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MINERAL ASSESSMENT – CITY OF WHITEHORSE

INTRODUCTION

This mineral assessment was undertaken for the City of Whitehorse to provide them with a tool to incorporate mineral resource values in their land use planning. A review of the available geoscientific information included: existing geological maps, government reports and assessment reports. Private archival documents (maps, exploration summaries, etc) were graciously provided by Hudson Bay Exploration and Development (HBED), the current owners of the old Whitehorse Copper Mines (WCM) ground and the largest land holders in the Copper Belt.

Most of the Whitehorse Copper Belt is included within the city limits. This 32 km long belt is defined by a linear series of copper skarn occurrences. This type of mineralization forms preferentially where the Cretaceous Whitehorse batholith intrudes the partially dolomitized limestones and clastic sediments of the Triassic Lewes River Group. Economic deposits form where irregularities in the contact produce pendants or embayments of sediments within the intrusive. Of all the deposits and showings in the Whitehorse Copper Belt, 28 have been mined intermittently from the turn of the century till the early 1980's. It is estimated that current reserves in the Copper Belt stand at 3 million tons of ore grading 1% copper.

METHODOLOGY

Geological and geophysical data as well as information on mineral occurrences were compiled in preparation for the assessment. The geochemical data was not compiled since the locally thick overburden masks the geochemical signature of the deposits.

A digital geology map at a scale to 1:20 000 was compiled by Craig Hart. The detailed WCM geology maps of various scales were incorporated to the pre-existing 1:50 000 regional mapping and the resulting linework was registered to a topographic base provided by the city. The computer drafting was done by Will van Randen.

All available geophysical data was provided to Amerok Geosciences Ltd. It was established that the compilation of all this data would be an immense job, well beyond the time and budget limitations of this project. Such detailed information could be studied on a case by case basis if detailed information about a specific deposit was required. The scope of this project was, therefore, better served by an overall look at the most recent surveys. An airborne electromagnetic (EM) survey flown in 1982 by and an induced polarization (IP) survey conducted in 1975 were chosen as the most recent, pertinent surveys with the best coverage.

This choice turned out to have severe limitations. The parameters for the EM survey as well as the original data were unavailable and the hand-drawn plots of the associated magnetic survey were of little use. The available plots were interpretations of EM data and coincident magnetic anomalies, there was little overlap between that survey and the 1975 IP survey. Nevertheless, tabulation and ranking of areas of geophysical interest was achieved by interpreting the clustering of anomalies, and noting if they had any magnetic coincidence or a favorable geological setting. IP surveys are the best geophysical tool to locate skarn deposits; the most recent surveys would need to be compiled at a property wide-scale in order to provide a regional perspective.

Much time was spent in trying to register both the geological and geophysical data to actual topographic coordinates.

Mineral occurrence information was compiled from: Minfile, existing geological maps, published reports by Dave Tenney and Pat Watson (DIAND), assessment reports, theses, private studies, internal property descriptions, and exploration summaries and proposals. A summary of the most recent exploration targets and results was tabulated for each area/deposit. It was concluded that outside of the deposits that were actively mined, the level of exploration was at a quite preliminary stage.

ASSESSMENT PANEL

On October 16, 1997 an expert panel was convened to assess the relative mineral potential of tracts within the City of Whitehorse. Members of the panel were: Dave Tenney, former chief geologist for Whitehorse Copper Mines; Gerry Bidwell and Robert Stroshein, both employees of HBED at the time of that company's exploration activity in the Copper Belt; Craig Hart, project geologist with the Yukon Geology Program. All of these participants have extensive expertise with the geology and mineral deposits of the Whitehorse area. Other panelists included Jeff Mitchell, geophysicist contracted through Amerok Geosciences to evaluate the geophysical database and Danièle Héon, mineral assessment geologist with YTG. Andy Hureau, former exploration geologist for WCM, was reached by phone at the end of the session and was asked to comment and to supply additional information.

The task of the panel was to divide the study area into tracts of similar geology and then rank those tracts on the basis of their relative potential to host metallic mineral deposits. The potential for limestone was not evaluated due to the lack of information and general expertise within the group. None of the other industrial minerals was thought to occur in significant quantities within the city limits.

Information relevant to each mineral deposit/area was reviewed. The study area was then divided into tracts which are numbered from 1 to 36. Tract definition was influenced by the types of mineral deposits occurring or expected to occur in each area. Since skarn deposits are the most significant targets within Whitehorse, tracts were drawn overlapping the prospective contact and allowing for the uncertainty of the location of that contact. Through the ranking process, the tracts were grouped in 8 categories of mineral potential. The criteria defining each category and the resulting ranking of tracts are outlined below in table 1.

Table 1.

		ranking	category	tracks
very high potential	highest	1	Established Resources	2, 4, 12, 14, 20, 36
		2	Mineralized zones, potential for resource development	27, 32, 5, 29, 31
		3	Mineral occurrences, favorable geology +/- geophysics, under-explored	22, 28, 8
more work needed		4	Favorable intrusive/ limestone contact	30,3, 26, 6, 16, 15, 18, 33
		5	Interpreted intrusive/limestone contact	10, 24, 1
		6	Whitehorse batholith with geophysical anomalies	7, 23
minimal interest	lowest	7	Whitehorse batholith without geophysical anomalies	11, 9
		8	minimal interest	13, 19, 21, 35, 17, 25, 34

Categories 1 to 3 represent ground of very high mineral potential. Any withdrawal of these tracts from exploration activities is predicted to meet with resistance and criticism from the mineral industry. Tracts belonging in categories 4 through 6 have undergone various levels of exploration; our panel recommends further studies if any of these areas are to be considered for withdrawal. Categories 7 and 8 represent areas of minimal interest to the industry. Withdrawal of these lands is predicted to be the least contentious.

Table 2 lists the tracts in numerical order with their respective ranking.

Tract no.	ranking priority	includes	tract no.	ranking priority	includes
1	5		19	8	
2	1	Cowley Park	20	1	Arctic Chief/ Grafter/ Best Chance
3	4		21	8	
4	1	Gem	22	3	Minfile 105D 055
5	2	Lewes River (Minfile 105D 062)	23	7	
6	4		24	5	
7	6		25	8	
8	3	Copper Cliff, Pass Lake	26	4	
9	7		27	2	Pueblo
10	5		28	3	Reservoir Lake
11	7		29	2	Copper King, Carlisle
12	1	North Star	30	4	
13	8	mined out Little Chief pit	31	2	Rabbit's Foot
14	1	Middle Chief	32	2	War Eagle
15	4		33	4	
16	4		34	8	
17	8		35	8	
18	4		36	1	Tailings compound

It must be emphasized that these conclusions are the best estimate at the time of the assessment. Conclusions should be revised with time as new discoveries are made within the City and elsewhere.

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