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October 20, 1955

Mr. G. M. Wiles
Manager, Mining Department
National Lead Company
111 Broadway
New York 6, N. Y.

Dear Gloyd:

The following are my remarks, as requested by your memo of October 13, 1955, concerning the report by Mr. G. W. Wunder entitled "Development of Mineral Deposits in the Bradshaw Mountain Area, Yavapai County, Arizona".

In Mr. Wunder's report it is proposed that an exploration project be set up in the southernmost part of the Bradshaw Mountains, some 50 miles north of Phoenix. This coincides with the contiguous Hum Bug and Tip Top mining districts with a total area of about 50 square miles, of which 15 square miles are apparently of most interest.

The ground under consideration is reported to contain numerous narrow but persistent quartz veins, some of which produced gold and silver from the oxidized zone at generally shallow depths. In places there is also some tungsten in the form of wolframite. Vein widths are generally from 1 to 3 feet, and most ore shot lengths are said to average less than 100 feet with values that are described as "spotty". Many of the veins occur along fissures through granite or along the edges of schist pendants included in the granite. There is a hint that shoots may be localized at or near dike intersections.

Several million dollars in precious metals were produced from these districts prior to 1914, but since then there has been very little activity. Most exploration is reported to have stopped at the sulfide zone at shallow depth; however, the Tip Top vein was explored to a depth of 800 feet but was only stoped from the 200 level to the surface throughout a strike length of 600 feet. This apparently was the best ore shoot developed.

The rich ores are said to have contained abundant silver in the form of native silver, cerargyrite, and dyscrasite. At greater depth in the Tip Top there were low-grade blocks of

ground that were uneconomical in the early days, but it is not clear whether this mineralization was sulfide or oxide. Concerning this, Findly advises, apparently on the basis of second-hand information, that ruby silver (sulfide) was found on 800 level. Also, 150 tons of rich ore are reported to have been extracted from between the fifth and sixth levels of the Tip Top, but we do not know the character and average assay value of the surrounding deeper material. It is stated that sulfide ore from unknown depth in the Little Joseph claim was shipped in 1937-1942. This was reported to average \$38 per ton in gross metal value.

All of the workings of the various old mines are at present flooded below the lowest adit draining each particular property, and these deeper levels cannot now be examined. Although the inference from some of the old reports is that the remaining deeper material may be merchantable ore, this matter remains in doubt.

Mr. Wunder lists the assay returns for about 100 samples, most of which were apparently taken by him from shallow workings in the oxidized zone of about 10 veins. Excluding a few picked samples and one sample high in antimony, these give an average gross dollar value for gold, silver, lead, and tungsten (in only a few), as follows:

Average Width:	Average Value:
1.7 feet	\$15.50 per ton approximately

Although the above are arithmetical averages, they are of interest because of the considerable number of samples taken and their wide distribution. It should be noted that only one sample was barren.

Because of the mineral composition of the silver ores and the shallow position of the gold ores, the writer suspects that near-surface secondary enrichment is responsible for much of the rich past production and that as a general rule values may fall off at depth. Consequently most of the ore shoots would be expected to occur just below the surface where past search would likely have found them, and early exploration results point to such localization. This, coupled with the districts' habit of narrow veins and short ore shoots that maintain such characteristics at depth, is not favorable for the finding of large and persistent ore bodies; and exploration and development costs for the tonnage potential would come high.

Somewhat similar quartz veins occur abundantly along and in front of the east side of the Bradshaw Mountains, where the Iron King mine is the only recent producer of importance. This broad area underwent thorough investigation a few years ago by New Jersey Zinc Company, following which certain zones were diamond drilled without success. I do not know whether this examination was carried around the southern end of the Bradshaws to include the Tip Top and Hum Bug districts, but I suspect that it was.

Although I have not personally examined the Hum Bug and Tip Top areas, from the evidence at hand and my familiarity with the east side of the Bradshaw Mountains I am not favorably impressed with their possibilities for containing large, rich, and persistent bodies of ore. On the other hand, present information suggests the possibility of finding several disconnected ore shoots. On the average these might be about 100 feet long and $1\frac{1}{2}$ feet wide with \$15 to \$25 in precious metals. These values might persist to a very few hundred feet in depth, below which it is suspected that gold and silver would fall off although the base metal content might increase. The possibility of finding large remaining bodies of bonanza type ore seems remote. There is also the hazard that schist roof pendants with marginal veins may pinch off at depth. Ore shoots of the kind expected would be costly (per ton of contained ore) to find, develop, and mine.

Unless such a speculative potential as that described above is attractive to National Lead Company, no further action is warranted.

Yours very truly

E. N. Pennebaker

ENP:mc

E. N. PENNEBAKER
CONSULTING GEOLOGIST
P. O. BOX 817
SCOTTSDALE, ARIZONA

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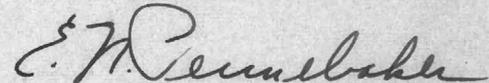
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E. N. Pennebaker

ENP:mc

96 Samples.

1.7 @ £15750[£]

Mostly shallow wells
underground in
at - gone ?

1667.18

162.70

13.6

$$\begin{array}{r} 96 \overline{) 1504.48} \\ \underline{96} \\ 544 \\ \underline{480} \\ 644 \\ \underline{576} \\ 68 \end{array}$$

$$\begin{array}{r} 544 \\ \underline{480} \\ 644 \end{array}$$

$$\begin{array}{r} 644 \\ \underline{576} \\ 68 \end{array}$$

$$\begin{array}{r} 576 \\ \underline{68} \end{array}$$

(+)

32.80
1.10

+ 32.90
26.98

+ 5.92

(-)

23.70
3.28

- 26.98

19.0

97 / 1667.18

97

697

679

81

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	6	5	8	✓	
	6	7	5	✓	
2	1	9	1	✓	
4	0	8	6	✓	
7	5	7	0	✓	
	8	2	5	✓	
	5	7	5	✓	
1	0	7	4	✓	
1	9	6	4	✓	
5	5	1	9	✓	
	3	5	4	✓	
1	9	8	2	✓	
2	7	0	5	✓	
	9	9	1	✓	
2	9	6	2	✓	
	3	9	2	✓	
	1	9	6	✓	
1	3	2	8	✓	
7	4	0	2	✓	
1	3	0	6	✓	
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1	2	0	9	5	✓
2	9	0	8	✓	
3	0	8	8	✓	
	2	6	8	✓	
2	9	9	5	✓	
	1	4	2	✓	
	5	7	2	✓	
1	0	2	5	✓	
2	1	7	4	✓	
	2	3	2	✓	
	6	2	8	✓	
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	5	2	0	✓	
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	5	1	8	✓	
	6	2	4	✓	
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±15.50

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Deed 1 6 6 1.2 6 *
+ 5.92
→ 16.67.18
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