THE 1994 EXPLORATION PROGRAM

IN THE GOSSAN HILL AREA

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1.0) Introduction

The Gossan Hill area is located on the Sulphurets Property and is within 200 meters of the West Zone underground workings. The Sulphurets property consists of 343 contiguous units in 65 claims and is located 65 kilometers northwest of the town of Stewart, British Columbia (Figure 1).

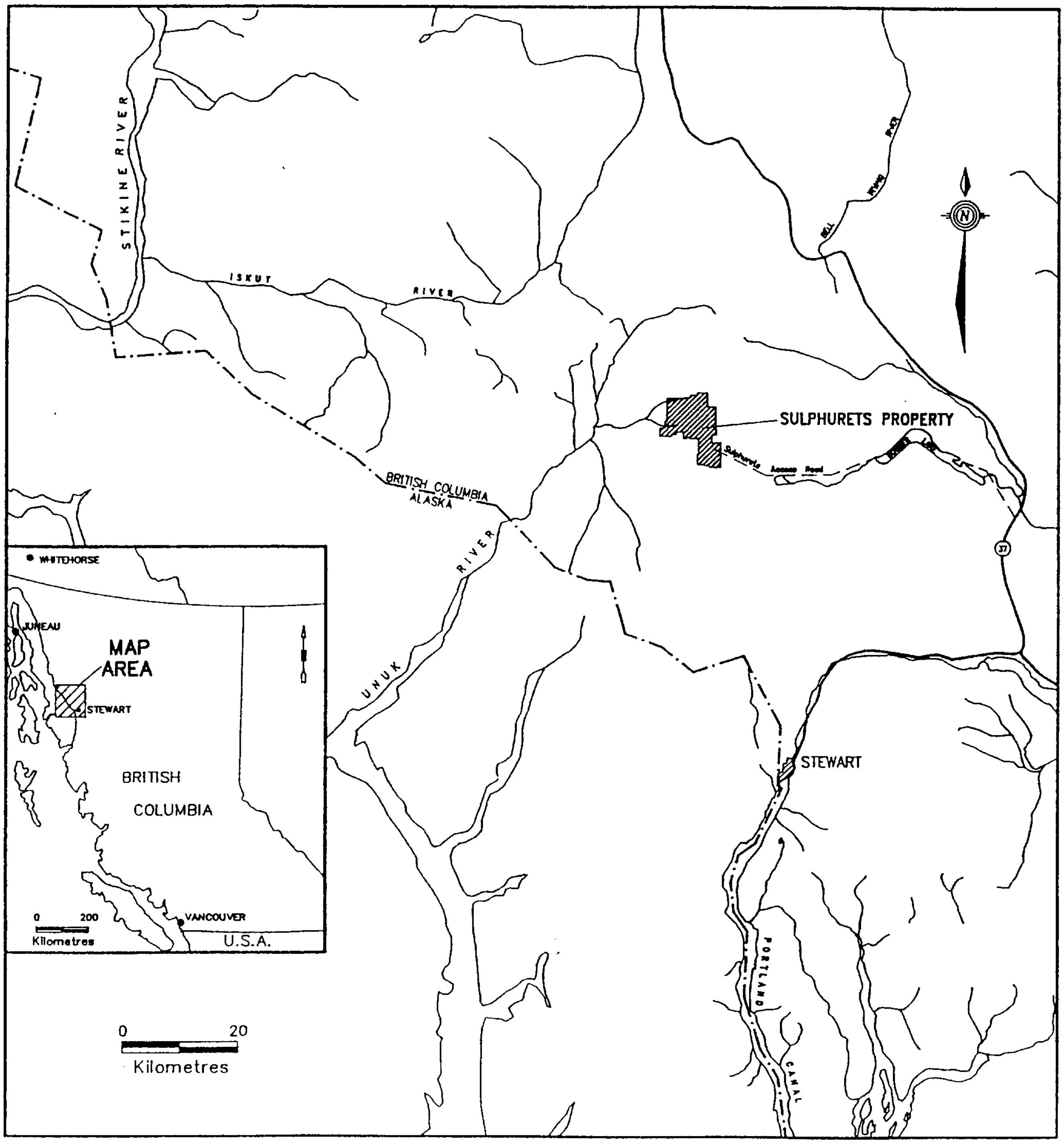
This report describes and analyzes the field work of 1994 which includes the area of Gossan Hill, and the areas between Gossan Hill and the Big Sleep, Shore Zone, and Camino Real through field mapping and sampling. Please refer to 1:500 Geology Sheets 440-320, 440-350, 440-380, 480-310, 480-350, and 480-380. The object of the 1994 surface program was to define and outline additional auriferous zones/structures and discover new ones (i.e. Big Sleep East and Trachsel Zone). Also, in-fill mapping and sampling was partially completed on Gossan Hill and between Gossan Hill and the Shore Zone.

2.0) Gossan Hill Area - Previous & 1994 Exploration Program

2.1) Mapping

The Gossan Hill area had undergone a rigorous exploration in the 1993 field season with detailed surface mapping. Prior to 1993, the area had undergone only limited detailed surface mapping. The 1994 detailed mapping and sampling program was initiated to define and outline the potential of Au-Ag zones along stratigraphic contacts (i.e. zones of weakness - susceptible to strain) along the periphyry of Gossan Hill. Due to inclement weather, detailed surface mappine was part-

Roach & Macdonald, Figure 1



ially completed on Gossan Hill and between Gossan Hill and the Shore Zone. Field work by the author commenced on July 9th and ended on September 26th, 1994. Field mapping consisted of detailed mapping at 1:500 scale and mapping of diamond saw cuts. Particular attention was focused on the metasedimentary/metavolcanic contact east of Gossan Hill and the northwest extension of the Shore Zone.

Mapping of outcrop and diamond saw channel cuts and other features were chained with reference to surveyed grid stations that have been established every 20 to 40 meters. All geological and assay plans on Gossan Hill are presented at a scale of 1:500 and are on file in the Vancouver office.

2.2) Sampling

The Gossan Hill area had undergone extensive diamond saw channel sampling in 1993. Prior to 1993, the area had undergone only limited diamond saw channel sampling. Continuation of this sampling program was a result of the discovery of the Big Sleep Zone in 1992 and the discovery of any new structures. Diamond saw channel sampling in the Gossan Hill area was carried out between July 12th and September 3rd, 1994.

The diamond saw channel cuts were carried out by Francois Larocque, Jim Franks, and Darren Adams with the description of the samples carried out by the author with the help of Barry McDonough. A diamond saw channel cut is approximately 5 cm wide and deep with sample intervals varying between 0.25 meters and 1.50 meters with the average being 1.0 meters. A total of 199.3 meters (653.9 feet) of cutting and sampling was conducted in 1994 in the periphyry of Gossan Hill. The zones that led to an extensive channel sampling program in 1994 are;

1) Big Sleep East - 71.60 m
2) Trachsel Zone - 54.69 m
3) Camino Real & Shore Zone - 39.15 m
4) Windy Point - 33.85

A total of 286 rock samples, including samples from diamond saw cuts and representative rock chip grabs from outcrops, were collected for assay. All samples were analyzed for gold (½ ton assay) by Eco-Tech in Stewart, and Ag(½ ton assay) and Cu, Pb, Zn, Sb, As, Th, Mo, and Hg (ICP) analyses were performed by Eco-Tech in Kamloops, British Columbia.

2.3) Drilling

A total of 8 diamond drill holes totalling 3486.6 meters (11,439.5 feet) were drilled on Gossan Hill in 1994. This total is included in the overall total of 36 diamond drill holes between 1985 and 1994 (Table 1). An overall total footage on Gossan Hill is 7797.6 meters (25,583.9 feet), which includes one underground drill hole that was drilled in 1990 for 370.6 meters (1216.0 feet). Three drill holes, S89-380 and S89-384 and 385, totalling 179.8 meters (599.0 feet) were drilled to test an area for a proposed mill site. A report describing the mill site drilling is under a separate cover entitled: Mill Site Sterilization Projects - 1989. A report describing previous surface mapping and drilling on Gossan Hill is also under a separate cover entitled: Review of the Surface Exploration Programs on Gossan Hill - 1993.

The 1994 drilling was to test the complex structures of

Table 1

Drill Hole	Section	Azimuth	Dip	Depth (m)	Zones
S85-128	31+00 E	000	-40	81.71	PM-4A,5,TK-3
S85-129	31+00 E	330	-40	87.80	PM-4,TK,TK-3
S86-181	31+20 E	000	-30	136.55	4,4A,5,TK/RO
S87-239	31+00 E	140	-40	96.32	5,TK,TK-3,3A
S87-240	31+00 E	140	-70	97.54	5,TK,TK-3,3A
S87-241	31+20 E	140	-40	88.09	PM-4A,5,TK
S87-242	31+20 E	140	-70	92.05	PM-4A,5
S87-246	31+20 E	095	-40	102.11	PM-4A,5
S87-247	31+20 E	095	-55	114.60	PM-4A,5
S87-248	31+20 E	095	-70	166.73	PM-4A,5
S87-254	30+80 E	140	-40	92.97	PM-5,R-0
S87-255	30+80 E	140	-70	108.21	PM-5
S87-275	31+20 E	050	-70	152.10	PM-4
S87-276	31+20 E	075	-55	123.75	PM-4
S88-296	32+40 E	232	-65	392.25	TK
S88-298	32+40 E	230	-65	405.69	TK
S88-300	32+30 E	232	-65	214.27	PM-4
U90-449	-	025	000	370.62	PM-4A,R-0,TK
S93-427	31+10 E	138	-40	102.70	4,4A,5,TK,3,3A
S93-428	31+60 E	142	-52	175.60	PM-3,3A,5
S93-429	31+70 E	191	-45	52.40	PM-6,TK,TK-2
S93-430	31+70 E	192	-63	105.40	PM-6,TK,TK-2
S93-431	31+70 E	163	-46	67.40	PM-6,TK,TK-1
S93-433	34+00 E	164	-42	170.07	Marie,PM-1,2
S93-436	31+60 E	140	-30	206.10	3,3A,4A,5,TK
S93-437	31+80 E	140	-40	175.30	PM-3,3A,4,4A,5
S93-438	31+10 E	140	-52	108.00	PM-3,3A,4,4A,5 TK,TK-3,3A
S93-441	31+30 E	140	-48	224.70	PM-4A,5,TK,TK-2

Table 1 (cont)

Drill Hole	Section	Azimuth	Dip	Depth (m)	Zones
S94-447	34+30 E	170	-45	432.2	Marie, PM-1,2,3, 3A,4,4A,5,6,Tommy-knocker
S94-448	33+40 E	170	-45	516.0	Marie, PM-1,2,3, 3A,4,4A,5,6,Tommy-knocker
S94-449	33+15 E	177	-45	462.3	Marie, PM-1,2,3, 3A,4,4A,5,6,Tommy-knocker
S94-450	35+70 E	170	-45	523.0	Gossan Hill,Big Sleep
S94-454	33+40 E	345	-45	415.4	Gossan Hill,Grace
S94-455	32+00 E	170	-49	288.6	PM-3,3A,4,4A,5, Tommyknocker
S94-456	32+00 E	170	-69	517.8	PM-3,3A,4,4A,5, Tommyknocker
S94-457	31+60 E	170	-55	331.3	PM-3,3A,4,4A,5, Tommyknocker

Gossan Hill at depth. The principal target area was the Tommyknocker Zone, down-dip. Drilling also outlined PM-1, 2, 3, 3A, 4, 4A, and 5, down-dip. However, drilling of the Marie Gold Zone was unsuccessful as the collar locations were at the extreme peripheral ends of the Au-Ag zone.

3.0) Regional Geology

The Sulphurets Property lies within the Stikine Terrane (Wheeler and McFeely - 1987). The rocks underlying the property consist of Upper Triassic Stuhini Group and Lower to Middle Jurassic Hazelton Group metavolcanics, metasediments, and intrusives. The regional geological lithostratigraphy has been described by Kirkham (1963), Groves (1986), Britton and Alldrick (1988), Alldrick and Britton (1991), and Kirkham et al (1991).

The Stuhini Group underlies approximately 40% of the area within the Sulphurets Property. This assemblage of rocks consist of metasediments and metavolcanics. The metasediments are pale to dark gray, carbonaceous mudstone, siltstone, sandstone, conglomerate, and metasedimentary breccia (Kirkham et al - 1991). The metavolcanics are classified as sub-alkalic, calc-alkaline andesite to tholeiitic basalt, and commonly include pyroclastics, flows, and epiclastic rocks (Figure **2**). High K-feldspar content of metasedimentary rocks, and high K_2O content of the mafic metavolcanics in conjunction with the occurrence of pyroxene phenocrysts, may be stratigraphically distinctive (Henderson et al - 1992). A syenitic intrusion on the north side of the Mitchell Glacier, cutting these metasedimentary rocks, yielded a U-Pb zircon date of 193.9 ± 0.5 Ma consistent with a Triassic age for the host

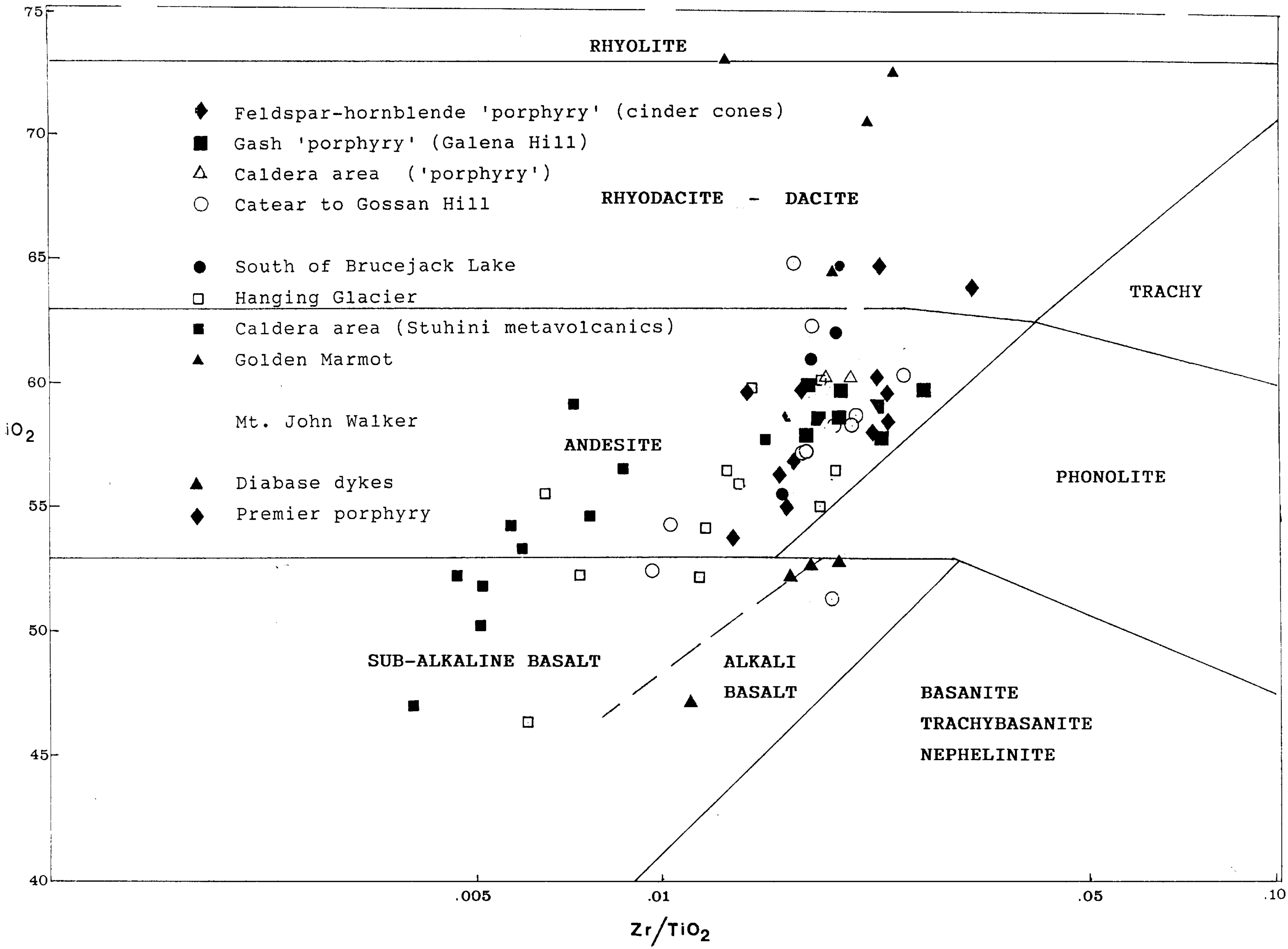

RHYOLITE
Feldspar-hornblende 'porphyry' (cinder cones)
Gash 'porphyry' (Galena Hill)
Caldera area ('porphyry')
Catear to Gossan Hill
South of Brucejack Lake
Hanging Glacier
Caldera area (Stuhini metavolcanics)
Golden Marmot
Mt. John Walker
Diabase dykes
Premier porphyry
RHYODACITE - DACITE
TRACHY
ANDESITE
PHONOLITE
SUB-ALKALINE BASALT
ALKALI
BASALT
BASANITE
TRACHYBASANITE
NEPHELINITE
75
70
65
60
55
50
45
40
iO2
.005
.01
.05
.10
Zr/TiO2

FIGURE 2

metasedimentary rocks (Kirkham - 1991).

The Lower Jurassic, basal Hazelton Group rocks are primarily metasediments that are quartz arenites, pebbly sandstones and conglomerates (Marsden - 1994). These arenaceous rocks are overlain by argillaceous rocks and debris flows or conglomerates (Marsden - 1994). These conglomerates or debris flows contain rip-up argillite clasts and feldspar-hornblende-phyric cobbles in an argillaceous or carbonaceous matrix. This Lower Jurassic basal unit unconformably overlies the Stuhini Group and conformably underlies the Hazelton Group of metavolcanics (Henderson et al - 1992).

The Hazelton Group is probably the thickest metavolvanic assemblage in the Sulphurets area, attaining thicknesses of ≤ 2 km. This predominant metavolcanic assemblage consists of three formations:1) Unuk River Formation, 2) Betty Creek Formation, and 3) Dillworth Formation (Groves - 1986). The rocks characteristic of the Hazelton Group underly approximately 50% of the property. They vary in color from green, to purple and red, monolithic, intermediate tuffs, lapilli tuffs, tuff-breccias, block tuffs, and heterolithic agglomerates with thin to medium beds of epiclastic ash tuffs and minor flows. The metavolcanics are typically plagioclase - (+ hornbende)-phyric and classify predominantly as sub-alkalic, calc-alkaline andesite, with variations into the dacitic and rhyolitic fields of the Dillworth Formation (Figure **2**). Marsden (1994) has suggested that a feldspar-hornblende-phyric porphyry, located on the south side of the outlet of Brucejack Creek, represents an extrusive flow dome with co-eval and flanking extrusive fragmentals. This type of 'porphyry' body underlies approximately 10% of the property area. This plagioclase-hornblende-phyric body has yielded a U-Pb zircon date between 182 and 190 Ma, and it may be as low as 168 Ma, although further work is required (The Iskut Telegraph - 1994).

There are two major structural domains in the region. The Stuhini Group of rocks are in a breached core of the north-plunging McTagg anticlinorium (Henderson et al - 1992). These metasedimentary rocks form tight and upright sequences of anticlines and synclines. These folds plunge 52° towards 343° (Henderson et al - 1992). In contrast, the overlying Jurassic rocks of the Hazelton Group form southeast vergent reclined folds that plunge 25° towards 024° (Henderson et al - 1992). The regional structure is further compounded by local north-south and east-west trending, steeply-dipping flattening fabrics.

The Brucejack Fault is the most notable linear as it extends for approximately 17 kilometers from Sulphurets Glacier to the Iron Cap ridge. This normal fault has an interpreted strike-slip movement and vertical displacement of less than 400 meters with the west side up. Below Iron Cap, the fault surface of the Brucejack Fault dips approximately 60° westward.

Most epithermal/mesothermal Au-Ag and porphyry Au, Cu, and Au-Cu deposits are located within the west arm of the Hazelton Group. Snip, Eskay Creek, Johnny Mountain, Catear, and Premier represent the most notable Au-(Ag) polymetallic deposits and Kerr, Sulphurets Gold, and Snowfield are the most distinctive bulk-tonnage deposits in the region.

4.0) Gossan Hill Area - Property Geology

The rocks underlying Gossan Hill and peripheral to Gossan Hill are located in both the basal metasedimentary unit of the Hazelton Group (i.e. Jack Formation) and the overlying Hazelton Group of metavolcanics. All these rocks have undergone extensive hydrothermal alteration and are part of an andularia-sericite-type alteration system that extends for 36 km. These strongly altered rocks account for approximately 80% of Gossan Hill and its surrounding area.

There are two sub-circular, oblate-shaped cinder/pyroclastic cones, peripheral to Gossan Hill, as part of an extensive 2.5 kilometer chain of 4 other similar-size and shape cinder/pyroclastic cones. This south-southeast chain is located from the area of the SG Zone to Old Yeller Pasture, east of Old Yeller/Galena Hill. These inferred cones are up to 200 meters in diameter. The rocks underlying these cones are generally unaltered and vary from sub-alkalic, calc-alkaline andesite to tholeiitic basalt (Figure 2). The cinder/pyroclastic cones are composed of; 1) feldspar-hornblende 'porphyry' flow domes with a similar compositional metavolcanic apron, and 2) extrusive fragmental varying from tuffs to block-tuffs with massive, pillowed, and porphyritic flows of similar composition. No sharp contacts were observed. The cinder/pyroclastic cones are peripheral to an inferred calderan basin, located south of the SG Zone. This circular-shaped basin has a diameter of 1 kilometer and is underlain by a thick sequence of sandstones. The calderan basin is underlain by radial, inward-dipping sandstone beds. There are numerous ring-like linear features emanating and cross-cutting the basin.

The partially altered and altered metasediments of the Jack Formation form an arcuate-shaped horizon, located west and east of Gossan Hill, convergent near the Graoe Zone/Big Sleep areas. This part of the stratigraphy form the basal part of the Hazelton Group and has a predominant metasedimentary component. These rocks are quartz arenites, pebbly sandstones, and conglomerates, and mark an abrupt change from the underlying mudstone and laminated mudstone, siltstone, and sandstone of the Stuhini Group (Marsden -1994).

Unaltered and altered metavolcanics and metasediments are in-turn cross-cut by late intermediate to mafic intrusive dykes (i.e diorite to diabase). These rocks classify as trachy-andesite to trachy-basalt (Figure 2).

The quartz + sericite ± pyrite (QSP) and K-silicate alteration overprints and displays a gradational contactwith the unaltered metavolcanics and metasediments. There are several dykes that have undergone hydrothermal alteration. The altered equivalents host complex, cross-cutting quartz + carbonate stockwork and vein structures.

The rocks underlying the core of Gossan Hill, Big Sleep, and Grace zones are within a synformal structurethat is convergent to the north. The east-dipping Jack Formation forms the west boundary of Gossan Hill, and similarly, the west-dipping form the eastern boundaryof Gossan Hill (i.e. Big Sleep East and Trachsel Zone). Marsden (1994) has suggested that the Big Sleep-Big Sleep East-Trachsel Zone are fault structures that emplaced uplifted Jack Formation with younger Hazelton Group of metavolcanics (i.e. cinder/pyroclastic cones). There are numerous young northwest-trending linears occupying topographically-low troughs. These linears are a commonplace in the Shore Zone-Camino Real-Trachsel areas.

There are at least 11 mineralized Au-Ag zones that are exposed on Gossan Hill. Detailed mapping in 1994 has not fully outlined PM-1 and 2, as well as the Marie Gold Zone. However, detailed mapping has extended the Big Sleep south east to Grind Bay with the outline of the Big Sleep East and Trachsel Zone. This continuous zone forms a concentric shape (i.e. cymoidal) about 1 or 2 cinder cones. The extension of the mineralized zones of the Shore Zone 'feather-out' along a northwesterly strike direction, being envelopped by a phyllic alteration zone.

The common theme in the comparison of Gossan Hill, as well as Big Sleep-Big Sleep East-Trachsel Zone, to known Tertiary epithermal districts is the sericitic cap formed over the orebody, as observed at Creede, Colorado, Oatman, Arizona, and Pachuca, Mexico.

4.1) Intermediate Metavolcanics

The unaltered intermediate metavolcanics underlie approximately 20% of the Gossan Hill area, extending from Brucejack Creek to the Big Sleep. It is part of a more extensive and thicker sequence that extends for at least 10 kilometers and has a maximum thickness of 1.2 kilometers (Britton and Alldrick - 1988). These unaltered metavolcanics are part of the Hazelton Group and classify as sub-alkalic andesite to basalt with minor dacite and rhyolite (Figure 2). These unaltered metavolcanics appear to form an extensive chain of cinder/pyroclastic cones and their related extrusive hiatus. The extensive andularia-sericite alteration system is gradational to the unaltered metavolcanics as one would commonly observe relict textures.

The intermediate metavolcanics in the Gossan Hill area underly two cinder/pyroclastic cones. Both these volcanic features have not been entirely outlined. The largest of the cones is located between the Marie Gold Zone and the Big Sleep. It measures approximately 200 meters in diameter. The fresh surface color varies from green to grayish green, with a weak to moderate brown oxidized weathered surface color. The eastern part of this cinder/pyroclastic cone is predominantly fragmental, comprised of tuff, lapilli tuff, and tuff-breccia. There are lenticular, sub-rounded to sub-angular monolithologic intermediate fragments as large as 50 cm in length, set in an intermediate, chloritic matrix. The size of the fragments gradationally increase towards the area near 48+20 South / 35+30 East, mine grid. This extrusive, fragmental body is gradational with massive, pillowed, and porphyritic flows, located in the western part of Gossan

Hill. The porphyritic flows consist of 1mm to 5mm altered and unaltered hornblende laths and/or crystals varying between 5% and 20% set in a very fine grained matrix. The presence of gradational contacts and the absence of well developed sharp cross-cutting contacts and chill zones, leads the author to believe that these rocks may be extrusive in nature.

The second, inferred, cinder/pyroclastic cone is located between the Trachsel Zone and Gossan Hill. Although this area has not been detailed, regional mapping suggests equivocally that it is part of a metavolcanic apron about the feldspar-hornblende 'porphyry' dome, located south of Brucejack Creek. Further detailed mapping would confirm whether this metavolcanic body is a separate cinder cone or part of the above mentioned flow dome interpreted by Marsden (1994).

The unaltered metavolcanics are composed of quartz + feldspar + chlorite fragments set in a tuffaceous matrix, commonly foliated. The matrix is composed of grains of quartz + feldspar (albite and K-feldspar) ± chlorite ± carbonate ± sericite. Hydrothermal alteration (i.e QSP) increases towards the quartz + carbonate stockwork and vein structures, as a result of fracturing, brecciation, and shearing. There are thin unaltered metavolcanic units that occur as apophyses in the andularia-sericite alteration system.

4.2) Metasediments

Metasedimentary rocks underlying the Gossan Hill area are situated at a stratigraphic break at the base of the Hazelton Group and the top of the Upper Triassic Stuhini Group. The metasediments are part of the Jack Formation and comprise of approximately 20% of the rocks underlying the Gossan Hill area. The rocks in this area are up to 100 meters thick. These rocks underlie and bound the northern, western, and eastern part of Gossan Hill. The eastern bounding metasediments, located between Gossan Hill and Shore Zone/Big Sleep East, and the northwestern extension of the Shore Zone, were the areas of focus in the 1994 exploration program. Metasedimentary rocks that underly the western and eastern bounds of the Gossan Hill area trend in a north to northwest direction. They converge in the Grace/Big Sleep area, that forms the northern boundary of Gossan Hill. The Jack Formation that bounds the western part of Gossan Hill youngs and dips steeply to the east between 70° and 80°, and the eastern bounding metasediments young and dip steeply to the west between 70° and 88°. The convergent nature of the Jack Formation reflects a synformal feature underlying the Gossan Hill area.

The metasediments vary from light dirty gray to black on fresh surface with a weak to brown oxidized weathered surface color. Individual beds are predominantly composed of thin to thick-bedded (≤ 30 meters) argillaceous rocks, including heterolithic reworked intermediate to mafic tuffs/muds (i.e. volcaniclastics), heterolithic conglomerates, and coarse sandstones. The contact between the overlying Hazelton Group of metavolcanics and the Jack Formation is transitional and conformable with the occurrences of volcaniclastics within the Jack Formation. However, the contact between the metasediments and the andesitic cinder/pyroclastic cones appear to be fault emplaced with the presence of stockwork and vein structures, such as the Trachsel Zone and Big Sleep

East. Bedding features are not commonly recognized, and therefore not very continuous, due to structural and hydrothermal overprint

The metasediments are composed of quartz + feldspar (albite and K-feldspar) ± sericite ± carbonate ± graphite. The graphite component is very distinctive in the argillaceous rocks, particularly between the Shore Zone and Camino Real.

4.3) Intermediate Porphyritic Intrusives

There are two intermediate intrusives underlying the Gossan Hill area.

The first intrusive is located north of Brucejack Creek, in the southern part of Gossan Hill. It may be part of the feldspar-hornblende 'porphyry' flow dome interpreted by Marsden (1994), located south of Brucejack Creek. The exact dimensions are unknown due to the lack of detailed mapping. This diorite has a green color fresh surface and is brownish-green on weathered surface. It consists of 10% to 20% feldspar phenocrysts (albite) set in a very fine grained chloritic matrix. The feldspars vary in size from less than 0.5 mm to 6.0 mm. This dioritic body has a characteristic porphyritic texture. The periphyry of the diorite is strongly foliated with the presence of intense chlorite and carbonate alteration. Both the contact between the diorite and the surrounding QSP alteration, and the surrounding fragmental apron, are gradational in nature.

The other intrusive body is located in the western part of

Gossan Hill. This area was not mapped in detail in the 1994 exploration program. However, there was diamond drilling in this particular area in 1994. The intrusive appears to transect the metasediments, but has been overprinted, gradtionally, by the andularia-sericite alteration zone to the east. The fresh surface color is pale greenish-gray to dark green with a brownish-gray weathered surface color. It consists of dull white feldspars (albite) set in a very fine grained chloritic matrix. The feldspars are up to 10 mm in size and vary in concentration between 5% and 25%. The author believes that the intrusive nature is equivocal, as these rocks have been consistently described as crystal tuffs and clast-supported fragmentals. Contacts are gradational.

4.4) Intermediate to Mafic Intrusives

Post-volcanic intermediate to mafic intrusives (diorite to diabase) occur as dykes and are not commonly observed in the Gossan Hill area. They are generally less than 1.0 meter wide with a limited strike length of less than 20 meters. These northeast trending dykes cross-cut both the unaltered and altered metavolcanics and metasediments in the Gossan Hill area.

The diorite to diabase dykes commonly weather buff-brown with a greenish-black fresh surface color. The diorite, commonly referred to as andesite, is aphanitic with the diabase being fine to medium-grained. Both these compositionally different dykes have well-developed chill margins. The diabase consists of plagioclase feldspar + pyroxene + amphibole ± chlorite ± epidote ± carbonate ± magnetite.

5.0) Alteration of Metavolcanics and Metasediments

Both the metavolcanics and metasediments as well as the porphyritic rocks have undergone hydrothermal alteration. The overprint of the alteration describe and define an andularia-sericite system, and account for approximately 60% of the rocks underlying the Gossan Hill area. Hydrothermal alteration of the intermediate metavolcanics show a well-developed mineralogical halo with:

1) K-feldspar + quartz + sericite ± carbonate
2) quartz + sericite ± K-feldspar ± carbonate (QSP)
3) sericite + quartz ± carbonate ± K-feldspar (QSP)
4) chlorite + carbonate ± sericite ± epidote

The QSP alteration is the most prolific alteration assemblage in the Gossan Hill map area. K-silicate alteration is more restricted to the quartz + carbonate stockwork and vein structures, envelopped by a broader QSP alteration. Propylitic alteration appears at the periphyry of the phyllic alteration. Both the K-silicate and QSP alteration have been intensely fractured with the presence of numerous stringers and veins. Regional lithogeochemical analyses by the Geological Survey of Canada indicates the altered wallrock significantly enriched in SiO_2, Al_2O_3, and K_2O and depleted in Na_2O.

The alteration assemblages are part of a more extensive north-south trending sodium-depletion alteration zone. The altered rocks underlying Gossan Hill represent the very top of the extensive andularia-sericite alteration system, as indicated by the predominance of vuggy, open-space, QSP alteration and the lack of any continuous and intense

K-silicate alteration. As mentioned before, the sericitic cap in the Gossan Hill area is similar to that at Creede, Oatman, and Pachuca.

6.0) Structural Geology

Henderson et al (1992) has described the Jurassic, Hazelton Group of rocks underlying the Knipple Icefield region formed as overturned southeast vergent reclined folds. However, the rocks underlying the Gossan Hill area occupy a synformal structure that is vergent to the north/northwest.

Bedding is best preserved in the metasedimentary and metavolcanic units. Generally, bedding in the Gossan Hill area has a north to northwest trend with steep dips varying between 70° and 88°. The western metasedimentary unit youngs and dips steeply to the east and the eastern unit (between Gossan Hill and Shore Zone) youngs and dips steeply to the west. There are minor folds that are reflected by a deviation in strike. The folded nature of the unaltered intermediate metavolcanic unit, that is located in the eastern part of Gossan Hill, exhibits an s-shape character. This would describe the eastern limb of the interpreted synformal structure. The foliation is conformable and at high-angle to the bedding.

There are numerous structural lineaments in the Gossan Hill area. These lineaments are defined by fault zones and shears. Vein and/or lithological offset, shearing, slickenslides, and brecciation are the main geological criteria.

The most prevalent type of structure mapped in the 1994 field season were linears occupying topographical low areas. This type of lineament is a common occurrence between Gossan Hill and the Shore Zone. These anastomosing, curvlinear lineaments have a minimum strke length of 0.50 kilometers in a northwest direction. The rocks proximal to these structures are intensely sheared and sericitized. These linear features appear to cross-cut lithological contacts and stockwork and vein structures, suggesting that these lineaments are fairly young. Marsden (1994) has suggested that the Big Sleep-Big Sleep East-Trachsel Zone are fault structures that emplaced Jack Formation with younger Hazelton Group of metavolcanics. However, regional mapping has suggested that this contact is transitional and conformable.

Other structural lineaments include both fault and fracture zones that trend northeast to north and east. They are generally vertically-dipping.

7.0) Economic Mineralization

Four zones were outlined in detail in the 1994 exploration program. With the exception of the Marie Gold Zone, all the explored zones are peripheral to Gossan Hill. The zones that were mapped and sampled were:

1) Big Sleep East - Trachsel Zone
2) strike extension of Shore Zone - Camino Real
3) Marie Gold Zone
4) Windy Point

The following is a synopsis of the four areas that were detailed in the Gossan Hill area.

Big Sleep East - Trachsel Zone - (Big Sleep)

These three zones form one continuous structure that has a fault contact among the zones. This continuous structure is approximately ½ mile (720 meters) in length. The nomenclature of the zones from Big Sleep, Big Sleep East, and the Trachsel Zone follow a trend from northwest to southeast, respectively. The structure forms a concentric shape form (cymoidal-shaped) that displays offsets between the Big Sleep and Big Sleep East and between the Big Sleep East and Trachsel Zone. These three namable zones are proximal and/or mark the geological contact between the metavolcanics and the metasediments.

The Big Sleep East Zone is a west-northwest trending (300° - 310°), vertical-dipping quartz vein/stockwork structure with thicknesses up to 14 meters. It has a strike length of 140 meters. The vein mat has undergone moderate to strong fracturing and brecciation. Strong sericitic alteration bounds the vein/stockwork for approximately 10 meters. Sulphide content is variable from <1% to locally 10%. The sulphides consist of pyrite ± tetrahedrite ± galena ± sphalerite + with trace amounts of arsenopyrite. Graphite commonly occurs as fracture-filling and seams, cross-cutting the quartz veins. The most significant assay obtained was located in the northwest part of the zone from GHZ-83, with a Au-Ag analyses of 0.386 oz/t Au, 29.50 oz/t Ag, over 0.70 meters. Analyses are summarized in Table 2.

The Trachsel Zone has been completely outlined for 280 meters, similar to that of Big Sleep East. The predominent trend of the zone is northwest with a gradual southerly trend in the southeastern part of zone. The structure is up to 12 meters wide. It has both vertical and flat-dipping quartz veins hosted in silicified argillites and argillaceous conglomerates near the metavolcanic/metasedimentary contact.

TABLE 2

Zone	Channel Cut	Au(opt)	Ag(opt)	Width(m)
Big Sleep E.	GHZ-80	0.031	0.15	0.75
"	GHZ-81	0.035	4.21	0.95
"	GHZ-83	0.386	29.50	0.70
"	GHZ-84	0.020	0.17	0.40
"	GHZ-85	0.030	0.37	0.55
"	GHZ-88	0.037	1.05	0.80
"	GHZ-91	0.026	0.96	0.55
"	GHZ-92	0.055	6.20	0.50
Trachsel Zone	TRC-01	0.018	0.46	1.00
"	TRC-02	0.256	52.43	0.75
"	TRC-03	0.010	1.06	0.70
"	14544(chip)	0.817	156.90	0.20
"	14546(grab)	0.147	17.69	-
Shore-Camino	SZ-01	0.709	3.44	1.00
"	SZ-02	0.090	12.71	0.35
"	CR-01	0.133	10.27	0.32
"	CR-02	0.020	1.59	0.92
"	CR-03	0.022	1.04	1.00
"	CR-04	0.036	0.28	0.70
"	CR-05	0.030	0.35	1.00
"	T-11	0.023	10.09	2.56
Marie Gold	14411(grab)	3.259	36.31	-
"	14415(grab)	0.992	49.40	-
"	14416(grab)	0.437	26.84	-
"	14417(grab)	0.902	28.77	-
Windy Point	WPT-02	0.073	10.83	0.50
"	WPT-04	0.063	4.88	0.55

Sericitic alteration is peripheral to the zone. There is little sulphide in the zone with minor to trace amounts of pyrite ± arsenopyrite ± tennantite ± tetrahedrite ± sphalerite ± galena ± gold. A showing was uncovered in the central part of the zone that assayed 0.817 oz/t Au, 156.90 oz/t Ag on a representative grab and 0.256 oz/t Au, 52.43 oz/t Ag over 0.75 meters. Gold was observed at this location. However, the Au-Ag mineralization is discontinuous. None of the other channel cuts obtained significant Au-Ag analyses. A summary of the analyses is listed in Table 1.

Shore Zone - Camino Real

Several discrete quartz vein/stockwork structures have been detailed northwest from the Shore Zone and southeast from Camino Real, along strike. The continuity of these structures along strike within a phyllic alteration envelope clearly illustrates that Camino Real is the strike extension of the Shore Zone. These structures are characterized by quartz vein and quartz stockwork with carbonate and barite with podiform sulphide mineralization. Sulphides include pyrite ± tetrahedrite ± sphalerite ± galena ± arsenopyrite. The vein and stockwork structures form as stacked, en-echelon, and sigmoidal trending lenses up to 100 meters in length with a thickness up to 1.5 meters. Strike lengths between 20 and 40 meters are common. The 'feathering-out' form of these structures within a phyllic alteration zone clearly indicates that these structures are peripheral along strike to the Shore Zone. In contrast, the altered rocks that host the Shore Zone have been intensely silicified and K-feldspathized. Analyses are summarized in Table 1.

Marie Gold Zone

The Marie Gold Zone has been outlined for at least 80 meters and contains a number of en-echelon quartz vein lenses containing pyrite ± tetrahedrite ± polybasite ± electrum ± sphalerite ± galena. Representative samples were taken to infill between a number of trenches and to explore the strike extension of the high-grade Au-Ag mineralization. Analyses are summarized in Table 1.

Windy Point

This particular zone was uncovered as a result of prospecting in the 1993 field season. One particular area of this structure had not been mapped nor sampled and it appears to merge with the Trachsel Zone. It trends west-northwest (300) and is vertically-dipping. This quartz veinand quartz stockwork structure is up to 9.5 meters wide, containing disseminated and fracture-filled pyrite ± arsenopyrite ± tennantite ± tetrahedrite ± sphalerite ± galena. The strike continuity of the structural thickness and sulphide concentration are consistent. The Windy Point zone has been extended for another 70 meters. Results are summarized in Table 1.

8.0) Recommendations

A continuation of the 1:500 scale mapping and sampling program is recommended. The program would in-fill unmapped areasfrom Gossan Hill to the Grace Zone, including the Shore Zone area. Detailed mapping in the hanging-wall of the West Zone should also be seriously considered, with the main focus on structural relationships between the structures observed underground in the West Zone/R-8 and surface. This part of the program would take 2.0 to 3.0 months with two geologists, depending on the intensity of sampling. This portion of the program would complement the continuation of Marsden's 1994 lithostratigraphic and structural mapping at 1:1000 scale. The main areas that require mapping are located from Quartz Hill to Hanging Glacier.

In lieu of the disappointing results on Gossan Hill, Big Sleep, Grace Zone, Coogan's Bluff, and Shore Zone, as a result of drilling on very top of an epithermal system, one has to consider where you are in this extensive andularia-sericite alteration system and compare to known productive systems. It has been documented in three epithermal districts, Creede, Oatman, and Pachuca, that a sericitc cap overlies the orebodies. Also, Heald et al (1987) has reviewed 16 known volcanic-hosted epithermal districts, and found that up to 60% of the districts studied have a common calderan setting. These two distinguishing features (i.e. alteration and tectonic setting) and other characteristics (i.e. mineralogy, host-rock composition, age, and size of area) are a blueprint for the Sulphurets area as a volcanic-hosted, andularia-sericite-type, epithermal system.

9.0) References

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