

# State Department of Geology and Mineral Industries

702 Woodlark Building  
Portland 5, Oregon

## BENEFIEL NITRATE PROSPECT

Lake County

Owner: Public domain administered by the Bureau of Land Management under the Taylor Grazing Act.

Location: The property leased by the Bureau of Land Management to Benefiel and Farrell contains a total of 1024 acres lying in secs. 31, 32, T. 31 S., R. 22 E., and secs. 5, 6, T. 32 S., R. 22 E.

The prospect is reached by taking a dirt road which meets Highway 395 between mileposts 48 and 49 (see map). Road goes around the north and west sides of Alkali Lake and at a point about  $7\frac{1}{2}$  miles from the highway the west fork of the road is followed. The prospect lies about half a mile west of this road at a point  $12\frac{1}{2}$  miles from the forks. The prospect area can be recognized by the numerous shallow cavities eroded into the face of the cliff, the lower portion of which is obscured by talus consisting of some huge angular light-colored blocks.

Lessees: Jim Benefiel and Tom Farrell of Lakeview, Oregon.

Elevation: Elevation of the valley floor below the cliff is approximately 4500 feet above sea level. The deposit occurs along the face of a rimrock cliff which is approximately 75 feet high. The area is characterized by rolling hills with occasional rimrock cliffs. Sage brush covers most of the land.

Development work: Prior to the drilling program described below, no development or prospecting work of any kind had been done at the prospect. The prospect was discovered by Benefiel while he was excavating a water hole for the Taylor Grazing Administration. Benefiel collected several samples

of nitrate efflorescence which he found on the walls and floors of the various cavities which occur just under the top of the cliff. Analysis of two samples submitted to the Department showed .21% and 1.61%  $\text{NaNO}_3$ .

During the week of February 13, five jackhammer holes 10 feet deep were drilled by Benefiel and R. W. Royster. Samples taken from these holes were checked qualitatively on the spot for the presence of nitrates, using the nitrate ring test. All but one of these samples gave negative results in the field and only a very faint ring was observed in the one positive test. Considerable difficulty was experienced in making the tests in the field. This was due to the large amount of suspended material which might have hidden a faint ring. One hole was drilled about 200 feet back from the edge of the cliff, another was drilled close to the edge of the cliff, and three were drilled at likely looking spots along the face of the cliff and from 10 to 35 feet below the rim. Samples were collected in a flour sack which was held over the end of a 2-inch tee, which with two short pipe nipples was thrust into the collar of each hole. There was some unavoidable loss of material in the form of a fine dust when the holes were blown, but recovery of most of the sample was believed to be good.

A total of 16 samples were taken from the 5 holes drilled. The samples represented a total of 19 feet of hole. Of the 16 samples, nine showed only a trace of  $\text{NaNO}_3$ , six less than 0.2%, and one 0.32%, when rechecked in the Department laboratory.

Geology: The cliff consists of a series of weathered flows which are probably rhyolitic or phonolitic. The uppermost flow was much less weathered than those below. At one place a granitic-like inclusion measuring approximately 6" x 10" x 4" was observed in one of the pitted depressions below the

rim. Nitrates were found on the floors of most of the shallow caves and cavities which occur rather abundantly along the face of the weathered flow. In some places the nitrate concentrations were an inch or more in thickness, although the usual thickness was only a fraction of an inch. Efflorescences were also observed in the numerous cracks which ran up and down the cliff face in places protected from the weather. Apparently the nitrate was deposited in these areas when water seeping out to the surface of the cliff evaporated and left the dissolved nitrate behind.

The prospect area lies approximately 10 miles west of the Abert fault and on the downthrow side.

Economics: On the basis of the almost completely negative results obtained from the field tests and from the descriptions of other nitrate prospects located in the same general area\*, it would appear that the possibility for any tonnage of material containing a sufficient amount of nitrate is unlikely.

Report by: Ralph S. Mason

March 22, 1950

\*Williams, I. A., manuscript report published in part under title Nitrate deposits of southeastern Oregon: Min. and Sci. Press, vol. 117, pp. 285-289, Aug. 31, 1918.

Nitrate deposits of the United States: U.S.G.S. Bull. 838, pp. 49-50, 1932.