

HILL/RUST GROUP 105 K-5
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D-6- 1970 Hecla Mng
SUMMARY REPORT
HILL-RUST GROUP
(JACOLA MINES LTD.)
105K5 105K6
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SUMMARY REPORT

HILL-RUST GROUP

(JACOLA MINES LTD.)

ANVIL RANGE, YUKON

for

HECLA OPERATING COMPANY

by

GORDON D. HOUSE B.A. (Mod.)

1970

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I. INTRODUCTION

This Summary Report describes the 1970 Drill Program on the Hill-Rust property.

Details of location, access, topography, climate, history and regional geology are adequately covered in the 1969 Summary Report by Dr. H. Linder and are not repeated here.

The writer was in charge of the 1970 Exploration Program, under the direction of Dr. Harold Linder. Exploration was carried out by Hecla Mining Company of Canada Ltd., on behalf of Hecla Operating Company.

II. SUMMARY

The Hill-Rust property of Jacola Mines Ltd., is being explored by Hecla Operating Company under an agreement dated June 1, 1967. The property is located 125 miles north-northeast of Whitehorse, Yukon, and 5 miles northwest of the Anvil Mine and airstrip.

Access was by helicopter or by foot from the Anvil airstrip but during the 1970 season a Cat Trail was built to the campsite, and tracked vehicle access is possible.

In 1969 the property was covered by a gravity survey and when minor lead-zinc occurrences were discovered near the prime gravity anomaly, this area was covered by an I.P. survey and detailed geologic mapping.

In 1970 a diamond drilling program was carried out to investigate the prime gravity and I.P. anomalies. The property was covered by geologic mapping on the gravity survey grid lines and a magnetometer survey was carried out over the prime gravity anomaly. The diamond drill program did not discover economically

significant mineralization and the results indicate more complexity in the geology and structure of the area than appeared from initial surface geological mapping.

The gravity anomalies appear to result from an isoclinally thickened calc-silicate sequence, although the possibility of sulfides contributing to these anomalies has not been completely ruled out. Sufficient amounts of pyrite and pyrrhotite were encountered in the calc-silicate unit to explain the I.P. anomalies.

The property is situated in a geologically favourable belt in which several major lead-zinc deposits are known, and additional exploration is warranted.

III. CLAIMS

The Hill-Rust property consists of 128 claims which are listed in Appendix A.

Jacola Mines Ltd., is the recorded owner of 46 claims, and Hecla Mining Company of Canada Ltd., and Hecla Operating Company are the recorded owners of the remaining 82 claims.

All of the Hill-Rust claims are in good standing until at least January 28, 1974. A total of 460.5 claim years assessment was received by using all applicable expenditures. Assessment credit of 124.5 claim years was received for bulldozer work in building the access road, drill set-ups and access, and general road maintenance. An additional 336 claim years assessment credit was received for diamond drilling. Some of the assessment credits were used for fractional years to bring all expiry dates to a common date, January 28.

Claim posts actually located on the ground are shown in Fig. III.

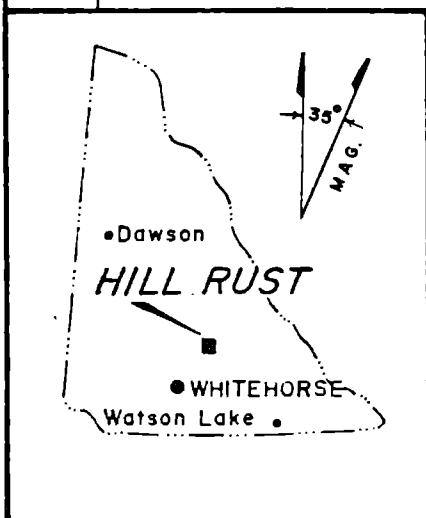
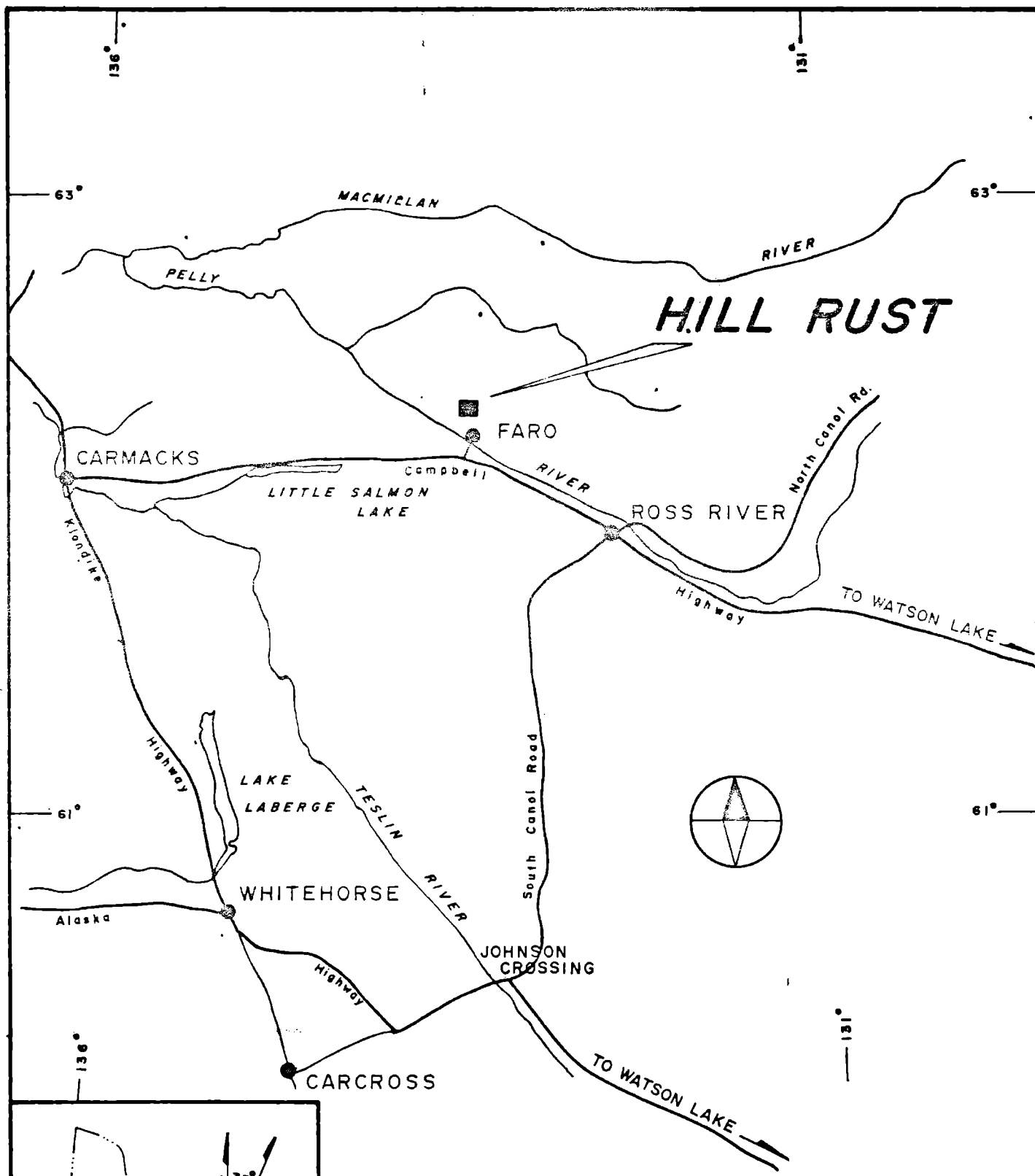
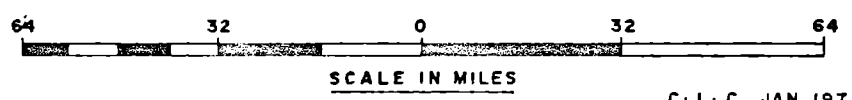


FIG. 1
 HECLA MINING CO. OF CANADA LTD.
 LOCATION MAP
 HILL RUST PROJECT
 ANVIL AREA, YUKON TERRITORY



IV. 1970 EXPLORATION PROGRAMA. Summary

Work carried out on the property included:

1. 3008 feet of diamond drilling in four holes.
2. Geologic mapping of the property on 800 foot lines, including ground checks of gravity anomalies A to P for a total of 30 line miles of traverse.
3. Magnetometer survey covering 16 line miles on lines spaced 800 feet in the area of gravity anomaly A.
4. Construction of 11 miles of road and 1600 feet of bulldozer trenching.

B. Road Construction and Trenching

A Caterpillar D7E bulldozer with ripper attachment, belonging to Carmacks Construction was used to construct access road to the property from the Anvil Airstrip, and putting in drill set-ups and access.

A total of 157 Cat hours were used in road construction which involved extensive repair of 3½ miles of old road, and construction of 6½ miles of new road. Road construction began on May 5th and was completed by June 6th.

Permafrost conditions greatly hampered road construction as the stripped ground thawed rapidly into a muddy quagmire and necessitated construction of numerous alternate routes and bypasses (see Photo #7).

Supplies were hauled in on an Athey Wagon towed by the D7E Bulldozer (see Photos #1 and #2). This tracked vehicle proved very useful in the mud conditions encountered.

The bulldozer was also used about 10 hours in bedrock trenching and bedrock road cut. Approximately 1600 feet of trenches were cut, chiefly near L.148 W, 12 N to 16 N.

The Caterpillar D6B bulldozer to be furnished by the drill contractor did not arrive until June 26th, so the D7E was kept on the property until the D6B arrived and was used a total of 125 hours for drill moves and hauling supplies.

C. Diamond Drilling

A total of 3008 feet of BQ Wireline Diamond Drilling was completed on the property in the period from June 5th to July 25th, by Artic Diamond Drilling Ltd., of Whitehorse, using a Longyear Model 38 Drill.

Eight primary drill targets were selected on the basis of the gravity anomalies, I.P. survey and detailed geologic mapping, the intention being to thoroughly test the main Anomaly "A" and dependent on results to test the other large Anomaly "B".

Anomaly "A" was tested by three drill holes. J-1-70 at L.132+00 W 13+00 N was drilled to 506 feet vertical and intersected calc-silicate skarn with very minor mineralization, bottoming in phyllitic quartzite. 154.2m

J-2-70 on L.140+00 W 10+00 N at 45° azimuth 030° was drilled to 997 feet, quartz diorite dykes were cut near surface and several large scale fault and shear zones occurred at depth. Again calc-silicate skarn with minor mineralization was cut, the main rock type however, was phyllitic quartzite. 303.9m

J-3-70 on L.163+00 W 20+00 N, vertical was drilled to 999 feet, mainly in phyllitic quartzites but with increasing calc-silicates with depth, marble being cut around 270 feet depth. Minor mineralization associated with calc-silicate skarn was noted. 304.5 m

J-4-70 was drilled on Anomaly "B" in the area of the gravity high, to 506 feet depth. A thick phyllite sequence going to phyllitic quartzite and calc-silicate skarn was cut, again minor mineralization in the skarn zones was noted. 154.2

Because of the results obtained, further drilling was not considered feasible at this time and the contract was terminated.

D. Magnetometer Survey

Mr. John Morris, under the direction of the writer, ran approximately 16 line miles of magnetometer survey over gravity anomalies A and B. Lines covered were L.100+00 W to L.196+00 W.

The survey showed magnetic variations of less than 100 gammas over the entire area covered, as shown in Fig. IV, and it appears that magnetic surveys are not a useful exploration tool on the Hill-Rust property.

E. Geologic Mapping

Reconnaissance geologic mapping was carried out by Dr. Harold Linder and the writer over the gravity survey cut lines for a total of 30 line miles of traverse.

Sparsity of outcrop lead to interpretation and correlation difficulties, shown in Fig. III, Geologic and Gravity Anomaly Map.

Examination of the drill core from four drill holes and geologic mapping did not materially alter the concepts outlined in the 1969 Summary Report concerning rock units and sequences.

The calc-silicate unit is now interpreted to be one unit containing the previous subdivisions of skarn, marble and calcareous quartzite.

The original rock was a limy sediment composition, with local variations in composition and subsequent proximity to quartz diorite dykes playing an important part in alteration to marble and skarn.

The southern part of the claims was found to be underlain solely by "greenstone", a dense basalt or gabbro of variable grain size, considered as volcanic flows or sills.

The "greenstone" appears to conformably overlies the phyllite and silicate sequence to the north and all measurable components indicate a gentle dip to the south.

Both the phyllite and phyllitic quartzite units are associated with complex overturned folding, noted in several outcrops, with strongly developed axial plane cleavage, which it is suspected has been confused with bedding planes in outcrops where the folded nature has not been exposed.

The actual contact of the metasediments with the Anvil Batholith does not outcrop on the grid lines traversed, but in the northern part of the surveyed area, dykes and sills(?) of granitic and dioritic rock types occur.

A larger outlier or extension of the Anvil Batholith outcrops sparsely in the north and east part of the surveyed area, striking roughly S.S.E. towards Rose Creek.

The outcrops mapped, and tentative interpretation are shown in Fig. III.

F. Camp

The camp was set up roughly in the centre of the property on claim Hill #28, beside a creek flowing south and east off the Hill Group.

The bulldozer access road runs right to the camp area, which was cleared and ditched to provide solid, dry footing for the four tent frames used.

The camp consisted of a drillers' bunk house, an office and Hecla bunkhouse, a cook tent, a small store tent and cook's sleeping quarters and a large 14' x 16' on squaw poles for miscellaneous storage.

All supplies were hauled in on sloop towed by the contractor's D6B bulldozer.

After completion of the project for the season, the tent frames were left standing, and two oil stoves and miscellaneous hardware items were stored in the office tent, which was left standing with a double polyethylene fly securely fastened.

V. DISCUSSION OF RESULTS

The diamond drilling while not indicating any economically significant mineralization, did not rule out the possibility of sulfides being associated with the gravity anomalies.

Density considerations of the calc-silicate unit, and the density contrast assumed in the model studies used in the

interpretation of the gravity results, would indicate an abnormal thickening of the calc-silicate sequence in the area of the anomalies.

The rather limited I.P. survey carried out over the "A" anomaly in late 1969 indicated chargeability anomalies of from 30 to 44 milliseconds on several of the lines. The drill results appear to have satisfactorily explained the sources of these anomalies as disseminated pyrite and pyrrhotite.

On L.132+00 W a content of around 5% by volume of metallicly conducting mineralization was indicated at relatively shallow depths from the Base Line to 18 N, and DDH J-1-70 did cut pyrrhotite/pyrite mineralization of up to 20% at depths of under 200 feet.

On L.140+00 W a deeper source of up to 10% metallicly conducting mineralization was indicated around 17+00 N, DDH J-2-70 collared at 10+00 N and drilling North at -45° intersected up to 20% of pyrrhotite/pyrite mineralization around 550' to 650', which would be approximately 300' vertically below from 15+00 N to 16+00 N on line.

On L.164+00 W there was only background chargeability noted, and no significant pyrrhotite/pyrite mineralization was encountered in DDH J-3-70.

The geology map, Fig. III, resulting from the geological mapping indicates that the sparsity of outcrop hinders correlation and interpretation. However, sufficient coverage was obtained to indicate that the main rock units, the phyllite and phyllitic quartzite sequences have been involved in complex isoclinal folding, with development of strong axial plane cleavage, which may have been interpreted as bedding planes in some outcrops.

The calc-silicate unit is thought to contain lenses of skarn and marble within the calcareous quartzite, as a result of original composition differences and present proximity to granitic and dioritic dykes and sills. This unit has also been involved in isoclinal folding, although evidence for this is sparse as the strong axial plane cleavage results in recrystallisation and orientation of the calcium carbonate and calc-silicates in the unit.

The greenstone found in the southern part of the claim groups has also been affected by the complex folding but its relationship to the phyllite-phyllitic quartzite - calc-silicate sequence is unclear. A hypothesis that the greenstone-volcanic sequence lies higher in the stratigraphic column has been suggested by several regional geologic reports published on the area.

No clear-cut contact with the Anvil Batholith was located by the geologic mapping, as drift-filled valleys occur between fairly continuous outcrops of metasediments and the granite rocks to the north of the gravity survey grid area. Outliers of both granite and quartz-diorite composition are found well into the meta-sediments in the northeast and northern parts of the property, and it is considered possible that large scale faulting may be responsible for these occurrences.

No other areas of lead-zinc mineralization outside of the known calc-silicate showings in the area of Anomaly "A" were noted, although the calc-silicate unit was found to extend into the northwestern part of the property.

VI. CONCLUSIONS AND RECOMMENDATIONS

The 1970 drilling program to test gravity and I.P. anomalies located in 1969 did not indicate any economically significant mineralization.

The gravity anomalies can probably be explained by an abnormal thickening of the calc-silicate sequence by isoclinal folding, while the I.P. anomalies are explained by pyrrhotite and pyrite mineralization associated with the calc-silicate unit.

The property lies in a favourable geological setting in a belt which contains several large lead-zinc deposits. The overall structural and geological setting of these deposits is as yet unclear, and the relationships of the Anvil Batholith and the Tintina Fault with these deposits remains problematical. Fairly extensive exploration programs continue to be mounted in this area, mainly by companies with extensive experience of the region.

For the above reasons, further work on the Hill-Rust property is justified. All of the claims are in good standing until at least January 28, 1974, but at least some systematic work should be done each year to broaden the overall picture.

It is possible that a deeper penetrating geophysical survey, such as the Turair system, might disclose information on the complex geology shown to exist on the property, and detailed geological mapping with bulldozer trenching in areas of no outcrop would assist in clarifying some of the geological problems posed at this time.

Further I.P. on the balance of the gravity survey grid is proposed, with additional drilling if indicated.

A future exploration program is proposed as follows:

1. A Turair survey of the property, with follow up ground surveys as indicated.
2. Complete I.P. coverage of the gravity grid.
3. Detailed geological mapping with bulldozer stripping in critical areas of no outcrop.
4. Strictly controlled geochemical soil sampling, especially in areas of no outcrop, such as south of the Base Line.
5. Fill-in diamond drilling on Gravity Anomalies A and B, and drilling of other anomalies, dependent on results of the above surveys.

VII. EXPLORATION COSTS

<u>Item</u>	<u>Cost</u>	<u>Cost/Ft.</u> <u>(3008' total)</u>
Direct Diamond Drilling Costs, including Camp, Transport, Equipment	\$40,275.61	13.39
D7E Bulldozer	\$17,632.00	5.86
Assays, Supervision, Field expenses	\$ 7,427.66	2.47
Office, Payroll, Miscellaneous (Jan. 1/70 - Jan. 15/71)	<u>\$11,164.64</u>	<u>3.71</u>
	\$76,499.91	25.43

Respectfully submitted.

GORDON D. HOUSE.

APPENDIX A
LIST OF CLAIMS

HECLA - JACOLA

<u>Claims</u>	<u>Grant Numbers</u>	<u>Record Date</u>	<u>Expiry Date</u>
HILL 1- 4	99509 - 99512	February 16, 1966	January 28, 1974
HILL 5- 9	99513 - 99517	"	"
HILL 11	99519	"	"
HILL 13-18	99521 - 99526	"	"
HILL 19-24	99527 - 99532	"	"
HILL 25-29	99533 - 99537	"	January 28, 1975
HILL 30	99538	"	January 28, 1974
HILL 31	99539	"	January 28, 1975
HILL 32	99540	"	January 28, 1974
RUST 1- 4	Y3441 - Y3444	March 21, 1966	"
RUST 17	Y3457	"	"
RUST 18	Y3458	"	January 28, 1975
RUST 19-22	Y3459 - Y3462	"	January 28, 1974
RUST 24	Y3464	"	"
RUST 34-38	Y3474 - Y3478	"	"

HECLA OPERATING COMPANY and
HECLA MINING COMPANY OF CANADA LTD.

FUBAR 1	Y20447	July 28, 1967	January 28, 1975
FUBAR 2	Y20448	"	January 28, 1976
FUBAR 3	Y20449	"	January 28, 1975
FUBAR 4	Y20450	"	"
FUBAR 5	Y20451	"	January 28, 1976
FUBAR 7 - 8	Y20453 - Y20454	"	"
FUBAR 9	Y20463	"	"
FUBAR 10	Y20464	"	January 28, 1977
FUBAR 11 -12	Y20465 - Y20466	"	January 28, 1976
FUBAR 23 -30	Y20469 - Y20476	"	"
FUBAR 31 -34	Y20479 - Y20482	"	January 28, 1975
FUBAR 35 -36	Y20477 - Y20478	"	January 28, 1976

HECLA OPERATING COMPANY and
HECLA MINING COMPANY OF CANADA LTD.

(Continued)

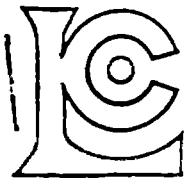
<u>Claims</u>	<u>Grant Numbers</u>	<u>Record Date</u>	<u>Expiry Date</u>
HECK 1 - 4	Y25554 - Y25557	July 30, 1968	January 28, 1975
HECK 5 - 6	Y25558 - Y25559	"	January 28, 1976
HECK 7 - 8	Y25560 - Y25561	"	January 28, 1975
HECK 9	Y25562	"	January 28, 1976
HECK 10-12	Y25563 - Y25565	"	January 28, 1975
HECK 13-17	Y25570 - Y25574	"	January 28, 1974
HECK 18-20	Y25575 - Y25577	"	January 28, 1975
HECK 21-22	Y25566 - Y25567	"	"
HECK 23	Y25568	"	January 28, 1974
HECK 24	Y25569	"	January 28, 1975
DA 1 - 2	Y29769 - Y29770	September 13, 1968	January 28, 1975
DA 3	Y29771	"	January 28, 1974
DA 4 - 7	Y29772 - Y29775	"	January 28, 1975
DA 8 - 13	Y29776 - Y29781	"	January 28, 1974
LA 30 - 32	Y29782 - Y29784	"	January 28, 1975
DEE 45 - 46	Y29785 - Y29786	"	January 28, 1974
HEC 1 - 15	Y48411 - Y48425	January 7, 1970	January 7, 1975

Total - 128 Claims.

HILL-RUST CLAIMSEXPIRY DATES - CHRONOLOGICAL ORDER

<u>DATE OF EXPIRY</u>	<u>CLAIM</u>	<u>GRANT NUMBER</u>
January 28, 1974	HILL 1 - 9	99509 - 99517
"	HILL 11	99519
"	HILL 13-24	99521 - 99532
"	HILL 30	99538
"	HILL 32	99540
"	RUST 1 - 4	Y3441 - Y3444
"	RUST 17	Y3457
"	RUST 19-22	Y3459 - Y3462
"	RUST 24	Y3464
"	RUST 34-38	Y3474 - Y3478
"	HECK 13-17	Y25570 - Y25574
"	HECK 23	Y25568
"	DA 3	Y29771
"	DA 8 -13	Y29776 - Y29781
"	DEE 45-46	Y29785 - Y29787
January 9, 1975	HECK 1-15	Y48411 - Y48425
January 28, 1975	HILL 25-29	99533 - 99537
"	HILL 31	99539
"	RUST 18	Y3458
"	FUBAR 1, 3, 4	Y20447, Y20449, Y20450
"	FUBAR 31-34	Y20479 - Y20482
"	HECK 1 - 4	Y25554 - Y25557
"	HECK 7 - 8	Y25560 - Y25561
"	HECK 10-12	Y25563 - Y25565
"	HECK 18-20	Y25575 - Y25577
"	HECK 21-22	Y25566 - Y25567
"	HECK 24	Y25569
"	DA 1 - 2	Y29769 - Y29770
"	DA 4 - 7	Y29772 - Y29775
"	LA 30-32	Y29782 - Y29784
January 28, 1976	FUBAR 2	Y20448
"	FUBAR 5	Y20451
"	FUBAR 7 - 8	Y20453 - Y20454
"	FUBAR 9	Y20463
"	FUBAR 11-12	Y20465 - Y20466

<u>DATE OF EXPIRY</u>	<u>CLAIM</u>	<u>GRANT NUMBER</u>
January 28, 1976	FUBAR 23-30	Y20469 - Y20476
"	FUBAR 35-36	Y20477 - Y20478
"	HECK 5- 6	Y25558 - Y25559
"	HECK 9	Y25562
January 28, 1977	FUBAR 10	Y20464



212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA
TELEPHONE: 985-0648

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 2959

TO: Hecla Mining Co. of Canada Ltd.,
Board of Trade Tower,
Ste. 2009 - 1177 West Hastings St.,
Vancouver, B. C.

INVOICE NO. 3135

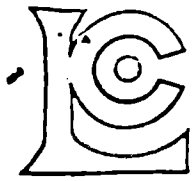
DATE RECEIVED June 30/7

DATE ANALYSED July 6/70

ATTN: Mr. P. Conley cc: Mr. J. E. McKinney

DBH J1 SAMPLE NO.:	% Copper	% Lead	% Zinc	Oz/Ton Silver	Oz/Ton Gold
20-30 52001	< 0.01	< 0.01	0.03	0.04	
30-40 52002	< 0.01	0.04	0.03	0.16	
40-50 52003	< 0.01	< 0.01	0.01	0.01	
50-60 52004	< 0.01	< 0.01	0.01	0.03	
60-70 52005	< 0.01	< 0.01	< 0.01	0.01	
70-80 52006	< 0.01	< 0.01	0.02	0.01	
80-90 52007	< 0.01	< 0.01	< 0.01	< 0.01	
90-100 52008	< 0.01	< 0.01	< 0.01	0.03	
100-110 52009	< 0.01	< 0.01	< 0.01	< 0.01	
110-120 52010	< 0.01	< 0.01	< 0.01	0.01	
120-130 52011	< 0.01	< 0.01	< 0.01	0.01	
130-140 52012	< 0.01	< 0.01	0.01	0.06	
140-150 52013	< 0.01	< 0.01	0.01	0.04	
150-160 52014	0.04	< 0.01	0.01	0.04	
160-170 52015	0.03	< 0.01	0.01	0.04	
170-180 52016	0.04	< 0.01	0.03	0.10	< 0.003
180-190 52017	0.01	< 0.01	< 0.01	0.06	< 0.003
190-200 52018	0.01	< 0.01	0.01	0.04	< 0.003
200-210 52019	< 0.01	< 0.01	< 0.01	0.03	< 0.003
210-220 52020	< 0.01	< 0.01	< 0.01	< 0.01	< 0.003
220-230 52021	< 0.01	< 0.01	< 0.01	0.01	< 0.003
230-240 52022	< 0.01	< 0.01	0.01	0.01	
240-250 52023	< 0.01	< 0.01	< 0.01	0.01	
250-260 52024	< 0.01	< 0.01	< 0.01	< 0.01	
260-270 52025	< 0.01	< 0.01	< 0.01	< 0.01	
270-280 52026	< 0.01	< 0.01	< 0.01	0.01	
280-290 52027	< 0.01	< 0.01	< 0.01	0.01	
290-300 52028	< 0.01	< 0.01	< 0.01	0.03	
300-310 52029	< 0.01	< 0.01	< 0.01	0.03	
310-320 52030	< 0.01	< 0.01	< 0.01	0.03	
320-330 52031	< 0.01	< 0.01	< 0.01	0.04	
330-340 52032	0.03	< 0.01	< 0.01	0.06	
340-350 52033	< 0.01	< 0.01	< 0.01	0.01	
350-360 52034	< 0.01	< 0.01	< 0.01	0.04	
360-370 52035	< 0.01	< 0.01	< 0.01	0.03	
370-380 52036	< 0.01	< 0.01	< 0.01	0.04	
380-390 52037	< 0.01	< 0.01	< 0.01	0.04	
390-400 52038	< 0.01	< 0.01	< 0.01	0.04	
400-410 52039	< 0.01	< 0.01	< 0.01	0.04	
410-420 52040	< 0.01	< 0.01	< 0.01	0.03	

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CANADA
TELEPHONE: 985-0648

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CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 8960

TO: Hecla Mining Co. of Canada Ltd.,
Board of Trade Tower,
Ste 2009 - 1177 West Hastings St.,
Vancouver, B. C.

INVOICE NO. 3135

DATE RECEIVED June 30/7

DATE ANALYSED July 6/70

ATTN: Mr. P. Conley cc: Mr. J. E. McKinney

	DDH J1 SAMPLE NO.:	% Copper	% Lead	% Zinc	Oz/Ton Silver
420-430	52041	< 0.01	< 0.01	< 0.01	< 0.01
430-440	52042	< 0.01	< 0.01	< 0.01	< 0.01
440-450	52043	0.01	< 0.01	< 0.01	< 0.01
450-460	52044	0.01	< 0.01	< 0.01	< 0.01
460-470	52045	0.01	< 0.01	< 0.01	< 0.01

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CERTIFICATE OF ANALYSIS

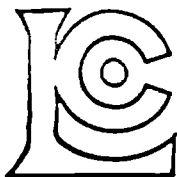
TO: **Escla Mining Co. of Can. Ltd.,**
Ste. 2009 - 1177 W. Hastings St.,
Vancouver B. C.

CERTIFICATE NO. **10046**
INVOICE NO. **3382**
DATE RECEIVED **July 18/**
DATE ANALYSED **July 24/**

ATTN: **cc: Mr. P. Conley** **cc: Mr. J. E. McKinney**

SAMPLE NO.:		%	%	%	Gr/ton
		Copper	Lead	Zinc	Silver
DDH J1	52046 470-480	0.01	< 0.01	< 0.01	< 0.01
	52047 480-490	< 0.01	< 0.01	< 0.01	< 0.01
	52048 490-500	0.01	< 0.01	< 0.01	< 0.01
	52049 500-506	< 0.01	< 0.01	< 0.01	< 0.01
DDH J2	52050 20- 30	< 0.01	< 0.01	< 0.01	< 0.01
	52051 30- 40	< 0.01	< 0.01	< 0.01	< 0.01
	52052 40- 50	< 0.01	< 0.01	< 0.01	< 0.01
	52053 50- 60	< 0.01	< 0.01	< 0.01	< 0.01
	52054 60- 70	< 0.01	< 0.01	< 0.01	< 0.01
	52055 70- 80	< 0.01	< 0.01	< 0.01	< 0.01
	52056 80- 90	< 0.01	< 0.01	< 0.01	< 0.01
	52057 90-100	< 0.01	< 0.01	< 0.01	< 0.01
	52058 100-110	< 0.01	< 0.01	< 0.01	< 0.01
	52059 110-120	< 0.01	< 0.01	0.01	0.01
	52060 120-130	< 0.01	< 0.01	< 0.01	< 0.01
	52062 130-140	< 0.01	< 0.01	< 0.01	< 0.01
	52062 140-150	< 0.01	< 0.01	< 0.01	0.01
	52063 150-160	< 0.01	0.01	0.01	0.01
	52064 160-170	0.01	0.02	0.03	0.03
	52065 170-180	0.03	0.03	0.10	0.39
	52066 180-190	0.02	0.04	0.04	0.24
	52067 190-200	0.04	< 0.01	0.07	0.36
	52068 200-210	< 0.01	< 0.01	< 0.01	0.01
	52069 210-220	< 0.01	< 0.01	< 0.01	0.01
	52070 220-230	< 0.01	< 0.01	< 0.01	< 0.01
	52071 230-240	< 0.01	< 0.01	< 0.01	< 0.01
	52073 250-260	< 0.01	< 0.01	< 0.01	< 0.01
	52074 260-270	< 0.01	< 0.01	< 0.01	< 0.01
	52075 270-280	< 0.01	< 0.01	< 0.01	< 0.01
	52076 280-290	< 0.01	< 0.01	< 0.01	< 0.01
	52077 290-300	< 0.01	< 0.01	< 0.01	< 0.01
	52078 300-310	< 0.01	< 0.01	< 0.01	< 0.01
	52079 310-320	0.02	< 0.01	< 0.01	0.04
	52080 320-330	< 0.01	< 0.01	< 0.01	< 0.01
	52081 330-340	< 0.01	< 0.01	< 0.01	< 0.01
	52082 340-350	< 0.01	< 0.01	< 0.01	< 0.01
	52083 350-360	0.01	< 0.01	< 0.01	0.06
	52084 360-370	< 0.01	< 0.01	< 0.01	0.01
	52085 370-380	< 0.01	< 0.01	< 0.01	0.03
	52086 380-390	< 0.01	< 0.01	< 0.01	0.01

Certified by 



CHEMEX LABS LTD.

212 BROOKSBANK AVE.
NORTH VANCOUVER, B.C.
CANADA
TELEPHONE: 985-0648

• CHEMISTS • GEOCHEMISTS • ANALYSTS • ASSAYERS

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 10047

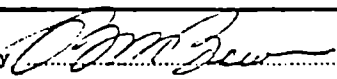
TO: Hecla Mining Co. of Canada Ltd.,
Board of Trade Tower,
2009-1177 West Hastings Street,
ATTN: Vancouver, B.C. Attn. Mr. P. Conley

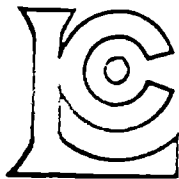
INVOICE NO. 3382

DATE RECEIVED July 18/

DATE ANALYSED July 27/

SAMPLE NO.:		% Copper	% Lead	% Zinc	Oz/Ton Silver
52087	390-400	< 0.01	< 0.01	< 0.01	0.01
52088	400-410	< 0.01	< 0.01	< 0.01	0.06
52089	410-420	< 0.01	< 0.01	< 0.01	0.04
52090	420-430	< 0.01	< 0.01	0.01	0.06
52091	430-440	< 0.01	< 0.01	0.01	0.04
52092	440-450	< 0.01	< 0.01	< 0.01	0.06
52093	450-460	< 0.01	< 0.01	0.01	0.06
52094	460-470	< 0.01	< 0.01	< 0.01	0.04
52095	470-480	< 0.01	< 0.01	< 0.01	0.01
52097	490-500	< 0.01	< 0.01	< 0.01	0.03
52098	500-510	< 0.01	< 0.01	< 0.01	0.01
52099	510-520	0.01	< 0.01	< 0.01	0.04
52100	520-530	0.01	< 0.01	< 0.01	0.03
52101	530-540	0.01	< 0.01	0.01	0.01
52102	540-550	< 0.01	< 0.01	< 0.01	0.01
52103	550-560	0.01	< 0.01	< 0.01	0.06
52104	560-570	< 0.01	< 0.01	< 0.01	0.06
52105	570-580	< 0.01	< 0.01	< 0.01	0.03
52106	580-590	< 0.01	< 0.01	< 0.01	0.06
52107	590-600	< 0.01	< 0.01	< 0.01	0.04
52108	600-610	< 0.01	< 0.01	< 0.01	0.06
52109	610-620	< 0.01	< 0.01	< 0.01	0.04
52110	620-630	< 0.01	< 0.01	< 0.01	0.04
52111	630-640	< 0.01	< 0.01	< 0.01	0.06

Certified by 



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NORTH VANCOUVER, B.C.
CANADA
TELEPHONE: 985-0648

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CERTIFICATE OF ANALYSIS

TO: Hecla Mining Co. of Can. Ltd.,
Ste 2009 - 1177 W. Hastings St.,
Vancouver, B. C.

CERTIFICATE NO. 13132
INVOICE NO. 4253
DATE RECEIVED Oct. 5/7
DATE ANALYSED Oct. 8/7

ATTN: Mr. P. Conley

cc: Mr. McKinney

DDH JL

SAMPLE NO.:		% WO ₃
52001	20-30	< 0.01
52002	30-40	< 0.01
52003	40-50	< 0.01
52004	50-60	< 0.01
52005	60-70	< 0.01
52006	70-80	< 0.01
52007	80-90	< 0.01
52008	90-100	< 0.01
52009	100-110	< 0.01
52010	110-120	< 0.01
52011	120-130	< 0.01
52012	130-140	< 0.01
52013	140-150	< 0.01
52014	150-160	< 0.01
52015	160-170	< 0.01
52016	170-180	< 0.01
52017	180-190	0.04
52018	190-200	< 0.01
52019	200-210	< 0.01
52020	210-220	< 0.01
52021	220-230	< 0.01
52022	230-240	< 0.01
52023	240-250	< 0.01
52024	250-260	< 0.01
52025	260-270	< 0.01
52026	270-280	< 0.01
52027	280-290	< 0.01
52028	290-300	< 0.01
52029	300-310	< 0.01
52030	310-320	< 0.01
52031	320-330	0.01
52032	330-340	< 0.01
52033	340-350	< 0.01
52034	350-360	< 0.01
52035	360-370	< 0.01
52036	370-380	< 0.01
52037	380-390	< 0.01
52038	390-400	< 0.01
52039	400-410	< 0.01
52040	410-420	< 0.01

Certified by

DATE Aug. 10-70

FILE NO. 5258-126

ASSAY CERTIFICATE

WHITEHORSE ASSAY OFFICE

P.O. BOX 346, WHITEHORSE, YUKON

RECEIVED FROM

Heckla Mining Co. of Can.

SAMPLE NO.	GOLD		SILVER	Lead	Zinc			
	OZ. PER TON	OZ. PER TON	OZ. PER TON					
<u>DDH J2</u> 52072	240-250		TR	.01	TR			
52096	480-490		.04	.01	TR			
52112	640-650		TR	TR	TR			
52113	650-660		TR	.02	TR			
52114	660-670		TR	TR	TR			
52115	670-680		TR	TR	TR			
52116	680-690		.02	TR	TR			
52117	690-700		TR	TR	TR			
52118	700-710		TR	TR	.01			
52119	710-720		TR	TR	TR			
52120	720-730		TR	TR	TR			
52121	730-740		TR	TR	TR			
52122	740-750		TR	.01	.01			
52123	750-760		TR	.01	.01			
52124	760-770		TR	TR	TR			
52125	770-780		.08	TR	TR			
52126	780-790		TR	TR	.01			
52127	790-800		TR	TR	TR			
52128	800-810		TR	TR	TR			
52129	810-820		TR	TR	.03			
52130	820-830		TR	.01	.02			
52131	830-840		TR	.01	TR			
52132	840-850		TR	.01	.01			
52133	850-860		TR	TR	.02			
52134	860-870		TR	.01	.03			
52135	870-880		TR	TR	.01			
52136	880-890		TR	TR	.03			
52137	890-900		.02	TR	.01			
52138	900-910		TR	TR	TR			
52139	910-920		TR	TR	TR			
52140	920-930		TR	.01	TR			
52141	930-940		TR	TR	TR			
52142	940-950		TR	TR	TR			
52143	950-960		TR	TR	TR			
52144	960-970		TR	TR	TR			
52145	970-980		TR	TR	TR			
52146	980-990		TR	TR	TR			
52147	990-997		TR	TR	TR			
<u>DDH J3</u> 52148	10- 20		TR	TR	TR			
52149	20- 30		.02	TR	TR			
52150	30- 40		TR	TR	TR			
52151	40- 50		TR	TR	TR			
52152	50- 60		.02	TR	TR			
52153	60- 70		.04	TR	TR			
52154	70- 80		.04	TR	.01			
52155	80- 90		.06	TR	TR			
52156	90-100		.02	.01	TR			
52157	100-110		.04	.02	TR			
52158	110-120		TR	TR	TR			
52159	120-130		.02	.03	TR			

ASSAYER

Geo. Spalding

DATE Aug. 10-70
 FILE NO. 6239-124

ASSAY CERTIFICATE

WHITEHORSE ASSAY OFFICE

P.O. BOX 346, WHITEHORSE, YUKON

RECEIVED FROM Heckla Mining Co. of Canada

SAMPLE NO.	GOLD OZ. PER TON	SILVER OZ. PER TON	Lead	Zinc			
52160	130-140	TR	TR	TR			
52161	140-150	.06	TR	TR			
52162	150-160	TR	TR	TR			
52163	160-170	TR	TR	.01			
52164	170-180	TR	.01	.01			
52165	180-190	.04	.03	.01			
52166	190-200	TR	.01	TR			
52167	200-210	TR	.01	TR			
52168	210-220	.02	TR	.02			
52169	220-225	.02	.01	.01			
52170	225-230	.02	.01	.03			
52171	230-235	.16	.07	.13			
52172	235-240	.06	.05	.53			
52173	240-245	TR	TR	.02			
52174	245-250	TR	.01	.01			
52175	250-260	TR	.01	TR			
52176	260-270	TR	TR	.01			
52177	270-280	TR	TR	TR			
52178	280-290	TR	TR	TR			
52179	290-300	.04	.01	.01			
52180	300-310	TR	TR	.01			
52181	310-320	TR	.01	TR			
52182	320-330	.04	.01	TR			
52183	330-340	.02	.01	.01			
52184	340-350	.02	TR	.01			
52185	350-360	TR	TR	.01			
52186	360-370	TR	TR	.01			
52187	370-380	TR	.01	TR			
52188	380-390	.06	TR	TR			
52189	390-400	.08	TR	TR			
52190	400-410	TR	.01	TR			
52191	410-420	TR	TR	.01			
52192	420-430	TR	TR	TR			
52193	430-440	TR	TR	TR			
52194	440-450	.02	TR	.01			
52195	450-460	TR	.03	.01			
52196	460-470	TR	TR	TR			
52197	470-480	.02	.03	TR			
52198	480-490	TR	TR	TR			
52199	490-500	.04	.01	TR			
52200	500-510	.04	.01	TR			
52201	510-520	TR	TR	TR			
52202	520-530	TR	TR	TR			
52203	530-540	TR	TR	.01			
52204	540-550	TR	TR	TR			
52205	550-560	TR	TR	TR			
52206	560-570	TR	TR	.01			
52207	570-580	TR	TR	.01			
52208	580-590	TR	TR	.01			

ASSAYER Geo. Spalding

DATE Aug. 10-70
 FILE NO. 6253-124

ASSAY CERTIFICATE

WHITEHORSE ASSAY OFFICE

P.O. BOX 346. WHITEHORSE. YUKON

RECEIVED FROM Heckla Mining of Can.

SAMPLE NO.		GOLD OZ. PER TON	SILVER OZ. PER TON	Lead	Zinc			
52209	590-600		TR	TR	TR			
52210	600-610		TR	TR	.01			
52211	610-620		TR	.01	.01			
52212	620-630		TR	TR	.01			
52213	630-640		TR	.01	.01			
52214	640-650		TR	TR	.01			
52215	650-660		TR	TR	.01			
52216	660-670		TR	TR	.01			
52217	670-680		TR	TR	.01			
52218	680-690		TR	TR	.01			
52219	690-700		TR	.01	TR			
52220	700-710		TR	TR	.01			
52221	710-720		.06	TR	.01			
52222	720-730		TR	TR	.01			
52223	730-740		TR	TR	TR			
52224	740-750		TR	TR	TR			
52225	750-760		TR	TR	.01			
52226	760-770		TR	TR	TR			
52227	770-780		TR	TR	.01			
52228	780-790		TR	TR	.01			
52229	790-800		TR	TR	TR			
52230	800-810		TR	.01	TR			
52231	810-820		TR	TR	TR			
52232	820-830		TR	TR	TR			
52233	830-840		TR	TR	TR			

ASSAYER Geo. Spallin

CONDENSED GEOLOGIC LOG

<u>DDH J1</u>	L 132 W, 13 N, 90°, BQ, Recovery 97.5% Started June 2, 1970, finished June 20, 1970.
0 - 14	Overburden (casing to 17 feet)
14 - 27	Banded amphibolite, 3% pyrrhotite.
27 - 36	Calcareous quartzite.
36 - 78	Skarn with phyllite bands, 5-10% pyrrhotite with minor chalcopyrite, sphalerite and/or Galena at 37.5, 49.5-50, 52.2, 54.4, 55.5, 56, 56.5, 56.7, 57, 60.5 and 72-73.
78 -118	Skarn with decreasing phyllite, less than 3% sulfides.
118-136	Phyllitic calcareous quartzite, about 5% sulfides.
136-144.5	Brecciated greenstone with some pyrite.
144.5-207.5	Phyllitic quartzite, in part calcareous with skarn bands. 20-25% sulfides, pyrrhotite, pyrite, chalcopyrite and minor sphalerite and galena.
207.5-230.5	Quartz diorite with up to 5% sulfides, chiefly pyrrhotite.
230.5-260	Phyllitic quartzite with skarn bands, some sulfides.
260-264	Skarn.
264-276	Phyllitic quartzite with minor sulfides.
276-325	Skarn with 3-10% sulfides, chiefly pyrrhotite.
325-334	Breccia, altered phyllitic quartzite and quartz veins, up to 10% sulfides.
334-390	Skarn with phyllitic layers and disseminated pyrrhotite; galena at 362 and 375.5.
390-411	Phyllite with some quartzite layers.
411-420	Quartz diorite porphyry, disseminated pyrrhotite.
420-442	Phyllitic quartzite with disseminated pyrrhotite and chalcopyrite, sphalerite at 420.5.
442-473	Amphibolite with disseminated pyrrhotite and chalcopyrite.
473-506	Phyllitic quartzite with disseminated pyrrhotite and chalcopyrite.
506	End of hole.

CONDENSED GEOLOGIC LOG

DDH J2 L 140 W, 10 N, 45° N, BQ, Recovery 92%.
Started June 20, 1970, finished July 1, 1970.

0 - 17 Overburden.

17 - 25 Phyllitic quartzite, broken and oxidized.

25 -110 Quartz diorite, porphyritic in part, accessory pyrite.

110-113.5 Contact zone between quartz diorite and skarned phyllite with calcareous quartzite.

113.5-122 Skarn with minor pyrrhotite and chalcopyrite; galena at 120.7.

122-157 Phyllitic quartzite, minor sulfides; galena and sphalerite at 156-157.

157-176 Skarn; up to 20% pyrite, pyrrhotite, chalcopyrite and minor lead-zinc.
164-166 Sphalerite and galena.

176-179 Altered quartz diorite.

179-201 Skarn with some galena and sphalerite.
186.7-188.3 20% pyrite; galena and sphalerite.

201-306 Quartz diorite with pyrite and pyrrhotite.

306-345 Phyllitic quartzite with pyrite, pyrrhotite and chalcopyrite; galena at 321.6.

345-370 Dark green massive quartzite, with some skarn and marble.

370-399 Skarn with less than 5% sulfides.

399-452 Fault zone with breccia, gouge, phyllite and quartzite.

452-495 Calcareous quartzite with some skarn; only minor sulfides.

495-527 Phyllitic quartzite with skarn bands, minor sulfides.

527-538 Fault zone, breccia, gouge, minor sulfides.

538-591 Phyllitic quartzite with some skarn; up to 15% sulfides; sphalerite at 568.

591-670 Phyllitic quartzite and much inter-bedded skarn, minor sulfides.

670-705 Dark quartzose phyllite, 15-25% disseminated pyrrhotite and chalcopyrite, some pyrite.

705-756 Phyllitic quartzite and inter-bedded skarn; about 5% sulfides.

756-794 Dark quartzose phyllite, less than 5% pyrrhotite.

794-850 Phyllitic quartzite and inter-bedded skarn, less than 5% pyrrhotite.

850-858 Dark quartzose phyllite.

858-895 Fault zone in phyllitic quartzite, brecciated; sphalerite and galena at 859-861.5.

895-921 Phyllitic quartzite with skarn bands; 5% pyrrhotite and pyrite.

921-939 Fault zone; calcareous quartzite and skarn.

939-974 Skarn and phyllitic quartzite, minor sulfides.

974-997 Thin-banded phyllitic quartzite, about 5% sulfides.

997 End of hole.

CONDENSED GEOLOGIC LOG

DDH J3

L 163 W, 20 N, 90°, BQ, Recovery 91%.
Started July 2, 1970, finished July 12, 1970.

0 - 4 Overburden.
4 - 18 Dark phyllite, disseminated pyrite and pyrrhotite.
18 - 80 Phyllitic quartzite, minor sulfides.
80 -136.5 Phyllitic quartzite with some skarn and breccia; minor sulfides; sphalerite and galena at 120.7-121.2.
136.5-167 Dark phyllite; shearing.
167-187 Dark greenstone (?); disseminated pyrrhotite.
187-210 Quartzose phyllite; disseminated pyrrhotite.
210-248 Skarn, some marble, galena and sphalerite disseminated and in bands from 227-244.5.
248-254.5 Fault zone; breccia and quartz veining.
254.5-271 Phyllitic quartzite; disseminated sulfides.
271-283 Marble.
283-289 Phyllitic quartzite.
289-311 Calcareous phyllitic quartzite; galena and sphalerite at 300', sphalerite at 303-306.5.
311-369 Phyllitic quartzite.
369-379 Fault zone in phyllitic quartzite.
379-521 Phyllitic quartzite; disseminated pyrrhotite up to 15%.
521-596 Phyllitic quartzite with skarn bands; locally brecciated.
596-700 Skarn, disseminated pyrrhotite.
700-770 Phyllitic quartzite, disseminated pyrrhotite.
770-999 Skarn with marble bands.
999 End of hole.

CONDENSED GEOLOGIC LOG

DDH J4 L 146 + 75 W, 66 N, 90°, BQ, Recovery 94%.
Started July 20, 1970, finished July 25, 1970.

0 - 12 Overburden.

12 - 24.5 Phyllite.

24.5-48.5 Phyllitic quartzite, some skarn layers.

48.5 - 82 Phyllite with some phyllitic quartzite and skarn; galena
at 56.2 in skarn band, minor pyrrhotite.

82 -109 Phyllitic quartzite, some pyrrhotite and chalcopyrite.

109-155 Phyllite with some phyllitic quartzite, some pyrrhotite.

155-170 Quartz-rich granite.

170-240 Phyllitic quartzite, minor pyrrhotite.

240-274 Granite with minor pyrite.

274-290 Skarn.

290-320 Phyllitic quartzite with minor pyrrhotite.

320-331 Granite.

331-390 Skarn with inter-layered marble; galena and sphalerite at
334 and 335.

390-408 Phyllitic quartzite with minor pyrrhotite.

408-431 Marble.

431-506 Skarn with some pyrrhotite.

506 End of Hole.