

Vital Resources Limited

Suite 500, 67 Richmond Street West, Toronto, Ontario M5H 1Z5 - (416) 361-0737

Summary

Vital Holds properties in the Johannsen Lake District of British Columbia which could contain hundreds of millions of tons of gold-copper ore, grading about \$20.00 N.S.R. On the Soup claims limited soil sampling averaged on one section 0.05 oz. Au and 0.15% Cu over a width of about 500 metres. About 20 hectares averaged greater than 500 ppb au.

On the nearby KLI claims, Vital indicated by drilling 0.5 to 1 million tons grading 0.05 oz. Au, 0.46% Cu and 0.2 oz. Ag, or about 3 million tons grading 0.03 oz. Au and 0.3% Cu and 0.1 oz. Ag-showing that open pit-type mineralization exists.

The gold floats with the chalcoppyrite (and pyrite?).

Surface sampling is difficult because outcrops are scarce and a peculiar oxidation leads to surface leaching of copper. The evidence suggests surface gold leaching also - perhaps related to the presences of manganese.

A drill test is considered essential.

On a second Vital property about 28 miles southwest of Houston, geology, geophysics and geochemistry suggest widespread Ag-Au-Zn-Pb mineralization in a graben. (See Olympic Dam, South

Australia, Econ. Geol. v.78, p.799, 1983). Float on the property assayed 30 oz. Ag, 0.45 oz. Au, and 25% Pb-Zn.

Having spent more than a million dollars of private capital on these properties, Vital is planning to raise some public funds to further test them-particularly the Soup. We are seeking a major company or group of companies which might be prepared to participate in this financing. It is envisaged that after the first test, costing perhaps \$250,000 to \$350,000 (to be supervised by one of the majors ?) success could be followed by further equity financing e.g. by flow-through shares to provide early write-offs. Provision could be made for the major group to obtain management control, and to benefit from early risk-taking at moderate cost.

Other methods of financing the properties could be considered.

We would be pleased to furnish in depth data on these properties and to discuss business arrangements in greater detail.

C. J. Sullivan
C. J. Sullivan
President

August 31, 1983

Attached:

- 1) Report and plans illustrating Johannsen Lake properties.
- 2) Note on Houston property.

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VITAL RESOURCES LIMITED

SUMMARY

There is a good possibility that the SOUP deposit wholly owned by Vital contains hundreds of millions of tons of gold-copper ore grading \$20 per ton, 80% of the value being in gold.

The mineralization could be mined by open pit methods and the gold is recoverable in the copper concentrate.

Total operating costs could be \$5 Canadian (1983).

Cost of a drill test would be about \$250,000.

An additional adjacent property held by Vital has been shown to contain economic mineralization, and an additional \$250,000 is requested to test and hold this property, and for other exploration purposes.

HISTORY

Vital is a private B. C. Company, incorporated as Vital Mines Ltd., later changed to Vital Resources Ltd. It acquired oil, coal, silver, gold and base metal interests. In 1980, a group, including the principals, provided \$500,000 @ 62.50 cents per present share to carry out work and acquire properties. Present capitalization is 10,000,000 shares of which 2,400,000 are issued.

Principals are well-known geologists, C. J. Sullivan and Terence Rodgers. From 1954-71 Sullivan directed exploration for Kennco, which resulted in many discoveries including Equity Silver, B. C. Molybdenum, Stikine Copper, Toodoggone gold-silver, Berg copper-molybdenum, etc. Sullivan and Rodgers, with a Japanese group, discovered the Kutcho Creek copper-zinc deposit

Vital controls the following properties:

OIL

At present, Vital owns oil prospecting concessions S.W. of Houston, B. C. It discovered oil-bearing rocks, later investigated by Esso, which thought that the oil was derived from oil shale. No further work is envisaged at present.

HOUSTON SILVER-GOLD

Vital owns mineral claims (RED et al) about 28 miles S.W. of Houston, B. C. on which there are impressive geological, geochemical and geophysical signs of lead-zinc-silver mineralization. Ore found on the property contains 30 oz. silver/0.45 oz. gold/per ton as well as 25% lead-zinc. This material

new 100% vital - Aug/83.

ould be highly profitable. The property is under investigation by Noranda (Mattagami) which plans further drilling in 1983. While this is proceeding, no further work is planned by Vital.

Total expenditure on this property to date by Vital, Noranda and others is estimated at approximately \$1 million.

The prospect is considered to be valuable, with geology not unlike that at Equity. The source of the ore is probably covered by gravels. Several significant geophysical indications remain to be drilled.

See note Aug/83.

AIR SURVEYS

Vital owns about \$400,000 worth of air-borne geophysical data, in which there are important signs of major mineralization, some very favourably situated for exploration. We plan to investigate these, as funds and metal markets permit.

KLIYUL GOLD-COPPER AREA (Between Aiken & Johannsen Lakes, B.C.)

Vital has been interested in this region for the past 10 years, and has spent over \$1 million in regional and detailed investigations. Past exploration was largely for porphyry copper, but in recent years the value of gold relative to copper has increased by about 10 - 15. This, combined with the discovery of Vital of unusual quantities of gold, has led to the conclusion that this district may be primarily a source of open pit gold. The gold is associated with magnetite, pyrite and chalcopyrite.

Vital controls two claim groups, the KLI and the SOUP, each with similar geology and mineralization.

KLI CLAIMS

These claims were staked in the early 60's by Kennco for porphyry copper. In the early 70's Sullivan and Rodgers, along with Sumitomo, optioned the properties and found mineralization grading 0.06 oz. gold and 0.5% copper. Subsequently, Vital obtained the Sumitomo interest and in 1981 spent \$200,00 on drilling and other work.

The testing was in a small magnetic area, now thought to be satellite to a larger magnetic zone to the north, staked by Vital in 1982.

The limited drilling discovered magnetite-chalcopyrite-gold mineralization and indicated about 500,000 tons grading 0.06 oz/ton Au, 0.46% Cu and 0.2 oz/ton Ag, or 2,500,000 tons grading 0.03 oz Au, 0.3% Cu and 0.1 oz Ag.

Metallurgical work on cores carried out by the Ontario Research Foundation and by the University of Toronto indicated that the gold concentrates readily in the chalcopyrite flotation concentrate which can be sold on good terms. Even if further work shows that some gold remains in the pyrite, this can be

roasted and leached at relatively low cost per ton of ore.

Recoveries for gold and copper are projected by competent metallurgists at 90%.

The KLI claims are presently owned 55% by Vital and 45% by Kennecott Copper. Vital can expand its interest to 80% by a further expenditure of about \$1 million.

Limited geochemical and magnetic investigation of the new claims staked in 1982 is proposed for 1983, the main attention being focused on the impressive SOUP claims.

SOUP CLAIMS

These claims commence about 6 km S.W. of the KLI claims, and are wholly owned by Vital. The geology is a continuation or repetition of that found at KLI and the deposits are similar. Large magnetic oxidized sulphide zones (gossans) are present, but outcrop is obscured by soil and rock scree.

The mineralized zones are believed to extend throughout the length of the claims (8,000 ft.) and the width of the zone could be up to 1,000 or more feet. Gold and copper are present in bands of rock containing up to 30% magnetite, but geochemistry, magnetics and rock sampling indicate that these metals are present also in other rock units containing minute fractures with magnetite, chalcopyrite, gold etc. Such vein systems, known as stockworks, have formed many large ore deposits.

Soil Sampling

As shown on the accompanying plans, soil sampling results are very impressive. For example, the accompanying section along line 40 and 50 S shows that, across a width of about 450 meters, samples taken every 25 meters averaged about 2000 ppm copper and 1.5 gms/ton gold. The value of these metals is about \$30 per ton at present prices.

Magnetics

Magnetics carried out by Noranda on SOUP 1, 2, 3 and 4 claims show that though higher readings occur over some mapped magnetite bands, previously unknown highly magnetic zones also exist, while a relatively high magnetite zone extends for 500 meters north of the baseline. This is also the area of high geochemistry. Whereas on the KLI claims the magnetic band drilled was 8,000 to 10,000 above immediate background, on the SOUP the known high magnetite bands are only 2 - 3,000 above the surrounding areas, showing that these also probably contain magnetite and other mineralization.

*Correlation between geochem. + highest mag., not 1:1.
Mineralization in "augite porphyry" (same intrusion?)
"diorite", etc suspected.*

Rock Sampling

This accompanying map shows rock sampling results. Owing to the difficult terrain and to scarcity of outcrop, only 17 spot samples were taken within the area of interest on claims 1, 2, 3, 4 & 11. However, of these, 8 contained metals worth plus \$20 per ton, 3 showed significant copper and 6 were negative.

This sampling is quite inadequate for a proper test, but the results are considered encouraging.

Economics

In thinking of gold deposits such as those in the Kliyul area, it is important to consider nett smelter return. Smelters pay for 95-98% of the gold in a copper concentrate, whereas freight, smelting, refining and realization of copper may cost 35-45¢ per lb. A rough copper concentrate from Kliyul (3.9% Cu) contained 1.47 oz gold/ton. A cleaned copper concentrate (20+% Cu) could therefore be expected to contain plus 5 oz gold per ton. This means that the producer could be paid for 98% of the value of the gold. At 90¢ per lb for copper, however, the concentrate producer would probably received about 50¢ per lb.

Thus, a miner recovering 10 lbs of copper per ton (0.5%) with copper at 90¢ might receive about \$5 per ton from the smelter, whereas a gold-copper producer recovering 1 gm gold per ton (about 0.03 oz) and 6 lbs of copper per ton (0.3% Cu) in a 5 oz gold per ton concentrate might expect to receive:

Gold at \$600 Cndn	=	\$20 x 98%	=	\$19.80
Copper at 90¢ Cndn	=	6 x 50¢ net	=	3.00
				<u>\$22.80 per ton</u>

Put another way, Kliyul-type ore (0.3% Cu, 0.03 oz Au) is equivalent in value to about 2% copper ore.

For comparison Lornex revenue per ton in 1981 was \$6.60, 20% being from molybdenum, now not so saleable. Operating costs were \$3.59 per ton. Other operating properties had lesser revenue per ton.

Using current Brenda (\$4.50), Lornex (\$3.60) and other costs, it is considered at this stage that large-scale (30 to 50,000 t.p.d.) mining and milling in this area could be carried out for \$5 (1983) per ton. As shown on the section, stripping ratios for major ore widths could be quite modest, and our mill tests indicate relatively easy concentration of the gold and copper at moderate grinding. Therefore, the following economics

Economics (Cont'd)

are possible, using 1983 prices, costs etc.:

Throughput - 15,000,000 t.p.y.

Revenue @ \$20/ton	-	\$300,000,000
Operating cost		<u>75,000,000</u>
Operating profit		<u>\$225,000,000</u>
Capital cost		<u><u>\$350,000,000</u></u>

(These numbers are shown to illustrate the type of prize which could be present.)

Proposed Program

The program envisaged is essentially to drill, as shown on Section 40 + 505. This would consist of about 725 meters or 2,400 ft. of diamond drilling, with core analysis, etc. At an estimated cost of \$250,000 this is considered an excellent venture in relation to the prize outlined above.

Toronto, Canada
January, 1983

C. J. Sullivan
C. J. Sullivan
President.

Vital Resources Limited

Suite 500, 67 Richmond Street West, Toronto, Ontario M5H 1Z5 - (416) 361-0737

HOUSTON, SILVER-GOLD-LEAD-ZINC

This property is centred about 28 miles southwest of Houston, B.C., 2 miles south of the gravelled Morice River road.

Geochemical surveys by Anaconda revealed widespread Zn-Pb-Ag in soils. Drilling discovered 1 to 3 oz. per ton silver with zinc and lead in Mesozoic tuffs and breccias over widths up to 100 feet. However the grade of this material in mineable widths appears uneconomic, and it does not explain the geochemistry.

Further detailed sampling by Vital shows that much of the geochemistry is arranged in fans, with the apices pointing west. This corresponds with the dominant ice movement from the Coast Ranges to the west, easterly down the Morice River. The claims are within the ice carved valley of the Morice, south of the present river.

The western apices of the major geochemical trains terminate in a graben structure containing Tertiary (?) lavas and intrusives surrounded by Hazelton? (Mesozoic) steeply dipping tuffs fragmentals and sediments. Faults at the edges of and within the graben are characterised by E.M.16 and other electromagnetic anomalies. Float grading 30 oz. silver 0.45 oz. gold, and 25% lead-zinc was found directly down ice and down geochemical train from an E.M.16 and shootback anomaly on the western margin of the graben, suggesting that some of the faults are mineralized, and that some

mineralization was exposed to ice and water.

The recent discovery of a 2 billion ton high-grade deposit at Olympic Dam, South Australia (Econ. Geol. v.78, p799, 1983) as well as much other evidence, emphasizes the importance of graben in the localization of ore. Hitherto most emphasis at Houston has been placed on the Sam Goosly (Equity) model-a discovery supervised by Sullivan.

The very widespread geochemistry and its favourable geology suggests that large deposits could exist, rich in silver and gold. More sophisticated geochemistry including localized tests for mercury, fluorine, etc., combined with geophysical methods such as gravity, deep I.P. magnetics etc., might well reveal large targets. In the mean time, definite drilling targets exist for fault-controlled high-grade veins. These should be tested, as being very economic in themselves. Additionally, they might lead into very exciting discoveries. (See Summary Plan and Section)

Widespread glacial deposits, plus concentration on the eastern bedded mineralization, have caused the graben zone to be neglected, though I have been convinced for sometime that this is the major source of metal, and of the high-grade float.

C. J. Sullivan
C.J. Sullivan
President

August 31, 1983

C. John Sullivan
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DIORITE AND GOLD - SOUP CLAIMS

Apart from the gold and copper associated with magnetite skarn zones, mineralization may also exist in dioritic sills - a possibility which has been neglected.

One sample taken by B.P. Minerals, apparently in a dioritic footwall sill, assayed 0.95 oz Au/ton over 3 meters (Soup claim 1).

Limonite-rich gossan, apparently in situ, which I examined immediately east of the baseline at 4225 S. appeared to be replacing basic igneous rock. It was only moderately magnetic. Adjacent soil samples contained 1.8 to 4.5 gms gold per ton and 1000 to 1500 ppm copper. The Shell Diorite, which extends on to the Soup claims, is known to be associated with magnetite-copper-gold mineralization (G.S.C. Memo. 274, pp 212-217, 1954).

On another property in this district, 0.2 to 0.3 oz gold per ton over widths of 30 to 40 ft. has been obtained in sheared diorite sills (Ibid, pp. 217-218).

There is a world-wide association between diorite and gold, e.g. Bougainville.

C.J. Sullivan

March 1, 1983

Vital Resources Limited

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KLIYUL AREA

HIGH MAGNETITE ZONES

Apart from the possible occurrence of very large mineralized zones susceptible to mass mining (10-20 million t.p.y.), the Kliyul area offers good possibilities for medium scale (1-2 million t.p.y.) mining of the more massive magnetite zones.

Thus, on the SOUP claims, distinguished geologists White, McTaggart and Sinclair estimated 27,000 tons per vertical foot of this material, or 27 million tons to a depth of 1,000 feet. Apart from the deposit already drilled, the KLI claims also offer good potential for additional ore of this type.

A senior engineer of a major company made a financial analysis of mining this material using the following parameters:

Tonnage	-	25 million
Grade	-	Au, 0.08; Ag 0.2; Cu 0.46
Price	-	Au \$600 Cn; Ag \$15; Cu 0.90¢/lb.

Open pit to 300 feet, 2.8:1 stripping ratio; width 70 feet; rate of production 2.5 million s.t.p.y.

This study showed a rate of return of 29% and a present value, discounted at 15% of \$83 million.

Although narrower zones may not be susceptible to open pit mining, these estimates show that the SOUP AND KLI claims may well contain very valuable gold-copper deposits, even if the larger zones prove uneconomic.

Toronto, Canada
January 28, 1983

C.J. Sullivan
President

Since writing the above, I have received reports on the Soup mineral claims, extending from 1 mile to 2.5 miles south-east of Vital claims. A continuous line of gossans extends from the Kli to the Soup claims. The gossans are believed to cover the same stratigraphic zone.

Concordant, magnetite-rich skarns have been mapped on the Soup claims for a distance of 8,000 ft., over widths of 20 to 100 ft. On the basis of the exposed zones, mineralization has been estimated by reliable geologists K.C. McTaggart, and W. H. White at 27,000 tons per vertical foot. The mineralized beds are exposed in various places over a vertical range of 2000 ft.

Examination of cores indicates that the material is essentially similar to that found on the Kli claims, and is probably at the same stratigraphic horizon. It appears to have been calcareous tuff, underlain by a diorite sill.

Surface sampling by G. Mannard of Texas Gulf in 1964, at three sites 500 ft. apart, gave the following results:

	Outcrop width	Au	Cu
<i>High grade zone</i> Site 1	20 ft.	0.09 oz/ton	0.91%
Site 2	35 ft.	0.06 oz/ton	0.46%
Site 3	30 ft.	0.10 oz/ton	0.44%
Average	28 ft.	0.08 oz/ton	0.63%

This material is similar in grade to that found on the Kli claims. It is thought to average 30 per cent Fe. No tungsten assays are known to have been made.

Other spot samples contained 0.02 oz/ton Au and 0.2% Cu. There is fairly extensive shallow surface oxidation and some leaching, at least for copper. Surface samples on the Kli deposit averaged 0.06% Cu and 0.04 oz/ton Au against a primary grade of 0.45% Cu and 0.07 oz/ton Au.

The Soup information is important for the district indicating:-

- (1) Stratigraphic control.
- (2) Persistence along strike and down-dip.
- (3) Large tonnage potential.

It is anticipated that the Soup claims will be optioned by Vital, and that the financing of Kliyul Mines will include provision for the exploration of these claims.

Jan 27. A sample taken by B.P. at the north end of property assayed 0.975 oz Au/ton over 3 meters. A further 102. Sample was obtained from our property. High-grade zones could be present.

ONTARIO RESEARCH FOUNDATION

SHERIDAN PARK RESEARCH COMMUNITY

MISSISSAUGA, ONTARIO, CANADA L5K 1B3 • (416) 822-4111 • TELEX 06-982311

31st October 1980

Mr. C.J. Sullivan
President
Vital Mines Ltd.
Suite 1014, 111 Richmond Street West
Toronto, Ontario
M5H 2G4

Subject: Testwork on Gold Ore Samples
ORF Investigation No. 80-71276

Dear Sir:

We have conducted assaying and flotation testwork on two samples submitted to us in July. The samples were marked KL-8 and KL-10. Sample KL-10 had an assayed trace (less than 0.01 oz/ton) of gold and also a trace of tungsten.

Sample KL-8 also showed a trace of tungsten and a calculated gold content of 0.085 oz/ton. On this sample we performed a Davis tube test at -200 mesh, to check if the gold occurs with the magnetics. The results were:

<u>Product</u>	<u>Wt. %</u>	<u>Au oz/ton</u>	<u>Au Dist.</u>
Head	100.0	0.085	100.0
DT Concentrate	12.7	0.02	3.0
DT Tails	87.3	0.09*	97.0

*calculated

/continued...

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There was some doubt as to the accuracy of the assay on the Davis tube concentrate, but we were assured by the assayers that they were correct. All assays were performed by X-Ray Assay Laboratories Ltd. of Toronto.

A flotation test was performed on a sample of the KL-8 material ground to -150 mesh. Conditions were:

Pulp Density: 25%
Dispersant: Soda ash 1.0 lbs/ton
Collector: Xanthate 350 0.1 lbs/ton
Frother: Aerofroth 65 0.05 lbs/ton

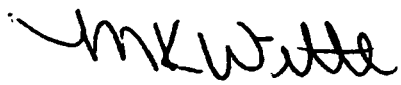
Conditioning time was 10 minutes and flotation time 3 minutes. The concentrate was re-floated with 0.025 lbs Aerofroth 65 for 2 minutes. The results were:

<u>Product</u>	<u>Wt. %</u>	<u>Au oz/ton</u>	<u>Dist.</u>	<u>Cu %</u>	<u>Dist.</u>
Head	100.0	0.085*	100.0	0.36	100.0
Rougher Underflow	76.2	trace	4.4		48.0
Clean Underflow	19.0	0.06	13.3		
Clean Overflow	4.8	1.47	82.3	3.9	52.0

It is apparent that the gold floats with the copper.

Due to the low tungsten content in the ore, no attempt was made to concentrate this mineral.

A second flotation test was carried out on KL-8 and the concentrate submitted to Vital Mines for their own tests.



M. K. Witte
Assistant Director
Department of Metallurgy
JB:df

Yours very truly



J. Biskupski
Senior Technician
Department of Metallurgy

SURFACE LEACHING OF METALS

KLIYUL AREA, B. C.

Several geologists visiting the Kliyul area, especially the SOUP claims, have noted the remarkable degree of oxidation, and some have been aware of the possibility of surface leaching of metals. These phenomena are well known in some parts of the world.

Thus, in the rather similar magnetite-chalcopyrite-gold deposits of Tennant Creek, Australia, which I investigated, copper and gold are leached from surface zones. At Oktedi, New Guinea, oxidized outcrops contained less than 1 gm gold per ton, whereas deeper zones contain 5-6 gms per ton. (This major porphyry copper-gold deposit was discovered by Kennecott with which Sullivan and Rodgers were associated. Canadian explorationists who took part, inform me that the surface geochemical expression is similar to that found on the SOUP claims).

The Berg deposit, south of Smithers, B.C., found and drilled by Kennco under my direction has very marked oxidation and surface leaching.

Although I am not suggesting that in the Kliyul area, there is anything like the depth of oxidation and leaching common in Australia or New Guinea, it is quite possible that the 7,000 foot mountain on the SOUP projected above the valley glaciers. In any case, there is direct evidence of surface leaching of copper and gold: -

- (1) In 1964, George Mannard, an extremely capable geologist, visited this area for American Metals. For sampling, Mannard took advantage of "actively eroding gullies, enabling the testing of relatively unweathered material". His samples were taken from magnetite-rich zones on the southern portion of the property (Claim 10). His results were: -

	<u>Width</u>	<u>Au</u>	<u>Cu</u>
Site 1	20 ft	0.09 oz/ton	0.81%
Site 2 (500 N of 1)	35 ft	0.06 " "	0.56
Site 3 (1,000 ft. N of 1)	<u>30</u> ft	<u>0.10</u> " "	<u>0.44</u>
Average	28 ft	0.08 oz/ton	0.57%

Continued

This is very comparable to the material we intersected in drilling the KLI claims.

In 1971, Falconbridge drilled 3 packsack holes in the oxidized outcrop to depths of 15 ft (1) and 25 ft (2) "at sites dictated by topography and water supply..... close to Mannard's sample sites". In the first hole the upper 5 ft assayed trace gold and 0.07% copper. Remaining samples 0.16% to 0.37% copper and 0.02 oz gold. Geologist T. Gyr, noted that "leaching seems to be predominant in the first 5 to 15 ft.

Dr. A.J. Sinclair, P.Eng., made a mineralographic study of the drill cores in 1975 and reported: "It is interesting to note that the short X-ray drill holes put down in 1971 did not actually penetrate the zone of weathering."

Two other gossanous surface samples graded 0.1 - 0.2% copper and 0.012 oz gold.

- (2) The soil sampling on the northern portion of the SOUP claims tends to suggest that the higher values occur in actively eroding gullies. This has been taken by some to indicate soil enrichment. It may also reflect more contact with the sort of material sampled by Mannard.
- (3) T. Rodgers and I have investigated essentially identical mineralization on the KLI claims. A 60 ft surface sample on a relatively fresh magnetite zone exposed to active erosion averaged 0.1% copper and 0.04 oz gold. Drill holes in the primary material averaged 0.06 oz gold, 0.45% copper and 0.22 oz silver.

A drill hole (5) after passing through 22 ft of overburden entered a limonite stained zone with minor malachite. A sample from 23-35 ft assayed 0.005 oz gold, 0.12% copper and 0.01 oz silver. From 52 to 91.5 ft the core averaged 0.075 oz gold, 0.95% copper, 0.17 oz silver.

In summary, the evidence indicates the presence of surface leaching and suggests that surface chip sampling may give deceptively low results. Such leaching can also render difficult, evaluation by surface inspection. It reinforces for me, the positive significance of the high geochemical results.

C.J. Sullivan
President

Toronto, Canada
January 28, 1983