

October 9, 1920.

Messrs. Wilson and Stone,  
Christmas, Arizona.

Gentlemen:

In compliance with your request for a brief report on the C & B Vanadium Mine, located in the Dripping Springs Mining District, Gila County, Arizona to be furnished the Radium Company of Colorado, I submit the following:

#### SOURCE OF INFORMATION.

My acquaintance with this property began eight months ago, and since that time, I have been on the ground probably a dozen times. Primarily, my interest has been the sampling of the concentrates produced. I have also made a crude surface and underground survey, and have several times traversed the surface and examined the various mine openings. This property is within the section covered by U S G S Professional Paper No 115 by Ransome, but nothing of interest is published except the general geology of the Dripping Springs District.

#### LOCATION OF PROPERTY.

This property lies on the north east slope of Dripping Springs Mts, about 10 miles north west from Christmas, Arizona, the nearest post office. The Tucson-Globe state highway passes about four miles from the property; the truck road to Dripping Springs Copper Camp comes within a mile of this property, and a private road passable for a small truck leads to the property.

Globe a mining center of importance lies north about thirty miles by road.

Christmas, the present terminus of the Arizona Eastern Ry, 10 miles distant is the nearest shipping point.

Winkelman, an important distributing point for mining supplies lies eighteen miles south along the Tucson Globe highway.

Tucson, a city of 22,000 population and the chief distributing point for Arizona and northwestern Mexico lies about 90 miles south. Daily auto stages ply between Tucson and Globe.

#### FACILITIES.

Water seems to be abundant along the north east slope of the Dripping Springs Mts and is easily obtained by sinking a few feet into the partly decomposed igneous rocks along the gulches. It is excellent drinking water.

## 2. W & S.

Fuel for camp use is wood found both in the Dripping Springs Valley and higher in the mountains. It will cost about \$5.00 per cord delivered at camp.

Timber for mining purposes would be shipped to Christmas and hauled to the property. As far as developed the ground of this property stands well without timbering and it is probable that only a minimum amount of timber will have to be used.

Power for mining purposes is largely gasoline, distillate or crude oil, distributed from Winkelman in retail or shipped in tank cars to Christmas. Electric power from the Roosevelt project is used at the large mines of this section. Any large development work should investigate the question of bringing in a power line from this source. The San Carlos hydro electric and irrigation project now under consideration by the Federal Government is convenient to this property.

### TITLE.

Claims are held by locations, duly recorded and are under option to Wilson and Stone of Christmas, Ariz.

The C & B group consists of six full claims each 600 ft x 1500 ft so placed as to cover a mineralized zone over one mile in length.

### DEVELOPMENT.

Property is developed by shallow shafts and tunnels to a total amount of about 1000 feet. The early development was done in the search for gold and silver ores; only recently have the vanadium showings received attention. The operations of the past year under Messrs Wilson and Stone was confined to one outcrop of vanadium ore about sixteen hundred feet from the south end line of the property. Here their development has shown at about 60 ft in depth ore bodies far better in grade and larger than the outcrop promised.

At this working the lower tunnel has a total length of 93 ft to the ore body which is opened for a width of about 25 ft and a length of over 50 ft on the tunnel level, with a raise to the upper tunnel and to a 40 ft shaft. The ore persists below the tunnel level as shown in a couple of shallow winzes.

On account of working with such limited capital Messrs Wilson and Stone were unable to carry out any systematic development toward blocking out ore. Practically everything broken in the mine was taken to the mill.

To my knowledge, there has never been a systematic sampling of the ore. On account of the system of milling which will be explained later there is no way to determine from the mill products the grade of the ore in the mill feed. As a guess, I should say that there has been considerable variation in the vanadium content of the ore ranging from 1% to over 3%  $V_2 O_5$  on daily mill heads.

The concentrates vary from 8.5% for the first 30 ton lot produced to 10.75% on a 5 ton shipment which was carefully sampled. Samples were taken by me, and assays made by Dr. Brinton of the University of Arizona.

A streak of high grade ore was being sacked for shipment on the occasion of one of my visits which I sampled with a result of 13.69%  $V_2 O_5$ .

#### GENERAL CHARACTER OF ORE ZONE.

This property covers a fault zone where the sedimentaries and the igneous rocks are in fault contact. Limestone predominates among the sedimentaries and diorite, diabase and andesite are recognized among the igneous rocks. The N-S fault zone is cut by numerous cross breaks and in the latter the heaviest mineralization occurs.

The Wilson and Stone workings are in such a cross break. Here the limestone appears as a faulted block within the diabase. Both the limestone and the diabase carry heavily of vanadium.

#### MINERALS OF THE ORE.

Vanadinite is the principal vanadium bearing mineral with Descloisite showing in appreciable amounts. The ore is iron stained, soft and decomposed until the original nature of the rock is indistinguishable.

#### CONCENTRATING WORKS.

The concentrating plant is of the simplest sort, consisting of one rock breaker, two trommel screens and two Overstrom Universal tables driven by gas engines.

The ore is trammed from the tunnel to the head of the mill and dumped into a bin. Shovel fed into a trommel with 10 mesh wire. Thru 10 mesh goes direct to tables, over 10 mesh thru rock breaker and into trommel with 10 mesh wire. Thru 10 mesh is added to the table feed from first trommel, and oversize is thrown on the dump.

Power is from a 22 H P Witte gas engine for the crushing and screening units and a 3 H P Fairbanks Morse gas engine for the tables.

Water is obtained from two shallow pits dug into the decomposed diorite above the mill and run by gravity to the mill. There is other water available in springs higher up the mountain so it is probable that sufficient water for a fair size plant could be developed at comparatively small expense.

The loss in this concentrating plant is very heavy. There has never been a tails sample taken for assay, so accurate data is lacking. It is certain, however, that the slimes and sands carry considerable vanadium besides the oversize from the screen which is discarded before it goes onto the tables. Tests have been made at the University of Arizona which indicate that this ore is amenable to flotation concentration. There is no doubt but that a flotation unit added to the table concentration would increase the recovery materially, probably 30% or more.

#### COSTS OF MINING AND MILLING.

Mr. Wilson is outlining for you the cost of mining and milling. The fact that no development work was done and that practically all the material broken in the works was taken to the mill resulted in very low mining costs for operations of this size.

#### RATIO OF CONCENTRATION.

From the description of the milling operation outlined above, it is evident that the actual ratio of concentration cannot be estimated. A guess would place it at 10 to 1.

#### PRODUCT OBTAINED.

The total concentrates produced by Messrs Wilson and Stone amounted to 49 tons of an average content of about 9-1/2 % V<sub>2</sub>O<sub>5</sub>.

The above covers the points on which you wish a statement from me.

In addition I would add that I consider this a property of much greater merit than the naked facts would indicate. Practically no development has been done but the results accomplished indicate wonderful possibilities under a real development campaign.

Respectfully submitted,