Arctic Star Summary Report

by Charles Fipke
C.F. Mineral Research Ltd.

Three small core samples of kimberlite weighing 0.97, 0.81 and 1.22 kilograms were submitted by Arctic Star Exploration to C.F. Mineral Research Ltd. for extraction, microprobing and classifying of any contained diamond indicator minerals.

According to Arctic Star the three pieces originated from various parts of the Arbutus kimberlite in which 143.05 kilograms of kimberlite from two drill holes contained 61 diamonds.

A summary sheet of the diamond indicators recovered, microprobed and classified is given as Table 1. An asterisk "*" present in a column type/header [G10* pyropes, Di*G9/11 pyropes, Di$* clinopyroxenes (Cr diopsides), Di* chromites, G1* eclogitic garnets, and Di* olivines] means that the indicator minerals recovered match the compositions of indicator minerals included in diamond, intergrown with diamond or are from diamond bearing xenoliths. About 11,000 of such diamond inclusion indicators from world wide sources are present in the C.F. Mineral Research database. The type and numbers of kimberlite indicators in Table 1 suggest that all three samples may originate from differing kimberlite phases in the same kimberlite.

Sample DG-2022-08 weighing 970 gms contained only a single G10* pyrope and a single G1* eclogitic garnet. However the sample contained 92 Di* chromites and 36 Di* olivines. Moreover, the sample contained a Di$* clinopyroxene and five Di* G9/11 pyrope garnets that are sourced from Lherzolite which are known to contain

small quantities of very large diamonds. Such Lherzolite minerals are included in diamonds greater than 52 carats from the Ekati Diamond Mine, Canada and are present at the Premier Mine, South Africa, the Lacara Mine, South Africa and the Letzing Mine, Lesotho. The last mine is known to contain huge diamonds with no or rare small diamonds.

Sample DG-2022-09B, weighing 810 gms also only contained a single G10* pyrope garnet and no Di*G9/11 pyrope garnets but contained 68 Di* chromites, 41 Di* olivines and 67 G1* ecologitic garnets. Thus, this sample is dominated by G1* ecologitic garnets from a diamond bearing ecologite source but also contains 3 Di$* clinopyroxenes from a Lherzolite source described above.

Sample DG-2022-09A weighing 1220 gms contained 73 G10* pyropes, 110 Di* chromites, 44 Di* olivines, 32 G1* ecologitic garnets. In addition the sample contained two Di* G9/11 pyropes and a single Di$* clinopyroxene. Thus these indicator minerals were sourced from diamond bearing pyrope and chromite sources as well as a diamond bearing ecologite source as well as from a Lherzolite source of large diamonds.

C.F. Minerals have never previously encountered such a rich source of G10-10* and G10-9* composition pyropes along with significant diamond inclusion minerals from diamond bearing chromite, Group 1 ecologite and Lhzerolite sources of diamond. According to the late Dr. John Gurney, Head of the Department of Geochemistry, South Africa, G10-10* and G10-9* composition pyropes are associated with the highest of diamond grades. We would expect the kimberlite phase of

DG-2022-09A to be loaded with diamonds and additionally contain some very large diamonds.

Unfortunately only four picroilmenites were recovered from all three samples submitted. Picroilmenites do not actually form with diamond but form from the kimberlite magma itself. When 40 to 50 picroilmenites are present it is possible to predict whether or not the kimberlite magma may have oxidized diamonds thus destroying small diamonds but leaving large diamonds only partially oxidized. Of course diamonds encapsulated in xenoliths would be insulated against an oxidizing kimberlite magma thus be recovered unoxidized.

If more of the DG-2022-09A phase is present we would expect correspondingly high diamond grades. All three samples contain Lherzolite sources of diamond in which large diamonds are expected with or without small diamonds. Overall, the DG-2022-09A phase Di* indicator results are the best C.F. Minerals have ever encountered.