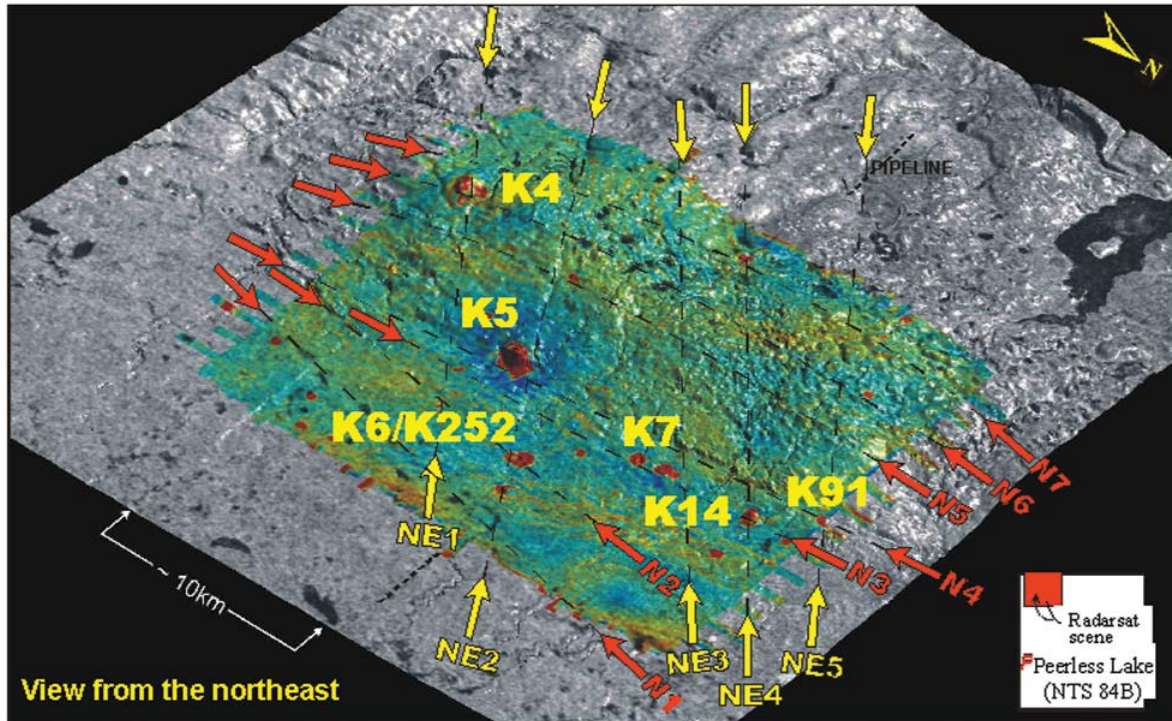


SIGNIFICANCE OF DIAMOND EXPLORATION

Most economic diamond pipes have 'values' of US\$0.5 billion to \$5 billion, but can be upwards of \$75 billion and attain mining lifespans ranging from 20 years to over 100 years. Discovery of an economic diamond deposit in Alberta would produce considerable wealth for the province in terms of jobs, royalties, mining investment and economic spin-offs for companies supplying the mining industry. For example, the Ekati, NT, mine will contribute about C\$5.1 billion to Canada's GDP and will create between 675 and 1000 jobs (*Venture*, May 1997).

Alberta, which has been mainly dependent on revenue from the oil and gas sector, has already experienced a dramatic increase in exploration expenditures from diamond seekers. Between 1995 and 2001, mineral exploration companies in Alberta spent a total of C\$76 million, of which about \$61 million, or 80% of the expenditures, was related to diamond exploration.



ALBERTA GEOLOGICAL SURVEY STUDIES

Current kimberlite-related studies at the AGS are focused on:

- kimberlite geochemistry and petrography;
- geochemical orientation surveys over exposed and buried kimberlite pipes;
- kimberlite-indicator mineral geochemical compilation, distribution patterns and summary maps; and
- structural-emplacement model for kimberlitic diatremes in northern Alberta.

The AGS is the custodian for publicly available Mineral Assessment Reports submitted by exploration companies and made available through AGS Information Sales (see contact numbers). As well, Alberta kimberlite core is available for viewing at the Mineral Core Research Facility (MCRF).

Integration of Radersat, aeromagnetic and digital elevation data to locate kimberlites (arrows indicate inferred faults). ↓

Contact Information

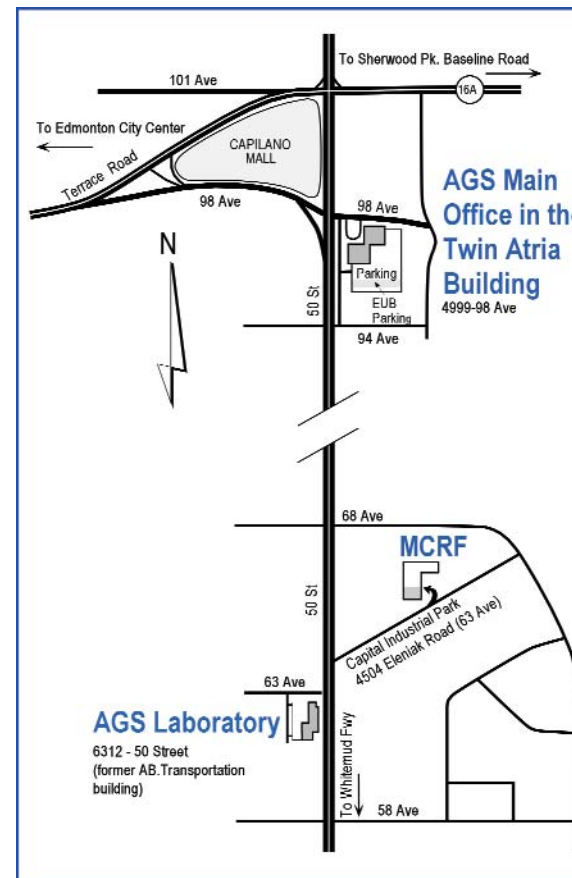
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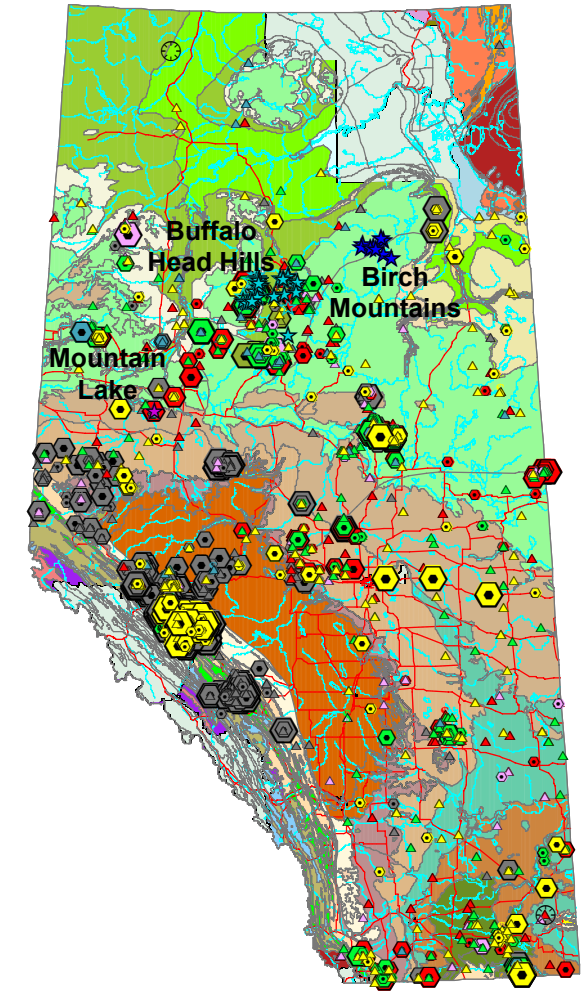


Alberta Energy and Utilities Board

Alberta Geological Survey



Diamond Potential of Alberta

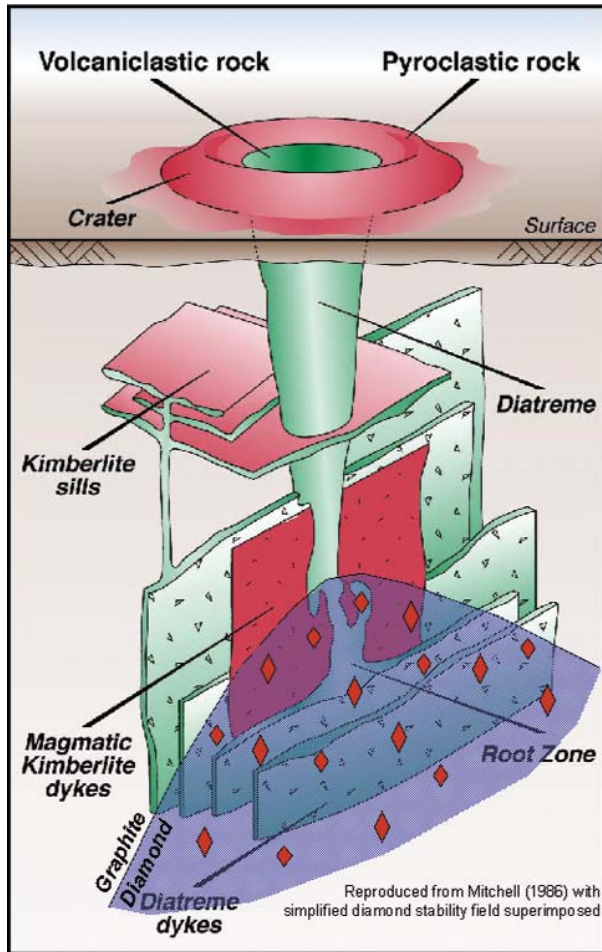


Alberta kimberlite and kimberlite-indicator mineral summary map.

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THE KIMBERLITE-DIAMOND CONNECTION

'Kimberlite' is a rock type first categorized over a hundred years ago based on descriptions of the diamond-bearing pipes of Kimberley, South Africa. Kimberlite is characterized as a hybrid, volatile-rich, potassic, ultrabasic igneous rock. Although volumetrically insignificant on a global scale, kimberlite commonly occurs in fields, or clusters, comprising up to 100 individual steep-sided intrusions.



Model of an idealized kimberlite magmatic system.

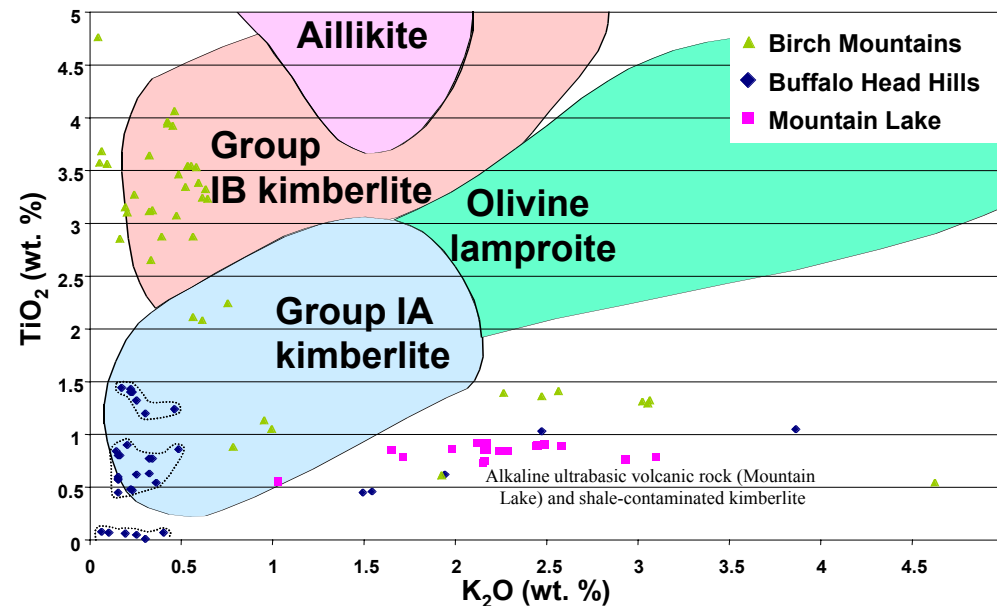
Kimberlites are only the mechanism by which diamonds are brought to the surface. Diamonds form much earlier than the kimberlite in the diamond stability field at depths of 110 to 150 km and temperatures of 900 to 1200°C. Because kimberlites

are derived from deep within the earth (>150 km below the surface), they are able to transport mantle material and possibly diamonds to the surface.



Buffalo Head Hills kimberlite K6 outcrop near Red Earth Creek, AB.

Kimberlitic rocks are the most important primary source of diamonds and the main rock type in which significant, economically viable diamond deposits capable of sustained profitable mining have been found so far. Economic concentrations of diamonds only occur in about 1% of known kimberlites worldwide.



The Buffalo Head Hills and Birch Mountains kimberlites have whole-rock chemical composition similar to Group I South African kimberlites.

ALBERTA'S KIMBERLITE POTENTIAL

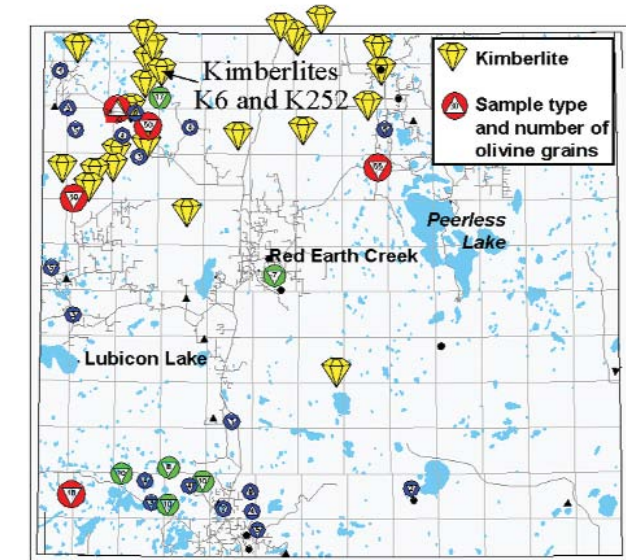
The geology of Alberta is favourable for discoveries of diamonds because:

- 1) most of Alberta constitutes a younger, flat-lying sedimentary platform underlain by an older (>2.0 billion years) craton;
- 2) Alberta contains tectonic features that may have provided pathways for kimberlite intrusion;
- 3) there is evidence of several ages of volcanic activity in Alberta, including late Cretaceous, which was the most prolific period for world-wide kimberlite volcanism; and
- 4) there are a large number of geological, geophysical and geochemical anomalies in Alberta that may have been or are related to emplacement of potentially diamondiferous kimberlites.

To the end of January 2002, 46 kimberlite pipes have been discovered in three separate areas of northern Alberta: Mountain Lake diatreme (north-western Alberta), Buffalo Head Hills kimberlites (north-central Alberta), and Birch Mountains kimberlites (northeastern Alberta).

ALBERTA'S DIAMOND POTENTIAL

The Buffalo Head Hills area has the best diamond content results to date. To the end of November 2001, Ashton Mining of Canada Inc., in a joint venture with Alberta Energy Company and Pure Gold Minerals Inc., has discovered 36 kimberlite pipes, of which 24 are diamondiferous and at least 6 contain estimated grades greater than 3 carats per hundred tonnes (cpht).



Kimberlite-indicator mineral distribution pattern in the Buffalo Head Hills area.

A 22.8 tonne mini-bulk sample from the Buffalo Head Hills kimberlite K252 returned a total of 12.54 carats of diamonds larger than 0.8 mm, for an estimated diamond content of 55.0 cpht. In addition, a 0.94 carat stone indicates K252 has the potential to host commercial-sized stones.

These pipes comprise mainly lapilli-bearing olivine volcanoclastic rocks, which are interpreted to be pyroclastic crater facies. Some of the Buffalo Head Hills kimberlites are quite large, up to 45 hectares in areal extent.