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MINERAL RESOURCE SURVEY
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The information contained in this circular was gathered by a unit of the WPA State-wide Mineralogical Survey of Texas, a project sponsored by The University of Texas Bureau of Economic Geology. The purpose of this survey is to assemble information concerning mineral resources and to gather other geological data and make them available to the public. With this information in the hands of the public, it is reasonable to suppose that industries of value to the State may be developed. The following report is based on work done in Llano County by Work Project No. 18047, from June 7, 1941, to August 14, 1941.

BARITE IN NORTHERN LLANO COUNTY*

by Alfred Zapp, Supervisor

INTRODUCTION

This report gives the results of a study of barite deposits on the adjoining Freeman and Hiilsmeier properties in northern Llano County, where a small tonage of residual barite has been mined or "gophered" during recent years. The principal objectives were to locate the source of the residual material and to determine the possibilities for commercial development of barite in the area.

During the course of the investigation, a number of test pits and trenches were dug and panning was done along all streams in the area. A map, compiled from pace-compass data adjusted to an aerial photograph base, is included in the report.

BARITE ON THE FREEMAN[1] AND HIILSMEIER PROPERTIES

These deposits trend NW-SE along the divide between the drainages of Pecan and Wolf creeks, within 2 miles of the Llano-San Saba County line. The area is best reached from the town of Cherokee in San Saba County, by following the Cherokee-Valley Spring county road for a distance of 5.3 miles and turning left on a pasture road. The second gate across this road (about 1.2 miles from the county road) is the western entrance to the Hiilsmeier property.

The barite is in a series of very irregular and generally very thin veins penetrating schists and gneisses of pre-Cambrian age which are a part of the Valley Spring gneiss as defined and mapped by Paige.[2] The chief mineralization is in a series of dark colored schists and gneisses overlain and underlain by pink gneisses. The dark colored series consists for the most part of coarse biotite schists with smaller amounts of amphibilitic schists and gneisses. The feldspar and quartz content of these rocks is quite variable, and with an increase in their relative abundance, the rocks take on a more gneissose character. The overlying and underlying gneisses are more massive and are usually extremely fine-grained. They are very poor in mafic constituents and are uniformly pink to reddish in color.

The metamorphic series has been intruded by fine-grained, aplitic granite, the larger bodies of which in the vicinity of the barite mineralization are mapped. Narrow granitic dikes and quartz pegmatites abound in the area but were not separately mapped.

In general the schistosity and bedding in the area dip in a northeasterly direction at angles of from ten to thirty degrees, but sharp structural deflections and steep dips are frequent. The igneous activity in the southern portion of the trend had rendered the structure particularly complex. The structural data that could be assembled from infrequent exposures in the area have been plotted on the accompanying map.

As previously stated, the barite veins are highly irregular and are subject to abrupt thickening and thinning and even completely lens out. Both concordant and discordant relationships are observable, but in all cases the strike of the barite veins is essentially that of the enclosing rocks.

The barite appears definitely to be of magmatic origin. The field association of the veins with igneous rock is indicative of this; furthermore, such primary minerals as quartz and feldspar may frequently be seen to have crystallized along with the barite. In nearly all instances where the barite has penetrated the dark colored schists it is found to be sandwiched between layers 4 to 8 inches thick of a dense granulitic rock consisting chiefly of quartz, feldspar, hornblende, and epidote. This rock has evidently resulted from thermal metamorphism and impregnation by the hydrothermal mineralizing solutions which deposited the barite.

The barite is crystalline-granular, the grain size averaging between 1 and 2 millimeters. The prevailing color is white, but pink, brownish, greenish, and bluish colors are common. Much of the material is rather impure. Quartz and feldspar have already been mentioned. In addition, a variety of impurities has resulted from the incorporation of portions of country rock, frequently resulting in a banded appearance. Copper carbonate stains are common.

The more prominent localities have been plotted and numbered on the accompanying map and are briefly described in the following paragraphs under the corresponding numbers.

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*Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project No. 665-66-3-233.

[1]The occurrence on the Freeman ranch has been previously described in Bureau of Economic Geology Mineral Resource Circular No. 11 (1939).

[2]Paige, Sidney, Description of the Llano and Burnet quadrangles: U.S. Geol. Survey Geol. Atlas, Llano-Burnet Folio (No. 183), 16 pp., 1912.

(1) In pit No. 1 a barite vein ranging between 1 and 3 inches in thickness and occurring concordantly in feldspathic mica schists was uncovered. One-inch layers of pink gneiss are found immediately above and below the barite vein. This locality is near a granite contact, and the structure is consequently irregular. A short distance from the contact the vein and enclosing rocks dip 14° N. 15° E. Considerable quartz, feldspar, and copper carbonates occur in the barite.

(2) Judging from the size of the old pit at locality No. 2, considerable amounts of residual barite must have been removed. The locality was not adequately trenched, but in the small pit dug, two concordant seams reaching 2 inches in thickness were found in place. A barite boulder which measured 7 inches in the smallest dimension was found in the soil mantle, and a maximum of 10 inches for the vein at this locality has been reported.[3] The metamorphic section here consists of highly weathered feldspathic mica schists above the barite and dark amphibolitic schists impregnated to a small extent with copper carbonate, particularly azurite, below the barite. The structure is very irregular, but the dip is generally southward at low angles.

Another pit approximately 30 feet southeast of (2) revealed a concordant vein of dark biotite schist dipping 10° S. 15° W. The thickness of the vein varies from 2 to 4 inches.

Between localities (1) and (2) there are repeated surface showings of barite along a general E-W trend, but tabular residual fragments indicate the vein rarely reaches 2 inches in thickness.

Old pits indicate that barite was mined at several places between localities (2) and (3), but trenching revealed only a single 1-inch vein in slabby pink gneisses.

(3) Locality No. 3 is a portion of a general N-S trend approximately 170 feet in length. The pit here revealed a 3½-inch concordant vein dipping 15° N. 45° E. The enclosing rocks consist of highly feldspathic mica schists and amphibolitic schists. Trenching elsewhere along the trend revealed only thin seams of barite. The horizon of mineralization in the southern portion of the trend has apparently migrated upward in the section to the contact between slabby pink gneisses above and dark colored amphibolitic schists below.

(4) At locality No. 4 a 1-inch vein of barite occurs concordantly in apparently flat-lying biotite schists and was found to lens out completely in a northeasterly direction.

(5) At locality No. 5 a barite vein ranging from 1 to 2 inches in thickness and of very small lateral extent occurs concordantly in pink gneisses dipping 10° to the east. Appreciable amounts of quartz and feldspar occur in the barite.

Localities (6), (7), (8), and (9) are apparently along a single, but evidently discontinuous, vein. The enclosing rocks encountered in each pit are closely comparable, consisting of decomposed light gray quartz-feldspar-mica schists underlain by dark biotite and hornblende schists.

(6) At locality No. 6 pitting revealed a vein striking N. 60° W. and dipping 18° concordantly northeastward. The vein thickens from 2 to 6 inches within a few feet in a northeasterly direction.

(7) At locality No. 7 a very irregular vein up to 6 inches in thickness, dipping 16° concordantly N. 35° E., was uncovered.

(8) Three concordant barite seams dipping N. 40° W. were revealed by trenching at locality No. 8. This barite is not aligned with that to the southeast and northeast of it but is a short distance to the southwest of the general barite trend.

(9) The largest body of barite found in the area was uncovered at locality No. 9. Here a banded, discordant vein averages slightly less than 2 feet in thickness and reaches a maximum of 30 inches. The vein is vertical and strikes N. 55° W. The enclosing schists dip 40° to 50° N. 35° E. A number of small veins branch from the main body. The lateral extent of this vein is probably not great, for a transverse trench 35 feet to the southeast failed to reveal any barite in place.

(10) Between localities (9) and (10) the strike of the metamorphic rocks is deflected toward the west, and locality (10) probably represents a continuation of the vein. At (10) a vein of very impure barite occurs concordantly in feldspathic biotite and hornblende schists dipping N. 40° E. at low angles. The vein exposed here has a maximum thickness of 3 inches. Old pits indicate that the vein continues northwestward for approximately 100 feet.

Seventy feet eastward from locality No. 9 a vein averaging 2 inches in thickness occurs concordantly in fine-grained pink to violet gneisses dipping 16° N. 55° E.

(11) At locality No. 11 a thin surface showing was trenched, and the vein was found to thicken to 2½ inches down dip. The vein and the enclosing biotite schists dip 18° S. 25° E. However, a test pit to a depth of 9 feet still farther down dip revealed only a thin concordant seam less than an inch in thickness. The enclosing black biotite schists are flexed into a low anticline plunging S. 65° E. at 18°.

(12) Locality No. 12 was not trenched, but residual material at the top of the stream bank indicates the presence of a vein reaching 3 inches in thickness.

(13) At locality No. 13 a shallow trench bottomed in black biotite schist revealed a vein varying between 2 and 6 inches in thickness and dipping approximately 10° east.

(14) At locality No. 14 the vein is of much the same character as at locality No. 13. The vein varies in thickness up to a maximum of 6 inches and occurs concordantly in mica schists dipping approximately 25° N. 60° E.

(15) Locality No. 15 was not trenched, but residual material at the surface indicates a vein reaching 7 inches in thickness.

(16) Deep trenching at locality No. 16 through a thick zone of soil and decomposed feldspathic mica schists revealed a discordant vein up to 8 inches in thickness dipping very steeply N. 35° E. One concordant tongue 2 inches in thickness branches from the main body. The enclosing metamorphics dip 33° N. 35° E.

(17) At locality No. 17 a vertical discordant vein striking N. 80° W. varies from 5 to 10 inches in thickness. The enclosing weathered mica schists are much disturbed but apparently dip 30° eastward.

(18) Pitting at locality No. 18 revealed a discordant vein dipping steeply N. 15° E. which consists of two layers of barite 1½ to 2 inches thick with a dark central band 2 inches thick.

(19) Trenching in the vicinity of locality No. 19 revealed 1-inch thick veins, but residual material at the surface indicates that at least one vein is 3 inches thick.

No trenching was done north of locality No. 19. There is apparently a network of small veins in the area between localities (19) and (20).

[3]Barnes, V. E., Additional notes on barite: Bureau of Economic Geology, Mineral Resource Circular No. 11, p. 3, May 1, 1939.

(20) At locality No. 20 the barite is well exposed in the stream bed. Several seams of barite are interleaved with the country rock, the banded aggregates reaching 6 to 8 inches in thickness. The barite seams and enclosing mica schists dip 10° N. 55° E.

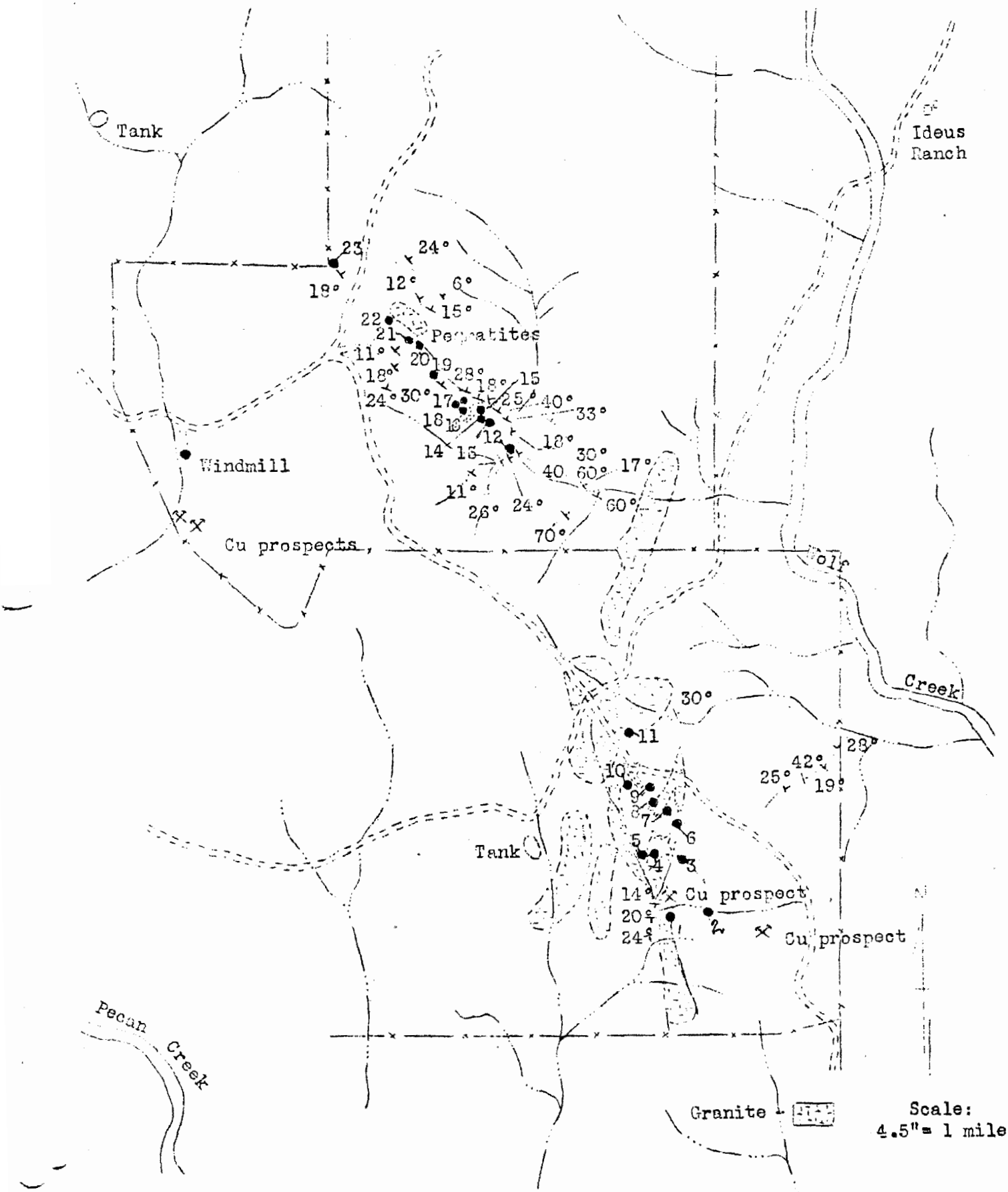
(21) At locality No. 21 shallow quarrying along the stream bank has revealed a concordant vein of barite thickening from 2 to 14 inches down dip. The country rock consists chiefly of dark feldspathic biotite schists dipping 12° N. 50° E.

(22) At locality No. 22 two concordant veins in feldspathic biotite schists average 1 inch in thickness and are separated by a 3-inch layer of dense granulitic material. Thin discordant tongues of barite penetrate the enclosing rocks which dip 13° N. 37° E. Residual material at the surface indicates that the veins had an appreciably greater up-dip thickness.

(23) At this somewhat isolated locality a concordant vein of barite averaging between 1 and 2 inches in thickness occurs discontinuously for a distance of 120 feet. The enclosing rock is a fine-grained pink gneiss dipping 18° N. 65° E.

ECONOMIC CONSIDERATIONS

From the present examination it appears that barite does not occur in commercial quantities in this area, but core drilling might locate larger deposits. The veins change thickness rapidly both laterally and with depth. However, the barite may average as much as 3 inches in thickness for a distance of 1800 feet. With an assumed dip of 45° for the veins and a specific gravity of 4 for the barite, less than 100 tons would be available per foot of depth. The most easily recoverable material (that is, residual boulders in the soil mantle) has been largely removed, and mining barite from fresh crystalline rock is expensive. Blasting tends to pulverize the barite, causing considerable loss.



Map of Barite Prospects on Freeman and Hillsmeier Properties in Llano County

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