
			63'	66°						
68.75	85'	Medium muscovite - biotite - quartz schist	Recrystallized zones of white millemanite nodules; minor disturbed sections							
68	75		2 in. wide quartz vein with chlorite - biotite muscovite selvages							
70.25	71		Chlorite - muscovite pegmatitic quartz vein							
74.75	76		Quartz vein, as above							
	73		fine-grained muscovite schist, muscovite 2-30%							
78	80.5		Disturbed section; muscovite 20-30%, epidote 5-20%							

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* For features such as foliation, bedding, schistosity, measured from the long axis of the core.

† Additional credit available. See Assessment Work Regulations.

Ministry of Northern Affairs and Mines
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Diamond Drilling Log

Fill in on every page → Hole No. 85-2 | Page No. 3

Drilling Company	Collar Elevation	Bearing of hole from true North	Total Footage	Dip of Hole at	Location of hole in relation to a fixed point on the claim.	Map Reference No.	Claim No.
Eastern Ontario Diamond Drillers				Collar			
Date Hole Started / Date Completed	Date Logged	Logged by		Ft. °		Location (Twp., Lot, Con. or Lat. and Long.)	
				Ft. °			
Exploration Co., Owner or Optionee	Date Submitted	Submitted by (Signature)		Ft. °		Property Name	
Ram Petroleums Ltd.				Ft. °			

Footage From	Footage To	Rock Type	Description (Colour, grain size, texture, minerals, alteration, etc.)	Planar Feature Angle *	Core Specimen Footage †	Your Sample No.	Sample Footage From	Sample Footage To	Sample Length	Assays †
85'	206.25'	Biotite (muscovite) schist	Nodular; muscovite-rich lamellae; bleached zones on white millimetre scale; garnets							
85	89.5		Biotite-rich quartz schist							
	90'		Muscovite ≤ 10%							
90.25	91.25		Nodular muscovite-bearing quartz schist; muscovite 30-40%							
	93.5'		Rusty fracture							
93	100.5		Mainly Biotite-sillimanite quartz schist; muscovite ≤ 10%							
103.25	131.		Hazy fine-grained biotite-muscovite quartz schist							
	103.25		slightly chloritized, muscovite quartz schist, schistosity fractures, muscovite 20-30%							
	105'		muscovite ≈ 20%							
	110'		muscovite ≈ 25%							
	112		" ≈ 40%							
	115		40-50%;	68°						
	117		30-40%,							
	120		30-40%							
122	131		muscovite ≈ 30%							
	135		15%							
	140		10-15%							
140	141.3		Mottled schist quartz micaceous with biotite and garnet grains							
	142		muscovite ≈ 10-20%							
143.75	147.5		Muscovite (≈ 40%) quartz schist with mafic fragments							
	149			50°						

783 (85/9)

* For features such as foliation, bedding, schistosity, measured from the long axis of the core.

† Additional credit available. See Assessment Work Regulations.

Ministry of Northern Affairs and Mines
Ontario

Diamond Drilling Log

Fill in on every page → Hole No. 85-2 | Page No. 4

Drilling Company	Collar Elevation	Bearing of hole from true North	Total Footage	Dip of Hole at	Location of hole in relation to a fixed point on the claim.	Map Reference No.	Claim No.
Eastern Ontario Diamond Drilling				Collar			
Date Hole Started / Date Completed	Date Logged	Logged by		Ft. °		Location (Twp., Lot, Con. or Lat. and Long.)	
Exploration Co., Owner or Optionee: Rain Petroleums Ltd.	Date Submitted	Submitted by (Signature)		Ft. °		Property Name	
				Ft. °			
				Ft. °			

Footage From	Footage To	Rock Type	Description (Colour, grain size, texture, minerals, alteration, etc.)	Planar Feature Angle *	Core Specimen Footage †	Your Sample No.	Sample Footage From	Sample Footage To	Sample Length	Assays †
	150'		muscovite 10-15%							
	160'		" 10-15%							
162	163		very fine-grained quartz-feldspathic gneiss							
	165		muscovite 10% ; progressive chloritization from 162 to 175'							
	169			60°						
	175		muscovite 3 10%							
174.75	180.5		Quartz muscovite pegmatite							
182.3	183.75		"							
185	185'2"									
187	189.3'									
190	191.31									
196.3	198		Static recrystallization of muscovite schist; randomly oriented biotite flakes							
198	206.3		Biotite quartz schist; muscovite 10-15%							
206.3	270	Gneiss-Biotite schist	Medium; similar to 165 ft. except biotite rich on millimeter bedding are more developed; minor quartz veins and chloritization							
264.5	264.5		Quartz vein							
264.5	211		Muscovite ≤ 10%							
211	215		muscovite 10-15%							
215			" 10%							
218	220		muscovite 20%							
220	222		Biotite-quartz schist; minor staurolite and garnets ; muscovite ≤ 10%							

783 (85/9)

* For features such as foliation, bedding, schistosity, measured from the long axis of the core.

† Additional credit available. See Assessment Work Regulations.

Ontario

Ministry of Northern Affairs and Mines

Diamond Drilling Log

Fill in on every page → Hole No. 85-2 | Page No. 5

Drilling Company	Collar Elevation	Bearing of hole from true North	Total Footage	Dip of Hole at	Location of hole in relation to a fixed point on the claim.	Map Reference No.	Claim No.
Eastern Ontario Diamond Drilling				Collar			[redacted]

Date Hole Started	Date Completed	Date Logged	Logged by	Ft.	Location (Twp., Lot, Con. or Lat. and Long.)
				Ft.	

Exploration Co., Owner or Optionee	Date Submitted	Submitted by (Signature)	Ft.	Property Name
Ram Petroleums Ltd.			Ft.	

Footage From	Footage To	Rock Type	Description (Colour, grain size, texture, minerals, alteration, etc.)	Planar Feature Angle *	Core Specimen Footage †	Your Sample No.	Sample Footage From	Sample Footage To	Sample Length	Assays †		
262	265		Muscovite - quartz schist, silvery colour; muscovite ≥ 30%									
270			EOH									
			Sample # 401 Taken from 60-85 ft. (split core)									
			Core stored at Core Storage Library (Tweed).									

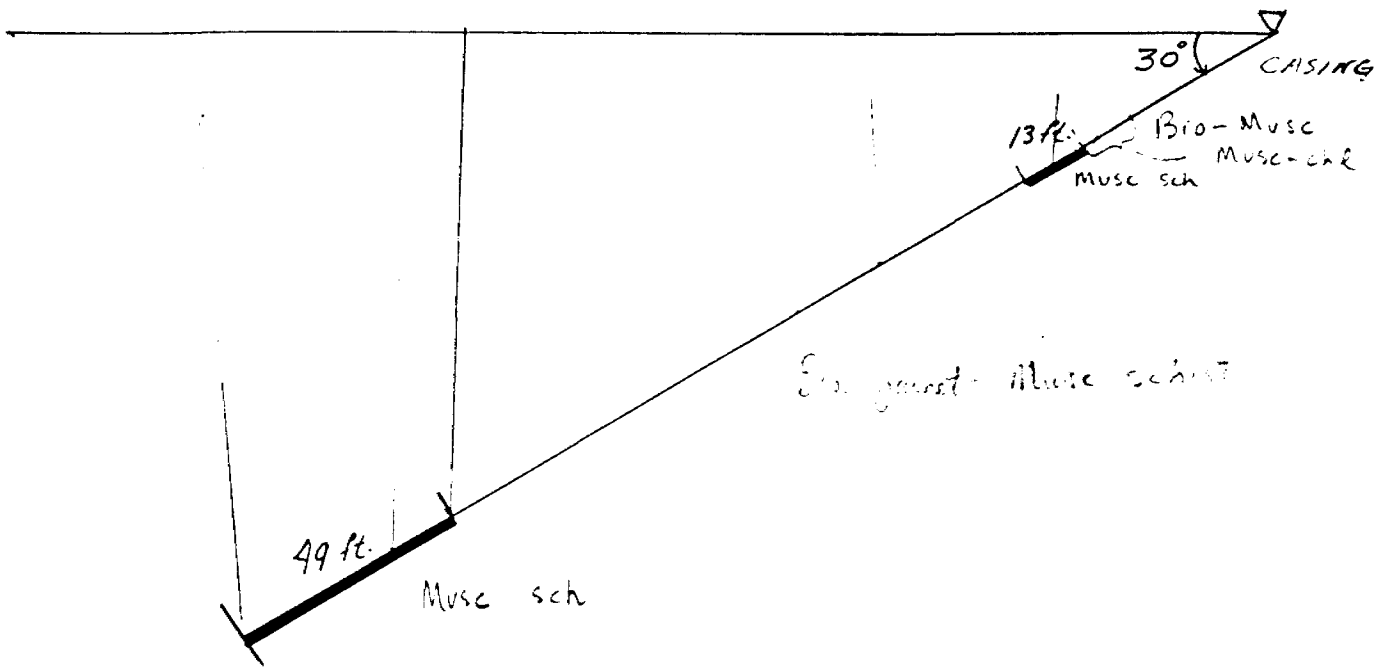
783 (85/9)

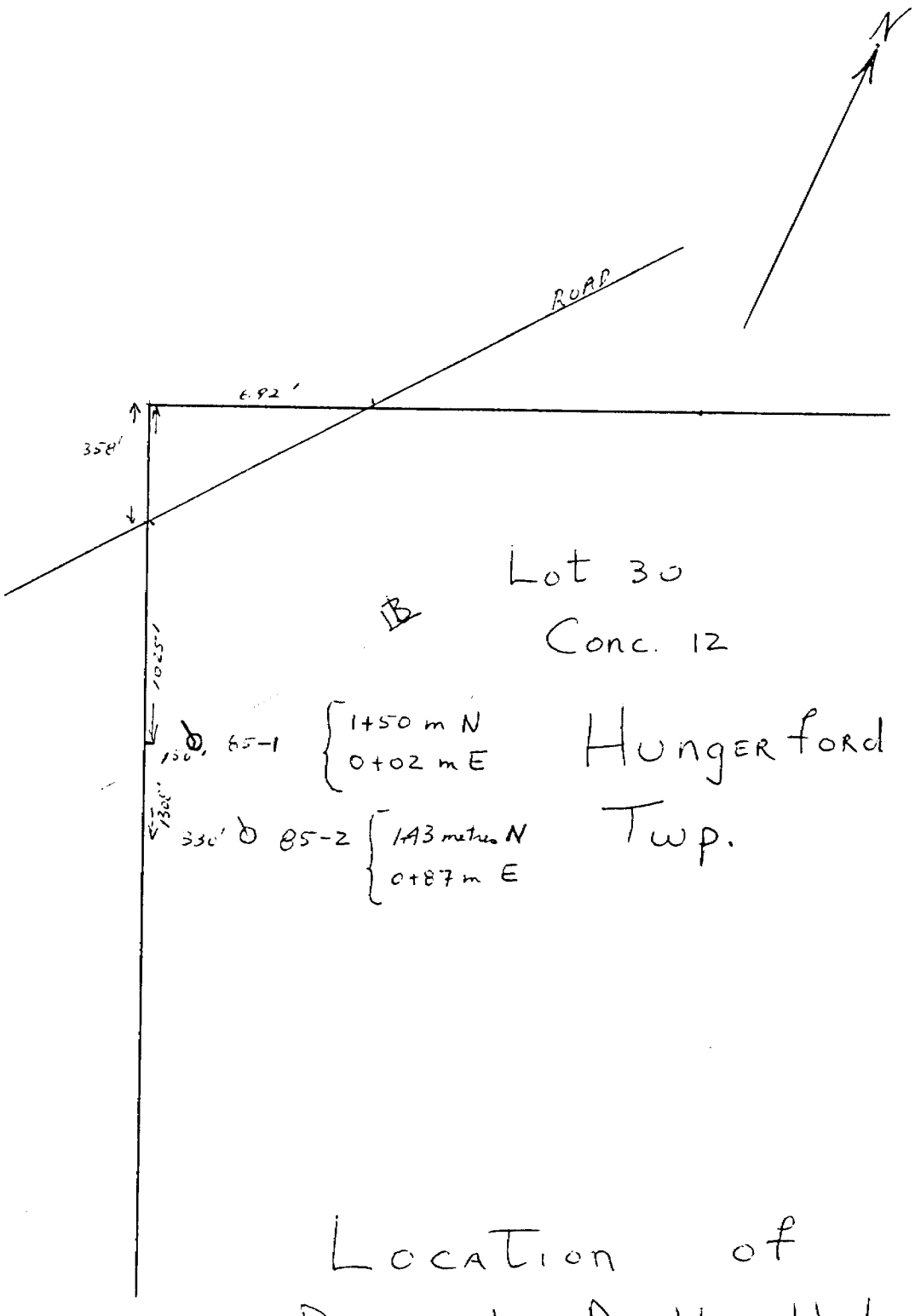
* For features such as foliation, bedding, schistosity, measured from the long axis of the core.

† Additional credit available. See Assessment Work Regulations.

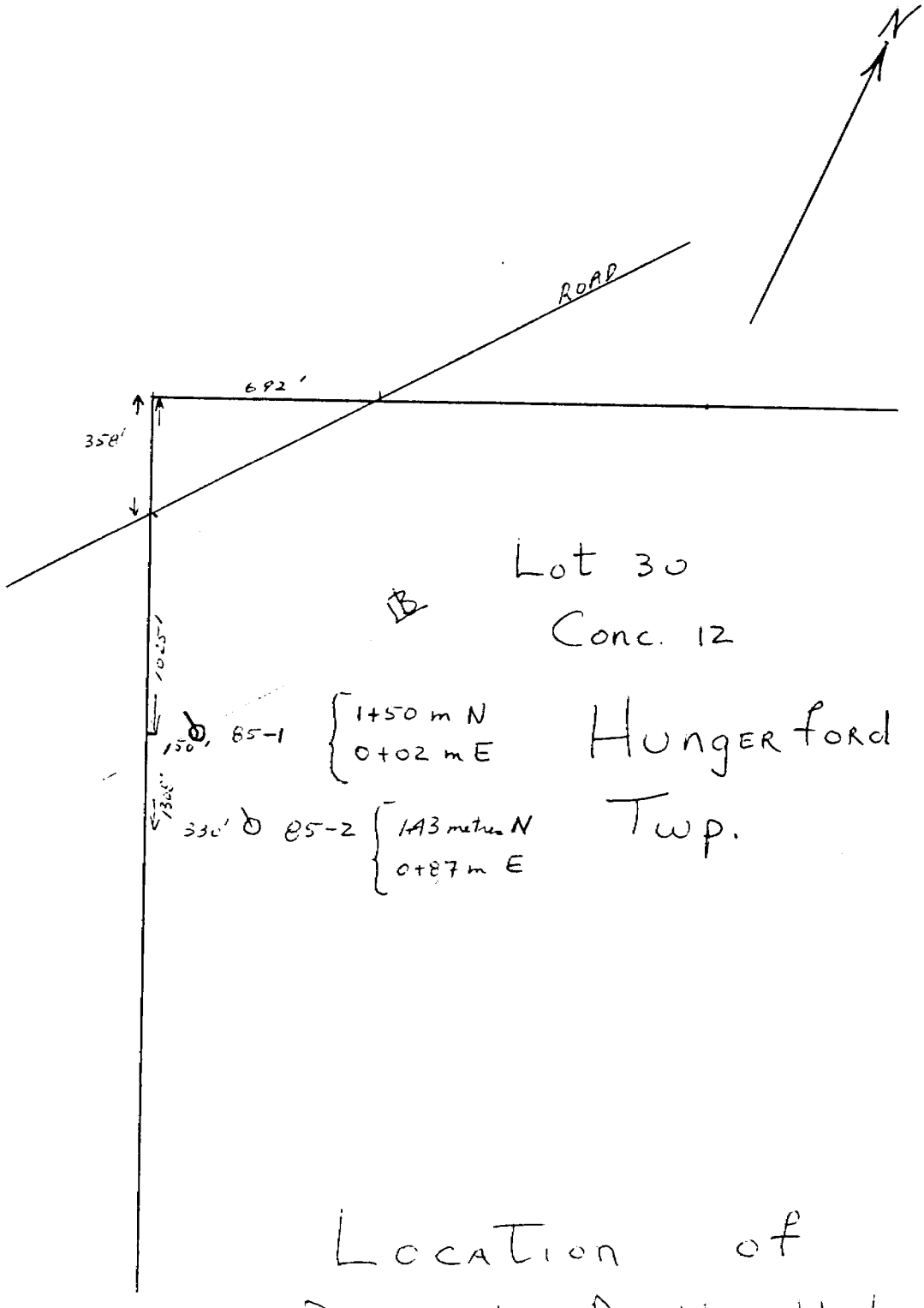
300° ←

DDH 85-1





Location of
Diamond Drill Holes
85-1, 85-2



Location of
Diamond Drill Holes
85-1, 85-2

MATERIALS DIVISION
Inorganic Materials Centre

MICA LIBERATION STUDIES

Industrial Minerals Services
Report No. IMS 64-40381

M. L. Petrovcic
March 3, 1986

for

Ram Petroleum Ltd.
Suite 918
130 Adelaide Street West
Toronto, Ontario
M5H 1S2

Attention: Mr. R. Opekar

1. INTRODUCTION

The Ontario Research Foundation was requested to evaluate a mica deposit. Three samples of mica ore were delivered to the Ontario Research facilities. The first, "burn-up" grab sample was to be used for preliminary testing, while two samples composed of drill core were to be used for formal investigations. A two-phased program was outlined. The first phase of the program involved the development of a process and the production of the mica concentrate. This was done in two stages. A grinding stage reduced the ore material to a size where liberation of mica occurred, and a classification stage separated and concentrated the mica. The second phase of this program was to determine the quality of the various products and by-products of the first phase. The second phase would commence upon the successful completion of the first.

2. SAMPLE PREPARATION AND INITIAL TESTING

Initial work was conducted on the "burn-up" sample which had been collected as a grab sample. Visual inspection suggested that it was a surface sample. The ore was broken by hammer where required and then fed through a laboratory jaw crusher set at a 1/2" gap. This initial crushing provided a proper feed size for the rolls crusher.

The jaw crushed material was further reduced by several passes through a laboratory rolls crusher, set at a 1/8" gap. Intermediate screening on a 6 mesh screen cloth removed the fines. This two stage crushing was required to reduce the rock with a minimum amount of fines produced.

The minus 6 mesh material was screened on a 10, 20, and 35 mesh screen cloths. Microscopic examination indicated that unliberated mica was present in the +10 mesh fraction, while the finer fractions showed greatly increased mica liberation.

The mica concentrating flowsheet outlined was developed from commercial circuits, which use a series of air tables, screens and "delaminators". Initial concentration provided a +20 mesh concentrate and a +35 mesh concentrate. Middlings were processed in subsequent stages to produce other mica concentrates. This study was designed to test the initial concentrating stage (see Figure 1).

The four size fractions of the "burn-up" sample were to be processed on the Denver air table. The +10 mesh fraction was immediately rejected as a table feed because of the unliberated mica fraction. The +20 and +35 mesh screen fractions were processed over the table to give a concentrate, a middlings and a tailings. The air table was able to partially concentrate the mica but a considerable amount of mica was lost to the middling and tailing fractions.

The air table concentrate consisted of a dominant mica fraction with minor amounts of the other equidimensional minerals, such as quartz, feldspar, magnetite, etc. These other minerals were reduced significantly in concentration, but were still present. The mica fraction in the concentrate tended to be slightly more delaminated than the mica in the middlings and tailings fraction. This type of mica segregation could be enhanced on a larger model of air table. The laboratory model does not have the surface area required for a good shape classification.

Mica that was significantly delaminated tended to blow off the table. This was gathered with an aspirator, collected, and added to the concentrate. This problem became more pronounced with the smaller screen fractions. Tests on the -35 mesh fraction were greatly hampered by the amount of material (micaceous and other) blown off the table, even at low air pressures on the fluidized bed. The aspiration system could not eliminate all the losses. It was determined that the +20 mesh and +35 mesh fractions had the best possibility of producing a mica concentrate on the air table.

3. MICA LIBERATION IN THE CORE SAMPLES

The core samples were visually inspected before processing. The mica content appeared to be lower than in the "burn-up" sample. The two core samples were processed separately through the laboratory jaw set at 1/2" gap and the rolls crusher to give a -6 mesh product. A screen analysis of these crushing stages is given for each core sample in Tables I and II and shown graphically in Figure 2.

The crushed samples were screened into four fractions (+10, -10+20m, -20+35, -35) as had been done in the preliminary study. The four samples were microscopically examined to estimate the degree of mineral liberation in each fraction. These examinations indicated that the mica liberation occurred below the 10 mesh fraction. Finer fractions showed increasing liberation of individual crystals, greater delamination of mica bundles, and a greater degree of liberation of the finer magnetite inclusions. A summary of these observations is shown in Table III.

The +20 mesh and +35 mesh fractions of the two core samples were passed over the air table, using the procedures used for the burn-up sample. The material blown off the table was collected and added to the concentrates produced by the table. Three products were generated: the concentrate, the middlings and the tailings.

4. RESULTS AND DISCUSSIONS

The products generated by the air table showed a rather poor mica concentrate. The concentrate itself had significant amounts of equidimensional minerals such as quartz and feldspar which the table could not separate from the mica. The mica itself was present in all table products, so that a true tailings was not produced. In the original "burn-up" sample, the mica was found in all products, but a

significant amount was concentrated. In the core samples, this was not the case. Mica "concentrates" from the core sample were much more contaminated by other minerals. Consequently they could not be considered true concentrates.

The proposed program had specified that mica concentrates be ground to approximately 100 mesh (140 micron) in order to fully liberate magnetite inclusions. The ground product would be passed over a magnetic separator, and the non-magentic product would be analysed. Ten minute grinding tests conducted on the +10 mesh "burn-up" sample indicated that the mica, being a platy mineral, tended to delaminate rather than decrease in size. The +100 mesh material was predominantly mica while the -100 mesh material was predominantly the equidimensional minerals that had been reduced in size.

The core sample (+10 mesh) were ground in a similar fashion with similar results. The +100 mesh fraction produced a much better mica concentrate while the -100 mesh fraction concentrated the equidimensional minerals. The core samples, however, had smaller mica flakes, and required a 30 min. grind to achieve mica liberation and delamination. Although not quantified, more mica seemed to have been lost to the -100 mesh fraction, in the core samples than in the "burn-up" sample. The +100 mesh product was processed through the dry magnetic separator to produce a non-magnetic mica concentrate.

These grinding tests suggest an alternative method of mica concentration. An interim crushing phase may be followed by a grind phase. Since the mica is more resistant to size reduction than the other minerals , it may be separated by various screening and aspiration stages. Air cyclone classification and collection may also be feasible.

5. CONCLUSIONS AND RECOMMENDATIONS

The multi-stage crushing was successful in liberating the mica, although magnetite inclusions would probably require grinding methods.

Air table classification of the core sample ground products was not able to produce a clean mica concentrate, or a tailings fraction. The "burn-up" sample behaved somewhat differently. There was a greater amount of mica released, and the mica itself was more readily delaminated and classified by the air table. This may be due to the weathered nature of this sample. It appeared to be a surface sample.

The lack of a mica concentrate, or tailings indicate that the true mica content or quality cannot be accurately determined. It is recommended that chemical analysis and testing not be done at this time, but testing should be done on a proper concentrate.

The grinding and screening tests suggest that a milling, screening and aspiration circuit may be used to classify and concentrate the mica. Figure 3 suggests a possible flowsheet to test this suggestion.

The grinding, screening, aspirating circuit outlined has been used to concentrate other industrial minerals. This basic concept has been used for decades by the asbestos industry. The flour industry also use such screening methods to classify their milled products.

M. L. Petrovcic
Project Scientist
Inorganic Materials Centre

C. A. Booth, Section Manager
Non-Metallic Minerals
Inorganic Materials Centre

:mw

TABLE I

SCREEN ANALYSIS OF THE ROLLS CRUSHER PRODUCT
FOR CORE SAMPLE 401

SCREEN SIZE	WT %	CUM WT %
+ 8 m	16.0	16.0
+ 10 m	14.2	30.2
+ 20 m	23.1	53.3
+ 35 m	13.9	67.2
+ 50 m	10.7	77.9
+ 60 m	2.6	80.5
+100 m	7.3	87.8
-100 m	12.2	100.0

TABLE II

SCREEN ANALYSIS OF THE ROLLS CRUSHER PRODUCT
FOR CORE SAMPLE 402

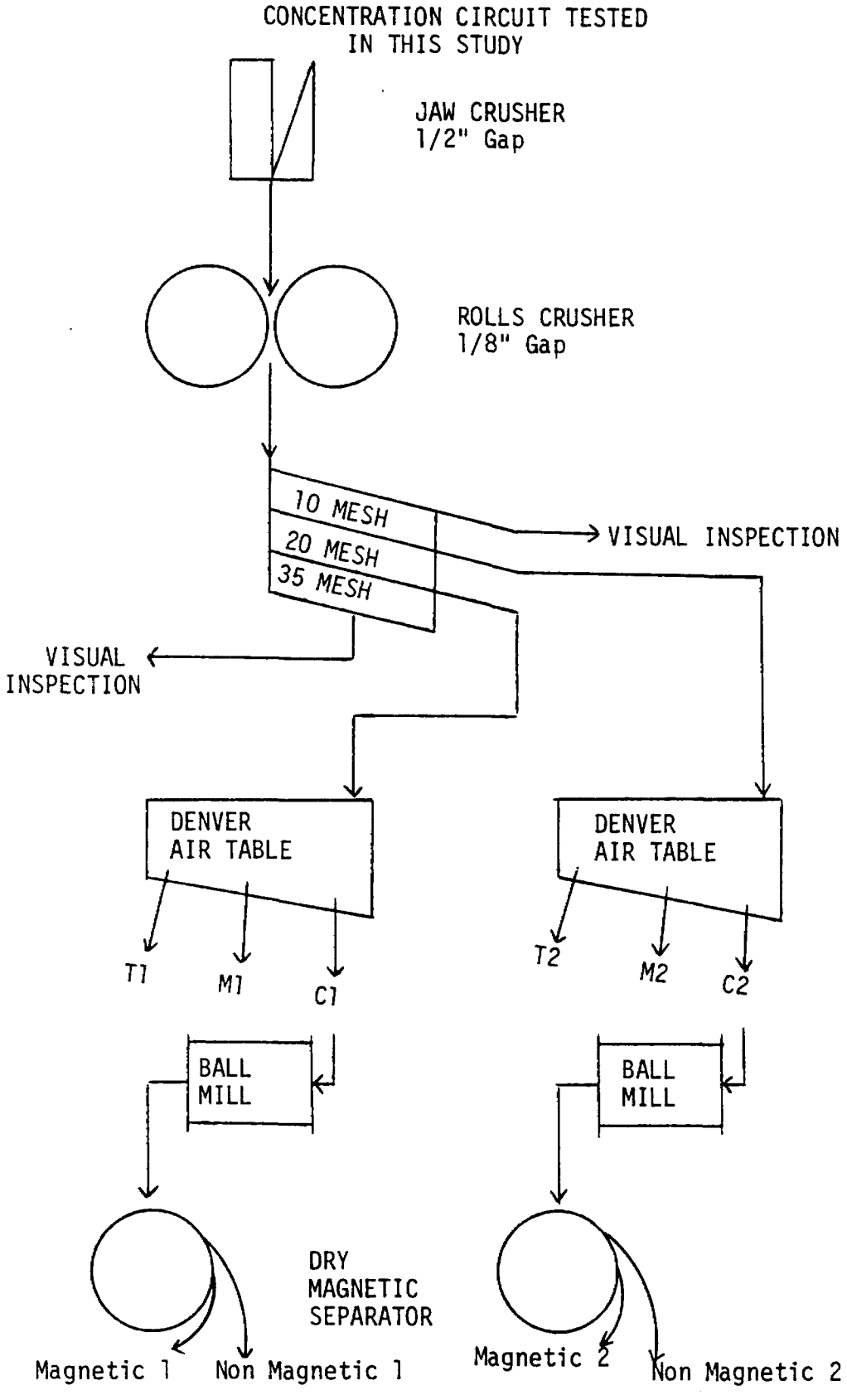
SCREEN SIZE	WT %	CUM WT %
+ 8 m	15.2	15.2
+ 10 m	13.3	28.5
+ 20 m	23.2	51.7
+ 35 m	15.6	67.3
+ 50 m	12.6	79.9
+ 60 m	2.9	82.8
+100 m	7.4	90.2
-100 m	9.8	100.0

TABLE III

OBSERVATIONS FROM THE MICROSCOPIC EXAMINATION
OF THE TWO CORE SAMPLES

SAMPLE	SCREEN SIZE (mesh)	WT %	OBSERVATIONS
401	+10	30.2	- mica bundles partially liberated. - quartz, magnetite inclusions still present.
	+20	23.2	- mica flakes substantially free of quartz intergrowths. - mica bundles partially delaminated - magnetite inclusions still present.
	+35	13.9	- mica completely liberated from most other minerals. - magnetite inclusions and grains still present.
	-35	32.7	- magnetite inclusions and grains liberated in the finer particles.
402	+10	28.5	- semi-liberated muscovite and biotite bundles. - quartz intergrowths and magnetite grains are common
	+20	23.2	- mica bundles were greatly reduced and were substantially free of quartz. - magnetite inclusions and grains still present.
	+35	15.6	- mica crystals liberated but still contain magnetite inclusions.
	-35	32.7	- magnetite grains liberated in the finer fractions.

FIGURE 1


CONCENTRATION CIRCUIT TESTED
IN THIS STUDY
JAW CRUSHER
1/2" Gap
ROLLS CRUSHER
1/8" Gap
10 MESH
20 MESH
35 MESH
VISUAL INSPECTION
VISUAL
INSPECTION
DENVER
AIR TABLE
DENVER
AIR TABLE
T1
M1
C1
T2
M2
C2
BALL
MILL
BALL
MILL
DRY
MAGNETIC
SEPARATOR
Magnetic 1
Non Magnetic 1
Magnetic 2
Non Magnetic 2

Ram Petroleum Ltd.
Report No. IMS 64-40381

FIGURE II

SCREEN ANALYSES OF ROLLS CRUSHER PRODUCT:

CORE SAMPLES 401,402

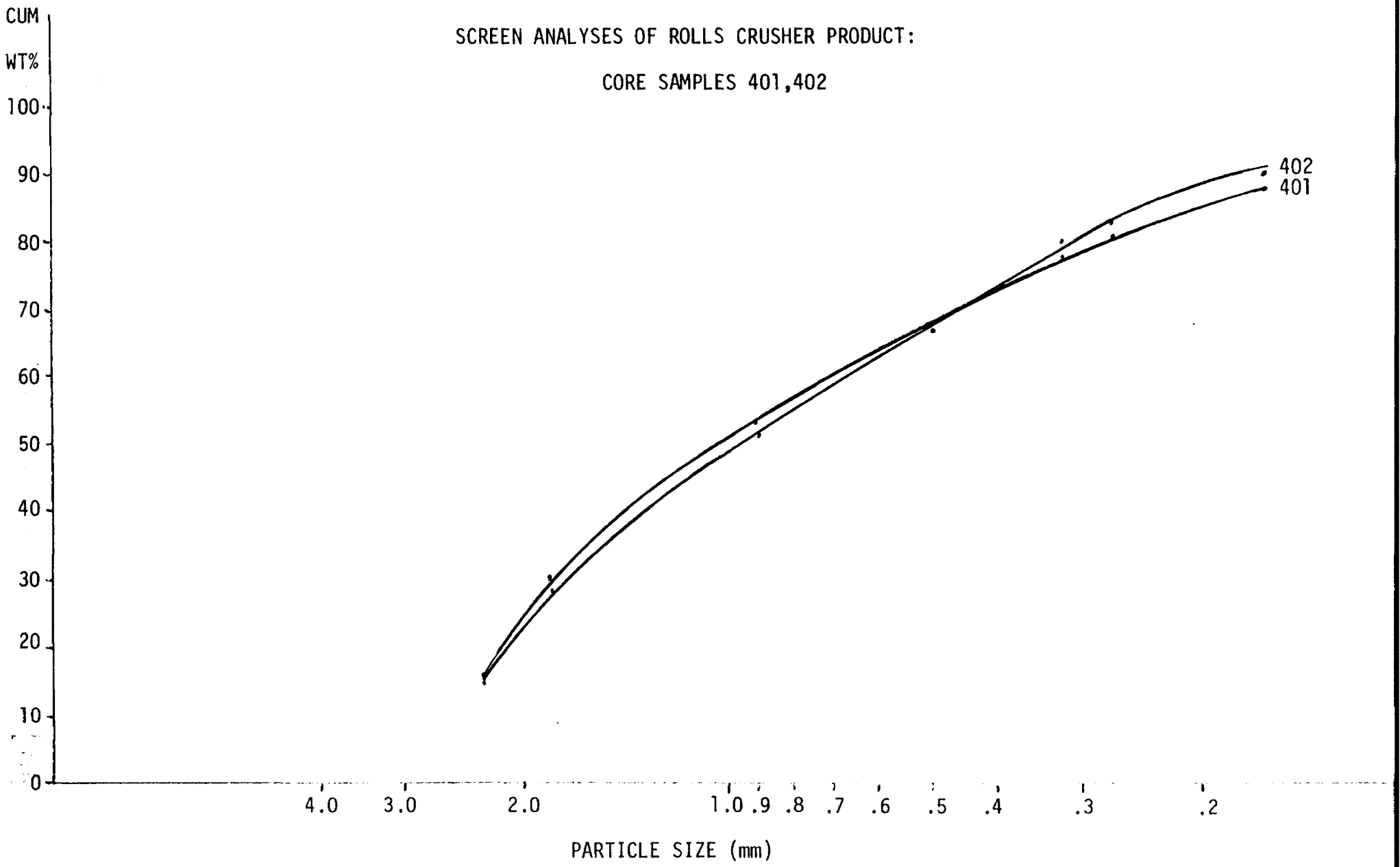


FIGURE III

ALTERNATE CONCENTRATION TEST CIRCUIT