012677

HART RIVER MINES LTD.
Report on
Mark Group Claims
Hart River, Yukon Territory

by:
F.J.L. Guardia, B.Sc.
ALRAE ENGINEERING LTD.

March 20, 1971

ALRAE ENGINEERING LTD.
VANCOUVER, B.C.
ENGINEERS & GEOLOGISTS

ABSTRACT

A deposit of massive sulphides, containing copper, lead, zinc, silver and gold, was located in the Hart River area in the Yukon Territory in 1966. The Mark Zone, as the deposit became known, is included in the Mark Group of claims which are registered in the name of Hart River Mines Ltd.

The claims lie 87 air miles east-northeast of Dawson City and 397 miles by road from Whitehorse. A winter road from the Dempster Highway has been constructed by Hart River Mines.

The Mark Zone, which has a central lens of massive sulphides discontinuously mantled by banded sulphides, measures 630 feet in length, 450 feet downdip and attains a thickness of 75 feet. The main portion of the body has a dip between 65° and 75° to the south. The principal sulphides present are pyrite, pyrrhotite, chalcopyrite, sphalerite and galena, with very minor tetrahedrite-tennantite. The sulphides are emplaced in a zone of thrusting which occurs along the axial plane of a small, local, westerly plunging overfold in argillites and siltstones, and andesite sills that were intruded into the argillites prior to folding. Following emplacement of the sulphides, which took place by replacement along bedding in the argillites and by local breccia filling in the andesite, the zone underwent further faulting and brecciation which have greatly added to the complexity of the deposit.

Exploration on the Mark claims has included geochemical, electromagnetic and magnetic surveys, geological mapping, 10,100 feet of diamond drilling from surface, 1,960 feet of crosscutting and drifting to explore the Mark Zone and 8,108 feet of diamond drilling from underground.

As a result of the exploration work to date it is concluded that the Mark Zone contains 528,500 tons of proven and probable ore with a net smelter return value of $20.21 per ton, using a $10.00

cut-off. Considering a 15% dilution factor, it is estimated that total costs of mining, milling and transportation, using a 500 tpd milling rate, will be slightly higher than the NSR value of the ore. However, if an additional one and one-half million tons of similar grade could be found, and a milling rate of 1,000 tpd employed, it is estimated that a viable mining operation might be feasible.

Effective exploration to date has been largely confined to exposed regions on the claims, but it is believed that favourable lithological and structural relationships exist beneath the extensive areas of overburden on the claims. In addition, an area known as Area A, or the 3rd Saddle Zone, 1,500 feet south of the Mark Zone, has been demonstrated to be geologically, geochemically and electromagnetically similar to the Mark Zone and constitutes a first class exploration target.

It is recommended that an electromagnetic survey using the TURAM method be conducted on the overburden areas and that the Area A anomalous zone be investigated by some 2,000 feet of diamond drilling. Total costs for the program are estimated to be $95,000.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

INTRODUCTION

GENERAL

The Mark Group property of Hart River Mines is a silver-copper-lead-zinc prospect located in the Hart River catchment area of the Yukon Territory. The main mineralized zone, known as the Mark Zone, is a replacement body of sulphides that has been partially explored by diamond drilling and underground development.

The exploration and development work on the property has been conducted by Alrae Engineering Ltd., on behalf of Hart River Mines Ltd. The writer is a Senior Geologist with Alrae Engineering, and this report is intended as a summary of all work by Alrae personnel on the main mineralized zone, as well as a description of the 1970 field program on the property. Exploration in 1970 and correlation of all earlier results has been under the direct supervision of the writer. The writer is not responsible for any work prior to 1970 on the property.

In the final section of the report conclusions are reached on the nature and value of the main mineralized zone and recommendations are made for further exploration for additional ore reserves that are needed before production plans and cost estimates may be seriously contemplated.

LOCATION, ACCESS AND TOPOGRAPHY

The claims are situated latitude 64°38'N, longitude 136°51'W on a northerly flowing tributary of the middle Hart River (figs 1-2). Dawson City is 87 air miles to the west-southwest, Mayo is 77 air miles to the south-southeast, while Whitehorse is 273 air miles to the south.

The claims are accessible by road in winter, using a 64 mile winter road constructed and maintained by Hart River Mines, from Mile 49 on the Dempster Highway which has its beginning 32 miles from

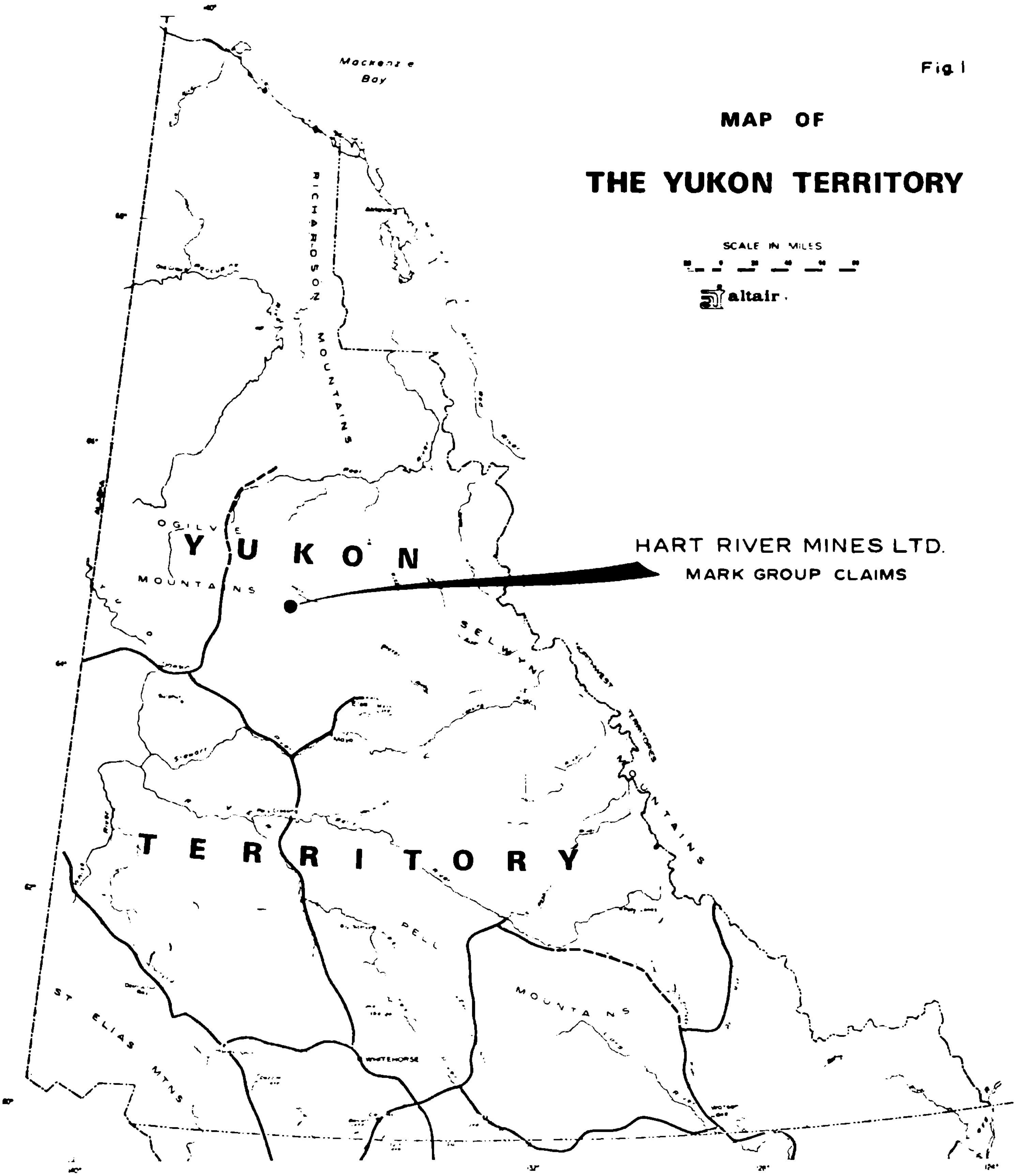


Fig. I
MAP OF
THE YUKON TERRITORY
SCALE IN MILES
altair
Mackenzie Bay
RICHARDSON MOUNTAINS
OGILVIE MOUNTAINS
YUKON TERRITORY
HART RIVER MINES LTD.
MARK GROUP CLAIMS
SELWYN
MOUNTAINS
PELLY
MOUNTAINS
ST ELIAS MTNS
WHITEHORSE

Dawson (fig. 2). Total road distances are: Whitehorse 397 miles; Dawson 145 miles; Mayo 227 miles. A 110 mile railway connects Whitehorse to deep sea facilities at Skagway, Alaska.

A gravel airstrip, suitable for aircraft up to DC3 size, has been constructed some 3/4 mile downstream from the main Hart River camp.

Elevations on the claim group vary from 3,200 feet to 6,500 feet. Gradients are generally steep and much of the outcrop areas are extremely rugged.

The tree line at these latitudes is around 3,500 feet so that only the main creek valley, in which the camp site is situated, has an appreciable tree cover of rather stunted black spruce. The small amount of timber required in mining is, however, obtainable in the valleys locally.

The climate is generally good for these latitudes. The severe cold of winter is compensated for by low snowfall and light winds. Snow can fall any month of the year but the short summer is generally warm and fairly dry. The area is one of permafrost.

Adequate water is available on the claims for mining and milling purposes.

PROPERTY

The Mark claim group is comprised as follows:

CLAIM NAME	RECORD NUMBER	EXPIRY DATE
Mark 1	Y6283	September 12, 1978
Mark 2	Y6284	September 12, 1974
Mark 3	Y6285	September 12, 1978
Mark 4	Y6286	September 12, 1975
Mark 5 - 10 incl.	Y6462 - Y6467	September 12, 1974

Mark 11	Y6468	September 12, 1973
Mark 12	Y6469	September 12, 1975
Mark 13 & 14	Y6470 & Y6471	September 12, 1978
Mark 15 - 17 incl.	Y6472 - Y6474	September 12, 1974
Mark 18	Y6475	September 12, 1975
Mark 19 & 20	Y6476 & Y6477	September 12, 1978
Mark 21 - 24 incl.	Y6478 - Y6481	September 12, 1975
Mark 25 & 26	Y14037 & Y14038	September 12, 1975
Mark 27 - 34 incl.	Y6912 - Y6919	September 12, 1975
Mark 35 - 38 incl.	Y14039 - Y14042	September 12, 1972
May 1 - 6 incl.	Y14763 - Y14768	September 12, 1972
May 12	Y14769	September 12, 1974
May 14	Y14770	September 12, 1972
Linda B 1 - 9 incl.	Y14771 - Y14779	September 12, 1972
Linda B 17 & 18	Y14780 & Y14781	September 12, 1976

All claims are recorded in the Mayo Mining District and are registered in the name of Hart River Mines Ltd.

HISTORY

The claims were staked in 1966 by D. Reinke who had been sent to the area by the Callison Syndicate to investigate a number of gossans and stained areas which had been observed by Mr. Callison from the air during many years of flying over the Wernecke Mountains. The most interesting zone was one occurring in an east-west saddle on a northerly trending ridge, from which extended two long streaks of stained talus and a creek in which bright red-stained boulders were conspicuous, and which suggested the oxidation of sulphide mineralization.

Preliminary trenching, an electromagnetic survey and geochemical soil sampling conducted in the neighbourhood of this zone in the summer of 1967 not only tended to confirm the presence of a sulphide body but gave interesting indications of base metal values. Two pack-sack drill holes completed in 1967 confirmed the existence of a massive sulphide body beneath the oxides exposed on the saddle.

In the summer of 1968, 31 diamond drill holes totalling 7,265 feet were drilled; 6,728 feet to explore the main mineralized zone and 537 feet, in one hole, to explore a second zone, beneath a topographic saddle, some 700 - 1,200 feet to the south, where apparently similar geological conditions were seen. In the same year the geology over 30 square miles was mapped on 2,000 feet to 1 inch scale, two square miles on 500 feet scale and 1/10 square mile on 50 feet scale, centred on the main mineralized zone. 7.8 line miles were surveyed electromagnetically using the Craelius EM Gun and 901 geochemical soil samples were collected from some 35 line miles and assayed for copper, lead and zinc. Magnetometry was conducted over the immediate mineralized area.

Based on the results of the 1968 diamond drilling, the decision was reached to explore the main ore body by tunnelling into it at the 3880 foot level. Consequently, in 1969-1970 some 2,000 feet of tunnelling were completed on this level and a further 220 feet on the 3680 foot level. The latter level was discontinued before it entered the mineralized structure, to await correlation of all previous data.

In 1969, 5,318 feet of diamond drilling, in 31 holes, were completed from underground and a further 2,835 feet, in eight holes, were done from surface.

In the spring of 1970, a review of all data obtained to date indicated that the development to that time had almost defined the full extent of the main mineralized zone, but that a number of interesting targets, based on earlier geochemical and geophysical data, had never been followed up. As a result of this review, and of the limited funds available for exploratory work in early 1970, all underground mining and drilling was discontinued and efforts were concentrated on surface work in the form of further EM and geochemical soil sampling. A map of the geology on the 3880 foot level was also completed.

GEOLOGY

REGIONAL GEOLOGY

The regional geology of the Hart River area is described in the G.S.C. paper 62-7: Dawson-Larsen Creek and Nash Creek Map Areas, Yukon Territory, by L.H. Green and J.A. Roddick.

The Wernecke Mountains, lying between the middle Hart River and the Hart River, are largely underlain by sedimentary rocks of the Proterozoic and early Paleozoic. Unit 1 of Green and Roddick is a dark weathering slate and argillite formation that has been intensely folded and sheared. Although phyllites are locally developed, the unit is relatively unmetamorphosed. The bottom is nowhere exposed and the unit may be over 5,000 feet thick. Unit 2 in the Larsen Creek area is rather restricted, being from 1,000 to 1,500 feet thick but the top is nowhere exposed. Generally, the unit is intensely deformed with tight folding and shearing. The dominant rock type in the formation is a thin-bedded, orange-weathering dolomite. Locally, a sub-unit, 2d, has been recognized, in which white, green and mauve sugary quartzites, dark grey shale and minor purplish and green shales are predominant.

Proterozoic rocks later than Unit 2 in this area were either never deposited or entirely removed during a long period of regional folding and erosion, as Unit 8 lies with high angular unconformity over Units 1 and 2. Unit 8 is generally considered to range in age from Upper Cambrian to Upper Silurian and consists almost exclusively of carbonate rock: limestones and dolomites. There are considerable variations in bedding thickness and in colour, and distinctive marker horizons have been recognized. In the Larsen Creek area, most of Unit 8 occurs as thrust blocks and rarely can the unconformable relationship with the underlying units be seen.

Sills of diorite, gabbro and their altered equivalents, at least some of which are considered younger than early Mesozoic, by Green and Roddick, intrude Unit 1 and 2, but have not been observed to cut Unit 8. Frequently these intrusives are altered to secondary amphibole, albite and epidote, which may display a foliation in the marginal zones, parallel to that developed in the host rocks, indicating intrusion prior to the main orogeny.

Two major periods of orogeny are recognized; one, which preceded the deposition of Unit 8, threw Units 1 and 2 into tight isoclinal folds on west-northwest axes, with south-southwest dips and overall westerly plunge, which, on a regional scale, is also reflected by alternating broad bands of country underlain by Unit 1 or Unit 2. Following a major period of orogeny and erosion, Unit 8 was laid down with marked angular unconformity on both Units 1 and 2.

Gentle folding of Unit 8 has been complicated by thrusting, dominantly from the southeast, which has given rise to complex alternations of the Paleozoic and Precambrian rocks.

It would appear that this part of the Yukon escaped severe glaciation in Pleistocene times. Undoubtedly minor valley glaciers existed in the Wernecke Range until comparatively recently, but the absence of deep hanging-valleys and large deposits of moraine preclude wholesale glaciation by an extensive ice cap. Present sharp topographic features are largely due to recent frost shattering.

CLAIMS GEOLOGY

The geology of the Mark claim group and the surrounding area has been mapped in detail by Allan S. Macdonald and John L. Usher (December 1968), on a scale of 1" = 2,000' and 1" = 500' (see fig. 3). The stratigraphic units distinguished by these geologists in the general area are summarized below:

AGE	FM.	LITHOLOGY	THICKNESS	MAP UNIT
Paleo- zoic	K	Pale Grey Limestone	+1,500'	8 (Larsen Ck.)
		U N C O N F O R M I T Y		
Proterozoic	J	Greenish qtzte/grey sh.	300-400'	
	I	Dark grey limestone	1,200'	
	H	Upper dolomite	600'	
	G	White quartzite	1,500'	
	F	Ferruginous qtzte/slate	200'	2
	E	Upper argillite	300'	
	D	Middle dolomite	1,500'	
	C	Middle argillite	1,700'	
	B	Lower dolomite	3,000'	
	A	Lower argillite	4,000'	1

Underlying the immediate area of the Mark claims are formations B, C and D. Formation B, or the lower dolomite, is characterized by orange weathering, laminated dolomites with thin argillite beds. In the area north of Reinke Creek, a distinctive platiness is imparted to the formation by a strongly developed cleavage which, with development of the more argillaceous facies, gives rise to pale grey phyllites.

Formation C, or the middle argillite, is comprised of two members; finely colour-banded blue-grey to black slaty argillites, some 300 to 400 feet thick, form the lower member and act as hosts to the Hart River Mines sulphide mass. The upper member consists of some 1,200 to 1,300 feet of drab buff, green and purple cleaved argillites and greenish, cleaved siltstones.

Overlying formation C is the middle dolomite, formation D, which is some 1,500 feet thick and consists of orange weathering platy dolomitic limestone with argillaceous laminae.

In the mapping of Usher and Macdonald, igneous rocks on the Mark claims are divided into diorite and andesite. The division is largely based on the overall differences in grain size. The main diorite mass, occurring east of Reinke Creek, is typically medium to coarse grained, dark green to black hornblende and diopside diorite and gabbro, with fine grained andesite in the chilled marginal regions. This mass appears to be a very large, moderately dipping sill, or a multiple sill, with southwesterly dip, intruded into the lower dolomite formation.

Sub-parallel to the main diorite are other westerly to southwesterly dipping sills that occur within the middle argillite formation on the west side of Reinke Creek. It is the scarp face of these sills that gives rise to the pronounced easterly-facing cliff in the neighbourhood of the main mineralized zone. These intrusive sheets have been termed 'andesite' and are generally thought of as being roughly contemporaneous with, and a fine grained version of, the diorite.

The fresh andesite seen underground and in diamond drill core is very variable in grain size, composition, texture and degree of alteration. Frequently, the original mafic constituents are altered to secondary amphiboles and chlorite, while feldspars are broken down to albite and epidote, with an overall masking of the original rock textures. Locally, the rock is finely porphyritic with either plagioclase or a mafic constituent being present as phenocrysts.

In many cases the argillite in contact with the andesite sheets, usually both above and below the sheet, is hornfelsed to produce a rock almost indistinguishable from the intrusive. In core logging, the actual contact could seldom be fixed with precision.

That the intrusives were generally emplaced prior to the principal orogenic phase is evidenced by foliation of secondary minerals in the marginal portions of the andesites that lie parallel to cleaving within the argillite.

The generally simple picture of early Mesozoic, intermediate to basic intrusive rocks intruding a long-consolidated pile of Proterozoic sediments with sill and sheet-like form is complicated by the recognition of pillow-structure in the basic rocks and a local dislocation and mineralization of the andesite. Approximately spheroidal structures in the andesite were recognized in 1970, high on the arête south of the Third Saddle Zone (see fig. 3). Although considerably deformed, they appear to be pillow-structures, thus indicating an extrusive origin for at least part of the andesites (others, especially the main sill below the pillows, show distinct columnar jointing), which would then indicate a Proterozoic age penecontemporaneous with that of argillites. Such an origin would readily explain the deformation, local brecciation and mineralization of the andesite. The presence of alteration and hornfelsing above and below the frequently obliterated contacts may possibly be explained by the extrusion onto and intrusion into unconsolidated wet sediments.

Arguing against entirely separate ages for the andesite and diorite is the lack of Proterozoic extrusives in the mapping of Green and Roddick, and the close similarity in composition and texture between the andesites in question and the intrusive diorite east of Reinke Creek. Further study of age relations is required to resolve this problem.

Warping of the andesite sheets was recognized in early geological mapping, but it was only after the 1970 detailed underground mapping and subsequent preparation of geological cross sections, that local over-folding on westerly plunging axes was recognized. The overfold in the Mark Zone area, described below, was almost entirely obscured by intense high-angle thrusting. A generally similar geological situation may exist in the Third Saddle area where the 1970 field program has produced most encouraging electromagnetic and soil geochemical results.

MINERALIZATION AND GEOLOGY OF THE MARK ZONE

The Mark Zone is a lens of massive sulphides, usually mantled by an outer envelope of banded replacement sulphides, which has been emplaced along a zone of faulting, shearing and crushing, in a locally dilated band of argillite on the slightly overturned and northerly limb of a westerly plunging fault. The sulphide body at its greatest thickness is some 75 feet wide and has been traced over a strike length of 630 feet. The down dip extent of the body is in the order of 450 feet but post-mineralization faulting has frequently cut the body and makes estimates of the original dimensions unreliable The general dip of the body is 65° to 75° to the south over the thick easterly portion, but it flattens to 40° in the west on the main level, and is even horizontal to northerly dipping above the level at one point.

Folding, high angle thrusting, cleavage and stratification, are the keys to understanding the controls of mineralization. Three

purely it is more reasonable
if the stratification mineralization is 1°,
the cleavage mineralization 2°?

major sets of post mineralization faults are recognized which greatly add to the complexity of the situation.

In attempting to correlate major faults recognized on surface, underground, and in drill holes, a general pattern emerged but it became apparent that each fault zone consisted of many sub-parallel breaks and that these breaks split and coalesced so frequently that correlation was not possible with the available data. The plan (fig. 5) and sections (fig's. 6a-h) are necessarily a great simplification of the situation, but serve to show the general mode of mineralization and deformation.

The sequence of events leading to the present configuration of the Mark Zone is believed to have been as follows:

(1) Folding on east-west axis of the westerly dipping andesite sills and the generally stratigraphically conformable argillites. This folding locally resulted in narrow overfolds as at the Mark Zone.

(2) Deformation in the overfold culminated in brittle rupture or thrust faulting in the competent andesites, while the relatively incompetent argillite failed largely in cleavage. Both faulting and cleavage were aligned approximately parallel to the axial plane of the fold.

(3) Mineralizing solutions, using the high angle thrusting and cleavage planes, invaded the argillite, partially or entirely replacing it by sulphides. In the banded ore, it is generally the stratification that has been selectively mineralized, but traces of sulphides along remnant cleavage suggest that solutions used the latter for access.

Locally, the andesite, where it has been well brecciated during the faulting, has been extensively mineralized.

(4) Deformation of the emplaced sulphide body caused local brecciation of the mass permitting access to calcite, quartz and much of the chalcopyrite. The latter is frequently found in small stringers crosscutting earlier pyrite and pyrrhotite bands and, locally, as extensive replacement in both massive sulphides and the relatively unmineralized argillite. This second phase of mineralization may be associated with early stages of the late deformation described below.

(5) Major faulting with strikes between 135° and 150° oblique to the sulphide body, and dips between 50° and 68° to the southwest (e.g.: faults B to F in the geological plans and sections), severely dislocate the sulphide body and, along with the initial thrust faulting, displace the argillite and andesite.

A second set of faults, complimentary to the northwesterly striking set, dip at moderate to shallow angles northwards and occur across the thrust faulted slices (examples of these are faults G and H on fig. 5), and similarly, they cut the sulphide body.

Data was too scanty to allow any but a few of the faults of the second set to be put on the sections, but the thinning and brecciation of the mineralized andesite on sections 50150 and 50250 East are largely attributed to such faults.

A fault believed to represent a third set (fault A) is seen near the end of the west drift (see fig. 5) and may be correlated, due to similar dip and lithological relations, with the contact zone between andesite and argillite at the base of the easterly facing cliff of andesite immediately south of the Mark Zone. This fault strikes approximately north and dips 42° to 45° to the west. Similar circumstances occur on the easterly edge of the main outcrop north of the Mark Zone, but here it is not known if the contact is similarly faulted. If it is, this fault may predate the earlier thrust faults which apparently cut this contact zone. Alternatively, the fault may be confined to the contact zone south of the east-west faults.

Whether faulted or not, the contact zone north of the Mark Zone, as seen on the surface, appears to occur in the trough of a synclinal structure that is complimentary to the anticlinal overfold in which the Mark Zone is emplaced. However, the apparent dip which would here be more or less representative of the plunge of the syncline is estimated to be between 60° and 85° to the west; very much steeper than the dip of the faulted contacts south of the east-west faults. This striking difference in plunge is attributed to a strong rotational component on one or all of the east-west faults that has the net effect of dropping the northern block further on the west than on the east, thus rotating the angle of plunge.

MINERALIZATION

In the Mark Zone sulphide body three main types of mineralization have been noted:

(a) Banded Ore - in which the host rock is discernably sedimentary in origin and in which sulphides have selectively replaced the rock along the bedding. Even tight folds and sedimentary slumping phenomena have been faithfully reproduced in the replacement and individual bands may be tracable over several feet. The contacts with the unmineralized argillite and totally replaced argillite are usually gradational.

The banded ore, when not removed by faulting, usually mantles the main body of the massive ore and may vary in thickness from a few inches to over 30 feet. Some sections in excess of 40 feet have been noted but this is usually where massive ore is absent.

(b) Massive Ore - generally defined by the presence of 90% or greater of sulphides in which little or no trace of the host rock is discernable. The ore varies considerably in character, from being a pure aggregate to one or more sulphides to being veined or streaked by quartz or dolomite gangue. Usually, where the gangue minerals are prominent the ore body has suffered considerable brecciation and the gangue minerals are generally in vuggy cavities and irregular veins and patches.

It is believed from geological relationships that both argillite and andesite may be totally replaced to produce virtually identical rock types, although the argillite host rock is clearly dominant.

(c) Mineralized Andesite - this material, in which the host rock is still recognizably andesitic, is seen in sections 50150E, 50250E, and 50500E. It may locally have a banded appearance where mineralization has replaced andesite preferentially along shearing, but frequently mineralization fills cavities caused by intense brecciation and invades the rock fabric from the fractures.

Eight polished sections taken from DDH 13 and DDH 92 were examined under the microscope by M. Zentilli, a post graduate student of Queen's University, in 1968. The conclusions outlined below are largely based on his observations but are modified by observations made by the writer in drill core and underground.

The principal minerals recognized in the Mark Zone sulphide body are pyrite, pyrrhotite, chalcopyrite, sphalerite, and galena, with very minor tetrahedrite-tennantite, and rare traces of silver sulphosalts and arsenopyrite.

Pyrite

In the western part of the ore body pyrite is the dominant sulphide present; easterly, it progressively decreases to give way to pyrrhotite and the other sulphides. The pyrite is characterized by idiomorphic crystals (0.05-1 mm.) that frequently shows considerable crushing and fracturing, with replacement and veining by other, later sulphides. In some cases the fracturing is lacking and the pyrite appears to be recrystallized. One occurrence (DDH 13) shows spheroidal aggregates (up to 2 mm. dia.) of pyrite crystals arranged about a core of pyrite and sphalerite.

In the eastern part of the Mark Zone, where pyrrhotite is dominant, pyrite occurs as sparce idiomorphic crystals surrounded by a pyrrhotite groundmass or gangue, and with local fracturing filled by pyrrhotite, sphalerite, and chalcopyrite.

Pyrrhotite

In polished sections from DDH 13, which intersects the upper reaches of the western part of the main sulphide lens, pyrrhotite is described as being present in minor to trace quantities, whereas in the massive ore in DDH 22, it is present as 50% of the rock, with pyrite playing a very subordinate role.

Pyrrhotite occurs as allotriomorphic crystal aggregates that locally show signs of recrystallization, and with local concentrations of chalcopyrite-sphalerite within the aggregates. In some places the pyrrhotite is seen intergrown with chalcopyrite and it has also been noted, together with sphalerite and chalcopyrite, veining pyrite that has been extensively fractured. Pyrite may be locally replaced by pyrrhotite.

Pyrrhotite in small quantities may be found in the argillites remote from the main body.

Chalcopyrite

The chalcopyrite content of the sulphide body varies considerably. On the north flank of the east end of the body, chalcopyrite locally becomes the dominant sulphide, similarly, on the south flank seen in the main crosscut. In the isolated western end of the body chalcopyrite content is low. Both massive and banded ore may be invaded by chalcopyrite and veins tend to crosscut existing bands of aggregates of pyrite and pyrrhotite.

Chalcopyrite is present as irregular aggregates of allotriomorphic crystals (grain size 0.01-2.0 mm.), as fracture fillings in crushed pyrite crystals and as irregular veinlets one centimeter or more in thickness. Chalcopyrite may be intergrown with pyrrhotite, sphalerite and galena, but more frequently it is interstitial to pyrrhotite.

Sphalerite

Occurs in similar fashion to chalcopyrite and is often found intergrown with it. Generally, it is less abundant than chalcopyrite in the eastern portions of the body, but becomes important at the main crosscut and westwards.

Aggregates of sphalerite vary between 0.01 and 1 mm.

Galena

Galena is similar in occurrence to chalcopyrite and sphalerite with which it is closely associated, but it is less abundant generally finer grained, and tends to follow sphalerite in distribution.

Tetrahedrite-Tennantite

This series is recognized in some of the sections from DDH 13 and DDH 22, and occurs as rare and minute inclusions in galena and associated with the chalcopyrite and sphalerite.

Other Metallics

Rare traces of silver sulphosalts and arsenopyrite have been recognized from polished sections in similar situations to tetrahedrite.

The sequence of events leading to the present mineralogy of the body is thought to be as follows:

1. Initial introduction of pyrite into cleaved argillite and crushed andesite, mainly in the region now occupied by the western portions of the body. It was concluded by Zentilli that spheroidal aggregates of pyrite were indicative of a sedimentary or syngenetic origin for the pyrite. However, the restricted lateral extent of the pyrite, cores of chalcopyrite and sphalerite in the spheroidal aggregates, and the recrystallization of the pyrite, suggests that pyrite is truly epigenetic and that the spheroidal structures are recrystallization phenomena later in the history of the body.

2. Further deformation of the Mark Zone led to crushing of the pyrite and the creation of extensive new passage ways for the introduction of further sulphides, especially in the eastern part of the zone beyond the massive pyrite.

3. Introduction of pyrrhotite, chalcopyrite, sphalerite and galena into the new fissures and voids created by the deformation. All four sulphides are found intergrown as fracture fillings in pyrite and exist together with the almost total absence of pyrite in the eastern part of the zone. Pyrrhotite is locally seen replacing pyrite.

4. Local and partial recrystallization of all sulphides involved.

5. Further brecciation and the introduction of quartz dolomite, probably synchronous with 4. Chalcopyrite appears to have been partially remobilized to give it a locally distinct crosscutting relationship in the pyrrhotite ore.

The overall importance of the foregoing descriptions of the body and its paragenesis lies in the fact that the mineralogy is highly variable from place to place in the body, the grain size is generally very small and much of the valuable sulphide material is tightly locked up in pyrite and pyrrhotite. All three factors militate against a straightforward treatment process.

GEOCHEMICAL SURVEYS

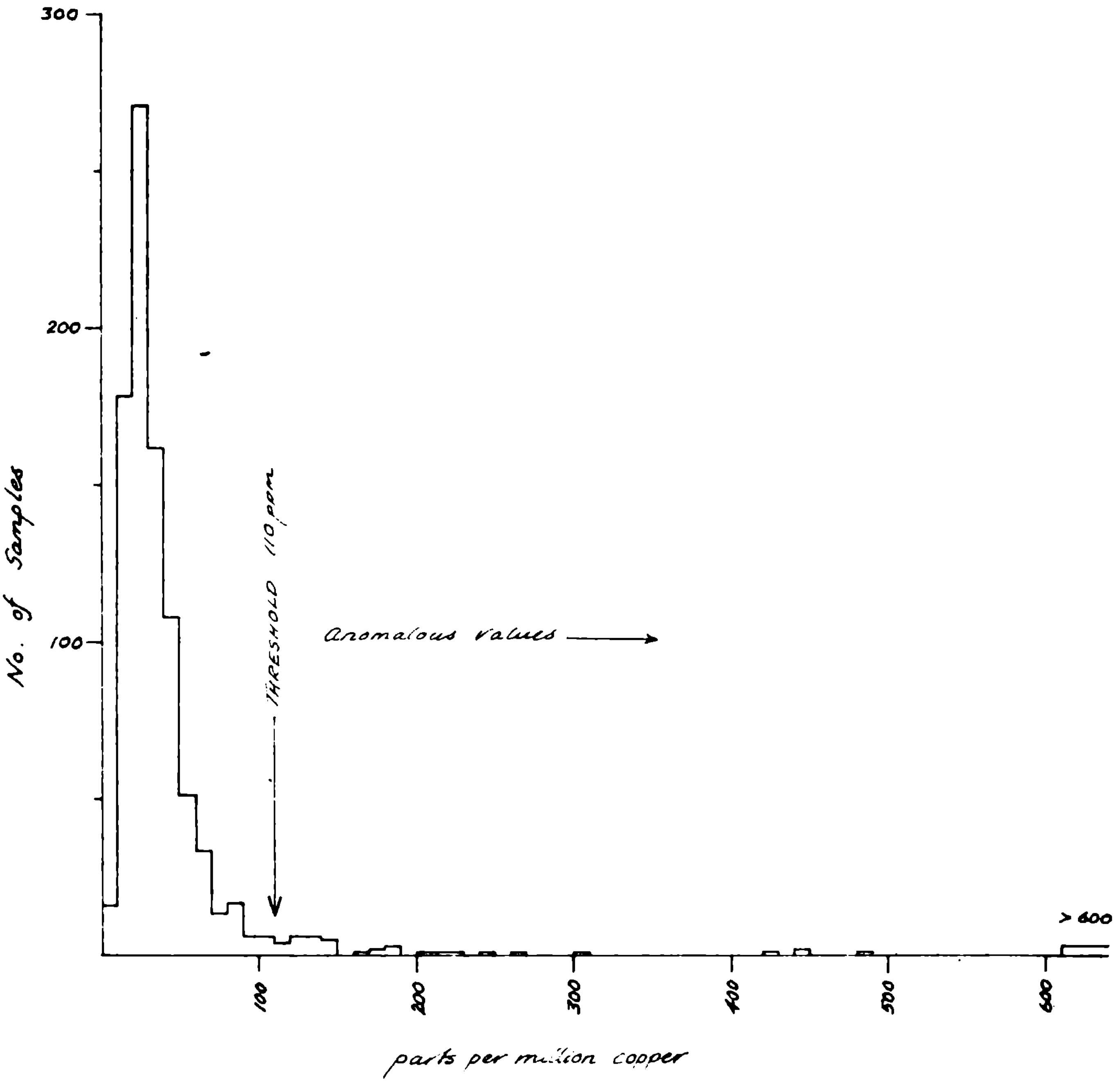
A preliminary geochemical survey of the Mark claims was conducted in autumn 1967 under the direction of J.A.C. Mackie, P. Eng. The work was conducted by soil sampling in the vicinity of the Mark Zone which had already been demonstrated by surface trenching and an extensive gossan to be a zone of massive sulphides. Many of the 601 samples collected and analyzed for copper, lead, and zinc were clearly anomalous with peak values of 1,000 to 5,850 ppm Pb. (9 samples); 1,000 to 5,250 ppm Zn. (15 samples); and 400 to 2,200 ppm Cu. (5 samples out of 358 analyzed for copper).

A further soil sampling program was conducted in the summer of 1968 on a regular grid with north-south lines 400 feet apart (where outcrops allowed) and a station interval of 200 feet. 901 soil samples were collected and analyzed by T.S.L. Laboratories Ltd. for copper, lead and zinc. The results of these analyses are tabulated below.

	Cu.	Pb.	Zn.
No. of samples	901	901	901
Threshold (revised)	110 ppm	70 ppm (120 ppm)	230 ppm
No. above threshold	40	80 (29)	40
Peak (no. of samples)	400 - 830 (7)	600 - 5,250 (4)	900 - 2,560 (10)

The 70 ppm threshold for lead is considered erroneous and should be reset at 120 ppm (see fig. 7b).

Histograms showing frequency distribution for the three elements are presented in figs. 7a - c. Interpretational plots of the



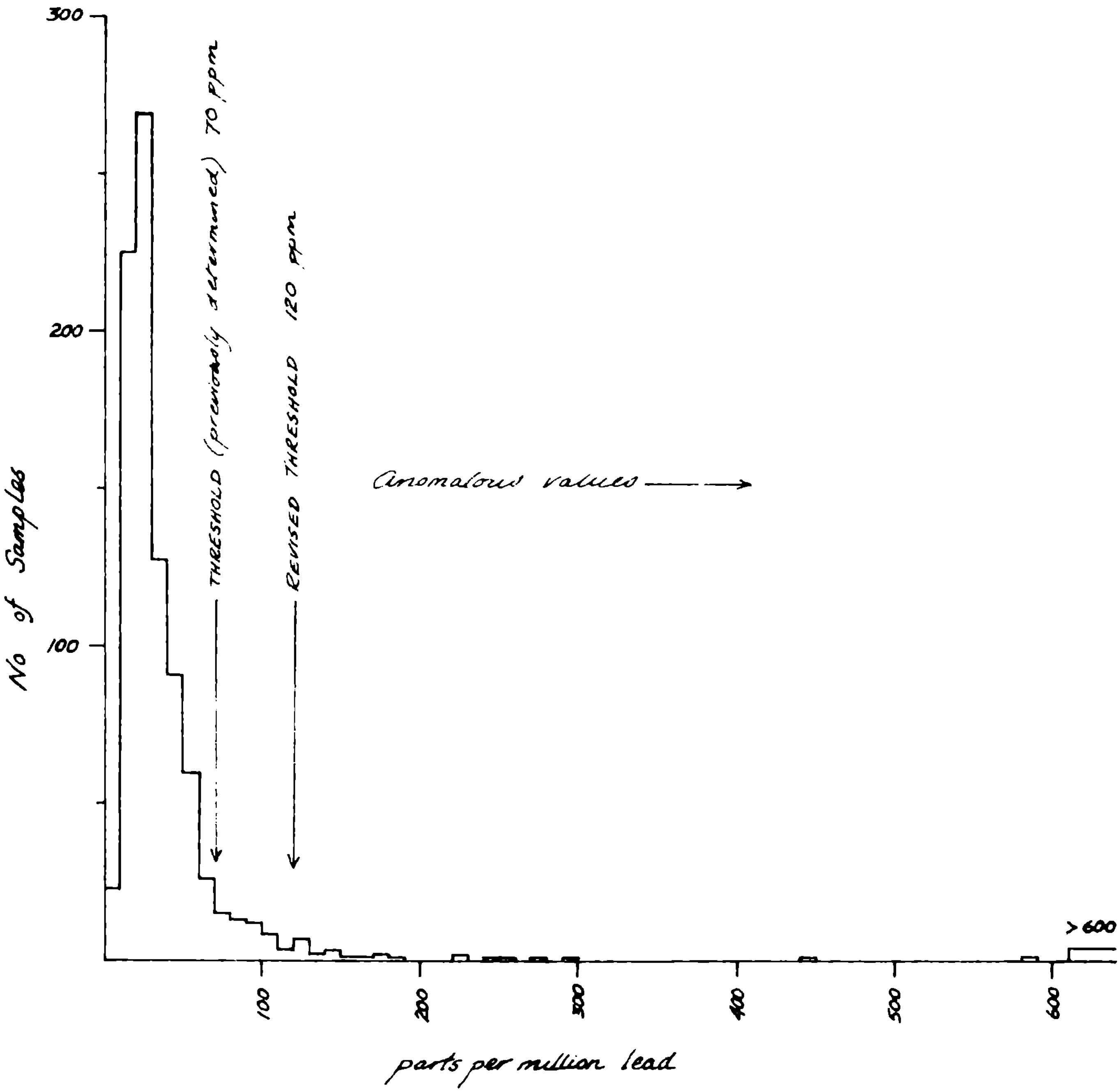
A COPPER

ALRAE ENGINEERING LTD.
CONSULTING ENGINEERS & GEOLOGISTS. VANCOUVER. CANADA

HART RIVER MINES LTD

1968 Geochemical Survey Fig. 7a
Frequency Distribution - Copper

SCALE	DESIGNED FG
	DRAWN FG
DATE March 1971	CHECKED RGT
REVISED	MAP Nº



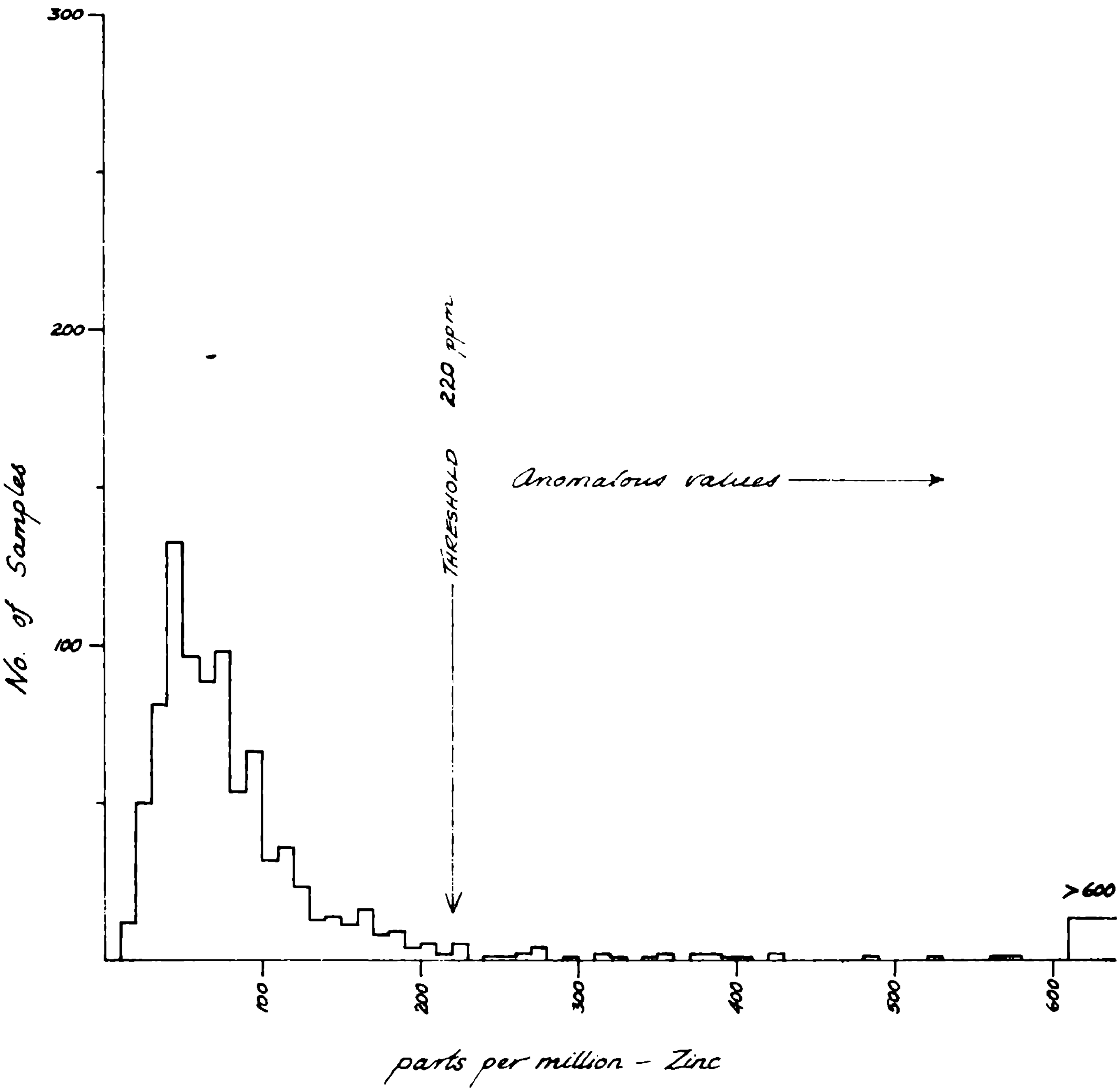
B LEAD

ALRAE ENGINEERING LTD.
CONSULTING ENGINEERS & GEOLOGISTS. VANCOUVER, CANADA

HART RIVER MINES LTD

1968 Geochemical Survey Fig. 7b
Frequency Distribution – Lead

SCALE	DESIGNED FG
DATE March, 1971	DRAWN FG
	CHECKED EGJ
REVISED	MAP No



C. ZINC

ALRAE ENGINEERING LTD.

CONSULTING ENGINEERS & GEOLOGISTS, VANCOUVER, CANADA

HART RIVER MINES LTD

1968 Geochemical Survey Fig. 7c

Frequency Distribution - Zinc

SCALE -	DESIGNED FG
DATE March 1971	DRAWN FG
	CHECKED RGJ
REVISED	MAP No

results are shown in figs. 8a - c, while a simplified map based on these plots (fig. 9) shows the areas that were recommended for further work in the 1970 field season on the basis of encouraging geochemical results and suitable geology.

In the 1970 field program, Areas A and C, as defined on fig. 9 were soil sampled. 225 samples were taken from Area A on a 50' x 50' grid over the main zone and a 200' x 500' grid east of the main zone with north-south orientated lines. 209 samples were taken from Area C on a north-south grid with lines 200 feet apart and a sample interval of 100 feet. Samples were collected from residual soil immediately underlying the humic layer wherever possible. Samples were analyzed for copper, lead and zinc by Fraser Laboratories using the Techtron AA5 atomic absorption spectrophotometer, with results frequently checked against certified standards.

The results obtained from Area C are shown in figs. 10a - c. Although scattered anomalous values for copper are apparent, they are not of the intensity of those found in 1968, and are far from coincident with the earlier results. Lead and zinc anomalous values were largely confined to the northeast corner of the grid and are in no way correlatable with the 1968 survey. It is concluded that the coincident anomalies for lead, copper and zinc detected in 1968 are entirely spurious, due either to analytical errors (which would cast doubt on the entire survey) or to sampling errors. Suspecting the latter, the holes remaining from the 1968 sampling were examined by the writer and it was clear that in several cases superficial humic soils were collected which may account for the highly anomalous results obtained.

Soil sampling results from Area A, known as the Third Saddle are plotted on figs. 11a - d, and may be summarized as follows:

	Cu.	Pb.	Zn.
Number of samples	224	224	224
1968 regional threshold	110 ppm	120 ppm	230 ppm
No. above threshold	146	114	131
Peak (no. of samples)	400-480 (9)	600-1600 (18)	900-3600 (11)

When compared with threshold values of 110 ppm for copper; 120 ppm for lead; and 230 ppm for zinc, obtained in 1968 (which may be slightly erroneous due to doubts already cast on this survey) it is clear that the area constitutes a highly anomalous zone, which, from the topography, suggests very little dispersion and derivation from mineralization in situ. It should be noted, however, that peak values for copper and lead are lower than over the Mark Zone.

When compared with the coincident electromagnetic anomaly detected over the Third Saddle, the anomaly constitutes a target for diamond drilling.

GEOPHYSICAL SURVEYS

The earliest geophysical survey conducted on the Mark claims was an electromagnetic survey conducted in autumn 1967, on the same lines used by the first geochemical survey. The instrument used was the Ronka EM-16, however, instrumentation trouble gave results of doubtful interpretational value.

In the summer of 1969, a new electromagnetic survey was conducted on the First Saddle, occupied by the Mark Zone, and southwards to include the Second and Third Saddles. Lines were orientated north-south and were 50 feet apart wherever the topography was not too extreme. 7.8 line miles were covered. The instrument used was the Craelius EM gun, a light-weight double-frequency instrument operated by two men, and intended for detailed study of near surface conductors. The results of this survey are plotted on fig. 12, and a comparative study of the EM profile and the geological section of the Mark Zone appears on fig. 13.

A study of the 1969 EM profiles (fig. 12), clearly demonstrates the effectiveness of the method over the Mark Zone and indicates another anomaly of generally comparable strength on the Third Saddle.

The Third Saddle area, or Area A, was rerun in 1970, using a Geonics EM-17 electromagnetic, horizontal-loop instrument. North-south lines 50 feet apart were used wherever topography permitted. Initial separation between transmitter and receiver coils was 200 feet, but a second survey, using 100 foot separation, was run on lines 100 feet apart. The results in profile form are plotted on figs. 14a and 14b. Severe changes in relief limited the scope of the surveys but it did serve to confirm the existence of a conductor.

Areas B and C were also tested by the EM-17 in 1970 but did not reveal any significant anomalies.

A magnetometer survey was conducted in the summer of 1968 on north-south lines extending 500 feet to the north and south of a baseline aligned along the First Saddle, under which the Mark Zone is emplaced. Line spacing was 50 feet with a station interval of 25 feet The corrected station values and contours are plotted on figs. 15 and 16. Several of the intense but limited magnetic 'highs' were diamond drilled and the neighbourhood of one prominent 'high', some 200 feet north of the Mark Zone, was crosscut by the main access tunnel. In each case, where the specific target was a magnetic anomaly, no significant mineralization was found, but rather, changes in magnetic expression could be attributed to the contrast in magnetic susceptibility between andesite and argillite. Indeed, it would seem that the magnetic expression of the abundant pyrrhotite found in the sulphide body is largely masked by the high susceptibility of the igneous rocks. The rapid fluctuations in magnetic value are attributed to the frequent lithological changes brought about by repeated faulting and the generally steep dips of alternating andesite and argillite bands.

MARK ZONE - EXPLORATION

1. Surface Showings and Trenching

Attention was first attracted to the Mark Zone from the air by a pronounced gossan and a stream of stained talus flowing west from an east-west saddle on a northerly trending ridge. On the ground, the zone is marked by rusted talus and weathered sulphide fragments.

Evidence of extensive faulting is seen in the abrupt cliffs bounding this saddle and the pronounced shearing in the andesite immediately adjacent to the zone.

On the east slope iron-oxide charged waters seeping from the easterly limit of the zone have cemented moss and gravel into a hard limonite crust.

In 1966, 12 trenches were hand-dug into the permafrost to attempt to find the surface limits of the mineralization. The trench locations are indicated on fig. 4. The mineralization encountered indicated a strike length of 450 feet.

2. Surface Drilling

A total of 10,100 feet of BQ drilling in 39 diamond drill holes were completed between 1967 and 1969. The locations of the holes are shown on fig. 4, while those pertinent to the geologic cross sections are shown on figs. 6a - h. Assays for important intersections on the latter are listed in Appendix A under the heading of the particular section in which they appear. Diamond drill logs and full assay data have not been included in this report, but are available in the files of Alrae Engineering.

Data on the surface diamond drill holes may be summarized as follows:

DDH No.	Coordinates North	East	Elevation Feet A.S.L.	Az. °	Dip °	Length Feet
1	99947.66	50342.80	4164.1	-	-90	294
2	99942.34	50345.26	4165.0	175	-60	112
3	99948.25	50341.41	4163.9	003	-45	60
4	99973.78	50349.75	4160.1	211	-80	354
5	99986.89	50241.28	4128.4	183	-60	174
6	99973.88	50237.14	4128.0	-	-90	88
7	99988.00	50241.74	4128.7	182	-75	199
8	99988.00	50241.74	4128.7	182	-67	213
9	99984.47	50241.74	4128.5	182	-45	220
10	100025.87	50144.26	4071.2	172	-40	212
11	100025.87	50144.26	4071.2	172	-68	198
12	100025.87	50144.26	4071.2	172	-59	179.5
13	99989.46	50134.55	4075.2	174	-60	156
14	99989.46	50134.55	4075.2	182	-40	82
15	99993.49	50011.95	4027.7	125	-60	201
16	99993.49	50011.95	4027.7	125	-40	121
17	99993.49	50011.95	4027.7	180	-45	224
18	99993.49	50011.95	4027.7	020	-70	287
19	99993.49	50011.95	4027.7	-	-90	201
20	100001.16	49884.46	3960.2	-	-90	320
21	99853.96	50530.96	4158.4	348	-45	297
22	99853.96	50530.96	4158.4	348	-60	221
23	99853.96	50530.96	4158.4	348	-70	300
24	99850.16	50528.03	4158.4	-	-90	400
25	99853.96	50530.96	4158.4	035	-55	225
26	99773.91	50685.85	4175.7	008	-48	400
27	99773.91	50685.85	4175.7	352	-60	258
28	99773.91	50685.85	4175.7	330	-60	324
29	99756.14	50766.37	4170.5	145	-35	232.5
30	99846.61	50781.75	4120.1	090	-45	176
31	99265.79	50408.33	4497.0	003	-55	537
32	99585.24	50681.51	4287.5	038	-70	393
33	99846.61	50781.75	4120.1	035	-60	502
35	99386.05	50589.10	4406.9	033	-50	340
36	98912.72	50516.36	4606.9	340	-45	219.5
37	100102.22	49783.99	3865.9	-	-90	232

38	no detailed survey	045	-45	488
39	no detailed survey	030	-80	365
40	no detailed survey	090	-30	296

3. Underground Exploration

The Mark Zone was explored underground on the 3880 level. The portal of the main access tunnel is located some 640 feet north-west of the highest point on the First Saddle (see fig. 4). The crosscut adit was driven at azimuth 150° for a total of 802 feet and encountered the Mark Zone sulphide body at 647 feet from the portal. Some 479 feet of drifting was done west of the main crosscut and 297 feet east of the crosscut. The east and west drifts are situated mainly on the footwall side of the sulphide body. A total of 382 feet of crosscutting was done from the east and west drifts to cut the body and provide diamond drill stations.

In addition, three large diamond drill stations were prepared to allow drilling southwards to test for mineralization under the Second Saddle. Only one station, at the end of the main crosscut adit, was actually used for this purpose as the two long holes drilled from here failed to give encouraging results.

The second portal is located at the 3680 level, some 930 feet west of the highest point on the saddle. It was intended to drift on the Mark Zone to explore mineralization on the lower level and to provide a haulage tunnel in the event of production. However, after 200 feet had been driven on this level, work was discontinued until sufficient ore reserves could be indicated to justify continuing

Total footage of underground development is as follows:

3680 level	-	200 feet
3880 level	-	1,960 feet
		2,160 feet

The results of assays of samples taken underground are plotted on fig. 17, and those drillhole assays relevant to all calculations on individual sections are listed under each cross section in Appendix A.

The sulphides in each crosscut were channel sampled and muck samples were taken in all but the third crosscut of the west drift. Muck samples were taken by combining approximately 15 lbs. of sample from each carload taken from each round. Wherever possible muck samples were used in the calculations as they are considered more representative than the channel samples.

4. Underground Drilling

A total of 8,108 feet of BQ drilling in 34 diamond drill holes were completed from underground. The locations of UDDH 7 to 34 are shown on the geologic cross sections (figs. 6a - h), and horizontal holes are also shown on fig. 5.

Underground diamond drill data may be summarized as follows:

UDDH No.	Coordinates North	Coordinates East	Elevation Feet A.S.L.	Az. °	Dip °	Length Feet
1	100257.39	50174.30	3881.84	015	0	202
3	100253.98	50184.51	3881.86	085	0	252
4	100252.23	50184.68	3881.89	100	0	293.5
5	100137.17	50255.68	3880.08	082	-25	316
6	100136.78	50254.03	3879.30	112	-30	293
7	100134.20	50236.56	3879.25	280	-35	240
8	99821.99	50407.87	3880.91	0	-45	223.5
9	99817.73	50407.71	3881.00	0	-70	174
10	99816.03	50407.83	3880.96	-	-90	262
11	99832.85	50405.68	3881.65	0	-22	133.5
12	99844.75	50251.03	3879.70	0	-45	179
13	99842.06	50250.97	3879.85	0	-70	218
14	99840.62	50251.08	3879.74	-	-90	263
15	99850.06	50249.44	3887.91	0	+45	89
16	99838.16	50148.80	3880.69	0	-30	73
17	99832.59	50147.79	3880.68	0	-60	142
18	99830.76	50147.34	3880.69	0	-80	187

19	99827.74	50145.40	3880.73	180	-85	257
20	99835.85	50148.18	3880.68	0	-40	135
21	99844.02	50508.19	3881.06	0	-45	117
22	99841.41	50508.90	3881.20	0	-70	132
23	99839.92	50039.05	3881.72	0	-45	253
24	99838.88	50039.00	3881.25	0	-70	104
25	not yet surveyed in detail			0	0	197
26	not yet surveyed in detail			0	-45	111
27	not yet surveyed in detail			0	-70	115
28	not yet surveyed in detail			-	-90	121
29	not yet surveyed in detail			0	0	96
30	not yet surveyed in detail			0	0	61
31	not yet surveyed in detail			180	0	80
32	not yet surveyed in detail			310	0	80
33	not yet surveyed in detail			182	0	1705
34	not yet surveyed in detail			182	-30	1004

Holes 1 and 3 - 7 were drilled east and west from the main crosscut to investigate the argillite-andesite contact north of the Mark Zone. Holes 8 - 37 investigated the immediate vicinity of the Mark Zone, while holes 33 and 34 were intended to investigate the region immediately south of the Mark Zone, in particular, the argillite below the Second Saddle. However, core from the Second Saddle area provided no encouragement.

An interesting inovation for diamond drilling in permafrost used at Hart River in UDDH's 33 and 34 was introduced by Mr. A.G. Ditto. The difficulty of rods freezing in the hole had constantly slowed drilling progress, especially on long holes, despite the use of calcium chloride. In these two holes glycol antifreeze was used in the recirculated drilling fluid which not only prevented any freezing, but was non-corrosive and acted as an additional lubricant. Greater efficiency and reduction of wear offset the additional cost of the fluid.

5. Metallurgical Testing

All metallurgical testing was conducted by Britton Research Ltd. Initial floatation experiments were conducted on 220 lbs. of sulphide ore, chip sampled and blended from all underground intersections of the sulphide body. In later tests, a composite sample submitted by Kaiser Engineers, in the course of an earlier feasibility study, was made from core selected from DDH 1, 3, 4, 5, 6, 13, 21 and 22, to give an assay closely approaching the average calculated for the entire body. The results of tests from the core samples are attached in Appendix B. Case (a) is described as results that may be guaranteed on all ore represented by the samples submitted; and Case (b) represents the best results to be hoped for on treating similar ore.

Britton took into account the remoteness of the Hart River property and the necessity of producing as high a grade concentrate as possible, without excessively reducing the recovery.

It was concluded that the very intimate association of copper, lead and zinc minerals with pyrite and pyrrhotite, and the overall grain size of the minerals, would require grinding the ore to about 90% -325 mesh or 70% -500 mesh. The lead, being fine grained, is very difficult to recover and it was concluded that a separate lead concentrate would not be economic.

The results are based on small quantities of material which, due to the high variability of the ore, are not likely to be representative. Additional tests will be required before a production decision may be contemplated.

CONCLUSIONS

MARK ZONE

The Mark Zone is a body of banded to massive sulphides that replaces cleaved argillite and crushed andesite in a locally westerly plunging and slightly overturned anticline. Axial plane thrusting and cleaving have provided channel ways for the sulphides, and, by their continued movement during and after mineralization, have greatly added to the complexity of the shape and tenor of the sulphide body.

The principal sulphides present are pyrite, pyrrhotite, chalcopyrite, sphalerite, and galena. In addition, significant quantities of silver, gold, and cadmium are present.

The body has been explored by 10,100 feet of drilling from surface, 8,108 feet of drilling from underground and by 1,960 feet of tunneling on the main 3880 level. A second level, at 3680, was discontinued before reaching the mineralized zone.

GRADE AND TONNAGE ESTIMATES

Initial estimates of average grade and tonnage from the drilling and underground work were made by G. Trowsdale, P. Eng., who concluded that the Mark Zone held 577,445 tons grading 0.041 oz gold per ton; 1.45 oz per ton silver; 1.45% copper; 0.87% lead; and 3.65% zinc as proven ore. In addition, 600,000 tons of similar grade were estimated as probable.

In 1970, the writer and W. Ash, of Alrae Engineering Ltd., using the new and more detailed underground mapping, correlated the results of drilling and underground development in a series of preliminary geological cross sections, with the result that grade and tonnage calculations could be reappraised.

In the new calculations it was decided to use the value of the ore in Net Smelter Returns, these being based on present and projected values of the contained metals, the preliminary testing by Britton Research and quoted prices for concentrates. Cut-off grades of $15.00 and $10.00 were used, and results of the estimates were as follows:

<u>$15.00 (NSR) CUT-OFF</u>

Proven - 174,800 tons @ $23.54
Probable - 137,500 tons @ $24.97
Possible - 135,000 tons

Proven plus probable - 312,365 tons @ $24.16

<u>$10.00 (NSR) CUT-OFF</u>

Proven - 380,400 tons @ $19.79
Probable - 148,100 tons @ $21.30
Possible - 94,100 tons

Proven plus probable - 528,500 tons @ $20.21

Average width = 31.4 feet

Details of the methods used in the estimates and definitions of the ore classifications appear in the report of W. Ash, May 1970, included in Appendix C. Distribution of proven, probable and possible ore at the $10.00 cut-off are shown on figs. 18a - e, and the longitudinal section, fig. 19. Some revision is required using the final geological sections.

The figure of 528,500 tons proven and probable ore, with average NSR value of $20.21 is in fairly close accord with the earlier estimate of 577,400 tons proven ore at an equivalent average NSR value of $18.70 but does not confirm an additional 600,000 tons of probable ore.

The NSR value of the ore takes account of the losses and payments in milling, smelting and refining, but dilution and costs must be considered.

DILUTION

Heavy faulting frequently displaces the sulphide body, and cleavage, brecciation and shearing in the argillite and andesite are all considered liable to create a heavy dilution factor.

Provisionally, this is estimated to be in the order of 15% and, consequently, the 528,500 tons of proven and probable ore, at $20.21 average value using the $10.00 NSR cut-off must be modified to give 607,775 tons at an average value of $17.18.

OPERATING COSTS

For the purpose of arriving at cost estimates for the mining of the sulphide body, it will be assumed that there are reserves of ore totalling 600,000 tons, which would require provision of a 500 tpd mill, with exhaustion of the deposit in four years. All cost estimates are preliminary and are based on costs for similar mining situations in published statistics in Canadian publications and journals. The cost of a 500 tpd mill, a 64 mile winter road, and equipment to include mining machinery and adequate facilities for housing and storage, are included in capital costs, which are estimated as follows:

500 tpd mill	$ 2,000,000.
Winter road ($20,000. per annum for 4 years)	80,000.
Equipment and facilities	1,000,000.
	$ 3,080,000.

Other cost factors are development, mining and haulage, milling, transportation of concentrates, and administrative overhead, but exploration costs have not been estimated.

Development costs, from experience and observation of the complexities of the structure, are going to be high and a figure of $2.00 per ton of developed ore is estimated.

Mining and haulage costs are estimated to be in the order of $3.50 per ton, while milling, owing to the extremely fine grinding apparently required, will be in the order of $3.60 per ton.

It is assumed that the combined concentrates, as estimated in the report of Britton Research (Case (b)), would be shipped by road rail, and sea to markets in Japan through Whitehorse and Skagway, Alaska. On this route there are 500 miles by road and rail, at an estimated 5¢ per mile/ton of concentrate, and 4,700 miles by sea at an estimated 10¢ per ton mile, or $30.35 per ton of concentrate, to include 65¢ per ton loading at Skagway. The combined concentrate weight is .1128 tons per ton of ore mined, so that the costs of shipped combined concentrates may be expressed as $30.35 multiplied by .1128 or $3.42 per ton of ore mined.

Administrative overhead, on a 500 tpd mill, should not exceed 50¢ per ton of ore. On a per ton basis, assuming reserves of 600,000 tons cost may be summarized as follows:

ITEM	$ PER TON
Capital costs	5.10
Development	2.00
Mining and haulage	3.50
Milling	3.60
Transportation	3.42
Administrative overhead	.50
	$ 18.12

Clearly, as it presently stands, mining of the deposit is not feasible. Even if a profit situation could be seen, it must be sufficient to assure a reasonable rate of return on investment.

However, if reserves of say 2 million tons of similar grade could be found on the property, and a 1,000 tpd milling rate were employed, costs per ton of ore could be estimated as follows:

ITEM	$ PER TON
Capital costs	2.20
Development	2.00
Mining and haulage	2.00
Milling	2.75
Transportation	3.42
Administrative overhead	.40
	$ 12.77

Such cost figures on ore with NSR value after dilution of $17.18 per ton would give a reasonable profit per ton and might allow a viable production situation.

FUTURE EXPLORATION

It is believed that the Third Saddle Zone shows sufficient encouragement to warrant diamond drilling. However, it is not possible, from available information, to come to any conclusion on the dimensions of the mineralization anticipated.

The Mark Zone structure is strong and probably has considerable lateral extent, and it should be noted that it has only bee adequately explored close to its exposed reaches. Similarly, apart from a wide spaced geochemical program, large tracts lacking exposure on the property have not yet received attention, despite being underlain by potentially favourable lithologies and structures. The good overall response of the Mark Zone to electromagnetic methods indicate that the method is the most likely to produce results in exploration of the remaining ground.

RECOMMENDATIONS

It is recommended that every effort be made to explore the possibility of similar mineralized bodies to the Mark Zone existing o those portions of the Mark claims underlain by favourable lithologies especially drift-covered areas on strike with known mineralized structures.

Area A, or the Third Saddle Zone, should be explored by 2,000 feet of diamond drilling. Such footage is somewhat higher than would normally be recommended to explore geochemical and electromagnetic anomalies of the size detected, but mobilization and setting up costs on the steep, dry arête will be very high and should be spread over enough drilling to fully test the zone.

It is also recommended that an electromagnetic survey be conducted over the known Mark Zone and the areas between Marc and Reinke Creeks where the andesite-argillite association is seen or may be expected. Deep overburden, the possibility of deep-seated, blind orebodies and rugged topography all call for use of the fixed-source TURAM electromagnetic method rather than the shallow reconnaissance methods used to date. Allowing a survey area of one square mile with line spacing of 400 feet and 25% fill-in at 200 feet spacing, some 17.5 line miles will be required. The need for expert interpretation of results calls for this work to be done by an experienced geophysicist familiar with the technique.

The diamond drill program and the TURAM survey should be run simultaneously in the summer months so that costs of reactivating the existing camp and airport, cooking, transportation and supervision may be shared. The time estimated for completion of the line cutting, TURAM and drilling is eight weeks.

It is recommended that the drilling and survey work be supported by a helicopter operating out of the base camp which would be able to supply water to the drill, assist in moves, put out crews, and assist in supplying the camp. A total of 80 hours flying is budgeted for.

Costs for the two month period of drilling, line cutting and electromagnetic surveys are estimated as follows:

Mobilization		
Fares, activating of camp, equipment and airport		$ 10,000.
Diamond Drill Contract		
2,000 feet of BQ diamond drilling @ $15/ft.		30,000.
Turam Contract		
17.5 line miles or approx. 36 days @ $275/day (2 operators, interpretation and instrument incl.)		10,000.
Wages		
1 geologist - 8 weeks @ $50/day	$ 2,800.	
2 field assistants - 8 weeks @ $30/day each	3,360.	
1 cook - 8 weeks @ $40/day	2,240.	
1 driver/mechanic - 8 weeks @ $40/day	2,240.	10,640.
Transportation		
8 air charters, Whitehorse-Hart @ $500/trip	4,000.	
Helicopter - Bell G47 - 80 hrs @ $150/hr	12,000.	16,000.
Camp and Supplies		
10 men - 8 weeks @ $6.00/man day		3,360.
Assays		1,500.
Supervision and Engineering		5,000.
Contingency		8,500.
		$ 95,000.

It is thought that such an expenditure will provide adequate data to allow a final decision on the feasibility of continuing exploration on the Mark Group.

Respectfully submitted:

Francis Guardia

F. J. L. Guardia, B.Sc.

APPENDIX A

A S S A Y S

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz / T	GOLD VALUE $	SILVER ASSAY oz / T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				(16.7)		(1.12)		(7.57)		(1.00)		(1.25)	
49950													
UDDH 25	51.5												
	56.5	5	0.6	1.00	2.66	2.98	.21	1.59	3.54	3.54	9.96	12.46	21.57
	61.5	5	0.6	1.00	2.58	2.89	.22	1.67	2.90	2.90	5.50	6.87	14.33
	66.5	5	.01	0.17	1.35	1.51	.12	9.10	2.58	2.58	5.60	7.00	20.90
	71.5	5	.08	1.34	.56	.61	.25	1.89	.78	.78	8.60	10.75	15.37
	76.5	5	.005	0.08	.10	.11	.04	.30	.21	.21	.54	.68	1.38
	81.5	5	.01	0.17	.83	0.93	.13	.98	1.44	1.44	4.30	5.38	8.90
	84.	2.5	.01	0.17	.39	0.44	.07	0.53	.56	.56	1.30	1.62	3.32
UDDH 26	2.5												
	7.5	5	.01	0.17	.87	0.97	.28	2.12	.67	.67	12.0	15.00	18.93
	12.5	5	.01	0.17	.95	1.06	.26	1.97	.25	.25	11.1	13.88	17.33
	17.5	5	.04	0.67	1.64	1.84	.14	1.06	1.59	1.59	5.6	7.00	12.16
	22.5	5	.04	0.67	.80	0.90	.38	2.88	.38	.38	11.9	14.88	19.71
	27	4.5	.04	0.67	.50	0.56	.40	3.03	.14	.14	10.0	12.50	16.90
UDDH 27	3.5												
	8.5	5	.06	1.00	1.94	2.17	.40	3.03	.49	.49	6.0	7.50	14.19
	13.5	5	.01	0.17	1.23	1.38	.19	1.44	.43	.43	6.0	7.50	10.92
	18.5	5	.02	0.33	3.06	3.42	.38	2.88	2.60	2.60	9.6	12.00	21.33
	23.5	5	.04	0.67	.44	.49	.25	1.89	.09	.09	9.5	11.87	15.01
	27	3.5	Tr	—	.28	.31	.12	0.90	.06	.06	3.4	4.25	5.57

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $	
			ASSAY oz/T	VALUE $	ASSAY oz/T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $		
				(16.7)		(1.12)		7.57		(1.00)		(1.25)		
49950														
(cont)														
UDDH 28	4.5													
	9.5	5	.005	0.08	1.52	1.70	.27	2.04	.72	.72	8.7	10.88	15.42	
	14.5	5	.04	0.67	1.28	1.43	.60	4.55	.46	.46	1.7	2.12	9.23	
	29.5	5	.02	0.33	.50	.56	.35	2.65	.10	.10	1.08	1.35	4.99	
	24.5	5	.04	0.67	1.52	1.70	.23	1.74	2.07	2.07	6.1	7.12	13.30	
	29.5	5	.005	0.08	.92	1.03	.36	2.73	.52	.52	9.8	12.25	16.61	
	36	6.5	Tr	—	.20	.22	.17	1.29	.12	.12	.48	6.00	7.63	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $
			ASSAY oz/T	VALUE $	ASSAY oz/T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	
				(16.7)		(1.12)		(7.57)		(1.00)		(1.25)	
50000													
DDH 17	121												
	131	10	0.04	0.67	1.32	1.48	0.35	2.66	0.23	0.23	1.04	1.30	6.34
	141	10	0.04	0.67	0.84	0.94	0.31	2.35	0.05	0.05	0.19	.24	4.25
	151	10	0.01	0.17	0.43	0.48	0.20	1.51	0.09	0.09	0.68	.85	3.10
	161	10	0.01	0.17	0.71	0.79	0.25	1.89	0.09	0.09	0.29	.35	3.29
	171	10	—	—	0.22	0.25	0.06	0.45	0.13	0.13	0.32	.40	1.23
	181	10	—	—	0.06	0.07	0.06	0.45	0.06	0.06	0.42	.52	1.10
	191	10	—	—	0.14	0.16	0.04	0.30	0.08	0.08	0.49	.61	1.15
	201	10	—	—	—	—	0.03	0.14	0.21	0.21	0.35	.44	0.79
	211	10	—	—	0.06	0.07	0.06	0.45	0.09	0.09	0.72	.90	1.51
	221	10	—	—	0.18	0.20	0.04	0.30	0.11	0.11	0.84	.97	1.58
	224	3	—	—	0.02	0.02	0.02	0.15	0.05	0.05	0.07	.08	0.30
DDH 19	81.6												
	86.6	5	0.005	0.08	1.20	1.34	0.08	0.60	1.25	1.25	7.1	8.87	12.14
	92.6	6	0.04	0.67	1.06	1.19	0.11	0.83	1.85	1.85	5.9	7.38	11.92

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
50050				(16.7)		(1.12)		(7.57)		(1.00)		(1.25)	
DDH 15	78.1	5.											
	83.1	5	0.04	0.67	1.20	1.34	0.27	2.04	0.96	0.96	6.10	7.13	12.14
	88.1	5	0.04	0.67	0.40	0.45	0.29	2.20	0.73	0.73	3.60	4.50	8.55
	93.1	5	0.02	0.33	0.30	0.34	0.37	2.80	0.91	0.91	3.20	4.00	8.38
	98.1	5	0.01	0.17	0.10	0.11	0.06	0.45	0.17	0.17	2.60	3.25	4.15
	103.1	5	Tr	—	0.16	0.18	0.10	0.76	0.13	0.13	0.44	.55	1.62
D.D.H. 16	82.6												
	87.6	5	0.01	0.17	0.25	0.28	0.21	1.59	0.28	0.28	1.34	1.68	4.00
	92.6	5	0.08	1.34	0.20	0.22	1.20	9.08	0.79	0.79	4.40	5.50	16.93
	97.6	5	Tr	—	1.48	1.66	0.26	1.97	1.25	1.25	8.10	10.13	15.01
	102.6	5	0.005	0.08	0.68	0.76	0.38	2.88	0.74	0.74	4.50	5.63	10.09
	107.6	5	0.005	0.08	0.08	0.90	0.37	2.80	0.10	0.10	0.32	.40	4.28
	112.6	5	0.005	0.08	0.14	0.16	0.15	1.14	0.09	0.09	0.28	.35	1.82
UDDH 23	12.4												
	18.6	62	Tr.	—	.20	0.22	.21	1.59	.14	.14	.70	.87	2.82
	23.6	5	.005	0.08	.08	0.09	.57	4.31	.16	.16	.94	1.07	5.71
	28.6	5	.005	0.08	.11	0.12	.17	1.29	.11	.11	.40	.50	2.10
	33.6	5	Tr.	—	.05	0.06	.01	0.07	.05	.05	.01	.01	0.19

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
50050														
(cont.)														
UODH 24	25													
	30	5	Tr	—	.54	0.61	.23	1.74	.34	.34	1.46	1.82	4.51	
	35	5	Tr	—	.24	0.27	.17	1.29	.51	.55	1.34	1.68	3.79	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				(16.7)		(1.12)		(7.57)		(1.00)		(1.25)	
50150													
DDH 10	40												
	45	5	C.01	0.17	0.10	0.11	0.30	2.27	Tr	—	Tr	—	2.55
	50	5	0.05	0.83	1.40	1.57	0.28	0.76	0.30	0.30	4.15	5.19	8.65
	55	5	0.04	0.67	1.05	1.18	0.10	0.76	0.80	0.80	7.00	8.75	12.16
	60	5	0.03	0.05	0.30	0.34	0.10	0.76	0.15	0.15	1.75	2.19	3.94
	65	5	0.05	0.83	1.50	1.68	0.40	3.03	0.30	0.30	4.60	5.75	11.59
	70	5	0.07	1.17	2.90	3.25	0.30	2.27	2.08	2.08	10.15	12.67	21.44
	75	5	0.07	1.17	3.35	3.75	0.30	2.27	1.80	1.80	5.60	7.00	15.99
	80	5	0.06	1.00	2.35	2.63	0.35	2.65	2.24	2.24	5.85	7.31	15.83
	85	5	0.08	1.34	1.90	2.13	0.40	3.03	1.40	1.40	7.00	8.75	16.65
	90	5	0.05	0.83	1.85	2.07	0.40	3.03	1.80	1.80	4.10	5.13	12.86
	95	5	0.04	0.67	1.30	1.46	0.30	2.27	0.45	1.45	1.80	2.25	7.10
	100	5	0.03	0.50	1.15	1.29	0.15	1.14	0.40	0.40	2.05	2.55	5.88
	105	5	0.06	1.00	1.15	1.29	0.30	2.27	1.05	1.05	4.50	5.63	11.24
	110	5	0.04	0.67	1.30	1.46	0.20	1.51	2.24	2.24	5.00	6.25	12.13
	115	5	0.05	0.83	2.05	2.30	0.45	3.41	1.17	1.17	4.15	5.19	12.90
	120	5	0.03	0.50	1.15	1.29	0.20	1.51	0.87	0.87	10.18	12.72	16.89
	125	5	0.01	0.17	1.80	2.02	0.25	1.89	1.40	1.40	6.85	8.56	14.04
	130	5	0.03	0.50	1.25	1.40	0.25	1.89	0.97	0.97	5.50	6.87	11.63
	135	5	0.02	0.33	0.70	0.78	0.18	1.36	1.40	1.40	5.85	7.31	11.18
	140	5	0.03	0.50	1.10	1.23	0.20	1.51	1.05	1.05	5.05	6.31	10.55

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				(16.7)		(1.12)		(7.57)		(1.00)		(1.25)	
50150 (cont.)													
DDH 10 (cont.)	140	5	0.03	0.50	1.05	1.18	0.20	1.51	1.05	1.05	5.05	6.31	10.55
	145	5	0.03	0.50	1.10	1.23	0.20	1.51	1.00	1.00	3.37	4.21	8.45
	150	5	0.02	0.33	1.10	1.23	0.55	4.17	0.85	0.85	1.70	2.12	8.70
	155	5	0.03	0.50	1.15	1.29	0.65	4.92	Tr.	—	0.15	0.19	6.90
	160	5	0.03	0.50	1.35	1.51	0.55	4.17	0.95	0.95	3.90	4.88	12.01

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				(16.7)		(1.12)		(7.57)		(1.00)		(1.25)	
50150													
(cont.)													
DDH 13	31												
	33	2	0.01	0.17	1.79	2.01	0.21	1.59	0.25	0.25	0.70	0.87	4.89
	35	2	Tr.	—	0.80	0.89	0.18	1.36	0.07	0.07	0.60	0.75	3.07
	37	2	Tr.	—	1.36	1.52	0.32	2.42	0.12	0.12	1.43	1.79	5.85
	39	2	0.005	0.08	1.28	1.43	0.24	1.81	0.12	0.12	2.58	3.22	6.66
	41	2	Tr.	—	1.92	2.15	1.16	8.78	0.33	0.33	3.00	3.75	15.01
	43	2	Tr.	—	1.92	2.15	0.45	3.41	0.45	0.45	5.10	6.38	12.39
	45	2	0.005	0.08	1.52	1.70	0.19	1.44	0.56	0.56	5.80	7.25	11.03
	47	2	0.04	0.67	1.40	1.57	0.99	7.50	0.20	0.20	1.92	2.40	12.34
	49	2	Tr.	—	1.80	2.02	0.99	7.50	0.17	0.17	0.83	1.04	10.73
	51	2	0.01	0.17	2.27	2.54	1.08	8.17	0.20	0.20	—	—	11.08
	53	2	0.005	0.08	1.10	1.23	1.16	8.78	0.16	0.16	0.22	.28	10.53
	55	2	0.005	0.08	2.20	2.46	1.65	12.50	0.19	0.19	0.17	0.21	15.44
	57.5	2.5	0.005	0.08	2.44	2.74	1.32	9.96	0.19	0.19	0.26	0.33	13.30
	60	2.5	0.005	0.08	1.84	2.06	0.88	6.66	0.26	0.26	1.65	2.08	11.14
	62	2	Tr.	—	1.52	1.70	1.10	8.32	0.22	0.22	1.76	2.20	12.44
	64	2	Tr.	—	1.60	1.80	0.77	5.83	0.30	0.30	3.30	4.12	12.05
	66	2	0.005	0.08	1.60	1.80	0.60	5.00	0.50	0.50	3.50	4.37	11.75
	68	2	0.01	0.17	1.56	1.75	0.66	5.00	0.25	0.25	3.20	4.00	11.17
	70	2	0.005	0.08	1.40	1.57	0.47	3.56	0.29	0.29	4.80	6.00	11.50
	72	2	0.005	0.08	2.12	2.37	0.48	3.63	1.00	1.00	6.90	8.60	15.68

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				16.7		1.12		7.57		1.00		1.25	
50150													
(cont)													
DDH 13	72	2	0.005	0.08	2.12	2.37	0.48	3.63	1.00	1.00	6.90	8.60	15.68
(cont)	74	2	0.005	0.08	2.16	2.42	0.66	5.00	0.77	0.77	5.20	6.50	14.77
	76	2	0.01	0.17	1.71	1.92	0.66	5.00	0.33	0.33	8.30	10.37	17.79
	78	2	0.01	0.17	2.67	2.99	0.42	3.18	1.60	1.60	8.50	10.63	18.57
	80	2	0.01	0.17	3.35	3.75	0.50	3.78	2.20	2.20	11.80	14.76	24.66
	82	2	0.04	0.67	2.28	2.56	0.25	1.89	1.21	1.21	13.80	17.25	23.58
	84	2	0.01	0.17	1.71	1.92	1.21	9.15	0.37	0.37	3.80	4.75	16.36
	86	2	0.01	0.17	1.03	1.15	0.99	7.50	0.11	0.11	1.50	1.87	10.80
	88	2	0.01	0.17	1.43	1.60	1.10	8.32	0.13	0.13	0.46	0.57	10.79
	90	2	0.08	1.34	1.08	1.21	0.72	5.45	2.40	2.40	0.13	0.16	10.56
	92	2	0.01	0.17	1.10	1.23	0.47	3.56	0.17	0.17	4.40	5.50	10.63
	94	2	0.01	0.17	2.07	2.32	0.49	3.71	0.88	0.88	9.20	1.03	8.11
	96.6	2.6	Tr	—	1.04	1.16	0.81	6.13	0.25	0.25	5.00	6.25	13.79
	98.6	2	0.005	0.08	1.64	1.84	0.60	4.55	3.00	3.00	17.80	22.25	29.02
	101	2.4	0.005	0.08	2.40	2.69	0.50	3.78	2.60	2.60	14.80	18.50	27.65
	103	2	0.005	0.08	1.30	1.46	0.55	4.17	0.82	0.82	10.50	13.12	19.66
	105	2	0.005	0.08	0.86	0.96	0.37	2.80	0.44	0.44	4.62	5.77	10.05
	107	2	0.08	1.34	6.68	7.48	0.72	5.45	4.84	4.84	25.30	31.60	50.71
	109	2	0.01	0.17	2.28	2.56	0.38	2.88	1.40	1.40	8.80	11.00	18.01
	111	2	Tr	—	0.68	0.76	0.10	0.76	0.28	0.28	—	—	1.80
	113	2	Tr	—	0.62	0.69	0.15	1.13	0.21	0.21	1.76	2.20	4.23

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				(16.7)		(1.12)		(7.57)		(1.00)		(1.25)		
50/150														
(cont.)														
DDH 13	113	2	Tr.	—	0.62	0.69	0.15	1.13	0.21	0.21	1.76	2.20	4.23	
(cont.)	115	2	Tr.	—	0.24	0.27	0.11	0.83	0.07	0.07	0.39	0.48		
	117	2	Tr.	—	0.30	0.33	0.18	1.36	0.09	0.09	0.09	.10		
	119	2	Tr.	—	0.24	0.27	0.23	1.74	0.03	0.03	0.24	0.30		
	121	2	Tr.	—	0.62	0.69	0.20	1.51	0.14	0.14	0.25	0.31		
	123	2	Tr.	—	0.40	0.45	0.18	1.36	0.09	0.09	0.38	.47		
	125	2	Tr.	—	0.42	0.47	0.18	1.36	0.10	0.10	0.30	0.37		
	127	2	0.005	0.08	0.32	0.36	0.22	1.67	0.17	0.17	0.08	0.10		
	129	2	Tr.	—	0.24	0.27	0.07	0.53	0.03	0.03	0.09	0.11		
	131	2	Tr.	—	0.34	0.38	0.18	1.36	0.03	0.03	0.13	0.15		
	133	2	Tr.	—	0.32	0.36	0.23	1.74	0.04	0.04	0.06	0.07		
	135	2	Tr.	—	0.32	0.36	0.27	2.04	0.04	0.04	0.08	0.10		
	137	2	Tr.	—	0.05	0.05	0.41	3.10	0.03	0.03	0.16	0.18		
	139	2	0.005	0.08	0.04	0.04	0.11	0.83	0.01	0.01	0.15	0.17		
	141	2	Tr.	—	0.40	0.45	0.19	1.44	0.40	0.40	0.70	0.87		
	143	2	Tr.	—	0.32	0.36	0.02	0.15	0.25	0.25	0.17	0.21		
	145	2	Tr.	—	0.26	0.29	0.05	0.38	0.05	0.05	0.33	0.41		

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				(16.70)		(1.12)		(7.57)		(1.00)		(1.25)		
50/150														
(cont.)														
UDDH 17	101.5													
	106.5	5	0.01	0.17	1.87	2.09	.47	3.56	1.45	1.45	7.08	8.85	16.12	
	111.5	5	.04	0.67	1.72	1.92	.58	4.39	1.45	1.45	8.10	10.12	18.55	
	116.0	4.5	.01	0.17	1.35	1.51	.26	1.97	0.76	.76	4.90	6.12	10.53	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $
			ASSAY oz / T	VALUE $	ASSAY oz / T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	
				(16.70)		(1.12)		(7.57)		(1.00)		(1.25)	
50150													
(cont)													
UDDH 18	134												
	141	7	.08	1.34	2.24	2.51	1.00	7.57	1.25	1.25	6.90	8.63	21.30

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz / T	GOLD VALUE $	SILVER ASSAY oz / T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				(16.70)		(1.12)		(7.57)		(1.00)		(1.25)		
5D150														
Cont.														
UDDH 20	94													
	99	5	.01	0.17	1.11	1.24	.32	2.42	.80	.80	4.9	6.12	10.75	
	103.5	4.5	.005	0.08	1.72	1.92	.43	3.26	1.50	1.50	11.6	1.45	8.21	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				(16.70)		(1.12)		(7.57)		(1.00)		(1.25)	
50250													
DDH 5	21												
	25	4	0.02	0.33	0.05	0.06	2.08	15.75	Tr.	—	Tr.	—	16.14
	30	5	0.03	0.50	0.35	0.39	1.30	9.82	0.05	0.05	0.50	0.62	11.38
	35	5	0.02	0.33	0.20	0.22	0.65	4.92	Tr.	—	Tr.	—	5.47
	40	5	0.02	0.33	0.70	0.78	2.48	18.78	0.12	0.12	0.85	1.06	21.07
	45	5	0.02	0.33	0.20	0.22	1.04	7.86	Tr.	—	0.20	0.25	8.66
	50	5	0.04	0.67	0.30	0.33	1.75	13.25	0.08	0.08	0.35	0.44	14.77
	55	5	0.03	0.50	0.75	0.83	1.35	10.22	0.20	0.20	0.60	0.75	12.50
	60	5	0.02	0.33	0.15	0.17	1.04	7.86	Tr.	—	0.12	0.16	8.52
	65	5	0.02	0.33	0.10	0.11	0.80	6.06	Tr.	—	0.10	0.13	6.63
	70	5	0.01	0.17	0.05	0.06	0.60	4.54	Tr.	—	0.05	0.06	4.83
	75	5	0.02	0.33	Tr.	—	0.50	3.78	Tr.	—	0.25	0.31	4.42
	80	5	0.02	0.33	0.05	0.06	0.30	2.27	Tr.	—	0.15	0.19	2.85
	85	5	0.02	0.33	0.10	0.11	0.40	3.03	Tr.	—	Tr.	—	3.47
	90	5	0.03	0.50	0.10	0.11	0.30	2.27	Tr.	—	0.05	0.06	2.94
	95	5	0.04	0.67	0.15	0.17	0.30	2.27	0.90	0.90	9.15	11.44	15.45
	100	5	0.03	0.50	0.40	0.45	0.40	3.03	0.15	0.15	1.10	1.37	5.50
	105	5	0.01	0.17	0.10	0.11	0.70	5.30	Tr.	—	Tr.	—	5.58
	110	5	0.01	0.17	Tr.	—	0.62	4.69	Tr.	—	0.45	.56	5.42
	115	5	0.02	0.33	0.05	0.06	0.28	2.12	Tr.	—	Tr.	—	2.51
	120	5	0.04	0.67	0.10	0.11	0.93	7.04	Tr.	—	0.38	0.47	8.29

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				(16.70)		(1.12)		(757)		(1.00)		(1.25)	
50250 (cont.)													
D.DH. 5 (cont.)	120	5	0.04	0.67	0.10	0.11	0.93	7.04	Tr	—	0.38	0.47	8.29
	125	5	0.02	0.33	0.05	0.06	0.75	5.68	0.15	0.15	0.95	1.17	7.39
	130	5	0.02	0.33	0.05	0.06	0.30	2.27	0.09	0.09	0.15	0.19	2.94
	135	5	0.03	0.50	0.15	0.17	0.60	4.55	0.05	0.05	Tr	—	5.27

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz / T	GOLD VALUE $	SILVER ASSAY oz / T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				(16.70)		(1.12)		(7.57)		(1.00)		(1.25)	
50250													
(cont)													
DDH 6	20												
	25	5	0.03	0.50	0.25	.28	0.60	4.55	Tr	—	Tr	—	5.33
	30	5	0.02	0.33	0.85	.95	3.50	2.65	Tr	—	0.05	.06	3.99
	35	5	0.04	0.67	0.75	.84	1.00	7.57	0.60	0.60	4.20	5.25	14.93
	40	5	0.04	0.67	1.50	1.68	1.55	11.70	Tr	—	1.05	1.31	15.36
	45	5	0.03	0.50	0.30	.34	0.60	4.55	Tr.	—	0.12	.15	5.54
	50	5	0.005	0.08	Tr.	—	Tr.	—	Tr.	—	Tr.	—	0.08
	55	5	0.005	0.08	Tr.	—	0.04	0.30	Tr.	—	Tr.	—	0.38
	60	5	Tr.	—	Tr.	—	Tr.	—	Tr.	—	Tr.	—	—
	65	5	Tr.	—	Tr.	—	Tr.	—	Tr.	—	Tr.	—	—
	69	4	Tr.	—	Tr.	—	Tr.	—	Tr.	—	Tr.	—	—

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				(16.70)		(1.12)		(7.57)		(1.00)		(1.25)		
50250														
(cont.)														
ODH 8	19													
	25	6	0.03	0.50	1.35	0.51	0.85	6.44	1.27	1.27	3.85	4.81	13.53	
	30	5	0.05	0.83	1.95	2.18	1.90	14.40	0.58	0.58	2.50	3.12	21.11	
	35	5	0.03	0.50	1.55	1.74	1.80	13.62	0.75	0.75	2.90	3.62	20.23	
	40	5	0.03	0.50	0.40	0.45	1.20	9.08	0.75	0.75	2.50	3.12	13.90	
	45	5	0.03	0.50	0.95	1.06	0.60	4.54	0.47	0.47	3.50	4.37	10.94	
	50	5	0.02	0.33	2.00	2.24	2.00	15.15	0.50	0.50	2.15	2.69	20.91	
	55	5	0.05	0.83	3.15	5.53	4.05	30.66	0.73	0.73	5.20	6.50	44.25	
	60	5	0.05	0.83	3.05	3.41	4.10	31.05	0.57	0.57	3.30	4.00	39.86	
	65	5	0.03	0.50	1.15	1.29	2.05	15.53	0.60	0.60	0.95	1.20	19.12	
	70	5	0.03	0.50	1.65	1.85	2.20	16.67	0.45	0.45	0.70	.87	20.34	
	75	5	0.02	0.33	0.80	0.90	1.00	7.57	0.60	0.60	1.30	1.62	11.02	
	80	5	0.04	0.67	2.20	2.46	1.20	9.08	0.10	0.10	2.00	2.50	14.81	
	85	5	0.04	0.67	1.20	1.34	0.80	6.05	0.35	0.35	3.15	3.93	11.56	
	90	5	0.04	0.67	1.15	1.29	0.90	6.81	1.15	1.15	4.25	5.31	15.23	
	95	5	0.03	0.50	0.55	0.61	0.70	5.30	0.85	0.85	3.60	4.51	11.77	
	100	5	0.03	0.50	0.65	0.73	0.50	3.78	0.50	0.50	2.55	3.29	8.80	
	105	5	0.02	0.33	1.00	1.12	5.10	38.60	0.60	0.60	2.20	2.75	43.40	
	110	5	0.03	0.50	0.75	0.84	6.70	50.70	Tr.	—	Tr.	—	52.04	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz / T	GOLD VALUE $	SILVER ASSAY oz / T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				(16.70)		(1.12)		(7.57)		(1.00)		(1.25)		
50250														
(cont.)														
DDH 8	110	5	0.03	0.50	0.75	0.84	6.70	50.70	Tr.	—	Tr.	—	52.04	
(cont.)	115	5	0.03	0.50	1.40	1.57	6.80	51.50	Tr.	—	Tr.	—	53.57	
	120	5	0.04	0.67	0.90	1.01	7.00	53.00	Tr	—	Tr.	—	54.68	
	125	5	0.02	0.33	1.90	2.13	6.00	45.40	0.05	0.05	0.10	.12	48.03	
	130	5	0.03	0.50	0.75	0.84	4.40	33.30	0.15	0.15	0.30	.38	35.17	
	135	5	0.03	0.50	0.30	0.34	2.90	22.00	Tr.	—	0.35	0.44	23.28	
	140	5	0.04	0.67	0.15	0.17	1.30	9.82	Tr.	—	1.20	1.50	12.16	
	145	5	0.02	0.33	0.05	0.05	0.35	2.65	Tr.	—	Tr.	—	3.03	
	150	5	0.03	0.50	0.15	0.17	0.45	3.41	Tr.	—	Tr.	—	4.08	
	155	5	0.03	0.50	0.35	0.40	1.90	14.40	Tr.	—	0.08	.10	15.40	
	160	5	0.01	0.17	0.10	0.11	1.30	9.82	Tr.	—	Tr.	—	10.10	
	166.8	6.8	0.02	0.33	0.60	0.67	1.50	11.35	Tr.	—	0.05	.05	12.41	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $
			ASSAY oz/T	VALUE $	ASSAY oz/T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	
				16.70		1.12		7.57		1.00		1.25	
50250													
(cont)													
DDH 9	22.4												
	25	2.6	0.05	0.83	2.45	2.74	0.30	2.27	1.07	1.07	4.10	5.13	12.04
	30	5	0.04	0.67	0.80	0.90	0.65	4.92	1.40	1.40	3.55	4.44	12.33
	35	5	0.05	0.83	1.45	1.63	0.95	7.20	0.30	0.30	3.70	4.62	14.58
	40	5	0.04	0.67	1.40	1.57	0.20	1.51	0.97	0.97	8.20	10.25	14.97
	45	5	0.04	0.67	0.75	0.84	0.15	1.14	1.20	1.20	7.50	9.46	13.31
	50	5	0.03	0.50	1.05	1.18	0.30	2.27	2.20	2.20	5.25	6.56	12.71
	55	5	0.04	0.67	1.30	1.46	0.25	1.89	2.25	2.25	7.20	9.00	15.27
	60	5	0.07	1.17	2.00	2.24	0.15	1.14	2.20	2.20	7.15	8.94	15.69
	65	5	0.05	0.83	1.30	1.46	Tr.	—	1.90	1.90	13.50	16.89	21.08
	70	5	0.06	1.00	3.30	3.70	Tr.	—	3.25	3.25	17.10	21.39	29.34
	75	5	0.04	0.67	0.95	1.06	0.10	0.76	0.85	0.85	11.20	14.00	17.34
	80	5	0.04	0.67	1.10	1.23	0.20	1.51	1.30	1.30	10.00	12.50	17.21
	85	5	0.03	0.50	0.65	0.73	0.20	1.51	0.60	0.60	8.00	10.00	13.34
	90	5	0.03	0.50	1.80	2.02	0.30	2.27	0.80	0.80	2.20	2.75	8.34
	95	5	0.04	0.67	1.35	1.51	0.45	3.41	1.27	1.27	4.30	5.37	12.23
	100	5	0.05	0.83	1.15	1.29	0.45	3.41	1.17	1.17	3.60	4.50	11.20
	105	5	0.03	0.50	1.90	2.13	0.35	2.65	0.50	0.50	1.00	1.25	7.03
	110	5	0.03	0.50	0.75	0.84	0.50	3.78	2.05	2.05	6.35	7.94	15.11
	115	5	0.04	0.67	0.30	0.33	0.35	2.65	0.50	0.50	0.50	.63	4.78

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $	
			ASSAY oz/T	VALUE $	ASSAY oz/T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $		
			(16.70		(1.12)			(7.57)		(1.00		(1.25)		
50250														
(cont.)														
	38.2													
UDDH 12	43.2	5	.005	0.08	.06	67	.28	2.12	.25	.25	1.50	1.87	4.99	
	48.2	5	.01	0.17	1.27	1.42	1.3	9.85	.44	.44	6.3	7.87	19.75	
	53.2	5	.04	0.67	1.28	1.43	1.5	11.35	.59	.59	3.0	3.75	17.79	
	58.2	5	.04	0.67	1.24	1.39	1.9	14.40	.50	.50	3.7	4.62	21.58	
	63.2	5	.04	0.67	1.40	1.57	1.6	12.10	.43	.43	3.4	4.25	19.02	
	68.2	5	.04	0.67	1.56	1.74	1.8	13.62	.38	.38	3.1	3.88	20.29	
	73.2	5	.02	0.33	.94	1.05	1.5	11.35	.26	.26	3.6	4.50	17.49	
	78.2	5	.04	0.67	.92	1.02	1.4	10.60	.13	.13	3.6	4.50	16.92	
	83.2	5	.06	1.00	1.02	1.14	.9	6.81	.16	.16	4.5	5.62	14.73	
	88.2	5	.02	0.33	1.06	1.19	.68	5.41	.46	.46	3.4	4.25	11.37	
	93.2	5	.04	0.67	1.50	1.68	.8	6.05	.71	.71	3.7	4.62	13.73	
	98.2	5	.02	0.33	1.70	1.90	.27	2.04	.96	.96	4.5	5.62	10.85	
	103.2	5	Tr.	0.✓	.28	.31	.03	.23	.30	.30	1.11	1.39	2.23	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				(16.70)		(1.12)		(7.57)		1.00		(1.25)		
50250														
(cont.)														
UDDH 13	53.8													
	58.8	5	.01	0.17	1.23	1.38	7.80	5.90	0.06	0.06	5.13	12.64		
	63.8	5	.08	1.34	2.28	2.55	1.10	8.34	1.60	1.60	6.13	14.96		
	68.8	5	.14	2.34	3.06	3.42	1.70	12.89	.78	.78	7.75	27.18		
	73.8	5	.06	1.00	1.50	1.68	2.00	15.15	.22	.22	1.65	19.70		
	78.8	5	.12	2.00	1.64	1.84	1.60	12.10	.71	.71	8.13	24.78		
	83.8	5	.04	0.67	1.16	1.30	1.30	9.85	.53	.53	4.87	17.22		
	88.8	5	.02	0.33	1.00	1.12	1.50	11.35	.38	.38	1.87	15.05		
	93.8	5	.06	1.00	1.66	1.86	2.30	17.40	.38	.38	2.18	22.82		
	98.8	5	.12	2.00	1.18	1.32	0.95	7.19	.34	.34	1.57	12.42		
	103.8	5	.10	1.67	1.52	1.70	1.60	12.89	.75	.75	3.38	20.39		
	108.8	5	.20	3.34	1.78	1.99	0.95	7.19	1.35	1.35	12.38	26.25		
	113.8	5	.04	0.67	2.00	2.24	1.60	12.10	.86	.86	8.62	24.49		
	118.8	5	.04	0.67	2.00	2.24	0.14	1.06	1.70	1.70	13.40	19.07		
	123.8	5	.01	0.17	1.44	1.61	0.16	1.21	.17	.17	8.13	11.29		
	128.8	5	—	—	0.75	0.84	0.26	1.97	.06	.06	1.65	4.52		
	133.8	5	—	—	0.36	0.40	0.4	3.03	.02	.02	0.02	3.47		
	138.8	5	—	—	0.16	0.18	0.08	0.60	Tr.	—	—	0.78		
	143.8	5	—	—	0.28	0.31	0.07	0.53	Tr.	—	0.01	0.87		

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $	
			ASSAY oz/T	VALUE $	ASSAY oz/T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $		
				16.70		1.12		7.57		1.00		12.51		
50250														
(cont.)														
UDDH 14	149.6													
	154.6	5	0.02	0.33	.66	0.74	30	22.75	0.06	0.06	0.16	24.08		
	159.6	5	.05	0.83	.63	0.70	0.45	3.40	0.12	0.12	1.23	6.59		
	164.6	5	.04	0.67	.32	0.36	0.28	2.12	0.08	0.08	0.58	3.95		
	169.6	5	.08	1.34	.44	0.49	0.34	2.57	0.11	0.11	0.70	5.38		
	174.6	5	.04	0.67	.44	0.49	0.30	2.27	0.08	0.08	0.21	3.71		
	179.6	5	.02	0.33	.38	0.43	0.76	5.75	0.08	0.08	0.36	7.04		
	184.6	5	Tr.	—	.36	0.40	0.61	4.61	0.04	0.04	0.43	5.59		

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				16.70		(1.12)		7.57		1.00		1.25	
50350													
DDH 1	19												
	25	6	0.06	1.00	0.85	.95	1.04	7.87	0.23	.23	4.60	5.75	15.80
	30	5	0.04	0.67	0.30	.33	1.35	10.21	0.25	0.25	4.38	5.37	16.83
	35	5	0.07	1.17	0.80	.90	1.70	12.88	Tr	—	1.20	1.50	16.45
	40	5	0.04	0.67	0.25	.28	1.80	13.62	0.10	0.10	2.25	2.81	17.48
	45	5	0.05	0.83	0.60	.67	1.20	12.10	0.02	0.02	1.23	1.54	15.16
	50	5	0.07	1.17	0.95	1.06	1.40	10.60	0.15	0.15	1.30	1.62	14.60
	55	5	0.06	1.00	0.85	.95	1.97	14.91	0.16	0.16	3.18	3.97	20.99
	60	5	0.07	1.17	0.25	.28	1.56	11.80	0.10	0.10	2.15	2.69	16.04
	65	5	0.08	1.34	0.50	.56	1.85	14.00	0.08	0.08	1.90	2.48	18.46
	70	5	0.06	1.00	0.60	.67	2.18	16.50	Tr	—	3.00	2.75	20.92
	75	5	0.07	1.17	0.75	.84	2.28	17.30	0.17	0.17	0.95	1.19	20.67
	80	5	0.08	1.34	1.35	1.51	1.35	10.21	0.60	0.60	2.70	3.38	17.04
	85	5	0.02	0.34	1.65	1.85	1.04	7.87	0.80	0.80	5.50	6.86	17.72
	90	5	0.08	1.34	0.95	1.06	0.90	6.81	0.45	0.45	8.47	10.59	20.75
	95	5	0.05	0.83	0.65	.73	0.60	4.55	0.70	0.70	8.25	10.30	17.11
	100	5	0.08	1.34	1.10	1.23	1.04	7.87	0.15	0.15	4.60	5.75	16.34
	105	5	0.18	3.00	2.00	2.22	1.75	13.25	0.40	0.40	6.15	7.68	26.55
	110	5	0.18	3.00	2.10	2.35	2.25	17.05	0.30	0.30	3.10	3.87	26.57
	115	5	0.15	2.50	0.75	.84	2.20	16.67	0.12	0.12	3.00	3.75	23.88
	120	5	0.13	2.17	0.85	.95	1.50	11.37	0.20	0.20	3.95	4.93	19.62

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				(16.7)		(1.12)		(7.57)		1.00		(1.25)		
50350 (cont)														
D.D.H 1	120													
(cont.)	125	5	0.18	3.00	1.80	2.02	1.70	12.88	0.22	0.22	3.20	4.00	22.12	
	130	5	0.19	3.17	4.90	5.50	1.75	13.25	0.45	0.45	5.63	[illegible]	29.41	
	135	5	0.16	2.68	1.75	1.96	1.50	11.37	0.10	0.10	1.70	2.12	18.23	
	140	5	0.16	2.68	2.25	2.53	3.48	26.40	0.30	0.30	2.75	3.44	35.35	
	145	5	0.08	1.34	2.80	3.14	2.60	19.70	0.55	0.55	3.50	4.37	29.10	
	148.5	3.5	0.04	0.67	0.35	.39	0.50	3.78	Tr.	—	0.45	.56	5.40	
	153	4.5	0.005	0.08	0.15	.17	0.05	.38	0.60	0.60	2.07	2.59	3.82	
	160	7	0.06	1.00	2.65	2.95	0.50	3.78	2.59	2.59	13.50	16.86	27.18	
	165	5	0.10	1.67	2.40	2.68	0.60	4.55	1.94	1.94	11.80	14.75	25.59	
	170	5	0.10	1.67	6.30	7.05	0.45	3.41	4.95	4.95	24.85	35.55	52.63	
	175	5	0.15	2.50	3.70	4.15	0.50	3.78	2.80	2.80	15.15	18.91	32.14	
	180	5	0.13	2.17	4.20	4.70	0.80	6.06	2.90	2.90	13.00	16.23	32.06	
	185	5	0.24	4.00	3.45	3.87	0.70	5.30	1.40	1.40	10.25	12.80	27.37	
	190	5	0.16	2.68	3.75	4.20	0.83	6.28	1.83	1.83	[illegible].40	24.21	39.20	
	195	5	0.20	3.34	2.85	3.19	0.48	3.64	0.80	0.80	13.10	16.38	27.35	
	200	5	0.16	2.68	2.70	3.02	1.04	7.87	0.95	0.95	7.95	9.92	24.44	
	205	5	0.18	3.00	4.40	4.93	1.24	9.40	1.30	1.30	6.90	8.62	27.25	
	210	5	0.12	2.00	3.10	3.47	0.94	7.11	1.25	1.25	12.00	15.00	28.83	
	215	5	0.12	2.00	3.15	3.53	1.35	10.21	0.64	0.64	6.50	8.12	24.50	
	220	5	0.11	1.84	2.15	2.41	1.04	7.87	0.46	0.46	5.95	7.44	20.02	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				16.70		1.12		7.57		1.00		1.25		
50350 (cont)														
D.D.H. 1	220													
	225	5	0.10	1.67	1.45	1.62	1.15	8.71	0.20	3.70	4.62	16.82		
	231	6	0.10	1.67	2.15	2.51	0.70	5.30	0.30	5.15	6.44	16.22		
	235	4	0.07	1.17	0.75	.84	0.40	3.03	0.50	4.00	5.00	10.54		
	240	5	0.02	0.34	0.55	.61	0.20	1.51	0.30	3.05	3.81	6.57		
	245	5	0.01	0.17	0.75	.84	0.40	3.01	0.20	0.15	.18	4.40		
	250	5	0.005	0.08	0.65	.73	0.30	2.27	0.25	Tr.	—	3.33		
	255	5	0.01	0.17	1.05	1.17	0.18	1.36	0.08	0.08	.10	2.88		
	260	5	0.005	0.08	0.10	.11	0.40	3.01	0.15	0.05	0.06	3.41		
	265	5	0.005	0.08	0.80	.90	0.20	1.51	1.04	2.90	3.62	7.15		
	270	5	Tr	—	0.10	.11	0.20	1.51	1.80	4.90	6.12	9.54		
	275	5	Tr.	—	0.30	.34	0.10	0.75	0.23	1.00	1.25	2.57		
	280	5	Tr.	—	Tr.	—	0.15	1.14	0.09	Tr.	—	1.23		
	285	5	0.01	0.17	0.10	.11	0.35	2.65	0.50	1.60	2.00	5.43		
	290	5	Tr.	—	0.15	.17	0.10	0.75	Tr.	Tr.	—	0.92		
	294	4	0.005	0.08	0.10	.11	Tr.	—	0.05	Tr.	—	0.24		

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $
			ASSAY oz/T	VALUE $	ASSAY oz/T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	
				16.70		1.12		(7.57)		(1.00)		(1.25)	
50350 (cont.)													
D.D.H. 2	18												
	20	2	0.06	1.00	2.90	3.25	0.40	3.03	Tr.	-	Tr.	-	7.28
	22	2	0.05	0.83	23.65	26.49	0.30	2.27	0.80	0.80	0.18	.24	30.63
	23.5	1.5	0.02	0.33	0.75	0.84	0.25	1.89	Tr.	—	Tr.	—	3.06
	25	1.5	0.03	0.50	0.85	0.95	0.25	1.89	Tr.	—	0.20	.25	3.59
	27	2	0.03	0.50	3.85	4.31	0.24	1.82	Tr.	—	Tr.	—	6.63
	28.5	1.5	0.06	1.00	17.20	19.25	0.40	3.03	Tr.	—	0.15	.19	23.47
	30.	1.5	0.06	1.00	12.90	14.15	0.25	1.89	Tr.	—	0.15	.19	17.53
	32	2	0.04	0.67	1.30	1.45	0.24	1.82	Tr.	—	Tr.	—	3.94
	33.7	1.7	0.03	0.50	0.45	.50	0.15	1.14	Tr.	—	0.08	.09	2.23
	36	2.3	0.02	0.33	6.30	7.05	0.10	0.75	Tr.	—	0.10	.12	8.25
	38	2	0.03	0.50	3.15	3.53	0.50	3.78	Tr.	—	2.60	3.25	11.06
	40	2	0.03	0.50	1.25	1.40	0.55	4.16	0.60	0.60	Tr.	—	6.66
	42	2	0.02	0.33	1.55	1.73	0.60	4.55	Tr.	—	Tr.	—	6.61
	44	2	0.02	0.33	2.00	2.24	0.45	3.41	0.35	0.35	0.80	1.00	7.33
	46	2	0.01	0.16	1.80	2.02	0.30	2.27	1.27	1.27	5.70	7.13	12.85
	48	2	0.005	0.08	0.15	1.68	0.30	2.27	Tr.	—	0.07	.08	4.11
	50	2	0.01	0.17	0.25	.28	0.50	3.78	Tr.	—	Tr.	—	4.23
	52	2	Tr.	0	0.05	0.05	0.30	2.27	Tr.	—	Tr.	—	2.33
	54	2	0.005	0.08	0.60	0.67	0.20	1.51	0.10	0.10	Tr.	—	2.36

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz./T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				(16.70)		(1.12)		(7.57)		(1.00)		(1.25)		
50350														
(cont.)														
D.D.H 2.	54													
(cont.)	56	2	0.005	0.08	0.15	.17	0.45	3.41	0.30	0.30	1.50	1.87	5.83	
	58	2	0.03	0.50	0.25	.28	0.25	1.89	0.65	0.65	2.00	2.50	5.82	
	60	2	0.01	0.17	0.10	.11	0.20	1.51	Tr.	—	0.12	.15	1.94	
	62	2	Tr.	—	0.15	.17	0.40	3.03	Tr	—	0.27	.34	3.54	
	64	2	Tr	—	0.20	.22	0.30	2.27	Tr.	—	Tr.	—	2.49	
	66.	2	Tr.	—	Tr.	—	0.30	2.27	Tr.	—	Tr.	—	2.27	
	68	2	Tr.	—	Tr.	—	0.20	1.51	Tr.	—	Tr.	—	1.51	
	70	2	0.005	0.08	0.25	.28	0.40	3.03	Tr.	—	Tr.	—	3.37	
	72	2	Tr.	—	0.10	.11	0.38	2.88	Tr.	—	Tr.	—	2.49	
	74	2	0.01	0.17	0.65	.73	0.75	5.68	Tr.	—	Tr	—	6.58	
	76	2	0.01	0.17	0.25	.28	1.30	9.85	T.	—	Tr.	—	10.30	
	77.5	1.5	0.005	0.08	0.10	.11	1.15	8.71	Tr.	—	Tr.	—	8.90	
	82	4.5	Tr	—	0.10	.11	0.30	2.27	Tr.	—	Tr	—	2.38	
	85	3	Tr.	—	0.05	.05	0.30	2.27	T.	—	Tr	—	2.32	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				16.70		1.12		7.57		[illegible]		1.25	
50350													
(cont.)													
D.D.H. 3	22												
	27	5	0.04	0.67	1.45	1.62	2.00	15.15	Tr.	—	1.00	1.25	18.69
	32	5	0.05	0.83	0.60	0.67	2.20	16.67	Tr.	—	0.23	.28	18.45
	37	5	0.04	0.67	0.45	0.50	2.10	15.90	Tr.	—	2.65	3.31	20.38
	42	5	0.03	0.50	1.45	1.62	1.65	12.50	Tr.	—	1.50	1.88	16.50
	47	5	0.02	0.34	1.60	1.79	1.30	9.85	0.20	0.20	3.20	4.00	16.18

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $	
			ASSAY oz/T	VALUE $	ASSAY oz/T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $		
				16.70		1.12		7.57		1.00		1.25		
50350														
(cont.)														
D.D.H 4	13													
	15	2	0.04	0.67	0.90	1.01	1.70	12.90	0.30	0.30	3.50	4.38	19.26	
	20	5	0.05	0.83	0.30	.33	1.56	11.80	0.25	0.25	3.30	4.13	17.34	
	25	5	0.04	0.67	0.75	.84	1.75	13.25	0.13	0.13	1.50	1.88	16.77	
	30	5	0.06	1.00	0.80	.89	1.87	14.17	Tr.	—	0.35	.44	30.67	
	35	5	0.06	1.00	1.15	1.29	2.18	16.50	0.15	0.15	1.35	1.69	20.62	
	40	5	0.06	1.00	1.00	1.12	1.86	14.10	0.38	0.38	2.30	2.88	18.48	
	45	5	0.07	1.17	0.25	.28	1.55	11.72	0.45	0.45	3.25	4.01	17.69	
	50	5	0.08	1.34	0.30	.33	2.08	15.75	0.55	0.55	4.70	5.87	23.84	
	55	5	0.14	2.34	0.20	.22	1.20	9.10	0.90	0.90	9.45	11.80	24.36	
	60	5	0.06	1.00	1.55	1.74	1.90	14.40	0.80	0.80	6.20	7.75	25.69	
	65	5	0.04	0.67	1.45	1.62	1.97	14.91	0.25	0.25	2.00	2.50	19.95	
	70	5	0.03	0.50	0.95	1.06	1.62	12.26	0.35	0.35	3.25	4.06	18.23	
	75	5	0.05	0.83	0.70	.78	1.20	9.10	0.20	0.20	2.70	3.38	14.29	
	80	5	0.03	0.50	0.55	.62	0.85	6.44	0.20	0.20	1.85	2.32	10.08	
	85	5	0.04	0.67	1.40	1.57	0.65	4.92	0.15	0.15	1.50	1.88	9.14	
	90	5	0.005	0.08	Tr.	—	0.10	.75	0.18	0.18	2.20	2.76	3.77	
	95	5	0.01	0.17	Tr.	—	Tr.	—	Tr.	—	Tr.	—	0.17	
	100	5	0.12	2.00	0.10	.11	0.18	1.40	0.07	0.07	Tr.	—	3.58	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD		SILVER		COPPER		LEAD		ZINC		TOTAL VALUE $	
			ASSAY oz / T	VALUE $	ASSAY oz / T	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $	ASSAY %	VALUE $		
				(6.7)		(1.12)		(757)		1.00		(125)		
50350														
(cont.)														
O.D.H. 4	100													
(cont.)	105	5	0.15	2.50	2.90	3.25	Tr.	—	0.10	0.10	Tr.	-	5.85	
	110	5	0.005	0.08	0.15	.17	Tr.	—	Tr.	-	Tr.	—	0.25	
	113	3	0.005	0.08	0.10	.11	0.01	.07	Tr.	-	Tr.	—	0.26	
	118	5	0.08	1.34	3.05	3.42	0.57	4.31	0.80	0.80	8.25	10.30	20.17	
	125	7	0.08	1.34	3.20	3.58	0.30	2.27	1.08	1.08	6.30	7.89	8.27	
	130	5	0.08	1.34	4.60	5.15	1.30	9.85	2.25	2.25	14.80	18.00	36.59	
	135	5	0.05	0.83	3.45	3.86	1.15	8.71	1.28	1.28	9.35	11.70	26.38	
	140	5	.03	0.50	1.40	1.57	0.30	2.27	1.07	1.07	11.50	14.38	19.79	
	145	5	0.07	1.17	3.20	3.58	0.70	5.30	1.40	1.40	17.95	22.42	33.87	
	150	5	0.09	1.50	3.90	4.37	1.30	9.85	1.80	1.80	13.40	16.72	34.87	
	155	5	0.11	1.84	2.30	2.58	1.50	11.35	1.25	1.25	0.70	0.87	17.89	
	160	5	0.14	2.34	4.85	5.44	0.60	4.55	3.05	3.05	16.00	20.00	35.38	
	165	5	0.08	1.34	2.00	2.24	1.50	11.35	1.44	1.44	5.85	7.30	23.67	
	170	5	0.10	1.67	2.70	3.02	2.00	15.15	Tr.	—	2.50	3.12	22.96	
	175	5	0.07	1.17	2.50	2.80	2.40	18.20	Tr.	—	0.70	0.87	23.04	
	180	5	0.07	1.17	2.55	2.86	1.05	7.95	1.00	1.00	6.40	8.00	20.98	
	185	5	0.08	1.34	2.10	2.35	1.30	9.85	1.65	1.65	7.50	9.35	24.54	
	190	5	0.09	1.50	2.30	2.58	0.60	4.55	2.30	2.30	11.95	14.90	25.83	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				(16.70)		(1.12)		(7.57)		1.00		(1.25)	
50350													
(cont.)													
D.O.H 4	190												
(cont.)	195	5	0.08	1.34	3.85	4.31	0.70	5.30	3.10	3.10	16.25	20.30	34.35
	200	5	0.06	1.00	2.00	2.24	0.60	4.55	2.78	2.78	13.15	16.40	26.97
	205	5	0.06	1.00	2.10	2.35	0.75	5.68	2.00	2.00	10.70	13.87	24.90
	210	5	0.06	1.00	2.75	3.08	0.40	3.03	2.55	2.55	14.20	17.72	27.38
	215	5	0.02	.33	2.15	2.42	0.50	3.78	2.45	2.45	13.95	17.42	26.40
	220	5	0.03	0.50	1.95	2.18	0.45	3.41	2.20	2.20	9.50	11.90	20.19
	225	5	0.06	1.00	2.00	2.24	0.45	3.41	2.70	2.70	10.55	13.18	22.53
	230	5	0.03	0.50	0.65	7.29	0.28	2.12	1.07	1.07	8.35	10.43	21.41
	235	5	0.07	1.17	3.70	4.15	0.65	4.92	1.85	1.85	10.20	12.72	24.81
	240	5	0.03	0.50	1.40	1.57	0.24	1.82	1.75	1.75	8.17	10.20	15.84
	245	5	0.13	2.17	2.65	2.97	1.45	11.00	tr.	—	0.20	2.50	18.64

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				16.7		1.12		7.57		1.00		1.25	
50400													
UDDH 8	475												
	53.8	63	0.005	0.08	0.12	0.13	0.18	1.36	0.20	20	0.61	0.76	2.53
	59	5.2	0.12	2.00	0.48	0.53	0.35	2.64	0.39	.39	1.06	1.32	6.88
	67.4	8.4	0.04	0.67	0.96	1.08	3.10	23.45	0.15	.15	0.83	10.38	35.73
	69.2	1.8	0.03	0.50	0.07	0.08	0.10	.76	0.05	.05	0.10	.12	1.51
	74.7	55	Fr.	—	0.88	0.98	0.58	4.40	0.74	.74	4.90	6.12	12.24
	78.0	3.3	Tr.	—	0.22	0.25	0.09	.68	0.26	.26	4.10	5.12	6.31
	82.2	4.2	0.06	1.00	1.18	1.32	0.86	6.50	0.40	.40	10.1	12.55	20.87
	85.2	30	0.04	0.67	0.56	0.63	1.20	9.10	0.06	.06	0.69	0.86	11.32
	90.5	53	0.03	0.50	0.23	0.25	0.52	3.93	0.4	.40	0.70	0.87	5.95
	96	5.5	0.01	0.17	0.19	0.21	0.12	0.91	0.15	.15	0.86	10.75	12.19
	102	60	0.005	0.08	0.30	0.33	0.28	2.12	0.28	.28	1.10	1.38	4.19

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				16.7		1.12		7.57		1.00		1.25		
50400														
(cont)														
UODH #9	71.5													
	78.7	72	Tr.	—	.24	0.27	.15	1.13	.30	.30	1.00	1.25	2.95	
	84.6	59	Tr.	—	.76	0.85	3.20	24.20	.30	.30	2.90	3.62	28.97	
	89.7	5.1	0.08	1.34	.96	1.07	.87	6.57	Tr.	—	.30	0.37	9.35	
	94.7	5.0	.06	1.00	.14	0.15	.45	3.40	Tr.	—	Tr.	—	4.55	
	99.7	5.0	.005	0.08	.26	0.28	.72	5.45	Tr.	—	Tr.	—	5.81	
	104.7	5.0	.005	0.08	.60	0.67	5.30	40.10	Tr.	—	Tr.	—	40.85	
	109.7	5.0	Tr.	—	Tr.	—	0.77	58.20	.20	.20	Tr.	—	58.40	
	115	5.3	Tr.	—	.12	0.14	0.10	.75	Tr.	—	.10	.11	1.00	
	120	5	Tr.	—	.12	0.14	.13	.98	Tr.	—	.10	.11	1.23	
	125	5	Tr.	—	.20	0.22	.14	1.06	.01	.01	.02	.02	1.31	
	130	5	Tr.	—	.44	0.48	.45	3.40	.24	.24	.78	0.97	5.09	
	137	7	Tr.	—	.26	0.29	.80	6.05	.23	.23	.69	0.81	7.38	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				16.7		1.12		7.57		1.00		1.25	
50400													
(cont)													
UDDH #11	36.5												
	41.5	5	0.08	1.34	2.28	2.55	1.90	14.40	.69	.69	6.8	8.50	27.48
	46.5	5	.01	0.17	.99	1.10	5.3	40.10	.06	.06	.28	.35	41.78
	51.5	5	.005	0.08	.52	.58	3.1	23.45	.02	.02	.06	.07	24.20
	56.5	5	Tr.	—	.44	.49	1.4	10.60	.01	.01	.04	.05	11.15
	61.5	5	.12	2.00	.60	.67	1.8	13.62	.06	.06	.65	.81	17.16
	66.5	5	.04	0.67	.68	0.76	1.2	9.10	.01	.01	.16	.20	10.76
	72.6	6.1	.04	0.67	2.24	2.57	5.3	40.10	.06	.06	.18	.22	43.56
	77.6	5	.01	0.17	0.71	.80	.75	5.67	.19	.19	.76	.95	7.78
	82.6	5	.01	0.17	.31	0.35	.15	1.13	.09	.09	.32	.40	2.14
	87.6	5	.005	0.08	.32	0.36	.23	1.74	.12	.12	.61	.82	3.12

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				16.70		1.12		7.57		1.00		1.25	
50500													
DDH # 21	79.2												
	85	5.8	0.005	0.08	0.66	0.74	0.06	0.45	0.13	0.43	3.7	4.63	6.33
	90.6	5.6	Tr.	—	1.40	1.57	1.54	11.63	9.68	9.68	0.27	.34	23.22
	129.6												
	134.6	5	Tr.	—	0.40	0.45	0.04	0.30	0.64	0.64	1.65	2.06	3.45
	140	5.4	Tr.	—	0.72	0.80	0.08	0.60	0.62	0.62	1.21	1.51	3.53
	145	5	0.005	0.08	1.12	1.25	0.11	0.85	0.80	0.80	2.09	2.61	5.59
	150	5	0.005	0.08	1.60	1.79	0.12	0.91	0.92	0.92	2.09	2.61	6.31
	155	5	0.005	0.08	1.36	1.52	0.60	4.54	5.72	5.72	0.74	.93	12.79
	160	5	0.005	0.08	1.80	2.02	0.83	6.28	9.46	9.46	1.25	1.44	19.28
	165	5	0.01	0.17	1.79	2.01	0.37	2.80	4.40	4.40	0.90	11.00	20.38
	170	5	0.01	0.17	1.43	1.60	0.32	2.42	4.10	4.10	0.48	0.60	8.89
	175	5	0.005	0.08	1.68	1.88	0.45	3.41	5.72	5.72	1.32	1.65	12.74
	180	5	0.01	0.17	2.07	2.32	0.83	6.28	9.68	9.68	1.05	1.31	19.76
	183	3	0.01	0.17	0.83	0.93	0.10	.73	0.60	0.60	0.28	3.50	5.96
	188	5	Tr.	—	0.48	0.54	0.05	0.38	0.30	0.30	0.92	1.15	2.37
	193	5	0.04	0.67	0.76	0.85	0.06	0.45	0.40	0.40	1.73	2.16	4.53
	198	5	0.005	0.08	0.52	0.58	0.03	0.23	0.36	0.36	0.04	0.05	1.30
	203	5	Tr.	—	0.28	0.31	0.07	0.53	0.38	0.38	0.03	0.03	1.25

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz / T	GOLD VALUE $	SILVER ASSAY oz / T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				16.7		1.12		7.57		1.00		1.25	
50500													
(cont.)													
DDH # 22	83.6												
	86	2.4	Tr.	—	0.72	0.80	0.23	1.74	2.86	2.86	0.38	.47	5.87
	91	5	0.01	0.17	0.31	0.35	0.17	1.29	3.08	3.08	0.46	.57	5.46
	96	5	Tr.	—	0.36	0.40	0.26	1.97	3.08	3.08	0.34	.47	5.92
	101	5	0.005	0.08	1.02	1.14	0.15	1.13	1.04	1.04	0.09	0.11	3.50
	106	5	0.005	0.08	0.84	0.94	0.21	1.59	1.04	1.04	0.80	1.00	4.65
	111	5	0.005	0.08	0.92	1.03	0.12	0.91	0.70	0.70	2.31	2.89	5.61
	116	5	Tr.	—	0.28	0.31	0.15	1.13	1.54	1.54	0.66	0.82	3.79
	121	5	0.005	0.08	0.76	0.85	0.15	1.13	0.90	0.90	0.48	0.60	3.56
	126	5	0.005	0.08	0.48	0.54	0.26	1.97	4.00	4.00	0.30	0.37	6.96
	146	5											
	151	5	0.005	0.08	0.36	0.40	0.07	0.53	0.60	0.60	2.60	3.25	4.86
	156	5	Tr.	—	0.80	0.90	0.06	0.47	0.70	0.70	5.20	6.50	8.57
	161	5	0.01	0.17	0.91	1.02	0.02	0.15	0.14	0.14	5.00	6.25	7.73
	166	5	0.01	0.17	1.03	1.15	0.22	1.67	2.10	2.10	2.42	3.03	8.12
	171	5	0.01	0.17	1.59	1.78	0.74	5.60	7.60	7.60	0.48	0.60	16.05
	176	5	Tr.	—	0.76	0.85	0.14	1.06	1.04	1.04	0.34	0.43	3.38
	181	5	Tr.	—	0.76	0.85	0.15	1.13	0.82	0.82	2.21	2.76	5.56
	186	5	0.005	0.08	0.64	0.72	0.21	1.59	2.80	2.80	2.02	2.52	7.71
	191	5	Tr.	—	0.20	0.22	0.06	0.45	0.42	0.42	0.18	.22	1.31

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				16.7		1.12		7.57		1.00		1.25		
50500														
(cont.)														
DDH #23	160													
	165	5	0.005	0.08	0.02	0.02	0.07	0.53	0.07	0.07	0.47	.59	1.29	
	172	7	Tr.	—	0.08	0.09	0.21	1.59	0.04	0.04	0.24	0.30	2.02	
	177	5	0.005	0.08	0.06	0.07	0.38	2.88	0.04	0.04	1.45	1.81	4.88	
	182	5	0.01	0.17	0.19	0.21	0.88	6.66	0.19	0.19	1.10	1.37	8.60	
	187	5	0.005	0.08	0.18	0.20	1.26	9.54	0.20	0.20	0.34	.43	10.45	
	192	5	0.04	0.67	0.60	0.67	2.10	15.90	1.00	1.00	0.27	.34	18.58	
	197	5	0.005	0.08	0.16	0.18	3.88	29.40	0.02	0.02	0.05	0.06	29.74	
	202	5	0.005	0.08	0.16	0.18	4.20	31.80	0.18	0.18	1.21	1.51	33.75	
	207	5	0.005	0.08	1.36	1.52	10.08	76.31	0.12	0.12	0.99	1.24	79.27	
	212	5	0.005	0.08	0.80	0.90	1.70	12.89	0.32	0.32	3.30	4.13	18.32	
	217	5	0.01	0.17	0.09	0.10	0.53	4.01	0.11	0.11	0.29	0.36	4.75	
	219	2	0.005	0.08	0.04	0.04	0.63	4.77	0.04	0.04	0.38	0.48	5.41	
	224													
	229	5	Tr.	—	0.06	0.06	0.58	4.39	0.04	0.04	0.18	0.23	4.72	
	234	5	Tr.	—	Tr.	—	0.35	2.65	0.91	0.91	0.04	0.05	3.61	
	245	11	Tr.	—	Tr.	—	0.07	0.53	0.07	0.07	0.08	0.10	0.70	

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $
				16.7		1.12		7.57		1.00		1.25	
50500													
(cont.)													
UDD # 21													
	37												
	42	5	Tr.	—	Tr.	—	1.00	7.57	.15	.15	.44	.55	8.27
	47	5	.01	0.17	.15	.17	2.00	15.15	.04	.04	40	.50	16.03
	515	4.5	Tr.	—	.88	0.98	7.3	55.20	.07	.07	.40	.50	56.75

SECTION and LOCATION	FOOTAGE	LENGTH	GOLD ASSAY oz/T	GOLD VALUE $	SILVER ASSAY oz/T	SILVER VALUE $	COPPER ASSAY %	COPPER VALUE $	LEAD ASSAY %	LEAD VALUE $	ZINC ASSAY %	ZINC VALUE $	TOTAL VALUE $	
				16.70		1.12		7.57		1.00		1.25		
50500 (cont)														
UDDH # 22														
	48													
	54	6	Tr.	—	.22	0.25	2.4	18.20	.14	.14	1.3	1.62	20.11	
	60.8	6.8	Tr.	—	.04	0.04	1.9	14.40	.02	.02	0.2	.25	14.71	
	64.1	3.3	.005	0.08	.64	0.71	10.5	79.50	.04	.04	0.2	.25	80.58	
	70	5.9	.005	0.08	1.16	0.30	8.4	63.50	.67	.67	3.2	4.00	68.55	

APPENDIX B

Britton Research Ltd.
INDICATED METALLURGY TABLES

APPENDIX B

HART RIVER MINES LIMITED

Indicated Metallurgy - Britton Research Ltd.

1. For ore assaying 0.03 oz/ton gold, 1.5 oz/ton silver, 1.35% copper, 0.75% lead, 3.5% zinc and 31.0% iron

Case (a)

			Assays							Distribution %					
#	Product	Weight %	Au. Oz/tn	Ag. Oz/tn	Cu %	Pb %	Zn %	Cd %	Fe %	Au.	Ag.	Cu.	Pb.	Zn.	Fe.
1	Copper concentrate	6.00	0.25	9.0	18.0	3.8	5.8	-	33.0	50	36	80	30	10	6
2	Zinc concentrate	4.20	0.04	1.8	0.3	0.7	50.0	0.28	12.0	6	5	1	4	60	2
3	Tailing	89.80	0.015	0.98	0.29	0.55	1.17	-	31.8	44	59	19	66	30	92
4	Head (assumed)	100.00	0.03	1.50	1.35	0.75	3.50	-	31.0	100	100	100	100	100	100
1 + 2	Combined concentrates	10.20	0.16	6.0	10.7	2.5	24.0	-	24.4	56	41	81	34	70	8

Case (b)

1	Copper concentrate	6.38	0.26	10.6	18.0	5.3	6.6	-	32.0	55	45	85	45	12	7
2	Zinc concentrate	4.90	0.04	1.8	0.3	0.5	50.0	0.28	12.0	7	6	1	3	70	2
3	Tailing	88.72	0.013	0.83	0.21	0.44	0.71	-	32.0	38	49	14	52	18	91
4	Head (assumed)	100.00	0.03	1.50	1.35	0.75	3.50	-	31.0	100	100	100	100	100	100
1 + 2	Combined concentrates	11.28	0.16	6.8	10.3	3.2	25.5	-	23.3	62	51	86	48	82	9

2. For ore assaying 0.03 oz/ton gold, 1.8 oz/ton silver, 1.75% copper, 0.6% lead, 3.2% zinc and 32.0% iron

Case (a)

			Assays							Distribution %					
#	Product	Weight %	Au. Oz/tn	Ag. Oz/tn	Cu %	Pb %	Zn %	Cd %	Fe %	Au.	Ag.	Cu.	Pb.	Zn.	Fe.
1	Copper concentrate	6.67	0.23	9.5	21.0	1.8	4.8	-	32.0	50	36	80	20	10	7
2	Zinc concentrate	3.52	0.05	2.6	0.5	0.7	50.0	0.28	12.0	6	5	1	4	55	1
3	Tailing	89.81	0.014	1.20	0.37	0.51	1.25	-	32.8	44	59	19	76	35	92
4	Head (assumed)	100.00	0.03	1.8	1.75	0.6	3.2	-	32.0	100	100	100	100	100	100
1 + 2	Combined concentrates	10.19	0.17	7.1	13.9	1.4	20.4	-	25.1	56	41	81	24	65	8

Case (b)

#	Product	Weight %	Au. Oz/tn	Ag. Oz/tn	Cu %	Pb %	Zn %	Cd %	Fe %	Au.	Ag.	Cu.	Pb.	Zn.	Fe.
1	Copper concentrate	7.00	0.24	11.6	21.0	2.6	5.5	-	31.0	55	45	84	30	12	7
2	Zinc concentrate	4.16	0.05	2.6	0.4	0.4	50.0	0.28	12.0	7	6	1	3	65	2
3	Tailing	88.84	0.013	1.0	0.30	0.45	0.83	-	33.0	38	49	15	67	23	91
4	Head (assumed)	100.00	0.03	1.8	1.75	0.6	3.2	-	32.0	100	100	100	100	100	100
1 + 2	Combined concentrates	11.16	0.17	8.2	13.3	1.8	22.1	-	23.9	62	51	85	33	77	9

HART RIVER MINES LIMITED

Composite "B" - Test 245-7 Conditions

	STAGE																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Total Reagent
Reagents: Lb/ton of ore																			
$Ca(OH)_2$	3.0	2.0	-	0.3	0.5	-	0.2	-	-	0.3	0.7	-	0.5	-	0.15	-	-	-	7.65
NaCN	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15
$ZnSO_4.7H_2O$	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
$CuSO_4.5H_2O$	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	0.5
CX-51 (a)	-	-	0.02	0.02	-	0.01	-	-	0.01	0.02	-	-	-	-	-	-	-	-	0.08
Z-200 (Dow)	-	-	0.02	-	0.02	-	-	0.01	-	-	-	0.04	-	0.02	-	0.01	0.02	0.02	0.16
M.I.B.C.	-	-	0.015	-	-	-	-	-	-	-	-	-	-	-	0.005	-	-	-	0.02
Pulp volume - ml (b)	-	4800	4800	4800	2600	2600	1200	1200	1200	4800	4800	4800	2600	2600	1200	1200	4800	4800	-
% solids	70	32	32	-	9	4	10	5	2	29	28	28	6	4	5	1.3	26	25	-
Time - minutes	75	5	5	5	10	5	5	2	2	2	5	5	5	5	5	2	5	5	-
pH	-	11.3	11.1	11.1	11.3	11.0	11.4	11.3	11.1	11.0	11.3	11.1	11.4	11.2	11.3	11.1	10.9	10.7	-
Temperature - °C	-	20	20	21	19	21	19	19	20	22	22	23	19	20	20	20	23	23	-

NOTES: (a) Potassium amyl xanthate; (b) Per 2000 grams of ore.

STAGES:

1. Grinding (to 99% -200 mesh, 93% -325 mesh, 71% -500 mesh)
2. Conditioning
3. Cu rougher flotation - 1st stage
4. Cu rougher flotation - 2nd stage
5. Cu cleaning - 1st conc.
6. Cu cleaning - 2nd conc.
7. Cu recleaning - 1st conc.
8. Cu recleaning - 2nd conc.
9. Cu recleaning - 3rd conc.
10. Cu scav. flotation
11. Conditioning
12. Zn rougher flotation
13. Zn cleaning - 1st conc.
14. Zn cleaning - 2nd conc.
15. Zn recleaning - 1st conc.
16. Zn recleaning - 2nd conc.
17. Zn scav. flotation - 1st conc.
18. Zn scav. flotation - 2nd conc.

APPENDIX C

ORE RESERVE ESTIMATES, MARK I ZONE
Report of Wayne M. Ash, May 6, 1970

HART RIVER MINES LTD.
Ore Reserve Estimates
Mark I Zone

ALRAE ENGINEERING LTD.

May 6, 1970

TABLE OF CONTENTS

I SUMMARY

Estimates of grade and tonnage for the Mark I zone were based upon the value of the ore in Net Smelter Returns. Two grade cut-offs were used, $15.00 and $10.00 ore. Estimates are as follows

$15.00 (NSR) CUT-OFF

Proven	174,800 tons @ $23.54
Probable	137,500 tons @ $24.97
Possible	135,000 tons

Proven plus probable - 312,365 tons @ $24.16

$10.00 (NSR) CUT-OFF

Proven	380,400 tons @ $19.79
Probable	148,100 tons @ $21.30
Possible	94,100 tons

Proven plus probable - 528,500 tons @ $20.21

Average width = 31.4 feet

This closely agrees with a calculation done in 1969 by George Trowsdale, P. Eng., which gave the tonnage at 577,400 tons at an equivalent NSR price of $18.70.

II VALUE OF THE ORE

Losses in milling, smelting and refining, smelting charges and losses in payment due to non-payable metal content have been considered. Therefore, costs still to be deducted from the value of the ore are:

Development
Mining
Haulage
Milling
Transportation
Administration

ORE CATEGORIES

1. Proven Ore

Proven Ore has been determined by assays and known geology between drill holes or cross-cuts on each section where holes are not separated by more than 60 feet.

or

where ore has been proven on adjacent sections up to 150 feet apart where there is little chance of a severe break in geology.

or

for a strike length distance of 25 feet from a "hanging" drillhole or crosscut.

Straight-line geometry was used between sections.

2. Probable Ore

Probable ore was based upon proven ore assays where probable ore was determined on one of the "supporting" sections.

or

for 20 feet beyond the proven ore in the case of a "hanging" drill hole or crosscut.

3. Possible Ore

Estimates of possible ore have been made upon geological evidence, but only where there is sufficient evidence to be reasonably sure of there being minable ore.

The estimate of 94,000 tons (for the $15.00 cut-off) may be considered conservative. Revised estimates cannot be made until:

(a) The mineralizing control factors have been determined.

(b) The fault zones are more clearly established with respect to faulted-off extensions of the ore body.

No inference of orebodies away from the main zone have been made.

IV TONNAGE CALCULATIONS

For the $10.00 (NSR) cut-off, the grade was determined by straight-line geometry on sections.

The tonnage for the $15.00 ore cut-off was begun using 50 foot horizons rather than sections. This method proved rather inflexible so calculation by section was done above the 3,900 foot horizon. Straight-line geometry was used where applicable. Tonnage factors allowed in cubic feet/ton were 8.0 for massive ore, 10.0 for banded.

V NSR VALUE vs ASSAYS

The value of the ore is based upon expected metal prices two years hence and Net Smelter Returns. For each assay the following net smelter returns were determined:

Gold = $16.70/oz. assayed in the hole
Silver = $1.12/oz. assayed in the hole
Copper = 37.8¢/lb. assayed in the hole
Lead = 5.0¢/lb. assayed in the hole
Zinc = 6.25¢/lb. assayed in the hole

VI MILLING LOSSES

Milling losses were based upon the metallurgical testing done by Britton Research Limited in 1969. However, some of the data has been altered where it is felt that better concentration may be expected. Calculations for milling recovery are based on three concentrates, a copper, a zinc, and a silver-lead.

Britton Research Limited indicated that an 18.0% copper concentrate would be obtained. It is felt that by using other milling methods the grade may be increased to 21.0%.

A lead concentrate can conceivably be made, increasing the lead recovery from the present 45% to 50.0%. The silver recovery would be increased at the same ratio.

The zinc concentrate was considered to stay constant at 50.0%. If this were the case, we would not be paid for the cadmium content. However, if the zinc concentrate could be increased to 55% we would be paid for cadmium as well as getting better payment for our zinc. Although this factor used is based upon the grade, it has not been included so that our zinc price may be underestimated (see "Zinc Concentrate"). The cadmium content should average 0.3 lbs/ton.

Payment for sulphur content has not been included. The content is estimated at 35%.

A lead concentrate has not been listed although credit in recovery and smelting is included.

BRITTON RESEARCH LIMITED
Metallurgical Test

Product	Weight	Assay %					% Recovery				
		Au	Ag	Cu	Pb	Zn	Au	Ag	Cu	Pb	Zn
Cu. Con.	6.38	0.26	10.6	18.0	5.3	6.6	55	45	85	45	12
Zn. Con.	4.90	0.04	1.8	0.3	0.5	50.0	7	6	1	3	70
Combined	11.28	0.16	6.8	10.3	3.2	25.5	62	51	86	48	82

Expected Results Through
Alteration of Proposed Milling Method

Product	Weight	Assay %					% Recovery				
		Au	Ag	Cu	Pb	Zn	Au	Ag	Cu	Pb	Zn
Cu. Con.	6.4	0.24	11.0	21.0	5.5	6.3	55	50	88	50	12*
Zn. Con.	4.9	0.04	1.8	0.3	0.5	50.0	7	6	1*	3*	70
					Combined		62	56	88	50	70

* Non-payable metal content.

VII SMELTING

Calculations for the silver-lead-zinc concentrates were based upon Cominco smelter prices for carload lots. Calculations for the copper concentrate were based upon a verbal estimate by American Smelting & Refining Company carload lots. It is expected that better prices might be obtained through negotiation.

VIII GUIDE TO SMELTER PRICES

1. Copper Concentrate - ASARCO

   (a) Gold - Pay 80% less $1.25/oz. smelting loss
   Price = $35.00 per oz.
   Content greater than 0.03 oz/ton concentrate.

   (b) Silver - Pay 80% less 1.0 oz/ton smelting loss
   Price for 1973 assumed $2.50/oz.*

   (c) Copper - Pay Cu % less 1.0% smelting loss
   Less $30.00/ton smelting charges
   Less 3.0¢/lb. refining charges
   Projected 1973 price - 53¢/lb.*

   (d) Lead - Pay 92% less 1.0% smelting loss
   Projected 1973 price - 11.6¢/lb.*

   (e) Zinc - No price, no penalty.

2. Zinc Concentrate - Cominco

   (a) Gold - Pay 80% less $1.25/oz. smelting loss
   Projected 1973 price = $35.00/oz.

   (b) Silver - Pay 80% E&MJ price less 1.0¢/oz.
   Projected 1973 price = $2.50/oz.*

   (c) Zinc - Pay for 50% con: 81%
   Less 2.6¢ per lb. smelting charges
   Projected 1973 price = 14.5¢/lb.*

   (d) Copper - No price, no penalty.

   (e) Lead - No price, no penalty.

   (f) Cadmium - Pay 70% less 40¢ per lb.
   Less 5 lbs/ton concentrate
   Price April 25, 1970 was $4.30/lb.

* NOTE: Price projections were personal and were not given by the smelters.

Respectfully submitted:

Wayne M. Ash

Wayne M. Ash.

APPENDIX D

REFERENCES

The following reports and correspondence pertaining to the Mark Claims are available in Alrae Engineering's file:

(1) Report on the Mark Claim Group for Hart River Mines Ltd. (N.P.L.) by J.A.C. Mackie, P. Eng., dated February 6, 1968.

(2) Interim Report to July 15, 1968, by D.L. McKelvie, P. Eng.

(3) Report on the Mark Group of Claims of Hart River Mines Ltd. by P.H. Sevensma, Ph.D., P. Eng., dated September 16, 1968.

(4) The Geology of Hart River Mines by John L. Usher and Allan S. Macdonald, dated December 1968.

(5) Report on a Geochemical Survey and a Magnetometer Survey on the Mark 1 - 38 Claims, Linda B Claims 1 - 9, 17 and 19, and the May Claims 1 - 6, by G. Trowsdale, P. Eng., dated January 15, 1969.

(6) Britton Research correspondence.

(7) Kaiser Engineering correspondence.

In addition, reference has been made to numerous work sheets diamond drill logs, etc., in Alrae's files.