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The Oneida Perlite Deposit

by

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State of Idaho
ROBERT E. SMYLIE, Governor
Idaho Bureau of Mines and Geology
E. F. COOK, Director

Characteristic occurrence of perlite in the No. 1 pit.

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INTRODUCTION

During the summer of 1950 a reconnaissance (Staley, 1950) was made to determine the extent of pumice and perlite in Idaho; the investigation failed to expose perlite of even average quality. At that time, perlite from New Mexico, Arizona and Oregon dominated the market and was taken as a standard of quality.

Recently, a large deposit of high-grade perlite was discovered in Oneida County. Because the known perlite reserves of Idaho are virtually confined to the Oneida deposit, this report deals exclusively with it. The outstanding resource available there should be called to the attention of the general public. In the future, more detailed geological and scientific data may become available.

I wish to thank Mr. Marion J. Hess, President of the Oneida Perlite Corporation, Malad City, for supplying information and granting permission to inspect the company's operation.

*Mining Engineer, Idaho Bureau of Mines and Geology

LOCATION

The Oneida Perlite Corporation claims are located in T 11 S, R 35 E, and occupy portions of sections 23, 24, 25, 26, 33, 34, and 35. In addition a small part of section 19, T 11 S, R 36 E, has been located. The claims are distributed along both sides of Wright's Creek, a tributary of the Little Malad River.

The mine is about 25 miles almost due north of Malad City. About half of this distance is covered by a paved highway; the remainder, by an improved gravel road. Both the company and the county help to maintain the gravelled portion.

GEOLOGY*

By far the largest known body of perlite in Idaho crops out in northern Oneida County. Dr. Warren Wagner of Boise estimated, on the basis of exposures and drill holes existing in the fall of 1959, that the deposit contains 6,200,000 tons of easily minable ore, as much or more indicated ore, and an unknown amount of probable ore; his estimate appears highly conservative. According to Wagner, the perlite is found in sufficient variety and quality to satisfy any known market demand.

The tentative stratigraphic column for the perlite area is:

Lake beds - sand, silt gravel -
---- Unconformity----
Basalt
Waterlaid mixture of pumice and perlite
Flow-banded perlite and rhyolite with some intercalated water-transported perlite detritus
Perlite sand (local)
Massive perlite in large mounds
Silt, waterlaid, underlying the massive perlite
---- Unconformity ----
Paleozoic sedimentary rocks

*This preliminary introduction to the geology of the perlite deposits was prepared by Dr. E. F. Cook.

In addition to its large size, the deposit is remarkable for the lack of waste material (obsidian or lithoidal rhyolite) in the massive phases. Noteworthy also is the face that these large mounds of massive perlite overlie waterlaid silt. Laboratory studies have shown that perlite forms by the hydration of obsidian (Ross and Smith, 1955). In places where rhyolite flows blanketed wet silts, the molten rock may have chilled to volcanic glass (obsidian). The obsidian in turn, as water was drawn out of the wet sediments, changed to massive perlite.

In his report on the deposit, Wagner pointed out that it probably resulted from special local conditions, because it grades laterally from perlite into ordinary flow rock.

PRODUCTION

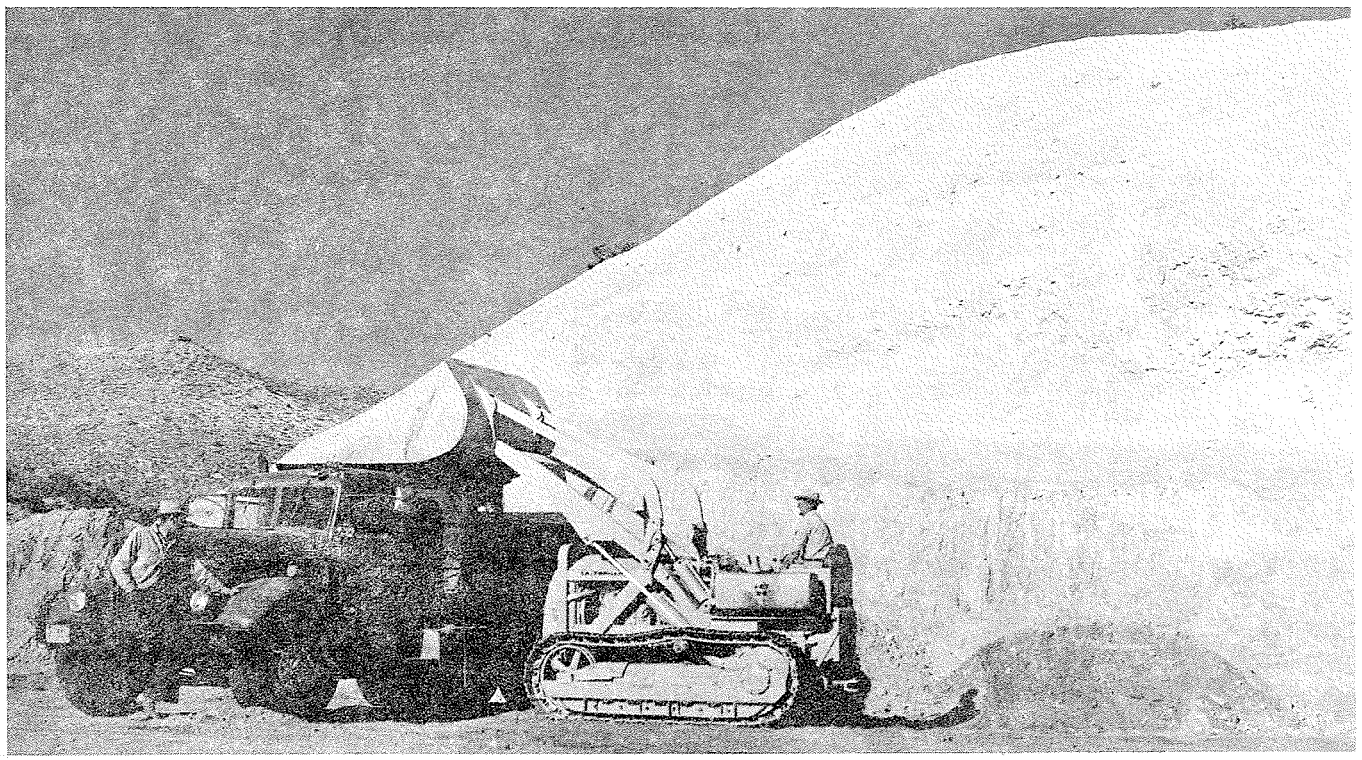
MINING

Because of the physical properties of the perlite, drilling and blasting, at least at present, are of minor importance; the perlite is mined by using shovels, trucks, and bulldozers in an open-pit operation. There are adequate facilities for providing additional equipment for a future expansion of the open-pit mining.

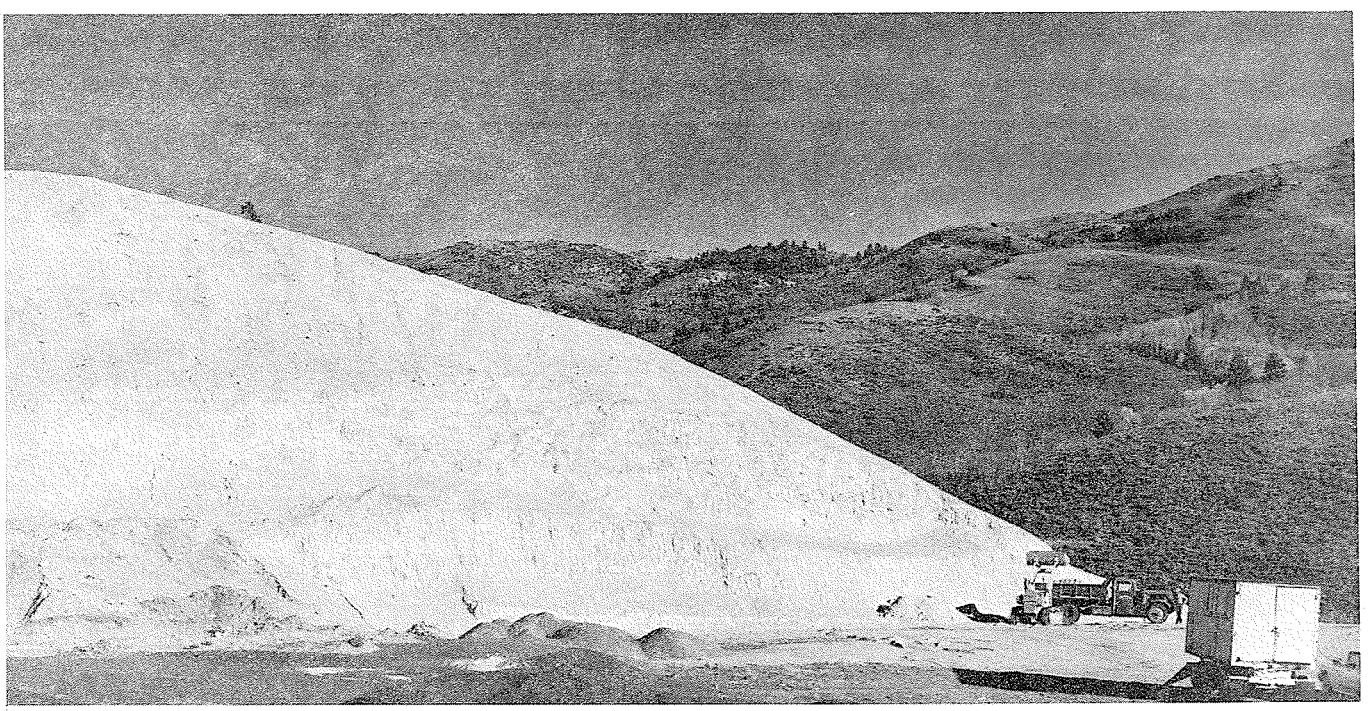
A 300-KW Diesel generator, located at the mine, provides power for mining and for operating the crushing and screening plant.

Six steel storage bins, each with a capacity of 150 tons of crushed and screened material provide storage for the finished mine product.

Photographs 1, 2, and 3, taken at No. 1 pit, show the characteristic occurrence of the perlite.



Loading perlite at the No. 1 pit



CRUSHING AND SCREENING

An ingenious gravity-flow plant has been designed and built for the crushing and screening operation. The mill was designed after a thorough inspection of the flow sheets of existing plants elsewhere in the industry. Screening is done by Tyler Ty-Rock screens having a total area of 360 square feet; oversize from the screens is returned to the rolls by belt conveyor. A horizontal, low-temperature, gas-fired kiln is used for drying the crushed and screened products; a belt conveyor system then distributes the various sizes to the proper bins. The capacity of the plant is 30 to 40 tons of raw ore per hour. There is a complete, efficient dust-collecting control with intakes at points where dust is produced or tends to escape from the system.

The mill building, which also houses a maintenance shop, is of concrete and steel construction with a cover of corrugated iron. Much of the concrete in the building has been made with pumice aggregate.

EXPANDING PLANT

The expanding or "popping" plant is on a recently built railroad spur near the outskirts of Malad City.

Six steel storage bins of 200 tons capacity each are provided for reserve storage and blending of raw material. The bins are filled by a movable belt-conveyor loader; a belt-conveyor system is provided for discharging the bins also. The system is designed for mixing or blending any of the six stored sizes to meet customers' requirements.

Facilities are available at the bins for loading and shipping raw material in bulk by truck or railroad car to consumers who wish to do their own furnacing. At present,

bulk material is transported to the furnace by truck.

For expanding the prepared raw perlite, a Murdock and Stein, gas-fired, horizontal furnace with a capacity of approximately 120 bags per hour has been installed. The daily capacity is 720 bags.

Six sizes of expanded product are produced. The material is bagged by automatic-bagging machinery and stored in the warehouse which is part of the furnace building. An ample supply is thus kept on hand for most any demand.

Dust-collecting equipment is installed to minimize the dust hazard and prevent loss of fines. A future addition to the facilities may be the installation of a filter-aid unit to the plant, thereby producing a very fine product used by the sugar refineries as a filter medium.

SPECIFICATIONS

Control for manufacturing expanded perlite is based on recommendations and specifications of the Perlite Institute, Inc., 45 West 45th Street, New York 36, New York, (Perlite Institute, 1961). But in addition, customer specifications of a special nature generally can be met. The expanded material is also made to meet the standards of the American Society for Testing Materials (ASTM, 1956 and 1957).

USES

INSULATING PROPERTIES AND LIGHT WEIGHT

Because of its outstanding insulating properties and light weight, expanded perlite has become a widely used material. For example, the Oneida Perlite Corporation expanded product weighs about 8 pounds per cubic foot. The original (not expanded)

perlite weighs in excess of 160 pounds per cubic foot. And as an example of its insulating ability, a 1 3/4-in. thick cover will fireproof steel for four hours (Underwriters' Laboratories, 3187-4).

Among the many uses for expanded perlite may be mentioned: (the Perlite Institute can supply detailed information on any of them):

CONSTRUCTION USES

Acoustical plaster; acoustical tile; concrete aggregate; insulation board; loose fill insulation; paint texture; pipe insulation; plaster aggregate, wallboard core filler; etc.

INDUSTRIAL USES

Abrasive material; fillers (plastics, paints); filter-aid; foundry work; moulding sand additive; packaging material; etc.

HORTICULTURAL USES

Inert carrier for insecticides; weed killers, soil conditioner; etc.

COLOR

Expanded perlite ranges in color from practically pure white to dark gray. For some reason the mistaken idea prevails that only the pure white perlite is acceptable. As a matter of fact, there are no drawbacks to the off-white material. Almost every application of perlite is followed by a later surfacing of paint or other finishing material. And in the case of wallboard, a paper layer is used to confine the core and thus conceals the color of the perlite. Wallboard invariably receives a paint or calcimine-type finish. Thus, the notion that perlite must be white has no foundation.

MARKETING

Raw ore has been shipped--among other places-- to Canada, Illinois, Washington, D. C., Indiana, Iowa, Ohio, and Minnesota.

Users of the expanded perlite are numerous, and are widely located in Idaho and Utah. The expanded material is available in six different sizes. Five of these are packaged in 3 cubic foot bags. Cor-Base is sold in 3 1/2 cubic foot bags and the horticultural grade in small bags. Suggested retail prices for the five main grades of materials range from $1.25 to $2.40 per 3 cubic foot bag.

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