NATIONAL LEAD COMPANY

REPORT ON

DRILLING OPERATIONS

SKINNER'S PASTURE

AND

RECONNAISSANCE

November 1951

through

March 1952

TO: Mr. A. R. Reiser

FROM: Mr. Charles H. Chase.

PURPOSE

The intention of this report is to describe a development drilling program which was carried out in a portion of the area known as Skinner's Pasture in Township 3 South, Range 27 East, Duval County, Florida, and the results of this program.

The object of the development drilling was to determine the economic possibilities of a high grade sand strata, present in this area beneath an overburden of variable thickness, with respect to rutile, ilmenite, zircon and monazite.

Also covered in this report is the Reconnaissance Drilling which was carried out under the following headings:

1) Anders Tract
2) General Reconnaissance
3) Beach Reconnaissance
4) Amelia Island Reconnaissance.

CONCLUSIONS

The circumstances under which the Skinner's Pasture area is being considered are unique in that the factors of operating cost and return on product are for obvious reasons so obscure as to make it outside of the ability of the writer to evaluate the property with reasonable accuracy.

TOPOGRAPHY

The Skinner's Pasture orebody lies on the southerly end of a prominent, narrow sand ridge which extends north and south. Roughly parallel swamps lie on either side.

The ridge rises rather abruptly from the swamps and the higher elevations have the rolling relief which might be expected in drifting sand. Maximum relief is not over thirty-five feet.

Trapped among the dunes are a number of high level swamps which at times impeded drilling operations.

Timber and plant growth is moderate on the elevations and extremely dense in the swamps.

GEOLOGY

The Skinner's Pasture orebody is located in Sections 12, 13 and 24, Township 3 South, Range 27 East. Starting at the north line of Section 12 it extends some 11,000 feet southward into Section 24. The average economic width is 1640 feet.

The part of Skinner's Pasture in question lies on what was once a long sand spit and obviously is an extension of the ridge currently being mined. This spit was undoubtedly built as the result of the combined action of ocean currents and the emergence of the land from the ocean, or possibly the recession of the ocean from the land, similar to many modern spits of recent formation on the Atlantic coast.

The ore, of late Pleistocene, or Pamlico, age, is a sharply defined, essentially flat deposit formed by a combination of wave and dune action. Roughly speaking, the sequence of deposition was probably this:

1) Deposition and concentration by wave action of the heavy minerals on the east slope of barrier reef by southbound ocean currents.

2) Transportation by wind across the reef as a part of westward traveling dunes. As the dunes move there is left, as a result of gravity concentration, a heavy mineral concentrate which is later covered by relatively barren sands. The dunes on reaching the west edge of the barrier drop their heavy mineral load into the water immediately adjacent to the barrier, the wind carrying the lighter sand particles farther out in the water. This develops the "storage" areas on the west end of the cross-sections which shows so prominently on the profiles as having a lower bottom elevation.

A rough approximation of the composition of the heavy mineral in the area of the Skinner Tract was arrived at by Mr. J. H. Carpenter who performed high tension and magnetic separations on a small representative sample of the heavy mineral from the area. This sample was from the A. C. Skinner area which covers the bulk of the orebody. Of the heavy mineral, ore zone:

Rutile	11.1%	
Ilmenite	40.4%	
Zircon	18.6%	
Other	29.9%	(Monazite 0.04%)
(Mostly garnet, staurolite, andalusite)		

In the examination of the ore zone heavy mineral a scale-like magnetic material was observed. This was taken from the sample by means of a magnet and regarded as having come from the metal of the drilling equipment. However, in a later sample it was observed that this material was made up of small clusters of mineral grains cemented by a sort of limonitic material.

Mr. Carpenter estimates that these grain clusters constituted approximately five per cent of the total heavy minerals. The economic mineral percentages were reduced proportionately. We then get, of the economic minerals in the ore zone:

Rutile	15.8%
Ilmenite	57.6%
Zircon	26.5%

The total of which equals 66.8% of the total heavy mineral in the ore.

Some thought was given to the economic possibilities of the overburden which averaged about 0.8% heavy mineral and which, if taken with the ore zone, would have been considerably upgraded with respect to heavy mineral. However, an examination of a sample of the heavy mineral in the overburden shows the difference in composition. Of the heavy mineral in the overburden:

Rutile	6.5%
Ilmenite	29.8%
Zircon	16.5%
Other	47.8%

Thus far it has appeared to be impractical to mill the overburden either with or separately from the high grade material.

OPERATIONS

The portion of Skinner's pasture under option was bounded by the range line on the east, the Skinner property line on the west, the north line of Section 1[illegible] and the south line of Section 36. This to be drilled on a 0.5 mile cross-section interval going south from the north boundary. If the results of this drilling warranted it was then intended to drill on a 0.25 mile cross-section interval between the original cross-sections. Hole interval, east and west, was 300 feet where possible.

Drilling was begun on December 30, 1951 with jet drill rigs one belonging to Humphreys Gold Corporation and the other to National Lead Company. By January 21, 1952, the orebody had been fairly well

outlined by the half-mile cross-sections. By February 18, 1952 the quarter-mile sections, which were drilled in the mineralized zone, were finished. Two hundred-eighty nine holes had been drilled to a depth determined by local conditions. It was the purpose to go ten feet beyond the ore zone in each case. Where no ore was encountered the hole was usually taken to forty-nine feet which, except in two instances, was sufficient. In Skinner's pasture a total of 12,650 feet of drilling was done at an average cost of $1.42 per foot.

The results of earlier prospect drilling indicated that the mineralized zone began at the top of the relatively hard strata of compact sand known as "hard pan." With this in mind the routine for each hole was to take three five foot drives to fifteen feet, taking a sample of each drive. Then the drive interval was to be reduced to two feet, in order that when the hard pan and the ore were encountered their respective distances from the collar of the hole could be closely determined. The samplers were carefully instructed on how to watch for both hard pan and ore. It turned out that the hard pan, when present, usually began some distance above the ore.

This method of drilling was quite effective in determining the vertical limits of ore and overburden within acceptable limits of accuracy.

The hard pan, in the opinion of Mr. M. C. Thompson, drill foreman, is no harder at any part of the economic area than it is in the area now being mined by this company. He has done all of the drilling in this area which has been done for Humphreys Gold Corporation in the past several years and is qualified to speak.

On the west the ore cut off abruptly on the edge of the main swamp. On the east certain cross-sections showed good ore on the edge of the big swamp. Enough work was done in penetrating this swamp, however, to determine that the ore feathered out under the swamp in all cases.

Operations were started with four three-man crews drilling on two shifts, with two men in the laboratory handling the samples and making heavy mineral determinations. Later one crew was dropped and the work was carried nearly to completion on a three crew basis.

EVALUATION

Tonnages of overburden and of ore were calculated by letting each drill hole develop half the distance to the next cross-sections north and south and one half the distance to the next holes east and west. Area developed by each hole multiplied by thicknesses of ore and overburden at that hole gave the respective tonnages of ore and overburden developed there. These tonnages were totalled to give the tonnage of overburden and ore for the economic length of each cross-section. For both ore and overburden the figure of 100 pounds per cubic foot is used.

Exhibits I and II, at the end of this report, are tabulations based on an economic cut-off of 85 tons of overburden per ton of heavy mineral. Any area in which the average overburden exceeded 85 tons per ton of heavy mineral was regarded as uneconomic by Humphreys Gold Corporation. A few holes in which the ratio was plus 85 were included in areas where the average was substantially lower then this.

This cut-off was determined by Humphreys Gold Corporation, the contractor currently mining this company's Jacksonville orebody, and represents an appraisal which is there estimate of operating costs plus a nominal profit yield if they mine the Skinner tract.

Having determined the economic tonnage, the tonnage of recoverable economic mineral is computed by the following method:

Tons ore x 80% mining loss gives net tons of ore after mining.

Net tons ore x grade heavy mineral x 66.8% economic mineral gives tons economic mineral to wet mill.

Tons economic mineral in the wet mill feed x 80% gives tons economic mineral in the dry mill feed.

Tons economic mineral dry mill feed x 95% gives tons product of economic mineral.

Of the product, from J. H. Carpenter,

Rutile	15.9%	
Ilmenite	57.6%	
Zircon	26.5%,	thus

Tons total product	x 0.159	=	Tons Rutile
" " "	x 0.576	=	Tons Ilmenite
" " "	x 0.265	=	Tons Zircon

It must be emphasized that these figures are all preliminary and can serve only as a guide. The sample upon which the economic mineral figures are based was extremely small and the results must be used with caution, also it is possible that the performance of mining and milling tests will throw a different light on the evaluations.

MAPS

Accompanying this report are Exhibits III and IV, a plan map and a set of profiles both of which describe the drilling program and the general nature of the orebody. On both of these the economic area is shown in red.

ANDERS TRACT

During the period of February 25 to 28, 1951, inclusive, twelve holes were drilled in a portion of the South Half of Section 1, Township 3 South, Range 27 East, owned by Ernest R. Anders with whom the company is negotiating for an option.

This work was in the nature of reconnaissance drilling and only general conclusions may be drawn from the results.

Where it was possible a five hundred foot hole interval was used. On cross-section #12, a nine hundred foot swamp intervened between holes #1 and #8. Both holes show quite a strong ore thickness and in view of the elevation of the swamp it is the belief of the writer that mineralization is probably continuous.

The terrain and the nature of the ore strata on both of the Anders cross-sections are about the same as on cross-section #1.

Ore estimate figures are included on Exhibits I and II and this area is included in the plan map and in the set of profiles.

Mr. Anders has said that an area involving some thirty-five acres extending north toward his housing development might be available. This probably should be examined when an option is obtained.

GENERAL RECONNAISSANCE

With the idea of prospecting the ridges east of the high ridge of the Jacksonville orebody, twenty-six holes, from 1-A to 1-Z were drilled in an effort to ascertain whether any areas of promise were being overlooked.

The results of this work were essentially negative. Three holes, 1-D, 1-J and 1-Z showed shallow but localized mineralization.

Because of their location the rather high ridges immediately east of the present mining area were prospect with totally negative results.

It is the opinion of the writer that this work together with all of that done previously in this area, gives a fairly comprehensive picture of a large area about which there had been some question.

BEACH RECONNAISSANCE

In the period from February 28 to March 5, 1952, eleven holes in three cross-sections were drilled on the James Stockton land, adjacent to the ocean just north of South Ponte Vedra.

The work done on this reconnaissance was for the purpose of serving as a guide to further work to be performed by Mr. J. H. Carpenter. The possible high monazite content of the heavy mineral on this property made it of special interest.

On those samples which showed two percent or more heavy mineral, the entire sample was put through the sink-float procedure in order to accumulate enough sample for the monazite determination.

Cross-sections S-1, S-2 and S-3 divide the five mile strip into two roughly equal parts. The widths shown below include the highway right-of-way:

Cross-section	Average Ore Depth	Average Ore Grade	Distance Normal to Beach
1	10	3.8	500
2	10	3.1	400
3	10	2.5	500

This drilling was not done from the tops of any of the dunes between the road and the beach which, if mineralized, would add considerable tonnage of ore; or if they were not mineralized, they would amount to [illegible] of waste. It was Mr. Carpenter's intention to follow this work with a more intensified campaign of drilling, if our results warrant it. He stated that our work to date was quite sufficient and that he did not feel that more was needed at this time.

AMELIA ISLAND BEACHFRONT

Under the direction of Mr. H. S. Cannon twenty-four holes were drilled on the southerly end of Amelia Island, Nassau County, Florida, with the intention of prospecting a series of old spits having roughly east-west axes.

Twenty-two holes, 2-A - 2-V, inclusive, were drilled on the side of State Road 105 on a 0.1 mile interval east of the bridge across Nassau Sound.

The drilling along the road produced two stretches of mineralization with the following results:

Holes	Distance	Average Thickness	Average Grade, H. M.
2-C - 2-F inclusive	0.3 mile	5 feet	4.8%
2-J - 2-V inclusive	1.1 mile	10.4 feet	5.5%

Hole 2-X approximately 600 feet west of Hole 2-P averaged 11.3% heavy mineral, or 10 feet.

The latter of the two sections of mineralization on the highway may warrant an attempt to acquire an option on the surrounding land for further exploration work. Mr. Cannon intends to report further on this work.

The results of the Amelia Island drilling are illustrated on the profile accompanying this report marked Exhibit V.

Respectfully submitted,

Charles H. Chase

Charles H. Chase.

Jacksonville, Florida.
March 27, 1952.

EXHIBIT I

3/25/52

SUMMARY OF CROSS SECTIONS

A. C. SKINNER

Cross Section	O. B. M-Tons	Ore M-Tons	Ratio OB/Ore	Grade % HM	Acres	REM M-Tons	Ratio TOB/THM
1	1,500	957	1.6	6.0	39.2	27.0	25.6
1-A	6,050	1,346	4.5	7.1	84.8	44.6	62.8
2	2,426	535	4.5	7.85	29.5	19.6	57.8
2-A	2,489	673	3.7	10.	40.9	31.6	36.7
3	2,140	561	3.8	8.8	31.8	23.1	43.4
3-A	2,831	1,278	2.2	7.3	59.0	43.6	30.4
4	3,444	915	3.8	8.4	56.7	35.9	44.8
4-A	2,042	1,417	1.4	8.2	52.2	54.3	17.3
5	908	693	1.3	7.7	11.4	24.9	17.0
	23,830	8,375	2.8	7.78	405.5	304.6 (292)*	36.6

. G. SKINNER

5	469	347	1.4	7.7	11.4	12.5	17.5
5-B	418	317	1.3	4.7	13.6	6.9	28.2
	887	664	1.3	6.27	25.0	19.4 (18.6)*	21.3
Total	24,717	9,039	2.7	7.66	430.5	324. (310.6)*	35.7

ANDERS

1	1,242	810	1.5	6.07	32.8	23	25.3
11	2,500	1,324	1.9	5.86	57.1	36.3	32.2
12	867	566	0.5	6.26	21.7	16.6	24.5
	4,609	2,700	1.7	6.01	111.6	75.9 (72.5)*	28.4
Total	29,326	11,739	2.5	7.29	542.1	399.9 (383)*	35.2

* The REM totals in parentheses are the latest figures arrived at by Humphreys and are the ones used in the Summary of Development Work.

EXHIBIT II

3/25/52

SUMMARY OF DEVELOPMENT WORK

	A. C. Skinner	R. G. Skinner	Anders	Total
Overburden - Tons	23,830,000	887,000	4,609,000	29,326,000
Ore - Tons	8,375,000	664,000	2,700,000	11,739,000
90% Mining Rec.	7,537,500	597,600	2,430,000	10,565,100
Grade of Feed				
% H. M.	7.78%	6.27%	6.00%	7.29%
% of Ore Econ @ 66.8% E.M.	5.20	4.19	4.01	4.87
Tons E.M. to Wet Mill	391,950	25,039	97,443	514,520
Tons E.M. to Dry Mill @ 80% W. Mill Rec.	313,560	20,031	77,954	411,616
Tons Total E.M. Rec. @ 93% Dry Mill Rec.	291,611	18,629	72,497	382,803
Acres	405.5	25.	111.6	542.1
Ratio TOB/THM	36.6	21.3	28.4	35.2

± 49,328 tons Rutile Ra[illegible]