

1330 0021

222

Item 21

43  
~~13~~  
Z-10

ECONOMIC REPORT ON MAGNESITE  
AND THE  
PROPERTY OF THE NEVADA MAGNESITE COMPANY

for

JOHN S. FIELD AND ASSOCIATES

by

JAY A. CARPENTER, E. M.

Reno, Nevada

October 30, 1942



ECONOMIC REPORT ON MAGNESITE AND THE PROPERTY OF  
THE NEVADA MAGNESITE COMPANY

Introduction

Mr. Kenyon Richard has made a geological report dated October 26, 1942 upon the property of the Nevada Magnesite Company, which should be attached to this report for reference.

This report is to discuss and advise if the property as described by Mr. Richard is worthy of exploration to determine its probable tonnage of magnesite with the object in view of then proceeding to mine and process the magnesite at a profit or with no financial loss.

Experience Record

The value of such a report depends upon the familiarity of the engineer with magnesite deposits, plants and marketing conditions.

I have personally examined several magnesite deposits and plants; and I have studied the literature on magnesite production and marketing, teaching the same. I am in close touch with the present war effort to produce magnesium metal and refractories.



18 R.

Hand & Horse Range - S.W. on W.P. Co. - 10 W. 3 Highway 46, about 30 mi S.W. of Ely.  
 4 Unpatented claims. Rex Pencil Co. Snowball No. 1, 1 No. 2 - leaves - found.  
 location.  
 80' adit - Pencil Co. - 20000' Rex pencil mine 150000 lb.  
 in the state: Qtz in close assoc.  
 replacement? is that spring?

MgO	SiO <sub>2</sub>	CaO
28	19	11.3
23	39	3.5
35	20	2.2
35	9.6	3.6

# THE DEPOSIT OF THE NEVADA MAGNESITE COMPANY

The deposit lies about 40 miles by road from Ely, Nevada. Ely in eastern Nevada is on the south end of a 120 mile branch road from the main transcontinental line of the Southern Pacific.

This deposit is one of several similar deposits in that vicinity, one of which I examined in 1931.

According to Mr. Richard, the magnesite occurs over considerable surface area, but his conclusion is that from the nature of the deposit it is in the form of a surface blanket with a probable thickness of around 50 feet. Apparently a large tonnage could be put in sight by a shallow diamond drilling campaign.

The analyses of his magnesite samples shows the magnesite to be quite impure, averaging but 63 per cent magnesite and containing about five per cent lime (calcium oxide) and 21 per cent silica (silicon oxide) as harmful impurities.

This sampling agrees with my sampling of years ago and with that of the United States Geological Survey in this district (Bulletin 871, page 142).

## USES OF MAGNESITE AND THE REQUIRED PURITY

The main use of magnesite has been for the making of refractory bricks and furnace linings. A more recent use is as a source of making metallic magnesium. A third use of small importance is that of "caustic" magnesite as cement and stucco. In all cases, the magnesite (magnesium carbonate) is calcined at high heat to reduce it to magnesium oxide (magnesia).



The largest source in the United States of magnesite for refractory purposes is at Chewelah, Washington. The magnesite to be calcined there must have a lime content of under two per cent and silica under four per cent, and this falls short of the purity of competing imported magnesite from Europe.

The largest source of magnesite in the United States for processing into metallic magnesium is at Brucite, Nevada. At the present time, it is averaging six per cent lime and four per cent silica, and so far the flotation plant has failed to produce the required purity of two per cent lime and  $1\frac{1}{2}$  per cent silica.

Most of the plants producing magnesium are obtaining their very pure source of raw material from brines and ocean water.

There is no apparent need at the present time of attempting to utilize highly impure magnesite deposits as ores of magnesium.

#### MANY IMPURE DEPOSITS

For many years I have been interested in the utilization of a very large, easily mined deposit of magnesite now on the shores of Lake Mead in Clark County, which deposit has less impurities than those in the Ely district. Much test work has been done on this deposit but to no commercial avail as yet.

I have examined large deposits near San Bernadino and near Mojave, California, of greater purity than the Ely deposits and these are not being utilized.



### FLOTATION TO UTILIZE LOW GRADE MAGNESITE

The flotation of the magnesite at Brucite, I am sure, will eventually prove successful, but at a high cost for the plant and a high percentage of rejection to obtain the required purity.

Flotation is used at Chewelah, Washington to utilize the accumulated dumps of low-grade material. The main production comes from magnesite pure enough for direct calcination.

At Chewelah, the silica is free silica of quartz in definite sized particles which aids in its rejection. In the Ely district, the silica is microscopic and the United States Geological Survey states that some of it is directly combined with the magnesium.

Flotation tests could be made to determine if the lime and silica could be sufficiently rejected on this Ely magnesite, but starting with only a 63 per cent magnesite ore, the cost of mining, milling and calcining along with plant investment would be very high per ton of magnesium oxide produced.

### SALE OF MAGNESITE AND MAGNESIUM OXIDE

Very little magnesite is marketed as the crude magnesite. There would be no chance to directly market impure magnesite.

This means that on a pure magnesite a calcining plant on shaft, rotary or hearth type must be installed. The main operating item outside of labor is fuel. Fuel costs at 40 miles out from Ely, itself distant from fuel, would be high.

If flotation could successfully produce a pure enough magnesite from the high silica magnesite, it would mean the installation of a



plant to crush and grind the ore fine enough for flotation plus flotation equipment, and a source of abundant water.

When magnesium oxide is produced there is no open market for it as for the ores of the common metals. Most of the large users produce their own. The Chewelah deposit is operated by one of the large steel companies of the United States.

If one attempted to turn his magnesium oxide into the final form of a refractory brick or the like, it would mean a manufacturing plant. Eastern Nevada would be a high priced location for such a plant, principally on account of the item of freight on supplies and the final products.

#### GENERAL CONCLUSION AS TO THE NEVADA MAGNESITE COMPANY PROPERTY

The Nevada Magnesite Company property and similar Ely deposits have been known and investigated for years, but for the reasons given above, there have been no operating mines or plants except for the recent mining there of small tonnage of very pure magnesite.

At the present time, there is a very keen demand for magnesium metal and refractories, but there are many deposits of purer material and better located than that of the Nevada Magnesite Company.

Even if I were informed as to the good terms offered your client on this property, I would recommend that you investigate other known deposits in the district with terms to acquire to see if you had the best available investment. To illustrate, the best farms or city rental property are a source of pleasure and profit, while the marginal and poor ones are a source of regret and loss. It, therefore, pays to



investigate carefully before making the first step in an investment, such as a drilling campaign in this case, because it so often leads to further involvement.

I have invested in mining ventures, both with gain and loss, and if I were to decide in this case, I would look for a more favorable chance of return than in the Nevada Magnesite property.

However, if for some reason your client is favorably inclined with the property, I would recommend that you

first, carry out flotation tests,

second, investigate the district for comparison properties and

third, investigate the present possibilities of profitably marketing your contemplated products.

Sincerely yours,

\_\_\_\_\_, E. M.

JAC:lb  
October 30, 1942