83-#134 — #11077

Geological

ASSESSMENT REPORT

ON

THE FRENIER PERLITE DEPOSIT

EMPIRE VALLEY, BRITISH COLUMBIA

MAY 1, MAY 2 CLAIMS

CLINTON MINING DIVISION

NTS 920/8W

LATITUDE 51°20'30"

LONGITUDE 122°21'00"

Filmed

OWNER: ART JOHNSTON, ET AL

OPERATOR: AURUN MINES LTD.

AUTHOR: E. J. HORNE

DATE: MARCH 30TH, 1983

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1.0 INTRODUCTION

1.1 GENERAL

This assessment report on the Frenier perlite deposit is submitted to the Department of Mines and Petroleum Resources, British Columbia in compliance with the Mines Regulation Act pertaining to application for assessment credit for all work done in 1982 and early 1983.

The deposit is located on a ridge immediately north and overlooking Higginbottom Creek in the Empire Valley area of the Lillooet Land District of British Columbia (see Figures 1 - 3 inclusive).

The area is characterized by gentle grassy slopes with scattered pine trees, light overburden and abundant ridges of outcrop. The deposit is at approximate elevation of 1,190 metres AMSL. The work performed on the deposit by Aurun Mines Ltd. under an option agreement with the property owners, a prospecting partnership, consists of sampling and testing to determine the quality of the perlite, preliminary determinations on the relative size of the deposit, and preliminary market and mine feasibility evaluations. The names of the claims are as follows:

May 1 Record No. 1211 6 units Date of Approval 25 May 1982

May 2 Record No. 1212 12 units Date of Approval 25 May 1982

One initial post for both the May 1 and May 2 claims as observed in the field had tag numbers 22577 and 22578, the claims are dated as staked on May 23rd, 1982.

Perlite is a glassy volcanic rock containing 2 - 5% combined water that has the characteristic of being able to expand from 4 to 20 times in volume upon heating quickly to its softening range.

The economic assessment of the property to date by Aurun Mines Ltd. is that the property warrants further work and eventual production.

This diagram has been copied from a B.C. Minister of Mines Report. It depicts the areal extent of lava flows in British Columbia.

DIAGRAM SHOWING MAIN AREAS OF
FLAT-LYING OR GENTLY DIPPING LAVA FLOWS

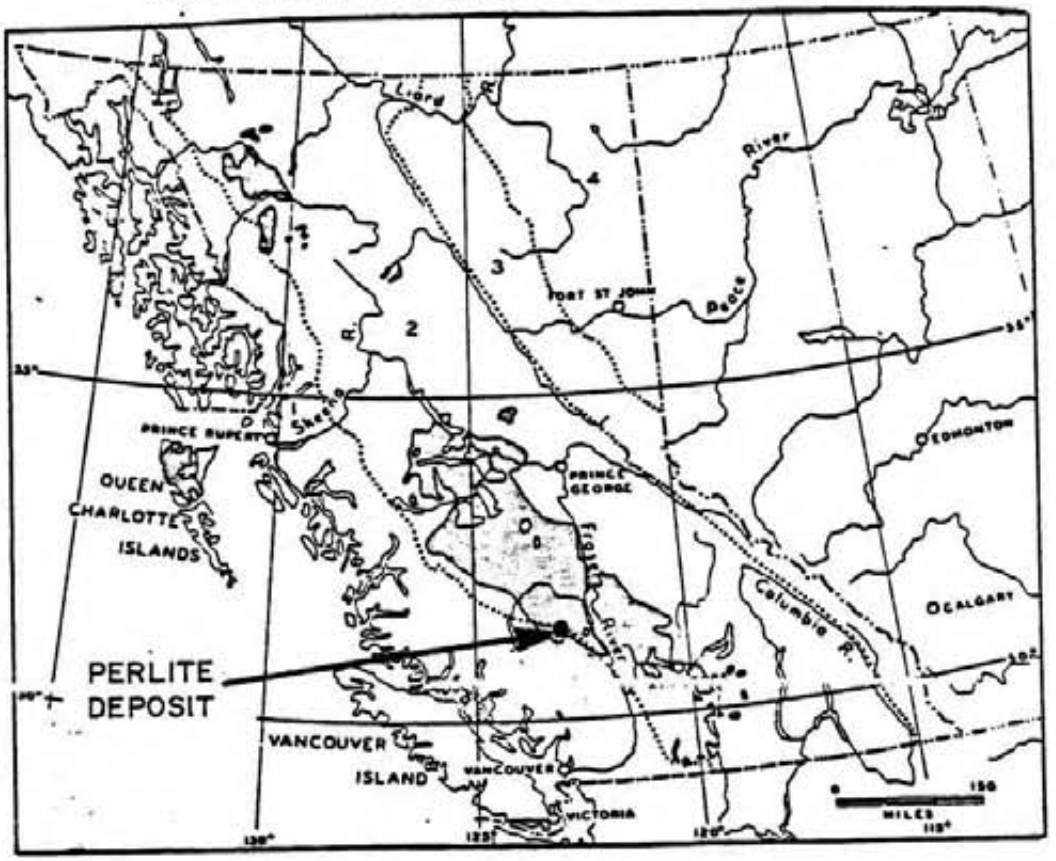


FIG. 2

AURUN MINES LTD.

LOCATION MAP

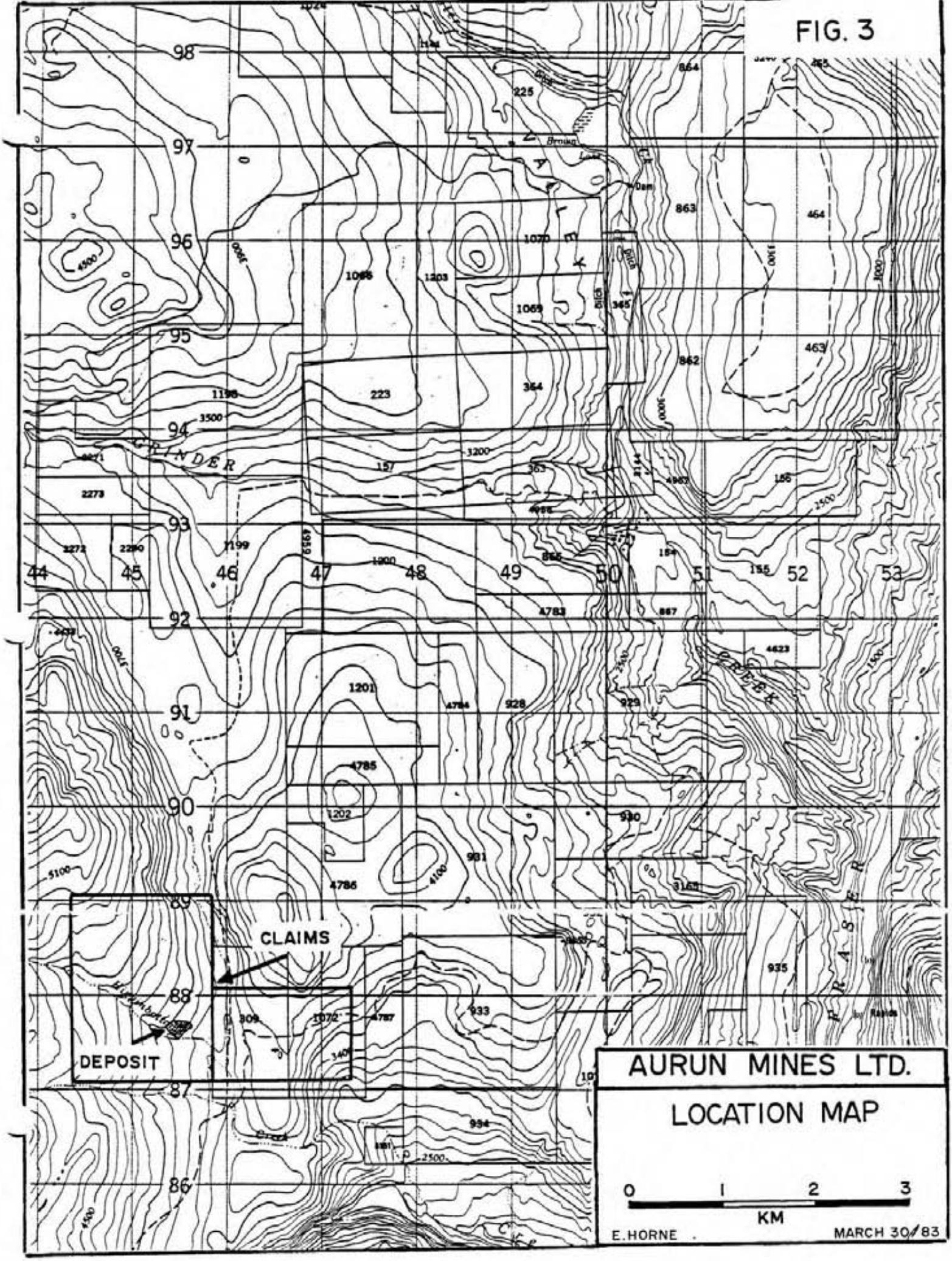
0 10 20 30

KM

E. HORNE

MARCH 30/ 83

FIG. 3


CLAIMS
DEPOSIT
GRINDER
CREEK
FRASER
AURUN MINES LTD.
LOCATION MAP
0 1 2 3
KM
E. HORNE
MARCH 30/83

1.2 LOCATION AND ACCESS

The deposit is located in the Clinton Mining Division, NTS 920/8W, latitude 51°20'30" north, longitude 122°21'00" west (see Figure 2 and Figure 3).

The claims are situated in the area of Higginbottom Creek, a tributary of Lone Cabin Creek, that flows easterly into the Fraser River. Clinton is located approximately 60 kilometers to the southeast. The May 1 claim is shown to lie on a portion of lots 309 and 1072, the May 2 claim and the deposit as presently known is shown to lie on crown land just west of lot 309 (see Figure 3). Access to the property is by road towards the Empire Valley Ranch and is 146 kilometers from Clinton, British Columbia. The unpaved road starts at a point 16 kilometers north of Clinton on Highway 97 North and continues via the Blackdome Mines road that starts immediately south of Brown Lake and continues onto the Porcupine Creek road which leads to a cabin on Higginbottom Creek. Access can sometimes be gained more directly through requests for permission to local land holders in the Grinder Creek or Empire Valley Ranch areas.

The road to the Gang Ranch and Empire Valley Ranch is maintained by the Department of Highways who also maintains a Government suspension bridge across the Fraser River that has a restricted load capacity of 12 tonnes tandem axle and a gross vehicle maximum of 29 tonnes. The Blackdome road is presently maintained by a local contractor to the Blackdome Mine.

The B.C. Railway crosses Highway 97 North approximately 8 kilometers north of Clinton and optimum rail facilities for the transportation of perlite are presently being determined.

1.3 HISTORY AND OWNERSHIP

The May 1 (6 unit) and May 2 (12 unit) were staked on May 23rd, 1982 by Mr. Sven Englund, agent for Mr. Art Johnston of Calgary, Alberta. The present claim owners are Art Johnston, et al "Prospectors". Aurun Mines Ltd. is the operator by signed agreement with the owners, and has 100% working interest in the property. The main deposit is on the May 2 claim, units 1, 2, 15 and 16.

The existence of perlite in the Empire Valley area has been known since 1949 when it was identified by W. W. McCammon on the Olive and Ralph claims in the area and the Gem 1 and Gem 2 claims described as located on a tributary of Lone Cabin Creek. Perlite was first documented in the Lone Cabin Creek area in 1949 by the British Columbia Department of Mines and Petroleum Resources. The only Canadian production of perlite is documented by the Department as 1,009 tonnes from a quarry on the Francois Lake deposit in 1953. The Frenier Perlite Deposit claims have gone through various hands starting with Lawrence Frenier in 1949 and finally J. Kruszewski, et al in 1976. The property was examined by Mountain Minerals Ltd. in 1976 but no action was taken, subsequently an option was taken by W. Jackman, et al but no work was done on it during the option period which ended in May 1982 upon which the area was re-staked by the present owners.

Other references to the Frenier Perlite Deposit can be found in the Energy Mines and Resources Canada Canmet Report 81-15E, October 1981 and the 1978 Minister of Mines Report for British Columbia, where they are referred to as the Empire Valley Deposit and perlite deposit respectively.

A previous report on the property by consulting geologist, E. Meyers entitled "Economic Evaluation of the Perlite 1 and 2 Claims, Empire

1.3 HISTORY AND OWNERSHIP (Con't)

Valley, British Columbia" September 1978 has been made available to Aurun Mines Ltd. and to the British Columbia Mineral Resource Branch, as an assessment report, #7009.

1.4 SUMMARY OF WORK DONE

1.4.1 GENERAL

The work done on the property during 1982 and early 1983 consists of three separate visits to the deposit as follows:

a) D. W. Philip of Aurun Mines Ltd. and two of the prospectors on November 21st, 1982, for the purposes of preliminary appraisal.

b) E. J. Horne and two of the prospectors from December 16th - 19th, 1982, for the purpose of sampling for laboratory testing deemed necessary previous to bulk sampling, to assist in the selection of a location for bulk sampling, and determine a suitable area for possible eventual mining. The work consisted of sampling, field reporting of sample locations, geological mapping, and confirmation of reserves.

c) D. W. Philip, J. A. Chapman of Aurun Mines Ltd. from February 4th - 5th, 1983, E. J. Horne and M. Dagenais contracted to Aurun Mines Ltd. on February 4th - 6th, 1983. Two of the prospectors joined the group on February 6th, 1983. The purpose of this trip was to collect a 2,000 lb. (1 ton) bulk sample for shipment to and testing by Silbrico Corporation, 6300 River Road, Hodgkins, Illinois. The purpose of the test is to establish the plant scale quality of the perlite

1.4.1 GENERAL (Con't)

c) (Con't)

and to assist in the possible selection of expander types. The preliminary market and economic evaluations performed to date appear favourable to the development of this deposit. Further work towards eventual production is presently underway. Other factors that have encouraged interest in the property are:

i) Very encouraging results from laboratory testing and discussion of these results with an operator in the industry. The results to date have yielded expansion factors well within the specifications established in the perlite industry.

ii) Size, apparent thickness and regularity of the deposit from field observations.

iii) The deposit is accessible, the area has gentle slopes, good drainage, sparse forest cover and very thin overburden, all of these contribute to ease of mining.

iv) Favourable climate, i.e. moderate and dry.

v) No present Canadian crude perlite production.

vi) Apparent rippability of the deposit.

In all the above property visits access to the site was attained by the use of four wheel drive vehicle, access in some cases was severely hampered by winter weather.

1.4.2 GEOLOGICAL WORK

The geological work done to date consists of confirmatory and preliminary mapping of the deposit, locating by chain and compass principal outcrops, old test pits, new sample locations, field test areas, and preliminary confirmation of reserves. The results are shown on Figure 4 and on Map 1-1, scale 1:1000. It is realized that detailed mapping, surveying and drilling is required in the future. For further geological mapping results see Section 2.0. The total area detailed to date is approximately 0.20 square kilometers.

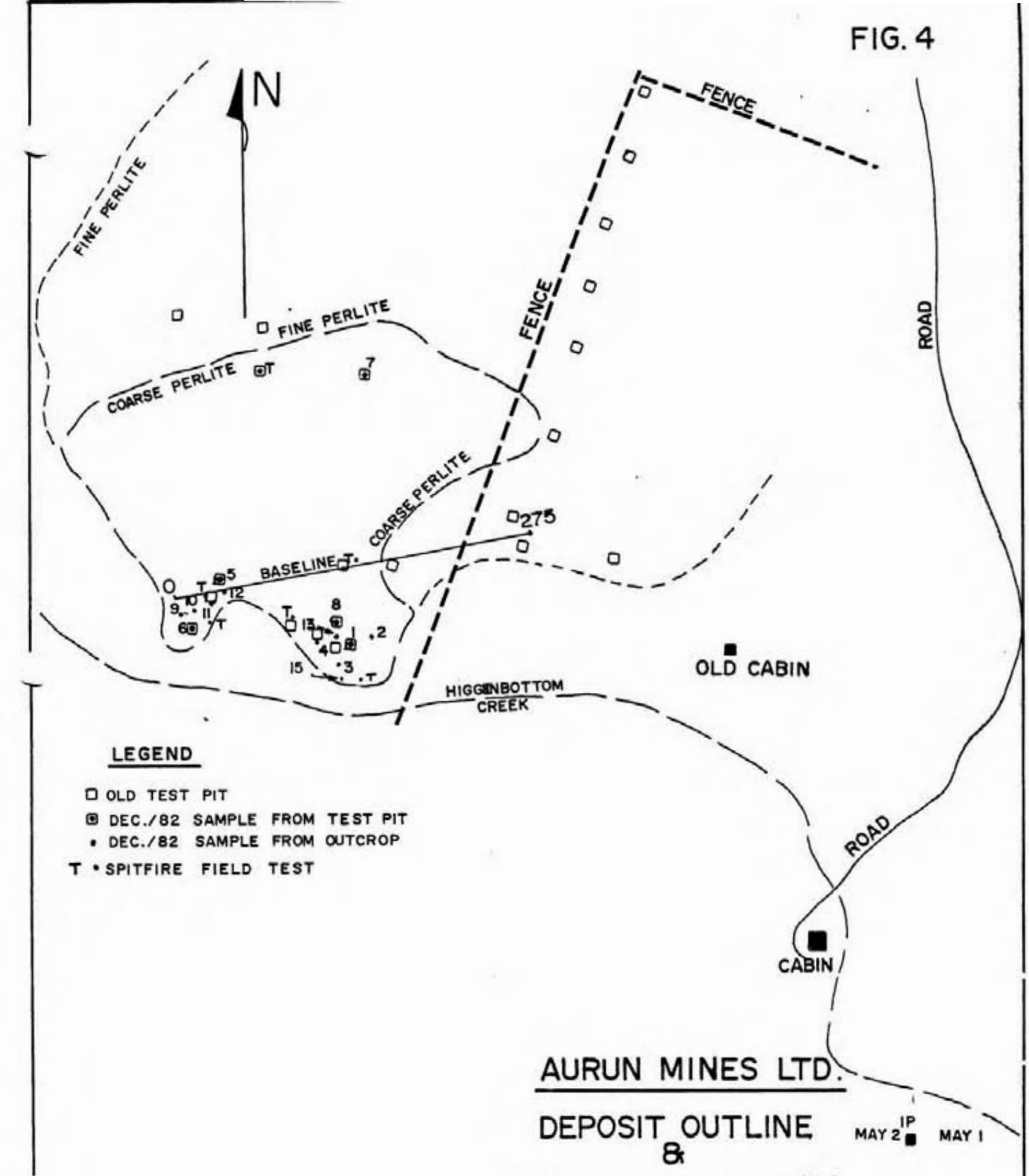
1.4.3 FIELD TESTING AND SAMPLING

A total of 15 laboratory samples were collected, each sample weighed approximately 10 kilograms. All of the laboratory samples were also field tested with a "Spitfire" propane torch in order to determine their relative expansion characteristics. All of the zones field tested exhibited expansion characteristics. See Appendix 2 for details on the field and laboratory testing method. Some sample locations were only field tested. All of the sample locations are shown on Map 1-1. For discussion of the results see Section 2.0.

1.4.4 LABORATORY TESTING

The samples collected were tested by Loring Laboratories Ltd. of Calgary, Alberta. The results are enclosed in Appendix 1. The total number of tests done to date are as follows:

FIG. 4


N
FENCE
FENCE
ROAD
FINE PERLITE
FINE PERLITE
COARSE PERLITE
COARSE PERLITE
275
BASELINE
OLD CABIN
HIGGINBOTTOM CREEK
ROAD
CABIN
LEGEND
OLD TEST PIT
DEC./82 SAMPLE FROM TEST PIT
DEC./82 SAMPLE FROM OUTCROP
T • SPITFIRE FIELD TEST
AURUN MINES LTD.
DEPOSIT OUTLINE
&
SAMPLE LOCATIONS
IP
MAY 2
MAY 1
0
100
200
300
METRES
DEPOSIT OUTLINE BY E. MEYERS (1978)
E. HORNE
MARCH 30/83

1.4.4 LABORATORY TESTING (Con't)

a) 15 determinations of crude perlite bulk densities and product bulk densities for arrival at expansion factor determinations. The samples were numbered 6601 to 6615. Sample #14 consisted of a sample obtained from another deposit for comparison purposes.

b) 4 repeat determinations; in one case the area was re-sampled; #6611.

c) One float-sink product sieve analysis, sample #6603.

d) One crude chemical analysis, sample #6603.

1.4.5 BULK SAMPLING

A 907 kilogram (2,000 lb.) bulk sample was collected from the vicinity of laboratory sample 6603 and 6601 - see Map 1-1. The sample location was also field tested and a 10 kilogram composite sample, sample C-1, was collected on a proportionate basis to the actual bulk sample taken. This sample was obtained by drilling with a Poinjar (Model 120) gas operated hand drill. Blasting was not done in order to reduce comminution. As this sample was loaded into four 45-gallon drums in Calgary for shipment to its destination in Hodgkins, Illinois, another composite sample was taken from each drum at 1/3, 2/3, and full capacity. This sample is composite C-2. Both of these composite samples had determinations of crude perlite bulk densities and product bulk densities performed by Loring Laboratories Ltd. of Calgary, Alberta. This sample was sent to Hodgkins, Illinois on February 24th, 1983.

1.4.6 LIST OF CLAIMS WORK PERFORMED ON

All of the work performed to date in the field was done on the May 2 claim. A general summary of the other related work done for this property consists of the following:

a) Logistical and other transportation studies.

b) Preliminary market evaluation studies.

c) Preliminary mining feasibility studies.

These studies are at this point not being claimed for assessment.

2.0 DETAILED TECHNICAL DATA AND INTERPRETATION

2.1 GEOLOGY

The perlite deposit shown on Figure 3 and Map 1-1 is massive and very uniform in appearance, no zones of alterations such as devitrified or argillitized zones were noted. The color of the perlite varies from light to dark grey when dry and from dark grey to black when moist, as on fresh surfaces. Greenish-buff surface weathering extends a maximum of 5.0 cm below the surface. The exposed portion of the deposit is on a ridge north of Higginbottom Creek, the remaining portion of the deposit is covered by very thin drift and can be noted only in old test pits and trenches located as shown on Map 1-1.

The exposed portion of the deposit consists of a relatively flat-lying flow of solid glass with some fragments and shards of glass "welded" or partially melted together to form a welded tuff or ignimbrite; no flow directions can be positively determined, however, the deposit is very massive, appears slightly domed, has well developed perlitic structure and shows some tendency towards blocky or splintery fracturing. The perlitic "onion" structure has been determined by thin section observations of a sample taken from the vicinity of sample location 6603.

The volcanics in the area are considered by the Geological Survey of Canada to be Miocene to Eocene in age, from open file report #534 available at the Geological Survey of Canada Information Services, Vancouver, British Columbia. If the deposit is post Eocene, this would be another positive factor, as the time for the development of devitrification is less than for deposits of pre-Eocene age.

2.1 GEOLOGY (Con't)

It is not known if absolute age dating or paleomagnetic has been done on or in the vicinity of the deposit. The composition of the perlite as determined by the elemental analysis of one crude perlite sample #6603 is as follows:

S_1O_2 71.50%, Al_2O_3 12.23%, Fe_2O_3 1.37%, T_1O_2 0.05%, CaO 0.64%, MgO 0.06%, Na_2O 2.37%, K_2O 3.89%, SO_3 0.03%, H_2O 0.19%, and LOI 4.10%.

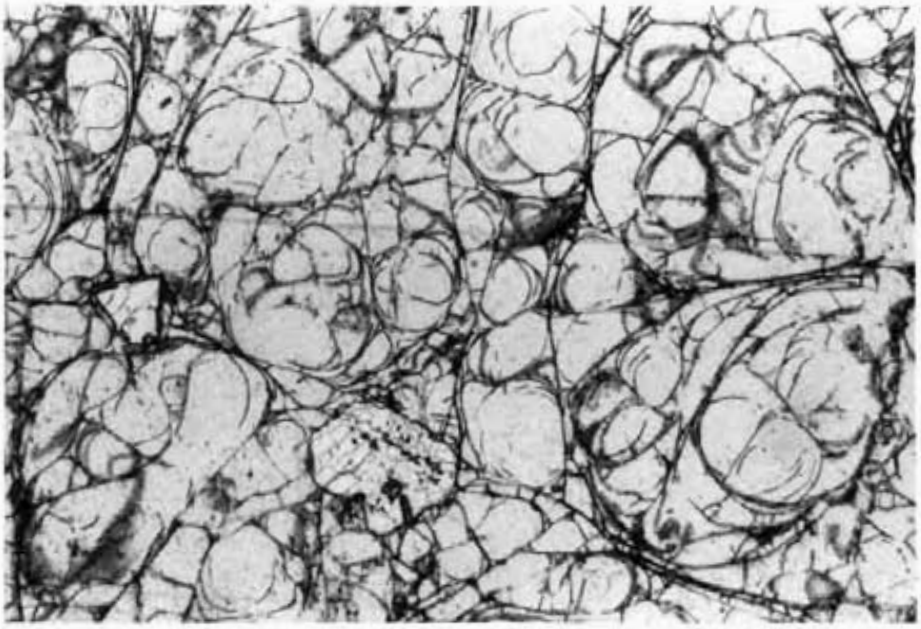
This corresponds to a rhyolite, or rhyodacite in composition with a total alkalies of approximately 6% and a silica content of +70%.

Petrographic examination of two thin sections of a sample taken in the vicinity of sample #6603 show that the glass has a prevalent perlitic (onion) structure. The glassy groundmass contains approximately 1 - 5% microphenocrysts of sanidine, sodic plagioclase and free quartz. The later commonly exhibits partially re-absorbed grain boundaries. Micro-fractures forming approximately 3 - 10% of the groundmass are filled with crystallites of chert or crystoballite?

Field observation in the sample location noted that a local, 0.05 cm wide fracture was filled with jasperoid.

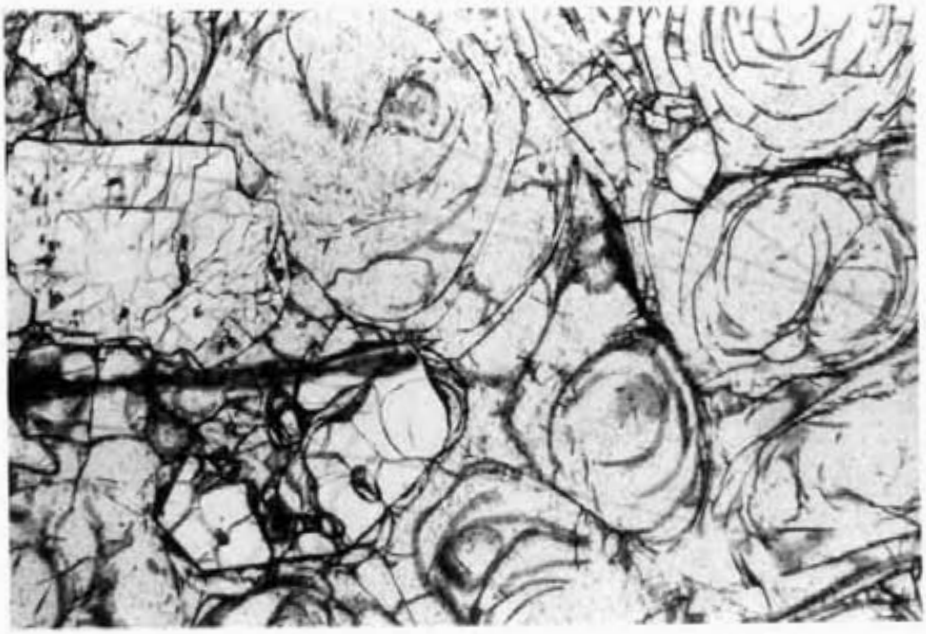
Typical photographs of these thin sections are shown on Figure #5. These illustrate the strong perlitic structure and the habit of micro-phenocrysts.

FIG. 5



6-a Groundmass of glassy perlite showing strong perlitic "onion like" concentric cracks and plagioclase microphenocrysts.
Magnification X20

1.0 mm



6-b Groundmass of glassy perlite showing perlitic "onion like" concentric cracks and microphenocrysts of twinned sodic plagioclase and free quartz (c-axis) exhibiting re-absorbed grain contacts. Sample #6603 location.
Magnification X20

1.0 mm

2.2 RESERVES

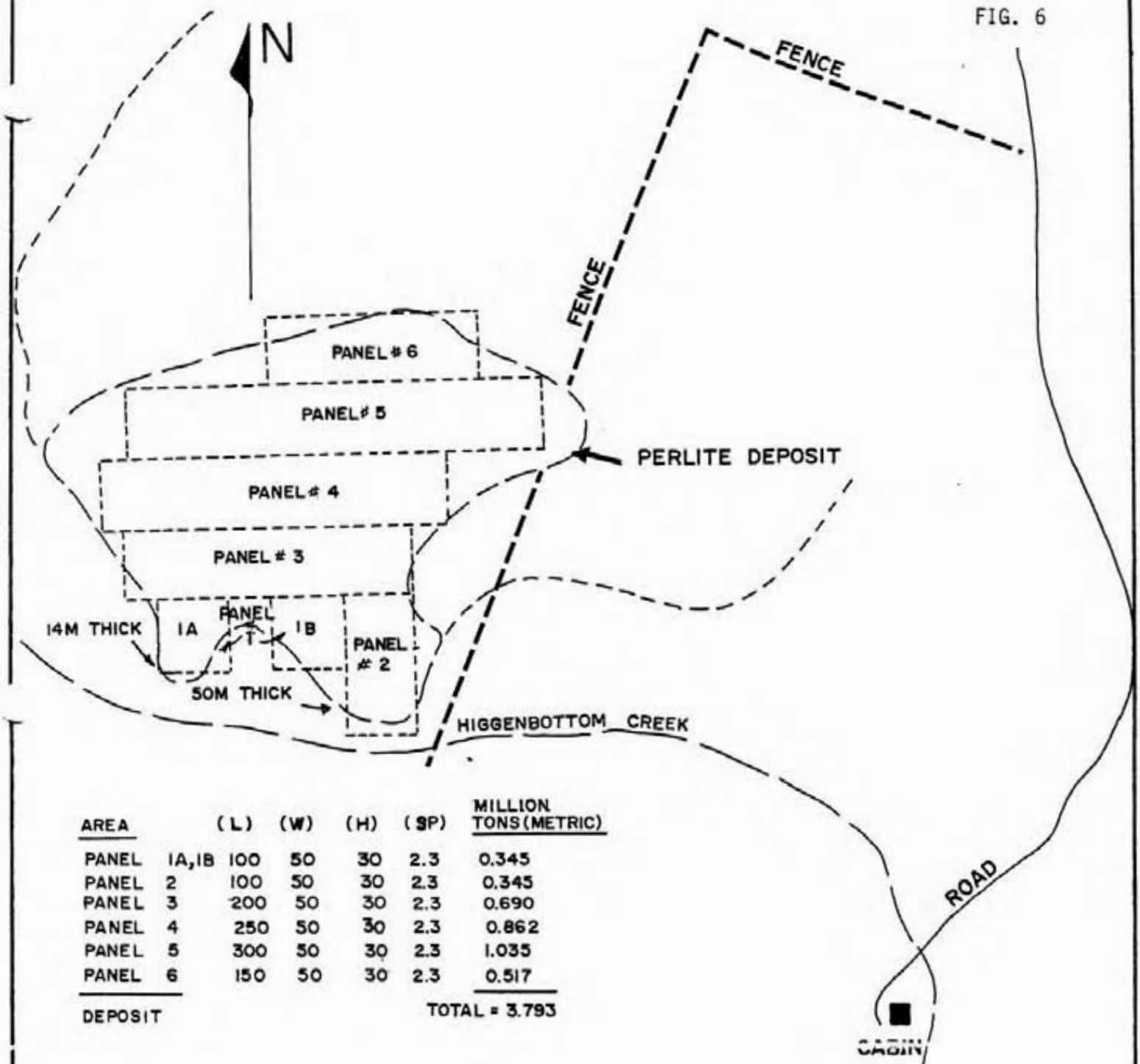
Previous reserve calculations by consulting geologist, E. Meyers in a report entitled "Economic Evaluation of the Perlite 1 and 2 Claims, Empire Valley, British Columbia, September 1978" are shown as 9,350,000 short tons of both "fine" and "coarse" perlite or 5,750,000 short tons of "coarse" perlite. Mr. Meyers considered these reserves as, "possible total reserve estimate". The reserves for the massive or "coarse" perlite have been revised by Aurun Mines Ltd. to approximately 3.8 million metric tonnes inferred using an average thickness of 30 metres and a specific gravity of 2.3 as shown on Figure 6. For Panels 1A and 1B, as shown on Figure 6 the tonnage is inferred from measurements taken in the field from the exposed crest of the perlite to the lowermost exposed perlite section. This distance is 30 metres. Test pits and limited exposure behind the crest for a distance of 50 to 100 metres were used to obtain a possible reserve of approximately 690,000 metric tonnes. Preliminary studies by Aurun Mines Ltd. indicate enough perlite reserves to support a long term, 20,000 tonne per year mining operation. The ability to develop a profitable operation will be determined by the detailed market study and further specific sampling, testing and a final feasibility study.

2.3 INTERPRETATION OF TECHNICAL DATA

2.3.1 FIELD TESTING

The results obtained from field testing assisted in the selection of areas to obtain samples for laboratory testing and to confirm if any areas that expansion did not take place could be located. The testing method is outlined in Appendix 2. This test although not quantitative does give an appreciation of the expansion characteristics. A summary of these tests follows:

FIG. 6



AREA		(L)	(W)	(H)	(SP)	MILLION TONS (METRIC)
PANEL	1A,1B	100	50	30	2.3	0.345
PANEL	2	100	50	30	2.3	0.345
PANEL	3	200	50	30	2.3	0.690
PANEL	4	250	50	30	2.3	0.862
PANEL	5	300	50	30	2.3	1.035
PANEL	6	150	50	30	2.3	0.517
DEPOSIT						TOTAL = 3.793

AURUN MINES LTD.

DEPOSIT OUTLINE & POSSIBLE RESERVES

0 100 200 300

METRES

DEPOSIT OUTLINE BY E. MEYERS (1978)

E. HORNE MARCH/ 83

2.3.1 FIELD TESTING (Con't)

Location 6601 - Located in Trench #11 area - coarse massive perlite, color light grey with minor whitish surface alteration. Expanded to white product. Fine material, hard to trap as blows out of can when expanded. Coarse material (+16 mesh) very obviously expanded.

Location 6602 - Perlite lighter color (buff), not as massive, slightly more granular, appears altered due to surface weathering. Expanded very well on test, similar results to 6601. Positive good - excellent).

Location 6603 - Located in exposed portion of cliff. Perlite light grey on dry surfaces, dark grey on fresh surfaces. Expanded very well. Best results so far. Tested positive (excellent). "Big white popcorn"on +16 mesh size.

Location 6604 - Perlite massive light grey with buff surface alteration due to water staining? Field test positive (good).

Location 6605 - Located in old test pit #3. Perlite massive light grey, test positive (good). Best results to date from Sample 6601 and 6603.

Location 6606 - Located in old test pit #4. Perlite is massive, light to medium grey. Field tested positive. Very best field test so far, excellent on +16 mesh fraction. Positive (excellent).

Location 6607 - Located in old trench #2 area. Very poor exposure. Tested positive (good, excellent). Perlite light grey and massive. Poor exposure.

2.3.1 FIELD TESTING (Con't)

Location 6608 - Located in old trench #8 area. Tested positive (good, excellent). Best samples so far 6606, 6603, 6601, 6607, 6608.

Location 6609 - Perlite massive, light grey, splintery. Tested (good).

Location 6610 - Perlite massive, light grey to buff with greenish buff surface weathering. Tested positive (good).

Location 6611 - Perlite light buff, with some more intensive surface alteration, more granular in nature but with massive sections. Tested positive (good).

Location 6612 - As above.

Location 6613 - Perlite glassy, black on fresh surfaces. Very minor surface weathering. Tested positive (good - excellent).

Location 6615 - Perlite light grey to buff with some pink weathering. Tested positive (good).

2.3.2 LABORATORY TESTING

The expansion factors obtained by laboratory testing at Loring Laboratories of Calgary, Alberta were frequently in the range of 10. Results varied from expansion factors of 5.64 to 14.0.

The product bulk densities varied from 0.09 gms/cc to 0.31 gms/cc. Frequently the results were in the area of 0.12 gms/cc. This is considered to be a favourable product bulk density. The basis for expansion factor determinations is discussed in field and laboratory testing methods in Appendix 2.

2.3.2 LABORATORY TESTING (Con't)

Testing of a sample obtained from Johns-Manville consisting of a PA 210 plaster aggregate feed gave an expansion factor of 7.93 and a product bulk density of 0.15 gms/cc. This sample was tested on the same apparatus by the same Loring Laboratories of Calgary, Alberta. A product target bulk density was considered to be lower than 0.22 gms/cc. This target was obtained through discussions with G. A. Wavering of Silbrico Corporation. The product sieve analysis for sample #6603 involved a water sink-float test. The portion that expanded floats, the non-expanded fraction sinks. The float product is dry sieved. The results obtained were compared to typical values for specifications as per W. R. Grace & Co. of Canada Ltd. and are shown below:

Perlite Grades Us Std. Sieve Size	W. R. Grace						
	Cryogenic	Indus. A-L.W	Indus. G	Indus. H	Indus. A-H.W.	Indus. T	Deposit Sample 6603
No. 8	------	----	22.4	39.2	----	----	0.10
No. 12	------	13.2	44.9	62.7	23.2	1.1	0.61
No. 16	0.6	34.4	62.1	77.0	N/A	10.4	3.75
No. 20	5.6	54.7	74.2	86.6	N/A	35.9	14.16
No. 30	24.1	68.1	85.2	92.0	68.1	59.6	45.99
No. 50	69.9	82.3	91.9	95.6	84.3	80.2	84.55
No. 100	91.7	91.0	----	----	91.2	88.1	97.00
Bulk Density	3.5	4.0	5.6	6.0	6.5	8.5	5.61
pH	6-8	6-8	6-8	6-8	6-8	6-8	-----

*6603 expanded from crude at minus 16 mesh.

3.0 ITEMIZED COST STATEMENT

3.1 WAGES

Number of Mandays = 13

3 days - 1 person on 16, 17, 18 of December 1982	
@ $215.00/day	$ 645.00
2 days - 2 persons on 4, 5 of February 1983	
@ $275.00/day	1,100.00
3 days - 1 person on 4, 5, 6 of February 1983	
@ $80.00/day	240.00
3 days - 1 person on 4, 5, 6 of February 1983	
@ $215.00/day	645.00
Sub-Total	$ 2,630.00

3.2 FOOD, ACCOMMODATION AND SUPPLIES

Food, accommodation and supplies are for 21 mandays as this was supplied to the prospectors in return for assistance to us in the actual collection of samples for testing.

Number of mandays = 21, Average Rate per manday = $40.00

3 days - 3 persons on 16, 17, 18 of December 1982

2 days - 2 persons on 4, 5 of February 1983

3 days - 2 persons on 4, 5, 6 of February 1983

1 day - 2 persons on 6 of February 1983

21 X $40.00/manday = $840.00

Sub-Total	$ 840.00

3.3 TRANSPORTATION

Used for on-site transportation and access to the property from the B.C.-Alberta border.

Number of days = 13 vehicle days

Rate per day = $72.50

1 - 4-wheel drive vehicle 6 days on 15, 16, 17, 18, 19, and 20 of December 1982

1 - 4-wheel drive vehicle 4 days on 3, 4, 5, 6 of February 1983 and 2 bus tickets to Calgary on 7 of February 1983.

1 - 4-wheel drive vehicle 3 days on 6, 7, 8 of February 1983

13 days X $72.50 = $942.50

	Sub-Total	$ 942.50

3.4 INSTRUMENTS AND TOOLS

Rentals - One Poinjar (Model 120) Hand Drill

Number of Days - 3

Rate/Day - $53.61

Total Cost - 4 X $53.61 = $160.85

	Sub-Total	$ 160.85

Purchases

Sample Bags - 100 bags with plastic liners

	Sub-Total	$ 101.68

Propane Torch and Propane for Field Testing

	Sub-Total	----------

(4) 45-Gallon Drums

	Sub-Total	$ 80.66

3.5 LABORATORY TESTING (SURVEYS)

3.5.1 EXPANSION TESTS

Number of Tests - 17

Unit Cost - $25.00

Total Cost - 17 X $25.00 = $425.00

Sub-Total $ 425.00

3.5.2 SIEVE ANALYSIS

Number of Tests - 1

Unit Cost - $25.00

Total Cost - 1 X $25.00 = $25.00

Sub-Total $ 25.00

3.5.3 ELEMENT (10) ANALYSIS, INCL. LOI MOISTURE, SOLUBLES

Number of Samples - 1

Unit Cost - $129.50

Total Cost - 1 X $129.50 = $129.50

Sub-Total $ 129.50

3.5.4 PETROGRAPHIC THIN SECTIONS

Number of Sections - 2

Unit Cost - $25.00

Total Cost - 2 X $25.00 = $50.00

Sub-Total $ 50.00

3.6 BULK SAMPLING (one ton)

Transportation from Site to Calgary (Included in transportation charges)

Transportation from Calgary to Chicago	$462.15	
Insurance	125.00	
Custom Brokers Charges	45.00	
Sub-Total		$ 632.15

3.6 BULK SAMPLING (Con't)

Note: No known testing facility on pilot scale available in Canada to non-producers.

3.7 COST OF REPORT

Compilation and Drafting

10 Days at $200.00/day	$2,000	
Typing & Xeroxing	500	
Sub-Total		$ 2,500.00
Grand Total		$ 8,517.34
Say		$ 8,517.00

3.8 APPORTIONMENT OF COSTS

The apportionment of wages per field accomplishment is as follows:

Claims	Geological Investigations	Field Sampling and Testing	Bulk Sampling	Total
May 1 (6 units)	----------	--------		
May 2 (12 units)	$430 (2 mandays)	$430 (2 mandays)	$1,170 (9 mandays)	$2,630 (13 mandays)
	16.4%	16.3%	67.3% =	100%

The May 1 and May 2 claims comprising 18 units have been grouped. The Grand Total $8,517.00 should be apportioned as follows:

May 1	$2,839.00
May 2	5,678.00
	$8,517.00

APPENDIX 1

RESULTS OF LABORATORY TESTING

LORING LABORATORY LTD.

PERLITE EXPANSION TEST

SUMMARY

Sample	Bulk Density of Crude / Bulk Density of Product gms/cc	Bulk Density of Crude / Bulk Density of Product lbs/cu. ft.	= Expansion Factor
6601	1.21/.12	75.47/7.48	= 10.08
6602	1.13/.17	70.48/10.60	= 6.64
6603	1.26/.09	78.59/5.61	= 14.00
6604	1.20/.22	74.84/13.72	= 5.45
6605	1.17/.25	72.97/15.59	= 4.68
6606	1.22/.13	76.09/8.11	= 9.38
6607	1.24/.12	77.34/7.48	= 10.33
6608	1.23/.12	76.72/7.48	= 10.25
6609	1.21/.21	75.47/13.10	= 5.76
6610	1.18/.21	73.60/13.10	= 5.62
6611	1.19/.31	74.22/19.33	= 3.84
6612	1.17/.22	72.97/13.72	= 5.32
6613	1.24/.20	77.34/12.47	= 6.20
**6611	1.22/.12	76.09/7.48	= 10.17
***C-1	1.25/.12	77.96/7.48	= 10.42
***C-2	1.22/.13	76.09/8.11	= 9.38
*6614	1.19/.15	74.22/9.35	= 7.93
6615	1.19/.23	74.22/14.35	= 5.17

* Sample of Johns-Manville Plaster Aggregate PA 210

Note: Detailed laboratory sheets are attached.

** Re-sampled
*** Bulk Sample Composites

E. J. Horne

March 30th 1983
Date

To: AURUN MINES LTD.,
910, 640 - 8th Avenue S.W.,
Calgary, Alta. T2P 1G7

ATTN: E. Horne

File No. 24401
Date February 21, 1983
Samples Perlite

Certificate of ASSAY

LORING LABORATORIES LTD.

SAMPLE No.	Bulk Densities Raw	Expanded	% Recovery
"Perlite Samples"			
C-1	1.25	.12	65.6
C-2*	1.22	.17	72.6
11	1.22	.12	61.7
15	1.19	.23	69.5
		*Vitrified	
C-2 Rerun	1.22	.13	75.4

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer

To: AURUN MINES LTD.,
910, 640 - 8th Avenue S.W.,
Calgary, Alta. T2P 1G7

ATTN: E. Horne

File No. 24278
Date February 24, 1983
Samples Perlite

Certificate of ASSAY

LORING LABORATORIES LTD.

SAMPLE No.	% Recovery
"Perlite Samples"	
6601	87.0
6602	78.4
6603	73.4
6604	73.5
6605	79.2
6606	70.03
6607	85.68
6608	76.80
6609	79.97
6610	78.60
6611	68.20
6612	76.78
6613	81.25

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer

To: AURUN MINES LTD.,
910, 640 - 8th Avenue S.W.,
Calgary, Alta. T2P 1G7

ATTN: E. Horne

File No. 24278
Date January 14, 1983
Samples Perlite

Certificate of ASSAY

LORING LABORATORIES LTD.

SAMPLE No.	Bulk Densities	
	Raw Sample	Expanded Sample
"Perlite Samples"		
6601	1.21	.12
6602	1.13	.17
6603	1.26	.09
6604	1.20	.22
6605	1.17	.25
6606	1.22	.13
6607	1.24	.12
6608	1.23	.12
6609	1.21	.21
6610	1.18	.21
6611	1.19	.31
6612	1.17	.22
6613	1.24	.20

100 gm Samples Used @ -16 Mesh

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer

To: AURUN MINES LTD.,
910, 640 - 8th Avenue S.W.,
Calgary, ALta. T2P 1G7

ATTN: E. Horne

File No. 24278
Date January 21, 1983
Samples Perlite

Certificate of ASSAY

LORING LABORATORIES LTD.

SAMPLE No.	% Retained on Sieves by Volume Cumulative
"Screen Analysis"	
Sample # 6603*	
+8	.10
8x12	.61
12x16	3.75
16x20	14.16
20x30	45.99
30x50	84.55
50x100	97.00
-100	

* Screen Analysis Completed on Expanded Sample after Cleaning by H20 Float

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer

To: AURUN MINES LTD.,
910, 640 - 8th Avenue S.W.,
Calgary, Alta. T2P 1G7

ATTN: E. Horne

File No. 24278
Date January 21, 1983
Samples Perlite

Certificate of ASSAY

LORING LABORATORIES LTD.

SAMPLE No.	# 6603
"Raw Sample" %	
SiO2	71.50
Al2O3	12.23
Fe2O3	1.37
TiO2	.05
CaO	.64
MgO	.06
Na2O	2.37
K2O	3.89
SO3	.03
H2O	.19

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer

To: AURUN MINES LTD.,
910, 640 - 8th Avenue S.W.,
Calgary, Alta. T2P 1G7

ATTN: E. Horne

File No. 24278
Date January 21, 1983
Samples Perlite

Certificate of ASSAY

LORING LABORATORIES LTD.

Page # 4

SAMPLE No.	Surface % H2O	L.O.I.* %	H2O Soluble %	Hot 30% HCl Soluble %	pH
"Raw Sample" # 6603	.12	4.10	.05	3.56	8.30

* Loss on Ignition Completed after Removal of H2O @ 105°C

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer

To: AURUN MINES LTD.,
910, 640 - 8th Avenue S.W.,
Calgary, Alta. T2P 1G7

ATTN: E. Horne

File No. 24278
Date January 21, 1983
Samples Perlite

Certificate of ASSAY

LORING LABORATORIES LTD.

SAMPLE No.	Bulk Densities	
	Raw Sample	Expanded Sample
"Johns Manville" Aggregate Sample 14	1.19	.15

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer

To: AURUN MINES LTD.,
910, 640 - 8th Avenue S.W.,
Calgary, Alta. T2P 1G7

ATTN: E. Horne

File No. 24278
Date Janaury 21, 1983
Samples Perlite

Certificate of ASSAY

LORING LABORATORIES LTD.

SAMPLE No.	Weights of Original Samples gms.
6601	10,928
6602	11,814
6603	13,447
6604	11,851
6605	10,365
6606	13,937
6607	10,788
6608	11,676
6609	10,031
6610	11,194
6611	9,693
6612	9,763
6613	10,195

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer

APPENDIX 2

FIELD AND LABORATORY TESTING METHODS

Note: The author has kept many measurements in this section in Imperial Units for clarity.

PURPOSE

The laboratory testing was done for the following reasons:

1. To select the site for a 907 Kg bulk sample.
2. To check possible variations in quality within the deposit.
3. To assist in the selection of the optimum initial minesite location.
4. To ascertain as best as possible any special types of problems that may be encountered.

HISTORY

No known commercial Canadian laboratories perform routine perlite tests. Testing for perlite quality is generally done by perlite producers and/or product manufacturers. Aurun Mines Ltd. requested Loring Laboratories Ltd. of Calgary, Alberta to do some expansion, chemical and sieve analysis tests. Assistance was provided by Mr. G. A. Wavering of the Silbrico Corporation in Chicago, Illinois as to both the manufacture of a perlite expansion laboratory testing apparatus and technical data requirements. Mr. Wavering provided some guidelines with regards to testing in the field and in a laboratory. The first recommendation was that before a sample was brought to Calgary for laboratory expansion tests it should be field tested to ascertain that in fact it did expand.

METHOD

Field Test

The recommended field test consisted of the use of a torch capable of attaining a temperature of 1400 - 1800°F. The material tested was to be the fraction passing through a 16 mesh (1 mm) screen. It should be noted that the torch flame has a tendency to blow away the fine unexpanded perlite and light expanded product. A trapping system is required if one wishes to determine the bulk weight of the field expanded product. Material coarser than 16 mesh can be

Field Test (Con't)

field tested but should not be used for quantitative determinations. The field testing was done on both -16 and coarser material and all of the sites tested showed expansion characteristics. The product turned white as required in all cases and a "popping" sound could be heard. The expansion took place instantly upon exposure of the perlite, which was placed on a shovel, to the flame. The type of propane torch used was a Spitfire Model 300 Series with a turbine swirl rotor capable of maintaining up to a 3400°F flame. It was noted that a considerable amount of fines product was lost and the coarser fraction expanded directly on the shovel surface. The products of both were mixed into a geochemical sample bag along with some unexpanded material for any required repeat testing. Field notes on the testing are available. This preliminary testing showed the best results to be in sample locations #1, 3, and 6.

Laboratory Test

Laboratory testing was done by Loring Laboratories (Calgary, Alberta) at the request of Aurun Mines Ltd. It was specified that the expansion would have to be done with a flame of 1600 - 1800°F and that the perlite feed would be -16 mesh (1 mm). These specifications were recommended to Aurun Mines Ltd. by Mr. G. A. Wavering who also gave us some specifications on a perlite expansion apparatus. This test apparatus was manufactured by Loring Laboratories under the guidance of Aurun Mines Ltd.

As per Mr. G. A. Wavering's specifications, this apparatus resembles a mini-vertical perlite expander plant. The specifications are as follows:

Manufacturing Specifications

1. A two (2) foot long open stainless steel pipe to stand vertically with flame to be introduced from the bottom and an expanded product trap to be arranged on the top.

Manufacturing Specifications (Con't)

2. A three-quarter inch feeder pipe, also of stainless steel to be welded onto the two foot pipe, the feed angle recommended at 60° from horizontal. The feeder pipe to be welded at 1/3 the distance (eight inches) from the bottom.

3. An acetylene torch to be used, with desired flame being a long blue flame. The stainless steel pipe to be cherry red before feedstock is added.

4. A trap for the product to be devised. It was pointed out to us that this area could create some minor difficulties.

Specifications For Expansion

The feed to be -16 mesh including (as specified) all of the fines and regularly fed into the feeder when the two inch stainless steel pipe is "cherry" red. The material is only put through the expander once.

Procedure For Measurement

Mr. Wavering recommended that the best way to assess the product was to obtain the bulk density of the crude previous to expansion and the bulk density of the expanded product. The expansion factor is as follows:

$$\frac{\text{Bulk Density of Crude}}{\text{Bulk Density of Product}} = \text{Expansion Factor}$$

He said that a target expansion factor should be in the area of 0.20 to 0.22 gms/cc with 0.04 gms/cc being exceptionally good. He felt that if we could obtain a product of 0.22 gms/cc he could substantially improve upon it on a larger scale pilot test in Hodgkins, Illinois (Chicago).

Actual Specifications

The apparatus as built consisted of the following:

1. A two (2) foot long open stainless steel pipe held vertically.

2. A 3/4 inch stainless steel feeder pipe welded onto the pipe eight (8) inches from the bottom.

3. An open five gallon metal pail was mounted on the top of the 2" pipe to trap the expanded product down to 100 mesh. A stainless steel mesh on the top of the pail confined the product.

4. An oxy-acetylene torch one inch rosebud torch was used, calibrated to provide the best long blue flame.

The part numbers for the components used for the manufacture and use of the test expander were:

Component	Specification
2 foot long 2" I.D. stainless steel pipe	SCH 40 WLD pipe. Desc.: A312T316 Part No.: 213 587 6521
3/4" I.D. stainless steel pipe	SCH 80 SMLS Pipe. Desc.: A312T316 Part No.: 203 595 7320
Oxygen Acetylene Torch	Handle 322-1.18 Torch 1" Rosebud LA 740 No. 10
Mesh Screen	100 Mesh stainless steel composition NiCr

Laboratory Measuring Procedures

The sample was crushed to -16 mesh (1 mm) and a 100 gm fraction was split off and weighed for the expansion test, its bulk density measurement determined on a weight/volume basis. This 100 gm sample was then put through the expander. The expanded product was collected from the trap, the product weighed and its bulk density determined on a weight/volume difference. Any material that fell through the flame was also collected and weighed. Both are considered the retained fraction and weighed to calculate the percent retained.

Laboratory Measuring Procedures (Con't)

During the development and initial testing of the expander the following items were noted:

1. An ordinary oxygen acetylene torch will not work on the expander because the length of the blue flame is not large enough and this is the part of the flame at 1600°F. A high percentage of crude had a tendency to fall through the pipe unexpanded.

2. A propane type "tiger" torch did not generate sufficient heat. The two inch diameter pipe did not develop a cherry red color all the way to the top and the flame thrust had a tendency to push the perlite into the trap too quickly.

3. In order to increase the retention time of the perlite in the expander, some choking and deflecting was done at the top, next to the trap. This did not improve matters since as soon as choking was done the retention time increased but the temperature was reduced due to impeding of the flame.

4. All items must be of mild steel and or stainless steel. Metal mesh screen placed on the top of the five gallon pail trap melted. A full metal cover had a tendency to choke the flame.

5. The two inch pipe must be cherry red from top to bottom.

6. A long blue flame is required and the perlite must contact this flame. The extra length enhances the chance of the perlite contacting it and increases the retention time.

7. The rate of feed flow on the crude should be regular.

Laboratory Measuring Procedures (Con't)

8. The 1/3 distance or 8 inches from the feeder junction to the pipe bottom is essential for retention time. Nothing is gained by shortening this distance.

Other tests done included a chemical analysis on a sample of crude perlite and a product sieve analysis on the same sample of crude perlite. The chemical analysis was done to compare the crude to that from other operating perlite deposits.

APPENDIX 3

STATUS OF BULK SAMPLE

Note: The sample has been sent to and received by Silbrico Corporation, 6300 River Road, Hodgkins, Illinois, U.S.A. 60525.

At the time of this submission the testing results were not available to Aurun Mines Ltd. The results of this testing will be made available in the future.

APPENDIX 4
STATEMENT OF QUALIFICATIONS AND CERTIFICATION

STATEMENT OF QUALIFICATIONS

I, Emmett J. Horne of the City of Calgary, in the Province of Alberta do certify the following:

1. I have been employed as a geologist with Aurun Mines Ltd. since July of 1982, both as a permanent employee and temporary contract geologist.

2. I am a graduate of the University of Saskatchewan with a Degree in Geology in 1967 and have practiced my profession continually since then.

3. I am a member of The Canadian Institute of Mining and Metallurgy.

4. Previous employers and positions are as follows:

   a) Saskatchewan Department of Mines and Resources (Field Season).

   b) Ontario Department of Mines (Field Season, Senior Geologist).

   c) Noranda Mines (Geco Division), (two years Staff Geologist).

   d) Scurry Rainbow Oil Ltd. and Bolivia Limitada, two years Project Geologist.

   e) Iron Ore Company of Canada, six years Geologist, and Supervisory positions.

   f) Syncrude Canada Ltd., four years, Senior Geologist Operations.

   g) Alsands Energy Ltd., one and one-half years, Senior Geologist.

5. I visited the site on two separate occasions on the 16th - 19th of December 1982 and the 4th - 7th of February 1983.

6. I have no direct financial interest in the property at this time, however I do expect to receive stock options in Aurun Mines Ltd. in the future.

E. J. Horne
Geologist
Aurun Mines Ltd.

CERTIFICATION

I, John Arthur Chapman, of the City of Calgary in the Province of Alberta, hereby declare:

1. That I am a registered Professional Engineer in the Province of British Columbia.

2. That I am an honours graduate in Mining Technology from the British Columbia Institute of Technology (1967).

3. That I am an honours graduate in Mining Engineering from the Colorado School of Mines (1971).

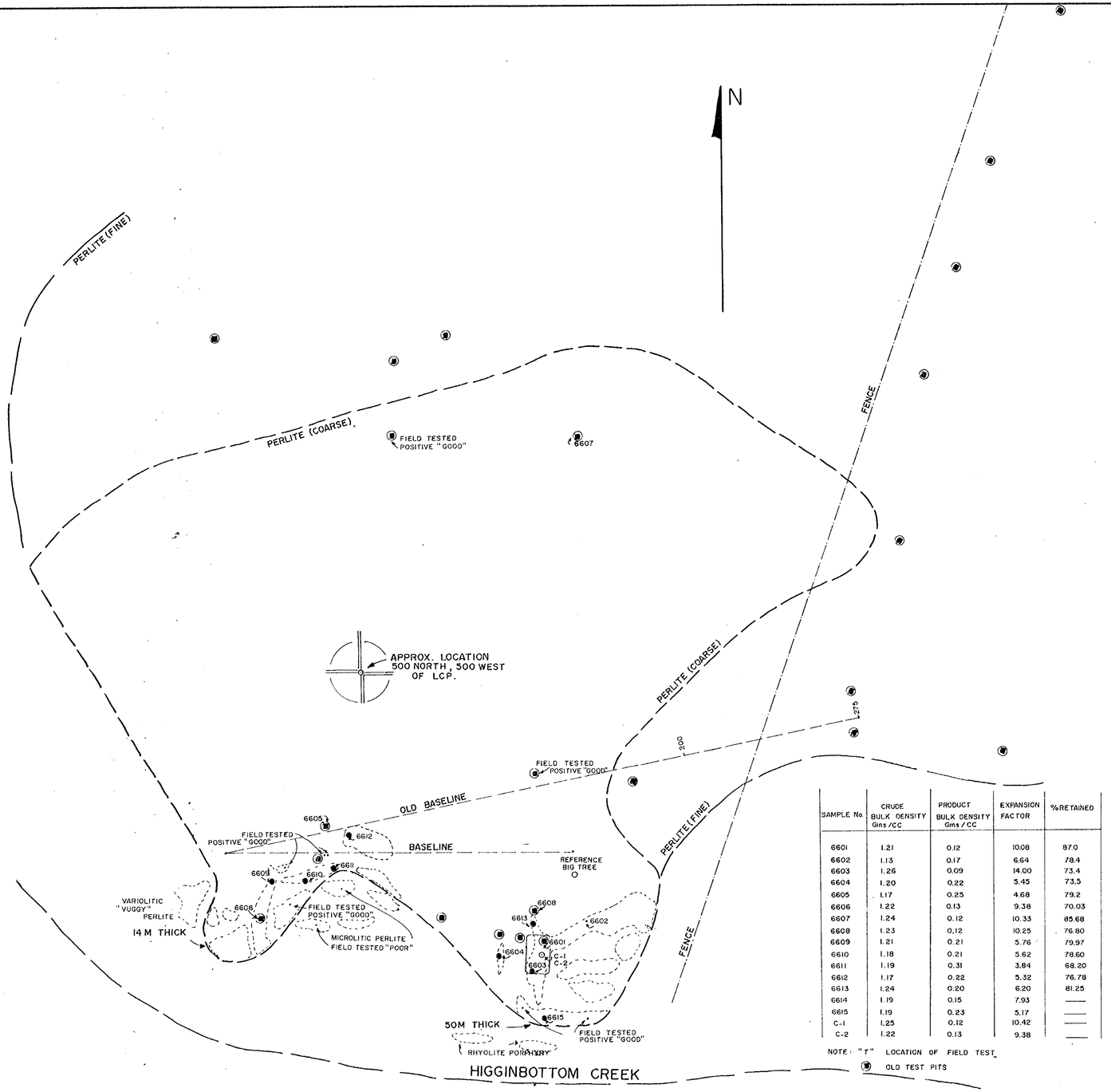
4. That I am a member of the Canadian Institute of Mining and Metallurgy, and the American Institute of Mining, Metallurgical and Petroleum Engineers.

5. That this report entitled "Assessment Report on the Frenier Deposit, Empire Valley, British Columbia, May 1, May 2 Claims" is a summary of work carried out during 1982 and early 1983 on the subject claims located in the Clinton Mining Division.

6. That to the best of my knowledge the acquisition of the data and expenditure claimed for the performance of work as presented in the attached two "Statements of Exploration and Development" dated March 30th, 1983 is correct.

7. That I have a financial interest in the properties described.

J. A. Chapman, B.Sc., P. Eng.



SAMPLE No.	CRUDE BULK DENSITY Gms/CC	PRODUCT BULK DENSITY Gms/CC	EXPANSION FACTOR	%RETAINED
6601	1.21	0.12	10.08	87.0
6602	1.13	0.17	6.64	78.4
6603	1.26	0.09	14.00	73.4
6604	1.20	0.22	5.45	73.5
6605	1.17	0.25	4.68	79.2
6606	1.22	0.13	9.38	70.03
6607	1.24	0.12	10.33	85.68
6608	1.23	0.12	10.25	76.80
6609	1.21	0.21	5.76	79.97
6610	1.18	0.21	5.62	78.60
6611	1.19	0.31	3.84	68.20
6612	1.17	0.22	5.32	76.78
6613	1.24	0.20	6.20	81.25
6614	1.19	0.15	7.93	——
6615	1.19	0.23	5.17	——
C-1	1.25	0.12	10.42	——
C-2	1.22	0.13	9.38	——

NOTE: "T" LOCATION OF FIELD TEST
OLD TEST PITS

LEGEND

- OLD TEST PITS (PRE-1978)
- NEW SAMPLE LOCATION
- BULK SAMPLE LOCATION
- GEOLOGICAL CONTACT
- OUTCROP
- FIELD TEST (ONLY)

NOTE: GEOLOGICAL CONTACTS FROM E. MEYERS REPORT "ECONOMIC EVALUATION OF THE PERLITE 1&2 CLAIMS" TAPE & COMPASS SURVEY

NTS 920/8W

0 10 20 40 60 80 100
METRES

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,077

AURUN MINES LTD.

SCALE: 1 : 1000	APPROVED BY: JAC	DRAWN BY EH
DATE: MARCH / 83		REVISED

FRENIER DEPOSIT

MAP 1-1

DRAWING NUMBER

22 X 34 PRINTED ON NO. 1000H CLEARPRINT