THE UNIVERSITY OF TEXAS AT AUSTIN
Bureau of Economic Geology
Revised, Second Printing, October 1942
Typeset from original stencil, December 1979

MINERAL RESOURCE SURVEY
Circular No. 50

The information contained in this circular was gathered by a unit of the WPA Mineral Resource 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 products and to gather other geological data and make it 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 by the Headquarters Unit, Work Project No. 49040.

TEXAS MATERIALS FOR EXTINGUISHING MAGNESIUM INCENDIARY BOMBS*

by Robert C. Redfield

INTRODUCTION

An effective means of extinguishing magnesium incendary bombs with ground feldspar or feldspar-rich rock has been announced by the United States Geological Survey, Department of Interior, Washington.[1] Effectiveness of the method has been demonstrated at the Geological Survey laboratories and at the Edgewood Arsenal of the Chemical Warfare Service. The United States Government controls the patent to protect the public interest against price exploitation and misleading or extravagant claims by private companies. Under the patent the process and use of the material will be made available to any commercial concern.

Feldspar or rock composed largely of feldspar is ground to pass a 10-mesh screen and to be retained by a 200-mesh screen. This ground material may be spread on burning or molten magnesium, the heat of which (about 3300 degrees Fahrenheit) quickly melts the substance (melting point about 2100 degrees Fahrenheit) which forms a protective coating that cuts off the supply of oxygen in the air and actually stops the magnesium from burning and its flame from spreading. After the ground feldspar or rock has been applied, the bomb requires no further attention, but a supply of water must be available to extinguish fires started by flying sparks.

Removal of extra-fine material of less than 200-mesh screen size from the ground product is essential because such fines tend to clog interstices that permit ready escape of gases; otherwise, the gases will erupt with sufficient violence to form miniature craters in the feldspar cover and impair or destroy its effectiveness.

Ground feldspar or rock of high feldspar content has proven to be superior to mixtures containing ashes, salt, pitch, or fine powders because it does not burn, blow out, scatter appreciably, or give off smoke. Sand has been recommended for controlling magnesium bomb fires, its merit being inertness, cheapness, and availability; however, it is inferior to feldspar because it does not cause the magnesium to cease burning, and the bomb must be immediately removed while enclosed in thick layers of sand.

Water is recognized as the best extinguisher of magnesium incendiary bombs and attendant fires, and the Office of Civilian Defense recommends it as the primary agent for fire control. The method of applying water to the burning bomb has been revised, and, according to the O.C.D., a jet of water rather than a spray of water should be used. A stream of water may be applied with the nozzle of a garden hose connected to the municipal water system so long as it remains intact, or with a suitable device such as a pump tank, stirrup pump, or other water types of extinguishers.

A system of control of incendiary bombs and fires incident thereto based solely on the use of jetted water may occasion disaster when supplies of water are cut off or lost. In Britain a major portion of all property destruction has been caused by fire during bombing raids. Prevention and control of fire during air raids is one of the more important duties of local civilian defense organizations. Their efforts may be prevented or seriously handicapped by disruption of water mains by high explosives. Shortages of metal will prevent equipping every householder, or even one householder in every city block in our cities, with pump tanks, stirrup pumps, or other water types of extinguishers which are fabricated of metal. Speed is imperative in fighting fire to prevent its growth into a conflaguration, and a burning incendiary bomb in the attic of a house will not wait on the promise of a stirrup pump or a repaired water system. A supply of inexpensive feldspathic material in every house to extinguish bombs may save a dwindling water supply for use on fires incident to the bombs.

Ground feldspar, or feldspar-rich rock, is easily handled and inexpensive. The use of such material does not require the services of trained personnel, and its application does not require expensive equipment, for a large bucket and long-handled shovel will suffice, and in an emergency even they would not be essential because if the feldspar is packed in paper bags such packages may simply be dropped on the burning bomb. About 35 pounds of ground feldspathic material is required to extinguish the small magnesium incendiary bomb. A hundred pounds should be enough for the average small house, and may be expected to cost no more than $0.75 wholesale, or slightly more when packaged in paper or cardboard containers for retail trade.

Licenses to distribute and market feldspar and related rock materials as an extinguisher of magnesium incendiary bombs are being issued by the Department of the Interior. Copies of the regulations covering the licensing are on file at the Bureau of Economic Geology where they may be seen by interested parties. (Summarized in part from circular by U.S. Geological Survey.)

---

*Assistance in the preparation of these materials was furnished by the personnel of Work Projects Administration Official Project No. 265-1-66-214.

[1]U.S. Geological Survey, Department of the Interior: Information Service, P. N. 190215, 1942.

FELDSPAR AND FELDSPAR-RICH ROCKS IN TEXAS

The mineral feldspar is mined in the Llano and Van Horn regions of Texas. The normal commercial applications of feldspar require a mineral meeting very rigid specifications; consequently much unsuitable feldspar is rejected at the mines; other deposits remain undeveloped because of their low quality or content of objectionable impurities. Reject material and deposits of feldspar that are not suitable for normal industrial purposes may be quarried and readily prepared for use in extenguishing magnesium fires.

Feldspar is the most abundant constituent of a variety of common igneous rocks that include granite, syenite, monzonite, pegmatite, and aplite. Ground rock materials containing large percentages of feldspar have been tested by the U.S. Geological Survey and found practically as effective as pure feldspar in extinguishing magnesium incendiary bombs.

Granite occurs in unlimited quantities in Llano, Burnet, Gillespie, Mason, and Blanco counties, a region centrally located within the State and served by railroads and paved highways. Deposits of aplite, pegmatite, and feldspar-rich porphries exist as well. A number of granite quarries are in operation in the region and waste or reject material is being ground for other purposes. Fine screenings from these operations augmented by additional crushing and screening units could supply a regional market. Vast quantities of disintegrated granite, which would need no quarrying, occur in the same counties and could be handled by power shovel, dragline, or scraper. Large tonnages of such material could be washed, crushed, and screened at comparatively low cost. Extensive deposits of disintegrated granite containing large proportions of feldspar occur adjacent to railroad facilities in the vicinity of Kingsland, Llano County.

In west Texas syenites and kindred rock species occur near railroad transportation in Brewster, Culberson, and Hudspeth counties, and in the vicinity of El Paso.

The following Texas firms may be able to supply ground feldspar and ground feldspar-rich rock:

Texas Mica and Feldspar Company,
Van Horn, Texas
Mrs. Tillie B. Moss,
Llano, Texas
W. A. Letson,
Llano, Texas
O. C. Montgomery,
Llano, Texas
C. E. Heinz,
Llano, Texas
Joe Darnell,
Johnson City, Texa
O. P. Gresham
Kingsland, Texas
Servtex Materials Company,
New Braunfels, Texas
Dezendorf Marble Company,
Austin, Texas
Texas Marble Company,
Austin, Texas
Milwhite Company,
Houston, Texas
Bennett-Clark Company,
Nacogdoches, Texas

REFERENCES

Burchard, E. F., Structural materials available in the vicinity of Austin, Texas: U.S. Geol. Surv., Bull. 430, 1910.
Chelf, Carl, A New Feldspar deposit in Llano County, Texas: Univ. Texas, Bureau of Economic Geology, Mineral Resource Circular No. 45.
———, Poultry grit from Granite: Univ. Texas, Bureau of Economic Geology, Mineral Resource Circular No. 36.
Metcalf, R. W., Marketing feldspar: U.S. Bureau Mines, Inf. Circ. 7184, 1941.
Nash, J. P., Texas granites: Univ. Texas Bull. 1725, 1917.
Paige, Sidney, Description of the Llano and Burney quadrangles: U.S. Geol. Surv. Geol. Atlas, Llano-Burnet Folio (No. 183), 1912.
Sellards, E. H., Adkins, W. S., and Plummer, F. B., Geology of Texas, Vol. I: Univ. Texas Bull. 3232, 1932.
———, and Baker, C. L., Geology of Texas, Vol. II; Univ. Texas Bull. 3401, 1934.
U.S. Geological Survey, Department of Interior: Information Service, P. N. 190215, June 14, 1942.