

RETROSPECTIVE OF DIAMOND EXPLORATION AT THE HARDY LAKE PROPERTY, LAC DE GRAS REGION, NORTHWEST TERRITORIES, CANADA

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Twenty-four kimberlites were discovered on the Hardy Lake property since 1992 using sediment sampling, till geochemistry, geophysics and drilling.

The classical heavy mineral anomaly obtained from till samples on this property is characterized by short linear trains 100 to 200m wide, two to three km in length, aligned parallel to the NNW and WNW ice directions.

The mineral dispersion trains at Hardy Lake property are controlled by the following factors: (i) Type of kimberlite (e.g. crater facies, hypabyssal kimberlites) (ii) Abundance and grain size of indicators in the kimberlite and in the till cover (iii) The size of the intrusion and its topographical location (e.g. on lakes, on land) (iv) Glacial history and type of glacial sediments sampled.

The entire property has been covered using detailed airborne magnetic and electromagnetic (EM) surveys at 75m and 100m line spacing. Targets selected from the airborne surveys were followed-up using ground geophysical surveys (mag, HLEM). Ground gravity and ground penetrating radar (GPR) techniques have also been used to follow-up targets not resolved by the other geophysical methods.

The twenty-four Hardy Lake kimberlites can be subdivided into two major groups with distinct geophysical signatures.

The hypabyssal kimberlites generally have strong magnetic low signatures without electromagnetic responses. This type of kimberlite occurs as small pipes or sheet-like bodies (0.1 to 0.4 ha) and is composed of macrocrystic and sparsely macrocrystic magmatic kimberlite (HK).

The Crater Facies kimberlites can have a neutral, very weak low or high magnetic signatures with electromagnetic response. The crater facies kimberlite are pipes and are relatively larger than the hypabyssal kimberlites (0.3 to 4.0 ha). The crater facies kimberlites are composed mainly of resedimented volcanoclastic kimberlite (RVK) with minor pyroclastic kimberlite (PK) and hypabyssal kimberlite facies (HK).

From the 19 intrusives tested for micro diamonds 17 returned positive results. Drill core samples from other three occurrences discovered in 2003 are currently being tested for micro diamonds by Majescor.

At Hardy Lake property, systematic changes in the major and trace element mineral chemistry of the kimberlites suggests that the kimberlites in the south portion of the property have sampled deeper lithosphere inside the diamond stability field.

The potential to find new kimberlites in the property is still significant based on the presence of several unexplained mineralogical /geophysical targets.

The largest pipe discovered on the property (Jack Pine kimberlite 4.0ha) and other selected kimberlites of interest also require further investigation to better evaluate their diamondiferous potential.