Location/Identification

MINFILE Number: 082JSE019

Name(s): **ICE**
CROSS, RAM, CROSSING CREEK, BONUS

Status: Prospect

Mining Division: Fort Steele
Electoral District: East Kootenay
Resource District: Rocky Mountain Forest District

Regions: British Columbia
BCGS Map: 082J006
NTS Map: 082J02W
Latitude: 50 05 31 N
Longitude: 114 58 09 W
Elevation: 2133 metres
Location Accuracy: Within 500M

UTM Zone: 11 (NAD 83)
Northing: 5550829
Easting: 645261

Comments: Ram 6.5 pipe, about 1750 metres east of the Cross kimberlite pipe, 8 kilometres north of the community of Elkford (George Cross News Letter No.225 (November 24), 1994).

Mineral Occurrence

Commodities: Diamond, Gemstones

Minerals
Significant: Diamond
Associated: Olivine, Phlogopite, Pyroxene, Garnet, Spinel
Alteration: Serpentine, Hematite, Talc, Calcite, Pyrite, Magnetite
Alteration Type: Serpentin'zn, Hematite
Mineralization Age: Lower Triassic

Isotopic Age: 240 and 244 Ma **Dating Method:** Rubidium/Strontium **Material Dated:** Mica separates

Deposit
Character: Pipe, Breccia, Disseminated
Classification: Diatreme, Industrial Min.
Type: N02: Kimberlite-hosted diamonds
Dimension: 500x200x0 metres
Comments: Plan dimensions of the Ram 5 pipe. Age date of the Cross kimberlite.

Host Rock

Dominant Host Rock: Plutonic

Stratigraphic Age	Group	Formation	Igneous/Metamorphic/Other
Pennsylvan.-Permian	Rocky Mountain	Unnamed/Unknown Formation	------

Isotopic Age	Dating Method	Material Dated
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Lithology: Diatreme Kimberlite, Carbonate Rock, Ultramafic Breccia

Geological Setting

Tectonic Belt: Foreland
Physiographic Area: Continental Ranges
Terrane: Ancestral North America

Inventory

No inventory data

Capsule Geology

The Ice prospect is located northwest of the town of Elkford on the west side of the Elk River Valley, directly opposite the Fording Resources Green Hills coal mine.
A series of ultramafic diatreme breccias occurs along a northwest trend line east of the Rocky Mountain Trench. All the diatremes intrude the sedimentary sequence along the western margin of the North American continent, prior to the Jura-Cretaceous Columbian Orogeny and have been deformed, weakly metamorphosed and transported eastwards during orogenesis (Fieldwork 1986).

The prospect is situated within the Rocky Mountain Alkaline Belt, which consists of a province of Rocky Mountain Foreland rocks intruded by Paleozoic alkalic intrusions. Numerous diatreme intrusions occur within the Rocky Mountain Alkaline Belt. The diatremes are clustered into two main groups. The Ice property is located within the Cranbrook-Bull River cluster to the south. Structurally, the property lies within the Rocky Mountain fold and thrust belt, a region of southwest dipping thrust faults and associated fold developed during the Late Mesozoic Columbian orogeny. The area is underlain by Devonian to Cretaceous sediments, including marine limestones, dolostones, calcareous silt and sandstone succeeded by nonmarine shales and siltstones after the Triassic period.

The Ice property currently hosts six diatreme breccias, including the Cross, Bonus and Ram pipes. The Cross kimberlite is located on the western edge of the property with the Bonus pipe immediately adjacent. The Ram 5, 6 and 6.5 pipes are located approximately 1700 metres directly east of the Cross pipe. In 2000, it was determined that the Ram 6 and 6.5 pipes were not two separate pipes, but were in fact one large boomerang-shaped pipe (Assessment Report 26343).The Cross kimberlite lies north of Crossing Creek approximately 10 kilometres northwest of the community of Elkford. It is intruded into Pennsylvanian and Permian Rocky Mountain Group carbonate rocks. The kimberlite outcrop is a steep bluff some 15 metres high and 50 to 60 metres long (circa 1986). Recent work indicates the body is approximately 300 by 30 metres in plan as defined by mapping and trenching (George Cross News Letter No.225, 1994). The kimberlite is lithologically heterogeneous and very friable. Inclusions comprise 15 to 20 per cent of the rock volume and consist of angular fragments of country rock, rounded, dark green serpentinized xenoliths and black pyroxenite xenoliths. The rounded xenoliths range in size from a few millimetres to 6 centimetres in diameter.

Xenoliths are almost entirely serpentinized pseudomorphs of olivine and pyroxene. Talc replaces pyroxene to a limited extent and also rims and veins serpentinized grains. Olivines are completely serpentinized. Interstitial spinels are also present in minor amounts. The xenoliths may therefore be broadly classified as spinel lherzolites (Fieldwork 1986). Macrocrysts (0.5 to 5.0 millimetres) consist of completely serpentinized olivines, partially altered garnets, garnets with kelyphitic rims and phlogopites. They may be round, oval or lath-shaped in random orientation and make up 10 to 20 per cent of the rock volume. Garnets show a moderate to high degree of alteration or dissolution in reaction with the matrix. X-ray spectra of clear and brown garnets show roughly similar compositions in the pyrope-almandine-grossular range with minor amounts of titanium and chromium (Fieldwork 1986). In 1994, analysis of a small bulk sample taken from the Cross kimberlite indicated G9 and G10 pyrope garnets (George Cross News Letter No.225, 1994).

The phenocryst population comprises completely serpentinized olivine, together with phlogopite and spinel. Phlogopite grains vary in size and are randomly oriented, square to rectangular in shape and relatively unaltered. Reddish brown translucent spinels are disseminated in the groundmass and show magnetite reaction rims. The fine-grained groundmass is composed of serpentine and calcite with minor disseminated talc, pyrite and magnetite. Calcite is also present as medium-grained, irregular-shaped masses suggesting late-stage crystallization. Secondary pyrite forms massive rims around calcite. Bright red hematite often forms envelopes around the pyrite and dendrites penetrating calcite aggregates.

Rubidium-strontium dating of mica separates from the Cross kimberlite has yielded ages of 240 and 244 million years (Fieldwork 1986).

The Bonus pipe is located on a southeast-striking ridge approximately 100 metres east of the Cross kimberlite. The intrusive is fine-grained porphyritic with biotite/phlogopitic phenocrysts up to 1 centimetre in size and contains an abundance of dark-coloured nodules, mafic xenoliths and country rock fragments. In outcrop, the rock displays moderately advanced but shallow, greenish-yellow weathering and dark greenish-grey fresh surfaces.

The Ram 6 diatreme was positively identified as kimberlite. The diatreme does not form competent rock in outcrop, appearing as a highly weathered to dark green, greasy unconsolidated mud, except where resistant clasts weather out of the breccia. The diatreme dips 62 degrees and is in sharp contact with the hostrock. From east to west, the pipe transitions from kimberlite to calcite-veined kimberlite to sheared and bleached kimberlite.

In 1957, the first intrusive breccias were identified during mapping in southeastern British Columbia. Cominco identified the intrusion, known as the Cross diatreme, as a kimberlite in 1976. Follow-up work identified numerous other diatremes, but only the original Cross diatreme was truly kimberlitic in nature. In 1988, petrographic analysis of material from the Cross diatreme verified that it was most similar to Group 1 kimberlites found in southern Africa.

In 1994, Consolidated Ramrod Gold Corporation undertook a stream and soil sampling program in an attempt to identify additional kimberlite

occurrences. The samples were analyzed by Dr. M.E. McCallum. Results of the analysis led to the discovery of four new kimberlite diatremes, including the Ram 5, Ram 6 and Ram 6.5. One macrodiamond was recovered during this phase of work, but samples were of mixed source and the diamond could not be attributed to a specific pipe. Ramrod Gold followed up in 1994 with a geophysical survey of the entire Elkford property. In 1996, Quest International Resources Corporation (formerly Consolidated Ramrod Gold Corporation) collected 90 tons of surface material from trenches on Ram 5, 6 and 6.5. The samples were shipped out for milling and testing in Colorado. Results indicated Ram 6.5 had the highest concentration of kimberlite indicator minerals.

In 1998, Skeena Resources Limited optioned the property. Exploration that year consisted of rock sampling over the Bonus, Ram 5 and Ram 6 pipes. Samples from Bonus and Ram 5 returned diamonds, but samples from Ram 6 were barren. The company followed up in 1999 with a stream sediment sampling program across the entire property. Results of the sampling program were used to define additional kimberlite targets. In 2001, Skeena commenced drilling on the Bonus, Ram 5 and Ram 6 pipes. Drilling on the Bonus site had to be abandoned due to water supply issues, so instead blasting and trenching was used to obtain a bulk sample weighing 3827 kilograms. Three diamond drill holes were drilled on the Ram 6 target and two on the Ram 5 target. Insufficient amounts of sample material from Ram 5 prevented further testing for diamonds.

No further work was completed until 2012, when Orange Minerals Corporation completed an airborne geophysical survey of the Elkford property in an attempt to locate new kimberlites and carbonatites similar to those already identified on the property.
The Ram 5 pipe has plan dimensions of 500 by 200 metres as defined by hand pitting. One 363-tonne sample was taken from near the centre of the pipe and yielded one diamond of near gem quality approximately 2 millimetres in size. A sample taken from near the west edge of the pipe did not indicate any diamonds greater than 0.25 millimetres in size. One clear, gem quality diamond fragment measuring 0.65 millimetres has been found in a sample from the Ram 6.5 pipe (George Cross News Letter No. 225, 1994).

In 1996, a bulk sample was taken from each of three kimberlite pipes (Ram 5, Ram 6 and Ram 6.5) and a sample was taken from a kimberlite dike in a road cut. A total of 86 tonnes of kimberlite material was shipped to Fort Collins, Colorado for diamond testing. Six diamonds were recovered, three from Ram 5 and three from Ram 6.5 (Assessment Report 26030). The three diamond fragments from Ram 5 were up to 0.185 carat in size and weighed a total of 0.25 carat (Northern Miner, December 23, 1996, Property File (MineMarket.com, 1999)).

Analysis of hand samples collected in 1998 yielded six microdiamonds totalling 0.001 carat from the 177.7 kilogram rock sample collected at Bonus, one microdiamond weighing less than 0.000 carat from an 89.23 kilogram sample from Ram 5 and no diamonds recovered from the 89.23 kilogram sample collected from Ram 6 (Assessment Report 26030). From the 2001 drilling and trenching program, no diamonds were recovered from the Bonus bulk sample and no macrodiamonds were recovered from the 218.9 kilograms of Ram 6 drillcore were sent for sampling (Assessment Report 26883).

Bibliography

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N MINER Dec. 23, 1996
PR REL Skeena Resources Ltd., Sept. 5, 2001
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EMPR PFD 901378, 3646, 3647, 907636, 908321, 882125, 882196, 884212, 884213, 884214, 884215

Date Coded:	1994/12/07	**Coded By:**	George Owsiacki (GO)	**Field Check:**	N
Date Revised:	2013/05/20	**Revised By:**	Nicole Barlow (NB)	**Field Check:**	N