

# MAR 19540009: LAC LA NONNE

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ECONOMIC MINERALS  
FILE REPORT No.  
BNT-AF-03

19540009

L A C L A N O N N E B E N T O N I T E

Progress Summary and Tonnage Estimates

-by-

Fred J. Hemsworth  
Vancouver, B.C.

May, 1954

Report prepared for:  
Barymin Company Limited,  
Toronto, Ontario.

## LAC LA NONNE BENTONITE

### Progress Summary and Tonnage Estimates

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#### INTRODUCTION:

This report is a synopsis of the results of the exploratory drilling, carried out by Barymin Company Limited, on the bentonite property of the Lac La Nonne Clay Development Company, during the months of March and April, 1954. The holdings consist of 800 acres situated about 50 miles northwest of Edmonton, Alberta.

#### SUMMARY:

Number of auger holes drilled - 81 holes.  
Total footage of holes - 1,653½ feet.  
Proven tonnage of yellow bentonite - 55,591 tons.  
Indicated tonnage of blue bentonite - 25,000 tons.  
Yield shown by first two tests - 60 barrels per ton.  
Beneficiation is required before product marketable for oil-well mud.  
Research work is recommended.

#### BENTONITE GEOLOGY:

Bentonite is a transported stratified clay, formed by the alteration of volcanic ash, shortly after deposition. It contains about 60% SiO<sub>2</sub>, 23% AL<sub>2</sub>O<sub>3</sub>, 10% H<sub>2</sub>O, and several per cent of alkalis. Bentonite occurs in sedimentary beds of cretaceous age. Its special physical properties are thought to be due to the adsorbent power of the contained mineral montmorillonite, a colloid hydrous aluminum silicate.

The strata overlying the bentonite beds consists of loam, brown and grey clays and sand. Only a few small stones were encountered in the drilling.

The general regional dip of the strata is almost horizontal, with a 20 feet to the mile slope to the southwest. The bentonite beds discovered to date, also show a dip to the south but the gradient is steeper and varies locally from 2% to 7%. When strip mining the deposits, this gradient will be advantageous as it will allow more rapid runoff of rain and sub-surface water.

#### DRILL DATA:

Drilling started on March 4th, 1954, and was suspended May 7th,

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1954. During March the drill was operated by a crew of 2 men for 16 shifts and 22 holes, totalling 459 feet, were drilled. In April, the drill operated 22 shifts resulting in 59 holes totalling 1,194½ feet. Up to May 1st, 81 holes aggregating 1,653½ feet were drilled. The holes were vertical, 3 inches in diameter, and ranged in depth from 4 feet to 30 feet, averaging 20.4 feet.

The test holes were drilled with a mechanical auger drill. The drill was mounted on a jeep, which supplied the power through a chain-drive from the power take-off. Winter conditions hampered the progress of the drilling. The ground was frozen to a depth of 4 feet and severe cold weather slowed up the work. The same machine, operated during the summer months, would average at least 80 feet of hole per shift.

Drill holes were placed at approximate 100-foot centers on a grid pattern centered around L.S.D. 1 of Section 11, Township 58, West of the 5th Meridian. The area was surveyed, by the writer, with transit and steel tape. The relative location and elevation of each drill hole is shown on the accompanying plan. The bearing of the baseline, stations 0 - 1, was assumed to be true north, and the elevation of station 1 taken as 2,300 feet above sea level.

TONNAGE - YELLOW BENTONITE:

The 81 holes drilled to May 1st outlined 3 deposits of yellow, expansible bentonite, designated on the map as Blocks "A", "B", and "C". A small deposit ("D"), around drill hole number 68, was not counted. The tonnages estimated as underlying each block, and the particulars, are tabulated below:

Table of Estimates - Yellow Bentonite

	<u>Block "A"</u>	<u>Block "B"</u>	<u>Block "C"</u>	<u>Total</u>
Tons bentonite	33,896	16,123	3,572	55,591 tons
On Steven's land	4,625	nil	nil	4,625 "
" Mainwaring's land	2,704	nil	not counted	2,704 "
" road allowance	3,386	nil	" "	3,386 "
" Crown land	23,181	16,123	3,572	44,876 "
Av. thickness bentonite	8 feet	5 feet	2 feet	
" " overburden	11 "	6¼ "	6¼ "	
Acreage of surface	2.12 acres	1.75 acres	0.82 acres	4.69 acres
Volume overburden	37,643 cu yds	17,631 cu yds	8,265 cu yds	63,544 cu yds
" bentonite	27,343 " "	14,105 " "	2,646 " "	44,094 " "

In estimating the tonnages, 20 cubic feet of bentonite was taken as equivalent to 1 ton of 2,000 pounds. The specific gravity of dry bentonite is given as 2.1. Wyoming bentonites contain 25-45% moisture. Allowing 40% moisture for Lac La Nonne bentonite, the specific gravity is 1.66, equal to 20 cubic feet per ton. If the moisture content is less than 40%, the tonnage figure will be correspondingly higher.

BLUE BENTONITE:

Although the primary purpose of the test drilling was to find yellow Bentonite, some beds of blue, non-expanding Bentonite were uncovered, particularly in and adjacent to Block "A". The principal bed of blue Bentonite indicated is 7 feet thick and lies under an average depth of 24 feet of overburden. There is an indicated tonnage of greater than 25,000 tons.

POTENTIAL TONNAGES:

The blocks of yellow Bentonite, "A", "B", "C", "D", appear to be isolated deposits, but further work may show the deposits to be connected by narrow channels of Bentonite. Extensions of the known blocks are also possible in several directions where the sloping hillside prevented test drilling.

Only a small percentage, about 5%, of the area held, has been explored. Other deposits are known or reported by farmers who have drilled water wells in this area. It is reasonable to assume that further test drilling will uncover other similar deposits.

GRADE:

Twelve samples were sent to the Chemical & Geological Laboratories at Casper, Wyoming, for tests on the physical properties. A partial test on the first two samples gave a yield of 60 barrels per ton, which is considered non-commercial. There appears to be little or no sale for 60-barrel mud to the oil well drilling industry. About a 70-barrel mud is the minimum yield required. Unless the remainder of the tests give a higher yield, beneficiation will be necessary to provide a product suitable for drilling mud.

Whether beneficiation is successful or not, other markets must be found. Some of the other uses for Bentonite are listed as follows: Refining of oils; extracting asphalt from tar sands; as an adsorbent for nitro-glycerine in the manufacture of dynamite; fertilizer filler material; bonding agent in moulding sands for foundry work; as a filler for paints; sealing irrigation ditches and earthworks; adsorbent for dyes; beauty clay for facial packs; as a filler and filter in the paper industry; in putty; water softener, purifier, and wetting agent.

The Alberta Research Council have been asked to conduct a research project to determine a beneficiation process to raise the yield to oil drilling standards, and in addition to investigate all other potential markets.

Respectfully submitted,

  
Fred J. Hemsworth.

Vancouver, B.C.  
May 18th, 1954.

**CHEMICAL & GEOLOGICAL LABORATORIES LTD.**  
 10568 - 114th Street, Edmonton, Alberta      2706 Centre Street N., Calgary, Alberta  
 Phones 25624 - 42562      Phone 76149

**ANALYTICAL REPORT**

From Barymin Company Limited Product Bentonite  
 Address ..... Date Received June 22, 1954.  
 Other Pertinent Data 3 Samples  
 Analyzed by Chemical & Geological Lab. Ltd. Date June 25, 1954. Lab. No. 5961-1.

BENTONITE ANALYSIS

SAMPLE # 1.

Mix, % Bentonite	5.2
Stormer Viscosity, centipoises	15.
Initial gel, grams	2.7
Final gel, grams	3.9
Non-gelling material, % by weight	1.2
Water loss, cc.	
7½ minutes	6.5
30 minutes	13.4
60 minutes	18.8
Filter cake characteristics	3/32", firm, flexible.
pH	8.6

% Solids Vs. Viscosity

Tabular Data

<u>Mix % Bentonite</u>	<u>Viscosity cp.</u>
4	5.0
5	13.0
6	33.5
6½	42.0
7	80.5
Yield - - - - -	107 bbls. per ton.

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Analyzed by Chemical & Geological Lab. Ltd. Date June 25, 1954. Lab. No. 5961-2-3.

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**SAMPLE # 2.**

% Solids Vs. Viscosity

Tabular Data

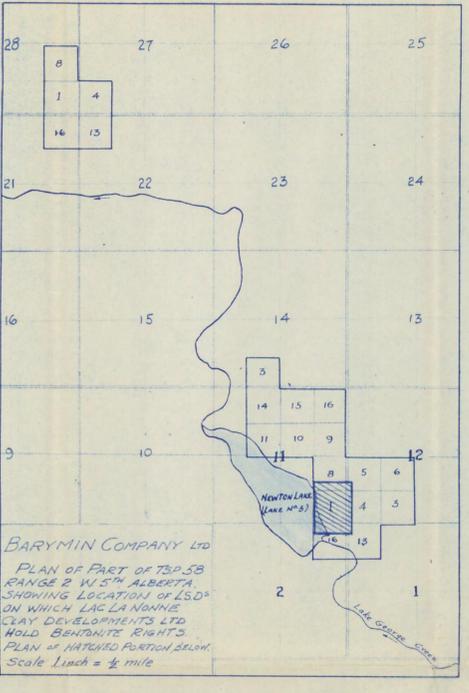
<u>Mix % Bentonite</u>	<u>Viscosity cp.</u>
4	2.0
$6\frac{1}{4}$	2.0
$7\frac{1}{2}$	2.2
10	2.4
12	2.5

From the above table it can be seen that the amount of gelling material in this sample is practically nil.

**SAMPLE # 3.**

<u>Mix % Bentonite</u>	<u>Viscosity cp.</u>
4	2.3
$6\frac{1}{2}$	2.5
7	2.8
10	4.
13	4.9

From the above table it can be seen that the amount of gelling material in this sample is practically nil.



**BARYMIN COMPANY LIMITED**  
 TORONTO-ONT.

SUBJECT-PLAN OF DRILL HOLES ON THE SOUTHERN PORTION OF THE BENTONITE PROPERTY OF LAC LA NONNE CLAY DEVELOPMENTS LTD NEAR HIGHRIDGE ALBERTA.

SCALE 1" = 50'	DRAWN BY	R.H.	Nº
MAY 15, 1954	REVISED TO	BY	REVISED TO BY