State Department of Geology and Mineral Industries

1069 State Office Building
Portland 1, Oregon

POWELL BUTTE URANIUM — Crook County

Owner: Harley Dosser, 917 Highland, Redmond, Oregon.

Location: A total of 17 claims have been filed by Dosser, et al, in the E½ sec. 23, W½ sec. 24, SE¼ sec. 14, SW¼ sec. 13, T. 16 S., R. 14 E., Crook County.

General geology: Powell Butte is actually comprised of three or four hills, one of which (the farthest north) is considerably larger than the rest. These hills are a distinctive topographic feature in this area because of their relatively isolated position between the foothills of the Cascades to the west and the Ochoco Mountains to the northeast. The buttes themselves are made up predominantly of rhyolites with subordinate tuffs and diatomite(?). The only geologic map covering this area is the one published by Hodge (1941) which shows the buttes as being composed of volcanics of Eocene Clarno age surrounded by the lavas of the Pliocene Dalles (Deschutes) formation. The Powell Buttes are therefore probably an outlier of the western Ochoco Mountains to the northeast which are made up predominantly of acid volcanics of the Clarno formation.

Geology and mineralogy of the deposit: The area that contains the radioactive deposits is found along the west side of one of the subsidiary buttes which, in turn, lies along the western margin of the Powell Butte highlands and is composed almost entirely of a medium gray to pinkish gray, very hard and dense porphyritic rhyolite. The phenocrysts, which are rather abundantly scattered through the dense felsitic groundmass of the rock, are composed mostly of the clear, glassy feldspar, sanidine. Other more translucent varieties of feldspar, some of which show Carlsbad twinning, are less abundant and probably belong to the potash group. Quartz is also present, although it is difficult to distinguish from the sanidine in every case. The phenocrysts average 1-3 mm (especially those that

have been broken off more or less normal to the C-axis) while those having a side pinacoid exposed are occasionally as long as 6-8 mm. The rock, even on a fresh fracture, has a somewhat "vuggy" appearance and these cavities, along with being iron stained, often are lined with beautiful, almost microscopic, clear mamillary quartz. Some of the quartz "bubbles" have included chlorite which gives them a greenish cast. Under the microscope the rhyolitic groundmass has a very fine-grained "mosaic" texture which Williams calls "cryptofelsite" and is usually due to the devitrification of originally glassy mesostasis. The felsitic material is iron stained a light yellowish to almost opaque brown color, apparently in part through the oxidation of very finely disseminated magnetite, although the magnetite makes up less than 5 percent of the entire rock mass. Much of the deeply iron-stained, almost opaque material is from the uranitized portion of the rock, but none of it showed anything significant under either reflected or transmitted light. No minerals of high relief could be discerned and no radioactive opaques could be identified with certainty.

The rhyolite, because of its resistant nature, stands out in bold cliffs along the upper portion of the butte and has an indistinct columnar structure through differential weathering along zones of fracturing or jointing. Flow banding in the rock indicates dips of from near vertical to 30° E. and a fairly constant strike along the west side averaging N. 10° E.

There is no well-defined contact where the younger volcanics of the Dalles formation lap up against the buttes, since a fairly thick blanket of talus material covers the lower slopes. All of the rhyolite in the butte shows approximately two to three times normal background count as registered in Redmond 12 miles away. In the joint or fracture zones the count ranges up to as much as 10-15 times normal background.

Here, as at the Steens Mountain uranium prospect (Corcoran and Wagner, 1955), the rhyolite, where it has become mineralized, is stained a deep dull red to brown

color along the joint surfaces as a narrow "selvage" up to 1 inch, but the average thickness, even in the "high grade material," is in the range of 1/8 - 1/4 inch. This narrow zone of uranitization ends abruptly against unaltered and almost non-radioactive country rock; the line between the two being in most cases as sharp as a knife edge. It is this sharp demarcation between the altered and unaltered rock that particularly differentiates it from the similar type deposit in Steens Mountain. A picked sample of the red-stained, mineralized material showed 0.11 - 0.12 percent U_3O_8 on the radioassayer and was submitted for chemical analysis to determine the actual amount of U_3O_8 (P-18771).

The major joint system in the rhyolite strikes N. 60° E. to E-W and is almost vertical. A subsidiary set of joints, also nearly vertical, strikes N. 10-20° E., N. 40-50° W., and N. 70-80° W. The uranium appears to be concentrated along the major joint system or where the subsidiary joints intersect the major joint system.

The origin of the joints is obscure, but the lack of any signs of slickensiding or brecciation* would indicate that there has been little, if any, movement along these fractures. It would appear, then, that the joint fissures were probably caused by tensional forces during the cooling of the lava rather than through any post-Eocene faulting. The high dip of the flow banding in the rhyolite does not necessarily indicate very much movement after solidification. The viscous nature of siliceous magmas very often causes a rhyolite to have a more or less contorted bedding due to continued movement of the lava while it is still in a semi-plastic state. The possibility of local block slumping also cannot be overlooked, although there was no clearly apparent surface indication that such might have happened in this area.

Conclusions: The period of hydrothermal(?) alteration that deposited the uranium in the joint fractures of the rhyolite is probably related to the same period of mineralization that introduced the deposits of cinnabar that are associated with Clarno volcanics in the Ochoco Mountains to the northeast (Waters, et al, 1941). A piece of tuffaceous rock brought in by Dosser also from Powell Butte

* see addendum

showed a trace of mercury on the willemite screen test. This rock is supposed to have come from near a rhyolitic dike approximately 1 mile northeast of the radioactive deposits, although the writer did not visit the locality personally. The association of mercury with uranium in the Eocene(?) volcanics of the Lakeview area (Schafer, 1955) would tend to substantiate this general conclusion concerning the syngenetic origin of the two minerals in the older Tertiary acid volcanics of eastern Oregon. It is interesting to note that samples of siliceous tuff that were said to have been collected near the Horse Heaven mercury mine showed a small amount of radioactivity (.01-.02 percent U_3O_8 e) on the radioassayer.

With respect to the Powell Butte deposit, the problem of finding minable amounts of ore is similar to that encountered in the Steens Mountain prospect. The uranitized rhyolite constitutes such a small percentage of the overall unmineralized volume of rock that mining the type of material so far exposed would not be feasible. Here again, the only chance for finding commercial tonnages of ore would be the possibility of encountering a more closely spaced set of joints along which the mineralizing fluids could have passed. The possible presence of porous and permeable tuffs beneath the rhyolite can only be inferred since no outcrops of such rock were seen anywhere in the neighborhood of the radioactive prospect.

Report by: R. E. Corcoran

Visited: August 18, 1955.

References:

Corcoran, R. E., and Wagner, N. S. (1955), Report on Pike Creek Carnotite group, Harney County: Oreg. Dept. Geology and Mineral Industries, Mine Rept. File, 1955.

Hodge, E. T. (1941), Geology of north central Oregon: Oreg. State College Monographs, Studies in Geology, no. 3, pp. 1-76, 1941.

Schafer, Max (1955), Report on White King uranium claims, Lake County: Oreg. Dept. Geology and Mineral Industries, Mine Rept. File, 1955.

Waters, A. C., et al (1941), Quicksilver deposits of the Horse Heaven mining district, Oregon: U. S. Geol. Survey Bull. 969-E, 1941.

Williams, Howell, et al (1954), Petrography: W. H. Freeman & Co., pp. 124-127, 1954.

State Department of Geology and Mineral Industries

702 Woodlark Building
Portland 5, Oregon

POWELL BUTTE AREA (U) Crook County

Visited: By Schafer and Schlicker, May 23, 1956.

Location: High Hope claims 1 - 24, located mostly in sec. 13, T. 16 S., R. 14 E. Claims are reached by traveling 20 miles from Bend towards Prineville, right at store, 8.6 miles south, 0.9 miles east to forks and on 0.9 mile past house, gate, etc., to end of road. Main development is up on side of butte on west side.

Development: Several bulldozer cuts along side of butte totaling 500 feet. Several pits in side of butte 6 feet deep.

Owners: People in claim are Harley Dosser; Numa, Walter and Eldon McCoin; D. C. Weber; F. L. Skeen and Evan Sturza all of Prineville or vicinity.

Geology: Butte is made up of succession of acid and intermediate volcanics. The majority of the rocks appear to be welded tuffs, rhyolites and andesites. Glass (?) is a major constituent of these rocks.

Probably plugs or sheets of volcanics have filled shear zones. There are dikes leading out south from the main butte.

Most of the butte has high background radioactivity. Iron-stained fracture-fillings are hot, and have assayed about 0.1% U_3O_8. One larger iron-stained fracture (6") has been explored with a small pit. The samples from this spot have been the best.

Conclusions: Volcanic rocks of Powell Butte carry abnormal amounts of uranium as original constituent of rock. Some of this uranium has been leached out and concentrated along fractures in the rock. These small concentrations have, in all cases examined, not been economic. It is doubtful

whether an economic concentration of this type exists here.

If the uranium is later than the country rock the chances for an economic deposit in a more favorable host, such as the porous tuffs, are better. Evidence at this time points to the uranium being an original rock constituent, however.

Recommendations: A very complete surface examination of all claims and limited exploration by trenching and pitting on any spots of high radioactivity. If no visible mineralization is found, then the economic and technical capabilities of the owners has been reached and they should look elsewhere for assistance in exploration and development.

* * * * * *

State Department of Geology and Mineral Industries

1069 State Office Building
Portland 1, Oregon

ADDENDUM TO POWELL BUTTE URANIUM REPORT

On the 19th of September, Mr. E. A. Groh brought in some of the radioactive rhyolites from the Powell Butte uranium area into the Department for examination. Of particular interest were several pieces of brecciated rhyolite similar to that noted in the Steens Mountain uranium prospect (Corcoran and Wagner, 1955), in that in addition to being slightly radioactive it had also been completely silicified. The color of the rock is light to dark buff with patches that are stained a light to dark reddish brown.

Very small grains of pyrite (or marcassite) are scattered through the rock and a willemite screen test for cinnabar showed a heavy trace of mercury to be present. On the radioassayer, a non-selected ground-up sample of the breccia indicated a U_3O_{8e} of approximately 0.1%. Although no definite uranium minerals could be discerned, the dark reddish brown stained areas appear to be the major sources of radioactivity.

According to Mr. Groh the brecciated material was found on the surface just below one of the prospect pits and presumably was blasted out when the pits were first opened up. The presence of the breccia would indicate that some, if not all, of the fractures in the rock may be shear fractures along which the mineralizing fluids passed. The occurrence of both pyrite and trace amounts of mercury in the sample would also substantiate the theory of a hydrothermal origin for these deposits.

State Department of Geology and Mineral Industries

1069 State Office Building
Portland 1, Oregon

ADDENDUM TO POWELL BUTTE URANIUM REPORT

On the 19th of September, Mr. E. A. Groh brought in some of the radioactive rhyolites from the Powell Butte uranium area into the Department for examination. Of particular interest were several pieces of brecciated rhyolite similar to that noted in the Steens Mountain uranium prospect (Corcoran and Wagner, 1955), in that in addition to being slightly radioactive it had also been completely silicified. The color of the rock is light to dark buff with patches that are stained a light to dark reddish brown.

Very small grains of pyrite (or marcassite) are scattered through the rock and a willemite screen test for cinnabar showed a heavy trace of mercury to be present. On the radioassayer, a non-selected ground-up sample of the breccia indicated a U_3O_{8e} of approximately 0.1%. Although no definite uranium minerals could be discerned, the dark reddish brown stained areas appear to be the major sources of radioactivity.

According to Mr. Groh the brecciated material was found on the surface just below one of the prospect pits and presumably was blasted out when the pits were first opened up. The presence of the breccia would indicate that some, if not all, of the fractures in the rock may be shear fractures along which the mineralizing fluids passed. The occurrence of both pyrite and trace amounts of mercury in the sample would also substantiate the theory of a hydrothermal origin for these deposits.

Norm Peterson

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

2033 First Street
Baker, Oregon

1069 State Office Building
Portland 1, Oregon

239 S.E. "H" Street
Grants Pass, Oregon

REQUEST FOR SAMPLE INFORMATION

The State law governing analysis of samples by the State assay laboratory is given on the back of this blank. Please supply the information requested herein fully and submit this blank filled out along with the sample.

Your name in full Harley S. Dosser

Street or P.O. Box 917 Highland Avenue City & State Redmond, Oregon

Are you a citizen of Oregon? yes Date on which sample is sent April 17, 1958

Name (or names) of owners of the property Hi Hope Mining Company

Are you hiring labor? no Are you milling or shipping ore? no

Name of claim sample obtained from Hi Hope

Location of property or source of sample (If legal description is not known, give location with reference to known geographical point.)

County Crook Mining District Powell Butte

Township 16 S. Range 14 E. Section 23-24 Quarter section

How far from passable road? 1 mile Name of road Private

	Channel (length)	Grab	Assay for	Description
Sample no. 1	12 feet		U_3O_8	
Sample no. 2				

(Samples for assay should be at least 1 pound in weight)

(Signed) Harley S. Dosser

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY - USE OTHER SIDE IF DESIRED

Sample Description

Sample number	GOLD		SILVER		URANIUM	MERCURY		
	oz./T.	Value	oz./T.	Value	U_3O_8	Hg		
P-22841 #1	- - -	- -	- - -	- -	0.07%	0.50 lb/ton	- - -	- - -

Report issued Card filed Report mailed 5-14-58 Called for

SIR-5

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

2033 First Street, Baker, Oregon | 1069 State Office Building, Portland 1, Oregon | 239 S.E. "H" Street, Grants Pass, Oregon

REQUEST FOR SAMPLE INFORMATION

The State law governing analysis of samples by the State assay laboratory is given on the back of this blank. Please supply the information requested herein as fully as possible and submit this blank filled out along with the sample.

Your name in full: Harley S. Dosser

Post office address: 917 Highland Avenue, Redmond, Oregon.

Are you a citizen of Oregon? yes Date on which sample is sent: January 13, 1958

Name (or names) of owners of the property: Hi Hope Mining Company

Are you hiring labor? no Are you milling or shipping ore? no

Name of claim sample obtained from: Hi Hope

Location of property or source of sample (If legal description is not known, give location with reference to known geographical point.)

County: Crook Mining District: Powell Butte

Township: 16 S. Range: 14 E. Section: 23-24 Quarter section:

How far from passable road? 1 mile Name of road: private

	Channel (length)	Grab	Assay for	Description
Sample no. 1		X	U_3O_8	Cooked ore from mercury retort
Sample no. 2		X	U_3O_8, mercury	New shaft

(Samples for assay should be at least 1 pound in weight)

(Signed) Harley S. Dosser

DO NOT WRITE BELOW THIS LINE - FOR OFFICE USE ONLY - USE OTHER SIDE IF DESIRED

Sample Description: (1) Hematite stained crystal tuff.

(2) Opalized tuff breccia.

Sample number	GOLD oz./T.	GOLD Value	SILVER oz./T.	SILVER Value	MERCURY Hg	RADIOACTIVITY U_3O_8 Equivalent		
P-22463 No. 1	- - -	- -	- - -	- -	- - -	0.03%	- - -	- - -
P-22464 No. 2	- - -	- -	- - -	- -	Trace	Trace	- - -	- - -

Report issued: Card filed: Report mailed: 1-29-58 Called for:

SIR-5

Hoagg reports that Harley brought in some material that assayed 1.5% U_3O_8 - Tuff with meta-autinite No location given! May 15 @ 1958.