

April 1945

UNITED STATES
DEPARTMENT OF THE INTERIOR
Julius A. Krug, Secretary

BUREAU OF MINES
R. R. Sayers, Director

SUPPLEMENTAL EXAMINATION REPORT

(Soule No. 6)

BUSTER CLAY DEPOSITS
SOCORRO COUNTY, NEW MEXICO
(CLAY)

By
John H. Soule¹

April 1946

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By John H. Soule^{1*}

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* Mining Engineer, Bureau of Mines.

INTRODUCTION

The Buster clay deposit was examined on September 13, 1945, by an engineer^{1/} of the Bureau of Mines. A representative sample of the clay was collected for analysis and testing by the Bureau of Mines Laboratory, Rolla, Missouri. The engineer was accompanied by Carlos Montoya, of Socorro, New Mexico, who acted as guide.

LOCATION AND ACCESSIBILITY

The Buster clay deposit is located in the north central part of Sec. 11, T. 3 S., R. 1 E., Socorro County, New Mexico. It can be reached by crossing the Rio Grande at the first bridge north of the town of Socorro and following the old road, southerly then easterly, to the Gonzales fluorspar mine and then one mile farther south as shown in Figure 1. The road, for the most part, is in very poor condition, and, in places, difficultly passable. Socorro is the nearest railhead and also the nearest point of telephone, telegraph and postal facilities, as well as of minor mining supplies.

PHYSICAL FEATURES AND CLIMATE

The clay deposits are in a region of moderate topography at an elevation of approximately 5,000 feet above sea level. Small local areas of ruggedness are present in a terrain of gently rolling hills.

^{1/} Soule¹, John H., Mining Engineer.

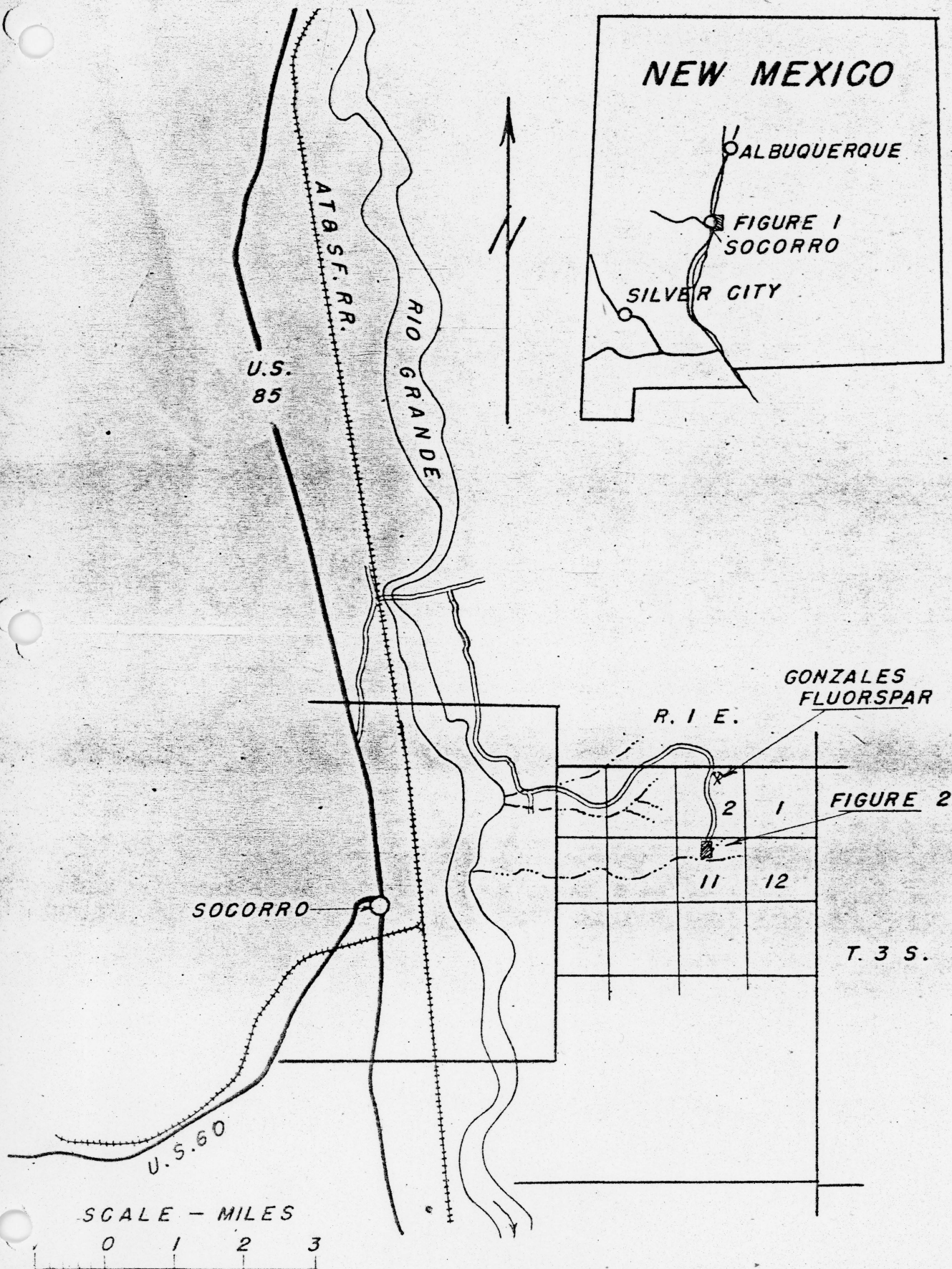


FIG. 1. INDEX MAP - BUSTER FIRECLAY DEPOSIT

Precipitation is scanty, characteristic of the desert regions. There are no permanent streams. The nearest permanent supply of water is the Rio Grande, 6 miles west of the deposits.

Characteristic desert flora abounds and there is no timber available for mining operations.

LABOR AND LIVING CONDITIONS

Unskilled labor is available in Socorro. The prevailing wage was about \$5.00 a day in 1945.

Living accommodations, sufficient for a modest operation, also are available in Socorro.

HISTORY AND PRODUCTION

The clay deposits near Socorro were reportedly worked about 1900 to supply a local smelter. The clay was hauled in wagons to the Rio Grande, barged across, and processed at Socorro. It is reported by the owners that the clay was shipped to Butte, Montana, and Cananea, Mexico.

An examination of the old workings showed no activity for a long period of time and that the operations were not extensive. It is estimated that less than 5,000 tons of clay was removed,

PROPERTY AND OWNERSHIP

The property was located in 1935 by Julius Sanchez, Philip Stackpole and associates of Socorro, New Mexico. It consisted of one placer claim, 100 acres in extent.

THE DEPOSITS

The clay occurs in a sandy shale bed in the lower Magdalena limestone of Pennsylvanian age. This series consists of quartzitic sandstones, shales, shaley sandstones and limestone which lie upon granitic rocks. A shale bed, 12 feet thick, near the bottom of the series was the source of the clay.

The sedimentary series is faulted and the same shale bed may be prospected in nearby areas. The general strike of the beds is No. 36° W. They dip minus 25 degrees to the northeast, as shown in Figure 2.

The shale that contains the clay is of a fine sandy texture and coarsely fissile. Fine scales of mica and probable plant remains were noted in the shale.

METALLURGICAL TESTING

A sample of the material was tested by the Bureau of Mines Laboratory, Rolla Missouri.

Petrographic examination showed that it was composed of fine quartz and illite. A considerable amount of iron oxide staining and a small amount of gypsum were present.

Spectrographic results are tabulated as follows:

Spectrographic Analysis*

B	tr
Si	h///
Mg	p
Cu	v.l.
Al	h///
Fe	hr
Ni	tr
V	tr
Na	p
Cr	tr
Th	p
Ca	p
Mn	l
K	hr
Ba	v.l.
Sr	v.l.
Zr	l

* The symbols have no numerical value. The relative amount, from a spectrographic trace to a substantial amount, is shown in this order by the following designations: tr (trace), v.l. (very low), l (low), p (present), h (high), and hr to h///.

Results of a thermal analysis of the material were as follows:

<u>Sample</u>	<u>Endothermic peaks. ° C.</u>	<u>Exothermic peaks. ° C.</u>
5753	145 552 782	850

The thermal curve agrees in general with illite curves made in the Rolla Laboratory and also with those published in the literature for illite. This serves to establish illite as the predominant mineral of the clay.

The clay was fusible before the blowpipe, thus preventing its use as fire clay.

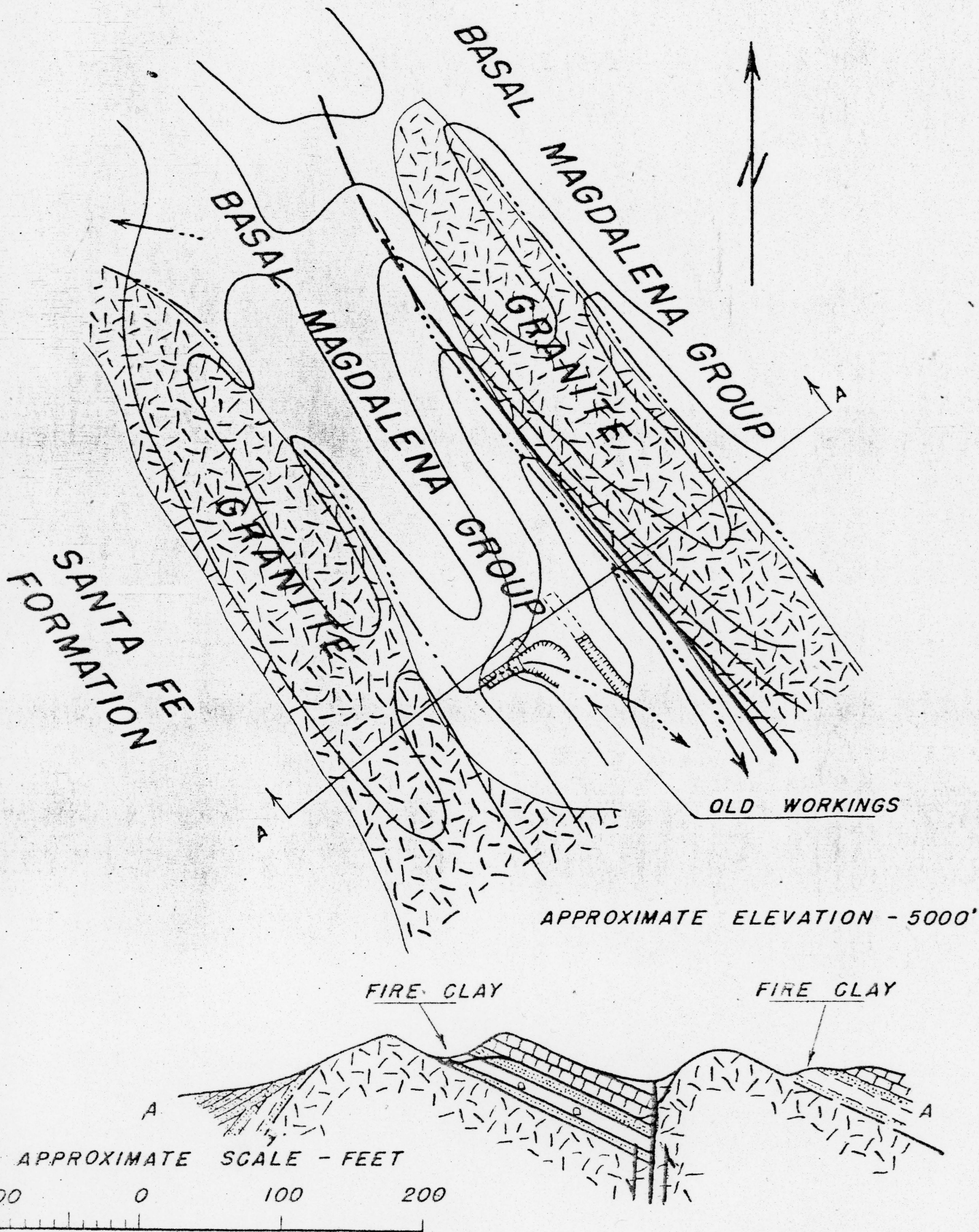


FIG.2. SKETCH MAP-BUSTER FIRECLAY DEPOSIT

To test the quality of this clay for making common building brick, the sample was ground to minus 150-mesh, mixed with sufficient water to form a plastic paste and moulded into a bar approximately 5 inches by one inch by one inch. The bar was air dried for 48-hours and then dried for one hour at 110°C. The sample was then fired for four hours at approximately 1165°C. (Cone 4).

After firing, the sample formed a good, dense, hard brick of a tan color.

As water absorption is the most important test in evaluating building brick a test was made to determine this property by the procedure outlined in A. S. T. M. Standard C-20-41. This method consists briefly of obtaining the dry weight of the sample, then boiling in water for two hours and obtaining its saturated weight. The sample absorbed 7.4 percent water, and meets the requirements of building brick.

The above tests show that this clay may be useful only in making building brick.

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CONFIDENTIAL REPORT

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SUMMARY

Considerable quantities of clay in a shale bed are located 14 miles by poor road east of Socorro, New Mexico. Reserves probably could be increased greatly by prospecting nearby areas which contain the same sedimentary series. Clay was mined and shipped from this deposit early in the present century. Operations were on a very modest scale.

This clay consists principally of the clay mineral illite and is unsuitable as a fire clay. It meets the standards required of building brick. At present, there is no apparent economic use for the clay.

ORE RESERVES

Ore reserves were estimated only in the fault block shown in Figure 2. This block is about 300 feet long, 150 feet wide and 12 feet thick. There are 540,000 cubic feet of clay material, or 43,200 tons using a tonnage factor of 12.5 cubic feet per ton.

The shale bed was noted elsewhere in the area and further exploration would show it to be quite extensive. This would greatly increase the reserves.

CONCLUSIONS

An appreciable tonnage of clay is located east of Socorro, New Mexico. Some of this clay was mined during the early part of this century. Operations were small and only a small production resulted. Prospecting probably would increase the amount of clay available. About ten miles of road must be renewed or built to reach the deposits.

The clay sample was tested and found unsuitable for use in making fire brick but met the requirements of building brick.

The clay deposits are not economically important at this time, due largely to the isolated location of the deposits.

April 1946

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UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

BUSTER CLAY DEPOSITS
SOCORRO COUNTY, NEW MEXICO

By John H. Soule¹

Sources of Information.

1. Examination by Bureau of Mines engineer.
2. Julius Sanchez, Philip Stackpole and Carlos Montoya,
Socorro, New Mexico.

APR 18 1946

Office Memorandum • UNITED STATES GOVERNMENT

TO : W. R. STORMS, Silver City, New Mexico

Tucson, Arizona
DATE: April 17, 1946 *WTH*

FROM : J. H. HEDGES, Tucson, Arizona

SUBJECT: Report on Buster Clay Deposit.

The specifications for clay building brick (C62-44, A.S.T.M. Standards 1944) establish (1) minimum compressive strength, (2) maximum water absorption by 5 hour boiling, and (3) maximum saturation coefficient. The latter is the ratio of absorption by 24 hour submersion in cold water to that after 5 hour submersion in boiling water. The maximum saturation coefficient for the best grade brick is 0.80 on the theory that if not more than 80 percent of the total pore space is occupied by water, there is room for expansion on freezing into the remaining pore space without disrupting the material.

There is no lower limit for water absorption in the specification. The discussion indicates that the lower the water absorption, the more durable the brick, and hence the better from that standpoint. The following provision seems to bear this out:

"If the average compressive strength is greater than 8,000 psi, or the average water absorption is less than 8.0 percent after 24 hour submersion in cold water, the requirement for saturation coefficient shall be waived."

There is nothing in the specification to indicate a desirable lower limit of water absorption. I think the Rolla statement is based on a mis-reading of the standard specifications.

The Rolla report on this test, dated March 13, 1946, states under "summary and conclusions"

"Tests made to determine the usefulness of sample 5753 showed that it could be fired to a hard, dense brick. The water absorption was lower than the permissible value of 12 to 16 percent but the color was unsatisfactory for common building brick".

It seems evident that the brick was quite satisfactory except for color, and possibly compressive strength which was not tested.

CC Mr. Moon
12003
DF

J. H. Hedges
J. H. HEDGES

Jack, - pls. note.

SEP 20 1945

No. Soule No. 6

12003

UNITED STATES BUREAU OF MINES

SUMMARY REPORT OF WAR MINERALS EXAMINATION

State. New Mexico County. Socorro Mineral Products. Clay (fire)
Name of property or deposit. Buster Placer claim
Date examined. 9-13-45 Engineer. John H. Soule Date of this report. 9-17-45
Engineer accompanied by. Carlos Montoya Address. Box 853, Socorro, N. Mex.
Extent of property. One placer claim of 100 acres.
Owner. Julius Sanchez, Phillip Stackpole & associates Address. Socorro, N. Mex.
Leased or optioned to. none Address.
Location of property (be specific) Sec. 11, T. 3. S., R. 1. E., Socorro Co., N. Mex. Fourteen
miles by road and 500 feet by trail east of Socorro, N. Mex.
Type of deposit and mineralogy (brief description). Shale bed in basal Magdalena formation.
Shale, in places, is argillaceous. Has been used for fire clay.
Known dimensions of the deposit
Length. 500 ft. Width. 12 ft. Depth. 100 ft.
Attitude of the deposit (strike, dip, etc.). Shale bed strikes about N. 40° W. and dips
-25° to the southeast.
Possible extensions; correlation of known showings. This bed of shale may be very extensive
but due to its soft nature the outcrops are obscure and usually manifested by small second
valleys.
Mine workings (brief description or attach map or sketch) (indicate whether accessible).
One small open-cut and 2 short adits, one 12 feet deep and the other about 50 feet deep.
Mining and milling equipment on property. none

(over)

Past production (if any). ~~There is~~ production but no records available. Brick reported shipped as far as Butte, Montana, and Cananea, Mexico.

Present rate of production (if any). none

Sampling (describe briefly, or attach sketch) Three samples: one of upper soft shale; one of underlying indurated shale and one of same bed from lower adit.

Tentative Estimate of Reserves (Subject to Revision)

State assumptions: 500 ft. by 100 ft. by 12 ft. thick. Factor of 12-1/2 tons per cubic foot used.

	<u>Tons</u>	<u>Assay, percent</u>
		Al ₂ O ₃
Measurable.....		
Indicated.....	48,000	unknown
Inferred.....		
Total and Average.....	48,000	unknown

Mining method (actual or suggested). none

Milling or processing method (actual or suggested). None until use for clay is found.

Processing tests suggested. Test for available alumina and possible uses.

Tentative Class of Report to be submitted (check one)
Class A.....; Class B.....; Class C.....; Memo. Class D.

Tentative conclusion and reasons for it. This deposit may be very extensive but is somewhat isolated. Economic possibilities depend upon character of clay.

To be accompanied by brief letter giving examining engineer's general impression of the deposit, his impression of the owner, and any other confidential information he may care to submit. May be executed in pencil. Should be mailed within 24 hours after examination is completed. Send copies to: District Engineer; Regional Engineer; R. S. Dean (2).

Bureau of Mines
Silver City, New Mexico
September 17, 1945

Letter to Accompany Summary Report of War Minerals Examination
Soule No. 6, Buster Placer claim, Socorro County, New Mexico.

A shale bed in the lower Magdalena formation, six miles air-line east of Socorro, New Mexico, was worked for fire clay about 40 years ago. An estimated 1,000 tons of clay was shipped at that time and no operation has been reported since that time.

Recent interest in clays, especially those with a high alumina content, resulted in an examination of this deposit in September, 1945.

The shale bed occurs in the lower Magdalena formation which is exposed in a small tilted fault block. The beds dip -25° to the southeast. About 43,000 tons of clay are indicated in this block. There is no doubt that the same clay bed can be found nearby by prospecting, and inferred reserves may be very large.

The economic features of this deposit are questionable at this time. Metallurgical tests are being made to determine the possible uses of this clay.

Respectfully submitted,

John H. Soule¹, Mining Engineer

Washington
cc Tucson

wes