

Wagontire Mountain. Nitrates have been found in many places on and near Wagontire Mountain, in northeastern Lake County and contiguous portions of Harney County.<sup>1</sup> Streams have cut deep radiating gorges into the east, south, and west slopes, and in the sides of these gorges are almost continuous exposures of the rocks of which the mountain mass is composed. More resistant lavas form rim rocks extending for many miles. Where protection is afforded along the faces of these cliffs, in innumerable recesses at their bases, where they have been undercut, or where they rest upon the tuffs or less resistant lavas, nitrates and associated salts appear on the walls of the rocks, as a lining of caverns, in crevices, in the talus, and in the organic matter and dirt accumulated on the floors of caves, and in many places to an unanticipated extent they permeate the pores and vesicles of the rock itself.

The American Nitrate Co. did a considerable amount of prospecting for nitrates on Wagontire Mountain in 1916, and preliminary investigations of the possibility of extracting the nitrate salts on a commercial basis were carried on in 1917. (See p. 100.) The operations of this company included prospect tunneling and quarrying at many points along Lost Creek and successive radiating gulches about the southwest slope of the mountain, many chemical tests, and finally the construction of an experimental plant for the extraction and recovery of the nitrate. The company abandoned the Wagontire enterprise late in the summer of 1917 and dismantled the plant. It is understood that the nitrates did not extend to any considerable depth and that the reason for indefinite suspension of the work was the failure of the investigations to prove the presence of a sufficient body of workable nitrate-bearing rock on which to found commercial nitrate production.

Sage Hen Creek. The Charles A. Newhall Co. about 1916 reported nitrate prospects 5 miles up Sage Hen Creek from the Burns-Riley road, in which the nitrate is found as streaks and pockets in a gray-white volcanic rock. The rock seems to be made up of grains of volcanic ash and fragments of lava that have been partly melted and stuck together, giving a porous mass that takes up and holds water like a sponge. Nitrate occurs only in the spongy portions of the rock. According to the report of this company nitrate occurs in similar manner along the walls of Buzzard Canyon, a deep winding cleft in the lava rock southwest of Harney Lake. The American Nitrate Co. in 1916-17 did considerable prospecting in this canyon in T. 28 S., R. 28 E., Willamette meridian, and also on the so-called Rawhide claims in T. 29 S., R. 26 E. (See p. 100.)

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<sup>1</sup>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.

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# State Department of Geology and Mineral Industries

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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 dowathrow 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.



STATE DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

BENEFIELD NITRATE

Project

Hole No. 1 Location ON TOP OF HILL 200' FROM EDGE OF  
of sec. 31 T. 32 R. 22E County LAKE CLIFF

Coord. \_\_\_\_\_ No. \_\_\_\_\_ E. \_\_\_\_\_

	From	To	Thickness of sample	Sample No.	Description
Elev. collar _____					
Depth to top of bed _____	4	5'	1'	9639	TRACE NA NO <sub>3</sub>
Elev. of top of bed _____	6	7	"	9640	SLIGHT TRACE "
Thickness of bed _____	8	9	1'	9641	VERY " " "
Elev. bottom bed _____					
Depth of hole _____					
Elev. water table _____					
Bottomed in _____					
*****					
Drill used <u>JACKHAMER</u>					
Number men <u>2</u>					
Engr. in charge _____					
Mtrl. classfd. by <u>MASON</u>					
Sampler _____					
Date hole began _____					
Date hole finished <u>2-16-50</u>					
Shifts actually drilled _____					

Remarks \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



STATE DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

BENEFIELD NITRATE

Project

Hole No. 2 Location NEAR EDGE OF CLIFF, ABOUT 400' NE  
FROM HOLE No 1  
 of sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_ County LAKE

Coord. _____ No. _____ E. _____	From	To	Thickness of sample	Sample No.	Description
Elev. collar _____					
Depth to top of bed _____					
Elev. of top of bed _____	<u>3</u>	<u>4</u>	<u>1</u>	<u>B9642</u>	<u>0.156% NaNO3</u>
Thickness of bed _____					
Elev. bottom bed _____					
Depth of hole _____					
Elev. water table _____					
Bottomed in _____					
*****					
Drill used <u>JACK HAMER</u>					
Number men <u>2</u>					
Engr. in charge _____					
Mtrl. classfd. by <u>MASON</u>					
Sampler _____					
Date hole began _____					
Date hole finished <u>2-16-50</u>					
Shifts actually drilled _____					

Remarks \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



STATE DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

NITRATE

Project

Hole No. 3 Location ON BENCH ABOUT 10' BELOW RIM

of sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_ County LAKE

Coord. \_\_\_\_\_ No. \_\_\_\_\_ E. \_\_\_\_\_

	From	To	Thickness of sample	Sample No.	Description
Elev. collar _____					
Depth to top of bed _____	0	1			GRAY-WHITE-DUST
Elev. of top of bed _____	1	2		P. 9643 X	" " " TRACE
Thickness of bed _____	2	3			" " "
Elev. bottom bed _____	3	4			" " "
Depth of hole _____	4	5			" " "
Elev. water table _____	5	6		P. 9644 X	NITRATE RING 0.18%
Bottomed in _____	6	7		P. 9645 X	HIT POCKET NIL
*****	7	8			
Drill used <u>J-HAMMER</u>	8	9		P. 9646 X	HIT POCKET NIL
Number men _____					
Engr. in charge _____					
Mtrl. classfd. by _____					
Sampler _____					
Date hole began <u>2-17-50</u>					
Date hole finished _____					
Shifts actually drilled _____					

Remarks HOLE DRILLED EASILY - VERY DUSTY



STATE DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

BANKFIELD NITRATE  
Project

Hole No. 4 Location 40' N. OF HOLE 3 8-10' LOWER

of sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_ County \_\_\_\_\_

Coord. \_\_\_\_\_ N. \_\_\_\_\_ E. \_\_\_\_\_

	From	To	Thickness of sample	Sample No.	Description
Elev. collar _____					
Depth to top of bed _____	0	1			LIGHT GRAY DUST
Elev. of top of bed _____	1	2			
Thickness of bed _____	2	3		P-9647 X	0.32% NA NOS
Elev. bottom bed _____	3	4		P-9648 X	TRACE
Depth of hole _____	4	5		P-9649 X	NIL
Elev. water table _____	5	6			
Bottomed in _____	6	7		X	
*****	7	8		P-9650 X	SL. TRACE
Drill used _____	8	9			BOTTOMED
Number men _____					
Engr. in charge _____					
Mtrl. classfd. by _____					
Sampler _____					
Date hole began <u>2-17-50</u>					
Date hole finished _____					
Shifts actually drilled _____					

Remarks STRUCK CANON AT 4'



STATE DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

BENEFIELD NITRATE  
Project

Hole No. 5 Location ABOUT 15' BELOW HOLE 4 AT BASE OF CLIFF

of sec. \_\_\_\_\_ T. \_\_\_\_\_ R. \_\_\_\_\_ County \_\_\_\_\_

Coord.	N.	E.	From	To	Thickness of sample	Sample No.	Description
Elev. collar							
Depth to top of bed							
Elev. of top of bed			2	3		P. 9651 X	0.12% NaNO <sub>3</sub>
Thickness of bed			3	4			
Elev. bottom bed			4	5		P. 9652 X	0.15% "
Depth of hole			5	6			
Elev. water table			6	7		P. 9653 X	0.16% "
Bottomed in			7	8			
*****			8	9		P. 9654 X	0.17% "
Drill used							
Number men							
Engr. in charge							
Mtrl. classfd. by							
Sampler							
Date hole began							
Date hole finished							
Shifts actually drilled							

Remarks \_\_\_\_\_



# NITRATE TRIP

TAKE:

- LEICA
- ~~MAPS - EAGLE ROCK - OSHAD BASE~~
- ~~NITRATE TEST KIT~~
- BRUNTON - G-PICK - CHICO PAN - HAND LENS
- NOTEBOOK
- ~~SAMPLE JARS~~
- DANA
- BUR 710
- ~~NIP BAG TIES - HANDS~~
- ~~ANTI-FREEZE~~
- ~~SAMPLE JARS~~
- ~~FOOD~~
- SOCKETS
- 50' TAPE

- DO: VISIT POTHONES - PIX  
 VISIT CAREY RANCH - SAMPLES - PIX  
 MEASURE THICKNESS - DIP  
**LEGAL DESC.**

BENEFEL NITRATE LOCATION

61.2 TAYLORS  
 59.2 CCC

$E\frac{1}{2} S E\frac{1}{4}$  (SEC 3, 32 T 31 S R 22 E)

2. MI

$SW\frac{1}{4}$  &  $W\frac{1}{2} S E\frac{1}{4}$  SEC 32 T 31 S R 22 E 89.8

LOTS 2, 3 & 4 &  $SW\frac{1}{4} N E\frac{1}{4}$ ,  $S\frac{1}{2} N W\frac{1}{4}$  63.4 CCC

$SW\frac{1}{4}$  &  $SE\frac{1}{4}$  (SEC 5) 26.4

19.

LOT 1  $SE\frac{1}{4} N E\frac{1}{4}$  &  $E\frac{1}{2} S E\frac{1}{4}$  (SEC 6) 7.4 CCC TO FRAS TO EUCHE

T 32 S R 22 E CONTAINING 1024.65 ACRES