MOUNT SKUKUM PROJECT

TOTAL ENERGOLD CORP. - AGIP CANADA LTD. JOINT VENTURE

1988 EXPLORATION

BY

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Executive Summary

This report provides details of the exploration program on the Mount Skukum property - a 63%-37% joint venture project between AGIP Canada Ltd and Total Erickson Resources Ltd., managed by Total Erickson (now TOTAL Energold Corporation).

During the period May to December, 1988 a total of 9,734 meters in 61 holes were completed on the property, most of them in Main Cirque area along the extension of the Main Cirque Zone structure and the related sub-parallel Brandy, Lake, Pika, and Fox Veins. In addition, reconnaissance mapping as well as soil and rock sampling was carried out over a portion of the property, a significant part of which remains unexplored. Limited drilling was also carried out on the Ocean Vein which continues to have potential for Omni-style mineralization, on Sulphide Creek, and on a recently discovered structure - the Tango Vein.

Results in the Main Cirque were discouraging. The Main Cirque Zone structure has been tested 550 m to the northeast and 650 m to the south at 50 m spacing. The structure was found to persist but no economic mineralization was encountered.

The most significant discovery of 1988 was the Tango Vein structure on the east flank of the Watson River Valley in the Carbonate Creek area. The structure has similarities of mineralogy and texture with the Main Cirque Zone, is 1 m to 35 m wide on surface, strikes 170^0, dips 80^0 east and displays many textural features suggestive of Cirque Zone mineralization. Two holes drilled in late 1988 failed to intersect ore grade mineralization. Over its 700 m extent, this is an inadequate test so a program of at least 4 and possibly 6 holes is planned for 1989.

An important aspect of the Tango discovery is that it clearly demonstrates the chance of a new discovery in areas which have not yet been thoroughly explored. The entire property must be thoroughly prospected for similar structures. The Berney Creek area and extreme northwest part of the property are examples of regions to be covered in 1989.

It is recognized that two distinct ages of mineralization exist on the property. The older - Omni style - is represented in the Omni deposit and the Ocean Vein / Chieftain Hill area on the Mt. Skukum property. The Ocean Vein represents a structure which has potential for

ore grade mineralization of the Omni-type along-strike and down-dip in a vein which locally exceeds 2 meters in true width. Typically these are gold-arsenic-base metal veins located in shear structures which cross-cut basement rocks.

Cirque Zone mineralization represents a distinctly younger episode of vein emplacement which occurred during the later stage of caldera formation. It is typified by quartz-carbonate epithermal veins wit rare pyrite and virtually no or very little base metal association.

Because the objective of the 1989 program is to discover either a Main Cirque Zone - type orebody (200,000 tons @ 0.4 oz Au/t) or an Omni-type deposit (500,000 tons @ 0.27 oz Au/t plus silver credits), exploration plans are focused on prospecting and definition of major structures having the best potential for these deposit types. Diamond drilling is aimed at providing the minimum test for these types of deposits in the most promising structures. Any additional drilling will be dependent upon results received from the first phase of work which will be constantly reassessed for changing priorities and opportunity for exploration success.

The 1989 program budgeted at $1,356,000 will be aimed at drill-testing the remaining high priority targets and a thorough prospecting-mapping-sampling of the western and southern portions of the property which have received little attention to date but have strong indications of major structures such as the Berney Creek Fracture.

A crew of up to 9 geologists and geological assistants over the period April to September will conduct prospecting, mapping, sampling, drill supervision and core logging.

Prospecting will be carried out in 14 areas including Tango Vein / Carbonate Creek, Skukum Creek, Berney Creek, Middle Cirque, Camp Cirque and others.

Grid sampling, trenching, and mapping will be carried out in conjunction with Mag and EM surveys on 11 grid areas including Tango, Goat, Alunite, Far Southwest, Evening, and the Gully grid areas.

Initial diamond drill targets with the minimum and maximum number of drill holes are listed below:

Tango Vein	4 holes	7 holes (1550m)
Ocean Vein	3 holes	6 holes (915m)
Queens Ridge	2 holes	3 holes (300m)
Goat Vein	2 holes	4 holes (1400m)

Success on any one of these targets will require an increase in funding.

The Main Cirque and Lake zones and the Pika Vein require additional drilling but are not included in this budget because of their lower priority, nor are areas which have as yet not been adequately defined to be ready for drilling such as, for example, Middle Cirque, Far Southwest Zone and the Champagne Vein.

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1.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

1.1 SUMMARY

Exploration in 1988 between May 1st and September 8th on the Mt. Skukum property included investigation of twenty target areas in the Mt. Skukum Caldera Complex. Mineral potential of these areas was investigated by a combination of geological mapping at 1:5,000, 1:1,000, 1:500, and 1:200 scales, contour and grid soil sampling, airborne and ground geophysical surveys, trenching, as well as surface and underground diamond drilling. Objectives of the program were to; 1) delineate extensions to mineralization outlined previously through diamond drilling and mining; 2) evaluate the economic potential of veins outside of Main Cirque; 3) locate new mineralized zones on the Mt. Skukum property. A total of 1,757 rock chip samples and 5,224 soil samples were collected and 9,734.94 meters of diamond drilling in 61 surface holes and 14 underground holes was completed.

Exploration was concentrated at Main Cirque in 1988 with drilling along Main Cirque Fault Zone 550 m north and 650 m south of Main Cirque Ore Zone. Additional drilling was conducted along southern extensions of the Brandy, Fox and Pika veins, within proposed ore boundaries in the Lake Zone, as well as along strike to the south and north of the Lake Zone veins. Limited geologic mapping at 1:1,000 scale as well as ground and airborne geophysical surveys were also conducted in the Main Cirque area.

The Main Cirque Fault Zone and associated quartz-calcite veins were traced north in drill holes to the Gully Zone. The vein structure attains widths of up to 20 m and averages 10 m over this interval with many textural similarities to the Main Cirque Ore Zone; however, it becomes a vein stockwork rather than a single consolidated vein, there is no associated rhyolite dyke, and gold assays are uniformly low in every intersection. Holes drilled to intersect the vein below 1600 m elevation in this area failed even to intersect the Main Cirque Fault Zone.

Holes drilled south of the Main Cirque Ore Zone traced the vein-fault system at least 400 m south of Main Cirque stope. Intersections of vein and stockwork zones up to 14 m wide were obtained; however, grades were uniformly low and, as in the north, the vein structure became an unconsolidated stockwork-shear zone without clear boundaries in host rock. The rhyolite dyke associated with the ore zone in the north is east of the stockwork zone in the south and was not tested by drilling.

Several splay structures, including rhyolite dykes and shears, diverging from the Main Cirque Fault Zone were drilled to the north of the Main Cirque stope. Small veins

and stockwork or shears were intersected in these areas; however, none produced significant gold assays or consolidated vein structures. One underground hole drilled eastward 610 m from the Main Cirque stope to test for mineralized structures parallel to the Main Cirque Ore Zone, failed to intersect a significant vein or structure suggesting limited potential for nearby parallel structures.

Geologic mapping south of the Main Cirque stope located two vein outcrops on strike with the Main Cirque Fault Zone and Brandy Zone structures. These quartz-calcite veins, the Kiwi and Crystal veins, can be traced over 170 m and 230 m respectively, are up to 0.2 m wide, are associated with ground geophysical signatures, but have produced uniformly low gold assays to date.

Drilling in the Brandy Zone tested the BV1 and BV2 veins south from section 200 S with holes at approximately 50 m intervals. The BV1 vein produced one intersection of 2.15 oz Au/t, 0.02 oz Ag/t over 0.27 m nearby a 1987 high-grade intersection but holes drilled further south along strike failed to hit vein material but produced an intersection of pebble dyke material and silicification instead. It appears that although the BV1 structure extends south the vein does not. Holes tracing the strike extent of BV2 south hit narrow low-grade vein intersections and finally a rhyolite dyke which occupies the position of the vein without any accompanying vein material. Tonnage remaining in BV2 vein stopes totals approximately 12,000 tons which averages 0.242 (0.215 cut) oz Au/t.

Diamond drill holes in the Lake Zone were completed to test continuity and predictability of grades in proposed stopes, as well as to test the vein north of section 00 N and south of section 500 S. Holes drilled in proposed stopes proved gold distribution to be erratic with local areas of high gold grade surrounded by large areas of low to trace gold grade. Similar results in underground rock chip samples combined with unforeseen structural complexities, lead to cessation of mining activities in the Lake Zone. Holes drilled north of section 00 N in the Lake Zone intersected narrow quartz veins 0.16 m or less which produced assays up to 0.352 oz Au/t. Holes drilled south of section 500 S failed to intersect the vein structure. Total estimated ore reserves in Lake Zone veins is 37,136 tons which average 0.548 (0.410 cut) oz Au/t.

Mapping and diamond drilling in the Fox Zone indicates the zone comprises two narrow but continuous veins which cross-cut andesite east of the Lake Zone. These veins reach widths of 1.0 m and have produced erratic gold assays up to 0.71 oz Au/t. The veins remain open along strike south of section 300 S.

Mapping and diamond drilling at Pika Zone indicate the mineralized structure comprises vein, stockwork and breccia hosted in a shear zone which extends northeast into Middle Cirque and south onto the Lake Zone Plateau. The vein undergoes a flexure in strike where it is cut by a fault. North of the fault the vein strikes 015^0, south of the fault the vein strikes 180^0. Assays up to 0.93 oz Au/t, 0.73 oz Ag/t over 0.05 m have been obtained from this vein but gold analyses were generally low. Maximum vein widths are up to 1.5 m in outcrop.

An HLEM geophysical survey conducted over the Gully Zone identified six subparallel conductors the two strongest of which are on strike from the Main Cirque Fault Zone.

Exploration in the Chieftain Hill area comprised 1:5,000, and 1:1,000 scale mapping, contour soil sampling, ground geophysical surveys, prospecting, and diamond drilling.

Regional mapping identified a large, elongate rhyolite stock in the southern part Chieftain Hill which may occupy the extension of the Omni Resources deposit structure onto the Mt. Skukum property. Several late stage rhyodacite dykes were also located along strike from the Omni Resources deposit. In the northern part of the region a major east-west fault in Midnight Gulch, which down-dropped rocks in the north relative to those in the south was inferred through lithological relationships and geophysical data.

Contour soil sample results indicate an anomalous zone, encompassed by the Sauna Grid, on the northwest side of Chieftain Hill south of Butte Creek. Soil samples as high as 3,150 ppb Au have been collected in this area.

Diamond drilling of Morning Vein indicates the vein does not extend west of its outcrop extension and tends to narrow at depth. Gold grades are uniformly low.

Drilling in Ocean Vein tested the structure at approximately 50 m intervals from an encouraging 1987 intersection. These holes obtained intersections up to 2 m wide containing intervals which assay up to 0.355 oz Au/t and 5.68 oz Ag/t. Composite averages across intersections; however, were uniformly low in gold although they contain up to 5.68 oz Ag/t. This vein remains open in all directions.

Exploration in the Mount Kopje area comprised 1:5,000, and 1:1,000 scale mapping, contour and grid soil sampling, rock chip sampling, ground and airborne geophysical surveys, prospecting, and diamond drilling.

Regional mapping identified stratigraphy comprising felsic pyroclastic and flow rocks intruded by a large

rhyolite stock to the northeast. Contour soil sample results indicate three anomalous areas in which several samples in excess of 200 ppb Au were obtained; 1) near Rim Creek; 2) on the east side of Rhyolite Creek, and; 3) at the head of Rhyolite Creek.

Detailed mapping in Sulphide Creek defined a late-stage quartz-feldspar porphyry dyke and zones of intense argillic, phyllic, and silicic alteration in felsic tuffs, which correspond with soils anomalous in gold. Ground geophysical surveys outline a magnetic low and HLEM conductors which coincide with alteration and the trend of the dyke. Grid soil sampling extended the area of anomalous soil samples 230 m to the southeast. Diamond drilling oriented to pass under the most geochemically anomalous areas and intersect some of the geophysical conductors, did not intersect significant structures, or gold mineralization.

Ten small veins were located by prospecting in the Rim Creek area. None are traceable in excess of 11 m along strike or exceed 0.25 m wide but significant assays up to 0.13 oz Au/t and 10.4 oz Ag/t were obtained.

Exploration in Pyroclastic Cirque area included contour and grid soil sampling, 1:1,000 scale geologic mapping, ground geophysical surveys, trenching, prospecting, and mapping.

The Spumante Veins, quartz stockwork veins associated with a rhyolite dyke, were located on Queens Ridge grid. Subsequent trenching and sampling outlined stockwork zones which average 0.1 m across but are up to 2 m wide and produce low gold assays with rare, isolated results up to 0.586 oz Au/t.

Exploration in Carbonate Creek area comprised contour and grid soil sampling, 1:5,000, 1:1,000, and 1:500 scale geologic mapping, ground and airborne geophysical surveys, rock chip sampling, trenching, and diamond drilling.

The Tango Vein was discovered by follow-up prospecting of contour soil sample anomalies in this area. The vein, hosted in a large fault bounding the Mt. Skukum Caldera Complex, is associated with a large rhyolite dyke and exhibits high-level epithermal textures. It is traceable over about 700 m on surface and is coincident with prominent airborne geophysical conductors and magnetic low anomalies. Although no significant gold assays have been obtained from rock chip samples or diamond drill core of the vein, soil samples over the vein are consistently anomalous in gold and arsenic and up to 4 oz Ag/t have been obtained from rock chip samples of the vein.

Exploration in Middle Cirque included contour soil sampling, 1:1,000 scale geologic mapping, prospecting, and ground and airborne geophysical surveys.

Mapping identified two narrow but persistent zones of stockwork veins along strike from the Fox and Pika Zones each of which produced uniformly low gold and silver assays.

Exploration in Camp Cirque area included contour soil sampling, airborne geophysical surveys, and prospecting. An area of anomalous contour soil samples containing up to 308 ppb Au has been identified at the head of the cirque and requires follow-up prospecting. Airborne geophysical data indicates a series of EM conductors, and a linear magnetic low extending west along the southern side of the cirque. A grid has been surveyed to cover this anomaly.

Exploration in Tuning Fork Creek area included 1:5,000 scale mapping, contour soil sampling, airborne geophysical surveys, and prospecting.

Limited regional mapping in the area indicates that andesitic volcanic rocks are intruded and cross-cut by a rhyolite stock and several associated dykes and small veins. No significant assay results were obtained in prospecting; however, several prominent airborne geophysical anomalies have been identified. The Far Southwest Zone vein, over a ridge 2.7 km to the northeast of Tuning Fork Creek, is traceable in outcrop over 375 m, attains a maximum width of 0.8 m but has produced no gold assays over 0.171 oz Au/t.

Exploration in the Berney Creek area included limited prospecting around the Berney Creek Fracture and airborne geophysical surveys. Zones of variable silicification associated with the fault were observed with discontinuous, massive quartz veins that assay up to 0.063 oz Au/t and 0.88 oz Ag/t.

1.2 CONCLUSIONS

Exploration on the Mt. Skukum property in 1988 was unsuccessful in delineating mineable reserves to replace those which had been exhausted in the Main Cirque Ore Zone. In addition, geologic reserves outlined in recent years were proven to be poor economic risks due to erratic gold distribution and complex vein structures. As a result mining activities on the property have ceased.

Potential for discovery of mineable reserves still exists on the Mt. Skukum property. The two most promising avenues for further exploration based on findings of the 1988 program are; 1) large, unexplored, areas of the

property in the west and south which encompass caldera boundary faults, and ; 2) the Ocean Vein at Chieftain Hill.

Marginal fault zones surrounding calderas are historically productive gold targets as they provide excellent ground preparation and commonly provide a heat source through emplacement of ring dykes and late stage stocks. An example of this potential, demonstrated in 1988 exploration, was discovery of the Tango Vein on the unexplored, western side of the property. This vein occurs in a fault which bounds the Mt. Skukum Caldera Complex, is associated with a large rhyolite dyke, and coincides with an arcuate series of airborne geophysical anomalies which approximately overlie the caldera boundary contact.

Exploration on the Ocean Vein at Chieftain Hill in 1988 produced intersections of which average 1.8 m with individual sample intervals containing in excess of 0.275 oz Au/t and 6.0 oz Ag/t. Macroscopically, this sulphide-bearing vein is similar to that which comprises the nearby Omni Resources deposit. It is also immediately across the Wheaton River valley from the Goddell structure of Berglynn Resources which has produced intersections of up to 0.61 oz Au/t over 11.3 m in 1988 diamond drilling. Although only one ore grade intersection has been made on the Ocean Vein to date, it is part of a large, complex structure including a series of veins and dykes. It should be noted that the Omni Resources deposit has many large areas in which no ore grade intersections were made. The Ocean Vein responds well to HLEM geophysical surveys; it remains open in all directions.

Exploration in 1988 has reduced the mineral potential of Main Cirque area significantly, particularly in areas adjacent to mine development. It is apparent that the Main Cirque Fault structure is limited in depth and narrows to the south. Potential still remains in the southernmost area of Main Cirque where veins were discovered this year. Rhyolite dykes which extend between the Main Cirque stope and the Alunite Cap Zone may occupy a structure which could host a vein. Also, north toward the Gully Zone, ground geophysical surveys have located conductors on strike from significant 1987 drill intersections of the Gully Zone Fault.

The focus of exploration efforts in Main Cirque area in previous years has resulted in limited exploration in other areas with potential. Several areas such as Pyroclastic Cirque and Tuning Fork Creek which encompass favourable geology and structures, have not been mapped at 1:5,000 scale or adequately prospected. Regional mapping efforts in 1988 exploration have been successful in providing more accurate assessment of mineral potential of several areas and should be applied elsewhere on the property. Mapping

should focus on geochemically anomalous areas as well as areas with abundant rhyolite stocks and dykes as these intrusive rocks seem to play an important role in events leading to gold deposition.

Regional mapping and sampling in 1988 documented a long suspected correlation between rhyolite stocks and dykes and high soil geochemical values in Sulphide Creek, Chieftain Hill area, and Carbonate Creek. High gold and local silver soil values tend to occur over small dykes and stocks or along the margins of larger rhyolite stocks. High gold soil geochemistry is associated with bleached, brecciated, silicified and pyritic contact zones of rhyolite with volcanic host rocks. It is concluded from this textural and map evidence that these late-stage rhyolites may be slightly enriched in gold content. Some of this gold may be leached out of the intrusive body through de-watering processes during cooling and concentrated in silicified marginal breccias and alteration zones around the intrusive body. Based on this evidence, it is not unreasonable to conclude that a potential exists in the Mt. Skukum region for gold porphyry mineralization previously overlooked because exploration efforts were concentrated on small, high-grade deposits.

1.3 RECOMMENDATIONS

1.3.1 Introduction

Exploration on Mt. Skukum property should be directed at identifying new ore host structures. Contour soil sampling and regional scale prospecting, follow-up investigation of contour soil geochemical anomalies and prominent airborne geophysical anomalies, detailed prospecting, sampling and mapping of specific anomalous areas, 1:5,000 scale mapping of areas of significant potential should be followed by limited diamond drilling. It is recommended that only one diamond drill be employed on the property in 1989 to allow time for complete surface evaluation of targets before drilling. The drill should be capable of at least 500 m holes and should be helicopter portable to allow drilling in areas without road access. A Hughes 500D helicopter is required to accommodate the heavy loads of a large drill in rough terrain, high altitudes, and windy conditions at Mt. Skukum property.

The proposed program requires a maximum of 9 geologists and geological assistants plus 1 cook and 1 bullcook. It is recommended that housing be provided for in bunkhouses already in place at the mill site. This would require a partial re-opening of the camp on a strictly limited basis with metered power supplied by a line from the mill which will be in operation under an agreement between Mount Skukum

Gold Mining Corp. and Skukum Gold Inc. Alternative, self-sufficient camp accommodation could be built in Camp Cirque. In order to house geological personnel as well as blasters, drillers, geophysicists, a helicopter pilot, and contract surveyors, the exploration camp must be able to accommodate up to 22 people.

Geological staff should start work in April and finish in August however some will be kept through to December for report writing and exploration data compilation. Camp accommodation should be available from June to the end of August with accommodation in excess of this time at hotels in Whitehorse.

1.3.2 1989 Exploration Recommendations

Regional Exploration

Regional exploration areas are presented in order of priority. Exploration to be undertaken includes rapid prospecting of large sections of the property, 1:5,000 scale mapping, and contour/ridge/stream sampling at coarse sample intervals.

Follow-up of anomalies generated through airborne geophysics and contour geochemical samples are included in this category.

A) Tango/Carbonate Creek:
- -Possibility of mineralization associated with fractures on western caldera margin.
- -Contour/stream sediment/ridge sampling north and south of Tango Vein, and 1:5000 scale mapping in area of Tango Vein structure.
- -Mapping (1 man,2 weeks)
- -Sampling (2 men,3 weeks)

B) Middle Cirque:
- -Possibility of Main Cirque style mineralization extending into Middle Cirque and area between Middle and Camp Cirques.
- -Contour/ridge sampling and 1:5000 scale map of entire Cirque area extending east to the Gully Zone.
- -Mapping (1 man,3 weeks)
- -Sampling (2 men,5 days)

C) Skukum Creek:
- -Possibility of Omni-style veins or veins associated with structures on the north and south sides of Skukum Creek (largely unexplored).
- -Contour/ridge/stream sediment samples
- -Sampling (2 men,2 weeks)

D) Camp Cirque:
- -This relatively unexplored area includes a sizable geophysical anomaly (both airborne EM conductor and magnetic low) which has not been followed up.
- -Contour/ridge/stream sediment sampling and 1:5000 scale mapping required.
- -Sampling (2 men,3 days)
- -Mapping (1 man,3 weeks)

E) Frigid Cirque:
- -Relatively unexplored area underlain by favourable host rocks with small but strong coincident airborne EM conductor and magnetic low anomalies.
- -Contour/ridge sampling, prospecting required.
- -Sampling (2 men,2 days)

F) Berney Creek:
- -Potential for Omni-style mineralization along Berney Creek fracture and associated splay veins.
- -Contour/ridge sampling, prospecting required.
- -Sampling (2 men,5 days)

G) Wedding Ring Creek:
- -Major fault lineament which extends toward Omni deposit. Past prospecting has uncovered a 0.5 m wide quartz-calcite-pyrite-sphalerite vein. Area is not fully explored.
- -Contour sampling, completion of 1:5000 scale mapping required.
- -Sampling (2 men,5 days)
- -Mapping (1 man,2 weeks)

H) Lake Zone (not included in proposed budget)
- -Several small veins have been located east of Pika Zone in a hanging valley which overlooks Middle Cirque. These should be investigated further.
- -1:1000 scale mapping, geophysics and gridding are required.
- -Mapping (1 man,2 weeks)
- -Geophysics (1 man,5 days)
- -Gridding (2 men,1 week)

I) Main Cirque Zone (not included in proposed budget)
- -A prominent rhyolite dyke extends east of the present grid between the Alunite Cap Zone and the Main Cirque stope. This dyke may occupy a structure which could also host a vein. The present grid should be extended east to cover the dyke and HLEM should be run over the area to accurately locate the structure for trenching or drilling.
- -Gridding (2 men, 5 days)
- -Geophysics (1 man, 3 days)

H) Tuning Fork Creek:
-A large vein/pegmatite(?) structure has been located in this creek as well as several low grade (0.22 oz Au/t) quartz float samples. These may represent a structure of importance to mineralization and should be traced out.
-1:5000 scale map to complete existing mapping is required.
-Mapping (1 man,2 weeks)

I) Pyroclastic Cirque:
-This cirque hosts two vein/fault structures including the Goat Zone vein and possesses a similar structural setting to the nearby Main Cirque. A large rhyolite dyke bisects the cirque and is associated with unexplained gold anomalies. This area should be further explored.
-1:5000 scale mapping, prospecting required.
-Mapping (1 man,3 weeks)

J) Kopje Hill/North Property Boundary:
-This area has not been examined in any detail and lies close to the major lineament hosting the Far Southwest Zone (Agip/PTO). Similar mineralization may occur in this area.
-Contour/ridge/stream sediment sampling required.
-Sampling (2 men,2 days)

K) Rhyolite Creek:
-Several small low grade ~0.1 oz Au/t veins have been discovered in this drainage which has not been fully prospected. Possibility also exists for replacement style mineralization. Care is required in evaluating possible false anomalies associated with felsic volcanics (ie. Sulphide Creek, Independence Zone).
-Contour/ridge/stream sediment sampling required.
-Sampling (2 men,4 days)

L) C & R Cirque:
-This small cirque is close-by the Gully Zone and contains topographic features suggestive of fault displacement.
-Contour/ridge sampling, prospecting required.
-Sampling (2 men,5 days)

Grid Scale Exploration

The following areas, as before, are presented in order of priority. "Grid Scale" exploration includes intensive, detailed sampling of surface exposures, detailed mapping/prospecting at 1:1000 and 1:500 scales, detailed grid geochemistry, ground geophysics and trenching.

A) Tango Vein:

-Detailed mapping of vein showing requires completion. Grid extensions are required to cover possible extensions to the vein. Some soil geochemistry remains to be completed over the existing grid as does hand trenching and sampling over areas of the showing covered by overburden. Additional magnetics may be required if an anomalous profile can be demonstrated from work already done.

-1:500 scale mapping, geochemistry, trenching, gridding and geophysics required.

-Mapping	(1 man,1 week)
-Geochemistry	(2 men,4 days)
-Trenching	(2 men,10 days)
-Gridding	(2 men,4 days)
-Geophysics	(1 man,3 days)

B) Middle Cirque:

-Pika and Fox veins have been traced into Middle Cirque bearing grades up to 0.6 oz Au/t over approximately 0.4 m widths in local areas. The full extent of these veins must be mapped and sampled into Middle Cirque. A grid established in the cirque remains to be sampled and have geophysics run over it. Potential for Main Cirque style mineralization.

-1:1000 scale mapping of local areas in cirque, grid geochemistry and geophysics, and sampling required.

-Mapping	(1 man,1 week)
-Geochemistry	(2 men,2 weeks)
-Geophysics	(1 man,2 weeks)
-Sampling/trenching	(2 men,1 week)

C) Goat Vein:

-This large vein has not been examined in detail and requires more work. Although it returns negligible gold values, its extent should be mapped and carefully sampled with a view towards using trace elements to identify promising areas on this vein exposure or find parallel structures.

-1:1000 scale mapping, geophysics, geochemistry (trace elements) required.

-Mapping	(1 man,1 week)
-Gridding	(2 men,2 days)
-Geochemistry	(2 men,3 days)
-Sampling/trenching	(2 men,1 week)

D) Alunite Cap:
-A large airborne conductor/magnetic low anomaly has recently been identified but not followed up. There is potential for replacement and/or vein mineralization in this area.
-1:1000 scale mapping, geophysics, geochemistry (trace elements).
-Mapping (1 man,1 week)
-Geochemistry (2 men,5 days)
-Geophysics (1 man,5 days)

E) Champagne Vein:
-This vein is exposed over about 75 m in Main Cirque adjacent to the Brandy Zone. It has returned grades of up to 1 ozAu/t over an average width of 0.2 m and has not been adequately drill tested.
-Geophysics, geochemistry (if area not too disturbed), and trenching are required.
-Geophysics (1 man,1 day)
-Geochemistry (1 man,2 days)
-Trenching/sampling (2 men,3 days)

F) Far Southwest Zone:
-This zone of vein material has been drilled by Agip\PTO and examined in a preliminary way by Mt. Skukum. Indications are a narrow, 1 m wide vein with sub-ore grades of 0.1 ozAu/t or less. This area should be further explored.
-1:1000 scale map, geophysics, geochemistry, gridding, trenching, and sampling are required.
-Mapping (1 man,2 days)
-Geophysics (1 man,1 day)
-Geochemistry (1 man,1 day)
-Gridding (2 men,1 day)
-Trenching (blasting required) (2 men,4 days)
-Sampling (2 men,2 days)

G) Tuning Fork Veins:
-Two areas of Tuning Fork Creek contain veins or vein stringers some of which have returned grades of up to 0.19 ozAu/t, these structures should be followed out and explored in detail.
-1:1000 scale mapping, geochemistry, geophysics, and gridding are required.
-Mapping (1 man,3 weeks)
-Geochemistry (2 men,1 week)
-Geophysics (1 man,2 weeks)
-Gridding (2 men,1 week)

H) Ebony Vein:
-Vein was discovered this year and has not been adequately prospected although it has returned modest silver values.
-1:1000 scale mapping, geochemistry, gridding, geophysics, and sampling/trenching are required.

-Mapping	(1 man,1 week)
-Gridding	(2 men,3 days)
-Geochemistry	(2 men,3 days)
-Geophysics	(1 man,2 days)
-Sampling/trenching	(2 men,4 days)

I) Sauna Grid:
-This grid was established over a contour sample anomaly on the north facing slope of Chieftain Hill. Although only single point anomalies were returned in geochemical surveys they have not been followed up or re-sampled.
-Prospecting and re-sampling are required.

-Sampling	(1 man,1 day)

J) Gully North:
-The Gully Zone is the northern extension of the Main Cirque Fault Zone towards C & R Cirque. A geochemical grid has established an open ended gold anomaly extending northward which should be followed out further. Drilling on areas of established gold anomalies has encountered a fault structure which locally carries up to 0.2 ozAu/t over a 7 m width.
-1:1000 scale mapping, gridding, trenching, geochemistry, and geophysics are required.

-Mapping	(1 man,2 weeks)
-Gridding	(2 men,5 days)
-Trenching (backhoe)	(2 men,3 days)
-Geochemistry	(2 men,1 week)
-Geophysics	(1 man,4 days)

K) Ebony Vein (not included in proposed budget)
-This quartz-suphide vein on Chieftain Hill should be further investigated.
-1:1000 scale mapping, rock chip sampling, geophysics and trenching are required.

-Gridding	(2 men, 5 days)
-Mapping	(1 man, 1 week)
-Geophysics	(1 man, 2 days)
-Sampling	(3 men, 4 days)
-Trenching	(backhoe, 3 days)

Diamond Drill Targets

Targets are available at the present time which are amenable to drilling without further groundwork or preparation. These targets are listed below in order of

priority. Three additional possible drilling targets, the veins in Middle Cirque, the Far Southwest Zone, and the Champagne vein are dependent upon a small amount of further work and are not included in the budget plans. Targets and brief details of the work and timing (assuming maximum footage drilled) required are listed below:

A) Tango Vein:
- -Two holes have been drilled to date, both involved large step-outs in attempts to hit the target at some depth (~100m) but neither produced significant intersections. Both holes were stopped prematurely due to freezing conditions or poor ground. Further drilling should be conducted from pads constructed closer to the structure to allow the vein to be tracked to depth with a series of two to three intersections. Additional holes are also planned to further test locations along strike.
- -Proposed drilling: 1,550 meters (7 holes,3 pads)
- -Timing July 29 - Sept 15 4 holes minimum

B) Ocean Vein:
- -This vein returned ore grade material (up to 0.25 ozAu/t and 6 ozAg/t) over widths of up to 2 m in holes drilled in 1988 which should be followed to depth and further along strike to the northeast.
- -Proposed drilling: 915 meters (6 holes,3 pads)
- -Timing May 1 - June 1 3 holes minimum

C) Queen's Ridge:
- -Several 1.0-2.0 m wide stringer zones associated with a rhyolite dyke have returned anomalous gold values up to 0.5 ozAu/t.
- -Proposed drilling: 300 meters (3 holes,0 pads)
- -Timing June 2 - June 15 2 holes minimum

D) Goat Vein:
- -This large vein structure should be tested at depth for the possibility of increased gold content once below this near-surface style of mineralization.
- -Proposed drilling: 1,400 meters (4 holes,0 pads)
- -Timing June 16 - July 28 2 holes minimum

E) Main Cirque Zone (not included in proposed budget)
- -Rhyolite dyke associated with ore in the Main Cirque stope extends south toward the Alunite Cap Zone and has not been tested south of the ore zone between elevations from which ore was obtained in the Main Cirque stope.

F) Lake Zone (not included in proposed budget)
- -The Lake Vein structure has not been completely tested along its projected south strike length or under the area of Red Ridge.

G) Pika Zone (not included in proposed budget)
-Holes drilled to intersect this structure previously may have overstepped the vein due to the flexure in its strike. Additional holes should be drilled to intersect the structure which trends 180^0 further below surface.

PROPOSED MANPOWER SUMMARY

Title	# Mandays Field Work Available	Employment Period (Salary)	Hiring** Requirement (# people)
Asst. Proj. Geologist	89	April-Dec ($3200/mo)	1
Senior Geologist	89	June-Dec ($3000/mo)	1
Drill Geologist	109	May-Aug ($2700/mo)	1
Junior Geologist	81	June-Aug ($2300-2600/mo)	1
Geological Assistant	229	June-Aug ($2000-2200/mo)	3
Cook		May 21 - Sept 15 ($3200/mo)	1
Bullcook		June-Sept 15 ($2450/mo)	1
Surveyors	44	Contractors	
Blasters	75*	Contractors	
Geophysics	44	Contractors	
Backhoe Operator	10	Contractors	
Helicopter		Contract	
Drill Footage	4,150 m 1 drill for 4.25 months 2,250 m minimum footage = 2.3 months (at 976 meters/mo)		

- Total Geology Crew: 8

- Require camp to accommodate: 22 people maximum

* Work for 3 man blasting crew

** Based on 21 days worked/mo after 1 day off/week and 5 days/mo weatherbound.

PROPOSED BUDGET FOR 1989 EXPLORATION

ITEM	Minimum* Budget Cost	Maximum** Budget Cost
Diamond Drilling	$227,100	$418,200
Labour	181,100	185,650
Helicopter	136,000	161,000
Food and camp charges	116,150	132,150
Trenching and roads	126,000	126,000
Assaying	103,000	108,000
Geophysics	50,000	50,000
Supplies	41,000	41,000
Consultants	30,000	30,000
Vehicles	24,000	25,000
Office rent and power	20,400	20,400
Travel	18,700	18,700
Drafting	16,250	16,250
Accommodation	15,000	14,000
Electrical Supply	9,000	10,000
TOTAL EXPLORATION BUDGET 1989	$1,113,700	$1,356,350
contingency (to be used only on approval)		300,000
PROJECT TOTAL BUDGET WITH CONTINGENCY =		$1,656,350

* Based on minimum diamond drilling of 2,250 meters
** Based on maximum diamond drilling of 4,150 meters

2.0 INTRODUCTION

2.1 LOCATION AND ACCESS

The Mt. Skukum project area, centered near latitude 60° 12′ north and longitude 135° 28′ west (NTS: 105D SW), is approximately 65 km southwest of Whitehorse, Yukon Territory (Plate 2.1.1), between the Wheaton River and Watson River Valleys.

Most of the project area lies above treeline and is characterized by moderate to steep slopes and locally jagged alpine topography. Relief varies 1400 m from the peak of Mt. Skukum at 2400 m elevation and the Wheaton River Valley at 1000 m elevation.

The area is easily accessible from Whitehorse using approximately 80 km of well-kept road. From Whitehorse, the Alaska Highway is followed southeast for approximately 17 km to the Carcross Highway junction. The Carcross Highway is followed south 18 km to the Annie Lake Road junction. The Annie Lake Road is then followed southwest 40 km to its termination at the mine camp and mill site. The portals are accessible from the mill site by a 10 km haulage road.

2.2 CLAIM STATUS

Mt. Skukum project area incorporates approximately 100 square km, including 820 claims and fractions owned 63% by Agip Canada Ltd. and 37% by Total Energold Corporation. The project is operated by a joint venture company, Mt. Skukum Gold Mining Corporation. Claim groups included under this joint venture and their present expiry dates are listed below:

Claim Group (FR denotes fraction)	Expiry Date
Glee 1 FR -- Glee 64 FR	Jan 1, 1995
Glee 65 -- Glee 67	Jan 1, 1994
Glee 68 FR -- Glee 84 FR	Jan 1, 1994
Glee 85	Jan 1, 1994
Glee 86 FR -- Glee 94 FR	Jan 1, 1994
Glee 95 -- Glee 97	Jan 1, 1994
Glee 98 FR -- Glee 124 FR	Jan 1, 1994
Moe 1 FR -- Moe 99 FR	Jan 1, 1995
Chu 1 FR	Jan 1, 1993
Butte #1 -- Butte #34	Jan 1, 1995
Kuku #1 -- Kuku #12	Jan 1, 1999
Kuku #13 -- Kuku #24	Jun 9, 1995
Kuku #25 -- Kuku #26	Jan 1, 1999
Kuku #27 -- Kuku #34	Jun 9, 1995
Kuku #35 -- Kuku #48	Jan 1, 1999
Kuku #49 -- Kuku #112	Jan 1, 1997

Kuku #113 -- Kuku #195	Jan 1, 1996
Kuku #196 -- Kuku #202	Jan 1, 1997
Kuku #203	Jan 1, 1996
Kuku #204	Jan 1, 1997
Kuku #205 -- Kuku #249	Jan 1, 1996
Kuku #250 -- Kuku #251	Jan 1, 1997
Kuku #252 -- Kuku #281	Jan 1, 1996
Kuku #282 -- Kuku #283	Jan 1, 1997
Kuku #284 -- Kuku #331	Jan 1, 1996
Chief #1 -- Chief #106	Jan 1, 1995
Woof #1 -- Woof #40	Jan 1, 1994
Pup 1 FR -- Pup 85 FR	Jan 1, 1994

2.3 PROPERTY GEOLOGY AND MINERALIZATION

Mt. Skukum property covers part of an early Eocene (51.6 $\pm$ 1.8 Ma) volcanic caldera complex on the border of the Coast Crystalline Complex and Yukon Crystalline Terrain. It lies approximately 27 km north-northwest of the Bennett Lake Caldera Complex. These volcanic complexes represent penecontemporaneous centers of volcanic activity forming the northernmost extent of a series of volcanic centers, known as the Sloko Volcanic Province, which extends southeastward into northern British Columbia.

Mt. Skukum Caldera Complex comprises a 20 km long and 11 km wide, sub-circular, fault-bounded remnant of Skukum Group volcanic rocks (Plate 2.3.1). It is composed primarily of andesitic and felsic volcanic rocks with a maximum vertical thickness of approximately 850 m. Two north-south trending faults divide the complex into two parts. The eastern part, mainly felsic volcanic rocks is down-dropped as much as 300 m (Pride, 1986) relative to the western part which is underlain primarily by rocks of intermediate composition. Eastern felsic units, locally intruded by rhyolitic stocks and dykes, consist mainly of rhyolitic to dacitic ashfall and lapilli tuffs, intensely flow-banded, maroon rhyolite flow rocks, and derived epiclastic rocks. Western intermediate units comprise flat lying, andesitic flow rocks and associated flow breccias interspersed with andesitic ash to lapilli tuff, and epiclastic rocks of similar composition. Rocks of the western portion are also locally intruded by small rhyolitic stocks and dykes.

Volcanic stratigraphy of the Mt. Skukum Caldera Complex has been divided into four formations by McDonald (1987; after Pride, 1985) which unconformably overlie Cretaceous granitic rocks and Precambrian metasedimentary rocks of the Yukon Group.

Formation 1, the oldest, comprises a 5 to 100 m thick section of coarse alluvial basement material including

conglomerate, siltstone, sandstone, and debris flow rocks with increasing volumes of volcanic components up-section.

Formation 2, widely distributed throughout the western part of the Mt. Skukum Caldera Complex, attains a maximum thickness of 300 m and lies unconformably over basement rocks, and rocks of Formation 1. Formation 2 comprises finely interbedded pyroclastic and derived epiclastic rocks ranging in composition from rhyolitic at lower stratigraphic levels to andesitic in upper levels of the formation. Units include densely welded to non-welded, ash and lapilli tuffs, derived epiclastic debris-flow and lahaar rocks, and some waterlain volcanisedimentary siltstones and sandstones.

Formation 3 underlies almost the entire western portion of the Mt. Skukum Caldera Complex. It reaches a thickness of up to 700 m and conformably overlies Formation 2 rocks. Formation 3 comprises rocks of uniform andesitic composition characteristically occurring as a sequence of gently dipping andesite flow rocks interbedded with andesitic ash and lapilli tuffs and derived epiclastic rocks. Andesitic flow rocks which make up the greatest volume of material in Formation 3, average 5 m thick, and are laterally continuous in excess of 1 km.

Formation 4, the uppermost sequence in the Mt. Skukum Caldera Complex, is most prevalent in the east although several outliers occur in the west as irregular shaped, isolated bodies in areas of high elevation. This formation comprises felsic volcanic rocks up to 550 m thick. These rocks include brecciated, flow-banded maroon rhyolite flow rocks, massive tan rhyolitic stocks and dykes, rhyolitic ash to lapilli tuffs, and derived epiclastic debris flows and lahaar rocks.

Evidence of at least three eruptive centers within the Mt. Skukum Caldera Complex exists in the form of pronounced circular fracture systems centered around large masses of vent facies eruptive material. Such material, including densely-welded tuffs, megabreccia, and explosion breccia infills and surrounds crater like unconformity surfaces. Some or all of these features surround the Main Cirque area, Mount Kopje, and Independence Grid area.

Gold mineralization in the Mt. Skukum Caldera Complex occurs as veins in complex shears and faults on the caldera margin, major cross-cutting faults, and within local, structurally complex fault zones associated with collapse of nested caldera centers within the Mt. Skukum Caldera Complex.

Three varieties of gold and silver bearing veins are present in the property area. The only veins from which gold has been produced to date are electrum-bearing quartz-

calcite-sericite epithermal veins that occur in the Main Cirque area of the property. These veins are typically white with sparse pyrite and rare sphalerite and galena, contain abundant breccia fragments of both wallrock and early vein material, display open space and lamellar textures, contain up to 49 ozAu/t locally, and are up to 14 m wide. Similar, veins are found throughout the property area and although several are of significant widths in structures of considerable continuity insufficient work has been done to outline economic quantities of ore on these structures.

A second variety of veins are brecciated mesothermal gold-bearing quartz veins found in the eastern part of the property on Chieftain Hill and the surrounding area. This style of mineralization comprises the Omni Deposit at Skukum Creek. These veins are typically white to grey and strongly brecciated with quartz, arsenopyrite, pyrite, galena, sphalerite, chalcopyrite, tetrahedrite, and gold infilling and re-cementing vein material. Ore grade material over widths of up to 8 m have been reported at the Omni deposit and results of up to 0.095 ozAu/t, 6.29 ozAg/t across 2.63 m have been obtained from similar veins at Chieftain Hill on the Mt. Skukum property.

The third style of veins are responsible for minor gold and silver production in the early 1900's from several small adits found throughout the Wheaton Valley. These quartz-stibnite veins occur in narrow fault and shear zones within granodiorite, often in association with mafic or intermediate dykes. The veins, usually less than 0.4 m wide contain galena, stibnite and chalcopyrite, and assay up to 3.11 ozAu/t and 71.33 ozAg/t at Chieftain Hill. These structures, however, are discontinuous and do not widen to a mining width on the Mt. Skukum property.

2.4 WORK HISTORY

Exploration interest in the Wheaton River district began in 1893 with the discovery of precious metal and antimony bearing veins. Small scale mining at several locations resulted in only limited production. The first geological investigation of the area was by D.D. Cairns in 1906, who mapped the district at a scale of 1 inch to 1 mile and studied Known deposits (Cairns, 1912, 1916). In 1940, H.S. Bostock studied antimony properties in the Wheaton River district (Bostock, 1941). Beginning in 1982, M.J. Pride (nee Smith) described and mapped much of the geology of the Mt. Skukum Caldera Complex as part of a Ph.D. study (Smith, 1982, 1983; Pride, 1985, 1987). Most recently, B.W.R. McDonald mapped and described Main Cirque area geology, its deposits, and surrounding stratigraphy (McDonald et al., 1986a, 1986b; McDonald, 1987). Despite

the prolonged period of geologic interest in the area, no record exists of staking in the Main Cirque area prior to 1981.

Agip Canada Ltd. became involved in the Mt. Skukum Property in 1980 when a reconnaissance program of prospecting, mapping and regional stream sediment geochemistry indicated anomalous concentrations of gold and arsenic in sediment from Butte Creek. In May 1981, 48 claims were staked to cover this anomaly and several brightly coloured gossanous zones in Main Cirque (Doherty et al., 1981). Exploration drilling and prospecting was conducted between 1981 and 1984. An exploration adit was collared in July, 1984 to explore the Main Cirque Ore Zone. Exploration on the property was suspended in 1985 with emphasis placed on underground development. In 1986, exploration resumed with a program of surface and underground drilling, prospecting, sampling and mapping. Exploration continued through 1987 and 1988 with similar programs. Production mining commenced in February, 1986 and continued at 300 tons per day until August, 1988 when production mining ceased. Exploration continues on the property.

3.0 1988 EXPLORATION PROGRAM

3.1 SCOPE AND LOGISTICS OF EXPLORATION

Exploration on the Mt. Skukum property in 1988 was conducted between January 1st and September 8th. The program involved a geological staff of up to eighteen people and a total budget of approximately $2.5 million. Exploration activity was based out of camp and office facilities already in place to service the Mount Skukum Gold Mining Corp. mine and mill.

Exploration including surface diamond drilling which was conducted between January and February, 1988 was reported earlier by Nagati et al. (1988) and will not be discussed here. The scope of this report will include underground diamond drilling between January and July and all surface exploration conducted during the 1988 summer season beginning in May and ending September 8th. Total expenditure represented by this work is approximately $1.9 million (Appendix A).

Exploration in 1988 was concentrated at Main Cirque and Chieftain Hill areas with the main objective to locate a mineable orebody, similar to the Main Cirque Ore Zone, in or near Main Cirque area (Figure 3.0.1). Work in the Chieftain Hill area was directed towards locating a strike extension of mesothermal vein mineralization from the Omni Property onto the Mt. Skukum claim group. In the course of this work six targets were examined and drilled in the Main Cirque area and five targets were examined, one of which was drilled, at Chieftain Hill area. In addition, nine other areas were investigated in some detail with limited diamond drilling in one instance (Table 3.0.1).

Table 3.0.1. Exploration and target areas examined in 1988

Exploration Area	Target Area
Main Cirque Area	Main Cirque Zone
	Brandy Zone
	Lake Zone
	Fox Grid
	Pika Zone
	Gully Grid
Chieftain Hill Area	Independence Zone
	Evening Grid
	Midnight Grid
	Sauna Grid
	Wedding Ring Grid

Mount Kopje Area	Sulphide Creek Grid Rim Creek
Pyroclastic Cirque Area	Queens Ridge Grid Kings Ridge Grid
Carbonate Creek Area	Tango Grid
Middle Cirque Area	Middle Cirque Grid
Camp Cirque Area	Gopher Grid
Tuning Fork Creek Area	Far Southwest Zone
Berney Creek Area	Berney Creek Fracture

Geological investigation of exploration areas on the property included airborne geophysical data, aerial photographic lineament interpretation, regional contour soil sampling, geologic mapping at 1:5,000 scale, and prospecting. Geologic assessment of targets within these areas included grid surveying, close spaced soil sampling, geologic mapping at 1:1,000 and 1:500 scales, and prospecting. Advanced exploration on these targets, dependant on the success of earlier work, included trenching, rock chip sampling, ground geophysical surveys, and ultimately diamond drilling.

Surface and underground diamond drilling was carried out on a contract basis by D.J. Drilling Co. Ltd. of Surrey, B.C. Three surface drills and one underground drill were in use on the property for most of the season including one Boyles 15A capable of helicopter transport, one Hydra 38 skid mounted, one Longyear 38 skid mounted, and one JKS 300 underground drill. All drills were capable of drilling NQ or BQ core and wherever possible BQ core was drilled. During July a Longyear 38, modified for use underground, was also used.

Diamond drilling between May and September 1988 totaled 9,734.94 meters including 8,176.71 meters of surface drilling and 1,558.23 meters of underground drilling. Almost all of this drilling was conducted in the Main Cirque area with the exception of 1,559 meters which was drilled at Morning Gulch, Sulphide Creek, and Tango Vein areas.

Helicopter support for field work and diamond drilling activities was supplied on a casual basis by Frontier Helicopters Ltd. of Abbottsford, B.C. using a Bell 206B helicopter based at the mine camp.

Ground geophysical surveys were performed on a contract basis by Geo-Physi-Con Co. Ltd. of Calgary, Alberta. A

technician and equipment were supplied by the contractor with assistants supplied from the exploration crew. Geophysical techniques employed on the property this year included horizontal loop electromagnetics (HLEM) and magnetics surveys as these have been found to produce meaningful results in previous years. A Max-Min I, eight frequency system was used for the HLEM survey with readings taken at 1760 Hz, 7040 Hz, and 14080 Hz at intervals of between 10 and 12.5 meters. Total field magnetic data was recorded using the EDA Omni IV system at stations between 10 and 12.5 meters apart. Diurnal variations were recorded using a similar base station magnetometer and were used to correct the data.

Additional contractors and equipment were used as required. M.J. Moreau Enterprises Ltd. of Whitehorse, Yukon prepared drill pads in rugged terrain, a 235 caterpillar backhoe and D8K bulldozer were rented from Ko-Ken Mining Ltd. also of Whitehorse, Yukon, and equipment was rented from other suppliers as required.

3.2 REGIONAL EXPLORATION

3.2.1 Airborne Geophysical Survey

An airborne geophysical survey was flown by Aerodat Limited of Mississauga Ontario over the western part of the Mt. Skukum property in March, 1988. This survey combined with the survey flown over the eastern portion of the property in July, 1987, provide complete coverage of the property. Equipment operated included an Aerodat three frequency electromagnetic system comprising two vertical coaxial coil pairs operated at 935 and 4,600 Hz and a horizontal coplanar coil pair operated at 4,175 Hz, a high sensitivity cesium vapour Scintrex Model VIW - 2321 H8 magnetometer, a two frequency VLF-EM system, a video tracking system and a Hoffman HRA-100 radar altimeter (Podolsky, 1988).

The 1988 survey area forms a crescent shaped zone over the western part of the property extending from the Wheaton River across the Berney Creek Fracture Zone to the slopes facing the Watson River in the south; from the east wall of Main Cirque, across Middle Cirque and the Tango Vein area in the central part of the property; and from Rhyolite Creek, across Tuning Fork Creek to the slopes facing the Watson River valley in the northern part of the property. Flight lines located at a nominal spacing of 100 m were flown at azimuths of 103^0 to 283^0 in the northern half of the area and 146^0 to 226^0 over the southern half of the area at a mean terrain clearance of 60 m in both areas. A total of 700 line kilometers were covered in this survey (Podolsky, 1988).

Aerodat has determined that magnetics and electromagnetics (EM) are the most effective aerial survey methods for this region although the rugged terrain was found to tax the capabilities of the system (Podolsky, 1988). VLF-EM data is not considered useful by Aerodat due to the influence of mountainous terrain on VLF fields (Podolsky, 1988).

Other than determining the relative effectiveness of each of the survey methods used, Aerodat Limited has arrived at few geologic conclusions as they were provided with no geologic data. Geophysical responses were determined to be uniformly weak and were all interpreted by Aerodat Limited to represent shear or fracture zones (Podolsky, 1988). This type of response is to be expected in a region where the character of mineralization involves narrow fault structures with few sulphides and narrow alteration envelopes. Magnetic activity over the area is moderate with a maximum relief in excess of 1,050 nanoTeslas (nT), and an average background level of 57,550 nT (Podolsky, 1988). Vertical gradient magnetics were determined to contribute little

structural information due to a significant correlation between vertical gradient response and topographic changes. EM data were determined to be of good quality due to low noise and only minor sferic interference. The survey area is quite resistive in general with very little EM response even over valley bottoms, making the weakest responses stand out quite prominently (Podolsky, 1988). Apparent resistivity contours from EM data also indicate low level responses; however, areas of anomalously low and high resistivity correlate well with known shear zones, veins, and structures of interest although the areas of these anomalies are generally much wider than the corresponding structures.

Airborne geophysical anomalies, although relatively weak, correlate well with known regional structural orientations in most cases, and tend to reflect known structures of interest such as dykes, veins, shear and fault zones. Structures illustrated in the aerial photographic interpretation (MineQuest, 1985) are represented by at least minor geophysical expressions in almost every case. As a result, the survey may prove useful in locating additional geologic features and structures not yet recognized.

A negative feature of this survey is the relative absence of a geophysical response in the area of the Main Cirque Ore Zone (Figure 3.0.2). The Main Cirque Fault Zone was not detected by the survey, and although two apparent resistivity lows overlie the zone, these anomalies trend almost 90 degrees to the trend of the ore zone. A trough-like trend of magnetic-low response in the northeastern part of the cirque delineates the trend of the Gully Zone, however, the trend becomes obscure where overburden cover increases to the south as the Gully Zone extends toward the Main Cirque Ore Zone.

Two primary regional geophysical orientations, which correspond with observed structural orientations, are apparent upon compilation of significant geophysical data (Figure 3.0.2). These orientations form fracture sets at 52^{o} and 138^{o} which occur throughout the survey area and form inferred lineations which extend across the entire Mt. Skukum Caldera Complex in some instances.

The most prominent geophysical trend involving the strongest geophysical responses in the survey area occurs in the western part of the caldera complex and does not conform with the inferred structural orientations outlined above. This trend (Figure 3.0.2) forms a marked arcuate curve coincident to the western margin of the Mt. Skukum Caldera Complex. The trend comprises two distinct, discontinuous, sub-parallel axes of combined magnetic-low response, magnetics-inferred faults, and EM conductivity that occur within 2.5 km of each other. The outermost arcuate magnetic

and conductivity axis corresponds directly with the margin of the caldera complex. This axis comprises a 900 m wide zone bounded by discontinuous, well-defined trough-like magnetic lows. These magnetic lows bound an irregular, discontinuous series of pronounced apparent resistivity-low anomalies. A coincident arcuate trend is noted in airphoto lineament interpretation although structures detected in air photos are far more sparsely distributed.

Individual areas of maximum geophysical response in the survey area, presented in no particular order, include; the headwaters of Rhyolite Creek, the area between the forked streams at the headwaters of Tuning Fork Creek, the headwall of Frigid Cirque, an area at the headwater of Camp Cirque, an arcuate trend extending from Operator Creek through the Tango Vein into Carbonate Creek and south off the property, an area at the headwater of Skúkum Creek, and an area at the headwall of C&R Cirque. All of these anomalies (Figure 3.0.2) comprise coincident magnetic lows and conductivity highs or lows which may reflect zones of geologic contact, as well as complex fault or shear structures which may be associated with some degree of alteration or mineralization. The anomalies are also all distinguished by their occurrence at high elevations in areas of little or no overburden cover presenting the possibility of undetected or poorly represented structures or anomalies in cirque bottoms and creeks. Conversely, it must be recognized that water saturated creek bottoms can produce large anomalously conductive zones which are not representative of a bedrock conductor.

The anomaly (Figure 3.0.2) at the headwater of Rhyolite Creek (Figure 3.0.1) forms the eastern end of a magnetic-low trough extending west-northwest to the anomaly between the forked streams at the headwater of Tuning Fork Creek. The anomaly in Rhyolite Creek, manifested by a magnetic-low, coincides with a rhyolite stock that is enveloped by argillically altered, pyritic country rocks. A trend of elevated gold assays in contour soil samples corresponds with this anomaly and extends westward toward the anomaly in Tuning Fork Creek

The anomaly between the fork of Tuning Fork Creek (Figure 3.0.2) comprises a magnetic-low, apparent resistivity low, and several intersecting magnetics-inferred faults. The anomaly occurs in an area of known stringer veinlets which, assay up to 0.27 ozAu/t across 0.15 m. The area is underlain by a series of interbedded pyroclastic and epiclastic rocks intruded by a rhyolitic stock and associated dykes.

An anomaly at the headwaters of Frigid Cirque (figure 3.2.1) comprises an intense apparent resistivity low, an elongate magnetic low trough punctuated by magnetic low

centers, and an intersecting magnetics-inferred fault. Although the aerial extent of this anomaly is small it is significant in that the associated magnetic-low trough parallels the Far Southwest Zone and may represent its strike extension onto the Mt. Skukum property. The area of the anomaly is underlain by porphyritic andesite flow rocks and subordinate andesitic pyroclastic rocks cross-cut by north-northwest trending rhyolite and dacite dykes. Preliminary prospecting located quartz vein float up to 0.25 m wide and sparse single-point contour soil geochemical anomalies up to 280 ppb Au.

An anomaly at the headwater of Camp Cirque (Figure 3.0.2) comprises a magnetic low as well as weak and strong EM conductors. This anomaly lies at the intersection of an east-west trending magnetic-low trough and a discontinuous series of magnetic-inferred faults which extend south towards the Omni Resources deposit on Skukum Creek and forming the innermost of the two prominent arcuate trends discussed earlier. This anomaly occurs on the contact between an isolated outlier of Formation 4 maroon flow-banded rhyolites and underlying porphyritic andesite flow rocks. Reconnaissance mapping has not revealed any major structures; however, initial contour soil sampling produced a series of 17 anomalous talus samples ranging from 40 ppb to 308 ppb Au with most over 100 ppb Au. Replicate sampling did not confirm initial results. Lab error is suspected.

An anomaly zone comprising several strong EM conductors, magnetic lows and associated troughs occurs on the south-facing slope of Operator Creek near its headwater (Figure 3.0.2). This anomaly forms the northernmost extent of the continuous, arcuate trend described earlier. The anomalous area has had little previous work; however, reconnaissance mapping and air photograph interpretation indicates the presence of a series of diabase dykes in the area and a rhyolite dyke immediately east which has returned values up to 0.04 ozAu/t and 0.35 ozAg/t. The south-southeast continuation of this anomaly across Operator Creek coincides with a large rhyolite dyke and graphitic fault zone. This fault and dyke are cross-cut by the epithermal Tango Vein which extends in outcrop over 350 meters and averages about 5 meters wide. The association between the geophysical anomaly and the Tango Vein structure indicates the potential significance to geophysical response in this area.

An anomalous zone comprising a series of magnetic-lows and several EM conductors occurs at the north extension of the Gully Zone overlooking C&R Cirque (Figure 3.0.2). This series of anomalies, in particular a magnetic-low trough, occur along strike from outcrop and drill intersected expressions of the Gully Zone Vein, a northerly extension of the Main Cirque Zone vein. Relatively little previous

exploration has been done in the area of the anomaly as the grid established to control previous work does not cover the area of the anomaly. The source for this anomaly may be Gully Zone - Main Cirque Zone Fault which has been intersected in diamond drilling in the south part of the Gully Zone where significant intersections were hit (5.81m @ 0.11 ozAu/t). Holes drilled to the north may have missed the magnetic-low trend.

Many other anomalies, some quite prominent, occur throughout the survey area (Figure 3.0.2) and are too common to discuss individually. The coincidence of geophysical anomalies with known structures indicates the need to follow up unexplained anomalies. The relatively minor geophysical response of veins in Main Cirque indicates that even subtle responses may be meaningful.

3.2.2 Regional Soil Sampling

Regional sampling of soil and talus fines was continued in 1988 with the bulk of this activity carried out in cirques facing Butte Creek in the Chieftain Hill, Mt. Kopje, Camp Cirque and Frigid Cirque areas. Samples were collected at 20 m intervals on chosen topographic contour elevations. This method allows quick geochemical coverage in mountainous terrain permitting identification of areas with elevated gold values which require follow up prospecting and sampling. Follow-up prospecting of such anomalies was responsible for locating the Tango Vein, the Brandy Zone, the Gully Zone, Sulphide Creek, and the Ocean vein.

Detailed investigation of contour soil anomalies on the Mt. Skukum property at Chieftain Hill, Sulphide Creek, and the Tango Zone has determined a correlation between high gold values and high-level, late-stage rhyolite stocks and large dykes. Extremely high gold soil values in excess of 5000 ppb Au are frequently found at the contacts of these structures with volcanic host rocks which are commonly silicified, bleached and pyritized. Frequently, detailed follow-up of these anomalies does not result in discovery of any defined structure which could host concentrations of gold nor are soil values replicable in lithogeochemical sampling although soil anomalies may be replicable themselves.

3.3 1988 EXPLORATION AREAS

3.3.1 MAIN CIRQUE AREA

3.3.1.1 Introduction

Location and Access

Main Cirque area, centered on coordinate UTM 6,674,500 N, 473,900 E, is located approximately 1.5 km northeast of Mt. Skukum (Figure 3.0.1). The area is encompassed by 1:5,000 scale map sheet 0 (Figure 3.1.1), and is contained within claims Kuku 2 to 32 and Pup 28F to 57F.

Main Cirque area is above treeline and has a geomorphology of steep and rugged cliffs, talus fans, and relatively flat plateaux with valley floors of felsenmeer, glacial till and outcrop. Relief ranges between 1,600 m and 2,200 m above sea level. Access to the area is by cat roads and by foot from the mine haul road that extends from the mill complex at the base of Mount Kopje to the 1,635 m Main Cirque Zone and 1,750 m Lake Zone portals.

Previous Exploration

In 1980, reconnaissance exploration by Agip Canada Ltd. (AGIP) revealed concentrations of up to 630 ppb Au and 192 ppm As in stream sediment at the head of Butte Creek (Bailey et al., 1980). In the following year, AGIP used soil geochemistry, geological mapping and trenching to delineate the Main Cirque Zone in central Main Cirque, and discovered the Lake Zone to the west and the Gully Zone along strike to the northwest with prospecting and soil geochemistry. From 1982 to 1984, AGIP performed diamond drilling, geological mapping, ground geophysical and geochemical surveys, trenching and prospecting in the Main Cirque area. At the end of 1984, drill indicated reserves were delineated in the Main Cirque and Brandy Zones. In addition, the Lake Zone had been drill tested and the Fox and Pika Zones had been discovered.

In July 1984, Mount Skukum Gold Mining Corp., a joint venture company created by Erickson Gold Mines Ltd. and AGIP, began underground development on the Main Cirque Zone.

In 1986 and 1987, Mount Skukum Gold Mining Corp. continued surface exploration in the Main Cirque Area. This exploration included diamond drilling, geological mapping, airborne and ground geophysical surveys, geochemical surveys, trenching and prospecting.

Mining of Main Cirque Zone commenced in February 1986 and continued until March 1988 with a total production of

227,412 tons of ore grading 0.431 oz Au/t (0.272 oz Au/t cut). Underground development on the Lake and Brandy Zones began in September, 1987 from the 1,750 m level portal. Early production figures for Brandy zone were discouraging and production ceased in June 1988. Subdrift development in Lake Zone encountered erratic grades and complex, unpredictable vein structure. Development on Lake Zone ceased in August 1988.

Geology and Structure

Geology of Main Cirque area is described in detail by McDonald (1987). The cirque is underlain by volcanic stratigraphy comprising Skukum Group porphyritic andesite flow rocks with interbedded andesite pyroclastic rocks. The stratigraphy is dissected by normal faults into down-dropped blocks that form a graben centered at Main Cirque (Doherty et al., 1981; McDonald, 1987). Felsic to intermediate dykes, pebble dykes and gold-bearing epithermal quartz-carbonate veins cross-cut the andesitic volcanic rocks, and are localized in and around normal faults which bound the graben.

Andesite flow and pyroclastic rocks are flat lying to gently dipping. Contacts with intrusive units are steep to vertical while vein contacts range in inclination from 45^0 west to 80^0 east. Graben-related faults which dissect the extrusive volcanics and host the Main Cirque Ore Zone and associated rhyolite dyke, trend between 000^0 and 045^0.

3.3.1.2 1988 Regional Exploration

In March 1988, an airborne geophysical survey was flown over the western half of the Mount Skukum property which included Main Cirque area. Results of this survey indicate a region of weak conductivity over Main Cirque area and an extreme magnetic low and high south of Main Cirque, over Alunite Cap.

Surface exploration in Main Cirque area commenced in May and continued to August, 1988. Work carried out at Main Cirque, Brandy, Lake, Fox, Pika and Gully Zones includes diamond drilling, geological mapping, ground geophysical surveys and rock sampling.

3.3.1.3 Main Cirque Zone

Location

Main Cirque Zone strikes between 030^0 and 045^0 across the valley floor of Main Cirque. The zone, centered near

coordinate UTM 6,674,650 N, 474,250 E (Figure 3.0.1), extends northeast from the mine workings to Gully Zone in the cliffs of the east wall of Main Cirque, and south to talus and cliffs near the head of Main Cirque. The area about the zone is covered by 1:1,000 scale map sheets 0A, 0B, 0H, 0I, 0W and 0X, and claims Kuku 13, 15, 17, 19 and Pup 37F.

Local Geology

Main Cirque Zone geology, described in detail by Doherty et al. (1981, 1982, 1983), Doherty (1984) and McDonald (1987), comprises a pile of porphyritic andesite and tuffaceous andesite with minor related andesite dykes and sills. Andesite rocks are cross-cut by a large steeply dipping rhyolite dyke as well as later dacitic and a second phase of andesite dykes (Plates 3.1.1 and 3.1.2). The larger rhyolite dyke, commonly flanked by rhyolite contact breccia, strikes north along the valley bottom of Main Cirque for 1.8 km. A north-northeast trending, high angle normal fault also cuts the rocks of Main Cirque. This fault, the Main Cirque Fault Zone, dips 80^0 east although its strike changes from 030^0 to 045^0 north of section 25 S of Cirque Baseline. The north trending rhyolite dyke intersects this fault zone from the north at about section 25 S where it bifurcates or is fault duplicated. A branch of this dyke follows the fault zone south to about section 200 S where it is pinched or faulted off. The main body of the dyke crosses to the east side of the fault zone and extends south to the head of Main Cirque. The branch of the dyke along the fault zone ranges from 2 m to 60 m wide and averages about 20 m in width. The fault zone, which has an average width of about 10 m, is present within and along the east side of the dyke. The Main Cirque Ore Zone is hosted in this fault zone, in and along the east side of the dyke. The ore zone comprises multiple emplacement, electrum- and native silver-bearing quartz-calcite-sericite veins with marginal stockwork and gouge zones (Doherty, 1984; McDonald, 1987). The northern limit of the ore zone is at about section 25 S where the fault zone changes strike and diverges from the rhyolite dyke. The southern limit of the ore zone is at about section 200 S where the west branch of the rhyolite dyke terminates. The ore zone has an average width of 5 m and was mined over a vertical distance of 80 m, from an elevation of about 1,650 m to surface at 1,730 m.

Previous Exploration

Main Cirque Zone was discovered through stream sediment geochemistry in 1980 and delineated with soil geochemistry, geological mapping, ground geophysics and trenching in 1981.

Diamond drilling from 1982 to 1984 delineated ore reserves in Main Cirque Zone (Doherty, 1984).

In 1986, geophysical orientation surveys including total field ground magnetometer, HLEM and local transmitter VLF-EM were performed over Main Cirque Zone. Areas north and south of the zone were subsequently surveyed with HLEM and local transmitter VLF-EM. Six trenches were excavated to trace Main Cirque Zone northeast into Gully Zone. The trenching did not locate the quartz-calcite bearing Main Cirque Fault Zone despite the presence of moderate to weak EM conductors extending subparallel to Main Cirque Zone towards Gully Zone (Dussell, 1987).

In 1987, 14 underground diamond drill holes and one surface diamond drill hole were drilled to test the down dip extension of the Main Cirque Zone for ore below the 1,635 m level. Results from this drilling indicate that the Main Cirque Zone vein and the associated rhyolite dyke extend to depth, but ore does not (Nagati et al., 1988).

1988 Exploration

Surface exploration on Main Cirque Zone was performed north and south of Main Cirque Ore Zone in 1988 (Figure 3.1.2 to 3.1.6). One underground diamond drill hole, 88-2,001, was drilled 614.78 m east from Main Cirque Zone to test for mineralization beneath the east wall of Main Cirque (Figures 3.1.7 to 3.1.14).

Exploration north of Main Cirque Ore Zone comprised 1,406.82 m of diamond drilling in 12 holes on and near the northeastern extension of the Main Cirque Fault Zone. This drilling was performed between sections 25 N and 325 N on the Gully Baseline. Holes 88-450, 88-451, 88-453 to 88-458 and 88-461 were drilled to locate and test the 045^0 trending Main Cirque Fault Zone structure north of the ore zone (Figures 3.1.15 to 3.1.24). Holes 88-459 and 88-460 were drilled to test two, more northerly trending splay structures; a flow banded rhyolite dyke, and a fault splay (Figures 3.1.21, 3.1.22 and 3.1.25). Hole 88-454 was drilled to test for a possible Gully Zone structure parallel to but east of the Main Cirque Fault Zone (Figure 3.1.26).

Exploration south of Main Cirque Ore Zone comprised 1,413.37 m of diamond drilling in 8 holes (Figures 3.1.27 to 3.1.39). Holes 88-422 and 88-462 to 88-469 were drilled between sections 300 S and 1,100 S of Main Cirque baseline to locate and test the southern extension of Main Cirque Fault Zone. As well, the southern 900 m by 400 m portion of South Cirque Grid was re-established and geologically mapped at 1:1,000 scale. Forty rock samples and 13 soil samples were collected from South Cirque grid.

Results

Drilling north of Main Cirque Ore Zone confirmed that the vein-fault structure continues northeast from the ore zone towards the Gully Zone. It comprises a complex structure which includes bladed quartz-calcite veins, vein-wallrock breccia, stockwork, fault gouge, andesite and rhyolite dykes, rhyolite breccia, hydrothermal breccia and intensely altered andesite. Throughout this area, the zone has a drill indicated average width of about 9 m and attains a true width of 20 m on section 75 N of Gully Baseline.

Holes drilled to test depth extensions in the northeast portion of the Main Cirque Fault Zone indicate the zone narrows consistently on all sections and may pinch out completely below the 1635 ore haul level. There is no indication of Main Cirque Fault Zone at 1,600 m elevation on section 225 N (Figure 3.1.19).

Assay results from fault zone intersections are uniformly low throughout the northeast section of the Main Cirque Fault Zone, generally less than 0.01 oz Au/t and 0.2 oz Ag/t. The highest individual assay result for gold is from a sample that assays 0.059 oz Au/t, 0.11 oz Ag/t over 0.75 m. This sample is from an interval that assays 0.016 oz Au/t, 0.040 oz Ag/t over 4.35 m in hole 88-451. Results indicate that the fault zone persists northeast of the Main Cirque stope toward the Gully Zone but includes more breccias and stockwork veins and less large, consolidated quartz veins. At depth the structure narrows and does not contain hydrothermal veins below about 1,600 m elevation north of Main Cirque Ore Zone. It is noted that HLEM survey results indicate a conductor to be spatially coincident with the fault zone north of the ore zone. The strength of the conductor decreases as the zone narrows and shallows to the northeast.

Hole 88-459 was drilled to test for mineralization in the rhyolite dyke above the 1,635 m haulage drift (Figure section 75 N Cirque Baseline). The hole intersected narrow widths of silicified porphyritic andesite that assay 0.003 oz Au/t, 0.33 oz Ag/t or less near the drift (Figure 3.1.25). These results indicate that hydrothermal mineralization is not associated with this portion of the rhyolite dyke.

Hole 88-460 was drilled to test a possible fault splay structure on Section 250 N of Gully Baseline (Figures 3.1.21 and 3.1.22). This hole intersected a north trending, 70^0 west dipping structure at a depth of 70 m. The structure contains stockwork that assays 0.035 oz Au/t, 0.182 oz Ag/t across a core length of 0.42 m. These results do not

indicate potential for increased gold grade and width in the structure.

Hole 88-454 was drilled to test for Gully Zone structures east of Main Cirque Fault Zone. This hole intersected stockwork that assays 0.035 oz Au/t, 0.236 oz Ag/t across a core length of 1.13 m in a structure that was intersected by 1987 drilling from the Gully Zone plateau (Figure 3.1.28). This intersection does not indicate an increase in structure width or gold grade to depth.

Drilling south of Main Cirque Ore Zone located a narrow extension of the Main Cirque fault. Five holes spaced at 50 to 100 m intervals over a strike length of 500 m south of the ore zone intersected a weak shear zone that included quartz-calcite stockwork and veins, altered andesite and hydrothermal breccia that extends south from Main Cirque Ore Zone at section 275 S to section 675 S of Cirque Baseline (Figures 3.1.27 to 3.1.33). The zone dips approximately 60^0 east and ranges from 1.5 m to 14 m wide. On sections 475 S and 525 S the zone is oriented subparallel to and approximately 25 m west of the western contact of the large north trending rhyolite dyke. The fifth hole was drilled on sections 650 S and 675 S to test the zone further along strike to the south. This hole, drilled from east to west, intersected scattered zones of stockwork up to 1.09 m wide over a 195 m interval extending from the west edge of the dyke to the end of the hole, and a 0.28 m wide zone of fault gouge 25 m east of the dyke. Assay results from the zone are low, generally less than 0.007 oz Au/t and 0.3 oz Ag/t. The highest gold assay result is 0.020 oz Au/t, 0.40 oz Ag/t across 0.63 m in hole 88-465.

These results indicate that immediately south of the ore zone, Main Cirque Fault Zone narrows and contains only minor stockwork veins, and further south diffuses and becomes difficult to recognize. The rhyolite dyke which hosts the Main Cirque Ore Zone to the north, occurs immediately east of the Main Cirque Fault Zone in these holes. Because of glacial till cover, the locally gold-bearing east margin of the dyke is not exposed and south of the ore zone at section 100 S, for at least 650 m, no drill holes have tested this edge of the dyke.

South of section 675 S, four holes were drilled to test for the Main Cirque Fault Zone beneath HLEM anomalies at the base of Alunite Cap Zone (Figures 3.1.34 to 3.1.38). Drill holes 88-422, 88-466 and 88-467 intersected shear zones and fault gouge less than 2 m wide below the HLEM anomalies. A 25 m wide rhyolite dyke and a 2 m wide andesite dyke that trend northerly, parallel to the fault zones, were intersected as well as one interval of stockwork 0.78 m wide. This latter interval, located beside a shear zone in hole 88-466, assays trace gold, 0.12 oz Ag/t. Samples from

silicified andesite below the Kiwi Vein in hole 88-422 assay up to trace gold, 1.80 oz Ag/t across 0.40 m. At the base of Alunite Cap Zone, hole 88-468 intersected a 1 m wide fault zone and a 0.38 m wide zone of vein breccia that assays trace gold, 0.09 oz Ag/t. All four of these holes south of Main Cirque Ore Zone located narrow fault zones that are on strike with and possibly part of Main Cirque Fault Zone; however, they contain almost no hydrothermal veins.

Underground drill hole 88-2,001 was drilled to test for structures parallel to the Main Cirque Zone. It was drilled horizontally east from section 00 N, 110 E of Cirque Baseline, and was collared in Main Cirque haulage drift on the 1,635 m level. The hole was collared in the west branch of the rhyolite dyke, passed through Main Cirque Fault Zone stockwork and veins for 18 m, then through 25 m of rhyolite dyke east of the fault zone and into porphyritic and tuffaceous andesite to the end of the hole. East of Main Cirque Zone, this hole intersected several intervals of stockwork and vein breccia up to 0.50 m wide between Main Cirque Zone and 450 E, below the east wall cliffs of Main Cirque. These intersections of stockwork and breccia assay up to 0.008 oz Au/t, 0.38 oz Ag/t. From 450 E to the end of the hole at 700 E, no hydrothermal mineralization was intersected. Three shear zones were encountered between 600 E and 650 E. This drill hole indicates that almost no hydrothermal mineralization and only minor structure exist below this area of the east wall cliffs of Main Cirque.

Geological mapping to define south extensions of veins in Main Cirque was performed at 1:1,000 scale on South Cirque Grid from line 250 S south to line 1150 S and from line 250 W east to line 200 E (Figures 3.1.3 and 3.1.5). The map area is underlain by porphyritic and tuffaceous andesite, rhyolite stocks and dykes and minor north trending andesite dykes. Two distinct rhyolites are present. One, which comprises dyke structures in the area, is tan colored, flow-banded to massive with minor disseminated pyrite. The other, a small stock centered on grid coordinate 1,050 S, 100 E, is maroon, finely flow-banded and has well-developed spherulitic texture. Two quartz-calcite veins are found in outcrop and float on South Cirque grid. The veins, called Kiwi Vein and Crystal Vein, are up to 0.20 m wide and can be traced discontinuously along northerly strike directions for 170 m and 230 m, respectively (Figure 3.1.5). Samples from Kiwi Vein, which is on strike with and about 600 m south of Main Cirque Ore Zone, contain background levels of gold. Crystal Vein occurs adjacent to Saddle Fault, 600 m south and along strike from Brandy Zone. Rock samples from the vein assay up to 0.014 oz Au/t. Glacial till covers the vein south of its last outcrop at about gridline 900 S. Close spaced HLEM and VLF-EM conductors that trend 000^0 to 020^0, coincide with both veins. A pronounced, linear

magnetic low extends north from the Crystal Vein, along the Saddle Fault to Brandy Zone.

Conclusions

The Main Cirque Fault Zone has now been explored over a 1,350 m strike length from the Gully Zone in the north to the south part of Main Cirque. Over this distance holes have been drilled at a maximum spacing of 50 m testing the structure to a depth of up to about 600 m below surface. Although the structure is continuous over this strike and contains significant widths of vein material commonly exceeding 20 m, gold grades are uniformly low rarely exceeding 0.01 oz Au /t and silver grades are similarly insignificant. The character of mineralization north and south of the Cirque Stope is that of a wide, stockwork quartz-calcite vein system rather than the single, compact structure observed in the Cirque Stope. This structure consistently narrows with depth and no holes below 1600 m elevation have intersected a significant vein or structure.

The potential for this structure to host additional, economically significant ore is remote. North of the Cirque Stope 29 holes have been drilled which trace the structure 550 m to the Gully Zone and test the potential of splay structures, dykes, and nearby parallel structures. No ore grade intersections have been returned.

South of the Cirque Stope 14 holes have been drilled which trace the structure 650 m along strike. Although the vein structure narrows significantly over this strike length, it has not been traced along its full length. Splay structures and, most significantly, one which hosts a large rhyolite dyke, have not been tested by drilling nor have they been adequately mapped. Some potential still lies in this area.

3.3.1.4 BRANDY ZONE

Location

Brandy Zone is subparallel to and approximately 360 m west of Main Cirque Zone, underlying gentle till covered slopes along the western side of Main Cirque. The zone, centered near UTM coordinate 6,675,000 N, 473,900 E (Figure 3.0.1), lies within an area covered by 1:1,000 scale map sheets 0A and 0H, and claims Kuku 16, 18, 20 and 31.

Local Geology

Brandy Zone comprises a series of up to six subparallel gold-bearing quartz-calcite veins that strike 014^0 and dip west 55^0 to 70^0. Veins of the zone occur across a width of 150 m and over a strike length of 650 m. The zone is hosted in flat lying porphyritic andesite flows and andesite tuffs. The propylitically altered andesitic volcanics are cross-cut by numerous, steep-dipping rhyolite and andesite dykes. These dykes form part of the Brandy Zone structure. The north trending, steep west dipping Saddle Fault intersects the zone from the south and traverses its northern half.

Brandy Zone veins comprise quartz, calcite, sericite and visible electrum. Chlorite and epidote are common in vein breccias where vein material is a matrix for altered wallrock fragments and as alteration halos in unbrecciated wallrock. Pebble dykes and hydrothermal breccias often occur within the same structures that host the veins. Veins range in width from 0.08 m to 2 m and average 0.2 m wide.

Previous Exploration

In 1982, Brandy Zone was located by soil geochemistry and prospecting. Soil sample results over the zone defined a pronounced linear anomaly with highs of up to 3,845 ppb Au. Rock chip sample assays were up to 1.36 oz Au/t over 0.35 m (Doherty et al., 1982).

In 1983, trenching exposed visible gold bearing veins. Stripping along strike in Trench 83-10 exposed 37.4 m of vein and stockwork that grades 0.88 oz Au/t, 1.03 oz Ag/t across a reported average width of 1.6 m (Doherty, 1984).

In 1984, trenching, surface sampling and 3,543 m of diamond drilling in 35 holes was performed. In addition to the first vein discovered, BV1, three additional veins, BV2 through BV4, were intersected by diamond drilling (Doherty, 1984). Probable ore reserves were delineated in the BV1 and BV2 veins.

In 1986, exploration on Brandy Zone comprised 3169.61 m of diamond drilling in 24 holes, 16 of which were from surface, to delineate mineable ore reserves in BV1 and BV2 veins. Five drill holes intersected ore grades and widths in BV2; no ore grades or ore widths were intersected in BV1 (Dussell, 1987). Drill results indicated that underground development was warranted.

In 1987, 1,676.87 m of diamond drilling in 19 holes was performed to test certain sections of BV1, BV2 and BV5 veins. Results from the two southernmost holes indicated

potential for improved gold grades in BV1 and BV2 veins to the south (Nagati et al., 1988).

1988 Exploration

Exploration on Brandy Zone in 1988 comprised 866.52 m of diamond drilling in nine holes to test the southern extensions of BV1 and BV2 veins (Figures 3.1.4, 3.1.40 to 3.1.47), and 332.23 m of underground diamond drilling in three holes to test BV2 vein to depth.

Results

Surface drilling tested BV1 and BV2 veins south from section 200 S of Cirque Baseline. Holes 88-417 to 88-420 were drilled to test BV1 for ore grade and ore width intersections within 25 m of encouraging intersections from 1987 drilling. These holes intersected up to 4.5 m widths of silicified andesite, hydrothermal breccia, and quartz-calcite veins corresponding to the position of BV1 (Figures 3.1.40, 3.1.43 to 3.1.44). Intersections in these holes assay up to 2.15 oz Au/t, 0.02 oz Ag/t across a core length of 0.27 m. Hole 88-419 was lost in overburden. Results from these holes indicate that BV1 has good gold grades but narrow widths in the area of section 325 S.

Hole 88-421 was drilled to test for BV1 100 m south of previous drilling (Figure 3.1.45). This hole intersected two pebble dykes and altered andesite in the inferred position of BV1. Assays from this intersection are up to 0.051 oz Au/t, 0.19 oz Ag/t across 1.00 m. This hole confirms that BV1 structure extends south to section 425 S, but BV1 vein does not.

Holes 88-413 to 88-416 were drilled to test BV2 south of section 175 S (Figures 3.1.41 to 3.1.43). In holes 88-413 and 88-414, BV2 comprises silicified andesite that contains background levels of gold and silver. A 0.13 m wide zone of silicification about 30 m west of BV2 assays 0.445 oz Au/t, trace Ag in hole 88-414. To the south, in holes 88-415 and 88-416, a rhyolite dyke occurs in place of BV2. A zone of quartz stringers in the dyke, in hole 88-416, assays 0.014 oz Au/t, 0.49 oz Ag/t across a core length of 0.24 m. Results from these holes indicate BV2 is narrow and difficult to trace south of section 125 S. A rhyolite dyke may occupy the BV2 structure to the south.

The north trending Saddle Fault, as indicated by drill hole intersections, strikes along the east side of Brandy Zone south of section 275 S. From this section north, drill sections show the fault migrating westward across Brandy Zone veins. HLEM and VLF-EM anomalies delineate the fault,

indicating a conductor within 15 m either side of the fault along its length.

Conclusions

Veins in the Brandy Zone have been drill-tested at maximum intervals of 50 m along their entire known strike length of 600 m. The BV1 and BV2 veins are the strongest structures in this zone. The BV2 vein has been examined with extensive underground development and both veins have been drill-tested to depths of 175 m below surface. This work shows all veins in the Brandy Zone to be narrow, characteristically 0.4 m or less. Grades are locally in excess of 2.0 oz Au/t but zones of continuous economic grades are rare. Underground development and test stoping has demonstrated that the erratic nature of gold distribution and narrow vein widths causes excessive wallrock dilution and creates a tendency to overestimation of reserve grade. As a result, areas outlined previously as probable ore in BV2 Vein, are not economic.

Potential for economic ore in the Brandy Zone is estimated as negligible at this time. Veins do not appear to be continuous to the south or down-dip and cliffs truncate the extent of this zone to the north. Remaining potential exists only in further extension of the Saddle Fault south of present drill-testing where veins may re-appear in reasonable mining widths. Surface prospecting does not support this possibility although outcrop is not abundant due to the presence of large amounts of glacial moraine material.

3.3.1.5 Lake Zone

Location

Lake Zone is subparallel to and approximately 520 m west of Main Cirque Zone in the west wall cliffs of Main Cirque and underlying Lake Zone Plateau. The zone, centered near UTM coordinate 6,674,700 N, 473,750 E (Figure 3.0.1), lies within an area covered by 1:1,000 scale map sheet 0A, 0G and 0H, and claims Kuku 18, 27, 29, 31 and Pup 30F.

Local Geology

Lake Zone comprises two interconnected veins of different orientations that are hosted in gently west dipping, propylitically altered porphyritic andesite and andesite pyroclastic rocks. The veins occur as massive, fine to coarse grained quartz-calcite-sericite veins, recemented vein breccias, vein-wallrock breccias,

hydrothermal breccias and stockwork. Accessory minerals in the veins include generally less than 1 percent of pyrite, pyrrhotite, sphalerite, galena, rhodochrosite, rhodonite and visible electrum.

Initial drilling indicated two subparallel, west dipping veins that strike 014^0. These veins were called LV1 and LV2. Subsequent drilling and underground development indicate a 50^0 west dipping, 020^0 trending vein with associated secondary, subparallel veins and splays that interconnect with a vertical, 012^0 trending vein. The 020^0 trending vein, called LV2-45, has a drill indicated strike length of 650 m from section 100 N to section 550 S of Cirque Baseline, and a vertical extent of 230 m from an elevation of 1,640 m to 1,870 m. The vein has step-like variations in dip that range from 30^0 to 80^0 west and an average dip of 55^0 west. Thickness of the vein varies from 0.1 m to 10.1 m and averages about 0.6 m overall. Southern portions of the vein average up to 2.5 m thick. The 012^0 trending vein, called LV2 Vertical, originates in the south between sections 350 S and 275 S where, at the 1,750 m level, it occurs as a vertical splay below LV2-45. Between sections 275 S and about 150 S, LV2 Vertical is narrow and discontinuous. North of section 150 S, the vein diverges from LV2-45 and becomes thicker and more continuous between the 1,750 m level and surface. The vein extends north to section 100 N and remains near vertical except for short intervals where the vein "dog legs" to a 45^0 west dip. LV2 Vertical ranges in thickness from 0.1 m to 7 m and averages about 0.45 m thick. Present reserve estimates in LV2-45 and LV2 Vertical veins are 20,286 tons grading 0.455 oz Au/t (0.405 oz Au/t cut) and 16,850 tons grading 0.66 oz Au/t (0.416 oz Au/t cut), respectively.

Previous Exploration

In 1981, soil sampling and rock sampling were performed along the west wall of Main Cirque. Results from a series of contour soil samples collected along the base of the cliffs that form the west wall, average greater than 627 ppb Au over 980 m. A 5 m wide quartz-calcite pod that assays 0.60 oz Au/t, 1.17 oz Ag/t was discovered up-slope from a 12,665 ppb Au soil anomaly (Doherty et al., 1981).

In 1982, rock sampling and 909 m of diamond drilling in six holes were performed. Discontinuous, 014^0 trending quartz-calcite veins that assay up to 4.65 oz Au/t across 0.3 m were discovered to outcrop for 400 m. Four of the drill holes intersected quartz veins with high gold grades and narrow widths (Doherty et al., 1982).

In 1984, 1,686 m of diamond drilling in 15 holes was performed. Results from this drilling indicated narrow, discontinuous veins (Doherty, 1984).

In 1986, 5,134 m of diamond drilling in 32 holes and soil geochemical and ground geophysical surveys were performed. Positive results from the drilling indicated an underground exploration program was warranted.

In 1987, surface rock chip sampling and diamond drilling of 3,990.1 m in 54 surface holes and 3,816.8 m in 39 underground holes were performed. This work led to refinement of reserves in the Lake Zone veins (Nagati et al., 1988).

1988 Exploration

Exploration on Lake Zone in 1988 comprised diamond drilling of 1,847.58 m in 15 surface holes (Figures 3.1.4, 3.1.48 to 3.1.61),and 2,604.63 m in 30 underground holes. Eleven surface holes and most of the underground holes were drilled to test gold grade continuity and define stope outlines in the LV2 veins. Surface holes 88-511 and 88-512 were drilled to test LV2-45 north of section 00 N. Holes 88-518 and 88-519 were drilled to test LV2-45 south of section 550 S. A 280 m by 560 m southern portion of Lake Zone grid was re-established in preparation for an HLEM survey.

Results

Surface drill holes 88-500 to 88-510 were drilled to test gold grade continuity of 425 S and 300 S stopes in LV2-45 and 50 N stope in LV2 Vertical (Figures 3.1.53 to 3.1.58). These holes intersected gold-bearing vein and vein breccia in the stopes with maximum assays as follow: hole 88-500 intersected 0.331 oz Au/t, 0.53 oz Ag/t across a true width of 1.24 m in 300 S stope; hole 88-507 intersected 2.26 oz Au/t, 1.95 oz Ag/t across a true width of 1.19 m in 50 N stope; and hole 88-508 intersected 0.115 oz Au/t, 0.66 oz Ag/t across a true width of 5.44 m in 425 S stope. Intersections in the other holes assay 0.081 oz Au/t, 0.837 oz Ag/t across a true width of 2.42 m or less. Hole 88-501 was lost short of target due to permafrost. Results from these and underground holes indicate that due to highly erratic gold grades, structural complexity, and narrow widths, these stopes do not warrant mining.

Holes 88-511 and 88-512 were drilled to test LV2 above the 1,750 m level north of previous drilling at section 00 N (Figures 3.1.58 to 3.1.61). These holes intersected vein material grading 0.005 oz Au/t, 0.52 oz Ag/t across a true

width of 0.16 m on section 50 N and 0.352 oz Au/t, 0.53 oz Ag/t across a true width of 0.09 m on section 100 N, respectively. With Middle Cirque cliffs as a northern vein limit at about section 200 N, these narrow intersections indicate little potential for tonnage in the northern portion of LV2-45.

Holes 88-518 and 88-519 were drilled on sections 600 S and 800 S to test LV2-45 south of previous drilling at section 550 S (Figures 3.1.51 and 3.1.52). Results from these holes, which did not intersect LV2-45, indicate that the vein, if it extends to these sections, is east of the ground tested by these holes.

Conclusions

Veins of the Lake Zone have been tested by underground development and diamond drilling along their entire known strike extent and down dip in excess of 245 m. These veins occupy a conjugate fracture set with divergent dips. One fracture set dips vertically, the other dips 60^0 west. veins do not consistently follow one fracture set but tend to intermittently "dog-leg" from one set to the other creating difficult mining conditions and introducing the potential for substantial dilution. Close-spaced drilling and underground development has demonstrated an erratic gold distribution and unpredictable continuity of grade over even 1 m distances. These problems have contributed to the substantial down-grading of reserves in this zone.

Diamond drilling north, south, and down-dip from the Lake Zone South and North ore zones indicates that vein widths narrow substantially and gold grade becomes negligible away from these zones. Below the 1750 m elevation ore haulage drift veins tend to dissipate into a large number of narrow structures which are almost uniformly barren of gold.

Potential for economic reserves of gold mineralization in the Lake Zone is regarded as poor. Northern strike extents of the largest vein structures are truncated by cliffs and drilling down-dip shows consistent degradation in structural intensity. Drill-testing to the south has not located extensions to the veins or their host structures. Although additional drilling could be performed in the extreme south portion of the zone to remove all possibility of a strike extension towards the rhyolite stock of Red Ridge (Figure 3.1.1) efforts in this regard are seen as relatively low priority in comparison to other targets on the property.

3.3.1.6 Fox Zone

Location

Fox Zone is subparallel to and approximately 100 m west of the Lake Zone LV2 Vertical vein underlying Lake Zone Plateau and Middle Cirque cliffs. The zone, centered near UTM coordinate 6,675,100 N, 473,650 E (Figure 3.0.1), lies within an area covered by 1:1,000 scale map sheet 0A, and claims Kuku 29, 31 and Pup 30F.

Previous Exploration

Fox Zone was located by prospecting in 1981. Rock chip samples collected from the zone assayed less than 100 ppb Au across 2 m (Doherty et al., 1981).

In 1986, Fox Zone veins were intersected in diamond drill holes that were drilled to test the Lake Zone. The Fox vein intersection in hole 88-177 assays 0.425 oz Au/t across a core length of 0.41 m. Ground geophysical and soil geochemical surveys performed over the Lake Zone grid covered part of the southern strike extension of Fox Zone. Weak VLF-EM anomalies occur over Fox Zone. A single soil sample anomaly of 90 ppb Au with a coincident HLEM anomaly occurs over the zone on grid line 320 S.

In 1987, 278.0 m of diamond drilling in three surface holes, 324.04 m of drilling in two underground holes from Lake Zone workings and rock sampling were performed. Fox vein intersections in these holes assay 0.04 oz Au/t, 0.18 oz Ag/t across 0.30 m or less. Rock samples from Fox Vein 1 and Fox Vein 2 assay up to 0.003 oz Au/t and 0.71 oz Au/t, respectively.

1988 Exploration

Exploration on Fox Zone in 1988 comprised geological mapping (Figure 3.1.62), rock sampling and 304.49 m of diamond drilling in three surface holes and 213.66 m in one underground hole from Lake Zone workings. The 60 m by 180 m Fox grid was established and 64 rock samples were collected. Surface holes were drilled to test the two Fox veins, FV1 and FV2, beneath their outcrop exposures in the east wall cliffs of Middle Cirque (Figures 3.1.48, 3.1.59 to 3.1.61). The underground hole was drilled to test the southern extension of the Fox veins at depth on section 300 S.

Results

Fox Zone veins are hosted in propylitically altered porphyritic andesite and andesite tuffs that dip about 10^0 northwest (Figure 3.1.62). Epidote, chlorite and locally calcite coat joints and shear zones in these andesites. These structures trend 040^0, and dip 58^0 northwest. Veins fill dilatent portions of otherwise narrow left lateral and normal faults. In outcrop, Fox Vein 1 (FV1) comprises a lamellar quartz-calcite vein with a core of vein-wallrock breccia. The vein, up to 1.0 m thick and traceable in outcrop over 20 m , has a trend of 030^0 and dips 55^0 northwest. The highest assay result for the vein in outcrop is 0.055 oz Au/t, 2.0 oz Ag/t across 0.04 m. Fox Vein 2 (FV2), located 45 m east of FV1, is texturally similar to FV1. This vein, up to 0.60 m thick and 7 m long in outcrop, also has a similar orientation to FV1. FV2 has spotty but high gold grades with surface samples which assayed up to 0.71 oz Au/t, 0.52 oz Ag/t across 0.4 m. Numerous quartz-calcite veins up to 0.40 m thick and 15 m long, occur adjacent to FV1 and FV2. These smaller veins assay up to 0.055 oz Au/t and 2.4 oz Ag/t.

Drill holes 88-513 to 88-515, drilled to test beneath FV1 and FV2 outcrop exposures, encountered difficult ground conditions. Sand and loss of circulation caused holes 88-513 and 88-514 to be lost short of target depth. All three holes intersected FV1 which assays up to 0.36 oz Au/t, trace Ag across a core length of 0.47 m in hole 88-514 (Figures 3.1.59 to 3.1.61). Hole 88-515 intersected weak hydrothermal breccia that assays up to 0.004 oz Au/t, 0.38 oz Ag/t across a core length of 1.00 m, close to where the FV2 intersection was expected.

Results of drilling and surface sampling to date indicate that Fox Zone comprises a continuous but narrow fault structure along which wider zones of gold-bearing quartz veins occur. Drill holes, between sections 75 N and 300 S, do not indicate any ore grades or mineable widths within the structure. The structure has not been explored on surface or to depth south of section 300 S. To the north, only 70 m of unexplored strike length exists between Fox Vein outcrops in the south wall cliffs of Middle Cirque and their continuation on the floor of Middle Cirque. In Middle Cirque the zone comprises well exposed weak stockwork that assays 0.034 oz Au/t or less over narrow widths.

Conclusions

Prospecting and diamond drilling demonstrates that veins of the Fox Zone are narrow, continuous, low-grade structures with small, erratically distributed zones of gold concentration. These structures are similar in many ways to

the Brandy Zone veins and their consistency of character over the 375 m explored strike-length indicates that the possibility for substantial improvement in vein width and grade further to the south or down-dip is remote.

3.3.1.7 Pika Zone

Location

Pika Zone is located in the cliffs of the southeast wall of Middle Cirque, approximately 560 m west of Lake Zone. The Zone, centered near UTM coordinate 6,674,950 N, 473,230 E (Figure 3.0.1), lies within an area covered by map sheet 0F, and claims Kuku 30, 32 and Pup 29F.

Previous Exploration

Pika Zone was located by prospecting in 1981. Rock chip samples collected from the zone assay up to 0.063 oz Au/t across 0.9 m (Doherty et al., 1981).

In 1982 the zone was traced northeast for 1,000 m into Middle Cirque (Doherty et al., 1982).

In 1984, the main Pika Zone vein was systematically resampled. Sample assay results indicated gold grades of 0.064 oz Au/t across 0.9 m or less, although one sample has assay results of 2.71 oz Au/t, 6.42 oz Ag/t across 0.9 m (Doherty et al., 1984).

In December 1987 and January 1988, 688.25 m of diamond drilling in four holes was performed. This drilling intersected up to 0.40 m core length of stockwork that contains trace gold and silver, below vein outcrop of Pika Zone (Nagati et al., 1988).

1988 Exploration

Exploration on Pika Zone in 1988 comprised geological mapping (Figures 3.1.63 to 3.1.67), rock sampling and 203.30 m of diamond drilling in two holes (Figures 3.1.68 to 3.1.70). An 80 m by 50 m grid was established and 35 rock samples were collected. The drilling was performed to test the southwestern strike extent of the zone.

Results

Pika Zone is hosted in flat-lying porphyritic andesite flow rocks that locally overlie andesite lapilli tuff (Figures 3.1.63 to 3.1.67). The andesites are

propylitically altered along flow contacts. Joints within the andesite are dominantly vertical and strike 024^0 on average. Four subparallel rhyolite dykes up to 8 m wide occur east of Pika Zone. The dykes are intensely fractured and altered, steep dipping, and have an average trend of about 028^0. Pika Zone comprises 0.1 m to 1.5 m wide quartz-calcite vein, stockwork and in places vein-wallrock breccia that has been traced over a strike length of 130 m. At grid coordinate 3+62 N, 0+53 E in the cliffs below Lake Zone Plateau, a northeast trending fault intersects the zone (Figure 3.1.63). North of the fault, the zone occurs as one vertical vein which trends 015^0 for 85 m. South of the fault, a zone of stockwork up to 0.5 m wide strikes discontinuously for 45 m along a trend of 180^0. Assay results from samples collected at Pika Zone in 1988 are 0.07 oz Au/t or less, except for one sample which grades 0.93 oz Au/t, 0.73 oz Ag/t across 0.05 m. Several discontinuous zones of stockwork up to 5 m long and 0.2 m wide occur subparallel to and up to 40 m east of Pika Zone. Samples from these zones assay up to 0.492 oz Au/t, 0.408 oz Ag/t across 0.20 m.

Drill holes 88-516 and 88-517 were drilled west from Lake Zone Plateau to test a southwest extension of Pika Zone (Figures 3.1.68 to 3.1.70). Hole 88-516 intersected the south trending zone of stockwork 20 m below surface. The zone assays 0.008 oz Au/t, 0.168 oz Ag/t across a core length of 3.16 m. Sheared andesite adjacent to the east side of the zone assays 0.036 oz Au/t, 0.20 oz Ag/t across a core length of 0.90 m. Hole 88-517,collared about 40 m southwest of hole 88-516, did not intersect stockwork. All samples from this hole, which was collared and drilled west of the south trending Pika Zone stockwork, contain trace gold. Results from these holes indicate that a hydrothermally altered shear zone with low but anomalous gold grades, extends south from Pika Zone.

Conclusions

The Pika Zone Vein has been traced in outcrop and through 9 diamond drill holes along a 325 m strike length. Surface samples in previous years have produced assays up to 0.6 oz Au/t and vein widths up to 1.5 m. Diamond drill holes have consistently produced intersections significantly narrower than corresponding surface vein exposures with little or no gold. Drill holes south of known vein exposures have produced no vein intersections.

The potential for economic ore concentration in this zone is considered remote. The narrow vein widths and lack of consistent gold grade in surface outcrop present a similar character to veins of the Brandy Zone. The northern extent of the Pika Vein is truncated by cliffs and down-dip

potential for the zone appears minimal. To the south the Pika Vein appears to be truncated by an east-west trending fault beyond which the structure continues but vein material does not.

Some potential remains in the possibility for further normal fault structures parallel to the Pika Zone but further to the west in a small hanging valley at the south end of Middle Cirque. This area has not yet been adequately prospected or mapped and is currently regarded as a low priority exploration target.

3.3.1.8 Gully Zone

Location and Access

Gully Zone is located in the east wall cliffs of Main Cirque and strikes onto Overlook Ridge Plateau, about 850 m northeast of Main Cirque Ore Zone. The zone, centered near coordinate UTM 6,675,270 N, 474,850 E (Figure 3.0.1), lies within an area covered by mapsheets 0B, 0C, 0L and 0M, and claims Kuku 10, 21 and Pup 49F, 50F, 51F, 57F. The zone is accessible by helicopter or by foot from the mine haul road.

Local Geology

Gully Zone comprises a section of Main Cirque Fault Zone. The zone, which trends 040^0 and dips 70^0 southeast, contains discontinuous lenses of quartz-calcite veins over a 110 m strike length in a gossanous shear zone that is up to 7.5 m wide. The veins are up to 1 m wide, but average 0.25 m. In the Main Cirque cliffs, the zone is hosted by propylitically altered porphyritic andesite and andesite lapilli tuff that dip 10^0 southwest on average. Northwest of the cliffs, glacial till on Gully Zone Plateau mantles bedrock.

Previous Exploration

Gully Zone was located by prospecting in 1981. Soil samples collected from hand trenches along the zone contained up to 480 ppb Au (Doherty et al., 1981).

In 1983, a ground magnetometer survey was performed over a grid on Gully Zone Plateau. A 50 m wide linear magnetic depression is coincident with Main Cirque Fault Zone.

In 1986, geological mapping, rock sampling and soil geochemical and ground magnetometer surveys were performed. Rock samples collected from quartz veins assay up to 0.90 oz

Au/t, 0.84 oz Ag/t across 0.10 m. Results of soil geochemistry indicate one and two sample anomalies of up to 225 ppb Au. The magnetometer survey delineated a 060^0 trending, horizontal geological contact.

In 1987, rock sampling and 1944.2 m of diamond drilling in 10 holes were performed. Surface samples of quartz-calcite veins generally assay 0.14 oz Au/t or less, although one sample assays 0.48 oz Au/t, 0.35 oz Ag/t across 0.65 m. Drill results indicate a zone that, near surface, assays up to 0.11 oz Au/t, 0.007 oz Ag/t across a true width of 6.55 m in one hole. Gold grade and width of the zone decrease to depth and along strike from this hole.

1988 Exploration

Exploration on Gully Zone in 1988 comprised re-establishment of the 400 m by 240 m Gully grid and an HLEM survey.

Results

Results of an HLEM survey over the Gully grid indicate a series of six subparallel, weak to moderate conductors that trend 010^0 to 020^0 (Bowman and King, 1988a). The two strongest conductors are on strike with the gold-bearing fault zone intersected by 1987 drilling. Moderate to strong magnetic lows are parallel to these conductors. These results indicate that the Main Cirque Fault Zone extends northeast to Gully Zone grid.

Conclusions

The Gully Zone is a contiguous northern extension of the Main Cirque Fault Zone and as such represents a significant exploration target. Prospecting and diamond drilling in previous years have outlined a gold-soil geochemical anomaly which overlies a quartz-carbonate vein which has produced intersections up to 6.55 m wide bearing 0.11 oz Au/t. Results of the 1988 airborne and ground geophysical surveys have provided significant exploration targets consistent with the northern extension of this structure. Also, the trend of these geophysical conductors implies that previous drilling tracing the far northern extent of this vein may not have been located to intersect the most significant structure.

The potential for this zone to host economic ore reserves is considered quite high. This structure has a productive history and has a demonstrated potential for mining widths of gold-bearing vein material even in the

Gully Zone area. Further geochemical and geophysical surveys may be useful in delineating a further extension to the Gully Zone structure but only diamond drilling can adequately test the structure due to the thickness of felsenmeer covering the vein structure in the area.

3.2 Conversion of Shares of Total Erickson and Subco

(a) each of the issued and outstanding Total Erickson Shares shall be converted into 0.357 Getty Resources Shares;

(b) each of the issued and outstanding Subco Shares shall be converted into 350,000 common shares of Amalco; and

(c) all of the authorized but unissued shares of Total Erickson and Subco shall be cancelled without repayment of capital.

file: scl

3.3.2 CHIEFTAIN HILL AREA

3.3.2.1 Introduction

Location and Access

Chieftain Hill area covers 14 square km on the northwest side of the Wheaton River Valley between Butte Creek and Skukum Creek centered on coordinate UTM 478,850 E, 672,900 N (Figure 3.0.1). The area includes all or portions of 1:5,000 scale map sheets 2, 3, 13, and 14 (Figures 3.2.1 to 3.2.4), and encompasses claims Chief 2 to 4, 6, 12 to 29, 32 to 34, 36 to 71, Glee 1F to 12F, 14F, 16F to 28F, 37F to 46F, 59F to 70F, 73, 74F to 78F, as well as Pup 70F, 71F, 83F, and 85F.

Chieftain Hill area is above treeline with steep cliffs, moderate talus covered slopes and rolling alpine plateaux. Topographic relief ranges between 1,370 m and 1,846 m above sea level. Access to the area is by helicopter or, to east facing slopes, by cat trails from the Omni Resources road up Mid-Day and Morning gulches.

Previous Regional Exploration

Interest in Chieftain Hill area began in the early 1900's with attention focused on precious metal and antimony veins.

In 1906 D.D. Cairnes mapped the Wheaton River area including Chieftain Hill at a scale of one inch to one mile (Cairnes, 1912, 1916) and made note of two quartz-antimony veins called the Morning and Evening veins on Chieftain Hill.

In 1940, H.S. Bostock conducted a study on special minerals and sampled the Morning and Evening antimony veins (Bostock, 1941).

In 1966, Yukon Antimony Corporation staked the south part of Chieftain Hill and through the 1967 and 1968 field seasons, trenched and drilled three holes to test IP anomalies for potential copper mineralization. The core was not assayed for gold.

In 1971 and 1972, Secord Investments conducted brief sampling programs over the south part of Chieftain Hill.

From 1980 to 1984, Agip Canada Ltd. conducted limited reconnaissance stream and contour geochemistry at Chieftain Hill area. The Wedding Ring anomaly was discovered on the southwest slopes of Chieftain Hill during a reconnaissance

soil sampling program in 1981 and followed-up with work on the Hawk grid in 1982.

In 1985 the Rainbow Road zone of the Omni Resources deposit was discovered on strike with, and 1 km southwest of the Mt. Skukum property boundary on Chieftain Hill.

In 1986, Mt. Skukum Gold Mining Corp. focused exploration efforts on the gossanous east slope of Chieftain Hill with a program of contour soil sampling and prospecting. Soil anomalies were defined on the south slopes of Chieftain Hill along strike from the Omni deposit, in Morning Gulch, and in Midnight Gulch. The Morning and Evening Veins described by Cairns (1912) were also located at this time. Detailed follow-up of these anomalies in 1987 with airborne geophysics, and detailed grid work led to discovery of several veins in Morning Gulch including the Ocean Vein, the Better B. Vein and the Johnny B. Vein.

In late 1987, limited diamond drilling was conducted on the Ocean Vein and Better B. Vein structures. Two holes drilled to intersect the Ocean Vein produced intersections averaging 1.25 m wide with grades up to 0.27 oz Au\t and 2.56 oz Ag/t over a down-dip extent of about 35 m. One hole drilled to test the Better B. Vein intersected a poorly defined 0.55 m wide structure which returned a grade of only 0.04 oz Au/t (Nagati et al, 1987).

3.3.2.2 1988 Regional Exploration

In 1988 regional geological mapping at 1:5,000 scale of Chieftain Hill area was combined with continued contour soil sampling, prospecting, and detailed grid work in areas of anomalous soil geochemistry. Regional mapping (Figures 3.2.1 to 3.2.4) covered all of Chieftain Hill area except for the western slopes into Wedding Ring Creek to determine the source and controls of gold soil anomalies in the area and assess their economic potential. Contour soil sampling (Figures 3.2.5 to 3.2.7) was extended north to define new anomalous targets.

Results

The geology of Chieftain Hill area comprises a basement of Proterozoic Yukon Group metasedimentary rocks intruded by Cretaceous granitic rocks unconformably overlain by a narrow basal conglomerate followed by andesitic and felsic Skukum Group volcanic rocks. This stratigraphic package is cut by at least one major east-west fault in the north and an irregular, elongate, north-east trending rhyolite stock in the south (Figures 3.2.3 and 3.2.4).

Metasedimentary basement rocks (GNSS) outcrop predominantly in the northeastern part of the map area north of a fault which has down-dropped stratigraphy in the south preserving upper stratigraphy in that area. These rocks comprise banded gneiss, schist, and amphibolite characterized by alternating 3 to 4 cm thick quartz-feldspar and amphibole rich foliae.

Cretaceous granitic rocks (GRDR) of the Coast Plutonic Complex intrude metasedimentary rocks and occur predominantly in the north and eastern parts of the map area at low elevation and as inliers representing paleotopographic highs. These rocks comprise foliated to massive hornblende granodiorite.

A basal conglomerate unconformably overlies basement rocks throughout the map area and is predominant in the northern part of the map area (CGBL, CGFL). This unit and one termed fluvial conglomerate (CGFL) in the southern part of the map area are probably correlative. These rocks form blocky, manganese coated and limonitic outcrops. Fresh surfaces are characterized by rounded to sub-angular pebbles to boulders of granodiorite and metasedimentary rocks, as well as minor quartz pebbles and felsic to intermediate volcanic rocks 1 cm to over 1 m in diameter.

Basal conglomerate rocks are overlain by porphyritic andesite flow rocks (PPAN) which are most common in the central part of the map area between Twilight and Midnight Gulches. These rocks have been mapped previously as unspecified older (Cairns, 1912), or Triassic or older Mesozoic age (Doherty et al, 1988), but are interpreted here to be part of Eocene age Skukum Group. Fresh surfaces comprise a dark green to maroon matrix enclosing 2 to 10 percent feldspar phenocrysts 2 mm to 5 mm in length. These rocks are commonly propylitically altered with 1 to 2 percent disseminated pyrite and are similar to porphyritic andesite in Main Cirque.

Felsic pyroclastic rocks overlie intermediate flow rocks and are most abundant in the southern part of the map area. These rocks include lithic lapilli tuff (LTLP), and lapilli tuff (TFLP), interbedded with debris flow rocks (DBFL).

Lithic lapilli tuff comprises a light green maroon or white tuffaceous matrix which supports variably welded, dark-green, chloritized vitric fragments, spherulitic to flow-banded and massive rhyolite fragments, as well as porphyritic andesite and granodiorite fragments. Lapilli tuff is similar to lithic lapilli tuff but contains exclusively vitric fragments.

Debris flow rocks (DBFL) occur as sparse isolated outcrops scattered throughout the southern part of the map area. Rusty weathered outcrops are olive-green to dark-brown on fresh surfaces with poorly sorted volcanic clasts 1 cm to 1 m across comprising massive and flow-banded rhyolite, porphyritic andesite, lithic lapilli tuff, granodiorite and metasedimentary rocks.

Several minor faults and shear lineaments have been detected in the Chieftain Hill area most of which are oriented approximately east-west. Only one major fault occurs in the area interpreted through discontinuous geology and geophysical data to run east-west through the north side of Midnight Gulch. This fault has down-dropped rocks to the south at least 150 m. Many small scale felsic and intermediate dykes including a small andesite dyke swarm south of Midnight Gulch and veins in Morning Gulch parallel the orientation of this major structure.

Several late-stage intrusive rocks cut basement and volcanic stratigraphy. These rocks include andesite dykes (AN/D), rhyodacite dykes (RD/D), rhyolite dykes/stock (RHYL, RY/D, RHBX, FS/D), and pebble dykes (PB/D).

Rhyolite intrusives are the most prominent intrusive rocks in the map area which occur as a series of irregular, extensive exposures in the south and central parts of the map area forming the surface expressions of an elongate northeast trending stock which is probably continuous at depth but intrudes through volcanic rocks to surface as a series of smaller apophyses. Rhyolite forms light yellow to yellow-brown weathered outcrops and is white to tan on a fresh surface. A tan, aphanitic matrix encloses quartz and feldspar phenocrysts 2 to 3 mm across with 2 to 3 percent disseminated pyrite throughout. Contact zones are commonly highly silicified and pyritic (up to 5 percent) and fine-grained commonly with a marginal rhyolite breccia up to 2 m wide. Host rocks commonly display bleached, pyritic, silicified contacts with rhyolite which are locally stained black with pyrolusite on weathered surfaces.

Minor andesite and rhyodacite dykes cross-cut volcanic rocks in the map area. These are rarely wider than 1 m across and average 0.5 m.

Mineralization in the Chieftain Hill area comprises quartz sulphide veins associated with felsic dykes and faults described by Nagati et al (1987). Two new veins in the northern and central parts of the map area were discovered with regional mapping; the Honey B. Vein and the Ebony Vein. The Honey B. Vein, which outcrops in hornblende granodiorite, comprises a sulphide-bearing, vuggy quartz vein. The vein averages 0.15 m, has an attitude of $100^0/88^0S$ and an exposed strike length of approximately 25m

(Figures 3.2.3). The highest assay result from a sample to date is 0.069 oz Au/t and 14.0 oz Ag/t over 0.15m.

The Ebony Vein which comprises grey-blue quartz, pyrite, galena and sphalerite, outcrops along the footwall of a 2 m wide rhyolite dyke that intrudes a shear zone in andesite (Figure 3.2.3 and 3.2.8). The vein has an attitude of $095^0/65^0N$ and an exposed strike length of 40 to 50 m. Vein width is up to 0.20 m with a 0.2 m wide alteration envelope of limonite and manganese staining extending into andesite wall rock. The vein assays up to 36.3 oz Ag/t and 0.026 oz Au/t although assay results are generally much lower.

No significant mineralization was discovered in the southern part of the map area and it was determined that although the southern part of Chieftain Hill is nearby and on strike from the Omni deposit, it does not have similar geologic or structural controls. If the ore-bearing structure at the Omni deposit strikes onto the Mt. Skukum property it is probably buried beneath the thick pile of andesitic and felsic volcanic rocks which underlie the area.

Contour soil sampling in the Chieftain Hill area located two zones of anomalous gold concentrations along the south side of Butte Creek. These areas each contained several anomalous results up to 140 ppb Au and 3,150 ppb Au in initial sampling. Follow-up soil sampling replicated initial values in an area on the north-east part of Chieftain Hill and the Sauna grid was surveyed to cover the area of the anomaly.

Conclusions

Regional exploration in 1988 indicates that quartz-sulphide vein systems similar to the Omni deposit to the south of the Mt. Skukum property and the Goddell prospect east of the Mt. Skukum property are present on Chieftain Hill. Mapping indicates that these veins are hosted exclusively in granodiorite basement rocks, unconformably overlain by Skukum Group volcanic rocks, and displaced by normal faults associated with caldera collapse.

Genesis of these veins is probably related to pre-volcanic, magmatic hydrothermal activity associated with emplacement and cooling of Eocene plutons which gave rise to the Skukum Group volcanic package. The high sulphur content of the veins, extensive alteration halos, and close association with Skukum Group rhyolite and andesite dykes is consistent with this origin.

Exploration potential for the Chieftain Hill area is considered high. The presence of gold-silver bearing veins

of mineable width, nearby concentrations of economic quantities of similar mineralization at the Omni deposit, and its location on the boundary fault of the complex are all significant to the potential of the area. Complications are introduced to exploration through the unconformable and unmineralized cover of volcanic rocks which obscures mineralization and extensions to mineralized structures like the Omni deposit; however, excellent potential exists in veins which have been discovered on this part of the Mt. Skukum property.

3.3.2.3 Independence Grid

Location and Access

Independence Grid is on the southeast side of Chieftain Hill and faces the Wheaton River valley. It is centered on coordinate UTM 479,100 E, 6,672,180 N, encompassed by 1:1,000 scale map sheets 2J, 2K, 13S, 13T and includes all or portions of claims Chief 13, 15, and Glee 10F. The area is above tree line at 1,560 m and includes elevations up to 1,760 m with moderate to steep slopes. The area is accessible by helicopter. No road access is available to the area.

Previous Exploration

There is no written record of field work in the Independence area prior to 1986; however, evidence of rock chip sampling is present.

In 1986 reconnaissance contour soil sampling was conducted across the projected extent of the Omni Resources Rainbow Road zone. Anomalous soil samples over a 200 m interval at an elevation of 1,700 m were located along strike from the Omni structure. Analytical results of less than 5 ppb Au to 1,350 ppb Au were obtained from these samples.

During 1987, resampling and prospecting confirmed gold soil anomalies in the area.

The July 1987 airborne geophysical survey indicates a weak regional magnetic high in the area of contour soil anomalies.

1988 Exploration

Exploration at Independence grid commenced in late May, with establishment of a 300 m x 500 m grid which covered the contour soil anomaly. Exploration on the grid included

1:1000 scale geologic mapping, rock sampling, soil sampling, and ground magnetometer and HLEM surveys (Figures 3.2.9 to 3.2.16). A total of 129 rock samples and 380 soil samples were collected.

Results

Geology of the Independence grid comprises Cretaceous granitic basement rocks unconformably overlain by moderate northwesterly dipping Skukum Group rocks. Skukum Group rocks include a basal debris flow unit overlain by porphyritic andesite flow rocks followed by a succession of felsic pyroclastic rocks. A large, irregular, elongate rhyolite stock intrudes stratigraphy in the grid area and is cut by later rhyodacite dykes (Figures 3.2.9 to 3.2.16).

Granodiorite basement rocks (GRDR) occur as rounded, inliers in the northern and eastern parts of the grid. They are grey and medium to coarse grained with up to 15 percent hornblende.

Debris flow and volcaniclastic sedimentary rocks locally unconformably overlie basement rocks throughout the map area (DBFL and EPSD). Grey to rusty brown in outcrop, these rocks comprise poorly sorted to unsorted, angular to sub-rounded clasts of massive to flow-banded rhyolite, porphyritic andesite, lithic lapilli tuff, granodiorite and metasediments 1 cm to 1 m across.

Porphyritic andesite flow rocks (PPAN) occur in the northeastern and southwestern parts of the map area. Contact relations are uncertain but debris flow rocks are interpreted to underlie andesite flows rocks. Porphyritic andesite is similar to that found in Main Cirque with a dark-green aphanitic matrix enclosing 10 to 15 percent feldspar phenocrysts. Weak to moderate propylitic alteration is common. Minor andesitic tuff horizons are associated with flow rocks (ATBK, ATLP).

Felsic pyroclastic rocks overlie andesitic volcanics and form the dominant lithologies in the map area. These rocks comprise lithic lapilli tuff (LTLP, FTLP), and crystal lapilli tuff (CLTF). They are pale green to white and variably welded with clasts of flow-banded rhyolite, porphyritic andesite, granodiorite, metasediments, chloritic vitric fragments, as well as accretionary lapilli and feldspar crystal fragments in a felsic aphanitic groundmass. Large blocks of porphyritic andesite up to 5 m across occur in these felsic rocks which are interbedded with minor debris flow units.

Grid stratigraphy is cut by a variety of late-stage intrusive rocks which include rhyolite, and rhyodacite, as

well as minor andesite, and pebble dykes. These lithologies all follow a north-northeast - south-southwest trend.

Rhyolite dykes are the most common intrusives on the grid and stretch through the area forming a discontinuous elongate stock up to 160 m wide and 450 m long. These rocks are pale yellow-brown to rusty brown with quartz and feldspar phenocrysts up to 4 mm across and 5 to 10 percent disseminated pyrite. Contact zones are commonly fine-grained and brecciated with a bleached, silicified and pyritized envelope extending up to 2.5 m into host volcanic rocks. Roof pendants and large lithic inclusions of the surrounding stratigraphy are locally present in the rhyolite.

Steeply-dipping rhyodacite dykes are most common in the southern part of the map area cross-cutting both volcanic stratigraphy and the rhyolite stock. They are greenish-brown with an aphanitic matrix enclosing 15 percent feldspar phenocrysts which average 3 mm across. These dykes are on strike with Omni Resources Rainbow Zone and may be emplaced within a similar structure.

Distinct mineralized structures are rare on the Independence Grid despite pronounced gold soil anomalies. Sparsely distributed, barren, coarsely crystalline calcite veins (Figure 3.2.9 and 3.2.11) less than 10 cm wide occur in the area, and pyritic, silicified alteration envelopes border the rhyolite intrusive rocks. Sulphide mineralization in the area is restricted to these alteration envelopes and the rhyolite stock itself which contains 5 to 10 percent disseminated pyrite. Trace specularite and rare 0.5 m diameter patches of malachite staining are present in debris flow rocks.

Soil geochemistry conducted over the grid area has defined a strong, elongate, northeast-southwest oriented soil anomaly coincident with the rhyolite stock (Figures 3.2.13 to 3.2.16). Results of up to 1,000 ppb Au occur over this rhyolite (Figure 3.2.14) particularly in areas where it is cut by rhyodacite dykes. Other prominent single-point anomalies are concentrated over or near contacts between the rhyolite body and surrounding volcanic rocks.

Rock samples collected in float and from outcrop on the grid are uniformly low in gold with weakly anomalous samples collected from silicified rhyolite. The highest assay results were obtained from rhyolite contacts where up to 0.027 oz Au/t have been obtained over 1 m adjacent to a rhyodacite dyke. Results of geochemical sampling indicate that the rhyolite contains an elevated gold content with respect to surrounding lithologies but similar to that found in nearby soil samples. Cooling and de-watering of this body after emplacement may have produced anomalous

concentrations of gold in rocks immediately adjacent to the stock.

Ground geophysics on the Independence Grid identified subtle HLEM conductors coincident with margins of the elongate gold soil anomaly and contacts of the rhyolite stock. Ground magnetic survey results indicate several magnetic lows within the regional airborne magnetic high. These lows do not correlate with geology or geochemistry.

Conclusions

Mineralization in the Independence Grid area constitutes rare, narrow, barren calcite veinlets and pyritic, bleached halos of silicification and argillic alteration surrounding rhyolite intrusive rocks. Anomalous soil samples collected in the area correspond to contact zones surrounding rhyolite stocks and dykes which are themselves slightly auriferous. These anomalies probably originate from dewatering of rhyolite intrusives during cooling.

No evidence exists that the Omni deposit structure or vein extends onto the Mt. Skukum property from the south. Further testing for the structure could only be accomplished by drilling hypothetical extrapolations of the structure which is obscured by up to 200 m of unconformable volcanic rock and possibly displaced a considerable distance by the caldera boundary fault. The potential for discovery of economic ore concentrations in this area is considered remote.

3.3.2.4 Evening Grid

Location and Access

The Evening Grid straddles Morning Gulch on east facing slopes of Chieftain Hill. It is centered on coordinate UTM 480,300 E, 6,672,400 N on 1:1,000 scale map sheets 13A, 13D, 13F, 13G, 13R, and 13S and includes claims Chief 34 to 37, 39, 58, and Glee 62F and 63F. The grid is above treeline between 1,100 m and 1,340 m with moderate slopes and is accessible by cat road from the Omni Resources road (Figure 3.0.1).

Previous Exploration

Antimony-bearing veins on the southeast slope of Chieftain Hill were discovered in the early 1900's and described by Cairns (1912 and 1916).

Old trenches on the Evening Vein are thought to be from copper exploration by Yukon Antimony Corporation in the mid-sixties.

In 1986, the position of the Morning and Evening veins was located in Morning Gulch in an area of anomalous contour soil samples.

In 1987, the Evening Grid was surveyed to cover the area of the Morning and Evening veins after prospecting led to the discovery of the Johnny B. Vein in Morning Gulch. Subsequent geological mapping at 1:1,000 scale on the grid led to discovery of many quartz and calcite veins including the Better B., Pristine, Ocean, and extensions of the Johnny B. Veins (Nagati et al, 1987). Soil geochemistry, prospecting, trenching, 1:200 scale mapping, and ground geophysics including magnetometer, VLF-EM, HLEM, and induced polarization were conducted over the grid area. Later the same year, seven diamond drill holes totaling 894.18 m were drilled to test the Evening, Pristine, Better B., Johnny B. and Ocean Veins. Maximum diamond drill assay results of 0.04 oz Au/t and 3.41 oz Ag/t over 0.15 m in the Evening Vein and 0.275 oz Au/t and 2.56 oz Ag/t over 1.42 m in the Ocean Vein were obtained (Nagati et al, 1987).

1988 Exploration

Exploration in the Evening Grid area in 1988 included 901.92 m of diamond drilling in eight holes, trenching, rock sampling and an HLEM survey. Holes 88-398, 88-399, 88-407, and 88-412 were drilled to test the Ocean Vein and holes 88-408 to 88-411 were drilled to test the Morning Vein (Figures 3.2.17 to 3.2.35). One cat trench was excavated along strike from the Ocean Vein.

Results

Lithogeochemistry in float and outcrop samples as well as those collected in trenching are generally low in gold and silver. The highest value obtained from a float sample on the grid was 0.016 oz Au/t and 0.08 oz Ag/t. Samples of outcrop returned mainly trace gold values with the highest assays from a 1987 cat trench over the Ocean Vein of 0.16 oz Au/t over 0.83 m and 8.27 oz Ag/t over 1.0 m.

An HLEM survey was performed over the portion of the Evening Grid that covers the Ocean Vein and its projected strike extent to the east. An HLEM conductor which coincides with the Ocean Vein is indicated extending east-northeast for approximately 300 m (Bowman and King, 1988a). Weak HLEM anomalies are also indicated over the Evening Vein and along strike from the Johnny B. Vein.

A bulldozer and backhoe were used to trench across the prominent HLEM conductor which extends along strike from the easternmost exposure of the Ocean Vein (Figure 3.2.17). A 0.7 m wide fault zone oriented $076^0/84^0$NW was uncovered approximately 260 m east of the easternmost exposure of the Ocean Vein. This fault zone, interpreted to be a continuation of the Ocean Vein structure, contains limonite stained clay gouge with up to 7 percent disseminated pyrite. Samples collected from the trench assay up to 0.01 oz Au/t and 2.42 oz Ag/t over 0.15 m. Results of trenching and sampling the HLEM conductor indicate that the Ocean Vein structure extends at least 260 m east of the outcropping vein and has anomalous gold and silver concentrations.

Four diamond drill holes were completed on the Ocean Vein in 1988 at approximately 50 m spacings to test the vein in the area of a 1987 intersection that grades 0.275 oz Au/t and 2.56 oz Ag/t across a true width of 1.02 m (Figures 3.2.17 to 3.2.25). Three of the four holes drilled intersected the vein approximately 50 m to the east and west of the 1987 intersection but at slightly lower elevations. The fourth hole, drilled 115 m to the west of the 1987 intersection did not intersect the vein. Vein intersections comprise quartz-sulphide fault breccia associated with a flow-banded rhyolite dyke and several massive andesite dykes in a sheared envelope of intensely altered granodiorite. The vein grades up to 0.02 oz Au/t and 5.68 oz Ag/t across a true width of 2.41 m in hole 88-398. In hole 88-399, two closely spaced vein intersections, suggesting bifurcation or fault displacement, are separated by an interval of granodiorite. The highest gold assays from 1988 Ocean Vein drilling, 0.355 oz Au/t and 2.39 oz Ag/t over a true width of 0.14 m, were obtained from this granodiorite in hole 88-399 adjacent to the northernmost vein. This hole produced a composite average grade of 0.027 oz Au/t and 1.52 oz Ag/t across a 1.85 m intersection of the Ocean Vein. Hole 88-412 was drilled to test for the vein 115 m along strike to the west. The Ocean Vein was not intersected. These results indicate the Ocean Vein has mineable widths but lacks consistent economic gold and silver grade where tested. The vein remains open in all directions.

Four exploration holes were drilled to test the strike extent of the Morning Vein on both sides of Morning Gulch (Figures 3.2.26 to 3.2.35). A minor shear zone in andesite containing quartz-calcite stringers was intersected along the strike of the vein. Only hole 88-409 intersected the stibnite-bearing Morning Vein which produced assays of 0.013 oz Au/t and 0.19 oz Ag/t across 0.16 m. Diamond drill assays were uniformly low in these holes never exceeding 0.016 oz Au/t. Drill results indicate that the Morning Vein narrows below its outcrop expression and does not extend to the west.

Conclusions

The Evening Grid area is an extremely complex zone including rhyolite and andesite dyke swarms associated with shears and at least six separate vein structures containing three distinct styles of mineralization. The dominant structural grain of the area is east-west but structures of this orientation are truncated to the west by the northeast trending caldera boundary fault.

Of the two structures tested in 1988 only the Ocean Vein was found to have significant potential. This structure has now been drill tested by 5 holes at 50 m spacings over a 100 m strike extent and to a vertical depth of 75 m. An additional hole drilled over 100 m west of section 475 E did not intersect the structure. With one exception, drill intersections produced encouraging vein widths averaging 1.8 m and although only one ore grade gold intersection was produced, silver values are uniformly high.

Geophysical surveys and subsequent trenching have demonstrated that the Ocean Vein responds well to HLEM techniques which have traced the vein as a strong conductor over 250 m east of the easternmost outcrop expression.

The potential of the Ocean Vein to produce economic ore is considered good. Given the location and ore grade intersections already produced, this vein may present the best exploration target on the property at this time. Continuation of the HLEM geophysics survey to trace the vein through increasing overburden cover to the east is recommended, however, diamond drill testing of the vein along strike to the east and down dip is also required. Testing this structure at considerable depth may be required in light of favourable intersections obtained at depth on the Goddell showing, a similar vein structure immediately across the Wheaton Valley east of, and on strike with, the Ocean Vein.

3.3.2.5 Midnight Grid

Location And Access

The Midnight Grid is on the east side of Chieftain Hill to the north of Midnight Gulch. It is centered on coordinate UTM 480,150 E and 6,673,550 N on 1:1,000 scale map sheets 13P, 13Q, and 14V and includes claims Glee 5F, 6F, and Chief 38 to 43. The grid is mostly above treeline between 1,260 m and 1,579 m with moderate slopes and flat plateaux. Access to the grid is by helicopter or by cat

trail from the Omni Road to Midday Gulch, about 250 m to the northeast of the grid.

Previous Exploration

In 1986, contour soil sampling indicated anomalous gold in the area north of Midnight Gulch. An 800 m by 200 m grid with baseline oriented east-west was established to cover the anomalous area. Follow-up prospecting, soil sampling, and a magnetometer survey were conducted over the grid area. A 550 m long, 150 m wide gold soil anomaly of with values between 50 ppb Au and 470 ppb Au was located on the grid.

In 1987, the grid was extended on three sides to determine the extent of the anomalous zone located in 1986. Several small soil anomalies of up to 650 ppb Au east and north of the main anomaly.

1988 Exploration

Exploration on Midnight Grid included 1:1000 scale geologic mapping, rock and soil sampling as well as ground HLEM and magnetometer surveys (Figure 3.2.35 to 3.2.40). A total of 11 soil samples and 65 rock chip samples were collected in the grid area.

Results

The geology of Midnight Grid consists of Cretaceous and earlier granite and conglomerate basement intruded by granite and andesite dykes and overlain by porphyritic andesite flow rocks (Figures 3.2.36 to 3.2.38).

Conglomerate (CGBL) is the oldest lithology in the grid area. This rock is not of Skukum Group and is probably correlative with Laberge Formation. It underlies the majority of the grid, weathers tan brown to orange, and comprises a variably coloured, sand-sized matrix enclosing cobble to pebble sized clasts of chert, felsic intrusives, and metasedimentary rocks. Crude bedding exists locally. This unit probably occurs as a roof pendant in the Cretaceous intrusive rocks which surround it in the area.

Granite (PPQF, GRNT) intrudes conglomerate in at least two phases. The first phase (PPQF) occurs in the north and south parts of the map area. It is white to grey, medium grained and porphyritic with phenocrysts of quartz and feldspar 1 to 8 mm across. The rock is commonly argillically to silicically altered with up to 5 percent disseminated pyrite. The second phase (GRNT) occurs as a dyke up to 17 m wide which cross-cuts conglomerate and

earlier granite in a north-south trend across the map area. It is pink, medium-grained, and contains quartz and feldspar with 3 percent biotite.

Andesite dykes (AN/D) cross-cut granite and conglomerate with an east-west trend in the north part of the map area. These dykes are up to 9 m across, dark green and fine-grained with feldspar phenocrysts up to 5 mm across enclosed in an aphanitic matrix. Propylitic alteration is common with up to 1 percent disseminated pyrite in altered areas.

Porphyritic andesite flow rocks, probably fed by andesite dykes occur on the south side of Midnight Gulch in the south part of the grid. This unit is separated from rocks north of the gulch, which it is interpreted to overlie, by an east-west trending fault. These rocks are interpreted to be of the Skukum Group and comprise a dark-green, commonly silicified matrix, enclosing 20 to 30 percent plagioclase laths up to 5 mm across. Propylitic alteration is common in this unit accompanied by up to 5 percent epidote.

Significant structures on the grid include an east-west fault which cuts across the map area through Midnight Gulch down-dropping younger porphyritic andesite flow rocks on the south side. Displacement cannot be measured but is considered significant. A series of small, steeply-dipping shears occur in the western part of the map area oriented 120^0 to 140^0.

Mineralization in the grid area includes two veins and a quartz stockwork associated with shear zones in the western part of the map area. Veins, oriented 120^0 to 140^0 and dipping vertically, are grey to white, up to 0.4 m wide and massive. One grain of galena was observed. A high gold assay of 0.019 oz Au/t and 0.08 oz Ag/t over 0.25 m was obtained from the westernmost vein on the grid and silver grades up to 1.2 oz Ag/t have been obtained. Envelopes of silicification and argillic alteration surround the vein and patches of pyrite 0.2 m across occur in granitic rocks.

Geochemistry on the grid was limited; however, resampling of anomalous soil samples that were collected in the 1986 geochemistry survey, indicated less anomalous results. These duplicate samples, taken from highly gossanous talus overlying silicified conglomerate and altered granite, have results that are much closer to background levels for gold.

Lithogeochemical targets included alteration envelopes and quartz veins. Assay results were uniformly low in gold with slightly higher silver results in silicified wall rock than in quartz veins.

Geophysics including HLEM survey and proton magnetometer surveys on Midnight Grid defined 7 moderate and 3 weak conductors associated with magnetic lows (Bowman and King, 1988a). All 10 conductors exhibit an east-west to northeast-southwest trend. The strongest conductor recorded in the south part of the grid is interpreted from geology to be an east-west trending fault coincident with Midnight Gulch. Northwest-southeast trending quartz veins were not detected by the HLEM survey. Magnetic lows are associated with argillically altered granite and conglomerate, and relative magnetic highs occur over the unaltered basal conglomerate.

Conclusions

The area of the Midnight Grid is underlain primarily by basement rocks and encompasses the unconformable contact between these rocks and Skukum Group volcanic rocks. Intensive prospecting, sampling and mapping has failed to identify significant mineralization with the exception of several narrow veins and also failed to reproduce soil geochemical anomalies located in previous years.

The economic potential of this area is regarded as extremely low. Some potential remains in geophysical and mapping evidence that a large east-west fault structure underlies Midday Gulch (Figure 3.0.1); however, this structure is completely covered by overburden and the lack of soil geochemical anomalies in the area suggests that even this structure is not mineralized.

3.3.2.6 Sauna Grid

Location and Access

The Sauna Grid is on the northeast corner of Chieftain Hill facing Butte Creek. The grid is centered on coordinate UTM 480,900 E and 6,675,400 N on 1:1,000 scale map sheet 14D and includes claims Chief 44 and 68, and Pup 85F. The grid is on a gentle, forested slope between 1,160 m and 1,300 m elevations. There is almost no outcrop on the grid. Access is by a cat trail leading up to the grid from the Omni Resources road. A helicopter pad was cut at the end of the cat trail on the east edge of the grid.

1988 Exploration

Reconnaissance contour soil sampling at 1,200 m elevation in mid-June identified a single point anomaly of 3,150 ppb Au (Figure 3.2.7). Follow-up contour soil samples

identified an anomalous zone with results as high as 530 ppb Au. In late June a 300 m by 350 m grid was established over the contour soil anomalies and 458 soil samples and 3 rocks samples were collected (Figure 3.2.42).

Results

Gold soil geochemistry on the Sauna Grid generally shows a low profile with isolated single point highs. Soil analyses have a mean of 47.6 ppb Au with results ranging from trace to 2,430 ppb Au. Although 25 single point highs greater than 100 ppb Au were obtained, their distribution seems random, no trends are apparent.

No outcrop was located on the grid, but angular gneiss and granodiorite talus is present. Samples of quartz float collected in talus assay trace gold and silver.

Conclusions

The Sauna Grid was established to cover several anomalous contour soil geochemical samples. Little work has been done on this grid aside from detailed soil sampling. Prospecting is difficult as the area is completely obscured by overburden.

The potential of this area has not yet been assessed. Several additional soil geochemical anomalies have been produced by grid sampling but these are all isolated, single-point anomalies which have not yet been followed up or resampled.

3.3.2. 7 Wedding Ring Grid

Location and Access

The Wedding Ring Grid is in the north-south trending valley west of Chieftain Hill. The grid is centered on coordinate UTM 477,700 E and 6,673,700 N on 1:5,000 scale map sheets 2 and 3 and includes claims Kuku 304, 306 to 309, Glee 14F, 29F, and 47, and Chief 1 and 2. The grid is on moderate to gentle slopes above treeline between 1,480 m and 1,600 m in elevation. Access is by helicopter; however, a cat road that leads to Queens Ridge grid, is approximately 1 km north of Wedding Ring grid.

Previous Exploration

In 1981, reconnaissance contour soil sampling on Chieftain Hill revealed three soil samples which assayed 130

ppb, 3,300 ppb Au, and 7,050 ppb Au on the west flank of the hill.

In 1982, the Hawk Grid was established in this area to follow-up anomalous soil results. No anomalous values were obtained.

In 1986, several soil contour traverses in the area did not confirm the anomalous results obtained in 1981.

In 1987, reconnaissance prospecting was conducted in the area between Goat grid and the present Wedding Ring grid. This work located epithermal, chalcedonic veins that assay up to 0.04 oz Au/t across 0.2 m. The July, 1987 airborne geophysical survey revealed a weak magnetic low over Wedding Ring grid.

1988 Exploration

The 450 m by 1,500 m Wedding Ring grid was established to cover the axis of the north-south valley immediately west of Chieftain Hill (Figures 3.2.1 and 3.2.2). An HLEM geophysical survey and prospecting were conducted on and southwest of the grid. In total, 37 rock samples were collected.

Results

Reconnaissance indicates the Wedding Ring Grid area is underlain by interbedded felsic pyroclastic and epiclastic rocks which are overlain by andesitic pyroclastic rocks. Stratigraphy is intruded by massive, gossanous rhyolite dykes. Four quartz veins less than 0.06 m wide were sampled at 2,110 m, 2,050 m, 2,040 m, and 1,950 m elevations along the northwest-southeast trending ridge 500 m southwest of the grid. Mineralogy and textures include open spaces with drusy quartz, chalcedonic quartz, stockwork, comb texture, and minor fluorite. Assays of vein material were uniformly low with the highest assay returning 0.011 oz Au/t.

An HLEM survey was conducted on the Wedding Ring grid to test for major north-south striking structures underlying the valley in the grid area. Five 020^0 trending conductors were located. Although these conductors are oriented subparallel to the valley, they do not indicate a single through-going major structure.

Conclusions

Reconnaissance mapping and prospecting in the Wedding Ring Grid area indicates the presence of vein mineralization

and associated shear structures oriented subparallel to the Wedding Ring Valley. Regional mapping by Pride (1985) indicates the presence of a major fault extending north-south through the area, although prospecting and limited geophysics has not located this structure.

Economic potential in this area has not yet been fully assessed. Work to date has been limited in extent and does not preclude the existence of a large mineralized fault either in the valley or immediately west. Mapping and soil sampling across the valley on wide spaced lines should be carried out to fully assess this possibility.

3.3.3 MOUNT KOPJE AREA

3.3.3.1 Introduction

Location and Access

Mount Kopje area, centered on UTM coordinate 6,677,700 N, 480,700 E (Figure 3.3.1), is located north of Chieftain Hill approximately 8 km northeast of Mount Skukum. The area is encompassed by 1:5,000 scale map sheets 4,14 and 15, and contained within claims Chief 72 to 106, Kuku 321 to 331, Pup 71F to 84F and Glee 97F to 120F.

Topographic relief at Mount Kopje area ranges from treeline at 1,200 m to 1,800 m above sea level. The area is characterized by felsenmeer covered plateaux, steep slopes and talus fans. Access to the area is by foot from the mine haul road and from a cat road that traverses Summit Creek Pass, or by helicopter.

Previous Regional Exploration

In 1981, stream sediment and heavy mineral concentrate samples were collected along the upper two thirds of Rhyolite Creek. Sample results do not exceed 25 ppb Au, 0.8 ppm Ag.

In 1982, contour soil sampling was performed along sections of the southern and western flanks of Mount Kopje. Anomalous sample results exceeding 100 ppb Au and up to 2,620 ppb Au were obtained from 22 samples collected in Sulphide Creek ravine. One sample collected near the head of Rhyolite Creek was also anomalous (Doherty et al., 1982).

In 1986, contour soil sampling confirmed anomalous gold-soil values found in Sulphide Creek in 1982. Subsequent prospecting, grid soil sampling, and trenching failed to locate a bedrock source for gold-soil anomalies, although a broad zone of alteration in felsic volcanics underlies the anomalous soils.

Prospecting near Rim Creek in 1987 located quartz vein float that assayed up to 0.026 oz Au/t, 2.3 oz Ag/t.

3.3.3.2 1988 Regional Exploration

Regional exploration at Mount Kopje area in 1988 comprised limited 1:5,000 scale mapping (Figure 3.3.1), prospecting and contour soil sampling (Figure 3.3.2). In total, 262 soil samples were collected.

Results

Geology of Mount Kopje area is dominated by a moderate southeast plunging paleotopographic trough that was infilled by a sequence of maroon, flow banded, spherulitic rhyolite flow rocks and an overlying ignimbrite and intermediate lapilli tuff. The rhyolite, about 300 m thick, is locally underlain by epiclastic sediments, hosts silver bearing veins at Rim Creek Area and underlies the gold-soil anomaly at Sulphide Creek grid. A 3.5 km by 2.5 km tan porphyritic rhyolite intrusion lies against the rhyolite flow rocks northeast of Mount Kopje, near the head of Rhyolite Creek.

Contour soil sampling indicates three areas of anomalous gold concentrations in soil.

Results of 110 ppb Au and 200 ppb Au were obtained from two samples collected near Rim Creek, along the northeast flank of Mount Kopje at an elevation of 1,300 m. These two samples were collected 350 m downslope from a quartz vein that assays 0.04 oz Au/t (1,370 ppb Au), 5.35 oz Ag/t across 0.25 m.

A second soil anomaly was located 250 m northwest of Sulphide Creek grid, on the east side of Rhyolite Creek ravine. Anomalous results of up to 240 ppb Au define a narrow, northwest trending zone that is at least 250 m long. This anomaly is roughly on strike with the northwest trending anomaly at Sulphide Creek.

A third area of anomalous soils at the head of Rhyolite creek was confirmed and improved by follow-up contour soil sampling. One of these samples containing 300 ppb Au was collected near a 1982 sample that contained 85 ppb Au. Slightly anomalous gold levels in samples near by, plus anomalous gold levels in a third line of samples further down slope, suggest an east striking zone of weakly auriferous soil that is at least 700 m long. Follow-up prospecting has not been performed at these three areas.

Conclusions

Geology in the Mount Kopje area which includes densely-welded felsic tuffs, thick rhyolite flow units, and ring fracture structures indicates that this area was once an eruptive center. This fact, its location on the margin of the caldera complex, and the nearby presence of a large rhyolite intrusive body, provide both the ground preparation and heat source required to drive hydrothermal circulation.

Initial prospecting has located several narrow veins and several gold-soil geochemical anomalies and as the area

has not been completely prospected, there is potential for additional, possibly larger mineralized structures.

3.3.3.3 Sulphide Creek Grid

Location and Access

Sulphide Creek grid, centered on UTM coordinate 6,676,450 N, 479,450 E, is located approximately 1 km southwest of Mount Kopje peak (Figure 3.0.1). The grid is covered by 1:1,000 scale map sheets 4J, 4Y, 14Q, 15T and 15U, and claims Chief 11, 30, 92, 94, 102 and 103; Kuku 320, 322 and 324; and Pup 72F to 74F and 77F. The area is above tree line between 1,250 m and 1,740 m elevations with steep to moderate slopes and abundant talus. Access is by helicopter or by foot from km 3 on the mine haul road.

Previous Exploration

In 1982, contour soil sampling was performed across highly altered rhyolite at Sulphide Creek. Sample results of up 2,620 ppb Au and an average of 206 ppb Au from samples taken at 25 m intervals over a 1.1 km distance were obtained (Doherty et al., 1982).

In 1983, limited follow-up geological mapping as well as soil and rock sampling were performed. All rock samples contained trace gold. The initial anomalous soil sample results were confirmed by limited replicate sampling. A heavy mineral concentrate sample collected from Sulphide Creek contained 9,080 ppb Au (Doherty et al., 1983).

In 1986, rock sampling, grid soil sampling and a ground magnetometer survey were performed at Sulphide Creek. Soil sample results ranging from 100 ppb Au to 5,050 ppb Au delineated a 300 m long gold-soil anomaly east of the creek. Rock samples from the area of the soil anomaly contained background concentrations of gold. Correlation between ground magnetics and soil geochemistry is poor (Dussell, 1987).

In 1987, prospecting and rock sampling were performed at Sulphide Creek grid. Rock samples collected from zones of argillically altered, silicified and pyritic rhyolite assay up to 340 ppb Au. These zones correlate with gold-soil anomalies.

1988 Exploration

Exploration at Sulphide Creek grid in 1988 comprised geological mapping (Figures 3.3.3 to 3.3.7), rock sampling,

soil sampling, ground magnetometer and HLEM surveys (Figures 3.3.8 to 3.3.11), and 549.92 m of diamond drilling in three holes (Figures 3.3.12 to 3.3.18). The Sulphide Creek grid was re-established and extended to 1.2 km by 450 m in size, and 179 soil samples and 199 rock samples were collected.

Results

Sulphide Creek grid is underlain by a north to northwest striking, moderately northeast dipping volcanic stratigraphy. Stratigraphy comprises interbedded epiclastic sediments and felsic pyroclastic rocks overlain by rhyolite flows and ignimbrite.

Interbedded epiclastic sedimentary and felsic pyroclastic rocks of Formation 2 (EPCL, FTLP), at least 100 m thick, outcrop along the western edge of the grid. Included within this unit are felsic lapilli tuff, lithic lapilli tuff and fine-grained tuffaceous epiclastic sediments. Graded bedding in waterlain tuffs indicate stratigraphic tops to the northeast. A felsic lapilli to ash tuff along the upper contact of the formation exhibits strong phyllic, argillic and locally silicic alteration. Also occurring along the contact and extending through the base of the overlying rhyolite is a strong argillically altered, left lateral fault zone that is up to 0.40 m wide. The fault which strikes 167^0 and dips 58^0 southwest, contains up to 0.10 m wide quartz-fluorite veins and a 2 m wide by 3 m long vein breccia zone that contains trace gold and silver.

Rhyolite flow rocks (RHYL), between 250 m and 350 m thick, grade up section from massive grey rhyolite with local flow-banding to platy, flow-banded and spherulitic maroon rhyolite and in places rhyolite auto breccia. These flow rocks which overlie interbedded epiclastic and pyroclastic rocks, have an overall orientation of 160^0 with a 40^0 northeast dip. A 5 m wide northwest striking, steep dipping quartz-feldspar porphyry dyke (PPQF) cross-cuts rhyolite at the northwest end of the grid. On the east side of Sulphide Creek, a zone of argillic and silicic alteration centered on line 3+00 S spreads out laterally from the center of the rhyolite and increases in intensity up through the unit. Alteration is most predominant and extensive along the upper contact with overlying and almost unaltered ignimbrite. Rock samples from this altered zone assay up to 0.033 oz Au/t, 0.11 oz Ag/t. Intense phyllic alteration also occurs locally in flow top breccias and along chill margins. Samples from phyllically altered zones assay up to 0.023 oz Au/t, 0.91 oz Ag/t.

Densely to non-welded, columnar brown-maroon lapilli tuff overlies rhyolite flow rocks and contains up to 25%

pumaceous and lithic lapilli as well as vitric and crystal fragments with abundant fiamme' textures in welded portions (IGNM, FTLP). Alteration in this unit is most prevalent along its lower contact. Samples from this contact assay up to 0.013 oz Au/t, 0.81 oz Ag/t.

Grid soil sampling at Sulphide Creek was performed along strike from the previously delineated gold-soil anomaly. As a result of this work, the soil anomaly was extended an additional 230 m to the southeast. Results to date indicate a 750 m long, roughly linear gold-soil anomaly. The anomaly is oriented subparallel to and roughly coincident with the center of the rhyolite flow rock. Portions of the anomaly above 200 ppb Au generally occur about 25 m down slope from intensely altered portions of the rhyolite flow rock. As rock samples from these altered portions assay up to 0.033 oz Au/t (1,131 ppb Au), the altered rhyolite is the likely cause of the soil anomaly.

An HLEM survey and extension of a previous ground magnetometer survey were performed on Sulphide Creek grid. Ground magnetics show a pronounced magnetic low along the upper contact of the rhyolite flow unit. This low is also apparent in the airborne magnetometer data. Ground magnetometer data also indicates a subtle low over the intensely altered portion of the rhyolite rock. HLEM survey data indicate moderate strength conductors coincident with upper and lower contacts of the rhyolite flow rock. A near vertical, weak to moderate strength conductor that extends the length of the grid, is coincident with the subtle magnetic low and the gold-soil anomaly on the east side of Sulphide Creek.

Three holes were drilled at Sulphide Creek to test for the source of the gold-soil anomaly. Fractured, locally sheared, and intense argillically and phyllically altered rhyolite, rhyolite breccia and rhyolite ash to lapilli tuff were intersected below the soil anomaly. A 0.25 m wide zone of fault gouge intersected in hole 88-425 correlates with the grid length HLEM conductor coincident with the soil anomaly. Assay results are uniformly low. One interval assays 0.014 oz Au/t, 0.18 oz Ag/t across a core length of 0.97 m, the remainder assay 0.008 oz Au/t, 0.06 oz Ag/t or less across a core length of 1 m or less.

Conclusions

Detailed mapping combined with soil and rock chip sampling and drilling demonstrates that the prominent gold soil anomaly in Sulphide Creek is coincident with a thick flow-banded rhyolite unit which is itself enriched in gold and produces grades similar to those found in adjacent soil samples. Mineralization in the area is restricted to patchy

zones of argillic and silicic alteration often associated with brecciation in the flow-banded rhyolite. Diamond drill holes targeted to pass beneath the most prominent soil anomalies and coincident alteration zones failed to produce intersections of any kind.

Economic potential of the Sulphide Creek area is considered to be relatively low. Gold anomalies observed in soil samples are produced by auriferous flow-banded rhyolite which does not contain sufficient quantities of gold to be economically significant in itself.

3.3.3.4 Rim Creek Area

Location and Access

Rim Creek Area, centered on UTM coordinate 6,677,700 N, 481,700 E, is located approximately 1.5 km east-northeast of Mount Kopje Peak. The area is covered by 1:5,000 scale map sheet 15 and claims Chief 76 to 79 and 86 to 89; as well as Glee 102F, 103F, 107F and 108F. The area extends from tree line at 1,200 m to 1,700 m in elevation with moderate to steep slopes, minor cliffs and abundant talus and felsenmeer. Access is by road north from 0.9 km on the mine haul road (Figure 3.0.1).

Previous Exploration

Quartz vein float at Rim Creek Area was located by prospecting in 1987. Samples from the float assayed up to 0.026 oz Au/t, 2.3 oz Ag/t.

1988 Exploration

Exploration at Rim Creek Area in 1988 comprised limited 1:5,000 scale geological mapping (Figure 3.3.1), and follow-up prospecting (Figure 3.3.2). In total, 47 rock samples were collected.

Results

Rim Creek Area is underlain by a sequence of rocks similar to those at Sulphide Creek grid. They include porphyritic andesite, felsic and lithic lapilli tuff, rhyolite flow rocks and ignimbrite. Stratigraphy strikes northwest and dips moderately southwest.

Three aeromagnetic lows on the east flank of Mount Kopje are associated with alteration zones along the upper rhyolite flow contact with the overlying ignimbrite rocks.

A fourth aeromagnetic low occurs north of Rim Creek, over the basal contact of rhyolite flow rocks with underlying lithic lapilli tuffs. Outcrop exposures near this magnetic low comprise intense argillically altered rhyolite. Ten small quartz veins occur within the rhyolite flow and lithic lapilli tuff, within 200 m to 500 m of the magnetic low.

Veins, up to 11 m long and 0.03 m to 0.25 m wide, comprise comb quartz selvedges with open space or calcite and fluorite filled cores. The veins occur with slickensides and clay gouge in shear zones which trend north to northeasterly and dip steeply northwest. The shear zones are recessive features that are enveloped by 1 m to 15 m wide zones of intense argillic and silicic alteration. Assay results from vein samples are low for gold, but anomalous for silver. The highest assay is 0.13 oz Au/t, 10.4 oz Ag/t across 0.10 m. Seven vein samples assay greater than 1 oz Ag/t.

Conclusions

The potential of the Rim Creek area has not been fully assessed. It lies on the northern extent of the caldera boundary although the fault contact between basement rocks and Skukum Group volcanic rocks has not been located.

Preliminary geochemical sampling has located several soil anomalies with narrow, low grade but auriferous veins nearby. Further reconnaissance exploration is required in this area to adequately judge its economic potential.

3.3.4 PYROCLASTIC CIRQUE AREA

3.3.4.1 Introduction

Location and Access

Pyroclastic Cirque area, centered on UTM coordinate 6,674,950 N, 476,950 E, is located approximately 4 km northeast of Mt. Skukum. The area is encompassed by 1:5,000 scale map sheets 2 and 3, and contained within claims Kuku 238 to 256, 270 to 289, 302 to 319 and Glee 30F to 58F.

Topography in Pyroclastic Cirque area ranges from treeline at 1,300 m to 2,100 m above sea level. Geomorphology includes rounded, felsenmeer covered ridges, broad slopes and steep cliffs. Access to the area is by helicopter or cat road from the mine haul road to Queens Ridge grid.

Regional Geology

Pyroclastic Cirque area is underlain by moderately dipping, interlayered andesitic pyroclastic and epiclastic rocks overlain by porphyritic andesite flow rocks and minor andesite lapilli tuff unconformably overlying granitic basement rocks. These rocks are intruded by a tan coloured rhyolite dyke and unconformably overlain by flow-banded maroon rhyolite. Wedding Ring Fault, a 2.5 km long, north trending fault east of Pyroclastic Cirque, separates these rocks from altered felsic volcanic rocks to the east. A north trending shear zone at the head of Pyroclastic Cirque hosts the Goat Zone vein, a high level epithermal quartz-fluorite vein at least 4 m wide. A large, vertical rhyolite dyke occurs in the cirque floor along strike from the Goat Vein. A second, smaller rhyolite dyke cross-cuts the east wall of the cirque.

Previous Regional Exploration

In 1981, a series of contour soil samples were collected along the east wall of Pyroclastic Cirque. Analytical results indicate five samples with over 100 ppb Au and a maximum of 950 ppb Au. Rock samples and stream sediment samples collected south of the cirque, on the slope facing Skukum creek, contained background gold and silver (Doherty et al., 1981).

From 1982 to 1984, limited prospecting was performed in Pyroclastic Cirque Area. The Goat Zone vein was located in the saddle at the head of Pyroclastic Cirque. Rock samples collected from the vein contained trace gold and silver.

In 1986, contour soil sampling was performed around and within Pyroclastic Cirque. Results of this work indicate a 100 m long gold-soil anomaly on the ridge above the east wall of Pyroclastic Cirque. Follow-up detailed grid soil sampling and a ground magnetometer survey were performed over this zone on the Ridge grid and wider spaced grid soil sampling was performed at the base of the east wall within the cirque on the Valley grid. Anomalies on the Ridge grid are scattered and include 28 results of over 100 ppb Au, and a maximum of 1,100 ppb Au. The anomalies are open to the south and west. Magnetic data from Ridge grid indicate a subtle north trending feature. Grid soil sampling and ground geophysical surveys were also performed over Goat Zone. Analytical results indicate background gold, silver, arsenic and mercury concentrations in soil. Ground geophysics indicate marked north trending magnetic and HLEM anomalies coincident with Goat vein (Dussell, 1987).

In 1987, exploration at Goat Zone comprised rock sampling, follow-up ground geophysical surveys of airborne geophysical anomalies on the ridge east of Pyroclastic Cirque, and contour soil sampling. Assay results from rock sampling at the Goat vein are up to 0.026 oz Au/t, 2.64 oz Ag/t across 0.3 m. Soil samples collected across the southern strike extent of the vein contained 25 ppb Au or less, up to 251 ppm Pb and up to 438 ppm Zn. Follow-up ground geophysics on Queens Ridge grid, on the ridge east of the mouth of Pyroclastic Cirque, located extremely conductive, northeast trending zones coincident with or adjacent to intense magnetic lows. Similar but much weaker anomalies are apparent in the airborne data over Kings Ridge, the ridge west of Pyroclastic Cirque.

3.3.4.2 1988 Regional Exploration

Exploration in Pyroclastic Cirque Area in 1988 comprised contour soil sampling east of Queens Ridge grid, along the west side of Wedding Ring valley. A total of 108 soil samples were collected (Figures 3.2.6 and 3.2.5).

Results

Analytical results indicate 20 ppb Au and 1.6 ppm Ag or less in the soil samples collected east and downslope from Queens Ridge grid except for two samples. One sample contained 225 ppb Au and another contained 2.5 ppm Ag.

Conclusions

Reconnaissance geochemical sampling comprising contour soil sampling, stream sediment sampling, ridge soil sampling and airborne geophysics has been completed in the Pyroclastic Cirque area. No large mineralized structures have been identified although several anomalous zones have been found and some have had detailed work performed on them.

Limited potential for economic ore remains in the area. The Goat Zone vein structure, barren in surface exposures, has not been drill tested for economic gold grades at depth. In addition, two rhyolite dykes associated with quartz-calcite stockwork veinlets, one in the cirque bottom and the other on Queen's Ridge, are associated with anomalous soil samples and on Queen's Ridge produce grades up to 0.5 oz Au/t in chip samples. These areas require further work but present limited opportunity

3.3.4.3 Queens Ridge Grid

Location and Access

Queens Ridge grid is encompassed by 1:1,000 scale map sheets 3A, 3B and 3H, centered on UTM coordinate 477,600 E, 674,800 N and covered by claims Glee 47F and 48F, and Kuku 280, 282, 309, 311, and 313. The entire area is above treeline and consists of flat to gentle slopes. The grid is accessible by cat road from 4.5 km on the mine haul road.

Previous Exploration

The July 1987 airborne geophysical survey indicates strong VLF-EM, EM, and magnetic anomalies over the area. A 400 m by 800 m grid was surveyed over the area of the airborne anomalies and follow-up ground magnetometer, HLEM and VLF-EM surveys were performed. Ground geophysical surveys defined several weak to moderate EM conductors and an associated magnetic trough extending subparallel to the baseline across the grid.

1988 Exploration

Exploration in 1988 comprised re-establishment of the Queens Ridge grid, 1:1000 scale geological mapping (Figures 3.4.1 to 3.4.3), soil sampling and prospecting along EM conductors (Figures 3.4.4 to 3.4.6). This work led to the discovery of the gold-bearing Spumante vein. Vein and host structure were subsequently trenched, mapped and sampled in detail (Figures 3.4.7 to 3.4.15). A total of 544 soil samples and 199 rock chip and rock grab samples were collected, and 14 trenches were excavated.

Results

Geology of Queens Ridge grid comprises maroon, flow-banded rhyolite and flow breccia, andesite lapilli tuffs, crystal tuffs and porphyritic andesite flow rocks. Contact relations between lithologies is obscured by overburden and complicated by a series of faults and by rhyolite dykes which intrude along some contacts.

Stratigraphic succession is difficult to determine; however, it appears that the youngest strata in the area are maroon, flow-banded rhyolite flow rocks (RHYL) which are most abundant in the northern part of the grid. These rocks are in fault contact with andesitic volcanic rocks which they are perceived to overlie. They occur as moderately south-dipping, variably-altered tan to white or maroon outcrops with green celadonitic alteration. Fresh surfaces are finely flow-banded to massive, commonly spherulitic and autobrecciated with sparse feldspar phenocrysts 2 mm to 6 mm across and 1 to 3 percent quartz phenocrysts less than 1 mm across.

A narrow succession of andesitic tuffs underlies rhyolite flow rocks in the grid area. These rocks include blocky andesite (ATBK), lapilli (ATLP) and crystal tuffs (CLTF) which occur along fault contacts between rhyolite flow rocks, and porphyritic andesite in the north and east parts of the grid and overlie porphyritic andesite in the west part of the grid. These units are all similar monolithic andesite tuffs distinguished by variable fragment sizes. All include cognate fragments of porphyritic andesite in a fine-grained, intermediate, ash matrix.

Intermediate pyroclastic rocks are underlain by a thick sequence of porphyritic andesite flow rocks (PPAN) most common in the south part of the grid. These rocks are similar to those found in Main Cirque with 10 to 15 percent plagioclase phenocrysts up to 5 mm across enclosed in an aphanitic, dark green matrix.

Volcanic stratigraphy is cross-cut in the central part of the grid by a rhyolite dyke emplaced along the contact between porphyritic andesite flow rocks and overlying intermediate tuffs. This dyke trends between 030^0 to 080^0, is steeply dipping, occurs in blocky weathered outcrops, and is light tan and massive in fresh surfaces with 5 to 10 percent feldspar phenocrysts averaging 2 mm across enclosed in an aphanitic ground mass. All lithologies, including the rhyolite dyke, have been cut by a series of steep-dipping, 036^0 and 141^0 trending faults, which have produced an 8 m right lateral apparent displacement in the rhyolite dyke. No estimate of dip slip motion is possible; however it is

significant as these faults juxtapose rhyolite flows with stratigraphically lower andesitic rocks.

Mineralization in the grid area comprises quartz stockwork and stringer veins as well as siliceous hydrothermal breccia. These features cross-cut the associated rhyolite dyke and are localized in faults and altered shear zones nearby and parallel to the dyke. Average strike of known veins is 050^0 with variable dips 72^0 northwest and southeast.

Prospecting and mapping located an outcrop of stockwork veins called the Spumante Vein which cross-cuts the rhyolite dyke. Assay results from outcrop and float samples of this vein material and adjacent altered volcanic rocks commonly exceed 0.1 oz Au/t and are up to 0.525 oz Au/t.

Soil geochemistry analyses on the grid average 9.4 ppb Au. Only two clearly anomalous samples were collected. One single-point anomaly of 135 ppb Au coincides with stockwork veins discovered in prospecting, the other, an 820 ppb Au sample from the west part of the grid, has not been explained. Silver content in soil samples was low with a high value of 0.77 ppm.

Trenching was conducted to expose the quartz stockwork Spumante vein and test conductive zones delineated by ground geophysics. Mapping in the trenches shows a good correlation between EM conductors and faults associated with argillic and phyllic alteration and erratic gold and silver grades. Stockwork which comprises white, sulphide-free quartz veins up to 0.11 m wide cross-cut the rhyolite dyke in a zone which averages 0.1 m width but is locally 2 m across. Assay results from samples taken in the trenches are erratic, up to 0.586 oz Au/t and 0.99 oz Ag/t across 0.4 m. A total of 13 samples collected from float and outcrop of this vein stockwork system assay greater than 0.1 oz Au/t.

Conclusions

Geology is favourable in the Queens Ridge area for Main Cirque - style mineralization. The presence of a large rhyolite dyke which cross-cuts porphyritic andesite flow rocks is similar to that of Main Cirque.

Trenching, chip sampling, geophysics, and mapping demonstrates that strong geophysical conductors identified in airborne surveys can be located with ground geophysics. These conductors are produced by a series of subparallel shears filled by gouge and generally devoid of vein mineralization.

Potential for this area is considered to be moderate at best. The most promising aspect of the area is a zone of stockwork quartz-calcite veinlets associated with a large rhyolite dyke. These veinlets occur in a zone up to 2 m wide and have produced gold values up to 0.5 oz Au/t. Veinlets are only sparsely distributed in the mineralized zone, however, and tend to be extremely narrow. The potential for economic mineralization exists only in a down-dip extension to the surface stockwork zone where veinlets may consolidate to form a single compact structure.

3.3.4.4 Kings Ridge Grid

Location and Access

Kings Ridge grid is situated on the ridge west of Pyroclastic Cirque. The grid, centered near UTM coordinate 6,675,700 N, 476,950 E (Figure 3.0.1), is encompassed by 1:1,000 scale map sheets 3D, 3E, 3O and 3P and includes claims Kuku 11, 250, 252, 253, 285, and 287 as well as Glee 35F, 36F, and 55F.

The area is above tree line from 1,640 m to 1,800 m elevation and is characterized by moderate talus and glacial till covered slopes. Access is by a cat road which leaves the mine haul road 4.5 km west of the mill site.

Previous Exploration

In 1987, Kings Ridge area was identified as an exploration target from airborne geophysical survey data. These data indicate a weak resistivity low with adjacent magnetic lows in the area. A 950 m by 400 m grid was surveyed to cover the area of this anomaly.

1988 Exploration

Exploration on Kings Ridge grid in 1988 comprised re-establishment and completion of the grid, soil sampling as well as ground magnetometer and HLEM surveys. A total of 546 soil samples were collected.

Results

Geophysical surveys indicate several weak to moderate HLEM conductors oriented 015^0 to 025^0, subparallel to the grid baseline. Most notable is a 400 m long moderate strength conductor in the northern half of the grid coincident with a pronounced north trending magnetic linear. Bowman and King (1988a) find that these anomalies are

similar in trend and signature to those on nearby Queens Ridge grid although they are somewhat smaller in amplitude.

Gold-soil geochemistry is uniformly low and does not indicate any anomalous trends. Analytical results indicate 14 soil samples with greater than 100 ppb Au and a maximum of 990 ppb Au. All anomalous results occur as single point anomalies distributed randomly across the grid.

Conclusions

Geophysical and geochemical evidence indicate that geology underlying the Kings Ridge grid is similar to that of the Queens Ridge grid. Moderate strength conductors and a linear magnetic-low anomaly probably represent the same combination of conductive shears and the possible presence of a rhyolite dyke respectively. Prospecting in the area is incomplete and what has been done has been unproductive due to the complete lack of outcrop and thick overburden. Soil sampling, however, has not produced gold anomalies of the sort found on Queens Ridge.

Potential for the Kings Ridge grid area is considered low. Trenching of geophysical anomalies similar to those on Kings Ridge but of higher amplitude on the Queens Ridge grid has produced only unmineralized shears. Mineralized areas of the Queens Ridge grid have been associated with soil geochemical anomalies. In order to test soil anomalies on the Kings Ridge grid trenching is required, however, the lack of anomalous trends and the presence of only single-point anomalies does not lend promise for significant discoveries.

3.3.5 CARBONATE CREEK AREA

3.3.5.1 Introduction

Location and Access

Carbonate Creek area, centered on coordinate UTM 6,675,200 N, 470,700 E, faces west into the Watson River valley approximately 3.2 km west-northwest of Mt. Skukum (Figure 3.0.1). The area includes all or portions of 1:5,000 scale map sheets 6 and 7 (Figures 3.5.1 to 3.5.4), and encompasses claims Kuku 117 to 130, 155 to 162, 191, 193, 195, 197, and 201, as well as Moe 37F, 38F, 41F to 47F, 50F to 61F, 67F and 69F.

Carbonate Creek area is above treeline with steep rugged cliffs, talus fans, and deeply incised drainages. Topographic relief ranges between 1300 m and 2233 m above sea level. Access to the area is by helicopter only.

Previous Regional Exploration

In 1981, reconnaissance stream sediment sampling of Carbonate Creek area by Agip Canada Ltd returned values no higher than 80 ppb Au, and 125 ppb Au in heavy mineral concentrates (Doherty, 1981). High values all originated in the Operator Creek drainage approximately 1 km north of Carbonate Creek in which the highest reported values were 20 ppb Au in stream sediment samples and 25 ppb Au in heavy mineral concentrates. No record of follow-up work in the area exists.

3.3.5.2 1988 Regional Exploration

In March 1988, an airborne geophysical survey (Podolsky, 1988) flown over the western half of the Mt. Skukum property included Carbonate Creek area. Results indicate a broad, arcuate zone of conductivity coincident with several arcuate, magnetic-low troughs including several pronounced magnetic-low anomalies.

Regional exploration in Carbonate Creek area included contour soil sampling, prospecting, and 1:5,000 scale geologic mapping. In total, 465 soil samples and 125 rock samples were collected.

Results

Geologic mapping at 1:5,000 scale was completed over portions of the Carbonate Creek and Operator Creek drainages (Figures 3.5.1 and 3.5.2). Lithologies in the area include

Yukon Group basement rocks unconformably overlain by Tertiary Skukum Group volcanics. This package is cut by a north-northwest trending fault that is intruded by a rhyolite dyke. The fault down-drops volcanic rocks at least 150 m relative to basement rocks.

Basement rocks which underlie most of the map area comprise mica schist, and limestone.

Mica schist (MCSC) weathers rust to dark purplish-black and is composed of biotite, muscovite, quartz, feldspar, garnet, and locally abundant graphite. Compositional laminae 1 mm to 30 cm wide are defined by interlayered mica-rich bands with relatively mica-free bands. These bands probably reflect primary sedimentary layering. Micaceous minerals define a strong foliation parallel to bedding which is deformed by larger, intense, almost isoclinal folding. Foliation generally strikes northwest and dips moderately northeast. Abundant, lenticular quartz-muscovite tension gash veins or "sweats" occur throughout this unit rarely exceeding 1m in width and 5 m in length, although one exceeds 60 m in length. Many such veins are folded, stretched, and display boudinage features. Samples from these veins have not returned significant assay values to date.

Light grey, fetid, recrystallized dolomitic limestone (LMST) is intercalated with mica schist and occurs between elevations of 1,800 m and 1,500 m in Carbonate Creek. It occurs as a large exposure near the head of Carbonate Creek and as lentícular masses up to 200 m long and 75 m wide enclosed in mica schist. The limestone is compositionally layered with shaley partings which separate light and dark graphite-rich and graphite-poor layers. Small open folds occur in these rocks.

The third basement lithology in the area is Yukon Group breccia (YGBX) which occurs in limited exposures with obscure contact relations. Breccia clasts are angular to sub-angular, 1 cm to 5 cm across, supported in a fine-grained black matrix, and include chert (30%) and mica schist (70%).

An unconformity marked by debris flow rocks (DBFL) separates underlying basement rocks from Skukum Group rocks. Debris flow rocks, locally up to 10 m thick, comprise unsorted clasts, up to 0.5 m across, of mica schist, limestone and andesitic volcanic rocks. Only one exposure of this unit, analogous to Pride's (1985) Formation 1, has been mapped in the Carbonate Creek area.

Andesitic volcanic rocks, possibly analogous with Pride's (1985) Formation 2, comprise porphyritic andesite flow rocks, crystal lithic tuff, andesite lapilli tuff, and

andesite dykes. These rocks outcrop between elevations of 1,800 m and 2,200 m on the ridge north of Carbonate Creek where they overlie basal debris flow rocks.

Porphyritic andesite flow rocks (PPAN) in Carbonate Creek area are limited to one small outcrop in the map area. Rusty-red on weathered surfaces, this unit forms a narrow flow or sill at 1,820 m elevation north of Carbonate Creek. Fresh surfaces display a black aphanitic groundmass enclosing 5% plagioclase phenocrysts 2 to 3 mm across.

Crystal lithic tuff (CLTF), overlies porphyritic andesite in outcrop between 1,800 m and 2,000 m elevation on the ridge north of Carbonate Creek. Light olive-green to green on fresh surfaces, this unit comprises a fine-grained matrix with feldspar crystal fragments 1 to 2 mm across, elongate vitric fragments, and lithic mica schist fragments. Bedding in this unit strikes roughly east-west and dips about 35^0 north.

Andesite lapilli tuff (CLTF) overlies crystal lithic tuff between 2,000 m and 2,120 m elevation on the ridge north of Carbonate Creek. Black to greenish-black in outcrop this unit comprises a fine-grained andesitic matrix supporting lapilli to block sized fragments of porphyritic andesite.

Lithologies in Carbonate Creek are cut by north-northwest trending rhyolite, dacite, and andesite dykes and a large fault.

Rhyolite dykes are the most common intrusive rocks in the map area. These dykes average 15 m in width and locally exceed 100 m across. They trend approximately 170^0 and dip between 80^0 and 42^0 east. The dykes occur as a small swarm between 1,400 m and 1,600 m elevations in the area between Halfway Creek and Carbonate Creeks (Figure 3.5.2). They also intrude the laterally extensive fault zone which separates down-dropped Skukum Group rocks and Yukon Group basement. Rhyolite dykes weather rusty-brown and are pale brown on fresh surfaces. They comprise a felsic aphanitic groundmass enclosing 5% feldspar and 5 to 7% quartz phenocrysts up to 4 mm across, as well as sparsely disseminated pyrite cubes averaging 2 mm across. Brecciation and patchy silicification is common in the largest rhyolite dyke which is associated with the Tango vein.

Dacite and andesite dykes are rare and narrow in the map area. Andesite dykes occur cross-cutting basement rocks between 1,600 m and 1,800 m elevations where they are less than 2 m across, khaki, and fine-grained. One dacite dyke cross-cuts andesitic volcanic rocks at 2,050 m elevation north of Carbonate Creek. This dyke, less than 5 m across,

is rust-red in outcrop, grey-green on fresh surfaces, and porphyritic with 5% feldspar phenocrysts 2 to 3 mm across enclosed in a siliceous, aphanitic matrix.

A prominent quartz vein, the Tango Vein, occurs in the north-northwest trending fault zone which cross-cuts the map area and is closely associated with the largest rhyolite dyke in the map area (Figure 3.5.2). This epithermal vein, which cross-cuts and brecciates the rhyolite dyke, is the only significant vein found to date in this area.

Contour geochemical sampling (Figures 3.5.3 and 3.5.4) was performed on south facing slopes of Carbonate Creek at elevations of 1,800 m and 1,600 m and extended discontinuously north past Operator Creek, along the east side of the Watson River valley between elevations of 1,400 m and 1,800 m. Generally, background gold values of less than 5 ppb Au to 20 ppb Au were obtained from these samples. Single point anomalies up to 100 ppb Au are rare except for a 1 km segment of the 1,800 m elevation contour soil sample line across the ridge between Carbonate and Operator Creeks. Ten samples over 100 ppb Au and one sample of 330 ppb Au were collected in this segment. These elevated gold soil results and observations of abundant quartz vein float in the area, prompted intensive prospecting which lead to discovery of the Tango Vein.

Conclusions

The Carbonate Creek area presents one of the regions of highest exploration potential on the Mt. Skukum property. This area is considered to include the entire western edge of the Mt. Skukum Caldera Complex which encompasses the boundary fault which juxtaposes basement rocks with the down-dropped caldera complex. This area has undergone only cursory examination in the past, is host to large rhyolite intrusions analogous to ring intrusions, and has proven potential for large vein structures and gold mineralization.

3.3.5.3 Tango Grid

Location and Access

Tango Grid is near the western property boundary on west facing slopes of Watson River valley. The grid is centered on coordinate UTM 6,675,200 N and 470,200 E, includes 1:1,000 scale map sheets 7A, 7D, 7H, 7I, 7O, 7W, and 7X, and is encompassed by claims Kuku 158 to 166, 191 and 193, as well as Moe 54F to 57F and 67F. The grid comprises two nearly contiguous baselines oriented at 350^0 and 318^0 which together extend for 1.9 km between 1,500 m and 2,000 m elevations across the ridge between Carbonate

Creek to Operator Creek. The grid is above treeline and encompasses terrain that includes steep slopes, cliffs, narrow ridges and talus fans. Access is by helicopter only.

Previous Exploration

No record of previous work exists for the area of the Tango Grid. Evidence of quartz vein float sampling exists on the trend of the vein near the initial post of claim Kuku 161.

1988 Exploration

In late June 1988, follow-up prospecting and detailed contour sampling of initial contour soil anomalies in Carbonate Creek valley led to discovery of the Tango Vein structure. A 1,400 m by 350 m grid was established at 170^0 to cover the outcrop exposure and possible strike extensions of the vein.

Subsequent exploration on Tango Grid included 1:1,000 and 1:500 scale geologic mapping (Figures 3.5.19 to 3.5.22), soil sampling (Figures 3.5.12 to 3.5.18), rock sampling (Figures 3.5.5 to 3.5.11), hand-trenching (Figures 3.5.23 to 3.5.26), 466 m of diamond drilling in two holes (Figures 3.5.27 to 3.5.31), and ground magnetometer and HLEM surveys. In total, 788 soil samples and 392 rock samples were collected.

Results

Geology underlying the Tango Grid (Figures 3.5.19 to 3.5.22) comprises a broad, complex, north-northwest trending fault zone that has down-dropped andesitic volcanic rocks on its eastern side and is intruded by a large rhyolite dyke. This fault zone and dyke host the Tango and associated quartz veins and breccia which cross-cut all other lithologies.

Dominant lithology of Tango Grid is folded and sheared Yukon Group metasediments which include mica schist and Yukon Group breccia. Mica schist comprises the majority of these rocks and includes graphitic layers of metamorphosed sandstone, quartzite, conglomerate, and recrystallized limestone. Foliation, well-developed in many layers, consists of oriented muscovite and biotite grains which develop a strong cleavage and local crenulation cleavage in the rock which wraps around rare garnet grains up to 4 mm across and quartz tension gash veins up to 0.5 m in length. Complex folds in schist layers and a variety of cleavage orientations are present in the map area. Rocks of this

unit are locally phyllically altered and host shear zones with abundant graphite and lesser hematite.

Yukon Group breccia occurs in the north central part of the map area between two exposures of rhyolite dyke. It is a matrix supported breccia containing angular, flattened clasts of chert (30%) and mica schist (70%) between 1 and 5 cm across enclosed in a fine-grained, siliceous, black matrix.

A large rhyolite dyke cross-cuts Yukon Group metasediments in the grid area and is controlled by fault structures and local cleavage in metasedimentary rocks. Outcrop exposure of this dyke is most common in the eastern part of the grid area. The dyke, continuous over a 75 m width at depth, contains lenticular inclusions of mica schist and at surface forms splay structures which split it into one continuous dyke 10 to 40 m wide flanked by several smaller, subparallel, discontinuous dykes 10 to 16 m across. Rhyolite is cream-coloured to reddish-brown in outcrop with sparse quartz and feldspar phenocrysts and locally up to 5% disseminated pyrite. The dykes are cross-cut and brecciated by quartz veins and stockwork and locally offset or truncated by faults.

Andesite volcanic rocks are not found on the grid area but occur nearby to the east. One andesite dyke cross-cuts Yukon Group metasedimentary rocks in the north part of the grid where it is controlled by foliation and occupies a fold nose. The dyke is cut by rhyolite at its eastern end.

Structures comprising quartz veins, breccia and stockwork cross-cut Yukon Group metasediments and the rhyolite dyke forming a series of discontinuous, splay structures, some laterally continuous, which range between 1 mm and 24 m across. They are structurally controlled by faults and locally by cleavage in metasedimentary rocks. Quartz veins and breccia are commonly enveloped by broad stockwork zones which also occur without an associated, distinct central vein. The zone of combined vein, breccia, and stockwork which form the Tango Vein structure outcrops at 1940 m elevation on the ridge between Carbonate and Operator Creeks. The structure is traceable in outcrop towards Operator Creek for 700 m along a north-northwest trend, over a vertical range in excess of 170 m. The vein has a slightly arcuate trend which averages 170^0 and dips steeply east at 70^0 to 80^0. Faults and shears associated with the structure show extremely polished slickensides with 342^0 trending, 15^0 plunging striations.

Quartz veins and breccia, up to 3 m wide, form prominent, black and white lichen-covered outcrops of massive, medium-grained sucrosic quartz with druzy vugs and comb textures surrounding brecciated fragments of silicified

rhyolite and Yukon Group rocks. Bladed pseudomorphs of quartz after calcite occur locally although no calcite has been detected to date. Small amounts of disseminated pyrite occur locally in these veins and pyritic envelopes of up to 5% pyrite may be found at contacts with rhyolite dykes. Zones of sulphurous smelling jarosite and hematite are encountered locally along vein margins and in vein breccia.

Quartz stockwork zones up to 12 m across that envelope veins and vein breccia, consist of rock with greater than 20% quartz veinlets in rhyolite or mica schist. Veinlets range from 0.1 to 2 cm wide and comprise massive to vuggy comb textured quartz and secondary chalcedony. Intense silicification and minor argillic, phyllic and propylitic alteration, most notable in rhyolite dykes, is commonly associated with stockwork veins and along margins of larger veins and shears.

Soil samples were collected over most of the Tango Grid (Figures 3.5.12 to 3.5.18). Most samples in the grid area are anomalous in gold with few values below background levels of <5 to 20 ppb Au.

Samples taken north of 55+20 N were from a deep talus fan. Samples were collected at 10 m spacings on lines spaced 40 m apart. No specific relationship between anomalies and veins is apparent; however, results are generally above 40 ppb Au. Results greater than 100 ppb Au are rare and the highest result is 1,830 ppb Au. Sampling in this area was limited to a narrow extrapolation of the vein trend.

Soil samples taken south of 55+20 N and north of 49+20 N were taken over a steep exposure of the Tango Vein. Samples were limited to short lines across the vein at 40 and 20 m intervals. Samples, which were collected at 5 m spacings on this part of the grid contained uniformly high gold. Results below 50 ppb Au are rare with most values between 50 and 300 ppb Au and locally as high as 2,940 ppb Au.

Soil samples taken south of 49+20 N were collected from talus cover south of the southernmost outcrop of the Tango Vein structure to define gold geochemistry over airborne geophysical conductors. Samples were collected at 20 m intervals on lines 40 m apart. Gold soil geochemistry is slightly elevated throughout this area with analytical results between trace and 50 ppb common. Rare results above 60 ppb Au and single-point anomalies up to 820 ppb Au are obtained from samples collected along the projected trend of the Tango Vein structure in this area.

Rock chip analyses were obtained from the Tango Vein through random outcrop samples, float samples, and lines of

continuous rock chip samples across the vein in trenches spaced at 40 m intervals (Figures 3.5.5 to 3.5.11 and 3.5.23 to 3.5.26). Assays of these samples were uniformly low in gold with variable silver. The highest gold result obtained was from a float sample which assayed 0.14 oz Au/t. The highest silver assay, 4.0 oz Ag/t, was from a vein outcrop at the south end of the grid.

Trench samples collected over contiguous 1 m intervals across the vein produced generally low gold assays of between 0.001 oz Au/t and 0.005 oz Au/t. Grades in excess of 0.01 oz Au/t are rare. The highest gold grade is 0.041 oz Au/t over 1 m. Silver values are erratic and range from trace to 0.74 oz Ag/t. Grades up to 0.25 oz Ag/t are common.

Ground magnetic and HLEM surveys were performed north and south of the areas of vein exposure between 49+60 N and 55+60 N (Bowman and King, 1988b).

The survey north of 55+60 N indicates a weak magnetic response with several strong single point dipolar high-low pairs. The dipoles are located along strike from exposures of the Tango vein structure but do not form a linear trend. A weak linear magnetic-high extends parallel to the baseline, through the survey area, parallel to the trend of the Tango vein structure (Bowman and King, 1988b). Seven HLEM conductors of moderate strength trend north-northwest through the survey area parallel to the trend of the Tango Vein structure. Although the source of these conductors cannot be ascertained, they appear to flank and partially overlie contact zones between rhyolite dykes and mica schist host rock. The conductors extend up to 640 m beyond the northernmost outcrop of the Tango Vein structure.

Ground geophysics south of 49+60 N comprised an HLEM survey only (Bowman and King, 1988). Several moderately strong conductors were identified extending up to 560 m south of the southernmost exposure of the Tango Vein structure. Trends of some of these conductors correlate with the location and possible extensions of the Tango Vein and the associated rhyolite dyke. Other conductor trends appear to parallel the trends of foliation in adjacent mica schist. The presence of abundant graphite in shear zones within the mica schist may obscure the conductive trace of the Tango Vein structure in this area.

Two holes were drilled below the northernmost and southernmost strike exposures of the Tango Vein structure (Figures 3.5.5, 3.5.7, and 3.5.27 to 3.5.31). Both holes were planned to intersect the Tango Vein structure about 100 m below outcrop exposure to determine if significant variations in structural, textural, or gold grade characteristics occurred with elevation change.

Hole 88-426 (Figures 3.5.7, and 3.5.29 to 3.5.31) was drilled on the ridge between Carbonate and Operator Creeks, just north of section 800 S, to intersect the Tango Vein structure below its southernmost exposure. The hole was drilled east to west through the structure at an azimuth of approximately 282^0. The hole penetrated variably altered rhyolite dyke through most of its length before passing into mica schist at 172.39 m. No significant veins were intersected. The rhyolite dyke has a drill indicated true thickness of at least 150 m and dips approximately 73^0 east. Margins of the dyke are flow-banded and fine-grained; central portions are coarser grained and massive. Fragments of mica schist are common throughout the dyke and swarms of chalcedonic quartz stringers locally form crackle-breccia. Several shears which cross-cut the dyke, are characterized by increased alteration, local pyrite and gouge. Alteration ranges from propylitic to intense argillic and phyllic. It is most intense in and surrounding a shear zone intersected at 110.76 m. This shear zone corresponds with the down-dip projection of the Tango Vein structure. This zone, intersected 81 m below the surface exposure of the Tango Vein, occurs over a true width of 10 m and comprises three distinct zones of fault gouge up to 1 m across. This gouge is comprised of up to 5% fragments of mica schist 4 to 5 cm across enclosed within the rhyolite dyke. Gold and silver grades are uniformly low throughout the hole. One of the highest grades obtained was 0.06 oz Au/t over 0.42 m in a brecciated, limonitic section of rhyolite dyke associated with a 3 cm fault gouge. Another intersection graded 0.12 oz Ag/t over 0.47 m in an intensely argillically altered section of rhyolite dyke with 1% disseminated pyrite.

Hole 88-427 (Figures 3.5.5, 3.5.27, and 3.5.28) was drilled east to west at 260^0 just south of section 300 S and intersected the Tango Vein 187 m below the northernmost outcrop exposure of the vein. The hole was collared in mica schist and penetrated a rhyolite dyke with a true width of 85 m before intersecting Tango Vein material in the footwall of the dyke and then passing back into mica schist. The rhyolite dyke is the same as intersected 500 m south in 88-426 with similar textures but a steeper dip of about 86^0 east. The Tango Vein occurs on the footwall contact of the rhyolite with mica schist. It comprises a fractured zone of quartz veins, quartz breccia and quartz stockwork zones up to 1 m across in rhyolite and mica schist. Zones of intensely altered rhyolite and schist flank vein and stockwork bearing structures. The zone of intersection has a true width of 8.57 m and grades trace gold and 0.026 oz Ag/t. It has a projected dip of 86^0 east which is conformable with the rhyolite dyke. The highest grades obtained from this hole were from the Tango Vein intersection where 0.005 oz Au/t over 0.85 m was obtained in a zone of stockwork quartz veins with trace pyrite which cut

mica schist, and 0.06 oz Ag/t was obtained over 0.67 m in a similar zone of stockwork quartz veins in mica schist.

Conclusions

The Tango Grid area is the newest and largest vein structure found on the Mt. Skukum property to date. It is known to contain appreciable gold in soil values and was identified originally as a geochemical anomaly. Although detailed exploration on the exposed portion of the vein is only partially complete, chip sampling and two diamond drill holes at the extreme north and south ends of the known extent of the vein have not produced economic gold grades.

Economic potential for this zone is considered to remain relatively high. Given the width and continuity of the structure an economic body of ore of similar dimensions to the Cirque orebody could be discovered several times over in the known strike extent of the vein. Low gold grades in chip samples and diamond drill intersections is not discouraging considering insignificant grades encountered along the entire Main Cirque Fault Zone with the exception of the area of the Cirque orebody.

Significant potential remains for this zone to host a large body of ore. This potential must be tested by further diamond drilling, mapping, sampling, geophysics, and prospecting along strike from the north and south exposures of the vein.

3.3.6 MIDDLE CIRQUE AREA

3.3.6.1 Introduction

Location and Access

Middle Cirque Area, centered on coordinate UTM 6,675,450 N, 473,450 E, is located approximately 2.5 km north-northeast of Mount Skukum (Figure 3.0.1). The area is encompassed by 1:5,000 scale map sheet 0 (Figure 3.1.1), and claims Kuku 22, 24, 31 to 34 and Pup 6F, 22F, 25F to 29F.

Topography at Middle Cirque Area ranges from 1,600 m to 1,900 m above sea level. The area is above tree line and characterized by broad, moderately steep south facing slopes and steep, rugged north facing slopes. The Cirque, rimmed by talus fans and partially covered by felsenmeer and glacial till, joins the Butte Creek valley as a hanging valley. Access to the area is by cat road from the mine haul road.

Previous Exploration

In 1982, geological mapping and rock sampling in Middle Cirque identified a weak zone of quartz-calcite veins and stockwork in a shear zone which was traced for 1,000 m northeast of Pika Zone. Rock grab samples from the zone assayed up to 0.13 oz Au/t (Doherty et al., 1982).

In 1983, a detailed ground magnetic survey was performed. Survey results reflect the presence of dykes, faults and andesites of varying magnetic susceptibility (Doherty et al., 1983).

In 1984, soil sampling, trenching and 297.95 m of diamond drilling in four holes was performed. Trenches over the Pika Zone produced assays up to 0.14 oz Au/t in grab samples. Drill core from the zone assayed up to 0.03 oz Au/t, 0.12 oz Ag/t across 0.27 m. Results of wide spaced grid soil sampling in Middle Cirque indicate a few single point anomalies of up to 125 ppb Au (Doherty et al., 1984).

In 1986, a 250 m by 300 m grid immediately northeast of Pika Vein was soil sampled. Sample results indicate one and two point anomalies of up to 290 ppb Au (Dussell., 1987).

In 1987, an east trending boulder train of quartz-calcite vein, stockwork and breccia, called the Wunder Zone, was located at the mouth of Middle Cirque. Rock chip and rock grab samples from boulders assay up to 0.69 oz Au/t, 0.47 oz Ag/t across 0.3 m and up to 1.29 oz Au/t, respectively. Four trenches and 436.28 m of diamond drilling in four holes were completed in an unsuccessful

attempt to locate the source of the vein material (Nagati et al., 1988).

In December 1987 and January 1988, 1,063.46 m of diamond drilling in seven holes was completed to test the Pika Zone extension. These holes intersected up to 1.93 m of vein and fault breccia, but almost all samples contained trace gold and silver. One sample assayed 0.010 oz Au/t.

3.3.6.2 1988 Regional Exploration

In March 1988, Middle Cirque Area was included in an airborne geophysical survey flown over the western half of the Mount Skukum Property. In July 1988, 90 contour soil samples were collected along the north slope of Middle Cirque (Figure 3.6.1).

Results

The airborne geophysical survey indicates a relatively uniform magnetic gradient along the axis of Middle Cirque that varies west to east from 57,600 nT to 57,750 nT. The results also show a uniform, flat background level for apparent resistivity over the cirque.

Contour soil samples were collected at an elevation of 1,860 m, along the north side of the cirque. Initial results indicated anomalies of up to 275 ppb Au at the mouth of the cirque. Follow-up sampling in the same area indicated lower anomalies of 80 and 90 ppb Au. Poor reproducibility of results may be due to lab error.

Conclusions

Geophysical and geochemical evidence provides little to support the presence of significant mineralized structures in Middle Cirque. Prospecting and mapping in previous years indicates the presence of many narrow veinlets with sparse, localized areas of gold grade. Although the geology of the area is similar to that of Main Cirque and veins of the Lake and Brandy Zones extend towards Middle Cirque, none of these structures has been traced with any width into Middle Cirque.

Further work is required to fully assess Middle Cirque. Soil sampling and completion of the existing mapping is essential to this work. Given preliminary indications however, the potential for this area to host significant mineralized vein is poor.

3.3.6.3 Middle Cirque Grid

Location

Middle Cirque grid is on the floor of Middle Cirque. It is centered on coordinate UTM 473,200 E, 6,675,200 N, and includes claims Kuku 22, 31 to 34 and Pup 25F to 27F. The area is above tree line between elevations of 1,660 m and 1,860 m with moderate to steep, talus covered slopes and a flat valley bottom covered in places by glacial debris. The grid is accessible by cat road from the mine haul road at the 1,635 m portal.

1988 Exploration

During July and August 1988, exploration in Middle Cirque area comprised establishment of an 800 m by 750 m grid, 1:1,000 scale geological mapping, prospecting and HLEM survey. In total, 42 rock samples were collected.

Results

Geological mapping indicates Middle Cirque is underlain by flat-lying porphyritic andesite flow rocks and andesite lapilli tuff (Figures 3.1.63, 3.6.2 and 3.6.3). Andesites are cross-cut by 1 m to 20 m wide, north and north-east trending rhyolite dykes. Two dominant vertical joint orientations which trend 005^0 and 025^0 occur in andesite. A third, horizontal joint set is also present. Several northeast trending, narrow shear zones and an east-trending fault with about 10 m of left lateral offset also occur along the south side of the cirque (Figure 3.6.2).

Stockwork and veins in Middle Cirque occur along two zones and in small isolated shears. The two main zones are 600 m and 300 m long and occur along strike from the Pika and Fox Zones, respectively. These narrow but persistent zones are characterized by quartz-calcite stockwork and veins less than 0.05 m thick. Jasper, fluorite and pyrite as well as slickensides and fault gouge are also present. The zones are enveloped by propylitically altered and silicified andesite. Surface samples from the Pika and Fox Zone extensions assay up to 0.038 oz Au/t and 0.034 oz Au/t, respectively.

Insufficient HLEM survey data does not allow for proper interpretation of results.

Conclusions

Insufficient work has been accomplished in this area to fully assess its potential. Regional mapping by Pride (1987) and air photo lineaments indicate the presence of a large east-west fault extending through the center of the cirque. This structure, if present, provides a locus for concentration of vein material and possible zones of structural complexity where it is intersected by the Lake and Brandy Zone structures.

Further mapping and completion of the geophysical survey, and geochemical sampling are required to fully assess the potential of the Middle Cirque area, however, preliminary indications are that the economic potential is relatively low for this area.

3.3.7 CAMP CIRQUE AREA

3.3.7.1 Introduction

Location and Access

Camp Cirque area, centered on coordinate UTM 6,677,450 N, 473,700 E, is approximately 4.5 km north of Mount Skukum (Figure 3.0.1). The area is encompassed by 1:5,000 scale map sheet 5, and contained within claims Kuku 49 to 54, 65 to 74, 83 to 86, 206 to 211; Moe 21F to 26F and Pup 18F to 20F.

Camp Cirque area is above tree line with relief from 1,500 m to 2,000 m above sea level. The cirque is rimmed by steep rugged slopes and talus fans. The cirque floor is mantled by glacial till except for along creek drainages. Access to the area is by foot from a cat road that ends 1 km from the mouth of the cirque, or by helicopter.

Regional Geology

Camp Cirque area is underlain by north dipping porphyritic andesite flow rocks and interlayered epiclastic rocks. Granitic rocks of the Coast Plutonic complex and overlying basal formations of the Mount Skukum Volcanic Complex outcrop at the mouth of the cirque (Pride, 1985). A large body of flow-banded maroon rhyolite underlies a large portion of a ridge that forms the northwest wall of the cirque. North trending rhyolite dykes outcrop in the south wall near the head of the cirque.

Previous Exploration

In 1982, eight stream sediment samples and three heavy sediment samples were collected from the creek draining Camp Cirque. Sample results of 15 ppb Au and 0.8 ppm Ag or less in stream sediments and 40 ppb Au and 0.3 ppm Ag or less in heavy metal concentrates were obtained.

3.3.7.2 1988 Regional Exploration

Exploration in 1988 comprised prospecting and contour soil sampling in and around Camp Cirque and airborne geophysical coverage (Figures 3.0.2, 3.7.1 and 3.7.2). Fourty-one rock samples and 294 contour soil samples were collected, and the 1.8 km by 600 m Gopher grid was established.

Results

Airborne geophysics indicates a pronounced linear magnetic-low anomaly with a nearby, subparallel resistivity-low anomaly. The magnetic anomaly strikes east from the head of Camp Cirque, along the south side of the cirque, for 2.5 km. The axis of the resistivity anomaly is approximately 200 m north of the magnetic-low axis, and extends east from the head of the cirque for 3.5 km. The anomaly is most extreme at the head of Camp Cirque where a second, north striking, 600 m long conductor is also indicated. The Gopher grid was established for ground geophysical follow-up of these anomalies.

Follow-up prospecting at the head of Camp Cirque and along its south wall located a jasper-pyrite stockwork in propylitically altered porphyritic andesite near the axes of the airborne anomalies. Samples from the stockwork contained trace gold and silver as did most samples from Camp Cirque Area. The most anomalous sample, which assays 0.03 oz Au/t, 2.9 oz Ag/t, was collected from argillically and propylitically altered andesite close to a peak at the head of Camp Cirque. A line of contour soil samples below this peak indicated anomalies of up to 308 ppb Au. Subsequent resampling indicated only background levels of up to 30 ppb Au in soil. Initial results are assumed to be due to lab error. No other soil anomalies were detected.

Conclusions

Preliminary prospecting in the area of airborne geophysical anomalies has identified alteration zones and minor stockwork veins. No gold is associated with these hydrothermal expressions although some anomalous soil samples have been collected which could not be duplicated.

Geophysical evidence suggests the presence of a fault structure with associated alteration, or, the presence of a conductive lithological contact. Field evidence supports a fault/alteration hypothesis but is inconclusive. Further work on a more detailed scale is required to assess this area and fully dismiss the possibility of anomalous soil samples in the area. Ground geophysics and soil sampling over the established grid area should be completed before a final assessment is made.

3.3.8 TUNING FORK CREEK AREA

3.3.8.1 Introduction

Location and Access

Tuning Fork Creek area, centered on UTM coordinate 6,678,200 N, 475,700 E, is approximately 6 km north-northeast of Mt. Skukum. The area is encompassed by 1:5,000 scale map sheets 4, 5, 17 and 18, and includes all or portions of claims Kuku 9, 86 to 90, 92 to 96, 103 to 112, 258, 260 to 265 and 267; Pup 42F to 46F, 60F, 61F, 63F; and Moe 1F to 7F, 9F and 10F.

Relief at Tuning Fork Creek area ranges from 1,400 m to 2,200 m above sea level. The area is above treeline and characterized by felsenmeer, talus, limited outcrop on gentle south facing slopes and deeply incised ravines. Outcrop is more prevalent on steeper slopes and in the north facing cirques. Access to the area is by helicopter or by foot from the mine haul road.

Regional Work History

In 1981, stream sediment and heavy mineral concentrate samples were collected along Tuning Fork Creek and the creek draining Frigid Cirque. Sample results of 400 ppb Au, 105 ppb Au and 65 ppb Au were obtained in samples collected from the west fork of Tuning Fork Creek. No other anomalous results were obtained (Doherty et al., 1981).

In 1982, prospecting in Tuning Fork Creek located discontinuous quartz and quartz-fluorite-calcite veins up to 0.20 m wide. Assay results from samples of a quartz vein near the head of the west fork are up to 0.27 oz Au/t, 0.44 oz Ag/t. A 20 m wide vein of massive quartz was also located approximately 500 m east of the fork in Tuning Fork Creek. This vein contains trace gold (Doherty et al., 1982.

In 1983, follow-up prospecting and soil sampling were performed near the head of Tuning Fork Creek. Rock grab and rock chip samples of vein material assay up to 0.067 oz Au/t, 0.15 oz Ag/t and 0.006 oz Au/t, 3.39 oz Ag/t. Soil sample results are 35 ppb Au or less (Doherty et al., 1983).

In 1986, prospecting, and contour and ridge soil sampling were performed throughout the Tuning Fork creek drainage. No anomalous soil samples were found; however, veins found in 1982 were relocated and resampled. Veins from the head of the west fork of the creek assay up to 0.3 oz Au/t across 0.3 m. Results from samples of vein float collected in the east fork of Tuning Fork Creek are 0.19 oz AU/t and 0.12 oz Au/t (Dussell, 1987).

3.3.8.2 1988 Regional Exploration

Regional exploration in Tuning Fork Creek Area in 1988 comprised limited 1:5,000 scale geological mapping (Figures 3.8.1 and 3.8.3), contour soil sampling (Figures 3.8.4 to 3.8.6), and coverage by the March 1988 airborne geophysical survey (Figure 3.0.2). A total of 46 rock samples and 326 soil samples were collected.

Results

Geology at Tuning Fork Creek area comprises moderately dipping felsic ash to lapilli tuff, porphyritic andesite flow rocks and epiclastic sedimentary rocks. Three dome-like intrusions of porphyritic and flow-banded rhyolite occur between the east and west forks of Tuning Fork Creek. Discontinuous quartz veins, quartz-fluorite veins and stockwork flank the 500 m by 200 m intrusion between the forks of the creek. A zone of quartz-fluorite stockwork along the south flank of the intrusion is up to 1.4 m wide and discontinuously exposed over a distance of 50 m. The highest assay result from samples of these veins and stockwork is 0.012 oz Au/t. Samples of quartz vein float in the west fork of the creek assay up to 0.174 oz Au/t. Results from contour soil sampling west of Tuning Fork Creek and within Frigid Cirque indicate one anomalous area at the head of Frigid Cirque. A single-point anomaly of 50 ppb Au and greater than 100 ppm Ag occurs at an elevation of 1,750 m. Further up-slope from this anomaly, at an elevation of 2,000 m, anomalous results of 280 ppb Au, 150 ppb Au and 80 ppb Au were obtained from a series of samples collected over a 400 m distance. Quartz vein float up to 0.25 m thick was located in the area of these anomalous soil samples. Rock samples of this float contained trace gold and silver. The float source was not located.

Results of the airborne survey indicate a continuous, 2.5 km long magnetic low coincident with the eastern two rhyolite intrusions near the head of Tuning Fork Creek. This low extends eastward to the head of Rhyolite Creek and coincides with a small apparent resistivity low over the central intrusion. A second geophysical anomaly comprises a 2 km long apparent resistivity low which strikes east-west across the creek down-slope from the first anomaly. A 1.2 km magnetic low parallels this resistivity low, but occurs further down-slope coincident with the 20 m wide quartz vein at the fork in Tuning Fork Creek. A third 800 m long magnetic low anomaly trends northeast, coincident with a smaller apparent resistivity low at the head of Frigid Cirque at an elevation of about 2,000 m, in the area of anomalous soil samples.

Conclusions

Several prominent airborne geophysical anomalies exist in the Tuning Fork Creek area. Geology indicates a favourable setting for vein mineralization with high-level rhyolite stocks and dykes intruding andesitic flow and pyroclastic rocks. Prospecting has located several small veins and stockwork systems and one east-west vein/pegmatite body up to 7 m wide which comprises course-grained graphic intergrowths of quartz and K-feldspar. None of these structures have been found to contain significant gold and extensive contour and ridge soil sampling has not produced significant anomalies. As a result, the potential of this area is considered to be low.

Favourable geology, the presence of a variety of mineralization styles, as well as geophysical evidence indicating several prominent structures in the area suggest that this area requires more work in order to fully assess its mineral potential. Geologic mapping is required at 1:5,000 scale to locate or explain airborne geophysics anomalies.

3.3.8.3 Far Southwest Zone

Location and Access

The Far Southwest Zone, centered on UTM coordinate 475,500 E and 6,680,000 N, occurs on north facing slopes about 2.7 km northeast of the fork in Tuning Fork Creek (Figure 3.0.1). The area is encompassed by 1:5,000 scale map sheet 18 and includes all or portions of claims Kuku 60, 74, 80, 93, and 95. The area is above treeline with moderate to steep slopes particularly along cirque walls and lies adjacent to the northern Mt. Skukum property boundary. Access is by helicopter.

Previous Exploration

In 1987, Aurum Geological Consultants, under contract to Pacific Trans-Ocean Resources Ltd., identified a high-level epithermal vein during exploration on the Said and The claims north of the Mt. Skukum property. The vein and associated stockwork, called the Far Southwest Vein, was reported to be up to 2 m wide and hosted within a southwest trending structure, the Far Southwest Zone, that strikes onto the Mt. Skukum property. Trenches were hand dug across the vein by Aurum Geological Consultants on Mt. Skukum property and chip samples across the vein assayed up to 0.5 oz Au/t.

1988 Exploration

Exploration at Far Southwest Zone in 1988 by Mt. Skukum Gold Mining Corp. personnel comprised limited 1:5,000 scale geological mapping and prospecting (Figures 3.8.3 and 3.8.6) on the portion of the structure which strikes onto the Mt. Skukum property. A total of 33 rock chip and rock grab samples were collected.

In 1988, Aurum Geological Consultants, with permission from Mt. Skukum Gold Mining Corp., collared three holes on the Mt. Skukum property to intersect the Far Southwest Vein on property owned by Pacific Trans-Ocean Resources Ltd.

Results

Geology of the Far Southwest Zone area comprises thinly bedded epiclastic and tuffaceous rocks interbedded with porphyritic andesite flow rocks. These rocks are cross-cut by felsic dykes oriented sub-parallel to a regional linear which hosts the Far Southwest Vein.

Thinly-bedded andesitic epiclastic and tuffaceous rocks (TUFF) comprise tuffaceous sandstones and siltstones as well as moderately to non-welded lithic, crystal and ash tuffs. Local soft sediment structures and graded bedding are characteristic of these rocks.

Locally columnar jointed porphyritic andesite (PPAN) is interbedded with epiclastic and tuffaceous rocks. These rocks are dark green with an aphanitic matrix enclosing 3 to 5 % feldspar phenocrysts 0.5 mm to 5 mm across. This porphyritic andesite is similar to that found in Main Cirque.

Rhyolite, dacite and rhyodacite dykes (RH/D, DC/D and RD/D) intrude the epiclastic and volcanic rocks in the area. These rocks trend northeast - southwest and, although they display minor textural variations, were probably emplaced together in one event.

The Far Southwest Vein is the only gold-bearing quartz vein in the area. It is hosted in a shear zone which can be followed in float and outcrop for 375 m. The vein is oriented $048^0/68^0$ southeast and has been observed to vary between 0.08 m and 0.80 m wide averaging 0.40 m although Pacific Trans-Ocean Resources Ltd. reports widths up to 2 m. The vein, flanked on the southeast by limonitic fault gouge, comprises quartz and minor fluorite with abundant open space filling textures. Silicification, phyllic alteration and minor argillic alteration envelope the vein. Assays of vein

material are low with an average grade of 0.039 oz Au/t over 0.40 m. The highest assay from outcrop is 0.171 oz Au/t over 0.08 m. One float sample assayed a maximum of 0.319 oz Au/t.

Conclusions

The Far Southwest vein structure lies on the far northern boundary of the Mt. Skukum property and only a small portion of the vein structure is encompassed by the Mt. Skukum property. Preliminary investigation indicates that this structure does not contain ore grades or mineable widths. Geological mapping is required to fully prospect and evaluate the structure but the economic potential is presently considered to be low. Attention should be given to claims adjoining the northern boundary of the Mt. Skukum property as the Far Southwest structure extends a considerable distance onto these claims and could expand to a significant width at any point along its strike.

3.3.9 BERNEY CREEK AREA

3.3.9.1 Introduction

Location and Access

Berney Creek area, centered on coordinate UTM 6,670,400 N, 475,700 E, is located approximately 4 km southeast of Mt. Skukum and 2.5 km west-southwest of the Omni Resources deposit (Figure 3.0.1). The area is encompassed by 1:5,000 scale map sheets 10 and 11, and claims Woof 16 to 40 and Moe 75F to 99F.

Relief at Berney Creek Area ranges from 1,300 m to 2,100 m above sea level. The area is above treeline and characterized by steep cliffs. Access is by helicopter.

Geology

Berney Creek area is underlain in the north by felsic lapilli tuff, felsic breccia, porphyritic andesite flow rocks and an intrusive rhyolite stock of Skukum Group. These rocks are in fault contact with granodiorite of Coast Plutonic Complex to the south along the 075^0 trending Berney Creek fault. The fault is occupied by a 3 m wide rhyolite dyke at least 160 m long and smaller pebble dykes. Other north trending faults, and rhyolite and andesite dykes cross-cut the fault (Doherty et al., 1983).

The Omni Resources Rainbow Road Zone and Kuhn Zone deposits occur within northeast trending splays off of Berney Creek fault, 2 km northeast of the Woof claims.

Previous Regional Exploration

In 1983, geological mapping and rock and soil sampling were performed in Berney Creek area. Rock samples from Berney Creek fault contained up to 2,370 ppm Cu, 41 ppm Ag and 800 ppb Hg. Gold results were low. Soil samples along the fault contained up to 250 ppb Au (Doherty et al., 1983).

In 1986, additional geological mapping and rock and soil sampling were performed along Berney Creek fault. Discontinuous quartz veins containing chalcopyrite and galena in zones along the fault assayed up to 0.26 oz Au/t and 8.0 oz Ag/t (Dussell, 1987).

3.3.9.2 1988 Regional Exploration

In 1988, limited prospecting and rock sampling were performed along Berney Creek fault (Figures 3.9.1 and 3.9.2). A total of 46 rock samples were collected.

Results

Silicified zones occur within Berney Creek fault and in altered granodiorite along the south side of the fault. A 160 m long silicified zone, the Polywog Zone, adjacent to the fault contains massive quartz veins that assay up to 0.063 oz Au/t, 0.26 oz Ag/t across 0.10 m. Other quartz veins in the granodiorite, within 25 m of the fault, assay up to 0.046 oz Au/t, 0.88 oz Ag/t across 0.10 m.

Conclusions

The Berney Creek area represents one of the areas of maximum exploration potential on the Mt. Skukum property. This area encompasses basement granodiorite rocks and Skukum Group volcanic rocks separated by the prominent Berney Creek Fracture which represents the southern boundary fault of the Mt. Skukum Caldera Complex with a vertical displacement estimated in excess of 1 km (personal comm. M. Pride, 1985). Andesite and rhyolite dykes are common and airborne geophysics indicates the presence of a well defined fracture pattern in the area.

Structural and geophysical parameters indicate that the Berney Creek area has a high exploration potential. The proximity of the area to the Omni Resources deposit, its similar geology, structure, and on a preliminary basis, metal ratios, indicate that the primary target in the area is a quartz-sulphide vein deposit. The combination of structural preparation and a heat and gold source provided by felsic dykes in the area allows good potential for a large deposit of a size similar to the Tango Vein.

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APPENDIX A:
PRELIMINARY EXPLORATION BUDGET FOR
1988 EXPLORATION: MT SKUKUM PROJECT
May 1st to December 31st

ITEM	Cost
Surface Diamond Drilling	$669,109
Labour	360,051
Helicopter	191,929
Trenching and roads	139,176
Underground Diamond Drilling	130,733
Food and camp charges	121,866
Assaying	86,040
Geophysics	71,987
Supplies	36,587
Vehicles	33,882
Travel	16,142
Drafting	13,176
Consultants	10,125
Office rent and power	2,930
Electrical Supply	1,842
TOTAL	**$1,885,574**

APPENDIX B
LIST OF TECHNICAL PAPERS WHICH ACCOMPANY REPORT

1) Podolsky, G.
1988: Report on combined Helicopter Borne Magnetic, Electromagnetic and VLF Survey Chieftain Hill Extension, Yukon Territory; Unpublished report for Mount Skukum Gold Mining Corp. by Aerodat Ltd.

2) Bowman, M. and King, A.
1988: Geophysical Surveys, Mt. Skukum, Yukon; Unpublished report for Mt. Skukum Gold Mining Corp. by Geo-Physi-con Co. Ltd.

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