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## MT. WASHINGTON PROJECT

### SUMMARY REPORT

Nanaimo Mining Division Latitude 49° 46' 30' N Longitude 125° 18' W NTS 92F/11W and 92F/14W

April 1989 Updated January 1990 C.C. Rennie, P.Eng.



BETTER RESOURCES LTD MT. WASHINGTÓN PROJ.

# SKI VILLAGE

# LEGEND

Trace Of Mineralized Shear Adit Projected

# MT. WASHINGTON

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# BETTER RESOURCES LTD. MT. WASHINGTON PROJECT SUMMARY REPORT

### **EXECUTIVE SUMMARY**

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Better Resources Limited holds gold silver rights on 230 mineral claims and units, covering approximately 12,000 acres on Mt. Washington, Vancouver Island, B.C. They also hold a lease from Fording Coal Limited on the base metal rights on 20% of the property, and an exploration agreement with Fording on base metals on the remaining 80% of the property. Access is 21 km of paved and gravel road maintained year round to within 2 km of the main showings. B.C. Hydro power is 1.5 km away.

Tertiary quartz diorite and feldspar porphyry intrude upper Triassic Karmutsen volcanics and overlying upper Cretaceous Comox Formation sediments. Diapiric and collapse breccias are variably mineralized with copper, gold and silver. Better Resources has concentrated their exploration on a gently west dipping brecciated and silicified shear zone, mineralized with pyrite, arsenopyrite, and chalcopyrite containing gold and silver, that cuts the north arm of Mt. Washington.

A total of 58,443 ft. of NQ diamond drilling in 270 holes (mainly on the Lakeview Domineer area) and 912 ft. of 8 ft. x 8 ft. underground incline have established a reserve on the north ridge, designated Lakeview-Domineer zone of:

Area	Tons	oz/T Au	oz/T Ag	%Cu	<u>%As</u>
Possible Pit Underground	274,500 332,100	.184 .208	.74 1.10	.49 .63	1.95 <u>2.14</u>
Total	606,600	.197	.94	.57	2.05

A cutoff of .050 oz/T gold was used for the possible pit and .10 oz/T gold was used for the underground portion. The strip ratio on the Possible Pit averages 10:1.

A small pit with 3.24:1 strip ratio and an intermediate pit (including the small pit) with 4.82:1 strip ratio were calculated as follows:

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	Tons	oz <u>/T A</u> u	:oz <u>/T Ag</u>	% <u>C</u> u	<u>% As</u>
Small Pit	147,700	.192	.96	.51	2.08
Interm. Pit	223,400	.168	.85	.44	1.90

Preliminary metallurgical testing has indicated that best gold recoveries can be made using a combination of flotation, bio-oxidation and cyanidation. A copper concentrate grading 23% Cu contains 26% of the gold. Bio-oxidizing and cyaniding the flotation tailings recovers an overall 92% of the gold. Preliminary mill operating costs for a 200 ton per day mill are estimated at \$34 per ton with approximately 1/3 being labour cost and 1/3 cyanide and cyanide destruction cost. Further test work may reduce the cyanide consumption and of course higher throughout would reduce the unit labour cost if larger reserves justify a larger mill. Preliminary mill capital costs have been estimated at \$7 million but \$4 million of this is a guess estimate of the bio-oxidizing requirements.

Additional drilling, at least 20,000 ft., is required to confirm and expand reserves in the Lakeview-Domineer zone, and to explore the Oyster Breccia and Murex Breccia zones. Continued metallurgical testing and engineering studies leading to a preliminary feasibility evaluation and then full feasibility are required, plus a Prospectus submission to start the Mine Review Process.

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# BETTER RESOURCES LTD. MT. WASHINGTON PROJECT SUMMARY REPORT

### LOCATION, ACCESS AND FACILITIES

The claims of Better Resources Ltd. on Mt. Washington are centered on Latitude 49° 46' North, Longitude 115° 18' West within map sheets N.T.S. 92F/11W, 92F/14W, in the Nanaimo Mining Division. The claims are located approximately 21.5 kilometres northwest of Courtenay, British Columbia. They straddle the summit of Mt. Washington, the McKay Lake Basin, the north spur of Mt. Washington, and a portion of the area to the north (see Figure 1 and 2).

Access to the claims is by a network of well maintained paved and gravel mining and logging roads. Depending on snowfall and runoff conditions, access to within one kilometre of any point on the property is usually possible by four wheel vehicle between July and November. In most areas of the property, a year-round supply of drilling water is located within a radius of 400 metres. An electric power line has been extended to the top of Mt. Washington, well within the claim boundaries. Well-appointed accommodations are available at the Mt. Washington Ski Resort during the summer months. Year-round accommodations are available in Courtenay. Construction supplies, services and labour are readily available in the Campbell River-Courtenay area.

### PROPERTY AND OWNERSHIP

The property consists of 230 claims and units inclusive of 4 Crown Grant claims, 2post claims and modified grid units, covering 12,000 acres, which are 100% owned by Better Resources Ltd. and encompass gold and silver mineral rights previously reserved to the Crown (Figure 2). Base metal rights over most of the property are held by Fording Coal Ltd., successor to the original E&N Land Grant (see Figure 2). Imperial Metals Corp. Ltd. obtained a lease from Fording Coal on base metal rights over 1,636 acres covering the Lakeview-Domineer Zone, which was purchased by Better in November 1989. Better have an extendable exploration agreement with option to lease on the remaining 8,400 acres of the Fording Coal base metal rights. The Oyster Breccia exploration target and the Murex Breccia lie within this Better-Fording agreement area.

In September 1987, Better and Noranda Exploration Co. Ltd. entered into an agreement on the 39 claim Murex block on the eastern side of the property. Noranda could earn a 51% interest in this block by completing \$2,500,000 exploration by December 31, 1990 and making staged payments to Better totalling \$100,000. Noranda explored in 1988 and 1989 but relinquished their agreement in December 1989 without earning any interest.

Surface rights over most of the property are owned by Crown Forest, a subsidiary of Fletcher Challenge. Better Resources have agreements with Crown Forest covering access road use and the underground ore stockpile. The main access road to Mt. Washington is owned by Crown Forest but is maintained year-round by the Mt. Washington Ski Development. At sometime in the future it may become a public road.

### PREVIOUS EXPLORATION

The Mt. Washington property has been extensively explored since its discovery in 1940 by the McKay brothers. Numerous individuals and companies have under taken trenching, prospecting, soil sampling, geophysical surveys and diamond drilling on the Domineer and surrounding areas. The following is a brief synopsis on the history of Mt. Washington.

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Year	Company	Work Done
1940	McKay Brothers	prospecting
1941	K.J. Springer	prospected Domineer
1944-45	Consolidated Mining and Smelting	exploring Domineer Vein
1951-59	Noranda Exploration	exploring north of Domineer Vein
1956	Mt. Washington Copper Co.	built road along Murex Creek
1957	Noranda & Mt. Washington Copper Co.	explored Murex basin, drilling outlined low grade copper zone
1958	Noranda & Mt. Washington Copper Co.	EM survey, trenching, diamond drilling flat lying zone of 2% copper north of the Domineer
1963-64	Cominco	drilled 12,596 ft.
1965-66	Mt. Washington Copper Co.	milled 392,000 tons of ore grading 1.16% Cu, 0.01 oz/ton Au, 0.5 oz/ton Ag
1969	Marietta Resources	drilled 6,947 ft., airborne magnetic survey
1971	Mt. Washington Copper	5 drill holes
1972-82	Esso Minerals	soil sampling, I.P. survey, geological mapping, drilled 10,489 ft., Lakeview zone pitted and short drill holes
1983	Better Resources	soil sampling, 2 drill holes
1984	Better Resources	soil sampling, water geochemistry, geological mapping, 16 drill holes
1985	Better Resources	Inactive
1986	Better Resources	trenching, 49 drill holes
1987	Better Resources	soil sampling, road and site building, 112 drill holes, 912 ft. of incline
1988	Better Resources	soil sampling, mapping, trenching, prospecting, 65 drill holes
1988	Noranda	geophysics, geochem, 9 holes 🥈
1989	Better Resources	trenching, 17 drill holes
1989	Noranda	geophysics, geochem, 2 holes



# BETTER RESOURCES LTD. MT. WASHINGTON B.C. PHOTOGEOLOGICAL MAP

LEGEND

BRECCIAS (UNDIFFERENTIATED) DIORITE & PORPH. DACITE COMOX FORMATION KARMUTSEN FORMATION

R. E. KUCERA 1987

In 1983, Heinz Veerman submitted this property to Better Resources Ltd. The property was acquired based on the presence of known gold mineralization, a huge arsenic soil anomaly (greater than 2 km long), the presence of a realgar and a Tertiary age of the intrusives. From 1983 to 1989, Better Resources has drilled approximately 49,411 feet on the Lakeview/Domineer zone, 2,557 feet on the Oyster Breccia, 3,300 feet on Glacier Ridge and 3,175 feet on the Murex zone for a total of 58,433 feet drilled. The Lakeview/Domineer zone, the Oyster Breccia and McKay Lake have been extensively soil sampled with anomalous areas then trenched and finally drilled. An 8 ft. by 8 ft. underground incline was driven 912 ft. in 1987 to provide a metallurgical sample, determine the continuity of mineralization and examine rock stability.

To date \$3.0 million dollars have been spent by Better Resources Limited on exploration on the Mt. Washington property with \$2.082 million derived from flow-through shares in the 1987 and 1988 seasons.

### **GENERAL GEOLOGY**

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The lowest and oldest rocks on the property (Figure 3) are Karmutsen volcanics of upper Triassic age. These are mainly massive basalts with lesser volcanic tuff and breccia members. Unconformably overlying the Karmutsen formation on part of the property is the upper Cretaceous Comox Formation of the Nanaimo Group, made up of sandstones and shales, with some carbonaceous material. McKay Lake is the center of a Tertiary quartz diorite intrusive with associated feldspar porphyry sills and dykes. Diapiric and collapse breccias may be contemporaneous with or later than the intrusive since many of the breccias contain quartz-diorite and feldspar porphyry fragments as well as Comox and Karmutsen fragments.

Mineralization is widespread on Mt. Washington within the breccias and in crackle zones around the breccias and intrusive contact. Pyrite and pyrrhotite predominate with variable low amounts of chalcopyrite. Most favoured target areas are the breccias, briefly described below.

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The Washington breccia, apparently the youngest, appears on surface as a plug between the Domineer vein outcrop and the south copper pit. Large angular clasts of diorite dominate over finely comminuted rock flour matrix, which has been partly replaced by actinolite and magnetite.

The Murray breccia, covering a large area south of the Washington breccia, has a much higher proportion of fine material to clasts. The clasts ranging from 1 to 10 cm in size and averaging 2 cm, are a mixture of quartz diorite, sandstone, siltstone and mafic volcanics. It has been argued that this breccia could be a Tertiary ejectamenta but crosscutting relationships with the Comox formation suggests a diatreme.

The McKay breccia located 2 km to the northeast of the Washington breccia also appears to be a diatreme. Features which suggest this mode of origin include: (1) an apparent pipe shaped morphology, (2) generally subrounded dast shape, (3) highly variable matrix content, (4) variety of clast compositions, (5) the presence of steeply dipping channels and (6) an increase in the fracture density of the country rock towards the breccia (McGuigan, P.J., 1975). As with the Washington breccia, veins of magnetite and actinolite are found to replace portions of the matrix.

The Murex breccia is both the largest and most complicated. Located at the eastern end of the property, this breccia has been subdivided by McGuigan (1975) into three variants or types. The first two types consist of subrounded to subangular clasts 1 to 10 cm in diameter of the Comox and Karmutsen Formations respectively. Matrix is generally less than 25% consisting entirely of finely comminuted rock fragments. Contact relations between the two mimic the overall trend of the unconformity, suggesting collapse to be the dominant process. The third form of Murex breccia is much more variable. More specifically the clast composition is heterolithic, with the size varying from 1 to 50 cm and the degree of roundness from subangular to spherical. The matrix content is also quite variable (20 to 80%) containing numerous matrix-rich channels. Alt of these

features indicate a fair degree of movement has taken place, suggesting a mode of origin akin to a diatreme.

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The Glacier Breccia located immediately east of the Washington Breccia consists of a sill-like body of highly mixed fragments. The Quarry Breccia located on the eastern slope of Mt. Washington is a composite breccia consisting of a core of rotated mixed fragments which is enclosed by a crackle breccia. Collapse appears to be mode of origin for this breccia.

Another collapse breccia is Oyster Breccia located approximately 2 km northwest of the Washington Breccia. Intense sericite alteration has affected the clasts with dolomite and vuggy quartz present in the matrix. Surrounding this breccia is a concentric, inward dipping fault-fracture set (McGuigan, P.J., 1975).



### ORE CONTROL AND MINERALIZATION

Better Resources Ltd. has concentrated most of their exploration activity on the Lakeview - Domineer Zone that cuts through the northwest sides of Mt. Washington. The ore controlling structure is a gently west dipping shear zone (Figure 4) that outcrops or sub-outcrops along both sides of the ridge and appears to be the same structure that contained the copper mineralization in the old copper pits at the north end of the ridge. The hanging wall of this shear is marked by a thin fault zone with some imbrications. Mullions on this fault in the underground working indicate the last movement was hanging wall moved from west to east relative to the footwall. Beneath this fault is a variable thickness of intense brecciation (possibly hydrothermal breccia) with strong silicification and clay alteration of the fragments. This structure cuts through the Comox formation approximately 100 m above its contact with the Karmutsen and through the Murray and Washington breccia. Tension cracks extending below the most intense breccia are mineralized. As yet no steep feeder zones for mineralization have been found beneath this structure.

are mineralized. As yet no steep feeder zones for mineralization have been found beneath this structure.

Gold bearing mineralization in the Lakeview Domineer zone is characterized by pyrite, arsenopyrite and some chalcopyrite in a silicified matrix around fine breccia fragments. Minor minerals reported by Carson are covellite, sphalerite, galena, tennantite, bornite, wernerite, hessite, chalcocite, realgar and orpiment. The best grade mineralization is concentrated immediately below the hanging wall of the structure. Higher gold values tend to accompany higher arsenopyrite content with up to 4 oz Au/T in nearly massive arsenopyrite at the adit collar. Higher silver values tend to parallel higher copper content.

### UNDERGROUND EXPLORATION

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In 1987, Better Resources Ltd. drove a total of 278 m of incline adit which was branched into two drives 105 m from the portal. This incline intersected five diamond drill holes. High grade mineralization at the portal dipped flatly into the footwall of the incline approximately 30 m inside the portal. A band of good grade (.20 oz/T Au) dipped out of the adit back at approximately 90 m from the portal and was followed by lower grade breccia ( .10 oz/T Au) in the main heading as indicated by the diamond drilling. Gold grade appears to be increasing again at the face of the main heading. In the north branch the structure is more complicated with good grade at the start and very low grade (.05-) to the face of the branch where grades are increasing.

Two 10 kg grab samples were taken from each round of muck and the walls of the adit were chip sampled. Insufficient time was available to channel sample the walls, which should be done for a more accurate grade check against drill holes.

Rock stability was generally good with only a few rock bolts inserted at the intersection of the north branch and a few bolts and screen elsewhere.



In general, the underground workings showed a continuity but imbrication of the structure with shingling lenses of mineralization.

A sample for metallurgical testing was taken from composite muck sample rejects from the start of the north branch as material representing the average grade of the reserves and average appearance of the general ore type intersected by drilling. In addition, some barrels of high grade and 20 tons of average grade material were stockpiled in Courtenay for future metallurgical testing if required.

All material from underground was stockpiled on 80 mil plastic on a troughed pad draining back to the portal and covered with 14 mil plastic to minimize drainage through the rock.

### **ORE RESERVES**

The 1988 reserves (Figure 5) for the Lakeview Domineer zone were compiled from all drill hole intersections to date obtained by Better Resources and previous operators. Areas of influence were established around each intersection extending halfway to the next intersection, or to surface or to a maximum 150 ft. (50 m). Minimum thickness uses was 6 ft. and where the zone was less than 6 ft. it was diluted to 6 ft. thickness with adjacent low grade. Drill hole intersection grades were used with no cutting as the gold is finely disseminated with no nugget effect. A cut-off of .05 oz Au/t was used for the possible open pit and .10 oz Au/t was used for the underground portion.

The possible pit has not been optimized and has an approximately strip ratio of 10:1. Drilling in the possible pit area is at roughly 50 ft. spacing whereas in the underground portion hole spacing is up to 200 ft. Both the closer spacing and lower cut-off grade provide better continuity of ore in the pit portion. Closer spaced drilling is required in the underground portion to outline areas for room and pillar mining.

Area	Tons	<u>oz/T Au</u>	oz/T Ag	<u>% Cu</u>	<u>% As</u>
Possible Pit Underground	274,500 332,100	.184 .208	.74 1.10	.49 .63	1.95 2.14
		<u></u>		<u> </u>	
Total	606,600	.197	.94	.57	2.05

Drill indicated reserves in short tons at 10 cu.ft./st (3.2 S.G.) are:

In late 1989, two smaller open pits were calculated to establish strip ratios and tonnage and grade for a small pit with a strip ratio calculated at 3.24:1 and an intermediate pit (including the small pit) with strip ratio of 4.82:1 with reserves of:

	Tons	<u>oz/TAu</u>	oz/TAg	<u>% Cu</u>	<u>% As</u>
Small Pit	147,700	.192	.96	.51	2.08
Interm. Pit	223,400	.168	.85	.44	1.90

### METALLURGICAL TESTING

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The majority of the metallurgical test work was carried out in 1988 by Gary Hawthorn of Westcoast Mineral Testing Inc. on a sample of composited crushed muck sample rejects from underground that represented average grade and mineral content. Assayed head grade was .178 oz/t Au, .64 oz/t Ag, .42% Cu, 4.02% As.

Various techniques were tested included:

- a) gravity concentration only 2.3% of the gold reported to a 2.3 oz/t Au concentrate;
- b) direct cyanidation only 70% gold recovery with high cyanide consumption;
- c) differential flotation potentially marketable Cu cons. but unmarketable bulk cons.;

d) flotation of Cu con., bio-oxidizing tailings and cyanidation of this biooxidized tailing gave an average 92% gold recovery.

This latter procedure was selected as the most effective and most environmentally acceptable. Since copper consumes cyanide, a removal of copper into a marketable concentrate is required before oxidation and cyaniding the remainder. The bio-oxidation converts the arsenopyrite to a stable ferric arsenate that can be contained in a tailings pond.

Hawthorn calculates that a 23% Cu concentrate containing 68% of the copper, 26% of the gold and 1% arsenic is potentially marketable. At a high level of biooxidation and arsenopyrite destruction 89.5% of the contained gold in the biooxidized flotation tailing can be recovered by cyanidation with a cyanide consumption of 3.5 kg/t, for an overall gold recovery of 92%.

In his January, 1989 report on Capital and Operating Cost Estimates for a 200 TPD concentrate, Hawthorn calculates a mill operating cost of \$33.85 per ton and a capital cost for the mill, including road and power supply, tailings and water supply of \$7,053,000. This capital cost includes an estimate only of \$4,000,000 for the bio-oxidation plant. Offices, shops, mining equipment and operating capital would be additional.

While this is a positive start on the technical aspects of gold extraction from Mt. Washington, much work is required to optimize recoveries and reagent consumptions and to detail the capital costs.

Copies of all progress reports on metallurgy and the summary cost report are on file in Better's office.

### THE 1989 PROGRAMS

Better Resources Limited carried out a small amount of trenching and drilled 17 NQ diamond drill holes totalling 1,876 ft. in three areas on the Lakeview zone. Two of the areas did not produce ore grades but drilling in the area immediately west of the portal produced intersections of gold and copper mineralization in intrusive dykes with the strongest intersection being 23' of .138 oz/TAu and 3.4% Cu with a possible true width of 15 ft. This steeply dipping zone of mineralized dykes with gold and high copper values and low to absent arsenic needs extensive testing.

Noranda carried out very detailed geochemistry and geophysics on a fault breccia zone in the Murex area and established a strong HEM conductor over 200 m long with coincident gold-copper geochem anomaly down slope. Only two short holes were drilled,, one of which cut 4 m of .184 oz/TAu and 4.08% Cu. Deeper drilling is required on this zone which has a minimum potential of 4000 tonnes per vertical meter.

### EXPLORATION POTENTIAL

Considerable potential for additional gold remains to be explored on the Mt. Washington property. Target area are already established and these may be expanded upon or others found by additional work.

In the Lakeview Domineer area (see Figure 5), two rows of shallow holes were drilled in 1988 north of the proposed pit area to explore for additional open pit ore. While the shear zone was recognized in these holes the mineralization was thin and low grade (0.5 ft. of .28 oz/t Au). There remains a larger area to be tested by drilling between these shallow holes and holes 87-109 and 87-140. Two other areas that warrant further drilling are the area between 87-109 and 86-29 (which is difficult access) and the area south of holes 87-130 and 87-131. While some holes adjacent to these areas have cut below cut-off mineralization our experience has

shown that lenses of better grade occur and may add substantially to the gold reserve.

The steeply-dipping gold copper bearing dykes west and south of the portal, indicated by the 1989 program, warrant extensive drilling.

The Oyster breccia area is a large zone of intense breccia and alteration with a coincident spotty gold arsenic antimony geochem anomaly on the southwest side. Hole 75-2 drilled to 604 ft. vertically by Esso in 1975 and deepened to 1,777 ft. by Better in 1988 is in continuous breccia with increased silicification to depth. This hole was deepened to examine the character of the breccia from an available site near the breccia centre. With this background it now makes sense to explore the perimeter of this breccia, possibly with geophysics but certainly with a progressive drill program.

The Murex breccia, following preliminary testing by Noranda, warrants detailing along strike and at depth.

### PROPOSED PROGRAM

In order to maintain the momentum of exploration and development on the property, consistent with previous years' work, a minimum \$750,000 program is required to include 20,000 ft. of NQ surface drilling, underground check sampling, surface trenching, geochemistry, additional metallurgical testing and optimizing, engineering studies on road, water and electricity supply, tailings pond selection and testing and submission of a Prospectus to the Mine Review Process. The proposed drill program will be laid out in detail and other facets of the program will be scheduled to be introduced or accelerated as funds become available.

April 1989 Revised January 1990 C.C. Rennie, P.Eng.

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### APPENDIX 1

### LOCATION OF RECORDS AND DATA

The registered office of Better Resources Ltd. is the office of McInnes and Neuman, 1620 - 701 West Georgia Street, Vancouver, B.C. V7Y 1G2, where legal records are kept.

All technical data, drill logs, maps, cross sections and internal and external consultants' reports are on file at the office of Better Resources Ltd. at 309 - 535 Howe Street, Vancouver, B.C. V6C 2Z4, telephone: 684-4320.

All drill core from Better's 1983 to 1988 program is stored in Courtenay in well-constructed core racks on the property of Zdebiak Trucking Ltd. on Peircy Road (Plateau Road).

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Approximately 6,000 tons of mineralization from the 1987 underground program is stockpiled on the property adjacent to the underground portal.