REPORT ON SURFACE GEOLOGY

TIONAGA PATENTED CLAIMS

LEFEVER OPTION, OROFINO RESOURCES

HORWOOD LAKE, ONTARIO

NTS 41-O-16

W. Gilman
January 1985

OROFINO RESOURCES LIMITED
Toronto, Ontario

REPORT ON SURFACE GEOLOGY - TIONAGA PATENTED CLAIMS

SUPPLEMENT TO REPORT ON DIAMOND DRILLING - TIONAGA '84 PROJECT

Lefever Option, Orofino Resources

Horwood Lake, Ontario

SUMMARY

Traverses along picket lines have encountered a few scattered exposures of intermediate to basic volcanic rock. The outcrop is of little significance as no stratigraphic continuity could be established. There were no obvious indicators of any features that could be related to gold mineralization except in a remote way; such as disseminated pyrite in fine grained andesite. The area is probably entriely underlain by regionally metamorphosed intermediate to basic volcanic rock intruded by later dykes. A known acid intrusive is present in the shaft area but is not exposed at surface.

INTRODUCTION

Field mapping was done at 400' to 1" along existing picket lines on patented claims numbered 25337, 25339, 25394 and 25395. Traverses were carried onto claim #25393 alothough it was not included in the Orofino-Westfield agreement. Shoreline exposures on claim 25425 and 25396 were also examined. The mapped portion is a local random sampling of part of a repetitive sequence of imbricate volcanic extrusive rocks. Detailed mapping at 10' to 1" was completed on an extensive trench system on claim #25337 and is discussed separately at the end of this report.

The usual headings of Previous Work and Access have all been documented in the main report on Diamond Drilling and will not be repeated here.

PHYSIOGRAPHY

As it plays such an important part in the present and future exploration of the area, the physical aspect of the surface will be discussed. On the west side of Horwood Lake, the general area is one of localized strong relief considering it is part of the relatively flat 'Abitibi Clay Belt'. This has been caused by

rapid erosion of varved clays post glacial deposition. Much of this relief is caused by remnant cross channels carved by drainage reversals after ice recession. At a waning stage in deglaciation, run off was northward and this has caused the extreme gullying often present on the west side of the lake. The area is covered by a grey clay mantle which masks bedrock contours. Intense structural deformation produced southwest trending ravines with a masking clay mantle superposed by lacustine deposition. These ancient structurally induced ravines subtely controlled later drainage.

Considerable work to the west of the area discussed has shown that rock exposure while scarce can occur almost anywhere with little surface indication. It has been observed that for the amount of rock exposure there seems an excessive amount of quartz vein in scattered blocks and outcrop.

Patented claims on the east shore of Horwood Lake cover an area of gentle relief with a prevailing clay mantle with unpredictable depth to bedrock and probable highly variable clay cover over short distances.

GENERAL GEOLOGY

A thick sequence of individual flows strike about N 80° E and dip steeply north. Each basaltic or andesitic flow usually has a fine grained top with features inherent with such flows. Amygdules and/or allochthonous fragments occur embedded as random bombs or as autochthonous fragments derived from breakage of crystal layers during cooling and incorporation as individual fragments. These flows usually have a thick medium grained central homogeneous core followed by a basement or contact segment which may be fine or medium grained and may - or may not - have features similar to those of flow tops.

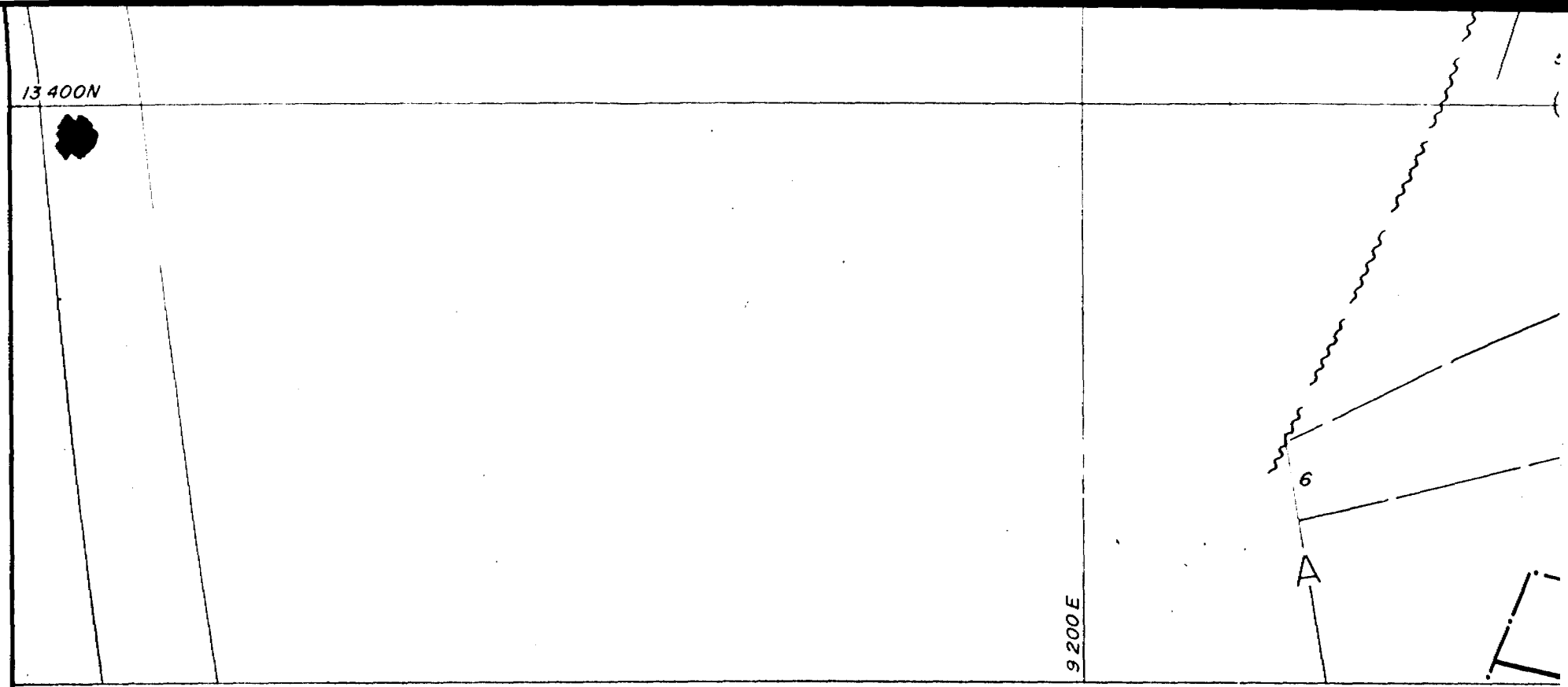
Varied thicknesses, usually thin, of pyroclastic segments or tuffs may occur between flows. The volcanic sequence is cut by later dykes of varied composition and widths.

DETAILED MAPPING - TRENCHES (see Inset Map)

A strong quartz vein of 2 to 4' width persists across 65' in an east-west direction and disappears in overburden at both margins. The trench was subjected to limited cleaning but was not extended. Pits and trenches at east and west extensions have slumped and are debris filled. The method of approach was to test the vein where exposed in existing trenches before attempting to extend it along strike.

The vein is intermittently exposed in a sheared chloritic basalt and is strong with sharp contacts and distinct dip to the north. A considerable amount of effort was required originally to explore the vein. It appears that much of the vein was plucked out and dispersed at the time of ice advance leaving only remnants adhering to rock walls.

The first four samples - #9201 to 9204 - were equi-sized fragments of bull quartz vein with minute sulfide chipped from broken quartz muck. Two of these samples assayed .003 and .004 oz per ton Au. The following ten samples were chips of vein in outcrop over measured distances and yielded trace quantities gold. The last sample, #9213, taken from a debris filled trench in which a thin film of vein is exposed on the footwall surface, assayed .018 oz per ton. These results indicate that further work along this vein should only coincide with bullish gold conditions internationally.



LEGEND:

LATE PRECAMBRIAN

- 8 — Olivine diabase dikes
- 8a — Quartz diabase

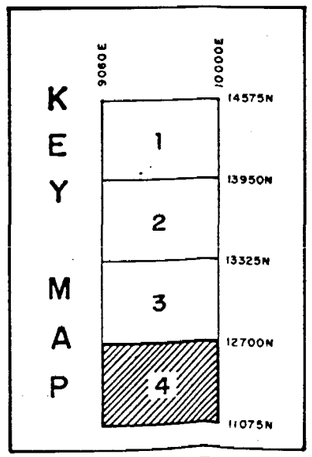
ALGOMAN

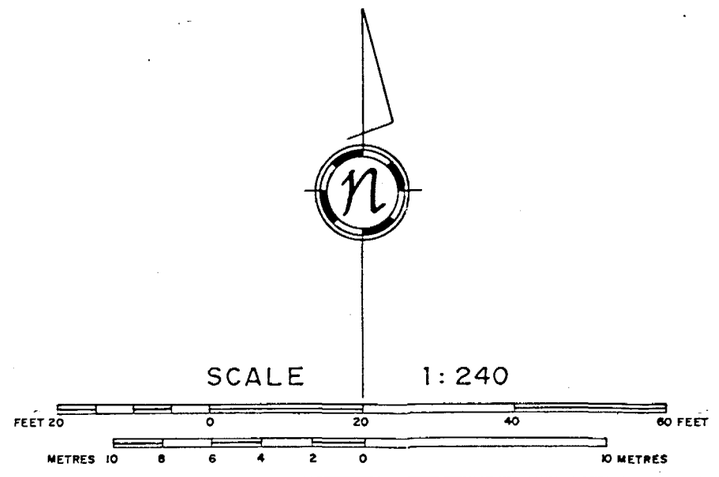
- 7 — Lamprophyre dikes, epidiorite
- 7b — Brown's dike
- 6 — Feldspar porphyry
- 6a — Dike - granite, chlorite
- 6b — Quartz porphyry
- 6c — Rhyolite dike
- 5 — Diorite
- 5b — Retrogradediorite, metagabbro
- 5a — Hybrid diorite
- 5c — Chlorite schist
- 5d — Migmatite
- 4 — Ultramafic-serpentite

EARLY PRECAMB

- 3 — Sediments
- 2 — Volcanics
- 1 — Pyroclastics

9800E





OROFINO RESOURCES LIMITED

OROFINO MINE PROJECT — No. 422

SILK and HORWOOD TOWNSHIPS, ONTARIO NTS 41 O/16

GEOLOGY

(SURFACE)

Work by: Tom Atkins	Date: Aug 1983		Scale: 1:240 (1" = 20')
Drawn by: Rodel Ortiz	Date: July 1984	Updated on: Aug. 1984	Drawing No. Map 4 of 4

REPORT ON THE TRENCHING,

MAPPING AND SAMPLING PROGRAM

OROFINO PROPERTY, OROFINO RESOURCES LTD.

SILK AND HORWOOD TOWNSHIPS, ONTARIO

NTS 41-0-16

Toronto, Ontario
March 1985

T. A. Atkins
W. F. Gilman

1.0 CONCLUSIONS

The trenching program at the mine site was directed towards exposing, mapping and sampling the surface projections of the near surface ore zones. This program had limited success as greater than expected overburden depths prohibited the exposure of the main target zone, the intersection of the No. 1 South (west) and the No. 1 North (west) Zones. The increase in negative bedrock relief combined with the observance of quartz veins proximal to the target area implies that the less resistant, friable alteration zone could lie beneath these greater overburden depths.

Encouraging assay results were returned from trench 84-3, the up-dip extension of the No. 1 South (east) Zone and trench 84-6, the up-dip extension of the No. 5 (east) Zone. These values are consistent with assays returned from the underground sampling of these zones and prove the continuity of ore grade mineralization to the surface.

Results from reblasted and resampled old high grade trenches were discouraging as this program failed to duplicate these high grade values. Gold values from the summer program were in the range of Trace to 0.16 oz Au per ton, over short sample widths. The discrepancy in these values is attributable to either the presence of free gold or the inconsistent reporting of old trenc assays, which may have been reported in dollar values (based on a $35/oz price of gold). The possible presence of free gold is exemplified in trench 84-6 where encouraging values over similar sample lengths were obtained although these values were not as high as those obtained by the old trenches. Trenches 84-3, 4 and 5 may have originally been reported in dollar values because large differences occur between the two sampling programs; differences that are proportional to the dissimilarity of the two reporting methods.

Pits and trenches aimed at revealing the extent of mineralization in mildly pyrite bearing quartz vein networks south of the mine shaft produced gold values ranging from 0.002 to 0.08 ounces per ton, over short channel sample widths, or from grab samples.

1.0 CONCLUSIONS - (Cont'd.)

Eighty-six pits were dug throughout the eastern claims to investigate the nature of anomalous zones in this area; very few of these pits exposed bedrock. Where overburden was shallow and bedrock was exposed the rock was in all cases pillowed andesite. These results indicate that the anomalies which were tested were largely a result of conductive clays and sands rather than mineralized bedrock.

Ten grab samples were taken from sulphide mineralized trenches east of Horwood Lake and discouraging results were returned.

1.1 RECOMMENDATIONS

No additional trenching is planned in the near future for either the outlying claims or within the mine site area. Because of the discouraging results received from the trenching of anomalies on the the outlying claims any plans for additional trenching of less accessible anomalies should be seriously evaluated before commiting exploration funds to the construction of access routes into these areas.

The next stage of exploration should concentrate on further evaluating the economic feasibility of the deposit. These plans should include attaining access to the shallow mineralized zones by means of a ramp, thereby allowing cheap mining of these reserves and facilitating a shorter lead time to development in the future. Ore extracted during the ramp sinking exercise would be useful as additional material for metallurgical testing.

2.0 INTRODUCTION

A trenching, mapping and sampling program at the Orofino Mine site and eastern outlying claims began in early June, 1984 and was completed by late July, 1984. The program was aimed at testing the up-dip extensions

2.0 INTRODUCTION - (Cont'd.)

of the ore zones at the mine site and geophysical and geochemcial anomalies on the outlying claims. Twelve pits were dug on the mine site property; 6 of which exposed bedrock and were subsequently blasted, sampled and mapped while another 2 trenches, free of overburden cover, were blasted, sampled and mapped. On the outlying claims 86 pits were dug, 8 of which exposed bedrock and were subsequently mapped.

3.0 OWNERSHIP

The Orofino property consists of 18 patented and 120 unpatented claims, in Silk and Horwood Townships (Claim map). All of these claims are held by Orofino Resources Ltd., Toronto.

4.0 PROPERTY LOCATION AND ACCESS

Please refer to Atkins et al., 1984 for a complete description of the property and its access route.

5.0 PREVIOUS GEOLOGICAL WORK

Please refer to Atkins et al., 1984 for a complete description of all previous geological work on the property.

6.0 REGIONAL GEOLOGY AND LOCAL GEOLOGY

Please refer to Atkins et al., 1984 for a complete description of the regional and local geology.

7.0 TRENCHING PROGRAM

7.1 MINE SITE

7.1.1 GENERAL

Twelve pits were dug on the Orofino Mine site property between early June, 1984 and late July, 1984 utilizing a John Deere 410 backhoe-loader. Eight trenches were subsequently drilled (utilizing a 160 cfm, trailer mounted , compressor driven rock drill and/or a portable Atlas-Copco Cobra drill) and blasted thereby exposing fresh bedrock. The exposed bedrock was sampled in 2-5 ft. channel lengths and were analysed for gold at the Pamour-Porcupine assay laboratory in South Porcupine, Ontario. Pit and trench locations, with assay results, are illustrated on Surface Geology Maps (map envelope).

7.1.2 TRENCH 84-1

Trench 84-1 (9335E-13175N, Geology Map Sheet 3) and the surrounding 5 pits were targeted at uncovering the zone of intersection between the No. 1 South Zone and the No. 1 North Zone. Trenching illustrated a large negative relief in the bedrock as one approached the targeted area (the area directly under the mine road) from the north and the south. An increase in quartz veining in the medium grained retrograde diorite host rock, proximal to the target area, indicates that the negative bedrock relief in this area could be due to the erosion of the friable, mineralized alteration zone and that this zone lies beneath these greater overburden depths.

7.1.3 TRENCH 84-2

Trench 84-2 (9350E-12550N, Geology Map Sheet 4) was blasted in order to test the extent of possible gold mineralization in newly discovered pyrite mineralized network of quartz veins and quartz breccia hosted in medium grained retrograde diorite. Discouraging assays were returned from this

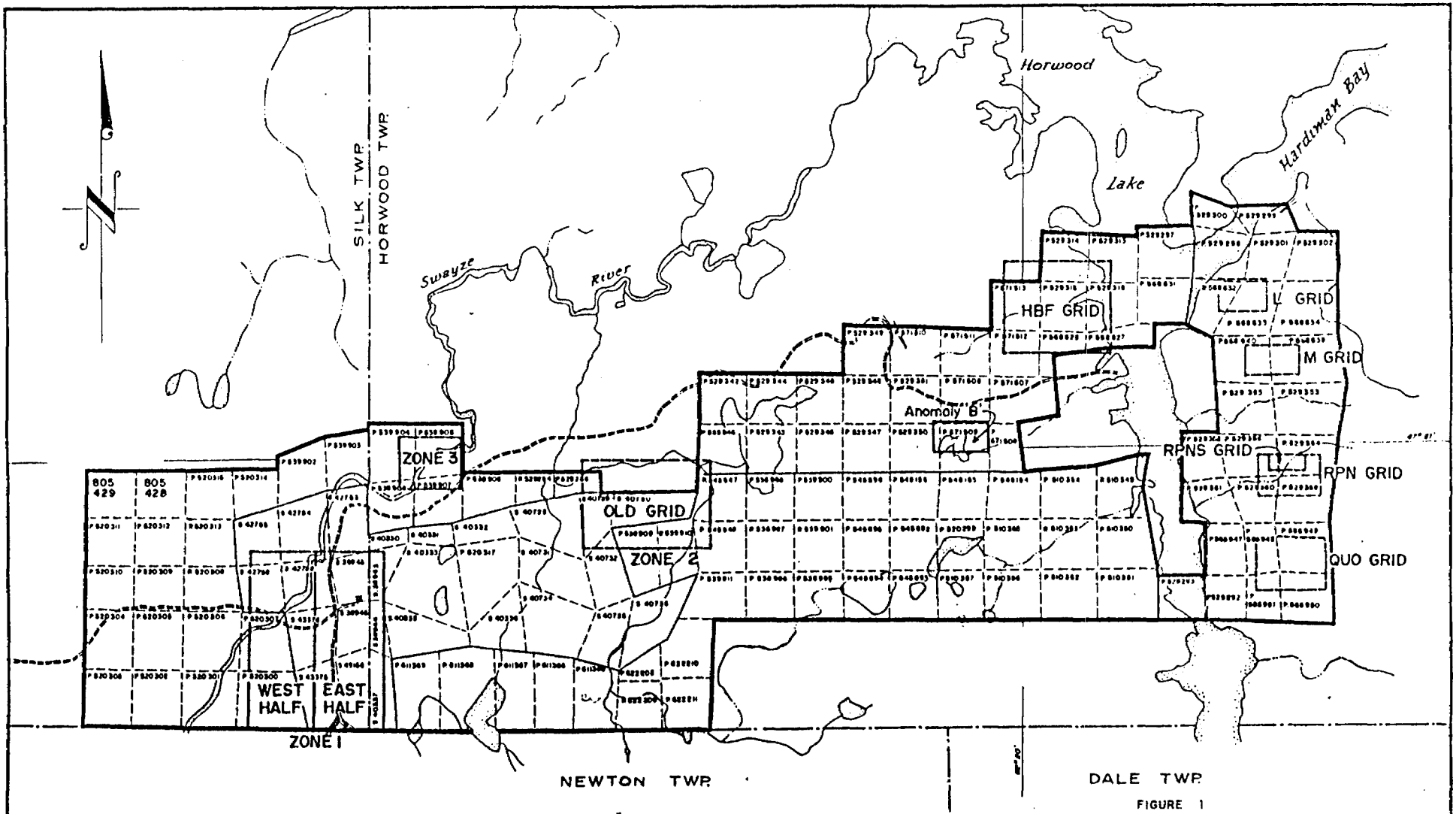


FIGURE 1

SCALE 1:31,680

MILES 1/2 1/4 0 1/2 1

METERS 800 400 0 800 1600

OROFINO PROJECT

CLAIMS LOCATION MAP

Showing

DETAIL GRIDS

A.R. Gunther

July 2, 1981

Revised [illegible]

7.0 TRENCHING PROGRAM

7.1.3 TRENCH 84-2 - (Cont'd.)

trench (the highest assay value was 0.015 oz Au/ton over 4 ft.). An increase in the concentration of quartz veins and brecciation as one travels east along this zone, combined with the reinterpreted rake of gold mineralization (reinterpreted to lie further east, south of the mine shaft, of what was originally believed to be its position - Atkins et al., 1984) make the investigation of the eastern extension of this zone an interesting target in the future.

7.1.4 TRENCH 84-3

Trench 84-3 (9780E-13425N, Geology Map Sheet 2) was targeted at resampling and reassaying the old, high grade (3.36 oz Au/ton over 15 ft.) trench which tested the up-dip extension of the No. 1 South (east) Zone. Gold values ranging from 0.001 oz Au/ton over 5 ft. to 0.010 oz Au/ton over 11 ft. (including a 2 ft. section assaying 0.16 oz Au/ton) are encouraging and are consistent with values obtained from underground sampling of this zone. The discrepancy between the old and most recent values can be attributed to either the presence of free gold in the original sampling (Harding, 1938) or because of inconsistant assay reporting these old values are quoted at a $35 per ounce gold price and therefore a 3.5 oz/ton value is actually equal to 0.10 oz/ton.

7.1.5 TRENCH 84-4 AND 84-5

Trench 84-4 and 5 (9550E-13850N, Geology Map Sheet 2) were targeted at resampling and reassaying the old high grade (0.34 oz Au/ton over 30 ft. and 0.41 oz Au/ton over 29 ft. respectively) channel samples which tested quartz veins in retrograde diorite. Results from the 1984 program were mixed as some samples gave assays as high as 0.10 oz Au/ton over 2 ft. while many assayed only trace amounts of gold. The reasons for the discrepancy between the old and the most recent values are suspected to be the same as they were for Trench 84-3.

7.0 TRENCHING PROGRAM

7.1.6 TRENCH 84-6

Trench 84-6 (9800E-13700N, Geology Map Sheet 2) was also targeted at resampling and reassaying an old high grade (0.66 oz Au/ton over 20 ft.) channel sample which tested the up-dip extension of the No. 5 (east) Zone of sulphide mineralized quartz veins in retrograde diorite. The summer program failed to duplicate the high grade values of the original program or 1980 sampling values of 0.13 oz Au/ton over 15. ft. Nugget effect is suspected as the cause of these differing results from samples collected only a few feet apart in the same trench.

7.2 OUTLYING CLAIMS

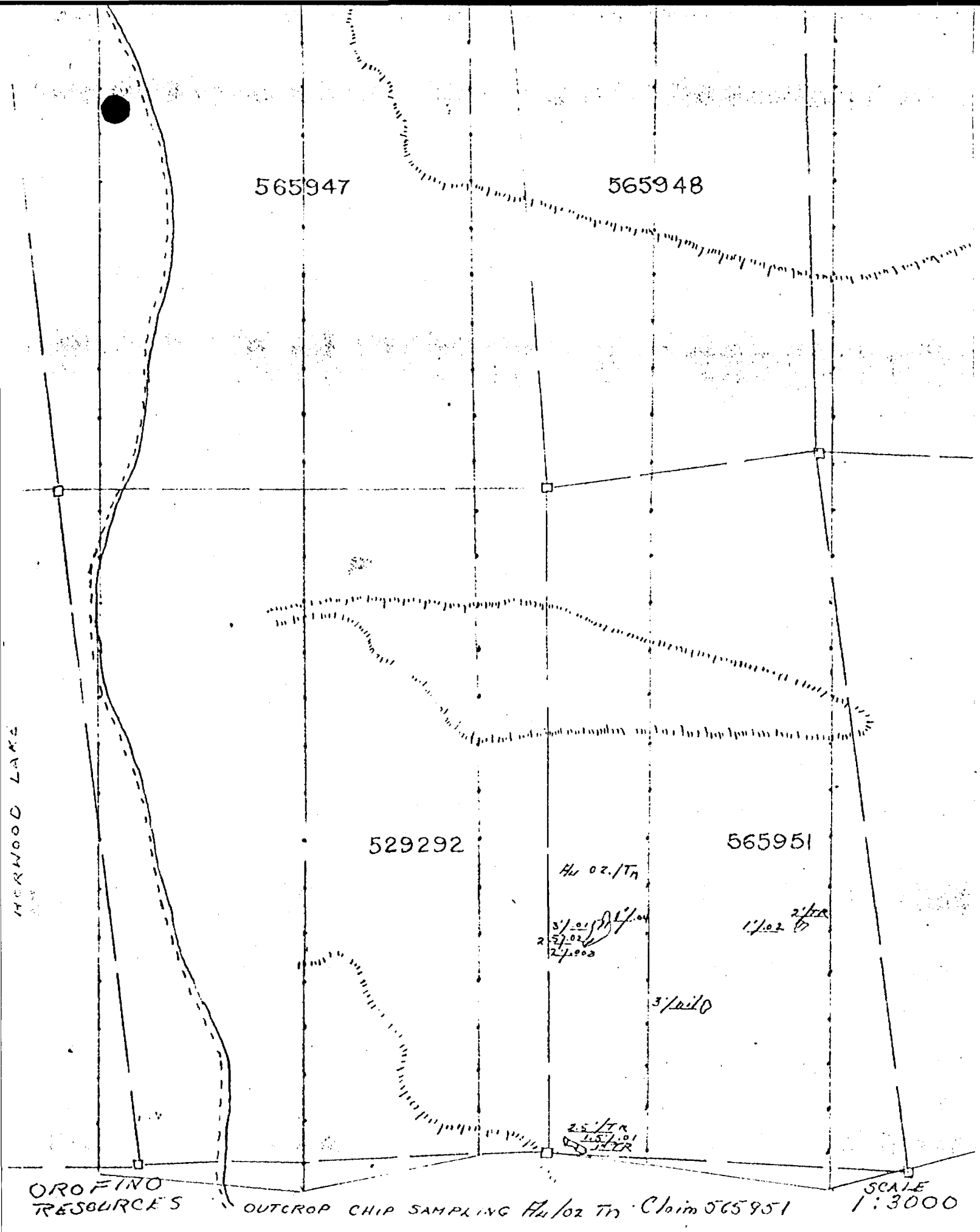
7.2.1 GENERAL

Eightly-six pits were dug throughout the eastern portion of the Orofino property (Outlying Claims - Trench Location Map), utilizing a John Deere 410 backhoe-loader, in an attempt to determine the nature of various geochemical and geophysical anomalies at these locations. Because of the limits the inconsistent terrain imposed on the access to various anomalies, trenching activity was restricted to anomalies close to existing roadways. Ten grab samples were taken from sulphide mineralized trenches east of Horwood Lake (Sample Location Map and Claims Location Map) and discouraging results were returned.

7.2.2 RESULTS

Where overburden was shallow enough to expose bedrock the rock was in all cases pillowed andesite. Assays taken where sulphides were present yielded discouraging gold values and it appears that these anomalies are the result of conductive clays and sands.

A complete description of glacial stratigraphy, bedrock remarks and assay results are included as Appendix I in this report.


565947
565948
529292
565951
HORWOOD LAKE
Au oz./Tn
3/.01
1/.04
2
3/.01
2/.02
2/.003
1/.02
2/.02
3/.01
2.5/.TR
1.5/.01
TR
OROFINO
RESOURCES
OUTCROP CHIP SAMPLING Au/oz Tn · Claim 565951
SCALE
1:3000

Appendix I

LOCATION AND DESCRIPTION OF TRENCHING 1984 PROGRAM
ON UNPATENTED CLAIMS OF OROFINO RESOURCES
IN SOUTHWEST HORWOOD TOWNSHIP, ONTARIO

TRENCH NO.	LOCATION (in meters)	SIZE (in feet)	GLACIAL STRATIGRAPHY	BEDROCK REMARKS
1	30.48X of HWR L28+80	20 X 3 X 15	varved clay u/S.P.	VLF anomaly
2	30.48S of HWR L27+60	18 X 4 X 14	3' sandy clay over varved clay	VLF anomaly
3	18.29W of 175N L27+60	30 X 8 X 5	varved clay u/S.P.	25' pillowed andesi
4	50.29W on HWR L27+60	20 X 4 X 2.5	varved clay u/S.P.	15' pillowed andesi
5	45.72W on HWR L 27+60	25 X 10 X .5		pillowed andesite
6	22.86W of TR #5	8 X 3 X 5	clayey Snd (stratified)	
7	45.72W of TR #5	8 X 3 X 11	clayey Snd u/S.P.	VLF anomaly
8	4.57E (30.48S) of HWR L26+40	30 X 5 X 20	clayey Snd (stout) random cobbles	VLF anomaly
9	22.86W on HWR L26+40	15 X 4 X 15	varved clay u/S.P.	VLF anomaly
10	30.48W on HWR L26+40	15 X 4 X 14	varved clay u/S.P.	VLF anomaly
11	650 N L25+20	50 X 5 X 14	2' varved clay, 2' sandy clay over varved clay	VLF anomaly
12	540N L25+20	15 X 4 X 17	clayey Snd, brown thru white	
13	540N L25+20	15 X 4 X 15	white clayey Snd u/S.P.	rare large Vc boul
14	200W L25+20	15 X 4 X 15	fine white snd. u/S.P.	5' varved clay at bottom
15	200W L25+20	15 X 4 X 18	fine white snd u/S.P.	5' varved clay at bottom
16	39.62S on Giff. Rd.	12 X 4 X 15	fine white snd u/S.P.	varved clay not present
17	60.96S of TR #16	30 X 8 X 3	Brn Snd and bedrock	Vc rock-qtz string
18	22.86W P.1 570508	25 X 25 X 1	bedrock - pillowed andesite	smooth straied surface
19	3+90N L25+20	15 X 4 X 15	bedrock -below strat Snd varved clay	sample - based till
20	7.62E of 3+45W L25+20	15 X 4 X 15	sandy clay above varved clay	
21	7.62E of 3+30N L25+20	10 X 4 X 15	sandy clay above varved clay	
22	30.48E of 2+70N L25+20	20 X 4 X 13	sandy clay - thin sand layers	VLF anomaly varved clay at dep
23	2+70N L25+20	15 X 4 X 11	sandy clay (stratified layers)	VLF anomaly
24	2+25N L25+20	50 X 8 X 6	volcanic rock (py)	needs spade cleanin
25	2+10N L 25+20	30 X 20 X 2	cbtd basic vc. - pyrite	stripped along str
26	15.24W of TR # 25	8 X 4 X 12	sandy clay, varve clay u/S.P.	sharp ridge
27	2+25N at 30.48W	15 X 4 X 14	sandy clay	ridge clay near R

HWR Horwood Lake Road

* u/S.P. under soil profile

S.P. 6" humus
6" Brown Snd - clay
6" leached wh. Snd
1' to 2' Brn Snd or Clay

TRENCH NO.	LOCATION (in meters)	SIZE (in feet) L x W x H	GLACIAL STRATIGRAPHY	BEDROCK REMARKS
28	15.24W of TR #23	15 X 4 X 10	sandy clay - fine layers	
29	30.48W of TR #21	10 X 4 X 11	sandy clay above varved clay	
30	3+60N L25+20	8 X 4 X 14	varved clay	
31	4+15W L25+20	8 X 4 X 8	2 sand layers over varved clay	
32	Midway Tr #18 and 31	6 X 4 X 9	varved clay	several large angular Qtz Vn
33	30.48W of 4+20N L25+20	10 X 4 X 14	several sandy clay layers over varved clay	
34	6.09N of Tr #33	6 X 4 X 10	sandy clay layers over varved clay	S. side steep ravine
35	L24+00E 540N	15 X 3 X 18	varved clay	N. side HWR
36	L24+00E 540N	15 X 3 X 15	clayey fine white sand	S. side HWR
37	53.34W of TR #35	12 X 3 X 12	alternation sandy clay - clay	N. side HWR
38	54.86W of TR #36	12 X 3 X 17	3' varved clay over sandy clay	S. side HWR
39	L22+80E 490N	12 X 3 X 12	3' varved clay over sandy clay	N. side HWR
40	L22+80E 490N	10 X 3 X 11	varved clay over sandy clay	S. side HWR
41	68.58W of L22+80	12 X 3 X 11	3' varved clay over strat'f'd sand	N. side
42	68.58W of L22+80	12 X 3 X 12	limonitic sand over white sandy clay	shoreline beach
43	24.38W of L21+40E 510N	10 X 3 X 9	crs stratified sand	excellent concrete mix
44	20.48W of L21+60E 510N	12 X 3 X 9	crs sand below beach sand	concrete mix below beach sand
45	51.82W of L21+60E	10 X 3 X 9	crs sand stratified	concrete sand
46	L20+40E 7+70N	12 X 3 X 9	crs sand	concrete sand
47	L20+40E 5+60N	10 X 3 X 9	crs sand	concrete sand
48	L19+20E 5+70N	14 X 4 X 10	crs stratified sand	concrete sand
49	91.44W of L19+20E	10 X 6 X 7	several cobble beds in Varved crs sand	mainly granite and gneiss
50	9.14E of L18+00E	10 X 4 X 8	stratified cement sand	concrete sand at 6+60N
51	38.1W of L18+00E	15 X 5 X 8	stratified cement sand	SW side of road
52	91.44NW of L18+00E	12 X 3 X 8	stratified cement sand	W side of road
53	182.88NW of L18+00E	10 X 4 X 7	stratified cement sand	W side of road
54	L16+80E 11+40N	10 X 4 X 8	several gravel beds in strat. cement sand	
55	45.72NW of L16+80E	12 X 4 X 13	5' gravel above 8' stratified sand	concrete sand
56	60.96SE of L14+40E	12 X 5 X 10	gravel 1' band, several cobble layers	stream channel
57	L14+40E 12+90N	10 X 5 X 8	crs gravel - boulders	fluctuating shore
58	45.72W of L14+40E	10 X 4 X 8	crs gravel - fine gravel	possible river channel
59	132.59SW of L14+40E	10 X 3 X 7	crs gravel	on HWR - pickel [illegible] not found
60	60.96SW of TR #59	10 X 3 X 8	stratified crs gravel, boulder beds	Foreset river bed
61	38.1SW of TR#60	10 X 4 X 8	multiple layers, sand, gravel boulders	several clay layers
62	38.1SW of TR #61	10 X 3 X 8	stratified cement sand	concrete mix
63	38.1SW of TR #62 (S. side road)	8 X 3 X 8	stratified cement sand	concrete mix

TRENCH NO.	LOCATION (in meters)	SIZE (in feet) L x W x H	GLACIAL STRATIGRAPHY	BEDROCK REMARKS
64	L12+00E 10+80N	8 X 3 X 8	stratified cement sand	N side road at cl line
65	L12+00E 10+80N	8 X 3 X 8	stratified cement sand	S side road at cl line
66	7.62E L6+00E 550N	18 X 3 X 12	stratified sand (white) u/S.P.	At EW claim bound
67	L6+00E 550N	8 X 3 X 9	stratified sand (white) u/S.P.	Between HWR and E boundary
68	L6+00E 550N	15 X 3 X 9	stratified sand (white) u/S.P.	S. side HWR
69	60.96W of L6+00E	10 X 3 X 9	2' stratified white sand over varved clay	at portage Stangl Lake
70	70.0W of L6+00E	9 X 3 X 8	2' stratified white sand over varved clay	30' west of porta
71	60.96W of TR #70	13 X 3 X 13	varved clay u/S.P.	N. side HWR
72	60.96W of TR #70	13 X 3 X 13	varved clay u/S.P.	S. side HWR
73	L4+80E 5+40N	13 X 3 X 13	varved clay u/S.P.	at picket line HW
74	L4+80E 5+40N	13 X 3 X 13	varved clay u/S.P.	at picket line HW
75	L2+40E 5+70N	13 X 3 X 13	3' sandy clay u/S.P., 1' pea gravel	pea gravel over 8' varved clay
76	L2+40E 5+40N	14 X 3 X 12	2' sandy clay over varved clay	
77	L2+40E 5+10N	10 X 3 X 11	varved clay u/S.P.	
78	38.1W L2+40E	9 X 3 X 8	varved clay u/S.P.	East side Landry
79	End visible Landy Rd	9 X 9 X 7	stratified sand u/S.P.	Sand from brown to yellow to whit
80	53.34W L2+40E	9 X 3 X 8	varved clay u/S.P.	West side Landry
81	L1+20E 510N	9 X 3 X 9	varved clay u/S.P.	N. side HWR
82	15.24W of L1+20E	9 X 3 X 8	varved clay u/S.P.	S. side HWR
83	45.72W of L1+20E	8 X 3 X 9	varved clay u/S.P.	N. side HWR
84	45.72W of L1+20E	10 X 3 X 8	varved clay u/S.P.	S. side HWR
85	L0+00 5+00N	9 X 3 X 9	varved clay u/S.P.	at West claim boundary
86	L0+00 5+00N	9 X 3 X 9	varved clay u/S.P.	at claim boundary S. side

Sortability Trial on Orofino Mine Sample

Introduction :

A sample was selected by Orofino Mine personnel at the request of Aggen Inc. for the purpose of assessing this material to electronic ore sorting techniques. A sample size of 375 pounds was forwarded to Peterborough for testing.

Preparation and Test Procedure :

To prepare the sample for testing, screening was performed to achieve two size ranges, +5/8" to -2" and +2" to -4". Although the sorting systems can handle an overall size range from +5/8" to 6", it is necessary to reduce this to narrower size ranges to accomodate physical limitations of the feeding system. For the purpose of this trial, the plus 4" size was not considered.

The two size fractions were first run consecutively through the photometric sorter. Two products were produced, an Accept and Reject. The Accept was basically quartz type material and was separated from the darker rock on the basis of reflectance intensity differences.

The Reject fraction of the photometric test was then rerun through the conductivity sensing system. Separation was made on the level of conductive response on a rock by rock basis. This part of the overall test procedure was conducted to determine whether any sulphide content in the photometric Reject fraction, with correlated gold content, could be recovered and to what degree.

All fractions of the testwork were forwarded to Lakefield Research for assay.

Results and Interpretation :

Table One gives results of the sorting trials. The major portion of gold values is recovered through the photometric system, and show significant upgrades of 135% for the small

Results and Interpretation (con't) :

size fraction and 167% for the large size fraction.

In looking at the overall test result, (Table Two), combining both size fractions and both photometric and conductive Accept fractions, a 91.4% recovery of gold was achieved. This accounts to an upgrade of 57%. At the same time 37.3% of the sample, by weight, is rejected at a grade of 0.020 ounces per ton.

TABLE ONE

Results of photometric and conductivity sorting trials on sample provided from the Orofino Mine.

A. +5/8" to -2" size range

Fraction	Weight %	Au (oz/ton)	Distribution %
Accept (photometric)	23.4	0.190	54.6
Accept (conductivity)	44.1	0.070	37.0
Reject	32.5	0.020	8.4
Calc. Head	100.0	0.081	100.0

B. +2" to -4" size range

Fraction	Weight %	Au (oz/ton)	Distribution %
Accept (photometric)	26.8	0.160	75.0
Accept (conductivity)	29.3	0.030	16.4
Reject	43.9	0.010	8.6
Calc. Head	100.0	0.060	100.0

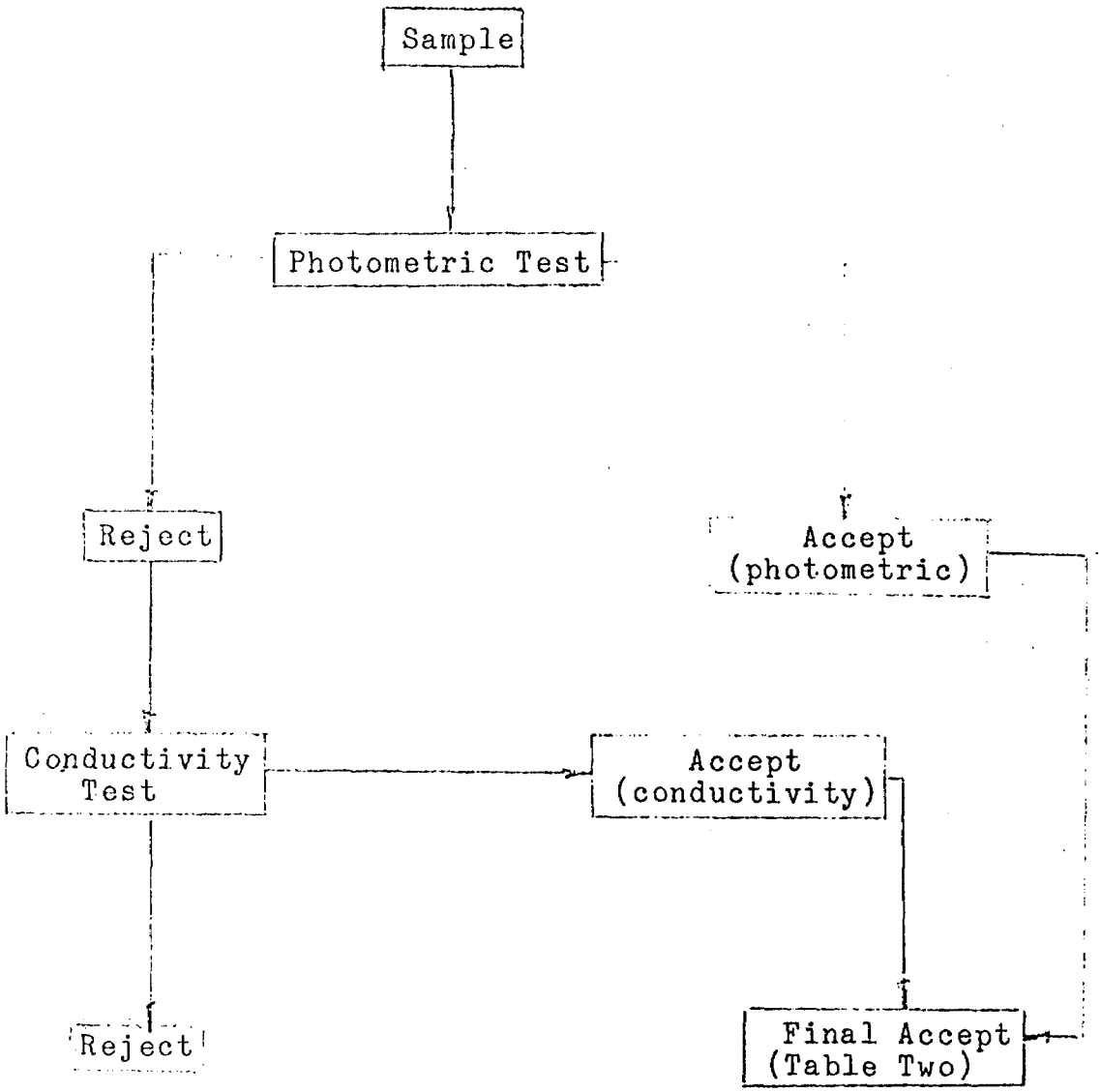
TABLE TWO

The following combines both sorted size fractions, as well as combining the accepts of photometric and conductivity sensing.

Fraction	Weight %	Au (oz/ton)	Distribution %
Accept*	62.7	0.110	91.4
Reject	37.3	0.020	8.6
Calc. Head	100.0	0.070	100.0

* Representing photometric and conductivity accepts combined.

SORTING SEQUENCE



An Investigation of

THE RECOVERY OF GOLD

from samples

submitted by

OROFINO RESOURCES LIMITED

Progress Report No. 1

Project No. L.R. 2820

NOTE:

This report refers to the samples as received.

LAKEFIELD RESEARCH
A DIVISION OF FALCONBRIDGE LIMITED
June 8, 1984

INTRODUCTION

In a letter dated April 30, 1984, Mr. T.M. Crandell of Orofino Resources Limited requested that we conduct preliminary testwork on samples from the Orofino property near Folyet to investigate the recovery of gold.

LAKEFIELD RESEARCH

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Experimental Work by: S.J. Parker

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S U M M A R Y

1. Head Samples

Four lots of samples were received from Northgate Exploration on May 8, 1984.

Sample No.	Weight kg (approx.)	No. of Samples
1	110	180
2	55	84
3	55	84
4	104	120

Each sample was crushed and a sample removed for gold assay:

Sample No.	Au, g/t (duplicate assays)	Ag, g/t
1	10.5, 10.5	<2.0, 3.1
2	2.94, 2.97	<2.0, <2.0
3	3.61, 3.93	<2.0, <2.0
4(in quadruplicate)	42.3, 31.8, 27.6, 42.2	5.5, 4.5, 5.0, 6.3

A composite of Sample No.'s 1, 2 and 3 was then prepered. This was designated Sample No. 5.

	Sample No.	Weight, kg
Sample 5	1	27
	2	14
	3	14

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Summary - Continued

1. Head Samples - Cont'd

Additional assays were then conducted on Samples 4 and 5:

Element	Sample No. 4	Sample No. 5
Au g/t	36.0	4.87
Ag g/t	5.3	<2.0
Cu %	0.005	0.006
Pb %	0.002	0.003
Zn %	0.007	0.008
Fe %	7.11	6.56
As %	0.013	0.018
S (Total) %	2.70	1.00
S (Sulphide) %	2.57	0.98
S (as pyrrhotite) %	<0.05	<0.05

Testwork was conducted on these two samples. The averag gold head assays, calculated from the test results, were 35.2 g/t for Sample No. 4 and 7.28 g/t for Sample No. 5.

ummary - Continued

. Cyanidat[redacted]n

Cyanidation tests were conducted on Samples 4 and 5 to investigate the ffect of fineness of grind and leach time. The NaCN strength was maintained at .5 g/L and the Ph at 10-11. The results of the tests are summarized in Table No. 1.

able No. 1

yanidation Tests

est No.	Sample No.	% -200 Mesh	Time Hours	Consumption NaCN kg/t	Consumption CaO kg/t	% Recovery Au	Residue g/t Au	Residue g/t Ag	Calc. Head,g/t Au
3	4	94.3	24	0.96	0.10	75.4	11.5	<1.0	46.7
4	4	94.3	48	0.88	0.14	97.2	1.06	<1.0	38.3
11	4	79.2	24	0.34	0.14	94.0	1.47	<1.0	24.4
12	4	79.2	48	0.59	0.14	98.7	0.46	<1.0	35.2
7	5	94.7	24	0.78	0.20	74.3	2.02	<1.0	7.83
8	5	94.7	48	1.09	0.08	94.4	0.36	<1.0	8.19
13	5	78.5	24	0.24	0.14	92.7	0.54	<1.0	7.46
14	5	78.5	48	0.69	0.14	93.0	0.45	<1.0	6.33

In 48 hours at the coarser grind of 80 % percent passing 200 mesh, 8 percent of the gold could be recovered from Sample 4 and 93 percent from Sample 5. aCN consumptions were low at 0.25-0.35 kg/t.

Summary - Continued

3. Flotation Tests

Rougher flotation tests were conducted using A-350 and R-208 as collectors. The results are summarized in Table No. 2.

Table No. 2

Flotation Tests

Test No.	Sample No.	% -200 Mesh	Reagents, g/t			Rougher Concentrate				Ro. Tail. Assay g/t		Calc. Head g/t
			AX 350	3477	R-208	Weight %	Assays g/t Au	Assays g/t Ag	% Distr. Au	Au	Ag	Au
1	4	78.7	80	10	20	9.58	390	46.7	98.2	0.77	<1.0	38.0
2	4	94.3	100	-	40	12.79	256	24.6	98.2	0.70	<1.0	33.3
6	5	94.7	100	-	40	9.40	67.2	11.5	93.0	0.53	<1.0	6.80
10	5	78.5	100	-	40	9.02	64.9	7.12	92.6	0.51	<1.0	6.32

At the coarser grind of 80 percent passing 200 mesh, 98 % of the gold in Sample 4 and 93 % of the gold in Sample 5 could be recovered in a rougher concentrate amounting to 10 % of the weight.

Summary - Continued

4. Gravity Separation

After grinding to 45-50 percent passing 200 mesh, the samples were treated by gravity separation on a table and the table concentrates were amalgamated. The results are summarized in Table No. 3.

Table No. 3

Gravity Separation

Test No.	Sample No.	Product	Weight %	Assays, g/t		% Recovery
				Au	Ag	Au
5	4	Amalgam	-	-	-	35.7
		Table Concentrate	7.09	368	36.5	86.3
		Table Tailing	92.91	4.44	<1.0	13.7
9	5	Amalgam	-	-	-	15.5
		Table Concentrate	3.66	140	22.3	64.4
		Table Tailing	96.34	2.95	<1.0	35.6

By gravity separation at 50 % minus 200 mesh, gold can be recovered by tabling. The table concentrates were not cleaned in order to avoid losses (small weight). Larger scale test would be required to evaluate this process.

DETAILS OF TESTS

Test No. 1

Purpose: To investigate flotation of Sample No. 4 at 78.7 % passing 200 mesh.

Procedure: As shown below.

Feed: 2000 grams minus 10 mesh Sample No. 4.

Grind: 40 minutes at 65 percent solids in the laboratory ball mill.

Conditions:

Stage	Reagents Added, grams per tonne				Time, minutes			pH
	A350	MIBC	3477	208	Grind	Cond.	Froth	
Grind	-	-	-	-	40	-	-	-
Rougher 1	20	10	-	-	-	1	1	8.0
	20	-	-	-	-	1	1	-
Rougher 2	40	-	-	-	-	1	2	-
	-	-	10	-	-	1	2	-
Rougher 3	-	-	-	20	-	1	3	-

Test No. 1 - Continued

Metallurgical Results

Product	Weight	Assays, g/t		% Distribution
	%	Au	Ag	Au
1. Ro. Conc. 1	6.19	544.	65.0	88.5
2. Ro. Conc. 2	1.81	197.	22.5	9.4
3. Ro. Conc. 3	1.58	6.08	2.8	0.3
4. Ro. Tail.	90.42	0.77	<1.0	1.8
Head (Calc.)	100.00	38.0	-	100.0

Calculated Grades and Recoveries

Products 1 and 2	8.00	466.	-	97.9
Products 1 to 3	9.58	390.	-	98.2

Screen Analyses

Combine Products

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 65	0.2	0.2	99.8
100	1.2	1.4	98.6
150	6.9	8.3	91.7
200	13.0	21.3	78.7
270	15.4	36.7	63.3
400	12.4	49.1	50.9
- 400	50.9	100.0	-
Total	100.0	-	-

Test No. 2

Purpose: To investigate flotation at 94.3 % passing 200 mesh.

Procedure: As shown below.

Feed: 2000 grams minus 10 mesh Sample No. 4.

Grind: 60 minutes at 65 percent solids in the laboratory ball mill.

Conditions:

Stage	Reagents Added, grams per tonne			Time, minutes			pH
	R208	MIBC	A350	Grind	Cond.	Froth	
Grind	-	-	-	60	-	-	-
Rougher 1	20	10	-	-	1	2	8.5
Rougher 2	20	-	50	-	1	4	-
Rougher 3	-	-	50	-	1	4	-

Metallurgical Results

Product	Weight	Assays, g/t		% Distribution
	%	Au	Ag	Au
1. Ro. Conc. 1	2.12	919.	62.0	58.5
2. Ro. Conc. 2	8.16	126.	18.3	30.9
3. Ro. Conc. 3	2.51	117.	13.4	8.8
4. Ro. Tailing	87.21	0.70	<1.0	1.8
Head (Calc.)	100.00	33.3	-	100.0

Calculated Grades and Recoveries

Products 1 and 2	10.28	290.	27.3	89.4
Products 1 to 3	12.79	256.	24.6	98.2

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Test No. 3

Purpose: To investigate cyanidation of Sample No. 4 at 94.3 % passing 200 mesh.

Procedure: The sample was pulped with water in a 2.5 litre bottle. NaCN and lime were added and the cyanidation was carried out on rolls in one 24 hour stage. The pulp was filtered and the residue washed three times with water.

Feed: 500 g Sample No. 4.

Solution Volume: 1000 mL Pulp Density 33 % solids

Solution Composition: 0.50 g/L NaCN

pH Range: 10-11 with $Ca(OH)_2$

Grind: 60 minutes per 2000 grams minus 10 mesh in the ball mill.

Reagent Balance:

Time	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
Hours	NaCN	$Ca(OH)_2$	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	0.50	0.10	0.47	0.07	0.15	0.07	0.32	0	10.4-10.0
2-5	0.34	0	0.32	0	0.40	0.07	0.07	0	10.2-10.2
5-8	0.07	0	0.07	0	0.40	0.02	0.07	0.05	10.1- 9.9
8-24	0.08	0	0.08	0	0.46	0.02	0.02	0	10.0-10.0
Total	0.99	0.10	0.94	0.07	0.46	0.02	0.48	0.05	-

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.96 CaO: 0.10

Test No. 3 - Continued

Metallurgical Results

Product	Amount	Assays, g/t, mg/L		% Distribution
		Au	Ag	Au
24 h Sol'n	1620 mL	10.9	1.62	75.4
24 h Residue	502.0 g	11.51	<1.0	24.6
Head (Calc.)	502.0 g	46.7	-	100.0

Screen Analyses

24 Hour Residue

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 100	0.1	0.1	99.9
150	0.8	0.9	99.1
200	4.8	5.7	94.3
270	11.0	16.7	85.3
400	15.3	32.0	68.0
- 400	68.0	100.0	-
Total	100.0	-	-

Test No. 4

Purpose: To investigate cyanidation of Sample No. 4 at 94.3 % passing 200 mesh.

Procedure: The sample was pulped with water in a 2.5 litre bottle. NaCN and lime were added and the cyanidation was carried out on rolls in one 48 hour stage. The pulp was filtered and the residue washed three times with water.

Feed: 500 g Sample No. 4

Solution Volume: 1000 mL Pulp Density 30 % solids

Solution Composition: 0.5 g/L NaCN

pH Range: 10-11 with $Ca(OH)_2$

Grind: 60 minutes per 2000 grams minus 10 mesh in the ball mill.

Reagent Balance:

Time	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
Hours	NaCN	$Ca(OH)_2$	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	0.50	0.10	0.47	0.07	0.15	0.07	0.32	0	10.8-10.2
2-5	0.34	0	0.32	0	0.45	0.07	0.02	0	10.2-10.2
5-8	0	0	0	0	0.45	0.05	0	0.02	10.2-10.0
8-24	0.05	0	0.05	0	0.50	0.01	0	0.04	10.0-10.0
24-48	0	0	0	0	0.40	0	0.10	0.01	10.0
Total	0.89	0.10	0.84	0.07	0.40	0	0.44	0.07	-

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.88 CaO: 0.14

Metallurgical Results

Product	Amount	Assays, g/t, mg/L		% Distribution
		Au	Ag	Au
48 h Solution	2000 mL	9.35	1.33	97.2
48 h Residue	502.4 g	1.06	<1.0	2.8
Head (Calc.)	502.4 g	38.3	-	100.0

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Test No. 5

Purpose: To investigate tabling of Sample No. 4 at 44.3 % passing 200 mesh with amalgamation of the Table Concentrate.

Procedure: The sample was ground and tabled in one pass over the Diester table. The concentrate was collected and amalgamated with mwecury for 2 hours on rolls. The mercury was recovered by elutriation. The table middling and table tailing were combined and filtered.

Grind: 20 minutes at 65 percent solids in the laboratory ball mill.

Feed: 2000 grams minus 10 mesh Sample No. 4.

Metallurgical Results

Product	Weight	Assays, mg, g/t		% Distribution
	%	Au	Ag	Au
1. Amalgam	-	12.20	0.59	35.7
2. Amalgam Tail.	7.09	216	32.3	50.6
3. Amalgam Conc.	92.91	4.44	<1.0	13.7
Head (Calc.)	100.00	30.2	-	100.0

Calculated Grades and Recoveries

Products 1 and 2	7.09	368	36.5	86.3

Screen Analyses

Combine Products

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 35	0.6	0.6	99.4
48	2.8	3.4	96.6
65	9.7	13.1	86.9
100	16.6	29.7	70.3
150	14.5	44.4	55.6
200	11.3	55.7	44.3
270	9.5	65.2	34.8
400	6.5	71.7	28.3
- 400	28.3	100.0	-
Total	100.0	-	-

Test No. 6

Purpose: To investigate flotation of Sample No. 5 at 94.7 % passing 200 mesh.

Procedure: As shown below.

Feed: 2000 grams minus 10 mesh Sample No. 5.

Grind: 60 minutes at 65 percent solids in the laboratory ball mill.

Conditions:

Stage	Reagents Added, grams per tonne			Time, minutes			pH
	A350	R208	MIBC	Grind	Cond.	Froth	
Grind	-	-	-	60	-	-	-
Rougher 1	50	20	10	-	1	4	8.4
Rougher 2	50	20	-	-	1	4	-

Metallurgical Results

Product	Weight	Assays, g/t		% Distribution
	%	Au	Ag	Au
1. Ro. Conc. 1	5.32	115	19.5	90.0
2. Ro. Conc. 2	4.08	4.92	<1.0	3.0
3. Ro. Tail.	90.60	0.53	<1.0	7.0
Head (Calc.)	100.00	6.80	-	100.0

Calculated Grades and Recoveries

Products 1 and 2	9.40	67.2	11.5	93.0

Test No. 1

Purpose: To investigate cyanidation of Sample No. 5 at 94.7 % minus 200 mesh.

Procedure: The sample was pulped with water in a 2.5 litre bottle. NaCN and lime were added and the cyanidation was carried out on rolls in one 24 hour stage. The pulp was filtered and the residue washed three times with water.

Feed: 500 g Sample No. 5.

Solution Volume: 1000 mL Pulp Density 33 % solids

Solution Composition: 0.50 g/L NaCN

pH Range: 10-11 with $Ca(OH)_2$

Grind: 60 minutes per 2000 grams minus 10 mesh in the ball mill.

Reagent Balance:

Time	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
Hours	NaCN	$Ca(OH)_2$	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	0.50	0.10	0.47	0.07	0.15	0.07	0.32	0	10.6-10.2
2-5	0.34	0	0.32	0	0.45	0.07	0.02	0	10.2-10.2
5-8	0	0	0	0	0.45	0.02	0.00	0.05	10.2- 9.8
8-24	0.05	0.05	0.05	0.04	0.45	0.01	0.05	0.05	10.2-10.1
Total	0.89	0.15	0.84	0.11	0.45	0.01	0.39	0.10	-

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.78 CaO: 0.20

Test ● 7 - Continued

Metallurgical Results

Product	Amount	Assays, g/t, mg/L		% Distribution
		Au	Ag	Au
24 h Solution	1720 mL	1.70	0.29	74.3
24 h Residue	501.8 g	2.02	<1.0	25.7
Head (Calc.)	501.8 g	7.83	-	100.0

Screen Analyses

24 Hour Residue

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 100	0.1	0.1	99.9
150	0.7	0.8	99.2
200	4.5	5.3	94.7
270	11.3	16.6	83.4
400	14.5	31.1	68.1
- 400	68.9	100.0	-
Total	100.0	-	-

Test No. 8

Purpose: To investigate cyanidation of Sample No. 5 at 94.7 % minus 200 mesh.

Procedure: The sample was pulped with water in a 2.5 litre bottle. NaCN and lime were added and the cyanidation was carried out on rolls in one 48 hour stage. The pulp was filtered and the residue washed three times with water.

Feed: 500 g Sample No. 5.

Solution Volume: 1000 mL Pulp Density 33 % solids

Solution Composition: 0.50 g/L NaCN

pH Range: 10-11 with $Ca(OH)_2$

Grind: 60 minutes per 2000 grams minus 10 mesh in the ball mill.

Reagent Balance:

Time	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
Hours	NaCN	$Ca(OH)_2$	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	0.50	0.10	0.47	0.07	0.15	0.07	0.32	0	10.4-10.0
2-5	0.34	0	0.32	0	0.40	0.07	0.07	0	10.2-10.2
5-8	0.07	0	0.07	0	0.40	0.05	0.07	0.02	10.2-10.0
8-24	0.10	0	0.10	0	0.50	0.03	0	0.02	10.1-10.0
24-48	0	0	0	0	0.40	0	0.10	0	-
Total	1.01	0.10	0.96	0.07	0.40	0	0.56	0.04	-

Reagent Consumption (kg/t of cyanide feed) NaCN: 1.09 CaO: 0.08

Metallurgical Results

Product	Amount	Assays, g/t, mg/L		% Distribution
		Au	Ag	Au
48 h Solution	2000 mL	1.51	0.27	94.4
48 h Residue	512.9 g	0.36	<1.0	5.6
Head (Calc.)	512.9 g	8.19	-	100.0

Test No. 9

Purpose: To repeat conditions of test No. 5 on Sample No. 5.

Procedure: As for test No. 5.

Grind: 20 minutes at 65 percent solids in the laboratory ball mill.

Feed: 2000 grams minus 10 mesh Sample No. 5.

Metallurgical Results

Product	Weight	Assays, mgs, g/t		% Distribution
	%	Au	Ag	Au
1. Amalgam	-	11.5	0.33	15.5
2. Amalgam Tail.	3.66	107	17.6	48.9
3. Table Tail.	96.34	2.95	<1.0	35.6
Head (Calc.)	100.00	8.00	-	100.0

Calculated Grades and Recoveries

Products 1 and 2	3.66	140.1	22.3	64.4

Screen Analyses

Combine Products

Mesh Size (Tyler)	% Retained		% Passing Cumulative
	Individual	Cumulative	
+ 28	0.2	0.2	99.8
35	0.4	0.6	99.4
48	2.8	3.4	86.6
65	8.6	12.0	88.0
100	13.6	25.6	74.4
150	15.3	40.9	59.1
200	11.8	52.7	47.3
270	8.6	61.3	38.7
400	7.3	68.6	31.4
- 400	31.4	100.0	-
Total	100.0	-	-

Test No. 10

Purpose: To repeat conditions of test No. 6 at 80 % minus 200 mesh.

Procedure: As outlined below.

Feed: 2000 grams minus 10 mesh Sample No. 5.

Grind: 40 minutes at 65 percent solids in the laboratory ball mill.

Conditions:

Stage	Reagents Added, grams per tonne			Time, minutes			pH
	A350	R208	MIBC	Grind	Cond.	Froth	
Grind	-	-	-	40	-	-	-
Rougher 1	50	20	10	-	1	4	7.8
Rougher 2	50	20	-	-	1	4	-

Metallurgical Results

Product	Weight	Assays, g/t		% Distribution
	%	Au	Ag	Au
1. Ro. Conc. 1	5.69	100	10.7	90.0
2. Ro. Conc. 2	3.33	5.02	<1.0	2.6
3. Ro. Tailing	90.98	0.51	<1.0	7.4
Head (Calc.)	100.00	6.32	-	100.0

Calculated Grades and Recoveries

Products 1 and 2	9.02	64.9	7.12	92.6

Test No. 11

Purpose: To repeat conditions of test No. 7 at 80 % minus 200 mesh.

Procedure: The sample was pulped with water in a 2.5 litre bottle. NaCN and lime were added and the cyanidation was carried out on rolls in one 24 hour stage. The pulp was filtered and the residue washed three times with water.

Feed: 500 g Sample No. 4

Solution Volume: 1000 mL Pulp Density 33 % solids

Solution Composition: 0.50 g/L NaCN

pH Range: 10-11 with $Ca(OH)_2$

Grind: 40 minutes per 2000 grams minus 10 mesh in the laboratory ball mill.

Reagent Balance:

Time	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
Hours	NaCN	$Ca(OH)_2$	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	0.50	0.10	0.47	0.07	0.37	0	0.10	0.07	10.6-10.6
2-4	0.11	0	0.10	0	0.47	0	0	0	10.6-10.6
4-24	0	0	0	0	0.40	0	0.07	0	10.6
Total	0.61	0.10	0.57	0.07	0.40	0	0.17	0.07	-

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.34 CaO: 0.14

Test No. 11 - Continued

Metallurgical Results

Product	Amount	Assays, g/t, mg/L		% Distribution
		Au	Ag	Au
24 h Solution	2000 mL	5.69	0.84	94.0
24 h Residue	495.4 g	1.47	<1.0	6.0
Head (Calc.)	495.4 g	24.4	-	100.0

Screen Analyses

24 Hour Residue

Mesh Size (Tyler)	% Retained		% Passing
	Individual	Cumulative	Cumulative
+ 65	0.1	0.1	99.9
100	1.6	1.7	98.3
150	6.2	7.9	92.1
200	12.9	20.8	79.2
270	16.7	37.5	62.5
400	12.4	49.9	50.1
- 400	50.1	100.0	-
Total	100.0	-	-

Test No. 12

Purpose: To repeat conditions of test No. 8 at 80 % minus 200 mesh.

Procedure: The sample was pulped with water in a 2.5 litre bottle. NaCN and lime were added and the cyanidation was carried out on rolls in one 48 hour stage. The pulp was filtered and the residue washed three times with water.

Feed: 500 g Sample No. 4

Solution Volume: 1000 mL Pulp Density 33 % solids

Solution Composition: 0.50 g/L NaCN

pH Range: 10-11 with $Ca(OH)_2$

Grind: 40 minutes per 2000 grams minus 10 mesh in the laboratory ball mill.

Reagent Balance:

Time	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
Hours	NaCN	$Ca(OH)_2$	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	0.50	0.10	0.47	0.07	0.30	0	0.17	0.07	10.6-10.6
2-4	0.18	0	0.17	0	0.47	0	0	0	10.6-10.6
4-24	0	0	0	0	0.47	0	0	0	10.6-10.6
24-32	0	0	0	0	0.47	0	0	0	10.6-10.6
32-48	0	0	0	0	0.35	0	0.12	0	10.6-10.6
Total	0.68	0.10	0.64	0.07	0.35	0	0.29	0.07	-

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.59 CaO: 0.14

Metallurgical Results

Product	Amount	Assays, g/t, mg/L		% Distribution
		Au	Ag	Au
48 h Cy. Sol'n	2000 mL	8.51	1.13	98.7
48 h Residue	489.6 g	0.46	<1.0	1.3
Head (Calc.)	489.6 g	35.2	-	100.0

Test No. 13

Purpose: To investigate cyanidation at 80 percent passing 200 mesh.

Procedure: The sample was pulped with water in a 2.5 litre bottle. NaCN and lime were added and the cyanidation was carried out on rolls in one 24 hour stage. The pulp was filtered and the residue washed three times with water.

Feed: 500 g Sample No. 5

Solution Volume: 1000 mL Pulp Density 33 % solids

Solution Composition: 0.50 g/L NaCN

pH Range: 10-11 with $Ca(OH)_2$

Grind: 40 minutes per 2000 grams at 65 percent solids in the laboratory ball mill.

Reagent Balance:

Time	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
Hours	NaCN	$Ca(OH)_2$	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	0.50	0.10	0.47	0.07	0.35	0	0.12	0.07	10.6-10.6
2-4	0.13	0	0.12	0	0.47	0	0	0	10.6-10.4
4-24	0	0	0	0	0.47	0	0	0	10.4
Total	0.63	0.10	0.59	0.07	0.47	0	0.12	0.07	-

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.24 CaO: 0.14

Test No. 13 - Continued

Metallurgical Results

Product	Amount	Assays, g/t, mg/L		% Distribution
		Au	Ag	Au
24 h Sol'n	2000 mL	1.71	0.28	92.7
24 h Residue	494.9 g	0.54	<1.0	7.3
Head (Calc.)	494.9 g	7.46	-	100.0

Screen Analyses

24 Hour Residue

Mesh Size (Tyler)	% Retained		% Passing
	Individual	Cumulative	Cumulative
+ 65	0.1	0.1	99.9
100	1.3	1.4	98.6
150	6.9	8.3	91.7
200	13.2	21.5	78.5
270	15.2	36.7	63.3
400	12.1	48.8	51.2
- 400	51.2	100.0	-
Total	100.0	-	-

LAKEFIELD RESEARCH
A Division of Falconbridge Limited
Lakefield, Ontario
June 8, 1984 / slk

Test No. 14

Purpose: To investigate cyanidation at 80 percent passing 200 mesh.

Procedure: The sample was pulped with water in a 2.5 litre bottle. NaCN and lime were added and the cyanidation was carried out on rolls in one 48 hour stage. The pulp was filtered and the residue washed three times with water.

Feed: 500 g Sample No. 5.

Solution Volume: 1000 mL Pulp Density 33 % solids

Solution Composition: 0.50 g/L NaCN

pH Range: 10-11 with $Ca(OH)_2$

Grind: 40 minutes per 2000 grams at 65 percent solids in the laboratory ball mill.

Reagent Balance:

Time	Added, Grams				Residual		Consumed		pH
	Actual		Equivalent		Grams		Grams		
Hours	NaCN	$Ca(OH)_2$	NaCN	CaO	NaCN	CaO	NaCN	CaO	
0-2	0.50	0.10	0.47	0.07	0.35	0	0.12	0.07	10.6-10.6
2-4	0.13	0	0.12	0	0	0	0	0	10.6-10.4
4-24	0	0	0	0	0.47	0	0	0	10.4-10.4
24-32	0	0	0	0	0.47	0	0	0	10.4-10.4
32-48	0	0	0	0	0.25	0	0.22	0	10.4-10.4
Total	0.63	0.10	0.59	0.07	0.25	0	0.34	0.07	-

Reagent Consumption (kg/t of cyanide feed) NaCN: 0.69 CaO: 0.14

Metallurgical Results

Product	Amount	Assays, g/t, mg/L		% Distribution
		Au	Ag	Au
48 h Cy. Sol'n	2000 mL	1.46	0.25	93.0
48 h Cy. Residue	496.3 g	0.45	<1.0	7.0
Head (Calc.)	496.3 g	6.33	-	100.0

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ANNUAL REPORT

EXPLORATION ACTIVITIES OROFINO PROPERTY

SILK AND HORWOOD TOWNSHIPS, ONTARIO

NTS 41-0-16

March 1985
Toronto, Ontario

T. R. Atkins
Orofino Resources Ltd.

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1.0 SUMMARY

Exploration activity on the Orofino property continued from October 1, 1983 to the end of the OMEP grant - OM83-5-C-223 - period on September 30, 1984. Although work continued till the end of the grant period Orofino Resources became ineligible for assistance as of July 9, 1984 when associate company Westfield Minerals' Scadding Mine, in Scadding Township, Ontario, went into production. This report describes the exploration activity on the property for the full year in accordance with OMEP regulations.

1.1 CONCLUSIONS

Upon the completion of the 1983 diamond drill program an ore reserve study was undertaken. These dual projects were successful in demonstrating that:

a) The mineral inventory, in all categories, is more than 1.6 million tons at a grade of 0.14 opt Au, calculated from a cuttoff grade of 0.05 opt Au.
b) The Orofino ore body has good potential for the down-dip extension of the ore zones.
c) Evidence indicates that good ore grades are present towards the surface from the underground workings in the No. 1 South Zone and the No. 1 North Zone.
d) Intersections of different ore zones are the locus for further enrichment in gold.
e) The extrapolated position of the up-dip subcrop of the Replacement Zone appears to lie further east than had been expected and therefore presents an additional exploration target.

A Metallurgical Study, on a 324 kg bulk sample of the Orofino Ore, by Lakefield Research illustrated that a good recovery rate of 98% for high grade samples (1.02 oz/ton) and 93% for lower grade samples (0.21/ton) is obtainable for this ore.

1.1 CONCLUSIONS - (Cont'd.)

A trenching program designed to elucidate the nature of the geophysical anomalies on the outlying claims illustrated that most of the VLF-EM conductors were due to conductive clays and sands.

The trenching program at the mine site, aimed at exposing, mapping and sampling the surface projections of the ore zones, was inconclusive as greater than expected overburden depths prohibited the exposure of these zones. The increase in the negative relief of the bedrock, combined with the observance of quartz veining proximal to the target area implies that the less resistant, friable, mineralized alteration zones may be below these greater overburden depths.

Although the intersection of the No. 1 North - and No. 1 South - Zones, the main target of the trenching, was not exposed, a portion of the No. 1 South-East Zone was exposed and encouraging assay results were obtained. Similar encouraging results were obtained from the No. 5 Zone thus proving the continuity of ore grade mineralization to the surface in these zones.

The 10 hole, 3,642.5 ft. diamond drill program, at the Tionaga Mine, was successful in bracketing the old workings of the mine and revealing a strong vein system with erratic gold values. It was concluded that sufficient drilling had been done to indicate that the expense of dewatering the old working, so that they may be mapped and sampled, would not be warranted at this time. These results combined with discouraging results from the surface geological mapping and sampling program resulted in Orofino Resources terminating the option agreement on the Tionaga property on September 1st, 1984.

1.2 RECOMMENDATIONS

At the present gold price of US$300 per ounce (Cdn $400 per ounce), mining of the Orofino deposit would not be in the Company's best financial interest. Mine engineering and cost studies should be completed to determine at what metal price mining of the whole deposit would provide an adequate return on investment and whether a two stage development

1.2 RECOMMENDATIONS - (Cont'd.)

would be preferable. The first stage of this program will concentrate on the near-surface area of higher grade mineralization in the vicinity of the old workings, while the second stage will concentrate on the development and further exploration of the deeper Replacement Zone and down-dip extension of the No. 1 South Zone.

Access to the shallow mineralization by ramp would enable considerable amounts of reserves presently defined as Probable and Possible to be upgraded to Proven and Probable respectively and would allow for cheap mining of these reserves. This ramp should be considered for development in the near term, firstly to provide additional material for metallurgical testing and trial stoping experience and secondly to be available to cut the lead time to production when improved metal prices occur. The existing vertical shaft is not a viable substitute for a ramp as it is incorrectly located, ties up considerable high grade ore in the shaft pillar and the cost of equipping it with headframe, hoist, guides, etc. would be half the cost of a ramp.

2.0 INTRODUCTION

During the spring and summer of 1983 most of the work at the Orofino Mine site centered around further defining the extent and grade of the mineralized zones through fill-in diamond drilling and mapping and sampling the underground workings. This work was completed during the early part of the present OMEP grant period and the information obtained from the program substantially increased both the understanding of the deposit and its ore reserves. This work further indicated the potential for substantial reserves up-dip of the near surface ore zones. In order to test these zones a summer trenching, mapping and sampling program was conducted at the Orofino Mine site. Further to the ore study metallurgical tests were conducted on bulk samples of the Orofino ore in the spring of 1984 by Lakefield Research and Aggen Inc.

2.0 INTRODUCTION - (Cont'd.)

As part of the continuing exploration on the outlying claims of the Orofino property, a 4 hole, 905 ft. diamond drill program was conducted in the fall of 1983 and a trenching, mapping and sampling program was conducted in the summer of 1984. Both these projects tested geophysical and geochemical anomalies in these areas.

During the winter of 1984 a diamond drill program and follow-up summer surface mapping and sampling program were conducted on the former producing Tionaga Mine, 6 km east of the Orofino Mine. These programs were undertaken to evaluate the potential for additional economic mineralization available for a central mill.

On July 9, 1984 Northgate Exploration's associate company Westfield Minerals' Scadding Mine; in Scadding Township, Sudbury Mining District, Ontario, formally began production. Orofino Resources Ltd. is a subsidiary of Northgate Exploration Ltd. (Northgate has a 56% ownership in Orofino Resources) and through this link was deemed to have a producing mine in Ontario. This action was felt to contradict the rules of the OMEP Act and Orofino Resources Ltd. was deemed to be ineligible for further OMEP assistance. Although OMEP assistance was halted the company continued exploration through the remainder of the summer and into the fall.

3.0 OWNERSHIP

At the beginning of the current OMEP grant period the Orofino property consisted of 27 patented and 118 unpatented claims in Silk and Horwood Townships. Two additional claims, numbers 805428 and 805429 were staked on May 20, 1984 in the northeast corner of the Orofino claim package, in Silk Township (Claims Location Map). These two additional claims were recorded on May 22, 1984.

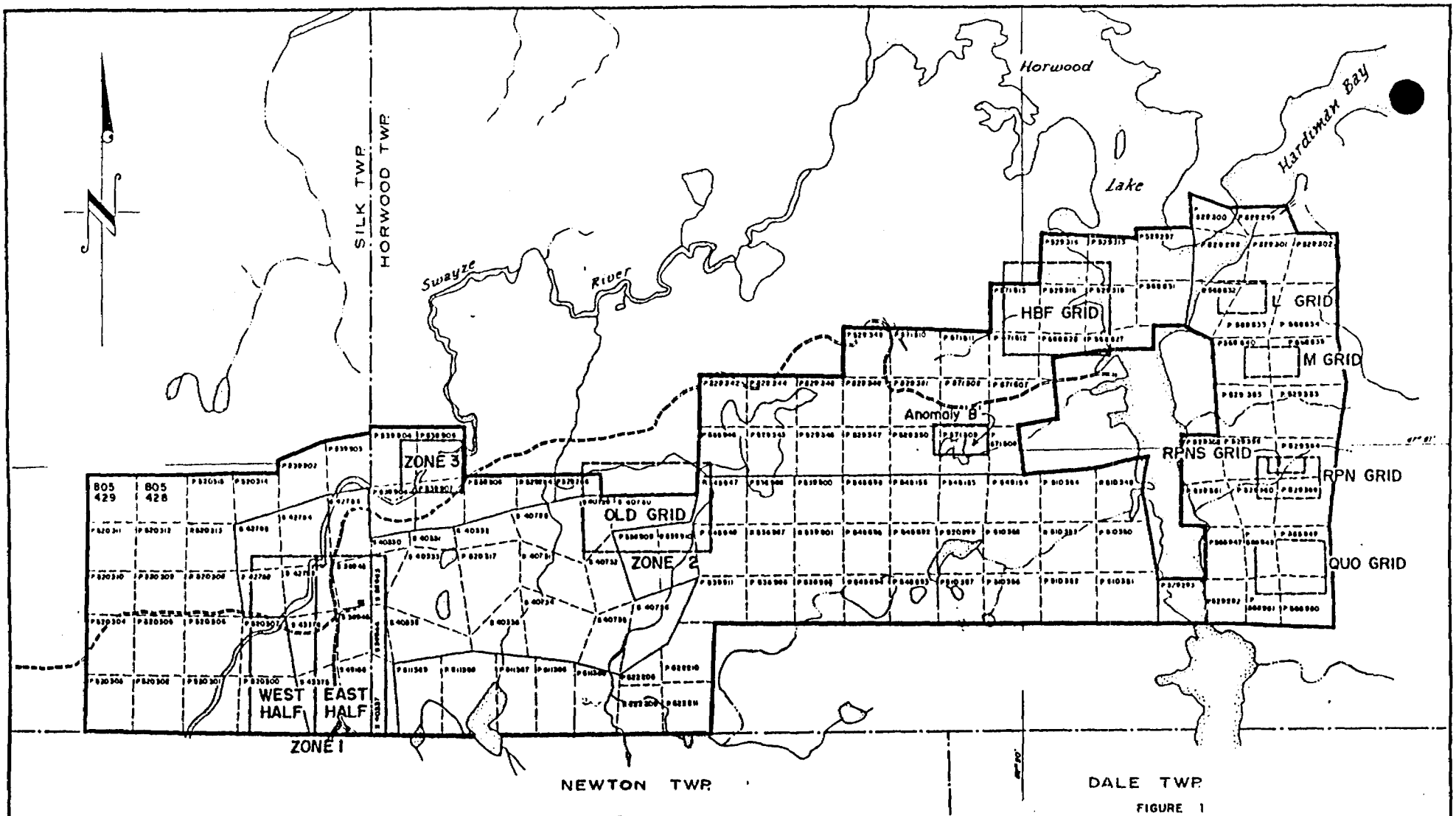

FIGURE 1

SCALE 1:31,680

MILES 1/2 1/4 0 1/2 1

METERS 800 400 0 800 1000

OROFINO PROJECT

CLAIMS LOCATION MAP

Showing

DETAIL GRIDS

A.R. Gunther

July 2, 1981

Revised [illegible]

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4.0 PROPERTY LOCATION AND ACCESS

Please refer to Atkins et al, 1984; and Gilman, 1984 for maps and a complete description of the property.

5.0 PREVIOUS WORK

Please refer to Atkins et al, 1984; and Gilman, 1984 for a complete description.

6.0 EXPLORATION PROGRAM OCTOBER 1, 1983 - SEPTEMBER 30, 1984

The exploration program initiated early in April, 1983, under the auspices of OMEP grant OM-83-5-23, continued past the September 30th termination date and into the current OMEP grant - OM83-5-C-223 period. The exploration activities during this latter grant period include:

a) Continued diamond drilling to the south of the mine shaft.
b) Additional drilling on outlying claims southwest of the mine site.
c) Completion of all remaining underground mapping and sampling in the Orofino Mine by early October, 1984.
d) Enlarging the property area by optioning the adjoining Tionaga Mine gold property to the east.
e) Completing a 10 hole, 3,642.5 ft. diamond drill program to test vein and value continuity up - and down - dip between the old mine workings at the Tionaga property.
f) Construction of a 1.5 km exploration access road to facilitate overburden trenching on the Orofino east central outlying claims.
g) Calculation of the geological reserves for the Orofino Mine by Northgate Exploration Ltd.'s personnel.
h) Completion of the metallurgical tests by Lakefield Research and Aggen Inc. on bulk samples of the Orofino Ore.
i) Trenching, mapping and sampling at the Orofino Mine site to expose and test the up-dip extensions of the near surface ore zones.

6.0 EXPLORATION PROGRAM OCTOBER 1, 1983 - SEPTEMBER 30, 1984 - (Cont'd.)

j) Trenching and mapping of the outlying claims to elucidate the nature of the geophysical anomalies in these locations.

k) Surface mapping and sampling of the Tionaga Mine area in an attempt to uncover and test the possible extensions of mineralized veins.

6.1 DIAMOND DRILLING - MINE SITE

Continued diamond drilling to the south of the mine shaft (drill hole 83-42, 327 ft.) was conducted in the fall of 1983 to test the up-dip extension of the Replacement Zone. Some interesting sections of "hybrid retrograde diorite" were encountered which assayed up to 0.04 opt gold. These mineralized, altered zones could indicate proximity to the targeted Replacement Zone.

Locations of all the 1983 drill holes were surveyed by T. E. Rody Ltd., O.L.S.

For additional information, including drill hole locations and drill logs please refer to Atkins et al, 1984.

6.2 DIAMOND DRILLING - OUTLYING CLAIMS

In early October, 1983 4 drill holes (numbers 83-43 to 46), for a total footage of 905 ft., were drilled by Morissette Diamond Drill Contractors on the outlying claim P520300 southwest of the mine site. These holes were drilled to test a possible fault system on the basis of topographic relief and geophysical response. Of the 4 holes drilled, hole 83-46 intersected encouraging widths of "hybrid diorite".

For additional information regarding drill hole locations and drill logs please refer to Atkins, et al, 1984.

6.3 UNDERGROUND MAPPING AND SAMPLING

The underground mapping and sampling program begun in late July, 1983 was completed by mid October, 1983. This program included the rehabilitation and dewatering of the old workings; an initial environmental study, under the guidance of the Ministry of the Environment to determine the optimum site for discharge of mine water; geological mapping of all the underground workings; and the collection of 1700 channel samples from the shaft, 150 ft. and 275 ft. levels and raises. Levi Laine and Orazio Antonacci of Timmins, surveyed the extension of surface points to the underground workings.

For additional information regarding the underground exploration program please consult Atkins et al, 1984.

6.4 TIONAGA MINE OPTION

The Tionaga Mine property, a former 2,229 oz gold and 404 oz silver producer in the mid to late 1930's, is surrounded by the pre-existing Orofino claims under and immediately east of Horwood Lake, in Horwood Township (Claim Location Map). This option agreement entitles Orofino Resources Ltd. to earn up to 100% interest, subject to a 10% net profit royalty through the expenditure of $100,000 on exploration during 1984 and the subsequent expenditure of up to $600,000 on exploration and development over the following three years, together with vendor payments of up to $140,000 and 100,000 Orofino shares.

Due to the drill indicated erratic nature of ore grade gold mineralization between the old mine workings and the lack of encouraging gold values from surface trenches the option agreement on the Tionaga property was terminated on September 1, 1984.

6.5 TIONAGA DRILL PROGRAM

Drilling on the Tionaga claims began in early February, 1984. Ten vertical diamond drill holes were completed for a total of 3,642.5 ft. These drill holes explored vein and gold value continuity between the old workings of the Tionaga Mine up - and down - dip of the old mine workings and in parallel structures. Encouraging intersections include 0.05 oz Au and 3.71 oz Ag from 488.6 - 491.2 ft. in hole 84-1; 0.11 oz Au from 104.7 - 106.9 ft. and 0.5 oz Au from 271.6 - 274 ft. in hole 84-4; and 0.38 oz Au and 0.13 oz Ag from 229 - 234 ft. in hole 84-8.

Although some interesting sections were encountered during this drill program the erratic nature and grades of the mineralization were not encouraging enough to warrant the expense of dewatering the old workings to facilitate detailed mapping and sampling of the Tionaga Mine.

For additional information, including drill hole locations, drill logs, drill sections and longitudinal sections, please refer to Gilman, 1984.

6.6 ACCESS ROAD CONSTRUCTION

A 1.5 km road was constructed in October, 1983 south from the Horwood Lake Road towards the east-central outlying claims of the Orofino property. This road was built to facilitate overburden trenching in the area and traversed portions of claims P529286, S40728, S40732, S40731 and P520317 (Claims Location Map). Contracted operator D. Belkosky of Foleyet, Ontario utilized a Caterpillar D7 bulldozer in the construction of this road.

6.7 ORE RESERVE CALCULATION

Calculation of the ore reserves for the Orofino Mine commenced in January, 1984 and were completed by June, 1984. This study included the construction of 10 longitudinal sections; 16 geology and ore block

6.7 ORE RESERVE CALCULATION - (Cont'd.)

cross sections; various surface plans and maps of the geology, ore zone projections and gold veins; and the assay plans and geology maps of the 150 and 275 ft. levels. A computer program was created which enabled the filing of each individual ore block. This program facilitates the retrieval of the ore inventory under a number of categories including, grade, level and ore category.

The ore reserve study outlined reserves from all categories of 1,651,691 tons at a grade of 0.14 opt Au, using a cutoff grade of 0.05 opt Au. Reserves in the Proven category are equal to 66,041 tons at a grade of 0.24 opt Au while in the Probable category they equal 278,587 tons at a grade of 0.19 opt Au, both using a 0.10 opt cutoff grade. Reserves in the Possible category are equal to 1,307,063 tons at a grade of 0.12 opt Au, calculated using a 0.05 opt Au cutoff grade.

For additional information on the methods, statistics, definitions and maps and plans related to the ore reserve study please refer to Atkins et al, 1984.

6.8 METALLURGICAL TESTS

During May, 1984 Lakefield Research performed a number of tests on two bulk samples comprised of the rejects from the underground channel samples of the Orofino ore. Encouraging recovery rates were obtained both by cyanidation and flotation methods. With a grind of 80% passing 200 mesh a 98% recovery of gold was achieved from the higher grade (1.02 oz/ton) sample while a 93% recovery was achieved from the lower grade (0.21 oz/ton) sample. The gold head assay, determined by Lakefield from the higher grade bulk sample (1.02 oz/ton), was significantly higher than the calculated average from the individual channel sample assays (0.28 oz/ton) while the gold head assay from the lower grade bulk sample (0.21 oz/ton) was very close to the calculated average from the individual channel sample assays (0.25 oz/ton).

6.8 METALLURGICAL TESTS - (Cont'd.)

The discrepancy in the higher grade sample is attributable to the nugget effect of gold in the high grade samples.

For further information regarding the methods and results of this metallurgical study please refer to Wyslouzil and Sarbutt, 1984.

During June, 1984 Aggen Inc. (Beneficiating Services) began testing a bulk sample from the Orofino Mine muck pile to determine how amenable the Orofino ore was to coarse particle beneficiating. Aggen crushed the sample to two size ranges, +5/8" to -2" to +2" to -4". The crushed samples were passed through photometric sorters which produce an Accept (quartz rich) and Reject (darker rocks) on the basis of reflective intensity differences. The Reject Fraction of the photometric test was then rerun through a conductivity sensing system with further separation made by the level of conductive response on a rock by rock basis.

Aggen's tests showed that the major portion of the gold is recovered through the photometric system and that this system is capable of an upgrading of 135% for the small size fraction and 167% for the large size fraction. By combining both size fractions and photometric and conductive Accept fractions a 91.4% recovery of gold was achieved while 37.3% of the sample by weight with a grade of 0.02 opt was rejected.

For further information regarding the methods and results of this metallurgical study please refer to Wait, 1984.

6.9 TRENCHING - MINE SITE

A trenching, mapping and sampling program at the mine site, utilizing a 410 John Deere backhoe-loader and a 160 cfm TS-55 air compressor, began in late May, 1984. This program was initiated in order to expose and test the up-dip extension of the main ore zones of the Orofino Mine.

6.9 TRENCHING - MINE SITE - (Cont'd.)

Unfortunately a greater negative relief in the bedrock combined with constant relief in the overburden did not allow the main target, the intersection between the No. 1 South and No. 1 North Zones, to be exposed with the available equipment. The negative bedrock relief in the area of the intersection of the two zones and the increase in quartz veining proximal to this area seems to indicate that the targeted intersection zone lies under these greater overburden depths.

The zones that were exposed by trenching and subsequently blasted, sampled and mapped gave assay values which ranged from trace to 0.16 over varying sample widths. Some of the better results came from the up-dip extensions of known mineralized zones, including the No. 1 South (east) Zone which assayed 0.10 opt Au over an 11 ft. sample length (includes a 2 ft. section assaying 0.16 opt Au. The results from the resampled and reassayed high grade trenches were discouraging as weak gold assays were returned.

For additional information, including trench location maps, please refer to Atkins and Gilman, 1985.

6.10 TRENCHING - OUTLYING CLAIMS

A trenching, mapping and sampling program, which ran concurrent with the mine site program, was initiated to determine the geological nature of various geophysical and geochemical anomalies and topographically interesting area. A total of 86 trenches were dug using a 410 John Deere backhoe-loader. In most cases the geophysical and geochemical anomalies were due to conductive clays and sands. In a few instances the overburden depth was shallow enough that the trenching was able to expose bedrock, of andesite composition. Samples taken of pyrite mineralized quartz veins hosted in Andesite were assayed but gave discouraging gold values.

For additional information, including trench location maps and logs of the trenches please refer to Atkins and Gilman, 1985

6.11 TIONAGA - SURFACE MAPPING AND SAMPLING

A surface mapping and sampling program which began in early September, 1984 on the Tionaga Mine property attempted to locate the possible extension of existing trenches and to excavate additonal trenches in interesting areas encountered during the surface geological work. Traverses along picket lines encountered a few scattered expanses of intermediate to basic volcanic rocks. No obvious indicators of gold mineralization were encountered in this surface work. An old trench 65 ft. long exposed sheared chloritic basalt with a 2 to 4 ft. quartz vein. Samples of the broken quartz muck and vein material along the footwall surface gave assay values from trace to 0.02 opt Au.

For additional information, please refer to Gilman, 1985.

7.0 SUMMARY OF EXPLORATION EXPENSES

Although Orofino Resources Ltd. was deemed ineligible for OMEP assistance after July 9, 1984 exploration activity continued until the end of the OMEP grant period. The following tables summarize expenditures for the period Oct. 1, 1983 to Sept. 30, 1984, (Table I) and Oct. 1, 1983 to July 9, 1984 (Table II).

Table I

SUMMARY OF EXPLORATION EXPENSES

OCT. 1/83 to SEPT. 30/84

Item	Cost Breakdown	
Surface Mapping & Sampling	Field M & S for 1 1/2 mos.	$6,985.45
	Report preparation expenses	841.78
		$7,827.23
Diamond Drilling	Contractor & geologist's time	$136,495.36
	Assay charges	4,775.19
		$141,270.55
Underground Exploration	Underground contractor	$9,145.39
	" mapping & sampling	10,492.94
	" assay charges	6,314.32
		$25,952.65
Trenching	Equip. rentals & assoc. costs	$15,161.99
	Mapping & sampling	20,357.16
	Assay charges	923.09
		$36,442.24
Road & Camp	Bulldozer contractor	$5,634.67
	Camp equip. & maintenance	4,261.43
		$9,896.10
Metallurgical & Ore Reserve Study	Ore reserve study	$52,883.35
	Metallurgical study	4,911.20
		$57,794.55
	TOTAL	$279,183.32

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Table II

SUMMARY OF EXPLORATION EXPENSES

OCT. 1/83 to JULY 9/84

Item	Cost Breakdown	
Diamond Drilling	Contractor & geologist's time	$136,447.18
	Assay charges	4,775.19
		$141,222.37
Underground Exploration	Underground contractor	$9,145.39
	" mapping & sampling	10.492.94
	Assay charges	6,314.32
		$25,952.65
Trenching	Equip. rentals & assoc. costs	$8,906.62
	Mapping & sampling	11,555.40
	Assay charges	141.20
		$20,603.22
Road & Camp	Bulldozer contractor	$5,634.67
	Camp equip. & maintenance	4,261.43
		$9,896.10
Metallurgical & Ore Reserve Study	Ore reserve study	$52,883.35
	Metallurgical study	4,911.20
		$57,794.55
	Total	$255,468.89

8.0 REFERENCES

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Gilman, W.F.

1984: Report on Diamond Drilling, Tionaga '84' Project, Lefever Option - Orofino Resources, Horwood Lake, Ontario.

1984: Report on Surface Geology, Tionaga Patented Claims, Lefever Option, Orofino Resources, Horwood Lake, Ontario.

REPORT ON DIAMOND DRILLING

TIONAGA '84' PROJECT

LEFEVER OPTION-OROFINO RESOURCES

HORWOOD LAKE, ONTARIO

NTS 41-O-16

W. Gilman
OROFINO RESOURCES LTD.

Timmins, Ontario
September 1984

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SUMMARY

The Tionaga, as a past producer within the Swayze Volcanic Belt, is of prime interest. It is within a reasonable distance and on strike with the Orofino Resources deposit which has mineable gold reserves.

A geological map of underground workings does not exist, nor is there one of the surface area immediately surrounding the property so that the potential has not been fully evaluated. The recent investigation by Orofino Resources of the underground geological structures with 10 diamond drill holes bracketing the old workings disclosed a strong vein system, but Au values within the veins are erratic. Sufficient drilling has been done to indicate that the expense of dewatering old workings and detailed mapping and sampling are not warranted at this time. A surface geological examination of surrounding patented claims is presently being made prior to a decision on further work.

The details presented in this report, together with logs and sections, indicate there is a good understanding of existing geology. The prime objective now is to locate further veins on surface previously undetected.

Claims surrounding the Tionaga patents are held by Orofino Resources. Several quartz veins on these claims are spatially related to Tionaga veins in a similar geological environment.

RECOMMENDATIONS

There is no existing geological map of the claims and it is assumed there was never one produced. It is suggested the property be mapped at 200' to the inch with detailed 10' to 1" mapping of existing trenches. Possible extension of existing trenches should be considered and excavation of additional trenches in likely areas selected during the surface geological work. The success of such work in the uncovering of veins and values will determine the extent of further work. There is the possibility some detailed sophisticated geophysics may be recommended on completion of the above work.

INTRODUCTION

In 1983, Orofino Resources optioned 8 patented claims from Mrs. Florence Lefever of Timmins and Mr. John E. Lefever Jr. of Hazel Park, Michigan, in Horwood Township, Porcupine Mining Division, NTS 41 O/16. The claims are numbered specifically S25337, 25339, 25391, 25392, 25394 to 25396 incl. and S42547 of which the surface rights are numbered separately as S25425. The claims are located in southwest Horwood Twp. straddling the south arm of Horwood Lake, south of Hardiman Bay (See Fig. 1). Diamond drilling commenced in February 1984 on 10 vertical AQ holes proximate to the underground workings. The drilling was planned to test the west and north extension of veins present underground. Veins of fair width were disclosed by the drilling in their inferred positions. Drilling was completed in early March 1984 (with total footage of 3642.5'). It is recommended ground investigations begin in June, preliminary to further work.

ACCESS

The Tionaga property is south of the entrance to Hardiman Bay on Horwood Lake and may be reached by five miles of good gravel road east of the Orofino Mine site. The Orofino workings are accessible by the Lesage Timber road, presently being up-graded by the Ministry of Natural Resources, from its northern terminus at Ivanhoe Lake Road and its junction with Highway 101 (the Timmins/Chapleau highway), 70 miles west of Timmins. An alternate route to the Tionaga Property is via Highway 101 to Palomar (50 miles west of Timmins) and thence by water from the north end of Horwood lake at the dam for 15 miles to the property.

PREVIOUS WORK

Gold was discovered in a massive east trending quartz vein on the east shore of Horwood Lake south of the west entrance of Hariman Bay, by W. Smith in 1933. The 30" vein assayed .75 oz Au/ton. After trenching and further

sampling, claim S25339 and adjacent claims were optioned by Hollinger Mines in 1935. Sinking of an inclined 45° shaft, following the vein, was completed in 1936 at 599'. Three levels, at 200', 352' and 570' were cut and limited drifting was done. After extensive underground sampling and diamond drilling, several small ore shoots were outlined. Hollinger dropped the option after drilling three long surface holes to intersect the vein at depth.

Tionaga Gold Mines was incorporated in 1937 and proceeded with shaft deepening to 731' with two additional levels. An amalgamation mill on site processed 6,653 tons of ore and produced 2,299 oz of Au and 404 oz Ag for an average Ag:Au ratio of 1::5.7. (1) From 1939, the property was essentially dormant until the Orofino Resources Ltd. option in 1983.

GENERAL GEOLOGY

A thick sequence of amygdaloidal pillowed andesitic flows with massive central segments, minor interlayered tuffs and pyroclastics is cut by thin lamprophyre dykes. The succession of flows abut against a quartz feldspar porphyry on the north. Some porphyries have been interpreted as dykes but may only be irregularities in the cupola margins. Quartz veins postdate the flows and porphyry. The quartz veins are frosted white and relatively pure with sharp contacts and generally minor sulphides. Innumerable thin shears appear in the drill core and many contain a greater quantity of sulphides then the usual background amount, but are devoid of gold.

Andesite

Intermediate to basic flows average 30' in thickness with pillowed amygdaloidal tops. Pillows contain prominent white amygdules which are more abundant near margins and a 5 to 10 cm. selvedge consisting of lithic fragments,

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(1) Breaks, F.W.
1978: Geology of the Horwood Lake Area, P. 46-47
Ontario Geological Survey; G.R. 169

laplli, and spherulites cemented by lithic alteration products. The central portion of the flow is massive, homogeneous and more coarsely crystalline than peripheral phases. The matrix of the andesite is a subophitic array of epidotic, subhedral feldspar and chloritic amphibole with the usual profusion of epidote, carbonate and minor accessories associated with metamorphosed andesitic flows of the 'greenschist facies'.

Quartz Feldspar Porphyry

The subterranean form of this intrusion is unknown. It has classic petrological textures of a dyke but the extent and quantity of porphyry encountered in drilling indicate an intrusion of larger dimension. A puzzling feature is that it does not change in character or texture with the intersection of large masses but retains the fabric of a dyke-like body. The porphyry consists of a profusion of coarse subhedral white to grey feldspar and lesser individual quartz augen set in a fine grey mesostasis with chlorite schlieren. The presence of feldspar phenocrysts of uniform size to the contacts suggest the injection of a plastic cyrstal mush in which most constituents had already crystallized and flowed in a fine felsic medium which provided the mechanism of emplacement exactly as registered by many porphyry dykes.

Lamprophyre

The lamprophyre is usually very fine grained, medium grey colour and contains corroded, altered, mafic phenocrysts, commonly amphibole, partly altered to chlorite, and biotite. The matrix is a fine feldspar mix with interspersed wisps of mafic minerals imparting a muddy appearance to the fabric. These near vertical dykes are of small thickness but persist to depth so that the same dyke may be intersected several times in a vertical drill hole.

DIAMOND DRILLING

The drill program was accomplished from February 15 to March 10/84 by Morrissette Drill Contractors and took advantage of ice conditions allowing easy mobility over Horwood Lake proximate to old workings. The drill site was investigated by the Ontario Ministry of Environment. Plastic sheets were laid below each drill site on the lake ensuring no contaminants remained on the ice. Waste water was pumped from the site into the old inclined shaft. Selected core was split and shipped to Bell-White Laboratories in Haileybury. The core from all holes is stored at the Orofino Resources Mine site. A summary of drilling and main results is outlined below.

	PURPOSE OF DRILLING	RESULTS
Hole #1	was designed to explore the west extension of the 570' level west vein	intersected vein at 488.6', subore but high Ag:Au ratio of 74::1
Hole #2	was spotted to explore the 570' west vein 50' north and further downdip	intersected vein at 547', barren
Hole #3	test of 570' vein in the plane of the inclined shaft	intersected two veins at 413' and 437.5' vertical depth with values from barren to .002 Au
Hole #4	located to test 570' vein 140' east of the shaft at 431.5'	the 570' vein assayed 2.3 oz Ag over 1.5' for an Ag:Au ratio of 385::1. Two additional veins intersections at 104.7 and 271.6 assayed .12 and .14 Au.
Hole #5	intersected the 570' vein below the 325 level to the east of the shaft	the vein was nearly barren at 278' vertical depth
Hole #6	set 100' west of #5 and close to the shaft	intersected nothing of interest, not even a barren vein, structure cut out.
Hole #7	on the lake ice probed the west vein above the 570' level	several proximate veins from 270 to 295' gave trace values
Hole #8	was located to test the west vein 50' horizontally up dip from #7	a significant .38 oz Au over 5' at 229' vertical
Hole #9	to the east of #8 was abandoned due to the intersection of a shear zone with pinching schist around rods	
Hole #10	A recollaring of #9, 10' to east, testing the updip extension of the vein previously probed by Holes 1, 2, 7 and 8.	hole intersected, vein but subore over 4.7' at 105.1'

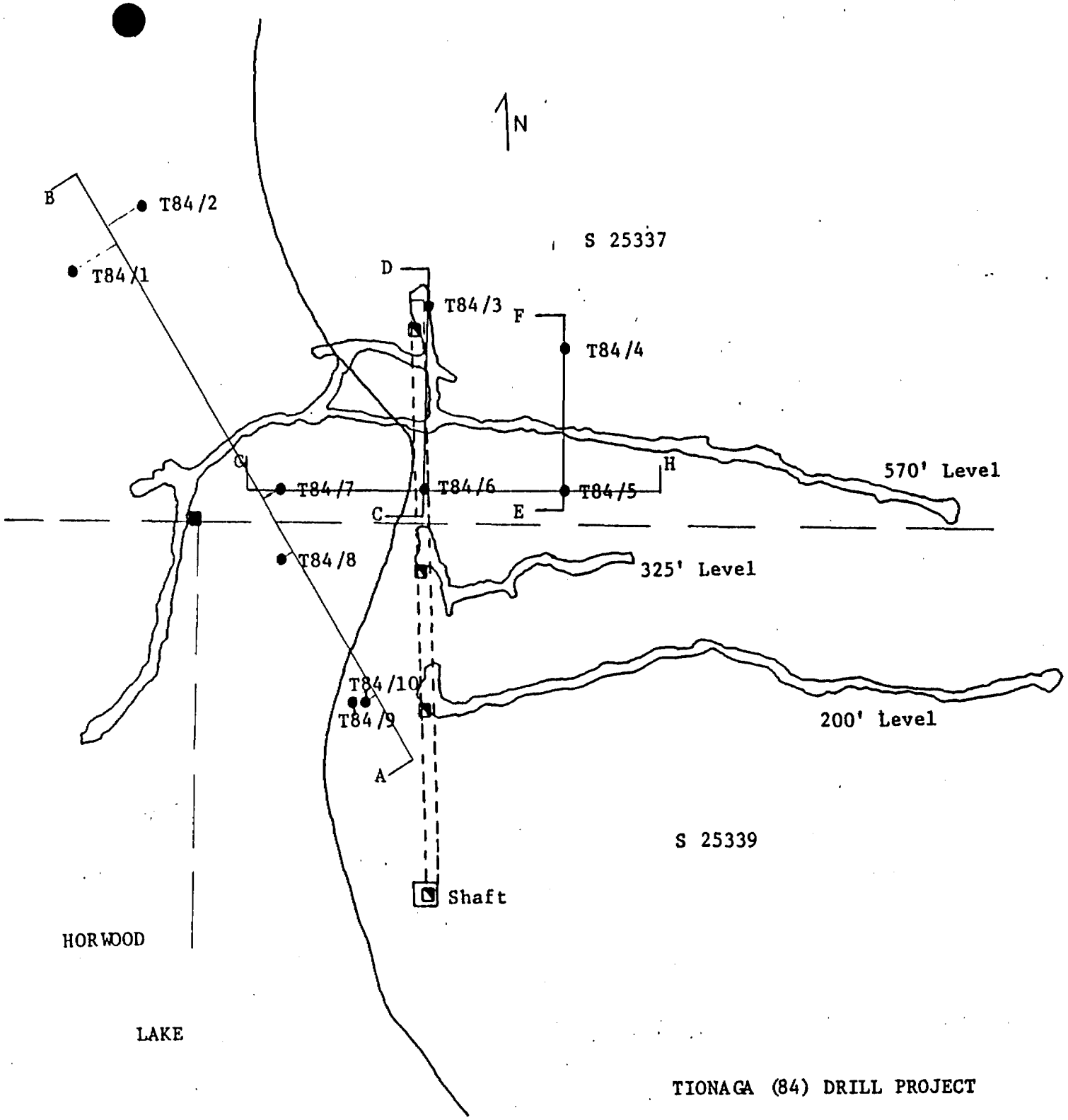
DISCUSSION AND CONCLUSIONS

The 1984 program suggests that the vein retains its characteristic 'spotty' nature of values and that the ratio of silver to gold becomes greater on the extensions to depth and to the west. This is a vital facet when evaluating the wisdom of further drilling to the west. The thick porphyry encountered north of the shaft, indicates proximity to a major intrusive, although petrologically unique, which mitigates against enrichment within the vein. Too close a proximity to source invariably indicates a diminution in values and strength of vein.

The vein, while persistent, contains many more barren segments than gold bearing. It is considered that any future attempt at mining the veins would be fraught with uncertainty and definable ore reserves could never be a reality. The deposit might lend itself to a scavenger operation from existing workings with uncertain predictability. The absence of the existence of shoots of sufficient grade would mitigate against the probability of profit.

In consideration of further drilling, any attempt to locate exploration holes further to the west will probably find a steep decline in the surface contour of the bedrock and a corresponding increase in overburden thickness, As a major shear probably runs the length of the bay it is much more difficult and expensive to test the zone further under the lake by drilling.

To the east of the shaft, the structure can be considered as open and some surface observations will suggest the potential for further work there. We do not have a surface geologic map of the land area nor records of sampling or of the abundance of old trenches. Therefore, it is proposed this be accomplished before a final appraisal of the property potential be made. Such a program, in summer 1984 would not only investigate the surface indications of the extent of the main vein but also parallel structures above it, whose presence is suggested by Drill hole #4.



TIONAGA (84) DRILL PROJECT

PROJECT #423

Plan of underground workings relative to hole locations and cross-sections.

Scale 1 in = 100 ft May 1984

R. Vail

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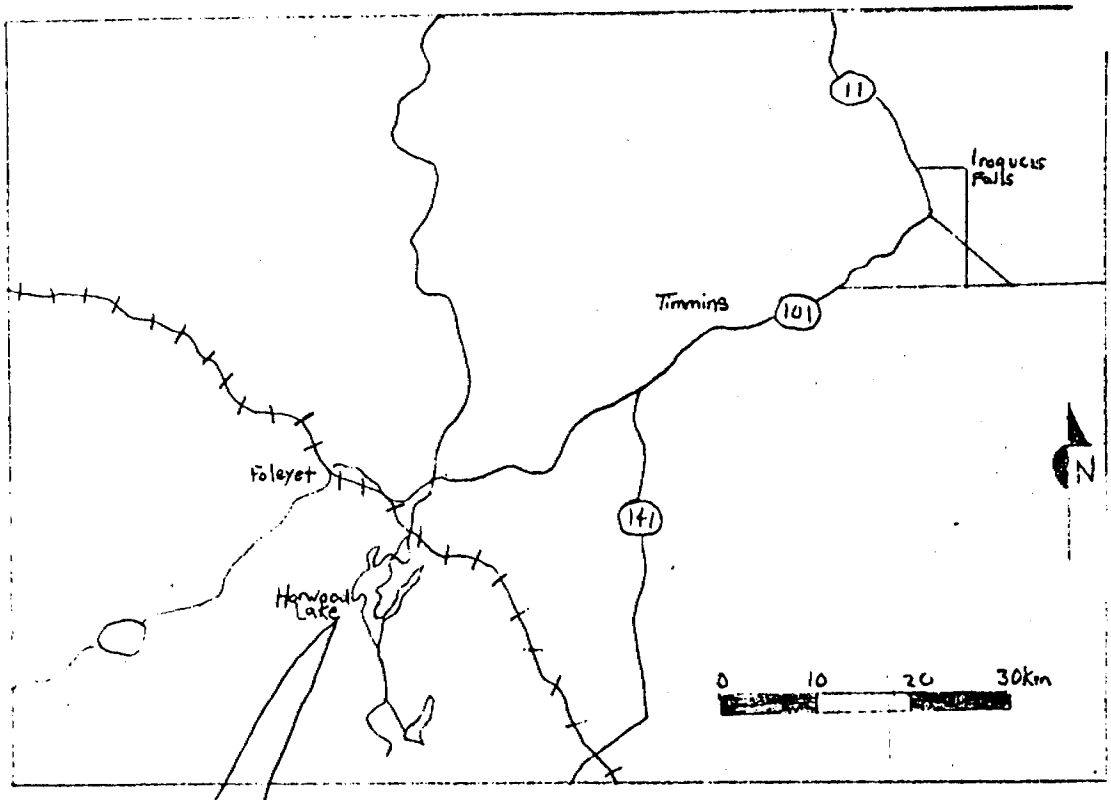
Fig. 1

Tionaga Pa[redacted]nt Claims

Location Map



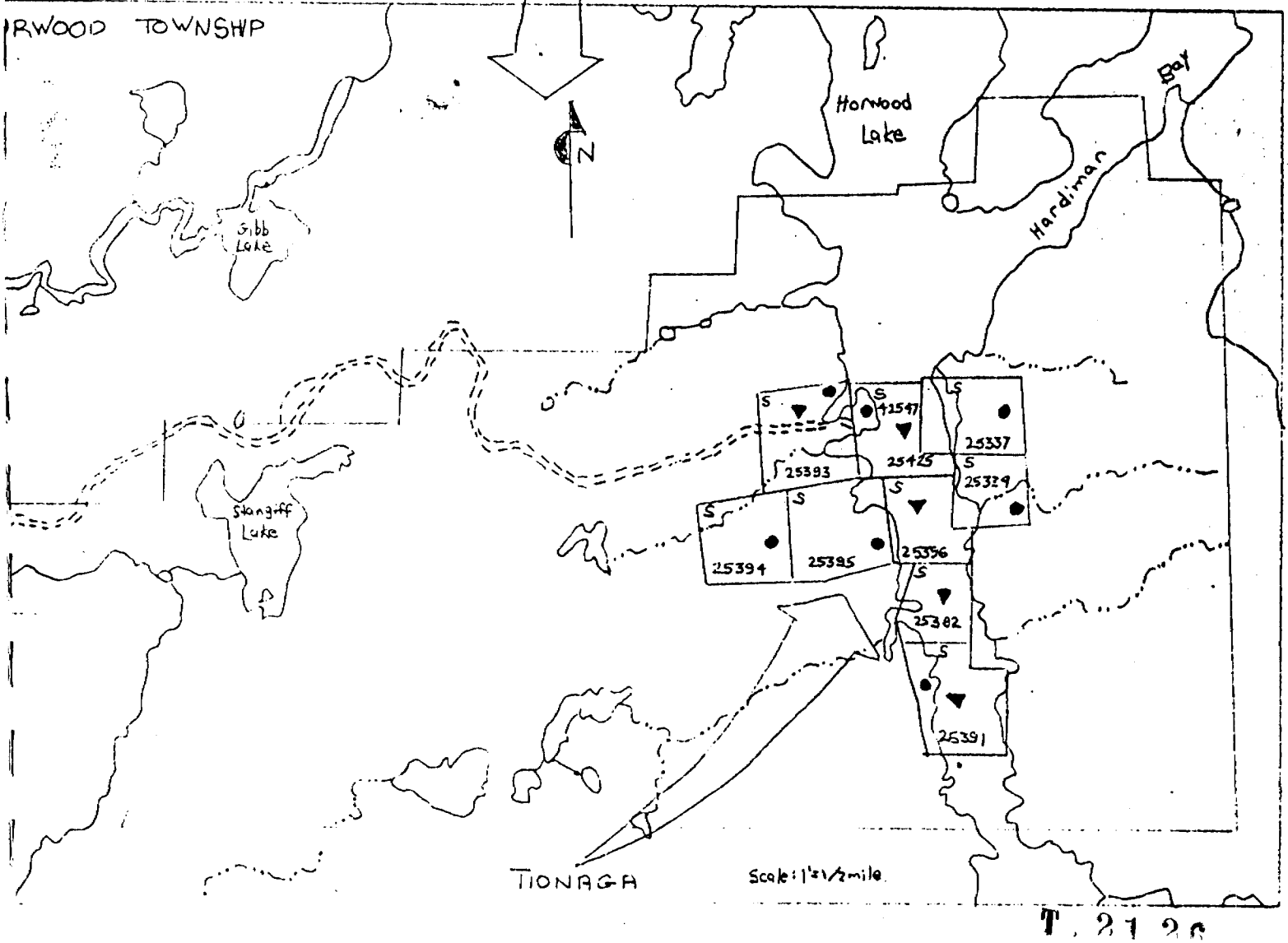
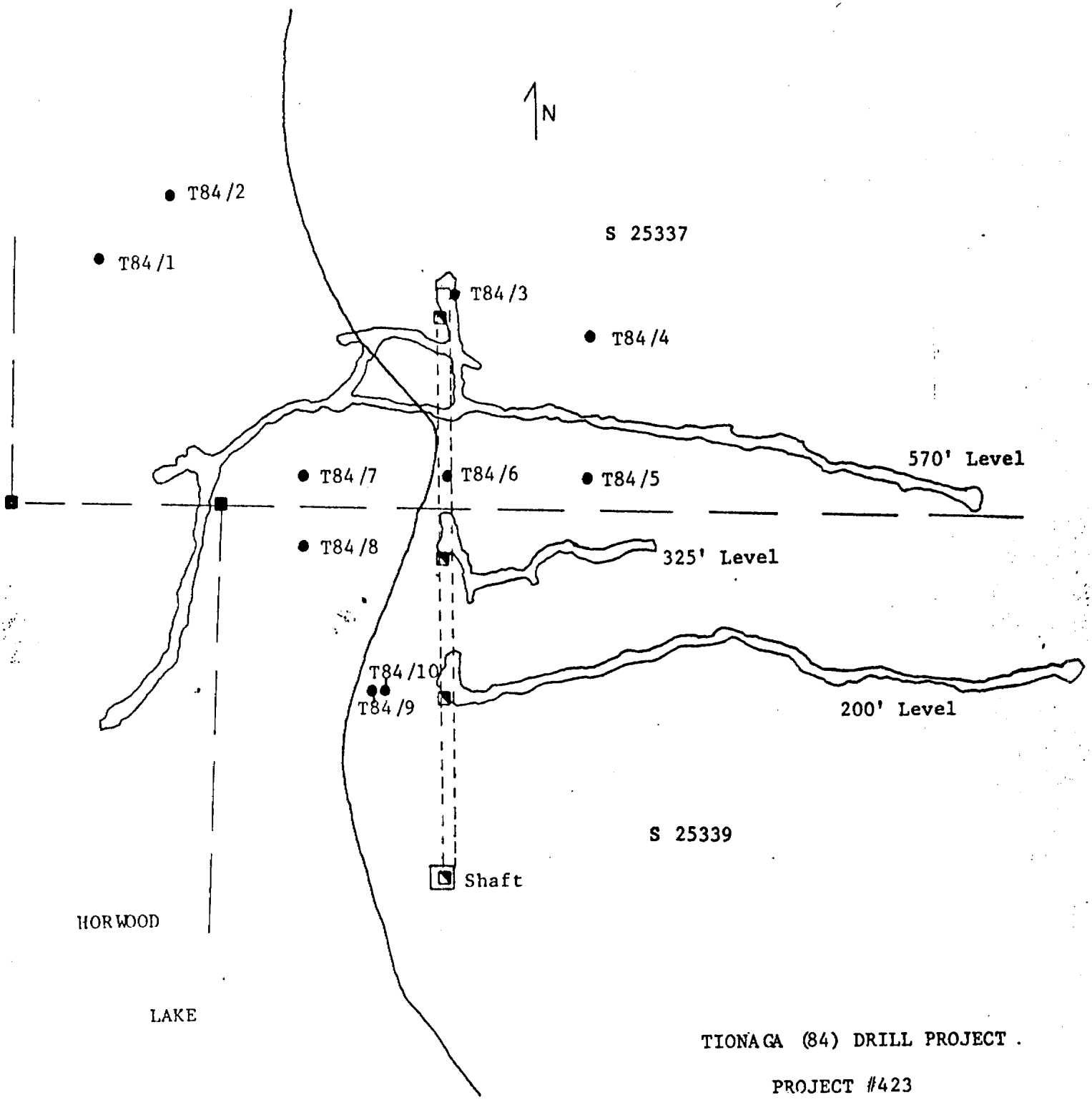


Fig. 2



TIONA GA (84) DRILL PROJECT .

PROJECT #423

Plan of underground workings relative to hole locations.

Scale 1 in = 100 ft May 1984

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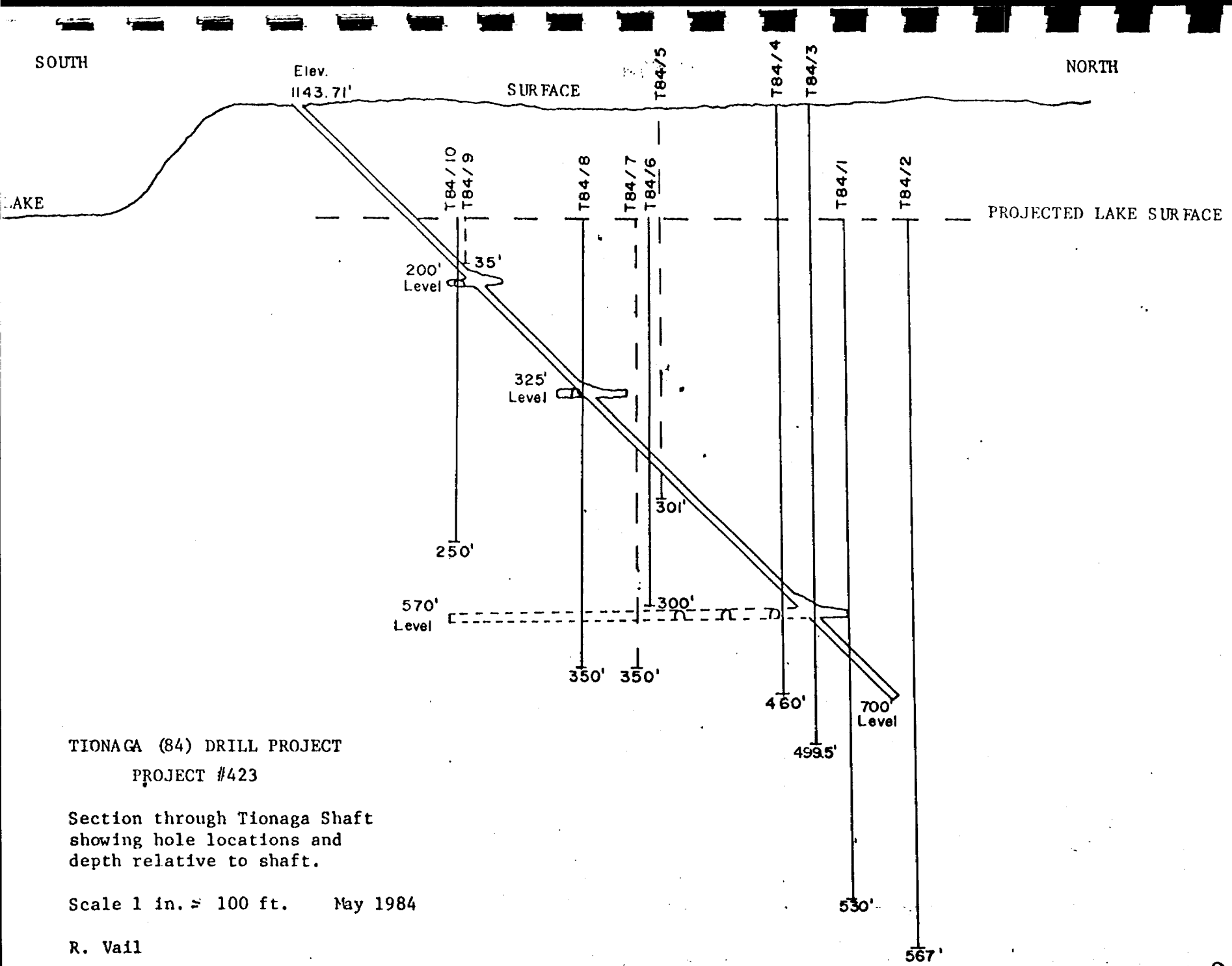
T. 21 26



TIONAGA (84) DRILL PROJECT

PROJECT #423

Section through Tionaga Shaft showing hole locations and depth relative to shaft.

Scale 1 in. = 100 ft. May 1984

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Fig. 3

Fig. 4

TIONAGA OPTION DRILLING PROGRESS - 1984

HOLE NO.	LOCATION N	LOCATION E	COLLAR Bearing	COLLAR Dip	CORE SIZE	DEPTH (ft)	CUM LENGTH in feet	CLAIM NO.	DATE Start	DATE Finish	COMMENTS
423-84-1	5300	4800	--	-90^0	AQ	530'	530'	S25337	Feb.19	Feb.22	QV 6% Sulphides (Py, Cpy, Ga), 488.6-491.2 (2.6' T. Width) o/b 24' to 74'
423-84-2	5350	4850	--	-90^o	AQ	567'	1,097'	S25337	Feb.22	Feb.25	QV minor Py, 547.5-553.0 (3.0' T. Width) Vein surrounded by silicified QFP o/b 26' to 38'
423-84-3	5275	5050	--	-90^o	AQ	499.5'	1,597'	S25337	Feb.25	Feb.28	QV in QFP: 409.0-415.0 (4.0' T. Width) bedrock setup
423-84-4	5250	5150	--	-90^o	AQ	460'	2,057'	S25337	Feb.29	Mar.2	QV in QFP: 430.0-440.0 (7.0' T. Width); minor py + Ga o/b 30'
423-84-5	5150	5150	--	-90^o	AQ	301'	2,358'	S25337	Mar. 2	Mar. 3	QV, minor py 278-282' o/b 30'
423-84-6	5150	5050	--	-90^o	AQ	300'	2,658'	S25337	Mar. 4	Mar. 5	QV not present o/b 10'
423-84-7	5150	4950	--	-90^o	AQ	350'	3,008'	S25337	Mar. 5	Mar. 7	QV, minor pyrite, 270-271, 272-276, 284-285, 289-295 o/b 22' to 38'
423-84-8	5100	4950	--	-90^o	AQ	350'	3,358'	S25339	Mar. 7	Mar. 8	QV, minor pyrite, 228-234, 238-241 o/b 24' to 60'
423-84-9	5000	5000	--	-90^o	AQ	35'	3,393'	S25339	Mar. 8	Mar. 9	abandoned when rock stuck o/b 10'-26
423-84-10	5000	5010	--	-90^o	AQ	250'	3,643'	S25339	Mar. 9	Mar.10	QV, minor values, little py, 105.1-109.8; matching values in contact volcanics at both margins o/b 5' to 22'

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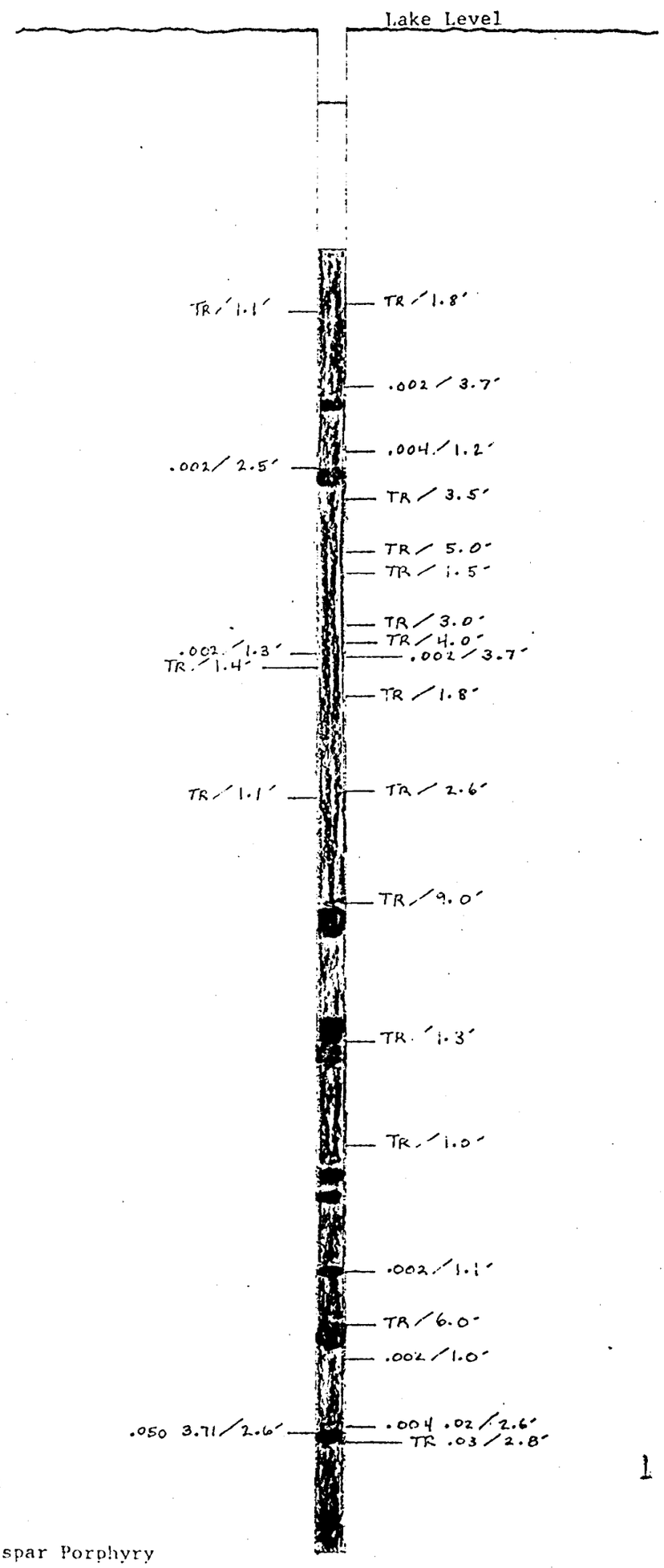
TIONAGA ('84) DRILL PROJECT

N

DRILL SECTION #1



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au (Ag) / footage

Scale 1 in = 50 ft May '84

R. Vail

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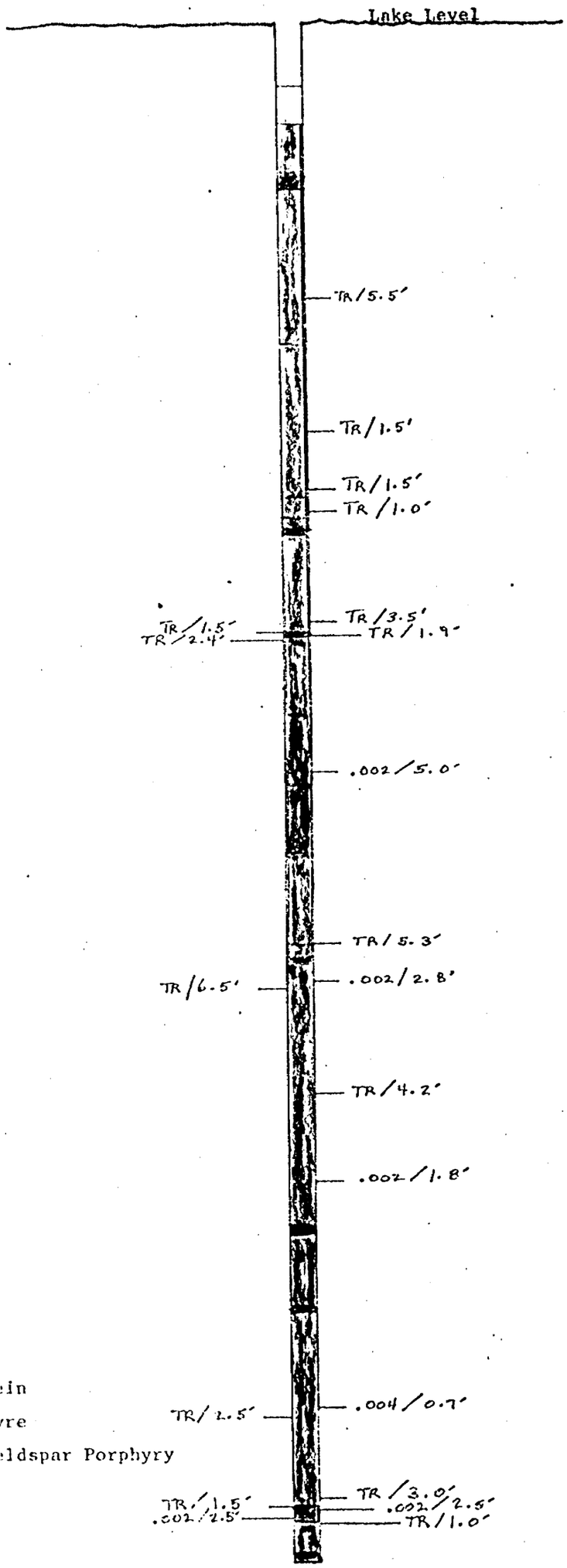
TIONAGA ('84) DRILL PROJECT

DRILL SECTION #2

S

N



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au (Ag) /footage

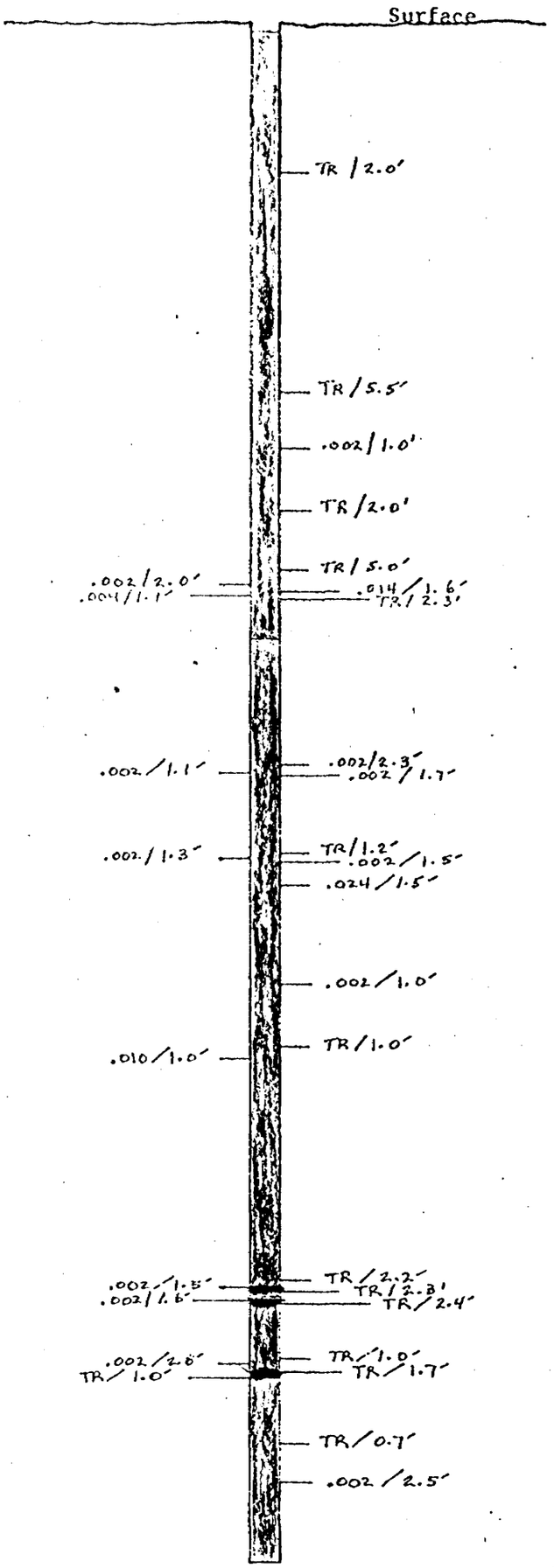
Scale 1 in = 50 ft May '84

R. Vail

T 2128

TIONAGA ('84) DRILL PROJECT

DRILL SECTION #3



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au (Ag) / footage

Scale 1 in = 50 ft May '84

R. Vail

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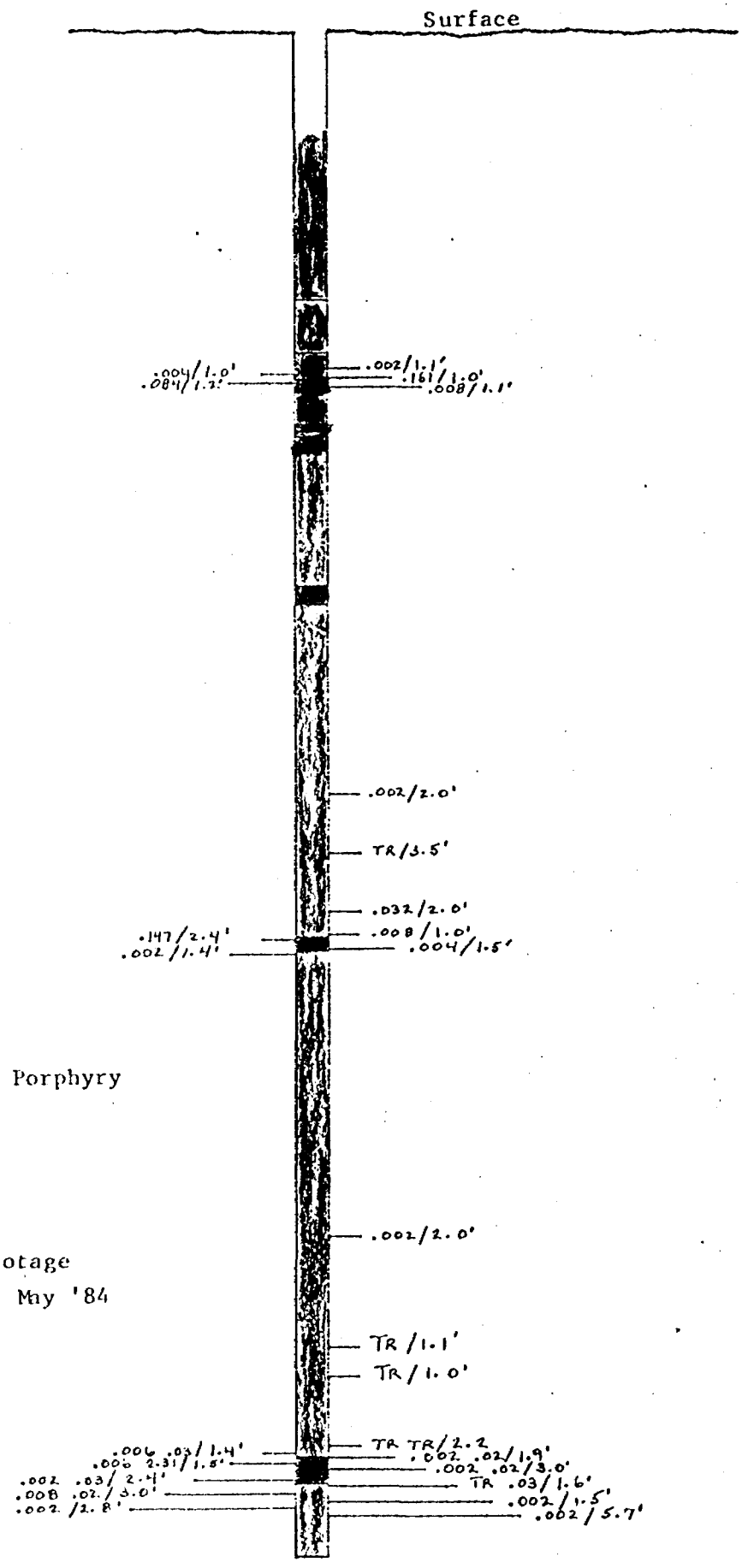
TIONAGA ('84) DRILL PROJECT

DRILL SECTION #4

N



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au(Ag) / footage

Scale 1 in=50 ft May '84

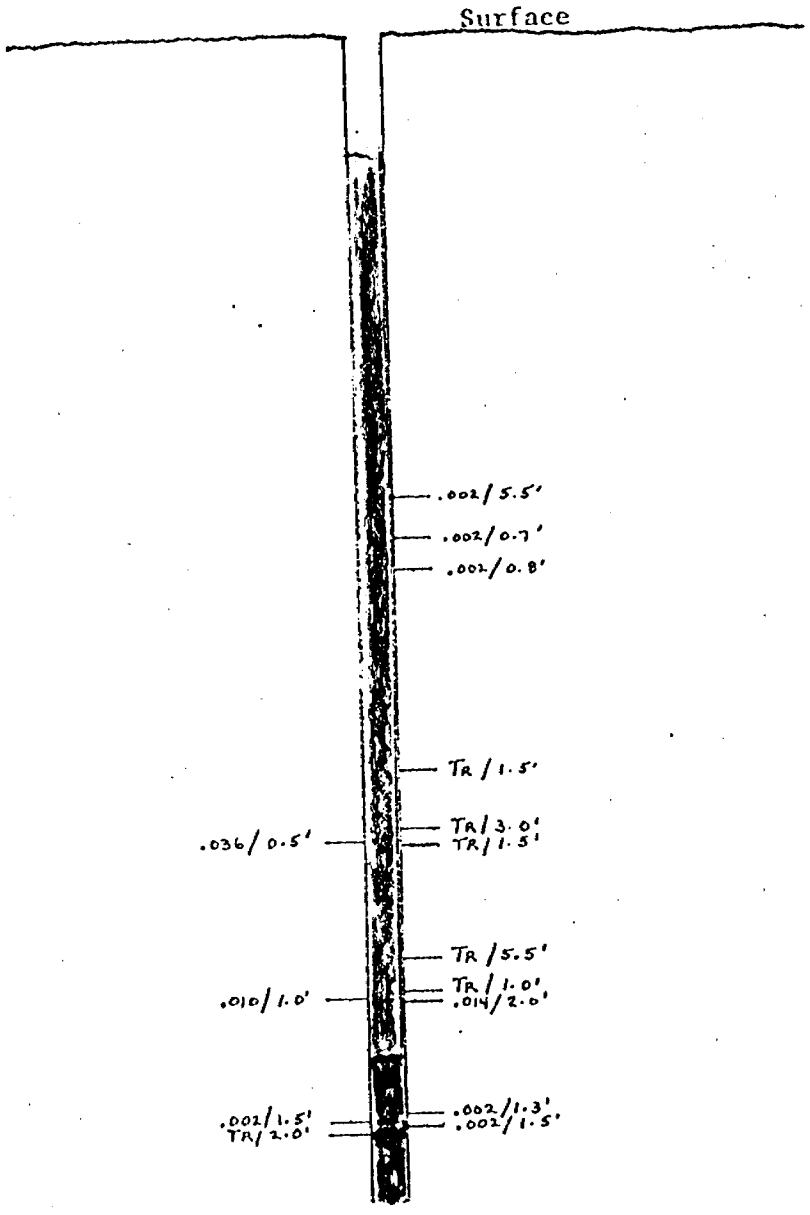
R. Vail

T. 21 26

TIONAGA ('84) DRILL PROJECT

DRILL SECTION #5

N



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au (Ag) / footage

Scale 1 in = 50 ft My '84

R. Vail

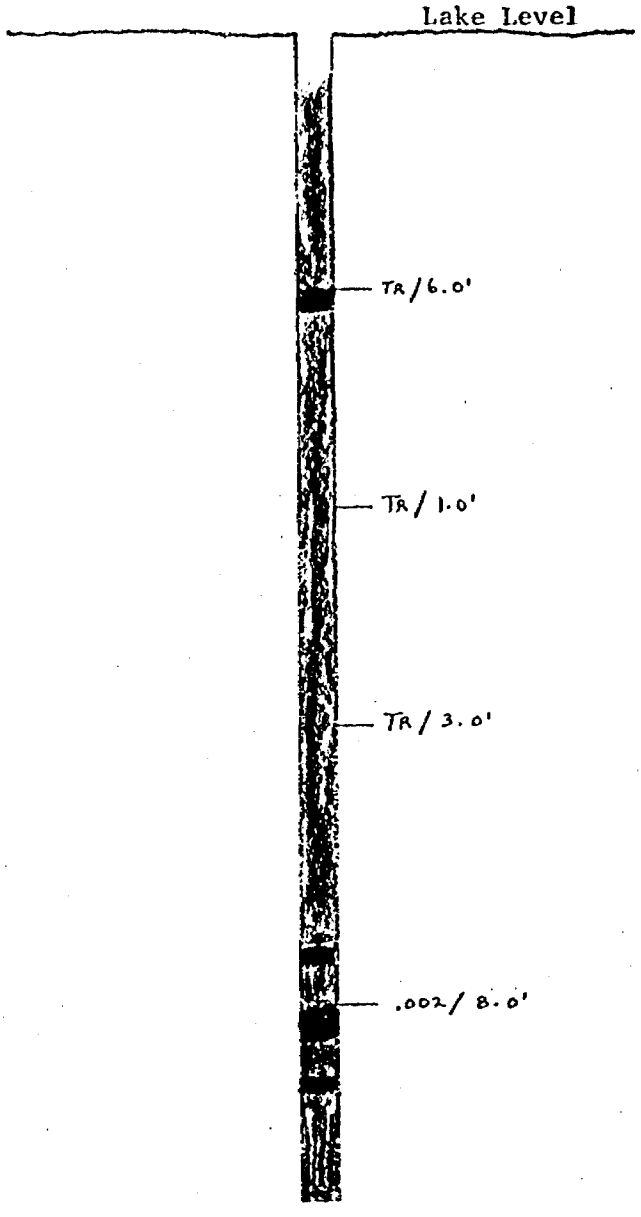
T.2126

TIONAGA ('84) DRILL PROJECT

DRILL SECTION #6

S

N



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au (Ag) / footage

Scale 1 in. = 50 ft May '84

R. Vail

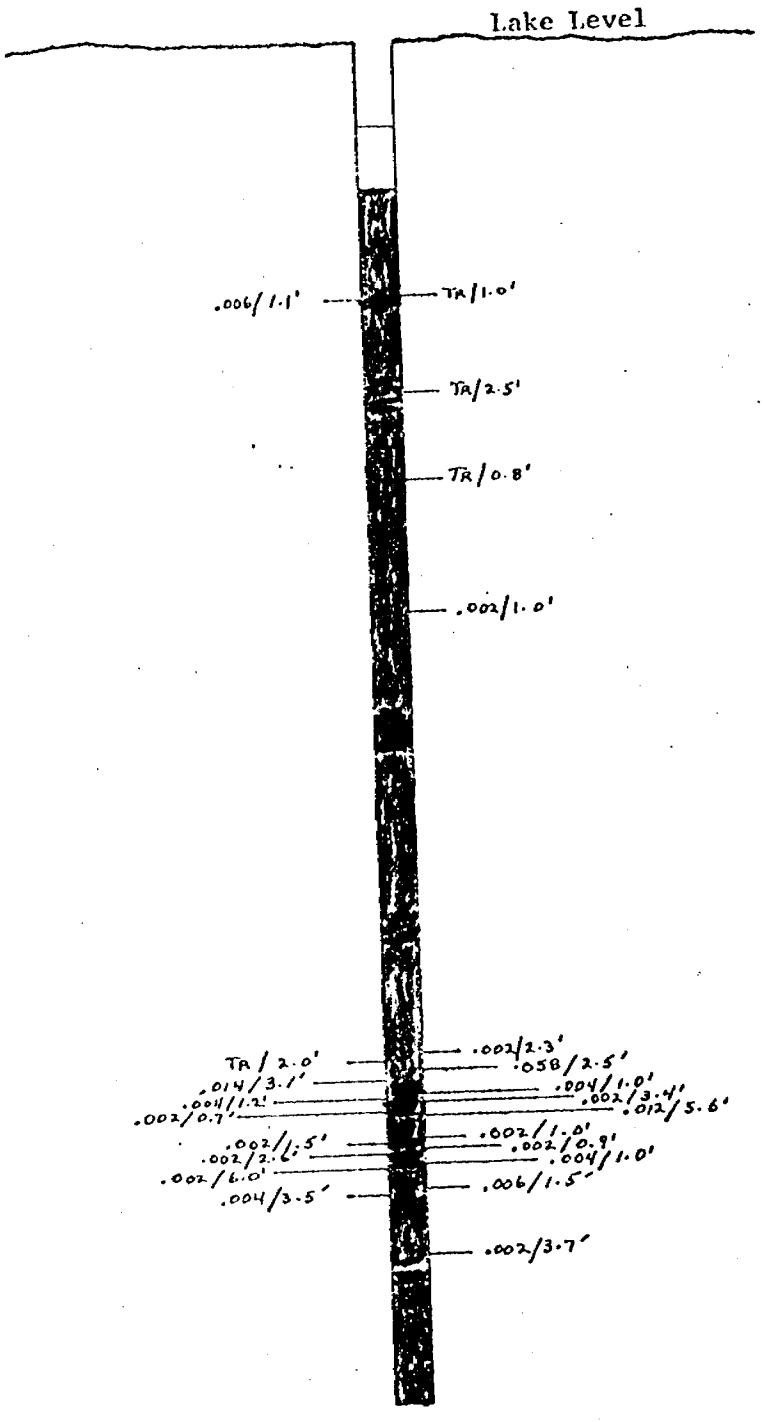
T.2128

TIONAGA (1984) DRILL PROJECT

DRILL SECTION #7

S

N



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au (Ag) / footage

Scale 1 in = 50 ft May '84

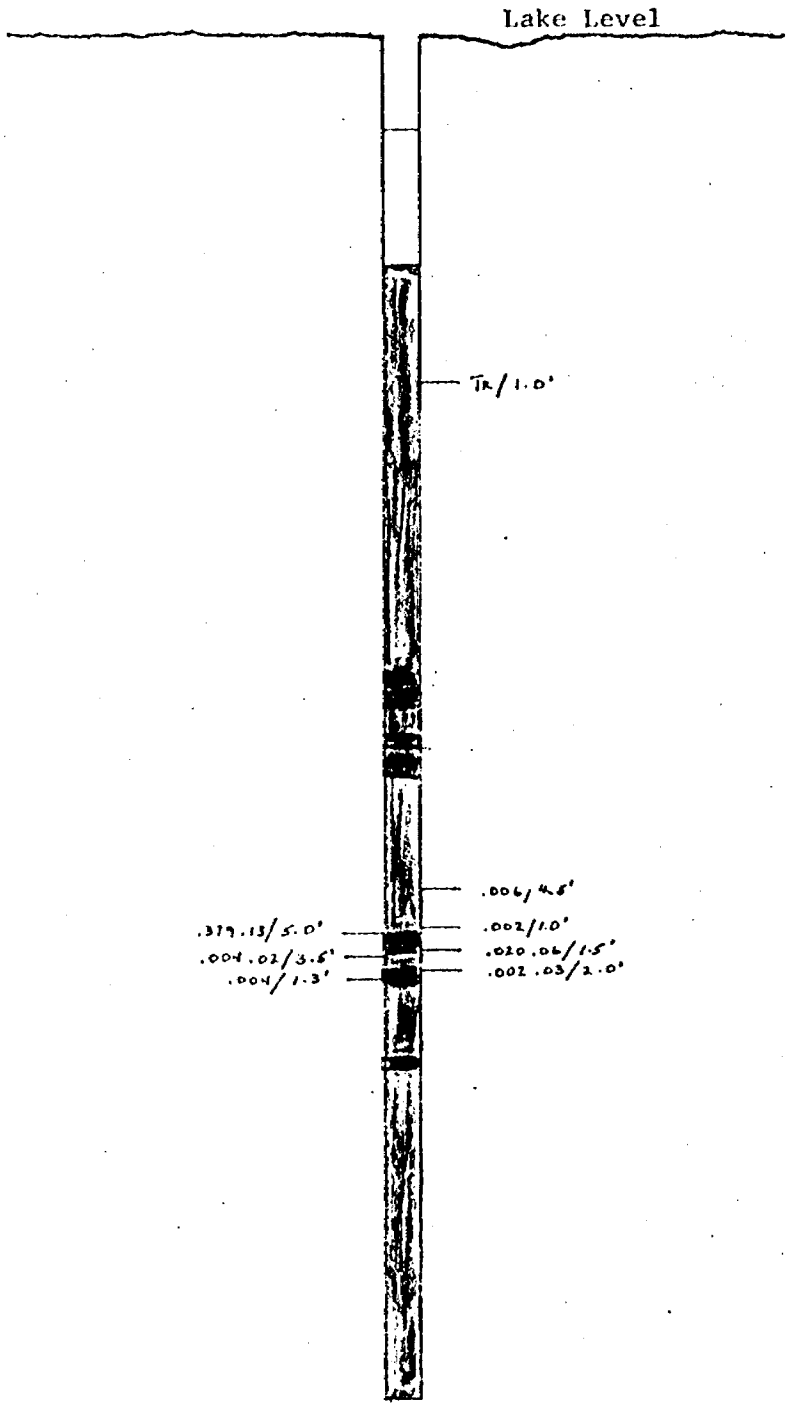
R. Vail

T 2126

TIONAGA ('84) DRILL PROJECT

DRILL SECTION #8

S N



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au (Ag) / footage

Scale 1 in. = 50 ft. May '84

R. Vail

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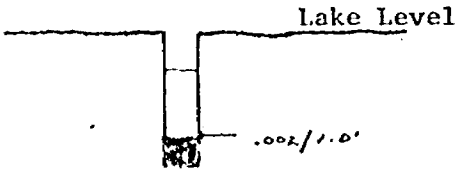
TIONAGA ('84) DRILL PROJECT

DRILL SECTION #9

S

N



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au (Ag) / footage

Scale 1 in. = 50 ft. May '84

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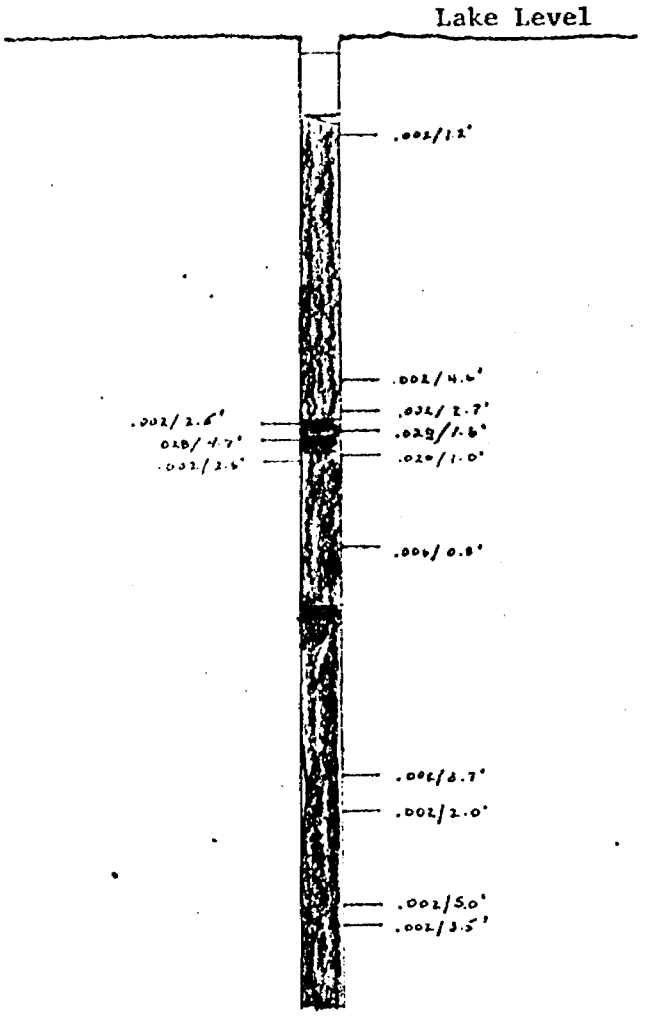
TIONAGA ('84) DRILL PROJECT

DRILL SECTION #10

S N



LEGEND

- Quartz Vein
- L - Lamprophyre
- P - Quartz Feldspar Porphyry
- T - Tuff
- A - Andesite

value oz. Au(Ag) / footage

Scale 1 in. = 50 ft. May '84

R. Vail

T. 21 26

OROFINO RESOURCES LIMITED

Property: Tionaga
Location: Norwood Lake
Co-ordinates: P.C. 5200N 4800E

Section:
Length: 530'
Elevation: Lake Level
Azimuth: -0- Dip: 90°

HOLE: T-84-1
Core size: AQ

Dip Tests: 530' -84°
Started: February 20/84
Completed: February 22/84
Logged by: Warren Gilman

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au oz/t	ASSAYS Ag oz/t
0	24.0	WATER - NORWOOD LAKE						
24.0	74.0	CASING: FINE GREY CLAY (24'-72'),at 72' boulders fine grain ANDESITE to 73.4 pink amphibole granite (73.4-74.0)						
74.0	121.0	ANDESITE: med. grain, med. green, coarse epidotic feld. clots, amphiboles, epidote and leucoxene metacrysts, cb. clots, minor qtz segregations, fine py <1% epidote, cb. 3 to 5 mm. fractures with fine py, average 20°TCN, at 81' 2 cm. cb. fracture with trace cpy in rock matrix, thin cb. seams 3 mm. at 80°TCN with fine py, folt'n rock fabric appears 40 to 60°TCN; at 83' grades to finer grain (flow top) with coarse leucoxene subhedral relicts at upper Ct., at 89' qtz vein 3 cm. at 30°TCN (barren) 93.4-95.2 py disseminated, varisized subhedral 5% in med. grain cb't'd flow	8533	1.8	93.4	95.2	Tr	
		95.2-96.3 massive cb. (frond like wisps) 3 to 4 cm. widths 80°TCN, minor matrix py, vein is barren	8534	1.1	95.2	96.3	Tr	
		at 98' reverts to med. grain massive epidotic flow at 100' 1 cm. cb. clots and matrix py 5% over 5 cm. at 112.5' 1 cm. cb. fracture 10°TCN, 4 cm. with 5% disseminated py at 117.6 and 118.6' 1 cm. cb. fractures 10°TCN from 110 to 121' intermittent epidotic segregations as possible vestigial pillow rims						
121.0	124.7	TUFF: andesitic fine grain banded indistinct, 30°TCN, chl. laminae, interlayered cb. clots, wisps, 30-40°TCN 121.0-124.7 irregular segregations varisized 4% py, 1 m. cb. slips 10 to 80°TCN	8535	3.7	121.0	124.7	.002	
124.7	143.8	ANDESITE: coarse grain med. green epidotic, (central portion) pseudo diabasic, amphibole laths, mesostasis epidote, relict feld., skeletal leucoxene varisized random subhedral py to 3 mm., vague folt'n appears 30°-60°TCN						
143.8	149.5	TUFF-ANDESITIC: fine grain banded indistinct, matted chl. laminae, interlayered parallel wisps cb., clots and seams cb., 1% fine py, banding 45-50°TCN 143.8-145.0 qtz. cb. en echelon (parallel fronds) veins, (barren), matrix py 5%	8536	1.2	143.8	145.0	.004	

ORIOFINO RESOURCES LIMITED

Property:
Location:
Co-ordinates:

HOLE: J-SV-1
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILLING COMPANY:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au oz/t	Ag oz/t			
149.5	262.0	ANDESITE: med. grain, med. green, single shards amphibole in chl. epidote, cb. mesostasis, minute black crystals (possible magnetite), cb. threads random (lining fractures) sporadic 2 mm. py 2 to 4% disseminated, folt'n 45 to 55°, limonitic fractures									
		149.5-152.0 individual clusters 4% py, probable in situ crystallization	8537	2.5	149.5	152.0	.002				
		160.0-163.5 4 cm. cb. qtz, feld. barren vein, at 161.2 at 10°TCN, 4 to 5% matrix py	8538	3.5	160.0	163.5	Tr				
		178.0-183.0 1 cm. vertical cb. vein 3% coarse py, lone euhedral cpy, hematite crystals, and 4% disseminated matrix py 2 mm., folt'n 45 to 65°TCN	8539	5.0	178.0	183.0	Tr				
		186.0-187.5 1 cm. vertical cb. vein, essentially barren, trace py	8540	1.5	186.0	187.5	Tr				
		from 191.5 to 196.0 a porphyritic (relict cb'td feld. laths) flow (flow Ct. at 191.5) intermittent cb. qtz 1 cm. fractures throughout 10° to 80°TCN, many 45° (barren)									
		204.5-207.5 med. grain central part flow, qtz cb. fracture 4 cm. 80°TCN barren, matrix py 3 to 4% to 2 mm., several 4 mm. cb. fractures	8541	3.0	204.5	207.5	Tr				
		at 209.0 to 210.0 same porphyritic phase, cb'td feld., (possible pillow margins)									
		210.0-214.0 several qtz veins (barren) to 4 cm., 0° to 45°TCN (probable flow Ct. and top) at 3 cm. qtz vein, 212.5 (sampling combined between flows)	8542	4.0	210.0	214.0	Tr				
		214.0-215.3 very fine grain chloritic flow top, folt'n 50°TCN, qtz (fractured) with cb. cementing qtz., some clustered vein py, mainly barren vein	8543	1.3	214.0	215.3	.002				
		215.3-219.0 med. grain central portion of flow or interior of pillow 4% matrix py	8544	3.7	215.3	219.0	.002				
		219.0-220.4 en echelon multiple qtz. cb. vein 40°TCN, light shear fine matrix py, lenticular py blebs to 2 cm.	8545	1.4	219.0	220.4	Tr				

OREFINO RESOURCES LIMITED

Property:
Location:
Co-ordinates:

HOLE: T-84-1
Core size:

DRILLING COMPANY:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au oz/t	ASSAYS Ag oz/t
		149.5 - 262.0 (con't)						
		from 224.0 to 229.0 porphyritic phase 5 mm. to 1 cm. cb't'd feld. in fine to med. grain matrix, (pillow selvedge or horizon in flow ?) 4% sulphides						
		229.5-231.3 qtz cb. 4 cm. vein (cb. cementing fractured qtz.), 4% matrix py in med. grain flow	8546	1.8	229.5	231.3	Tr	
		231.3-262.0 med. grain massive flow, threaded with thin irregular minor cb.						
262.0	301.0	ANDESITE: fine grain apple green epidotic amygdaloidal flow with upper 3' roapy very fine grain contorted swirled surface, minor py -- uniform amygdaloidal epidotic 60°TCN						
		262.0-264.6 elongate lumps fine grain lighter colour phase with sericitic inter fragment fill, 2% fine py	8547	2.6	262.0	264.6	Tr	
		264.6-265.7 qtz vein, minor cb. seams red cb., 60°TCN, minor 2% py, trace cpy	8548	1.1	264.6	265.7	Tr	
		at 269.0' brecciated matrix to 272 cemented with later cb.						
301.0	310.0	TUFF: fine grain, light to med. green, en echelon cb. lenses in epidotic chloritic banded matrix, 45° to TCN, some cb. qtz lenses parallel bedding						
		301.0-310.0 scattered py sporadic in cb. lenses, average 2%, minor secondary cb. fractures	8549	9.0	301.0	310.0	Tr	
310.0	340.6	ANDESITE: med. grain pale green, varisized amygdules, white cb. usually with fine epidotic rims, matrix of chl., cb., epidote, blackish inclusions, probably amphibole, 5 mm. to 1 cm. qtz cb. fractures, fine sporadic py, hematite cb. threads folded, variable folt'n, local fold (variable folt'n) exaggerates thickness of amygdaloidal unit, prevailing folt'n and amygdule orientation 45°TCN, at lower Ct., amydules 80°TCN, at 335' cb. fracture with disseminated cpy						

T. 2128

OROFINO
RESOURCES LIMITED

Property:
Location:
Co-ordinates:

HOLE: T-84-1
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au oz/t	Ag oz/t
340.6	350.6	LAMPROPHYRE: matrix very fine grain, tan-grey-silicified, chloritic schlieren after amphibole, 20% of matrix, cb. threads in later fractures, both Cts 80°TCN						
350.6	358.0	TUFF-LAPILLI TUFF-AGGLOMERATE-AMYGDALOIDAL ANDESITE: epidotic pot-pourri of tuff, fragmental tuff, thin amygdaloidal fine grain pale green flow and vague larger epidotic 5 cm. bombs in darker green matrix, sporadic varisized py., tuff bedding 45°TCN, amygdules 50° to 60°TCN, local thickening (folding) segments folt'n 80 and 90°TCN						
		350.6-351.9 qtz. cb. feld. fractured vein, tuffaceous, chloritic, tr py	8550	1.3	350.6	351.9	Tr	
358.0	395.7	ANDESITE: fine to slight med grain, pale green, strongly amygdaloidal, white cb. with wisps hematite, 5 mm. to 1 cm. amygdules with pale epidotic rims, no sulphides, thin cb. threads in fractures with trace cpy, hematite, intermittent 5 cm. ragged cb. segregations with 5% py pillow selvedges often with minute bedding (plastic flow) within amygdaloidal flow						
		387.0-388.0 multiple en echelon qtz. cb. dyke with interlayered chl. laminae, trace py trend of flow feolt'n and numerous pillow selvedge average 45°TCN	8551	1.0	387.0	388.0	Tr	
395.7	400.2	LAMPROPHYRE: same as 340.6-350.6; strong silicic, chloritic schlieren impart porphyritic imprint on matrix, Cts 70°TCN						
400.2	401.6	ANDESITE: amygdaloidal pale green epidotic flow, fine grain						
401.6	405.3	FELDSPAR PORPHYRY: med. grain grey ultra silicic feld. porphyry, anhedral grey phenocrysts in fine grey mesostasis with minute schlieren chl. after amphibole (entirely unlike any feldspar from Orofino) trace py, crs random, Cts 45°TCN, phenocrysts 25% of rock fabric						
405.3	431.4	ANDESITE: amygdaloidal, varisized 2 mm. to 1 cm. white cb. amygdules, pale fine grain matrix, sporadic py trains parallel folt'n, usually with 5 cm. pillow selvedge, 45° to 60°TCN						
431.4	432.5	TUFF: en echelon cb. beds with interlayered cbhl. laminae, delicately banded, 5% py with cb.						
		431.4-432.5 4% py only with cb. lenses in trains parallel bedding, ave 1% in cb.	8552	1.1	431.4	432.5	.002	

DENISON MINES LIMITED

Property:
Location:
Co-ordinates:

HOLE: T-84-1
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au oz/t	ASSAYS Ag oz/t
432.5	450.0	ANDESITE: fine grain pale green amygdaloidal (white cb. amygdules) flow top to 440' (amygdules parallel folt'n 45°TCN) to 444.5 med. grain central portion of massive featureless central part of flow, an interflow Ct. at 444.5 with massive med. grain featureless flow with trace py to 450.0						
450.0	458.0	TUFF: delicately banded vari-coloured (shades of pale green) at 30°TCN with interlayered cb. beds 450.0-456.0 trace py in delicately banded andesitic tuff with sporadic thin cb. lenses	8553	6.0	450.0	456.0	Tr	
458.0	488.6	ANDESITE: pillowed fine and med. grain lava, intermittent pillow selvedge usually 5 cm. of fragmented margins with similar fabric to lapilli tuff usually with very fine grain central portion and med. grain segments pocked with fine pods cb. on either side of selvedge, usually some py concentrated in selvedge, only trace in main matrix, variable but folt'n average 45°TCN minor short amygdaloidal segments 462.0-463.0 carbonated fragmented pillow selvedge 5% py, pods massive cb.	8554	1.0	462.0	463.0	.002	
		486.0-488.6 fine grain pillow selvedge with some tuff lenses and amygdaloidal fine grain flow, a 5 cm. qtz vein, -45°Cts, with cb. margins (barren), 1% matrix py in flow	8555	2.6	486.0	488.6	.004	.02
488.6	491.2	QUARTZ VEIN: minor small irregular cb. schlieren, upper Ct. 10°TCN, lower 60°TCN, denditric 1 to 2 mm., trains of sulphides, py, cpy, galena ratio 6:py:2: gna:1:cpy 488.6-491.2 sulphides 8% of total mass of vein, moly. in blebs to 3 or 4 mm.	8556	2.6	488.6	491.2	.050	3.71
491.2	530.0	ANDESITE: to 494.0'; fine grain tuffaceous flow top, interlayered cb. delicate banding 45°TCN, grading to med. grain massive cb't'd central portion of flow 491.2-494.0 tuffaceous pillow selvedge 2% py, threaded by en echelon cb. parallel folt'n	8557	2.8	491.2	494.0	Tr	.03
		massive med. grain flow to 520, from 520 to 530 fien grain flow top, uniform, massive, some cb. threading, a 4 cm. massive cb. fracture at 522 (barren), trace py in fine grain and med. grain massive portions of flow, folt'n 45°TCN						

T. 21 20

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property: Tionaga
Location: Horwood Lake
Co-ordinates: P.C. 5350N/4850E

Section:
Length: 567'
Elevation: Lake Level
Azimuth: -0- Dip: -90°

HOLE: T-84-2
Core size: AQ

Dip Tests: 567' -82°
Started: Feb. 22/84
Completed: Feb. 25/84
Logged by: Warren Gilman

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag			
0.0	38.0	CASING (0-24 WATER) (26-36 BOULDERS) - lesser Clay									
38.0	49.0	ANDESITE: fine grain med. green, amygdaloidal flow top, rare anhedral epidotic, more acid bombs to 5 cm., minor white cb. amygdules to 2 mm., fine qtz? (blue white) amygdules to 1 mm., flow banding faint at 45°TCN, disseminated py to 2% average									
49.0	55.0	TUFF - ANDESITE: mix of amygdaloidal flow top and variable bands tuff, fine laminae chlorite with intervening layers, lenses, clots, cb., rare lapilli fragments, bedding 40°TCN, py <1%, predominant med. green colour									
55.0	60.3	LAMPROPHYRE: coarse grain grey, silicified, similar fabric to sheared massive flow, abundant grey mica enwraps elongate blebs silicified feld., upper Ct. 60°TCN, lower 10°, no resemblance to Orofino lamprophyre, sheared and met'm phased unlike primary dyke, several 5 mm. to 1 cm. cb. fracture fills at low angle TCN									
60.3	111.5	ANDESITE: coarse grain massive, med. green, central part of flow, amphiboles in diverse array with intersertal epidote and yellow feld., random segregat'ns through fabric of anhedral pink-white qtz rimmed with epidote feld. and surrounding light subhedral feld. (as if qtz blebs - to 2 cm. - were nucleii for slow crystallization, main massive fabric has abundant disseminated coarse leucoxene, fabric is largely epidote, feld., amphibole chl., minor quartz, leucoxene py sporadic, short 4% segments, large barren zones, no average									
111.5	117.0	TUFF: fine to med. grain, med. green, delicately banded, predominant chl. laminae with intervening massive cb. bands, lenses, pods, banding 40°TCN, random py 111.5-117.0 average 2% py in banded chloritic tuff, subhedral py to 5 mm.	8558	5.5	111.5	117.0	Tr				
117.0	150.0	ANDESITE: coarse grain massive, med. green, central part of flow - essentially same as 60.3-111.5 with minor quartz segregations, rare, smaller coarse grain qtz segregations as integral part of massive fabric									

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

HOLE: T-84-2
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
150.0	173.0	ANDESITE: med. grain, med. green, less massive than above, probable separate flow 150.0-151.5 quartz vein 4 cm., several fracture fills, rimmed with crs subhedral py to 5%	8559	1.5	150.0	151.5	Tr	
		from 151.5 grading to more massive centre of flow, probable interflow Ct. at 171.5 171.5-173.0 en echelon quartz to 5 cm. (barren), 3% py to 3 mm., subhedral	8560	1.5	171.5	173.0	Tr	
173.0	182.0	TUFF: med. grain, med. green, banded, chl. laminae and layers, lenses, pods parallel cb. (not classic tuff but appears closer to tuff) possibly sheared flow tops, unlikely, 2% py 179.5-180.5 quartz vein 5 cm., 40°TCN rimmed with 5% 2 mm. py	8561	1.0	179.5	180.5	Tr	
182.0	185.8	ANDESITE: coarse grain med. green, central part of flow - holocrystalline, amph. epidote, feld., minor quartz cb. blebs						
185.8	187.1	LAMPROPHYRE: fine grain dark grey, soft, some vague phenocrystic amphibole, fractured, threaded with network of pink and white cb. in minute fracture no sulphides, soft, upper Ct. 45°, lower 20°						
187.1	224.0	ANDESITE: med. to coarse grain massive central appearing flow portion with random 5 cm. epidote, cb. segregations (pillow selvedge), staggered plates of fine epidote with interlayered cb. and epidote saturated rims of abvious selvedge about every 3' 220.5-224.0 py 4% (2 mm. subhedral) some 5 mm. in schistose base of flow several en echelon 3 mm. cb. fractures, pronounced folt'n 55°TCN	8562	3.5	220.5	224.0	Tr	
224.0	225.5	QUARTZ VEIN: massive frosted quartz, included vague chl. schlieren, upper Ct. 45°, lower 10°TCN 224.0-225.5 faintly fractured, threaded with cb, (post chl.), trace py	8563	1.5	224.0	225.5	Tr	
225.5	230.0	ANDESITE: fine grain leucoxene rich, chloritic flow top with irregular qtz vein crudely 45°TCN, 5% py, parallel trains to folt'n 225.5-227.6 qtz vein 30% total, (barren), chloritic fine fabric 5% crs py	8564	1.9	225.5	227.6	Tr	
		227.6-230.0 en echelon cb. 3 cm. vein, some fractured qtz (15% of segment) lava 4% py	8565	2.4	227.6	230.0	Tr	

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

Section:
Length:
Elevation:
Azimuth: Dip:

HOLE: T-84-2
Core size:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag			
230.0	250.0	ANDESITE: coarse grain central part of flow, med. green, coarse amph., chlorite base with individual segregations cb. intersertal to amphibole with subhedral skeletal leucoxene, 3 cm. to 5 epdiotic random segregations as pillow selvedge increasing to lower part of segment (flows appear Tops up); fractured Cb. threaded to lower Ct. (2'), folt'n appears 50°TCN, py 3% in disseminated as segregations parallel folt'n, subhedral, py greater adjacent to Cb. fractures and in pillow selvedge.									
250.0	275.0	FELDSPAR PORPHYRY: very fine grain silicic base, grey white, with varisized clear subhedral feld. phenocrysts, pink stained adjacent to contact, with relict clots anhedral chl. disseminated in matrix and in feld. phenos., (different from Orofino shaft porphyry), py in chl. segregations and in fine siliceous matrix, Cts (upper) 40°TCN, parallel trend to phenos and chl. segregations, local steepening to folt'n to 65°TCN, thin cb. threads, most in fractures 30° to 40°TCN, local bleached buff segments of 5 to 10 cm., ultrasilicic, feld. phenos 35% total fabric, chl. clots, segregations 15% to 20° of total fabric, py average 2%, some late fractures in dyke with trains py coursing break N.B. anhedral chl. appear to be xenolithic remnants of intruded andesite heavily brecciated lower Ct., chloritic cement, Ct. 20°TCN									
275.0	280.0	CHLORITE SCHIST: mono numerallic fine grain chl. with intersertal cb. and cb. threads, lenses and massive cb. vein 80° to 90°TCN, minor py 275.0-280.0 random py, 35% barren cb. 80°TCN, en echelon stringers some qtz feld. in 4 cm. vein	8566	5.0	275.0	280.0	.002				
280.0	305.0	LAMPROPHYRE: fine grain silicic base, relicts of probable feld. phenos, homogenous fine grain mesostasis with 20% chl. clots, fractured parallel folt'n, upper Ct. 80°TCN, lower Ct. broken (0° to 10°TCN ?), vertical dyke with some xenoliths andesite, buff coloured ultrasilicic segments (in contrast to Orofino lamprophyre) is stressed and strong foliated, 70°-80°TCN, very sporadic fine py, average < 1%, some greater fine py infractured cb. threaded portions of dyke									

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

Section:
Length:
Elevation:
Azimuth: Dip:

HOLE: T-84-2
Core size:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag
305.0	306.5	AGGLOMERATE: multi-fragment, diverse comp'n, shape						
306.5	329.0	ANDESITE: apple green, fine grain heavily amydaloidal flow, colourless and frosted white stretched cb. amygdules in fine matrix 60° to 70°TCN, flow lines in fine grain matrix parallel trend of amygdules, minor py, hematite stained joints, 5 mm. pseudo tuff bands (pillow selvedge) 70°TCN, (epidote aureole around amygdules)						
329.0	338.6	ANDESITE: med. grain, med. green, central portion, massive, individual crystals distinct, fabric essentially clusters fine chl. and mini metacrysts cb., trace py, trace cpy, fabric oriented 60° to 70°TCN						
338.6	343.9	TUFF - AGGLOMERATE - CHERT (lenses): sericitic yellow green, finely banded, boudins qtz, bedding 45°TCN, sporadic py 3%, random crs and fine cpy, disseminated chalky blebs (white sphalerite or leucoxene, orientation beds, chert lenses 45°TCN						
		338.6-343.9 random py, cpy, (chalky blebs), barren qtz boudins, rims py	8567	5.3	338.6	343.9	Tr	
343.9	443.0	QUARTZ FELDSPAR PORPHYRY: silicic grey porphyry, enhedral 1 cm. augen qtz to 5% thru fabric with 25 to 30% elongate light grey white feld. with resorbed margins minute chloritic amphiboles and fine chlorite cloudy segregations in matrix impart grey colour to rock, phenos and foliated mica matrix 45°TCN						
		352.7-355.5 60° to 90° qtz vein, py margins 5% to 3 mm. (chalky white blebs - leucoxene ?)	8568	2.8	352.7	355.5	.002	
		355.5-362.0 1' local shear, qtz augen porphyry, 2% chalk white blebs, random py	8569	6.5	355.5	362.0	Tr	
		several zone 1' width local shears, imbricate fractures in porphyry with well foliated fabric, no increase sulphides						
		394.5-398.7 en echelon 3 cm. qtz veins 45°TCN, 5% py mainly rim of vein <1% py	8570	4.2	394.5	398.7	Tr	
		426.4-428.3 interporphyry shear 45°TCN, qtz augen, sericite lenses, sporadic 2% py, 4 cm. en echelon qtz veins	8571	1.8	426.4	428.3	.002	

T. 21 26

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

Section:
Length:
Elevation:
Azimuth: Dip:

HOLE: T-84-2
Core size:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
443.0	445.7	LAMPROPHYRE: fine grain to med. grain (individual crystals evident) homogeneous med. and dark grey dyke, matrix largely grey cb. with uniform matrix mafics amph. chl.?; minute flecks chalky white leucoxene, lower Ct. 70°TCN, fine py, upper Ct. indistinct, appears 45°TCN, 2% coarse py						
445.7	473.2	QUARTZ FELDSPAR PORPHYRY: as above; quartz augen, feld. rich locally sheared with fine grain matrix, minor py, folt'n 45°TCN; strong local sericite qtz shear, epidote lenses 461 to 464, trace py						
473.2	474.0	LAMPROPHYRE: fine grain med. grey, folt'd uniform matrix, individual crystals evident, cut by later cb. fractures with 4% py, some pink hematite, Cts 45°TCN, clustered matrix py to 8%						
474.0	547.5	QUARTZ FELDSPAR PORPHYRY: same quartz augen porphyry with 'crystal mush' subhedral white light grey feld. phenocrysts to 1 cm. as above, with 2 to 3% disseminated leucoxene (or saussurite clots), minor py, prevailing 45° folt'n						
		501.0-502.4 local brecciated zone of movement, strong chlorite, 2% py, trace cpy with later cb. fractures (to 5 mm.)						
		509.0-509.7 sericitic, epidote rimmed qtz vein 45°TCN, random 5% rimming py	8572	.7	509.0	509.7	.004	
		513.5-516.0 en echelon qtz veins from 1 to 5 cm., random py, some crs, average 2%	8573	2.5	513.5	516.0	Tr	
		543.0-546.0 slight schisted, 45° folt'n, qtz fractures 5 mm. fine py rims	8574	3.0	543.0	546.0	Tr	
		546.0-547.5 py solitary 2 mm. crystals, average 1%, cb. clots, imbricate fractures 70°TCN	8575	1.5	546.0	547.5	Tr	
547.5	552.5	QUARTZ VEIN: white bull qtz, some thin late cb. fractures, minor schlieren chl. fine py Cts 45°TCN						
		547.5-550.0 massive bull qtz, very minor chl. schlieren, trace py	8576	2.5	547.5	550.0	.002	
		550.0-552.5 rare clots py to 1 cm., mainly massive bull qtz, Cts 45°TCN	8577	2.5	550.0	552.5	.002	
552.5	565.8	QUARTZ FELDSPAR PORPHYRY: very light grey white qtz augen, feld. phenocrysts, sheared, imbricate fractures 552.5-554.5 50°TCN						
		552.5-553.5 qtz vein 5 cm. with schisted porphyry Cts, trace fine py in vein, solitary crs py in schistose sericitic matrix	8678	1.0	552.5	553.5	Tr	

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

Section:
Length:
Elevation:
Azimuth: Dip:

HOLE: T-84-2
Core size:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag			
565.8	567.0	LAMPROPHYRE: med. grey, silicic, fine base with phenocrystic reticulate chloritic amphibole as 'phenocrysts', upper Ct. broken, perhaps 70°TCN, trace py									
	567.0	END OF HOLE									

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property: Tionaga
Location: 80'E of Lake Shore
Co-ordinates: P.C. 5275N/5050E

Section:
Length: 499.4
Elevation:
Azimuth: -0- Dip: -90°

HOLE: T-84-3
Core size: AQ

Dip Tests: 499.5 -78°
Started: Feb. 25/84
Completed: Feb. 28/84
Logged by: Warren Gilman

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag			
0.0	2.0	CASING									
2.0	119.5	ANDESITE: med. to coarse grain massive, homogenous, med. green, central part of flow, fabric of amphibole, chl. aggregates, qtz cb. segregations, epidote clots, cb. metacrysts, interlocking fabric, folt'n appears 80°TCN, py av. 2% disseminated (sporadic, segments with no py), amphiboles recrystallized at 44.5 vague amygdules, epidote, carbonate, interpreted as basal portion of flow, folt'n indicates contortion, local feld. with abnormal representation flow thickness, (some random possible pillow selvedge) epidotic feldspathic 3 cm. at 70°TCN, random cb. fractures 3 mm. to 1 cm. 0° to 30°TCN 49.0-51.0 flow top - heavy epidote permeat'n, 4% insitu cyrstallization 2 mm. py, epidotic qtz feld. vertical fracture at 51.0 grades to medium to coarse grain central homogeneous central portion of flow, random 3 cm. pyritic portions probably related to pillow selvedge, leucoxene, saussurite in stretched clots parallel folt'n of fabric; at 54 and at 94' massive 2 cm. cb. bordered by banded rims in cm. (pillow selvedge); 70° to 75°TCN, 2% py	8579	2.0	49.0	51.0	Tr				
119.5	142.0	ANDESITE: recognizable flow top--banded tuff like fabric, may be partly tuffaceous pillow selvedge, interlayered 1 mm. to 1 cm. cb. lenses in fine chloritic bands, py increase by 3%, probable in situ xstallization, 40 to 65°TCN 119.5-125.0 flow top--partly tuffaceous pillow slevedge, cb. lenses, 4% py grades at 125' to med. grain massive central portion of flow	8580	5.5	119.5	125.0	Tr				
		137.4-138.4 cb. vein 10 cm. 65°TCN, 5 to 8% py in matrix margins	8581	1.0	137.4	138.4	.002				
142.0	176.0	ANDESITE: fine grain fragmented flow top-- angular 3 to 5 cm. epidotic light green fragmented surface, cemented by darker more basic mesostasis (movement and fracturing of solidified cooled surface) underlain by amygdaloidal fine grain flow over long distance (34') -- exceedingly long intervals of same phase of flow, either abnormal thick flows or local folding, folt'n and amygdule orientation appears 60°plus TCN, minor threading with fine cb., 1% fine py									

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

HOLE: T-84-3
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
		142.0-176.0 (con't)						
		157.5-159.5 en echelon 3 cm. to 7 cm. cb. and cb. qtz veins, barren, 45°TCN matrix py 1%	8582	2.0	157.5	159.5	Tr	
		continuous amygdaloidal fine grain flow to lower Ct. at 176', white amygdule to 1 cm.						
176.0	198.0	ANDESITE: fine grain dark grey flow top, more silicic, brittle homogeneous, no features, abundant pillow selvedge, 3 to 5 cm. banded tuffaceous fabric						
		176.0-181.0 fractured cut by 1 cm. vertical cb. vein, trace cpy, 3% py in glassy matrix	8583	5.0	176.0	181.0	Tr	
		181.0-183.0 en echelon (2) 5 cm. cb. quartz veins, 2% clustered py, tr. cpy	8584	2.0	181.0	183.0	.002	
		183.0-184.6 en echelon (2) 45°TCN, py, arsenopy, trace cpy at vein Cts	8585	1.6	183.0	184.6	.014	
		184.6-185.7 en echelon qtz 8 cm. (2) qtz veins, reticulate massive po on margins, some py elongate clusteres, secondary cb. in vein fractures, 70°TCN	8586	1.1	184.6	185.7	.004	
		185.7-188.0 fine grain light green flow top-- disseminated 1% py	8587	2.3	185.7	188.0	Tr	
		from 188.0-198.0 fine grain light green flow, outer margin of smingle flow, some flow features uninterpretable, late fracturing, py threading of fabric, 1% disseminated py, some amygdaloidal pillow selvedge (upper part of flow)						
198.0	409.2	QUARTZ FELDSPAR PORPHYRY: light grey qtz augen, subhedral feld. porphyry with light grey fine glassy mesostasis, feld. to 5 mm. 25% of matrix, to 10% varisized qtz augen, great variation granularity and comp'n over short length fringe of large intrusive cupola, small segregations (metacrysts) leucoxene saussurite						
		239.0-247.0 pronounced sheared 45°TCN, sericite bandes alternate with silica with prominent qtz augen stretched parallel folt'n						
		239.0-241.3 sericite augen schist 45°TCN, 2% random py, cb. lenses, tr po	8588	2.3	239.0	241.3	.002	
		241.3-242.4 brecciated fractured dark blue grey vein 45°, secondary Cb., 1% py trace po	8589	1.1	241.3	242.4	.002	
		242.4-244.1 fine agglomerated blebs py parallel folt'n 50°TCN, py 2%	8590	1.7	242.4	244.1	.002	

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NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

HOLE: T-84-3
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag			
		198.0 - 409.2 (con't)									
		from 252.0 to 260.0 local intense sheared sericitic zone 45°TCN, sericite enwraps large qtz augen, minute leucoxene clots, 1% py, glassy fine grain green matrix									
		268.0-269.2 typical porphyry - silicic - 1% py disseminated, minute leucoxene	8591	1.2	268.0	269.2	Tr				
		269.2-270.5 quartz vein 45°TCN, secondary cb. in fractures, trace margining py	8592	1.3	269.2	270.5	.002				
		270.5-272.0 sheared qtz sericite schist, 2% disseminated py, 45° folt'n TCN	8593	1.5	270.5	272.0	.002				
		at 278.0-299.5 local sericitic remobilized zone with qtz augen, boudins intraformational fault, 45°TCN									
		278.0-279.5 py 2%, minor qtz cb. vein, barren, Q.F.P. above varies from footwall	8594	1.5	278.0	279.5	.024				
		at 287.0-290.0 and 307.0-309.0 sericitic remobilized zone, probably segments local movement									
		310.0-311.0 qtz vein (fractured) secondary cb. barren 20 cm. from sericitic contorted segment	8595	1.0	310.0	311.0	.002				
		330.7-333.0 irregular qtz vein 70°TCN rimmed with sericitic contorted Q.F.P., 2% py	8596	2.3	330.7	333.0	Tr				
		334.5-335.5 irregular qtz vein flat, clustered sporadic py trains, av. 2%	8597	1.0	334.5	335.5	.010				
		from 335.5 to 409.2 massive porphyry with subhedral grey white feld. to 1 cm and quartz augen with sporadic subhedral py (av. 1 to 2%) and isolated clots saussurite -- leucoxene, random cb. fractures 2 mm., some qtz filled fracture									
		407.0-409.2 py 4% disseminated in relatively unaltered porphyry	8593	2.2	407.0	409.2	Tr				
409.2	410.7	QUARTZ VEIN: white bull qtz, saturation type gradual Ct. with 8 to 10% py over 3 cm. at Ct.									
		409.2-410.7 bull qtz with minor chl. schlieren with clustered single py in chl., vein barren	8599	1.5	409.2	410.7	.002				
410.7	413.0	QUARTZ FELDSPAR PORPHYRY: recrystallized med. grain fabric, feld. recrystallized, original fabric destroyed, silicified, 10 cm. qtz vein saturation type Cts									
		410.7-413.0 py 8% in matrix, qtz vein barren, chl. scheileren with 10% py	8600	2.3	410.7	413.0	Tr				

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

HOLE: T-84-3
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag
413.0	414.6	QUARTZ VEIN: white bull qtz, minor chl. schlieren, impurities, py aggregated around chl. to 5 mm. 413.0-414.6 vein with saturation type indistinct Cts, py highly random	8601	1.6	413.0	414.6	.002	
414.6	437.5	QUARTZ FELDSPAR PORPHYRY: as described 198.0-409.2; qtz augen, subhedral feld. (20% plus) with grey fine silicic chl. sericite feld. matrix, 2% disseminated py 414.6-417.0 silicic 5% py, 4 cm. Ct. grading to 2% py in Q.F.P.	8602	2.4	414.6	417.0	Tr	
		423.0-425.5 local sericite shear, imbricate sericite laminae with interlayered deformed porphyry fabric 45°TCN, larger qtz augen due to crystal growth along margins 433.7-434.7 py 2% in normal Q.F.P., qtz augen, coarse feld., chalky clots leucoxene	8603	1.0	433.7	434.7	Tr	
		434.7-437.5 en echelon 5 cm. qtz veins 40°TCN, margined by py (5%)	8604	2.8	434.7	437.5	.002	
437.5	439.2	QUARTZ VEIN: frosted white qtz, reticulate chl. schlieren, py ubiquitous with chl. seams 437.5-439.2 same indistinct saturation type vein Ct. with 8% margining py for 3 to 5 cm. adjacent vein Ct., chl. schlieren with py in interior of vein	8605	1.7	437.5	439.2	Tr	
439.2	499.5	QUARTZ FELDSPAR PORPHYRY: as described above; partly silicified (resorbed margins on feld.) musky grey matrix, prominent qtz augen, chalky white clots saussurite, fled. aligned generally 45°TCN 439.2-440.2 2% py in normal Q.F.P.	8606	1.0	439.2	440.2	Tr	
		460.5-461.2 sericite inclusions in fractured qtz vein, secondary cb. py margins	8607	.7	460.5	461.2	Tr	
		473.0-475.5 several en echelon 5 cm. qtz veins with intervening Q.F.P. 5% py	8608	2.5	473.0	475.5	.002	
		at 484.5 20 cm. barren bull qtz with sheared sericitic Q.F.P. from 485 to 487, normal foliated green-grey feldspathic-qtz augen porphyry to end of hole.						
	499.5	END OF HOLE						

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NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property: Tionaga
Location: 180'E of Lake Shore
Co-ordinates: P.C. 5250N/5150E

Section:
Length: 460'
Elevation:
Azimuth: -0- Dip: -90°

HOLE: T-84-4
Core size: AQ

Dip Tests: 460' -84°
Started: Feb. 28/84
Completed: March 2/84
Logged by: Warren Gilman

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
0.0	30.0	CASING						
30.0	81.0	ANDESITE: fine grain light to med. green, cb. pocked fine chloritic matrix, strong shear from 30-34', folt'n 80°TCN (probable deformed amygdules) grading to med. grain flow with individual crystals epidote, Cb't'd feld., amphiboles coarse skeletal leucoxene, cb. clots, oriented 45°TCN, late fracturing with jagged cb. filling, 2% py, grading at 39' to med. grain massive epidotic holocrystalline flow; at 42' heavily pyritic 10 cm. pillow margin; at 51 and at 52' qtz vein 3 cm. 45°TCN, pyritic rims at 60.7 a 4 cm. massive chl. fine grain pillow selvedge with 2'med. grain massive rock below; at 64.5 fragmental flow Ct. with highly pyritic 5 cm. ct., later fracturing with massive cb. fill; at 67.0 fine grain light green amygdaloidal (white cb.) flow with cb. thread at 74.0 pillow selvedge in light green amygdaloidal flow to lower Ct. minor py 1% except for narrow segments on pillow rims						
81.0	97.2	QUARTZ FELDSPAR PORPHYRY: coarse grain light grey (crystal mush injection) crs subhedral feld. phenos to contacts, 5% qtz augen to 5 mm. -- fine chl. sericite silicified base for 30% white feld. phenos and qtz, clots leucoxene several barren qtz with secondary cb. fractures, Cts. 45°TCN, no sulphides						
97.2	103.7	ANDESITE: med. grain massive, med. green central part of flow, featureless, trace py vague steep folt'n. 102.6-103.7 qtz vein 4 cm. py margins 60°TCN, qtz stringers py, po, cpy	8609	1.1	102.6	103.7	.002	
103.7	106.9	QUARTZ VEIN: frosted white, schlieren chl. Cts 45°TCN, some segments Andesite host						
		103.7-104.7 qtz vein 10 cm., upper Ct. 70°TCN, py, po, cpy margins	8610	1.0	103.7	104.7	.004	
		104.7-105.7 qtz vein, secondary cb. infractures, reticulate po, py, 1%cpy	8611	1.0	104.7	105.7	.161	
		105.7-106.9 .7' vein with schlieren chl. reticulate po, py, 2% cpy	8612	1.2	105.7	106.9	.084	
106.9	116.5	ANDESITE: fine grain light green, upper part pillowed flow, flow levis, pillow selvedge 45°TCN 106.9-108.0 fine po clots parallel folt'n 5%, concentrated vein Ct	8613	1.1	106.9	108.0	.008	

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

HOLE: T-84-4
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
116.5	117.3	QUARTZ FELDSPAR PORPHYRY: Cts sharp 45°, crystal mush (cold rapdi inject'n) no py xenoliths andesite						
117.3	122.2	ANDESITE: fine to slight med. grain base of flow, scattered white anygdules developed towards lower Ct., folt'n 45°TCN, late fracturing with jagged cb., an earlier fracture pattern towards lower Ct. with chl. cb. cement of homogeneous fine matrix, py 1%						
122.2	166.5	QUARTZ FELDSPAR PORPHYRY: light grey vitreous matrix with 25% feld. phenos and ubiquitous augen qtz., relict pseudomorphs leucoxene, many subtle variat'ns to texture and compositions of fabric suggesting multiple pulses of inject'n not feasible to categorize here, phenocrysts oriented 45°TCN, trace isolated fine py 158.0-160.0 local shear 65°TCN, some contorted qtz cb. injection, sericite mats, 2% py						
166.5	171.8	LAMPROPHYRE: med. to dark grey, trains amphibole, chlorite in cb. base, folt'n 65° TCN, 2% py, cb. threads in late fractures 45°TCN, Cts 70°TCN, 2% subhedral py						
171.8	271.6	QUARTZ FELDSPAR PORPHYRY: as described above; light grey, 25% light grey to white feld. phenos to 1 cm., abundant qtz augen, leucoxene relicts, trace py at 183.5 several en echelon local sericitic shears 5 cm. to 10 cm. 45°TCN, pronounced sericitic shear 188.0-189.0, no sulphides, local en echelon sericitic shears 45° to 55°TCN from 195 to 205 separated by short segments normal porphyry, no sulphides, minor 1 to 2 cm. cb. boudins with 4% py, epidote saturation thoughout shears, strong cb. saturation						
		228.0-230.0 test local shear 55°TCN, lone py random to 4 mm. in epidote sericite	8614	2.0	228.0	230.0	.002	
		245.5-249.0 several en echelon 10 cm. qtz vein in schisted porphyry, 2% py, trace cpy	8615	3.5	245.5	249.0	Tr	
		263.0-265.0 several en echelon 5 cm. qtz vein in porphyry, py margins on vein, trace sph.	8616	2.0	263.0	265.0	.032	

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NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

Section:
Length:
Elevation:
Azimuth: Dip:

HOLE: T-84-4
Core size:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag			
		171.0 to 271.6 (con't)									
		265 through 271.6 sheared sericitic porphyry 70°TCN, folt'n, qtz augen, recrystallized rims, 1 to 2% random py									
		270.6-271.6 random 1% py, isolated clots leucoxene	8617	1.0	270.6	271.6	.008				
271.6	274.0	QUARTZ VEIN: frosted white contorted qtz, secondary cb. in fractures, upper Ct. 70°TCN, upper 1' has 15% py, grading to 3% coarse py to 5 cm. down dip									
		271.6-274.0 qtz, schlieren chl. sericite, 15% clustered py 1'	8618	2.4	271.6	274.0	.147				
274.0	429.6	QUARTZ FELDSPAR PORPHYRY: as described; feld. phenos, qtz augen in light green chl. silica, cb. matrix, random clots leucoxene, folt'n general 45°TCN									
		274.0-275.5 py 4% disseminated at lower Ct. qtz vein	8619	1.5	274.0	275.5	.004				
		276.6-278.0 sheared local zone, some squeezed qtz vein, aligned py	8620	1.4	276.6	278.0	.002				
		at 331.0 qtz vein 10 cm. py margins; at 327.0 qtz vein 3 cm. 4% py; at 332.0 qtz vein 3 cm.; at 336.6 qtz vein 4 cm., margining Crs. single crystal py,									
		360.0-362.0 test of normal unsheared silicic porphyry 3 to 4% py	8621	2.0	360.0	362.0	.002				
		from 362.0 through 424.0 secondary crushing of porphyry fabric with filagree of thin cb. coursing it, some realignment of qtz feld. toward preferential alignment and realignment of pale green mica segregations, (fabric has cushioned movement caused by major breaks with attendant en enchelon small shears)									
		395.0-396.1 en echelon 2 cm. qtz fractures with 4% matrix py in host	8622	1.1	395.0	396.1	Tr				
		404.5-405.5 en echelon qtz vein with intense silica saturation between vein 5% py	8623	1.0	404.5	405.5	Tr				
		from 424.0 sericite schist grading into strongly schisted porphyry above vein									
		426.0-428.2 alternating qtz lenses; similar to boudins with sericite sch., random py	8624	2.2	426.0	428.2	Tr	Tr			
		428.2-429.6 en echelon 10 cm. qtz vein with intervening sericite sch., margins py	8625	1.4	428.2	429.6	.006	.03			

NORTHGATE EXPLORATION LIMITED

DRILLING COMPANY:

DRILL LOG

Property:
Location:
Co-ordinates:

Section:
Length:
Elevation:
Azimuth: Dip:

HOLE: T-84-4
Core size:

Dip Tests:
Started:
Completed:
Logged by:

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
429.6	438.4	QUARTZ VEIN: frosted white vitreous fairly pure qtz with schlieren pale chl. sericite, impurities in qtz. concentrated towards upper Ct.						
		429.6-431.5 py associated with chlorite schlieren, strongly sporadic	8626	1.9	429.6	431.5	.002	.02
		431.5-433.0 reticulate thin seams galena with minor cpy and py; Average ?	8627	1.5	431.5	433.0	.006	2.31
		433.0-436.0 frosted white qtz minute chloritic schlieren with sporadic fine py	8628	3.0	433.0	436.0	.002	.02
		436.0-438.4 minor schlieren with sporadic clustered py, individual xstals to 3 mm.	8629	2.4	436.0	438.4	.002	.03
438.4	460.0	QUARTZ FELDSPAR PORPHYRY: coarse grain qtz augen, feld. porphyry with interstices of chl. sericite						
		438.4-440.0 en echelon qtz 10 cm. veins, general 45°TCN, sporadic py in sericite schist	8630	1.6	438.4	440.0	Tr	.03
		440.0-443.0 py 3 or 4% in folt'd porphyry 70°TCN, isolated amorphous chalky leucoxene	8631	3.0	440.0	443.0	.008	.02
		443.0-444.5 py 2% in folt'd porphyry 70°TCN	8632	1.5	443.0	444.5	.002	
		444.5-447.3 en echleon 10 cm. qtz vein 45°TCN (barren), 4% sulphides in Q.F.P.	8633	2.8	444.5	447.3	.002	
		447.3-453.0 massive porphyry with aligned phenos 60°TCN, chloritic seams sporadic py	8634	5.7	447.3	453.0	.002	
		normal directional fabric to Q.F.P. with 2% py to end of hole, general 45°TCN						
	460.0	END OF HOLE						

OROFINO RESOURCES LIMITED
P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X1C7 TELEPHONE: (416) 362-6683 TELEX: 06-217766

Property: Tionaga
Location: 80' East of Lake Shore
Co-ordinates: P.C. 5150N / 5150E

HOLE: T-84-5
Core size: AQ

Section:
Length: 301'
Elevation:
Azimuth: -0- Dip: -90°

Dip Tests: -84° at 300'
Started: March 2/84
Completed: March 3/84
Logged by: Warren Gilman

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag			
0.0	30.0	CASING									
30.0	127.5	ANDESITE: fine grain light green amygdaloidal flow top, white cb. amygdules with fretted margins, fine grain epidotic matrix with abundant scattered clustered chlorite clots, amygdules 0° to 45° TCN from 49 to 55' staggered 5 cm. imbricate, cb. lenses as pillow selvedge, very sporadic py in selvege from 15% to trace, all 45° TCN; minor shear at 51.5 along pillow selvedge, minute cb. threading of fractures, trace po, py, rare jagged fractures with massive 2 mm. py; from 55' long amygdaloidal pillowed segment with staggered epidotic selvedge about every 3' and abundant amygdules, white and colorless throughout but clustered adjacent to pillow selvedge, amygdules, folt'n 45° TCN; py sporadic (some 3 cm. selvedge 8% py), matrix py extremely random 118.5-124.0 irregular 3 to 5 cm. qtz cb. and cb., nil to 5%-py, matrix 1%py	8635	5.5	118.5	124.0	.002				
127.5	185.0	ANDESITE: med. grain homogeneous basal portion of flow - abrupt change from amygdaloidal top to rough matrix with individual crystals apparent, amphibole, chlorite in cb. base, py <1% 129.8-130.5 20 cm. qtz vein with cb. margins, secondary cb. fracture, no py	8636	.7	129.8	130.5	.002				
		137.1-137.9 20 cm. qtz vein, sporadic py on margins, 3% matrix py	8637	.8	137.1	137.9	.002				
		from 150' less intanse folt'n, abundant disseminated epidote, harder matrix, individual crystals less distinct, less shearing than upper 25' at 152' cb. fracture with coarse cpy, very sporadic cpy from 5% in short segments, in generals, matrix is NIL.									
185.0	236.0	ANDESITE: fine grain amygdaloidal, light green flow top, fine matrix with chlorite segregations, white and colorless amygdules, with random pillow selvedge 188.5-190.0 intergrowth of coarse epidote with intersertal cb. 10% fine py:po ratio 1::1 in irregular pillow selvedge	8638	1.5	188.5	190.0	Tr				
		below 190' much of random pillow selvedge at 5 cm. and 45° TCN is barren amygdules with micro-aggregates po with rimming epidote, random-in matrix from 204' to 209' sequence en echelon 5 mm. cb. fracture fillings									
		204.0-207.0 en echelon series cb. 5 mm. fractures 30° TCN, barren	8639	3.0	204.0	207.0	Tr				

OROFINO RESOURCES LIMITED
P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X1C7 TELEPHONE: (416) 362-6683 TELEX: 06-217766

Property:
Location:
Co-ordinates:

HOLE: T-84-5
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
		185.0 - 236.0 (con't)						
		207.0-207.5 qtz vein 5 cm., 30° TCN, thin lenses with cpy, po, or py, 4%	8640	.5	207.0	207.5	.036	
		207.5-209.0 some scattered po in cb. fractures, en echelon, trace py continuous fine grain light green amygdaloidal flow with random epidotic pillow selvedge to 229.5; from 229.5-236.0 coarse segment of basal flow, homogenous, massive, amphibole epidote	8641	1.5	207.5	209.0	Tr	
236.0	260.0	ANDESITE: fine grain light green, flow top, strong folt'n, amygdaloidal (not abundant), amygdules white and colorless, dark green chl. metacrystic clots in fine matrix, random py, folt'n and stretched amygdules 60° TCN						
		237.0-242.5 staggered en echleon cb. fractures, minor py	8642	5.5	237.0	242.5	Tr	
		246.0-247.0 fine grain barren flow top, no features, few cb. threads	8643	1.0	246.0	247.0	Tr	
		247.0-248.0 5 cm. qtz vein with rimming en echelon Cb., qtz is 15% py, po cpy (much of po cpy is coarse, parallel, to folt'n 70° TCN (local feld.)	8644	1.0	247.0	248.0	.010	
		248.0-250.0 strong folt'n, en echelon cb., coarse single xstals py, 4% from 250' to 260.0' strong directional trend, could be partly tuffaceous 70°TCN, some cb. en echelon in imbricate fracturing, some epidotic scattered pillow selvedge	8645	2.0	248.0	250.0	.014	
260.0	280.5	QUARTZ FELDSPAR PORPHYRY: base of very fine grain grey silicic matrix with grey white feld. phenocrysts to 1 cm. (subhedral) with resorbed margins, qtz augen average 5 mm. with orientation due to margin growth parallel folt'n, disseminated py average 2%, upper Ct. 40°TCN; disseminated anhedral blebs leucoxene, saussaurite, crystal mush injections, crs phenocrysts developed to contact						
		277.7-279.0 minor 5 cm. qtz veins poched with aggregates granular py	8646	1.3	277.7	279.0	.002	
		279.0-280.5 qtz vein 50% of segment, irregular, 8 to 10% fine cluster py	8647	1.5	279.0	280.5	.002	
280.5	282.0	QUARTZ VEIN: bull qtz, frosted grey, fractured, threaded with fine cb., some py on margins						
		280.5-282.0 scattered py 3 cm. from Ct., center vein barren, Cts 40°TCN	8648	1.5	280.5	282.0	.002	

OROFINO RESOURCES LIMITED
P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X 1C7 TELEPHONE: (416) 362-6683 TELEX: 06-217766

Property:
Location:
Co-ordinates:

HOLE: T-84-5
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag			
282.0	301.0	QUARTZ FELDSPAR PORPHYRY: as described above; vein injection parallel prevailing folt'n 282.0-284.0 3 cm. vein, minor py, matrix of porphyry average 2% py a constant 40 to 45° folt'n due to en echelon sericitic epidote slips (gradual absorbtion of movement along major break)	8649	2.0	282.0	284.0	Tr				
	301.0	END OF HOLE									

OROFINO
RESOURCES LIMITED
P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X 1C7 TELEPHONE: (416) 362-6683 TELEX: 06-217768

Property: Tionaga
Location: Lake Level
Co-ordinates: P.C. 5150N/5050E

HOLE: T-84-6
Core size: AQ

Section:
Length: 300'
Elevation:
Azimuth: -0- Dip: -90°

Dip Tests: 300' -88°
Started: March 4/84
Completed: March 5/84
Logged by: Warren Gilman

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
0.0	10.0	CASING - BOULDERS - GREY CLAY AT LAKE SHORE (N.B. casing left intact)						
10.0	25.0	ANDESITE: fine grain light green, sparingly amygdaloidal flow top, random 3 cm. to 5 cm. pillow selvedge, some abundant small vague white and colorless amygdules, metacrystic anhedral chlorite clots in fine grain light green matrix, minute secondary jagged fractures with cb., random py with cb. fractures <1% : from 19 to 25' homogenous massive featureless base of flow with bottom features near Ct., probably altered remnants of stone bubbles (lithophysae)						
25.0	56.0	ANDESITE: fine grain light green flow, essentially same sequence as described above, with less coarse basal crystalline portion						
56.0	65.0	ANDESITE: a fragmented flowtop with angular fragments (epidotic light green), with resorbed margins in darker matrix, this flow has been recorded in 2 or 3 previous holes, grading below to fine grain homogeneous central to basal portion with few features						
65.0	71.0	TUFF: very finely laminated, dark and light green bands, several bands across 1 mm., lapilli fragments, strongly chloritic, well fractured with cb. threads and lenses at acute angle to bedding, random py blebs, minor qtz 65.0-71.0 cb. lenses 35% of total segment, py blebs random, beds 45°TCN	8650	6.0	65.0	71.0	Tr	
71.0	150.0	ANDESITE: fine to slight med. grain pillowed lava, staggered epidotic selvedge 5 cm. to 10, with fine clusters po in selvedge; matrix of lava has individual chl. cb. chloritic amphibole, epidote, typical greenstone matrix scattered small blebs aggregated po, amygdules white, clustered near selvedge many epidotic coarse relict amygdules with resorbed margins, (same charactoristics persist over long distance, probably local thickening from feld.), some amygdaloidal segments 80 and 90°TCN, random amygdules with minute central core of po, trace cpy; abrupt change at 119' to more coarse darker phase of same flow 121.0-122.0 selvedge cb. with 15% fine po, 3 cm. with py in matrix rock below 122' random fine po with trace cpy in amygdules; at 122' a 10 cm. qtz cb. vein, ratio 1::1 cb. qtz., very minor py on margin, 45°TCN	8651	1.0	121.0	122.0	Tr	

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OROFINO RESOURCES LIMITED
P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X 1C7 TELEPHONE: (416) 362-6683 TELEX: 06-217766

Property:
Location:
Co-ordinates:

HOLE: T-84-6
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag
150.0	180.0	ANDESITE: flow Ct. - finely fragmented top, amygdaloidal grades to fine grain light green epidotic with amygdules stretched 70°TCN, pillow selvedge 45°TCN, fine sporadic amygdules with finely crystalline po and trace cpy random and rare from 175 to 180' phenocrystic lava (pseudomorphs cb. after feld.) 177.0-180.0 granular sporadic minute clusters po and trace cpy 175 to 180' feature is pillow selvedge cut at acute angle and at pillow cusp	8652	3.0	177.0	180.0	Tr	
180.0	234.1	ANDESITE: fine grain light green amygdaloidal flow top, repetition of above sequence of flows, usual anhedral clots dark chl. in light green fine grain matrix, amygdules clustered adjacent to base of pillow selvedge, matrix of distinguishable chl. epidote, cb., and cb. pseudomorphs after feldspar, minute segregations granular po,; at 205' and 220' a roapy melange of epidote, cb., some lone cre py, minor po, trace cpy (pillow selvedge), at 225' selvedge with 10 cm. barren qtz cb. vein; from 207' to 220' central homogeneous massive med. grain portion of flow, some relict amygdules.						
234.1	239.0	FELDSPAR PORPHYRY: dyke, med. grey, siliceous, prolific anhedral and subhedral phenocrysts feldspar in fine grain grey base, phenos oriented 45°TCN, upper Ct. 45°, lower Ct. 60°TCN; some fine qtz in matrix (non-augen), probable satellite of qtz feld. intrusive, widespread in general area; py average 3% in single fine grains and lone coarse crystals						
239.0	249.0	ANDESITE: basal med. grain massive, homogeneous flow portion, some fracturing and ragged qtz cb. injection 45°TCN, rare trace py, epidote and cb. 1 mm. fractures						
249.0	258.0	TUFF - LAPILLI TUFF: finely banded chloritic intermediate andesite tuff with interlayered cb. beds and secondary cb. in layers, lenses, seams parallel and at small angle to bedding, very sporadic segregations py and po, trace cpy. 249.0-257.0 sporadic vari-sized clusters 1 mm. py and of po, average ?, 2% with 15 cm. qtz cb. vein (barren) at upper Ct.	8653	8.0	249.0	257.0	.002	

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Property:
Location:
Co-ordinates:

HOLE: T-84-6
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag			
258.0	268.0	ANDESITE: fine grain light green amygdaloidal with dark chloritic pillow selvedge staggered, fine white amygdules abundant adjacent to selvedge, trace py, selvedge 30°TCN; at 266' amygdules aligned at 80°TCN									
268.0	271.0	TUFF - LAPILLI TUFF: bedding 10°TCN, essentially as described above, minute relict fragments, some cb. lenses, minor clustered py, po									
271.0	300.0	ANDESITE: med. grain coarse homogenous, massive central part of flow, some cb. fractures, random breccia like pillow selvedge with clustered py, po; at 299' stretched amygdules (white) in fine grain light green matrix 70°TCN									
	300.0	END OF HOLE									

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Property: Tionaga
Location: Lake Level
Co-ordinates: P.C. 5150N/4950E

HOLE: T-84-7
Core size: AQ

Section:
Length: 350'
Elevation:
Azimuth: -0- Dip: -90°

Dip Tests: -350' -85°
Started: March 5/84
Completed: March 7/84
Logged by: Warren Gilman

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
0.0	22.0	LAKE WATER						
22.0	38.0	CLAY - BOULDERS						
38.0	43.5	ANDESITE: med. grain med. green base of flow, odd epidotic anhedral segregations to 4 cm., (fragments in base ?) with random orbicular clustered po; rare cb. fractures, trace cpy, most py also with cb. fractures, matrix crystals individual, chl. amph. epidote, a secondary silication imposed on fabric folt'n 50°TCN						
43.5	58.0	ANDESITE: fine grain light to med. green amygdaloidal flow top, white phenos to 1 cm., abundant minute dark green anhedral in clusions, average 45°TCN, random large epidotic amygdulaes; at 53 to 58' a med. grain central to basal portion of flow, massive, homogeneous, more silicic than fine grain top, rare epidotic coarse fragments in flow base with orbicular po aggregates						
58.0	66.4	ANDESITE: fine grain light to med. green, amygdaloidal, epidotic light green stretched amygdules to 1 cm. oriented 45°TCN, abundant anhedral small dark green chloritic; inclusions; 61' to 63' pillow selvedge, aggregated tablets rhyolitic in chl. epidote, cb. base, a melange oriented 85°TCN with 4% py with cb., minor po, trace cpy						
		65.4-66.4 amygdaloidal fine grain lava with trace minute sulphides	8654	1.0	65.4	66.4	Tr	
66.4	67.5	QUARTZ CB. VEIN: frosted fractured, barren, strong cb. margins, core of qtz, Cts. 45°TCN						
		66.4-67.5 intimate mix cb. quartz, barren, hematite Cts.	8655	1.1	66.4	67.5	.006	
67.5	88.5	ANDESITE: essentially same 58.0-66.4; fine to med. grain, slightly amygdaloidal, more basal part of above flow, trace py						
88.5	94.0	TUFF - LAPILLI TUFF: dark green andesitic, fine laminations, varying comp'n, central fine lapilli portion, well fractured and threaded with cb. in angular fractures						
		89.5-92.0 fractured lapilli zone cemented with cb., minor py, some cpy	8656	2.5	89.5	92.0	Tr	

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Property:
Location:
Co-ordinates:

HOLE: T-84-7
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
94.0	173.5	ANDEISTE: fine grain light to med. green, amygdaloidal, stretched 45°TCN, some random barren qtz cb. fractures to 3 cm., pillow selvedge, cb. interlayered with chl. rock fragments at 45°TCN, very minor sulphides, some massive cb. to 1 cm. fractures						
		112.2-113.0 pillow selvedge, melange cb. and chloritic fragments 65°TCN, 3% py, some cpy	8657	0.8	112.2	113.0	Tr	
		at 121' and 123' pillow slevedge 2 and 4 cm. with aggregated 10% py, minor po.						
		146.0-147.0 20 cm. siliceous pillow selvedge with pink red chert, epidote, 5% py and amygdaloidal rim with disseminated py, angular chl. rock	8658	1.0	146.0	147.0	.002	
		at 152.5' shear 5 cm. uncemented pulverized gouge 70°TCN; at 166' to 167.5' brecciated fine grain light green matrix cemented with hematitic cb., random fracturing above Brx. zone -- barren						
173.5	182.0	PERIDOTITE DYKE: fine grain dark green-black, soft, homogeneous, heavily fractured (blocky), crystal much, upper Ct. 80°TCN, 50% dark blue-black varisized anhedral fragments in fine grain green matrix (fragments carry to Ct.), minute nucleii of sulphides in center of dark gragments, thin fractures with scattered py lower portion of dyke, white cb. fragments, strongly abundant, lower Ct. destroyed						
		Vari Lampophyre						
182.0	212.0	ANDESITE: fine grain light green, epidotic anhedral clots to 1 cm. often with nucleii sulphides probably basal portion of flow, may be relict amygdules or rock fragments converted by alternation and metamorphism to vestigial remnants at 196' 3 cm. cb. vein, trace cpy 40°TCN						
		208.0-212.0 med. grain homogeneous base of flow, individual crystals, chl. amph. epidote, a few scattered amygdules						
212.0	228.2	ANDESITE: fine grain light green, amygdaloidal flow top, amygdules stretched 70° to 80°TCN, (local contortion), random pillow selvedge 70°TCN, up to 10 cm. minute py, po, trace cpy; small dark green chloritic clots in flow matrix often with minute nucleii of sulphides						

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Property:
Location:
Co-ordinates:

HOLE: T-84-7
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
228.2	228.5	FELDSPAR PORPHYRY: small green dykelet with 1 mm. abundant pink feld. phenocrysts, irregular Cts. 90° to 0° TCN						
228.5	240.0	ANDESITE: grading from fine grain to med. grain central homogeneous massive part of flow, individual crystals chl., amph., epidote, several en echelon barren 1 cm., qtz fractures, hematitic margins to fracture fillings						
240.0	260.2	ANDESITE: fine to med. grain base of flow with relict coarse epidotic anhedral fragments either relict amygdules or lithic fragments, as described 182 to 212, minor disseminated py						
260.2	270.1	ANDESITE: fine grain light green, amygdaloidal, strong folt'n, stretched amygdules 60°TCN, parallel fractures cb. to folt'n, en echelon qtz cb. 1 to 3 cm. veins, trace py, clots disseminated py in rock matrix						
		260.2-262.5 en echelon qtz, qtz cb., and cb. veins, folt'n 60°TCN, 3% py matrix of rock, some clots po, trace cpy	8659	2.3	260.2	262.5	.002	
		262.5-264.5 predom cb. with minor quartz, crenulated vein parallel folt'n trace py	8660	2.0	262.5	264.5	Tr	
		264.5-267.0 very sporadic py in fine grain lava and minor qtz cb. veins (20% of segment)	8661	2.5	264.5	267.0	.058	
		267.0-270.1 clustered spherules 2% py in rock matrix, some barren qtz cb. veins	8662	3.1	267.0	270.1	.014	
270.1	271.1	QUARTZ VEIN: minor secondary cb. filagree in fractures of qtz, upper Ct. 45°TCN, trace py, mainly barren						
		270.1-271.1 minor py in qtz with secondary cb., lower Ct. 60°TCN	8663	1.0	270.1	271.1	.004	
271.1	272.3	ANDESITE: fine grain light green amygdaloidal flow top, 4% matrix py, some contorted cb. vein conformable parallel folt'n with sporadic clustered py						
		271.1-272.3 matrix py 4%, 20% cb. vein with 4% py, py remobilized with folding, clusters parallel folt'n	8664	1.2	271.1	272.3	.004	

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Property:
Location:
Co-ordinates:

HOLE: T-84-7
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
272.3	275.7	QUARTZ VEIN: frosted white bull qtz, grey white; schlieren chl. 10%, minor py Cts, upper Ct. 45°TCN						
		272.3-275.7 scattered py at Cts, mass of vein, barren, no py with chl. schlieren	8665	3.4	272.3	275.7	.002	
275.7	282.0	ANDESITE: med. grain med. green basal part of flow, local contortion, folt'n 70°TCN several frond like cb. veins adjacent to upper Ct., py selective in cb. fractures, most nil and other 8% py						
		275.7-276.4 py 8%, 1 to 2% cpy in multiple fronds cb., 35% segment is vein	8666	0.7	275.7	276.4	.002	
		276.4-282.0 med. grain lava, sporadic spherules py, most portions Nil	8667	5.6	276.4	282.0	.012	
282.0	284.5	ANDESITE: fine grain light green amygduloidal flow top, local fold., folt'n 70 to 90°TCN, qtz cb. parallel folt'n						
		282.0-283.0 trace py on margins qtz cb. veins in fine grain lava	8668	1.0	282.0	283.0	.002	
		283.0-284.5 py in parallel clots, remobilized from matrix in preferential cb. fractures	8669	1.5	283.0	284.5	.002	
284.5	285.4	QUARTZ VEIN: cb. secondary in fractured margins qtz vein, vein Cts 80°TCN, barren						
		284.5-285.4 barren, near vertical qtz cb. vein	8670	0.9	284.5	285.4	.002	
285.4	289.0	ANDESITE: med. grain dark green, homogeneous central to basal part of flow, massive random spherules py						
		285.4-288.0 matrix py 8% disseminated spherules, in situ crystallization	8671	2.6	285.4	288.0	.002	
		288.0-289.0 irregular qtz cb. vein with sporadic clusters py and po, ratio 1::1	8672	1.0	288.0	289.0	.004	
289.0	295.0	QUARTZ VEIN: some secondary cb., imbricate fracturing in portion qtz with cb. threading en echelon smokey grey qtz, some very minor chl. schlieren with random, euhedral minor py Cts. 45°TCN						
		289.0-295.0 as above, random euhedral py with chl. schlieren, minor py Cts	8673	6.0	289.0	295.0	.002	
295.0	316.2	ANDESITE: fine grain light green amygdaloidal flow top, contorted, fractured several feet below vein						
		295.0-296.5 clustered remobilized 8% py with cb. stringers 80°TCN	8674	1.5	295.0	296.5	.006	
		296.5-300.0 remobilized 5% py infractured, folded fine grain flow	8675	3.5	296.5	300.0	.004	

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Property:
Location:
Co-ordinates:

HOLE: T-84-7
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag			
		295.0 - 300.0 (con't) from 300' to 312.5' amygdaloidal fine grain lava with random pillow selvedge of interlocking melange 3 to 4 cm. of epidote, cb. and 5% py 312.5-316.2 heavily threaded with cb., thin filagree of stringers 20°TCN, trace py	8676	3.7	312.5	316.2	.002				
316.2	318.8	FELDSPAR PORPHYRY: very light grey green dyke, profusion of small white phenocryst carbonate after feldspar in fine grey matrix, clots granular disseminated py 4%, minor fractures with cb., Cts 45°TCN									
318.8	325.0	ANDESITE: fine grain light green amygdaloidal flow top, contorted and fractured with filagree of cb. adjacent to dyke Ct., grades to typical top with 5 mm. white amygdules									
325.0	350.0	ANDESITE: med. grain dark green, flow base, sporadic pillow selvedge with random py, matrix py trace 349.7-349.9 qtz cb. vein 45°Cts., isolated coarse blebs sphalerite									
	350.0	END OF HOLE									

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P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X 1C7 TELEPHONE: (416) 362-6683 TELEX: 06-217766

Property: Tionaga
Location: Lake Level
Co-ordinates: P.C. 5100N/4950E

HOLE: T-84-8
Core size: AQ

Section:
Length: 350'
Elevation:
Azimuth: -0- Dip: -90°

Dip Tests: 350' -89°
Started: March 7/84
Completed: March 8/84
Logged by: Warren Gilman

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	Ag			
0.0	24.0	LAKE WATER									
0.0	60.0	CASING: (24-58 grey clay with some boulders just above bedrock)									
60.0	162.0	ANDESITE: fine grain light green amygdaloidal flow top, random white amygdules, staggered 5 cm. pillow selvedge, usually melange of chloritic laths with interspersed cb., minor py; matrix of flow a fine grain altered mix of chlorite, cb. with random epidote, all later fractures lined with massive cb., amygdules white cb _____ 10°TCN, at 70.7-71.0 and 75.6-76.0, a 5 cm. qtz vein trace py, 5°TCN at 117' stretched amygdules 70-80°TCN (at times amygdules reflect arrangement around pillow contour, alternately they represent local fold)									
		89.0-90.0 epidotic pillow selvedge with lenticular trains py and clustered cpy, (5-3%)	8677	1.0	89.0	90.0	Tr				
		at 105.5-106.0 intricate filagree epidote and chl. tablets with interspersed cb., minor py; 106-107 very fine grain epidotic light green amygdaloidal pillow margins with 5% fine py; from 108 to 130 fine to med. grain light green flow with anhedral (ragged) 1 cm. epidotic lithic remnants or relict pillows (probably base of flow but not classic coarse grain massive featureless variety), trace py; 112.3-112.8 frosted qtz vein 10°TCN with rare clusters py; at 130' vertical crystalline cb. hematite (cement) fault gourge or joint fill, no sulphide; at 130.5 epidote, qtz pillow selvedge, some lenticular py chains, remobilized, to 162' long pillowed sequence, selvedge evident with adjacent fine grain light green highly amygdaloidal grading to med. grain massive pillow center and reversion to some sequence of amygdaloidal, selvedge, latter characterized by coarse epidote cb. and py									
162.0	167.2	FELDSPAR PORPHYRY: dark grey, slight brown silicic matrix, abundant vari-sized anhedral feld. phenos 30% of fabric, ('crystal mash') (no visible quartz augen), upper Ct. 45°TCN, dyke lineation roughly parallel, trace fine py, xenoliths lava in dyke, lower Ct. 70°TCN									

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Property:
Location:
Co-ordinates:

HOLE: T-84-8
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
167.2	168.0	ANDESITE						
168.0	168.7	FELDSPAR PORPHYRY: satellite of above, Cts 55 and 60°TCN						
168.7	178.2	ANDESITE: fine grain light green, fragmented flow top, light chl. secondary in fractures						
178.2	178.5	FELDSPAR PORPHYRY: dykelet of 162.0-167.2; some pink feld., multiple qtz steep Ct						
178.5	180.8	ANDESITE: fine grain light green amygdaloidal flow top, abundant white cb. amygdules to 5 mm.						
180.8	189.5	FELDSPAR PORPHYRY: light grey green fine silicic base with 30% 2 mm. subhedral phenocrysts, upper Ct. parallels amygdule trend in overlying volcanic rock 70°TCN, lower 20°TCN, 'crystal mush' injection, py, cpy 1% only with secondary cb. fractures						
189.5	212.0	ANDESITE: fine grain light green, amygdaloidal upper part of flow, random chloritic, carbonaceous pillow selvedge, pillow interiors approach med. grain massive, homogeneous						
212.0	229.0	ANDESITE: fine grain tuffaceous, fractured, flowage dessicated, highly chloritic carbonaceous, contorted top, profusion secondary Cb. infractures, py 4% disseminated in matrix, fine cpy in cb.						
		218.0-222.5 heavily fractured with secondary cb., 4% matrix, trace cpy with cb	8678	4.5	218.0	222.5	.006	
		228.0-229.0 schisted, 60°TCN, some amygdules, trace py	8679	1.0	228.0	229.0	.002	
229.0	234.0	QUARTZ VEIN: dark grey white smokey, frosted, some fracturing with secondary cb., barren, trace py, cpy margins						
		229.0-234.0 smokey grey qtz, barren, minor py trace cpy on margins, upper Ct 45°TCN	8680	5.0	229.0	234.0	.379	.13
234.0	239.0	ANDESITE: med. grain, med. green, central part of flow, massive, irregular qtz vein near upper Ct., clots fine py disseminated through matrix						
		234.-235.5 random py in qtz vein 30% of segment, some fine cpy	8681	1.5	234.0	235.5	.020	.06
		235.5-239.0 sporadic spherules finely crystalline matrix py in massive lava	8682	3.5	235.5	239.0	.004	.02

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Property:
Location:
Co-ordinates:

HOLE: T-84-8
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
239.0	241.0	QUARTZ VEIN: very impure, schlieren chl. widespread thoughout, some imbricate lenses chl., 4% py, trace cpy 239.0-241.0 py concentrated in relict chl. schlieren, remobilized (in trains)	8683	2.0	239.0	241.0	.002	.03
241.0	262.0	ANDESITE: med. grain central part of flow, scattered amygdules, some pronounced pillow selvedge always with 4% average sulphides, at 243.5' clusters py with qtz cb. lenses of selvedge, folt'n strong 60°TCN, individual xstals, chl., dark chl. amph., cb., epidote. 241.0-242.3 en echelon cb. 2 mm. fractures with thin seams py in cb. Av.? below 242' random subhedral py 2% of rock fabric, strong content amygdules above 260', often with aureole of epidote around amygdules, cb. mainly barren in fractures after lithification	8684	1.3	241.0	242.3	.004	
262.0	265.0	FELDSPAR PORPHYRY: satellitic stringers Ct. irregular, same feldspar porphyry described continuously above, long sliver xenolith of schisted lava, silicic dark grey matrix with profusion subhedral feld. phenocrysts 'crystal mush', lower Ct. 60°TCN						
265.0	290.0	ANDESITE: med. grain central to basal part of pillowed flow, epidotic pillow selvedge to 10 cm. abundant sporadic, with central med. grain pillow individual crystals, chl. cb. epidote, amph. uniform sized though matrix, secondary fractures with massive cb. 40°TCN						
290.0	297.0	ANDESITE: very fine grain med. green, partly tuffaceous, amygdaloidal, crusted flow top, movement after solidification, vague brecciated fabric, original crust lighter green epidotic with secondary saturation of darker lava, profusion minute white amygdules, much cb. secondary in fractured top, barren of sulphides, small widths of tuff with cb. seams parallel multi-bedding, 30 and 40°TCN, scattered very fine trace py						
297.0	302.0	ANDESITE: partly tuffaceous, more massive flow top, fine to med. grain approaching interior of flow, some pillow selvedge evident, rare trace py, 45°TCN, bedding in short tuff segments						

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P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X1C7 TELEPHONE: (416) 362-6683 TELEX: 06-217766

Property:
Location:
Co-ordinates:

HOLE: T-84-8
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag			
302.0	350.0	ANDESITE: fine to slight med. grain light green pillowed flow, with amygdules adjacent to pillow selvedge, selvedge consists of melange of individual tablets of chl. epidote and of cb. qtz, with 4% disseminated py, a 10 cm. massive qtz cb. barren vein at 302 (arbitrary upper Ct.) several 3 cm. massive cb. barren veins, as fracture fill sporadic though lava sequence; amygdules mainly white cb. 5 mm. with some larger epidotic amygdules less abundant, minor trace py through matrix, folt'n appears about 55°TCN									
	350.0	END OF HOLE									

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Property: Tionago
Location: Lake Level
Co-ordinates: P.C. 5000N/5000E

HOLE: T-84-9
Core size: AQ

Section:
Length: 35'
Elevation:
Azimuth: -0- Dip: -90°

Dip Tests: NONE
Started: March 8/84
Completed: March 9/84
Logged by: Warren Gilman

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
0.0	10.0	WATER						
10.0	26.0	GREY CLAY at 10.0-22.0 with 3' boulders above bedrock CASING at 22-26 (in rock)						
26.0	27.5	ANDESITE: fine grain dark green, chloritic flow, 2% disseminated py, solitary 1 mm. crystals in massive soft matrix						
27.5	28.5	CARBONATE VEIN: banded massive cb. in brecciated fault zone, void with cb. fill, angular fragments on margins, lower Ct. 75°TCN 27.5-28.5 layered cb. and crystalline cb., angular rock inclusions, barren	8685	1.0	27.5	28.5	.002	
28.5	35.0	ANDESITE: fine to med. grain dark green, abundant dark green clots (chlorite?) in lighter green fine matrix, py 1%, cb. slip 1 mm. with trace cpy, minor cb. threading of fractures, excess chl. in rock suggests alteration in aureole of faulting; below 35' no core, hole squeezed around rods, unable to rotate, no return water, unable to obtain smaple, possible fault zone						
	35.0	HOLE ABANDONED						

T. 21 26

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Property: Tionaga
Location: Lake Level
Co-ordinates: P.C. 5000N/5010E

HOLE: T-84-10
Core size: AQ

Section:
Length: 250'
Elevation:
Azimuth: -0- Dip: -90°

Dip Tests: 250' -85°
Started: March 9/84
Completed: March 10/84
Logged by: Warren Gilman

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
0.0	5.0	LAKE WATER						
5.0	22.0	CASING: erroneous - as drilled over 10' in bedrock to try and asserve completion of lake						
22.0	90.0	ANDESITE: fine grain light green amygdaloidal pillowed flow, random 3 cm. pillow selvedge with amygdules prominent proximate to selvedge, amygdules spherical white and anhedral epidotic light green, latter are stretched with fretted margins, some may originally have been rock fragments. selvedge epidote cb. chl. tablets and melange of fragments often have 10% py, usually in lenticular trains parallel to curvature of margins, segments of massive fine grain rock are pillow interiors, with dark green clots in fabric, fabric is an altered epdiotic, cb'td, chloritic melange of metamorphic derivatives of original minerals; trace cpy disseminated in selvedge, amygdules parallel pillow contour and at acute angle to true folt'n 24.7-25.9 qtz vein 20 cm. barren with host rock, 1% py, vein up. Ct. 20°TCN	8686	1.2	24.7	25.9	.002	
90.0	94.6	FAULT: breccia of qtz, cb. boudins and angular blocks with internal angular rock fragments, cemented with chl. threads and senuous strands, barren of sulphides upper Ct. 65°TCN, lower 80°TCN, both Cts sharp distinct 90.0-94.6 fault plane 80°TCN, mainly qtz with secondary cb. chl., rare trace py in chl.	8687	4.6	90.0	94.6	.002	
94.6	101.0	ANDESITE: med. grain dark green, amssive, dark green angular fragments to 1 mm., relict fault brx. (obvious a fault with plural series of movements -- actually at ancient fault gouge recrystallized with massive appearance) from 98.3 to 101.0 post lithification brx'tn, brx with massive cb. in fractures, no sulphides 98.3-101.0 massive cb. seams 35% of segment, fabric matrix, ancient brx	8688	2.7	98.3	101.0	.002	
101.0	105.1	ANDESITE - TUFF: amygdaloidal flow top with tuff semgnets, fine banded chl. cb. 45°TCN, some secondary fracturing with massive cb. seams, some brx. in cb. seams 101.0-103.5 massive cb. seams 20% of fabric, tr. py in tuff parallel bedding 103.5-105.1 sample comprises section thru pillow - selvedge at each end 3 cm. 8% py with 4% py in pillow interior	8689	2.5	101.0	103.5	.002	
			8690	1.6	103.5	105.1	.028	

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Property:
Location:
Co-ordinates:

HOLE: T-84-10
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
105.1	109.8	QUARTZ VEIN: frosted grey-smokey qtz., due to relict inclusions-impurities, some chl. schlieren 105.1-109.8 trace py in qtz, sporadic py in chl. inclusions, Cts 45°TCN	8691	4.7	105.1	109.8	.028	
109.8	119.4	ANDESITE: fine to med. grain center of flow, homogeneous, massive, some fractures with massive cb. 109.8-110.8 py 8% adjacent to Ct. overlying vein 110.8-113.4 some crs py in cb. fractures; minor matrix py	8692 8693	1.0 2.6	109.8 110.8	110.8 113.4	.020 .002	
119.4	133.3	ANDESITE: fine grain amygdaloidal flow top, sporadic pillow selvedge 3 to 8 cm. all as described previously, some cherty very light green plates with some selvedge, at 30°TCN, amygdules concentrated proximate to selvedge 132.5-133.3 qtz vein 15 cm. parallel to pillow selvedge 45°TCN, trace py	8694	0.8	132.5	133.3	.006	
133.3	148.0	ANDESITE: med. grain center of pillows, massive homogeneous, some clustered white cb. amygdules proximate to pillow rims, rock fabric is crystalline mix of alteration minerals, epidote, cb., chl. and chloritized lamphibole, trace fine py.						
148.0	151.1	FELDSPAR PORPHYRY: med. grain grey green silicic 'crystal mush', 40% subhedral grey feld. phenocrysts in very fine grey base, av. phenos abundant to Ct. Cts flat, trace py, (148.0-148.3, bull qtz vein barren, flat at upper Ct.)						
151.1	200.0	ANDESITE: fine to slight med. grain light green pillow lava, sporadic 3 to 5 cm. pillow selvedge of a melange of epidote and chlorite tablets with interserta cb. often 45°TCN, with 5% random py, some qtz and hemalitic qtz in selvedge some bleached conformable 'rind' of light green fragments as original surface of pillowed rock, amygdules random, concentrated proximate to pillow margins 3 to 4' semgnets massive homogeneous lava from centers of pillows; 3 cm. to 5 cm. qtz and qtz cb. fractures usually proximate to pillow margins, thru all this sequence of successive flows, amygdules of 2 types, white sharp cb. spherules and more vague crs epidotic anhedral segregations to 1 cm. which may in part be lithic fragments incorporated in flow, a late set of fractures with massive cb. 5 mm. transects directional quality of flows,						

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P.O. BOX 143, 1 FIRST CANADIAN PLACE, TORONTO, CANADA M5X1C7 TELEPHONE: (416) 362-6683 TELEX: 06-217766

Property:
Location:
Co-ordinates:

HOLE: T-84-10
Core size:

Section:
Length:
Elevation:
Azimuth: Dip:

Dip Tests:
Started:
Completed:
Logged by:

DRILL LOG

DEPTH from	DEPTH to	DESCRIPTION NOTE: All angles are measured with respect to the long core axis.	sample number	width	from	to	ASSAYS Au	ASSAYS Ag
		151.1 - 200.0 (con't)						
		trace cpy and minor po with rare amygdules and sporadic in pillow selvedge several pronounced intermittent chloritic shears developed in pillowed flow with en echelon cb. bands parallel shears 40 to 60°TCN						
		191.3-195.0 cb. bands, lenses 25% of segment, fine py <1%	8695	3.7	191.3	195.0	.002	
200.0	250.0	ANDESITE: tuffaceous light green, jagged flow top, due to crustal break and 'brecciation' during lithification, qtz and cb. margined 15 cm. vein 45°TCN at flow Ct.						
		200.0-202.0 some aligned py in cb. bands parallel folt'n, 15 cm. qtz nil	8696	2.0	200.0	202.0	.002	
		grades to pillowed flow below crustal features at 202' with usual amygdaloidal and pillow selvedge, with later cb. fractures, barren; local chloritic shear with darkening of matrix from 224' to 232.5' en echelon cb. bands alternate with chloritic layers of variable width						
		224.0-229.0 minor py random with late cb'ate in sheared lava	8697	5.0	224.0	229.0	.002	
		229.0-232.5 en echelon cb. minor qtz 30% of semgnet in fine grain lava	8698	3.5	229.0	232.5	.002	
		pillowed, randomly amygdaloidal flow with 45° folt'n to end of hole						
	250.0	END OF HOLE						

Aggen
(Beneficiating
P.O. Bo
Peterborough, Ontario
K9J 7Y4
(705) 748-3024

900

November 21, 1984

Orofino Resources Limited
1 First Canadian Place
Suite 3140
Toronto, Ont.
M5X 1C7

Attention : Mr. Gerald Harper
Vice President

Dear Mr. Harper :

Some months ago you authorized your people to send us a sample from the Orofino Mine. We had requested same for the purpose of conducting sortability tests, with results to be incorporated in a Ministry of Natural Resources open file report. Having now completed the testwork, we enclose our report .

The results obtained were very encouraging and indicate that the Orofino ore could be quite amenable to coarse particle beneficiating. Due to the small sample size, values and percentages are suggestive, and should not be construed as indicative of sortability on a productive basis.

Should there be any questions regarding the testwork or results, please do not hesitate to contact us.

Yours Very Truly,
AGGEN INC.

W. Kemp Wait, P.Eng.

WKW/ar

encl's

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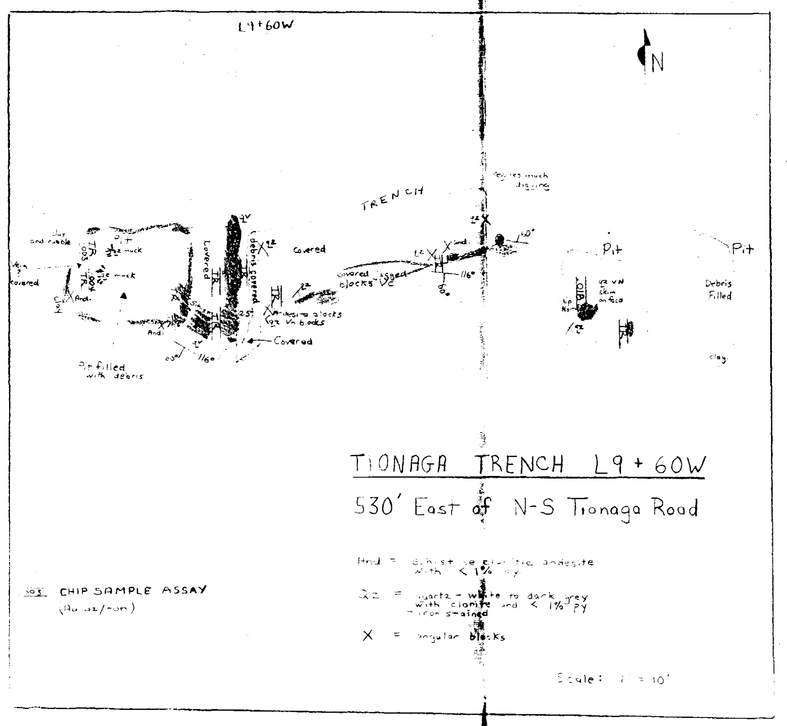
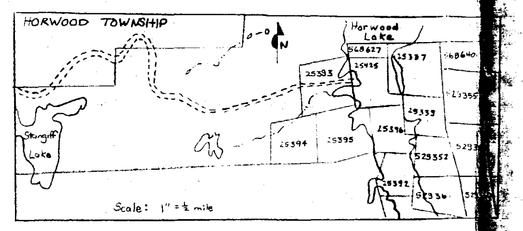
S 400E

S 200E





From 00 at Horwood East boundary

L18+60W L16+80W L15+60W L14+40W L13+20W L12+00W L10+80W L9+60W L8+40W L7+20W L6+00W L4+80W L3+60W L2+40W L1+20W L0+00

L33+60E

529316 568631 568632 568633 568634

568627 568640 568639

25425 25337

Cottage

Poplar, Birch

Poplar, Balsam

Poplar, Alders

Birch, Alders, Balsam

25393

529355 529353

25339

25396

529352 529356 529354

25395

25394

25392

L28+80E L30+20E L31+20E L32+40E

L27+60E L26+00E

From 00 at Horwood West boundary

LAKE

(25391)

N

T.2126

OROFINO RESOURCES LIMITED

TIONAGA PATENTED CLAIMS

GEOLOGICAL MAP

63.4539

Drawn by RICK VAIL	Date SEPT. 1984		Scale 1" = 300'
Drawn by LINDA FRANOLLA	Date SEPT. 1984		Drawing No.

210

LEGEND

- QUARTZ VEIN
- QUARTZ FELDSPAR PORPHYRY (no surface exposure)
- ANDESITE (flows agglomerate tuff)
- ROCK OUTCROP
- SCATTERED ROCK EXPOSURE (area of)
- FAULT
- CLAIM CORNER
- PICKET LINE
- MINE SHAFT
- MINE DUMP
- STRIKE DIP — FOLIATION
- ROAD

PROPERTY OF
MINISTRY OF NORTHERN DEVELOPMENT AND MINES
RESIDENT GEOLOGIST
TIMMINS

634539

T.2126

OROFINO RESOURCES LIMITED

OUTLYING CLAIMS
TRENCH LOCATION MAP

Work by: W. Gilman	Date: July 84		Scale: 1:3000
Drawn by: W. Gilman	Date: Aug. 84		Drawing no.

42547

25337

25425

Horwood

Lake

25396

25339

ODH 24

ODH 23

ODH 25

700 Level

570 Level

450 Level

325 Level

200 Level

Shaft

5500 N

19000 N
Orofino Grid

5000 N

4500 N

Legend:

84-9 (90°/1350') — 1984 DDH BY OROFINO RESOURCES LTD. (SURFACE)

— STOPES

SCALE 1:600

PROPERTY OF
MINISTRY OF NORTHERN
DEVELOPMENT AND MINES
RESIDENT GEOLOGIST
TIMMINS

63.4539 T. 2126

OROFINO RESOURCES LIMITED

TIONAGA MINE

COMPOSITE
DRILL PLAN
(SURFACE & UNDERGROUND)

Data by W.W. Weber	Updated by Rodel Ortiz May 1984	Dwg No
Drawn by A.R. Gunther	Scale 1" = 50' 1:600	

(32000 E Orofino Grid)

5000 S

5500 S

HORWOOD TWP
PROJECT 781
Stringoff Lake Group
27 Claims

PROJECT 782
Hardman Bay Group
25 Claims

HBF GRID

L GRID

M GRID

RPN GRID

QUO GRID

Anomaly 'G'

PROJECT 783
East MGX-Gowreau Group
38 Claims

DALE TWP

CLAIM MAP

84-1 84-2 84-8 84-7 84-9, 10 84-6 84-5 84-4

Collar Elev. 1149.11'

Lake Elev. 1115.00'

Horwood Lake

Fill

Cribbing

Sub 1 W1

1 West Raise

200 Level @ 1001.57'

4 West 1 Drift

4 East 1 Drive

200 LEVEL

Rock Surface

4 West 1 Raise

qv

325 Level @ 914.54'

3 East 1 Drift

325 LEVEL

5 West 1 Sub Stope

5 West 1 Stope

570 Level @ 742.37'

5 West 2 Raise

5 West 1 Drift

5 East 1 Stope

5 East 1 Drift

5 East 2 Stope

570 LEVEL

1 West 1 Sub Stope

Porphyry Dyke

1 West 1 Stope

Ore Hole

700 Level @ 654.50'

1 West 1 Drift

700 LEVEL

LEGEND:

- ABOVE PLANE
- DRILL HOLE INTERSECTION OF SECTION PLANE
- qv QUARTZ VEIN
- BELOW PLANE

PROVINCE OF ONTARIO
MINISTRY OF NORTHERN DEVELOPMENT AND MINES
RESIDENT GEOLOGIST
TIMMINS

T. 2126 63.4539

OROFINO RESOURCES LIMITED

TIONAGA GOLD MINES LTD.

LONGITUDINAL SECTION THROUGH VEIN

Scale: 1" = 40'

June 1, 1939 R.A. Findlay

Updated: March '84, R. Ortiz Redrawn Dec '83, A.R. Gunther

ORofino RESOURCES LIMITED

TIONRGA MINE

COMPOSITE LEVEL PLAN

Scale: 1" = 20'

63.4537

PROPERTY OF
MINISTRY OF NORTHERN
DEVELOPMENT AND MINE
RESIDENT GEOLOGIST
TIMMINS

84-1 — -90° (350') — 1984 DRILLING BY ORofino RESOURCES LIMITED

P. 21 8R

Shaft - 45°

200 LEVEL
elev 100'N'

84-9, 10
-90° (230')

325 LEVEL
elev 19'S'

84-8
-90° (350')

450 LEVEL
elev 075'W'

84-5
-90° (201')

84-6
-90° (300')

84-7
-90° (350')

570 LEVEL
elev 190.37'

84-3
-90° (499.6')

84-4
-90° (460')

700 LEVEL
elev 639.50'

84-1
-90° (350')

84-2
-90° (567')

Tlor-Zooda

Tezlie

Porphyry

Granstone

Fault 1 Shape

Fault 2 Shape

Fault 3 Shape

Fault 1 Ditch

Fault 2 Ditch

Fault 3 Ditch

Fault 4 Ditch

Fault 5 Ditch

Fault 6 Ditch

Fault 7 Ditch

Fault 8 Ditch

Fault 9 Ditch

Fault 10 Ditch

Fault 11 Ditch

Fault 12 Ditch

Fault 13 Ditch

Fault 14 Ditch

Fault 15 Ditch

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Fault 995 Ditch

Fault 996 Ditch

Fault 997 Ditch

Fault 998 Ditch

Fault 999 Ditch

Fault 1000 Ditch

No. 1 South Vn. (Upper Split)
(105° / 47°N)

No. 1 North Vn. (West Lower Split)
(106° / 28°N)

No. 1 South Vein (West)
(077° / 45°N)

No. 1 North Vein (East)
(110° / 16°N)

PIT

13 800N

13000N

12 800N

12600N

12 400N

A B C D E F G H I J K L M N O

Note: Refer to Map No. 2 for legend

KEY MAP

SCALE 1:250

PROPERTY OF
MINISTRY OF NORTHERN
DEVELOPMENT AND MINES
RESIDENT GEOLOGIST

63.4539

OROFINO RESOURCES LIMITED

OROFINO MINE PROJECT
SILK and HARWOOD TOWNSHIPS, ONTARIO

GEOLOGY
and
GOLD VEINS / ZONES
1 - SURFACE

260

ORCHARD RESOURCES LIMITED

GEOLOGY

Orchard Mine - Pedro Area

Scale 1" = 400'

Date: Jan. 1982

Drawn by: [illegible]

Checked by: [illegible]

Resident Geologist

Manager

63A537

KEY MAP

No. 1 South Vein (East)
(077°-080° / 45°N)

No. 3 Zone (South Zone)
(131°-274°N)

No. 5 Zone (West)
(117°-234°N)

No. 5 Zone (East)
(072°-47°N)

Fault Zone
(020°-65°W)

core shack

SHAFT

TRENCH

EARL T. MACAMMON

SYMBOLS

270