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cc Brandy report.

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Subject Summary of Available Information,Northair,Brandywine areas

The following is intended as a summary of the existing information to date and not as a final report.It is intended as a starting point for comment and discussion. Also covered will be areas for future work on the properties in light of the above comments.

A Regional Geology

1) It is clear from the available information, that the Callaghan Creek valley forms a crude anticlinal structure.The core of the structure is occupied by a sequence of agglomeratic rocks,overlain and interfingering with a sequence of sediments and pyroclastic debris.The eastern limb of this structure,in the Northair area,is steeply dipping but predominantly to the east, while the western limb,covering the Brandy property dips to the west. The rock units in the two limbs are not identical since some rapid facies variations exist in the Callaghan Creek area. In addition there are blurred facies from metamorphic effects.

2) An additional complication in the area, is the presence of several sets of faults ,which juxtapose contrasting facies.There are several NE trending sets which appear to be offset by the strongly developed regional set of NS faults,which are developed on both sides of the valley.

B Northair Area

The synthesis of the Northair geology is as yet incomplete,especially in the mine area,where drill core logging will ehhance the picture.The available information does permit a reasonably clear picture to emerge,with a bearing on mineral control. There appears to be four distinct cycles or lithofacies developed in the Northair area. The

1) The lower unit comprises an agglomeratic unit,with only few indistinct variations,subordinate tuffaceous units and rarer thin bedded crystal tuffs. This unit occupies the core of the anticlinal structure.

2) The agglomeratic unit is in fault contact with a unit,predominantly of volcanic arkose,occasionally variable in texture with an interbedded ferruginous

arkosic unit,cross bedded and which is exposed in the lower part of the succession.Lateral facies equivalents of this unit comprise interbedded, argillites,often graphitic,siltstones and arenaceous units.The volcanic arkose unit exhibits rare cross bedding,most frequently developed in the upper 50m,where it becomes more quartzose,occasionally pebbly. The arkose unit passes conformably upwards to a pyroclastic sedimentary assemblage.

3) The pyroclastic assemblage,at least 300m thick, exhibits some rapid lithological variations, with interbedded arkosic and sub arenaceous units, often exhibiting large scale cross bedding.The arkosic units appear to reflect smaller scale cycles in the unit.Lateral variations are present.The pyroclastic assemblage ranges from matrix supported breccias to volcanic arenites,but, in general does not have the manifestation of very coarse breccias.

4) The upper pyroclastic assemblage is characterised by the presence of giant breccias,matrix supported,textures of welded aspect,the presence of magnetite inthe matrix over a wide area and a transition upwards to coarse and finer grained volcanic arenites,lithologically distinct from the volcanic arenites developed in the lower pyroclastic unit. Sedimentary structures are widely developed in the sequence,but, in contrast to the lower assemblage, tend to be of a more subtle nature,often only revealed in good core intersections.There appears to be some fault juxtaposition of these units in the Northair Mine area and to the east of the mine. The unit may be upwards of 300m thick, but, on the present information,exhibits lateral variations to poorly sorted arenites,of greywacke aspect with intercalated graphitic horizons in the siltier members. The unit appears to pass vertically as well as laterally to pyroclastic sediments , with rapid grain size variations.Subordinate lithologies in this unit comprise siliceous tuffs,thin and of rapid variation,pumice horizons and some thin,ambiguous lapilli tuff, and primary pyroclastic breccias,

5) These units are cut by basaltic dykes,rhyodacite dykes and overlain,in part by valley basaltic flows.Drill core intersections reveal that the basaltic dykes are frequently, but not ubuiquitously, cored by the rhyodacite dykes.A pervasive buff coloured alteration is often associated with the rhyodacite dykes,expressed by the development of hematitie and kaolinite. Rare auto-breccia zones are developed at some dyke margins.

C Brandywine Area

The geological framework of the Brandywine area is similar in many aspects to the Northair area. The stratigraphy encompasses a lower agglomerate unit, probably overlain by fine grained volcanic arenites with intercalated carbonate units and, in turn overlain by a pyroclastic assemblage. The data does not permit a categorisation into an upper and lower unit.

1) The agglomerate unit is similar in all aspects to the units exposed in the Northair unit. The contact with the finer grained arenites is a structural one.

2) The finer grained greenstones or volcanic arenites are often calcareous, have intercalated silty dolomite horizons and, in one area, a rapid intercalation of quartzite and carbonates.

3) The fine grained material appears to pass upwards into a pyroclastic assemblage with volcanic arenites and breccia-tuffs; the salient characteristics are often obscured by metamorphic overprinting. Coarse breccias as seen in the Northair area, appear to be absent, or not recognised as such.

The Brandy area appears to be a facies equivalent of the Northair group, but not a direct equivalent.

4) The Brandy area is cut by a number of rhyodacite and basaltic dykes. In one area, a basaltic breccia complex is cut by a rhyodacite dyke.

5) Injection zones are peripheral to the granitic intrusions in the area; palaeo-stratigraphy is still recognisable in these areas.

As in the Northair area, there is widespread development of north-south fault zones

D Geochemistry

The geochemical response of mineralisation in the project area is ambivalent in some aspects. Response in overburden is, in most cases not direct. Not all anomalies can, as yet, be categorised. There is clear evidence of the presence of anomaly trains in the area, secondary hydromorphic anomalies and suppression of response from clay cover from late glacial deposits. In general, the geochemical evidence tends to reinforce data from other sources, rather than provide fresh information.

The surveys conducted in 1980, had only marginal consideration to the evaluation of the area.

E Geophysics

The major effort in geophysics in 1980 was the airborne survey conducted from Soo River to Daisy Lake. The results were somewhat disappointing and ambivalent in character. The data fleshed out existing surveys, gave regional coverage but did not significantly change the geological picture that had already been deciphered. Ground follow up of existing anomalies indicated that the conductors were lithological contrasts, not sulphide type conductors.

F Mineralisation

F 1 Northair Area

On the basis of the present information and past data, the following suggestions are made.

1) The Warman & Manifold zones appear to cross cut stratigraphy,albeit at a low angle.The zones appear to cut both coarse and finer grained fragmental zones,alhough some of these may be structural repititions.

2) The Discovery zone is located at and close to a transition zone from coarser fragmental rocks to finer grained assemblages. Core intersections suggest the presence of both primary pyroclastic breccias and secondary pyroclastic debris.Alteration in and around the zone is variable and is not completely clear at the moment.

3) All the mineral deposits appear on a gross scale to have a spatial association with zones of pervasive pyrite sericite alteration,silicification and with partial corelation with area of buff coloured hem. $\pm$ KAOL. alteration associated with,locally ,rhyodacite dykes. On a more local scale,this correlation is not so evident.Some secondary gypsum appears to be present near the Discovery zone, but the extent is not clear.

4) On the basis of present information, it would be hard to ascribe the origin of the Northair suite of deposits to solely a stratiform origin.What appears to be the case is a combination structural/lithological combination; the Discovery, on this basis could still possess some characteristics of stratiform deposits, given its location in and near primary pyroclastics transitional to finer grained pyroclastic debris,with possibly some fine silicic tuffs, of uncertain distribution being present.

5) The 1980 drilling programme effectively reduced the potential for any repititions of the mineralisation in both stratigraphic and structural locations, within an accessible distance from existing workings. The area of sericitic alteration,plus pyrite, is still open to the SE. but these locations are not readily accessible to drilling,would involve substantial road building and have no assay data that sugrest the presence of mineralisation of Warman-Manifold types.

6) While possibly information of a negative tone, there is still a potential for similar mineralisation on a regional scale.

F 2 Brandywine Area.

Exploration still continues on the Brandy property and as such, definitive conclus- would be premature.

1) The Silver Tunnel mineralisation is clearly correlative with a shear zone controlled rhyodacite suite. The mineralisation is erratic but high grade appears to exhibit some supergene enrichment, and may be partly preserved from glacial erosion.

2) The Silver Tunnel type of mineralisation is also present elsewhere in the property but does not exhibit comparable grades.

3) The Tedi Pit mineralisation exhibits distinct affinities with the Discovery zone, is not so extensive, and, as with the Silver Tunnel, has the associated presence of rhyodacite dykes and associated alteration

4) Facies variations and metamorphic overprinting has prevented effective stratigraphic correlation with the Northair area, but on partial evidence, may be at a comparable stratigraphic level above the lower agglomerate.

5) Occurrences of mineralisation in the Brandy area shows a close association with rhyodacite dykes, emplaced along shear zones, with peripheral kaolinitic alteration and carrying minor galena and sphalerite. Other occurrences are along shear zones- e.g. Dority Creek

6) Conventional exploration merely outlines areas decipherable from other evidence. The only exploration method that is valid (and expensive) is grid drilling.

7) The erratic grade of the known mineralisation does not suggest a high probability of occurrence of a significantly higher tonnage, or grade

G Future Work

1) The programmes to date in both areas have not been successful. in that they have not delineated new mineral areas in close proximity to existing workings.

2) The results from the Brandy area will be compiled in the near future and some statistical work done on the available data, for definite recommendations to be made. There is still valid prospecting work that can be carried out on known zones. More exhaustive exploration will await the synthesis of the data.

3) In the northair area, the field work has defined the geology in greater detail than had been previously possible, Although the 1980 drilling programme was not outstandingly successful in the economic sense, it has by no means eliminated all areas of potential ; those that remain may not be overtly important, but it seems to be important to check some of these out while the mine is still operating. A group of four x 500' holes in the winter in areas readily accessible will serve to check these out.

4) Northair should not lose sight of the fact that some valid regional programmes can be effected from the mine area, both in the Callaghan Creek zone and in the search for deposits that might be amenable to be stockpiled. A preliminary study of the regional geology might indicate the means by which this can be effected. Such a programme may be administrative problem