



STATE DEPARTMENT OF GEOLOGY  
AND MINERAL INDUSTRIES

1069 STATE OFFICE BUILDING  
PORTLAND 1, OREGON

Sample submitted by DOGAMI - Dole

Analysis by:

Sample received on \_\_\_\_\_

JCh

Analysis requested \_\_\_\_\_

Lab. No.	Sample Marked	Results of Analysis	Remarks
P-23646	Ward Hill	Be <u>Mil</u>	Bill <del>Schaeffer</del> Schaeffer Property

The Department did not participate in the taking of this sample  
and assumes responsibility only for the analytical results.

242.100, T. 10 S., R. 18 E.

HORSE HEAVEN MINE  
JEFFERSON COUNTY, OREGON  
by  
J. Eldon Gilbert\*

*Source: U.S. Geol. Surv. 85*

The Horse Heaven Mine, located in Jefferson County, about 35 miles east of Madras, ranks as one of Oregon's principal mercury producers. During its two periods of activity, from 1934 through 1944 and from April 1955 to the present time, the mine has produced slightly more than 16,600 flasks of quicksilver.

History: The initial evidence that a body of quicksilver ore lay along the northern base of Horse Heaven Mountain was found in the pan of Art Champion who was prospecting for cinnabar on Cherry Creek in April 1933. His interest in the "prospect" was sold to Ray R. Whiting, Ray R. Whiting, Jr., and Harry Hoy. The latter two discovered the first ore in place when one of them accidentally kicked loose a piece of rock with cinnabar attached to it. Subsequent underground work revealed a high-grade ore shoot in the same year.

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\* Manager, Cordero Mining Company.

A small Herreshoff furnace was ~~then~~ purchased and installed, and production began in September 1934. The mine ran under the supervision of Ray Whiting, Sr., for about 2 years during which time it produced approximately 2,200 flasks of mercury. In 1936 the property was sold to the Sun Oil Company which still owns and operates the property. Operation of the mine was continued with little interruption for the next 8 years, increasing the total production to 15,097 flasks of quicksilver. ~~Then~~, in November 1944, the Herreshoff furnace, the power plant, and other structures were destroyed by fire.

At the time of the fire, known ore reserves were limited to pillars containing vital accessways and thin layers of ore left to help support the upper edges of some of the stopes. In view of rising costs and the decreasing value of quicksilver which followed the Government purchase of large stocks of foreign mercury in 1944, no immediate plans were made to rebuild the mill. However, mine development was continued on a very limited and intermittent scale for the next 10 years.

During 1954 the price of mercury climbed to more than \$300 per flask. This price seemed to reflect a new market for the metal, and

future needs looked promising. Consequently the company decided to install a small plant to recover the limited amount of ore left in the mine when it closed. A small rotary furnace was installed together with ore bins, crusher, and conveyors, and was put in operation in April 1955.

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From 1955 through 1957 the mill operated more or less continuously.

Some difficulties were experienced in reclaiming the smaller, less accessible ore pockets, *Insert A* ~~so the furnace was occasionally shut down~~

*Insert* ~~for lack of ore.~~ *q* During the years 1956-1957 a total of 18,829 tons of ore containing slightly more than 6 pounds of mercury per ton was furnaced. ~~At the present time the furnace is operating at a capacity of 30 dry tons per day with all ore coming from underground.~~

Geology: The Horse Heaven ore bodies are associated with a biotite rhyolite plug, and its subsidiary dikes and protrusions, which has intruded volcanic rocks and derived sediments of Clarno (Eocene) and post-Clarno age. Three general types of ore bodies were formed:

- (1) Breccia zones formed during the emplacement of the intrusive were later filled with cinnabar to form relatively large and high-grade

ore shoots, <sup>of the shoots</sup> although ~~their~~ size and grade were in part dependent upon the intensity and amount of brecciation. (2) Locally cinnabar was dropped from solution beneath clay cappings developed along minor faults bordering the intrusive, and small but very high-grade ore bodies were formed. (3) Relatively low-grade ore bodies were formed in the rhyolite tuffs overlying ~~the contact of~~ the intrusive.

The distribution of ore bodies in the mine was impossible to predict and an extensive amount of diamond drilling and exploratory drifting was necessary to locate and evaluate them.

Present operations: Extraction of ore is done by various mining methods, from simple drifting to square set stoping.

The entire crew at the property, including mine, mill, surface, office and supervision, is 11 men. Many of them, especially the mill crew, have been with the mine continuously from the beginning of the present operation. They work harmoniously together and, as employees of any small mine, they realize the necessity of augmenting each other's efforts and working for the good of the operation.

The success of this small mine is due essentially to three men.

Frank E. Lewis, general superintendent, has been in charge of the operation for 20 years and it is his knowledge of the old work and the conditions of parts of the old mine which has made it possible to recover, economically, rock which was once left as waste. Mr. Lewis also keeps up the essential engineering and office work. Clarence McClain, general foreman, is in charge of all labor, both underground and in the plant. He has had considerable experience in many types of mines and in handling many classes of people. This experience has been valuable to Horse Heaven. Verne Haas, assistant manager of Cordero Mining Company, has been in the planning end from the beginning of the present operation. He put the various parts of secondhand equipment together to form an efficient, integrated mill. Many of the units are his own design and construction. He also assisted in planning work underground and organizing the entire operation. Many times he has had the role of trouble shooter and has helped solve problems of malfunctioning machinery, <sup>5</sup> low-grade ore, ~~or~~ <sup>5</sup> ~~of~~ finances.

Communication is maintained with the other company-owned operations and with the company management in Palo Alto, California, by means of a radio which operates on a special frequency authorized by the Federal Communications Commission.

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Insert B →

The future of the mine is not bright. During the past year the price of mercury has declined from \$250 per flask to \$220-225. Mercury can be sold to General Services Administration during the rest of 1958 at a price of \$225 delivered San Francisco but difficulties in obtaining tags and flasks which are acceptable to GSA reduced this to an equivalent of \$220 per flask. The future beyond 1958 is very uncertain.

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