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**Qualitative gold grain analysis to target blind deposits: “Kemptville” - A Nova Scotia case study**

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The Meguma terrane of southern Nova Scotia has been described as one of the largest gold anomalies in the world. However, to date, only modest success has been achieved in winning gold production from an area equivalent in scope and geology to the productive goldfields of Victoria State in Australia. Is this due to the superior technical and entrepreneurial skills of Australian geologists and mine developers, or some physical limitation on gold exploration in Nova Scotia? One factor at play here may be the presence in Nova Scotia, particularly west of Halifax, of thick glacial tills that mask outcrop and to many provide a deterrent to traditional “boot and hammer” prospecting and exploration techniques. Rather than letting these till sheets frustrate gold exploration, perhaps they can be used to assist in the search for “blind” or obscured gold deposits by a more focussed analysis of the gold particles contained therein.

Building on techniques first developed by Stu Averil of Overburden Drilling Management (ODM) of Nepean, Ontario and championed on a pilot basis by NSDNR geochemist, Terry Goodwin, AYARCO Gold Corporation embarked on the first deposit scale qualitative gold grain in till survey in Nova Scotia. The objective of the survey was to locate the source of extremely high grade (>300 g/t Au) float samples found across the ice front between two former producers in the historic Kemptville Gold District in Yarmouth County. Over 270, 10 kg till samples were collected by AYARCO and analyzed at ODM. The methodology was to prepare a heavy metal concentrate (HMC) from the original sample and examine the resulting concentrate under a powerful microscope. Gold grains were counted and measured while their morphology was noted to determine if it was pristine, modified or rounded. Pristine grains generally indicate a transport of less than 150 m, while modified may have moved up to a 1000 m and rounded more than 1km. Gold grain counts generally indicate the magnitude of the source area, but this can vary depending on the host.

When plotted, the results defined a very strong, coherent, gold in till anomaly stretching over 600 m across the ice front and extending up to 2000 m down ice. This anomaly has very clear cut-offs to the north, east and west and is believed unique in Atlantic Canada in both the number of gold grains present, the extent of the anomaly and the very high percentage (>80%) of pristine grains. The down ice extension of such a high per-

centage of pristine grains may possibly be explained by a series of en-echelon mineralized zones in a structure cutting across the major (>30 km) regional Kemptville Shear Zone.