

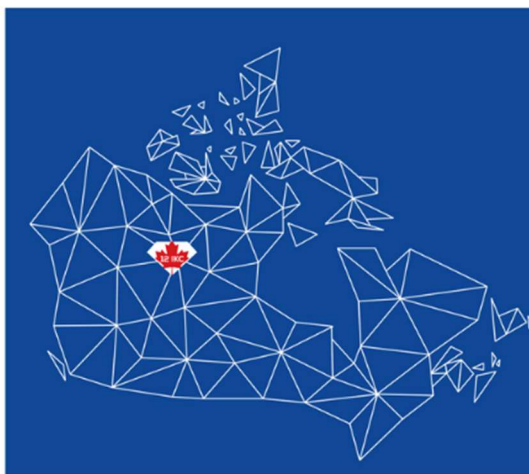
12th INTERNATIONAL KIMBERLITE CONFERENCE
YELLOWKNIFE, GNWT, CANADA
2024



12 IKC was held in July 2024 in Yellowknife's two main and adjacent hotels, Chateau Nova Hotel (Lecture Hall) and The Explorer Hotel (Poster Hall), which are within 5 minutes walking distance from each other. **Figure 12 IKC-1**



Yellowknife, the capital, largest community and the only city in the Northwest Territories is known as the Diamond Capital of North America being the most appropriate place to host 12 IKC as Canada has become the third largest producer of diamonds by value after Botswana and Russia. The Northwest Territories is where it started and there are now three operating mines. **Figure 12 IKC-2**



The name “Yellowknife” comes from the European view of the Dene during the early fur trade. Samuel Hearne called them “Copper Indians” since they led him to the Coppermine River in 1771. Alexander Mackenzie coined the term “Redknives” in 1789 because of the reddish hue of copper tools carried by the Dene of the area. Fur traders soon began using the name Yellowknife Indians, again a reference to Dene knives and other copper implements. Yellowknife River was written on European maps cementing the name for a community when gold was discovered there in the 1930’s. These are of course all imposed colonial names. The Dene of the area refer to themselves as the

Williideh Yellowknives Dene. They are descendents of the T’satsqot’ine (“copper people”) that Europeans met hundreds of years ago. Williideh is the Dene name for the Yellowknife River which translates as “toothless fish river” referring to the important inconnu fish. **Figure 12 IKC-3**

12 IKC-3



The bustling City of Yellowknife is also known as Somba K’e, meaning “the place of money”. The Yellowknives are one of the five main groups indigenous peoples of Canada who live in the Northwest Territories. The Yellowknives Dene First Nation is a band government representing the Yellowknives people residing in two main communities Ndilo and Dettah bordering the City of Yellowknife. They lived north and northeast of Great Slave Lake (Tinde’e) and used the major rivers of their traditional land as routes for travel and trade as far east as Hudson Bay, where early European explorers such as Samuel Hearne encountered them in the 1770’s.

The activities at the Conference and the main fieldtrip FT01 were photographed by the conference photographer and also participants and organisers of the FT01. Selection of the photos as well as very detailed information about the Conference can be found on its website <https://12ikc.ca/> with the access to photos and conference materials on the downloads page <https://12ikc.ca/downloads/>

12 IKC was also the first IKC conference with very active social media on the following channels.

<https://www.linkedin.com/in/12ikc-secretariat/>

<https://www.facebook.com/12IKC>

<https://www.instagram.com/ikcacconference/>

<https://x.com/IkcSecretariat>

The following pictures and descriptions provide a detailed summary of the 12 IKC showcasing its Technical Programme, Social Events, Field Trips FT01 and FT03 and lastly Accompanying Persons' Programme, as presented on social media. Most of the conference photos have been provided by Bill Braden, who was the official 12 IKC photographer with additional images provided by various delegates.

Figure 12 IKC-4 The Canadian diamond industry owes much of its success to partnerships with the local Indigenous peoples of the North. Over the past 30 years, this deeply interconnected history has greatly benefitted both individuals and businesses. To highlight this significant relationship, the 12th International Kimberlite Conference began its official programme with a workshop titled "An Indigenous Perspective on 30 Years of Diamonds in Canada", which was open to everyone, not just the delegates.

At the Icebreaker which followed, delegates and guests received a heartfelt Northern welcome delivered by representatives of the Akaitcho First Nation who performed a traditional Feeding of the Fire Ceremony followed by the Yellowknives Dene First Nation drummers. This ancient ritual used for healing, rites of passage, and marking key events, was a fitting way to start a week of scientific and cultural exchange at 12 IKC!



Figure 12 IKC-5 12 IKC was officially opened by the Honourable Premier R.J. Simpson (top left), premier of the Northwest Territories. During the rest of the week the Technical Programme, always the main focus of IKCs, featured over 50 oral presentations reflecting both current and future academic and industrial interests together with keynotes in each of the five Scientific Themes: (1) Diamonds (Oded Navon top right), (2) Emplacement and Economic Geology of Kimberlites and Related Magmas (Casey Hetman), (3) The Origin and Evolution of Kimberlites and Related Magmas (Max Schmidt bottom left), (4) Diamond Deposits – Exploration and Mining (Andy Davy and Malcolm Thurston) and (5) Cratonic Mantle – Petrology, Geochemistry and Geophysics (Sergei Lebedev bottom right).

All the long abstracts are available in the online Journal of International Kimberlite Conference Abstracts (JIKCA) at <https://ikcabstracts.com/index.php/ikc>. The 12 IKC Proceedings will be published as a Special Volume of the well-known, and highly respected international journal *Mineralogy and Petrology* published by Springer. The Volume is sponsored by Rio Tinto.

12 IKC was proud to continue the tradition of providing Financial Support Awards to young scientists from across the world made possible by the generous sponsorship of 11 IKC and Dr Malcolm McCallum. The awardees included more than 30 presenters from both academia and industry travelling from five different continents.



Figure 12 IKC-6 In addition to the Technical Programme, as part of the celebration of '30 Years of Diamonds in Canada', 12 IKC added some special, and very well received, opening and closing keynotes by renowned speakers from within the Canadian diamond and kimberlite community. Jon Carlson (top right) started the conference off with the opening special keynote presenting a historical perspective by outlining in detail "The Ekati and Diavik Discoveries – Canada's Entry to Global Diamond Production". Casey Hetman (top left) then summarised the "Advancements in Kimberlite Geology After 30 Years of Kimberlite Exploration, Evaluation and Mining in Canada". During this time Canada became the third largest producer of diamonds by value in the world.

On a different note, two special forward-looking keynotes concluded the Technical Session. Eira Thomas (bottom right) presented a “Review of Current Natural Diamond Market Supply and Demand Fundamentals together with an Examination of Recent Global Diamond Exploration and Development Investment Trends”. Eira’s talk was followed by John Armstrong (bottom left) providing a “Summary of Recent Diamond Exploration World-wide, Next Steps, Areas of New and Renewed Interest and the Role of Technology and ESG in Exploration and Mining”.



Figure 12 IKC-7 The 12 IKC Technical Programme, always the main focus of IKCs, in addition to oral presentations had a vibrant and equally important Poster Hall for the conference’s five Scientific Themes: (1) Diamonds, (2) Emplacement and Economic Geology of Kimberlites and Related Magmas, (3) The Origin and Evolution of Kimberlites and Related Magmas, (4) Diamond Deposits – Exploration and Mining and (5) Cratonic Mantle – Petrology, Geochemistry and Geophysics. Over 100 posters were on display for the entire week of the conference with three dedicated Poster Sessions. With authors at their posters as well as snacks and a bar there was a



great deal of lively discussion, networking and laughter. In the bottom left photo are Aven Thomas, Eira Thomas, Jon Carlson and Gren Thomas. Jon, Gren and Eira were all involved with the initial diamond discoveries in the NWT. Gren and Eira along with Lawson Lundell LLP and Mountain Province Diamonds each kindly sponsored one of the three poster sessions bars.

Figure 12 IKC-8 Over 150 long abstracts selected for the traditional 12 IKC Oral and Poster Presentations are now published and available in the online Journal of International Kimberlite Conference Abstracts (JIKCA) at <https://ikcabstracts.com/index.php/ikc>.

First are the presentation slides from the 12 IKC Special Seminar talks that addressed two emergent topics: (i) Kimberlitic Olivine: tracking mantle cargo and kimberlite melt evolution (by Geoff Howarth, Frederico Cassetta, Adam Albersteiner) and (ii) Large Irregular Type II Diamonds: genesis and transport to surface (by Evan Smith, Suzette Timmerman, Ingrid Chinn).

Secondly, an abstract titled “Celebrating the lives and contributions of colleagues, geologists, mineralogists

and legends who shaped the diamond industry” by John Bristow et al., is included as part of 12 IKC’s celebration of 50 Years of International Kimberlite Conferences. To further acknowledge those who have passed away since 11 IKC, a special “Wall of Remembrance” poster was displayed and re-designed as a cover of the printed copies of this abstract available during the conference.

Lastly, the above is followed by the long abstracts for each of the keynote presentations, including the special Opening Keynote by Jon Carlson, which was part of celebrating *30 Years of Diamonds in Canada*, as well as the keynotes for each of the five scientific themes (presented by Casey Hetman, Sergei Lebedev, Suzette Timmerman, Andy Davy and Malcom Thurston, and Max Schmidt). These are followed by the long abstracts for all oral and poster presentations.

This new Journal, JIKCA, is a complete record of the long abstracts for *all* the oral and poster presentations from *all* the 50 Years of International Kimberlite Conferences. Not all of these presentations have associated publications in the IKC Proceedings Volumes



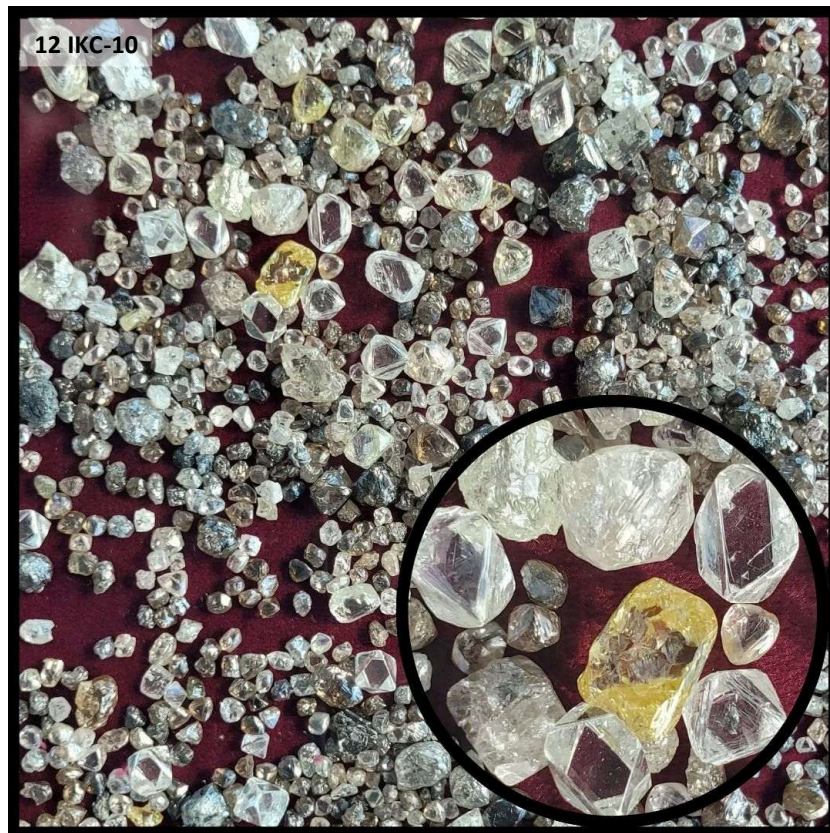
Figure 12 IKC-9 The 12 IKC Sponsor Booths shown here, were an important part of '30 Years of Diamonds in Canada'. Burgundy Diamond Mines (top right) were a big attraction with an amazing display of rough diamond production together with a few rock samples from the Ekati Mine, the first diamond mine to open in Canada in 1998. Enthusiastically looking at the display are Gren Thomas and Jon Carlson (left to right). Jon Carlson was part of the discovery of Ekati and continued to be an important part of the



mine ultimately in the role as Head of Exploration and Project Development. Gren Thomas was a driving force in the discovery of the next diamond mine to open in 2003, the Diavik Diamond Mine. Three dimensional models of different kimberlite pipes within the Diavik Diamond Mine, including both open pit and underground workings, were displayed at the Rio Tinto booth (bottom right).

The De Beers Group booth (top left) displayed geological models and typical rock samples from the Gahcho Kué Mine which opened in 2016 (a joint venture with Mountain Province Diamonds Inc.) with Pam Ellemers (left De Beers) and Prof Maya Kopylova (UBC). The rock samples include distinctive Kimberley-type Pyroclastic Kimberlite named after the type-area in South Africa which are notably different to the kimberlites at Ekati and Diavik in the Lac de Gras area. The Saskatchewan Research Council (bottom left) is the leading analytical facility in Canada servicing the diamond exploration and mining industry. The display included microdiamonds, heavy mineral concentrates prepared from kimberlite and/or exploration samples as well as an array of individual kimberlite indicator minerals. Here Mike McCubbing (SRC) is discussing the display with Dave Newton (Seequent) and Evan Smith (GIA) at the microscope, a real opportunity for delegates to observe and learn.

Figure 12 IKC-10 At the 12 IKC Ekati Diamond Mine booth, a distinctive sampling of rough diamonds recovered from typical ‘run of mine’ blend from Sable and Misery kimberlite production was on display for attendees to examine, along with several ‘specials’ (stones greater than 10.8 carats). The Misery kimberlite is renowned for producing highly sought after yellow diamonds, including the 71.26-carat fancy-vivid yellow recovered in 2022, appropriately named ‘Ekati Saatio’ (pronounced: Eh-k’ah-tee suh-clo and meaning ‘Ekati Sundance’).



As you can see from the photo, Ekati diamonds come in a wide range of shapes and colours. Diamond shapes evident in Ekati production include octahedra, macles (octahedral twins), tetrahexahedra (resorbed octahedra), cubes, and irregular forms. Growth features such as trigons (triangular plates), stepped faces and corrosive features, such as etching, can add to the uniqueness of each diamond. Colours range from top white (colourless) to off-white, brown, yellow, black, and coated (black or grey fibrous diamond growth on older typically colourless diamonds). Yellow colouration in diamonds is due to nitrogen atoms incorporated into the crystal lattice during diamond formation and growth. Sable pipe production is characterized by relatively abundant colourless, sharp-edged octahedral diamonds whereas Misery production is typified by tetrahexahedral diamonds (commonly brown).

A small percentage of Ekati stones are classified as boart and are not gem quality. These stones are known as industrial diamonds and are typically used as an abrasive or for drilling, cutting, and grinding purposes.

In 2023, Ekati produced over five million carats and recently celebrated a major milestone. From its opening in 1998 through late 2024, Ekati produced 100 million carats confirming its place as a significant global diamond producer.

Figure 12 IKC-11 The 12 IKC Icebreaker evening, called ‘Diamonds and Ice’, immediately followed the Indigenous Programme and continued the conference celebration of “30 Years of Diamonds in Canada!” where it all began, in Yellowknife, northern Canada. On a summer evening by Frame Lake, delegates and guests were welcomed by the Akaitcho First Nation, who performed a traditional Feeding of the Fire Ceremony (top left), followed by Yellowknives Dene First Nation drummers. Everyone had a chance to taste an Aurora Borealis or Northern Lights-themed drink (top right) while saying hello to others. Unexpected rain didn’t dampen spirits, and the atmosphere remained festive. After the official welcome, we moved to a northern winter wonderland inside a marquee (bottom left, second right). It was snowing as we arrived (bottom right) and then we were encouraged to “break the ice”, enjoy delicious northern cuisine including Great Slave whitefish, bison meatballs as well as smoked Arctic Char (bottom left) and try a special 12 IKC Diamond Lager by the NWT Brewing Co. (third right). This was just the start to a great conference and key to nearly all aspects were the wonderful duo of Kat Duda, the 12 IKC Professional Conference Coordinator of The Conference Runner, and Cynthia Moyo of Dash Event Designs and Rentals (right and left in bottom right). They made it special.

The evening was a true icebreaker! All Canada’s diamond mines are located in the vast, often remote, barren lands of subarctic Canada. Innumerable lakes and streams freeze during the long winters which allowed access to discover, and later build and operate diamond mines. Diamonds are also called “ice” because they are both clear colourless ice-like crystals and feel ice-cold to the touch. The Icebreaker was kindly sponsored by Burgundy Diamonds.



Figure 12 IKC-12 Although the annual Yellowknife Beer Barge re-enactment tradition took place two weeks prior to the conference, we created a similar experience for the 12 IKC delegates. The Beer Barge was once a proud tradition in the city's early water faring days. Until 1960, when the highway connecting Yellowknife to the rest of Canada was completed, summer transportation to the city was only by barge on Great Slave Lake. In the true northern winters, the lake is frozen for six months and with spring breakup the arrival of the much anticipated first barge of the season was a big deal! Most importantly, beer was always the priority for thirsty gold miners who, by this time, had run out of their winter supply.

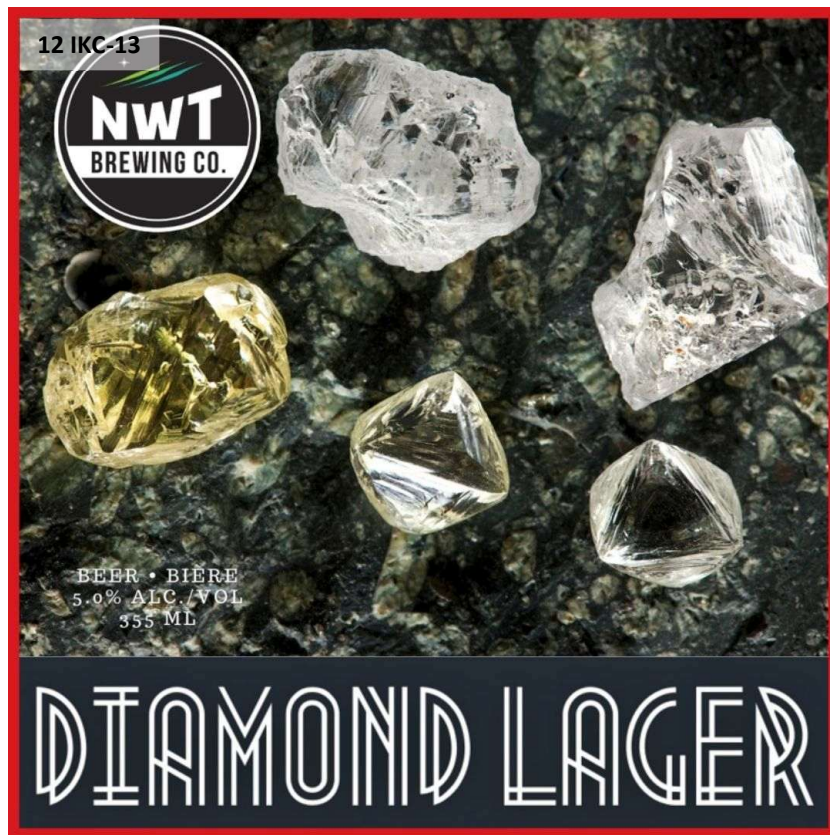
This beer garden-style evening was held at the newly opened Yellowknife Historical Museum on the shore of Great Slave Lake (top right). Forty lucky delegates had the unique opportunity to arrive from Yellowknife on a historic barge, where they were greeted at the dock by the Northwest Territories Pipe Band (top left). Hats and costumes were provided for those who wanted to dress up to add to the historical theme. After the pipe band finished playing, one of Yellowknife's favourite party bands, The Stray Dogs, took over, with



party-goers led by the two Colleens dancing (bottom left) until the last buses departed the venue. Dinner was another Yellowknife tradition, a Fish Fry, with freshly caught Great Slave whitefish served with other local fare (bottom right). The Beer Barge was kindly sponsored by Dr Stewart and Marilyn Blusson.

Figure 12 IKC-13 Our inspired Yellowknife-based caterer Jen Vornbrock of ‘Stake Catering’ worked with the NWT Brewing Co. to create a special 12 IKC beer label for all the 12 IKC Social Events as part of the celebration of ‘30 Years of Diamonds in Canada’.

The Canadian Diamond Rush was triggered by the announcement by BHP and Dia Met Minerals to the Vancouver Stock Exchange in November 1991, that diamonds had



been recovered from the Point Lake kimberlite, NWT now within the Ekati Mine. During the subsequent years, hundreds of kimberlites were discovered leading to the opening of seven mines and Canada became one of the top three diamond producers in the world (by value).

One of these mines resulted from earlier significant discoveries in 1988-1989 at Attawapiskat, Ontario and at the same time additional kimberlites were found at Fort à la Corne, Saskatchewan, which still ranks as one of Canada’s most advanced diamond projects. It is therefore very appropriate that the beer label celebrating ‘30 Years of Diamonds in Canada’ displays some special diamonds from one of the first major discoveries.

These diamonds are some of the high value stones recovered from the Star and Orion South kimberlites of the Fort à la Corne Province and are displayed on a piece of the Star kimberlite. This Kimberlite Province is now a type-area for a then newly recognised textural variety of kimberlite, now termed Fort à la Corne-type Pyroclastic Kimberlite (FPK). The details of the diamonds are (clockwise from the top centre):

- Star - 11.96 carat Type IIa; Price US\$13,787/carat; Value US\$164,826
- Orion South - 15.88 carat Type IIa; Price US\$6,40/carat; Value US\$95,901
- Star - 4.77 carat internally flawless octahedron; Price US\$4,685/carat; Value US\$22,362
- Star - 5.39 carat internally flawless octahedron; Price US\$2,728/carat; Value US\$14,721
- Orion South - 10.53 carat fancy yellow; Price US\$8,300/carat; Value US\$87,348

Figure 12 IKC-14 Time flies when you're having fun! Before we knew it, the last day of the conference was upon us, bringing Friday's Farewell Dinner: a "Bush Flying Bash", appropriately held at the Acasta Helicopter Hangar at the Yellowknife Airport to conclude our celebrations of '30 Years of Diamonds in Canada'. This venue was an acknowledgement to the crucial role of bush flying in diamond exploration, especially under the challenging conditions of the Canadian North. The 12 IKC Mascot Tindi, a



twin otter, adorned the rafters, tables and even the dessert cookies (top right), while a real twin otter and other aircraft were on display outside on the airport apron including "The Snowbirds", the military aerobatics flight demonstration team of the Royal Canadian Air Force.

The evening began with a welcome drink and hors d'oeuvres on the tarmac apron (top left). Inside the hangar the décor mimicked a prospecting bush camp in the Canadian Tundra with a grizzly, black bear, bobcat and wolf (stuffed!) lurking from the sidelines. The talented Master of Ceremonies Jeff Harris presided (bottom right) introducing inspiring speeches and award presentations. In front of him on the edge of the dance floor was a large piece of the ~4 billion year old Acasta Gneiss, the oldest dated rock in the world, from ~400km north of Yellowknife on the Slave Craton. Keeping with tradition, the Mantle Nodules song was performed by the six veterans who have been to all twelve IKCs (centre right). Specially designed cookies (top right) concluded the celebrations of '30 Years of Diamonds in Canada' as well as '50 Years of International Kimberlite Conferences'. To end the evening, live music from Yellowknife's famous band Priscilla's Revenge kept the dance floor full (band member Norm bottom left), until the last buses departed for the hotels. However, on the way to the hotels, the buses also stopped at the legendary Gold Range Bar for those who did not want the party to end and there they continued until the wee hours.

The Farewell Dinner was kindly sponsored by the De Beers Group, now a long-time tradition of IKCs. The venue was enthusiastically provided by Acasta Heliflight which is one of the companies providing specialised services to the diamond industry in the Canadian North throughout the '30 Years of Diamonds in Canada'.

Figure 12 IKC-15 At the Farewell Dinner on Friday 12 July 2024, Roger Mitchell announced, on behalf of the Technical Programme Co-Chairs Graham Pearson and Thomas Stachel, that the 12IKC Proceedings Volumes will be dedicated to the following four eminent geoscientists, who have all spent their careers improving our understanding of kimberlites, diamonds and mantle composition and evolution: Oded Navon (top left; Hebrew University of Jerusalem, Israel), Herb Helmstaedt

12 IKC-15



(top right; Queen's University, Kingston, Canada), Steve Richardson (bottom left; University of Cape Town, South Africa) and Volker Lorenz (bottom right; University of Würzburg, Germany). The timing of this award was particularly significant for Steve Richardson, as this dedication was made one week shy of forty years since the publication of the landmark paper: Origin of Diamonds in Old Enriched Mantle by S.H. Richardson, J.J. Gurney, A.J. Erlank and J.W. Harris in Nature v310 p198-202 19 July 1984. This was the first paper to unequivocally confirm that ancient (3.2-3.3 Ga) diamonds are xenocrysts in significantly younger kimberlite host rocks. Each recipient was presented with a gift of four wine glasses engraved in Yellowknife with the 12 IKC mascot, Tindi, as well as an Arctic animal such as a polar bear or caribou, a wonderful memento of this occasion.

The 12 IKC Proceedings will be published as Special Volumes of the well-known, and highly respected international journal Mineralogy and Petrology published by Springer. The Volume is sponsored by Rio Tinto.

Figure 12 IKC-16 acknowledges the **Thirty Years of Diamonds in Canada**. Diamond-bearing kimberlites had been discovered in Ontario (Attawapiskat) and Saskatchewan (Fort à la Corne) in the late 1980's. However, the drilling of the Point Lake kimberlite, Lac de Gras in late 1991, and the recovery of diamonds from the drill core, precipitated an historical claim staking rush on the Slave Craton of the NWT and Nunavut. Diamond exploration on these claims ultimately resulted in the opening of



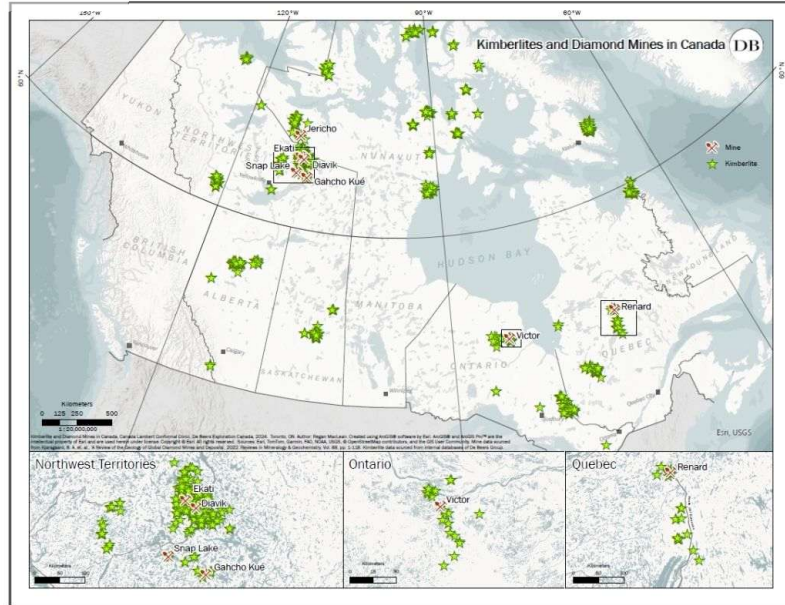
the following mines: Ekati (1998-Present), Diavik (2003-Present), Snap Lake (2008-2015) and Gahcho Kué (2016-Present) in the NWT and Jericho (2006-2008, 2012) in Nunavut. These diamond mines made Canada a major world diamond producer, the third largest by value after Botswana and Russia. From 1998 to 2023, the four mines (Ekati, Diavik, Snap and Gahcho Kué) have collectively produced 291 million carats generating revenue of ~\$40 billion.

Victor was one of the Attawapiskat kimberlites discovered and sampled by De Beers in the late 1980's but initial microdiamond and indicator mineral chemistry results did not suggest a significantly economic deposit. However, the early recovery of rare high value diamonds led to additional evaluation drilling in 1998 and 1999 and bulk sampling in 2000 and 2001 which confirmed their presence. The Victor diamond mine commenced production in 2008 and by 2019 had produced 8.5 million carats, with average annual diamond prices between \$420 and \$650 per carat, resulting in total mine revenue of \$4.5 billion. The Renard kimberlite cluster was discovered in Quebec in 2001 and the Renard diamond mine opened in 2016 and by 2023 had yielded 12 million carats, generating revenue of \$1.2 billion before ceasing production in October 2023.

Since the Fort à la Corne kimberlites were discovered in the late 1980's, extensive exploration and evaluation were undertaken. These Cretaceous kimberlites have unusual morphology resulting in huge potential ore volumes. Two of these kimberlites have moderate diamond grades but unique diamond populations with coarse size frequency distributions, high proportions of Type IIa diamonds and a high average diamond price (>\$200 per carat). The Fort à la Corne kimberlites remain undeveloped and potentially represent the future of Canadian natural diamond production. All dollar amounts in US\$.

Figure 12 IKC-17 In addition to displaying geological models and kimberlite rock samples from the Gahcho Kué Mine, NWT, at their booth, the De Beers Group distributed copies of this map prepared specially as a contribution to 12 IKC's celebration of '30 Years of Diamonds in Canada'. The map shows the location of all currently known kimberlite bodies as well as the diamond mines. Before ~ 1985 only about 50 kimberlites were known. Since then, the rate of discovery has been incredible. The total number of kimberlites now

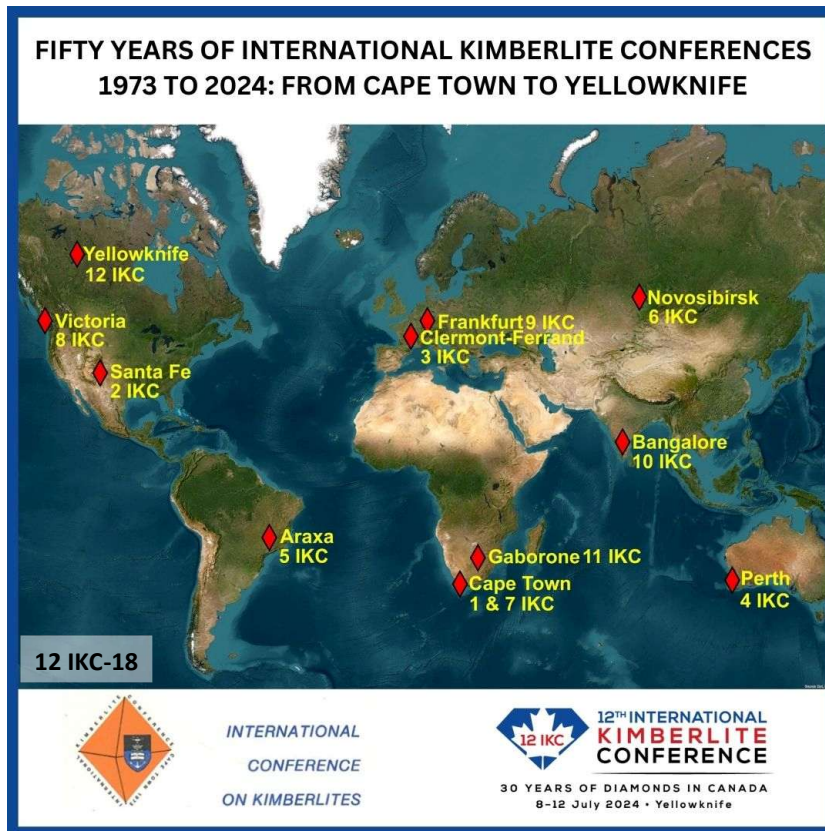
12 IKC-17



Kimberlite Discoveries across Canada after 30 Years of Diamond Exploration

known and shown on this map is 1077 (De Beers Group, pers. comm.). Most of the kimberlites were found during the largest staking rush in Canadian history which started in 1991 triggered by the announcement that diamonds had been recovered at Point Lake, Lac de Gras in the NWT resulting in the opening of the first diamond mine in Canada in 1998, the Ekati Diamond Mine. Subsequently, hundreds of kimberlites were discovered leading to the opening of seven mines and Canada becoming one of the top three diamond producers in the world (by value). One of these mines, the Victor Mine, resulted from earlier significant discoveries in 1988-1989 at Attawapiskat, Ontario. At the same time additional kimberlites were found at Fort à la Corne in Saskatchewan, which still ranks as one of Canada's most advanced diamond projects. Three mines are still operating: Ekati, Diavik and Gahcho Kué which are all located in the NWT and were visited on the 12 IKC Field Trip 01. The special opening keynote presentation by Jon Carlson outlined "The Ekati and Diavik Discoveries – Canada's Entry to Global Diamond Production" *Image and Data Credit: De Beers Group*

Figure 12 IKC-18 The idea of an International Kimberlite Conference was first proposed at a fortuitous meeting of Joe Boyd, Henry Meyer, Ian MacGregor, Tony Erlank and John Gurney, who all happened to attend the Lunar Science Meeting in Houston in early 1970, to discuss the Lunar geology and early Apollo 11 analytical results. The initial idea proposed was to hold a conference in southern Africa to assemble international academic and industry delegates interested in kimberlites, diamonds and



mantle rocks. The location was chosen due to its century of diamond mining history that created access to kimberlites, diamonds and mantle xenoliths for research. John Gurney was responsible for approaching De Beers in South Africa (Barry Hawthorne) and the United Nations mission in Lesotho (Peter Nixon), for participation in the conference and facilitating field trips to active mines and kimberlites. The positive confirmations from Hawthorne and Nixon ensured that the conference became a reality and a success.

Fifty years later, the IKCs have been held at 11 different locations worldwide since the first conference (1 IKC) in Cape Town, South Africa in 1973. Its continued success has meant an IKC has been held more or less every four years arriving in Yellowknife, Northwest Territories in 2024. The 13 IKC is to be held in Brazil in 2028. The IKC has provided the perfect venue for academia and industry to share and discuss new discoveries, developments in exploration techniques, and ideas that use kimberlites and diamonds as windows on the mantle, with an emphasis on the evolution of the lithosphere and asthenosphere in Earth history. The IKC has always promoted post-graduate students to participate with oral presentations, posters and peer-reviewed papers published as conference proceedings. The enthusiastic participation of students ensures the perpetuation of the IKC into the future.

Visit <https://12ikc.ca/downloads/> page to view the [50 Years of International Kimberlite Conferences by George Read and Jeff Harris – A Presentation from the Farewell Dinner](#).

11 IKC introduced a conference mascot which was so popular that we thought 12 IKC must have one too and we created Tindi [the 12 IKC mascot](#). **Figure 12 IKC-19**

Tindi is a twin otter, an aircraft able to service remote areas without road access, an essential necessity in the Canadian North. Tindi is depicted during a Sub-Arctic midnight sunset with inukshuk-like reflections on the lake below and black spruce trees on the land.

Twin otters are a specific type of bush plane developed and made in Canada which first flew on 20 May 1965 and are still in production. They are versatile passenger and/or cargo twin-engined planes that are a stalwart for accessing the very remote Canadian Arctic and Sub-Arctic. They are capable of landing on short natural ground strips using tundra tires in the summer, a significant requirement to access very remote areas. In the winter, the twin otter can land on frozen lakes using wheel skis and/or skis, and in the summer using float-equipped aircraft.

Tindi means “big lake” in one of the local First Nations languages Tłı̨chʼo Yatı̨ (or Tli Cho) and refers to Great Slave Lake (469 km long), which is the second-largest lake in the Northwest Territories and the tenth-largest lake in the world (by area). Bush planes first landed in the north in 1929 starting a new charter air industry, and twin otters became the backbone of the mining cycle.

12 IKC-19



Figure 12 IKC-20 The city of Yellowknife in the Northwest Territories - the Diamond Capital of North America was very appropriate location to celebrate **'30 Years of Diamonds in Canada'** and to acknowledge the key role of bush flying in the exploration for diamonds. The first use of bush planes dates back over 100 years ago and transformed Canada's North. The 12 IKC mascot, a twin otter named 'Tindi', was part of this celebration and proudly displayed on the conference t-shirt with a midnight sunset creating inukshuk-like reflections on a lake below surrounded by black spruce trees (left; Luísa de Carvalho, U of Alberta). Tindi means 'big lake' in Tłıchʼo Yatıı, or Tli Cho, a local First Nation language, and refers to Great Slave Lake. This lake is the 10th largest lake in the world with the city of Yellowknife situated on its northern shore.

'Tindi' is a De Havilland Twin Otter (DHC-6) plane that was developed in Canada in the mid-1960's and is still in production today. The twin otter was critical during the Canadian Diamond Rush with its ability to operate in the North's adverse conditions, in particular, landing using wheels or skis on the innumerable frozen lakes during the long winters (top right; Air Tindi twin otter, Kennady North adjacent to Gahcho Kué Mine, 2015). In summer, tundra tires are used to land on eskers or floats to land on lakes.

Water/ice-based aircraft like 'Tindi' were used to bring equipment, supplies and personnel into these remote areas, allowing the extensive use of helicopters, essential for till sampling, geophysical surveying, and drill moves (bottom right; Acasta helicopter working with an Air Tindi twin otter).

Acasta Heliflight, a helicopter company well known to the diamond industry, kindly provided their hangar as the venue for the 12 IKC Farewell Dinner – 'A Bush Flying Bash'. During the dinner, Gary Vivian (Aurora Geosciences) gave a presentation on '30 Years of Diamonds in Canada – The Importance of Aviation'.

Visit <https://12ikc.ca/downloads/> page to view the [30 Years of Diamonds in Canada – The Importance of Aviation by Gary Vivian, Aurora Geosciences – A Presentation from the Farewell Dinner](#)



Figure 12 IKC-21 International Kimberlite Conferences, the most important venue for the advancement of our understanding of kimberlites, upper mantle petrology and diamond genesis, are characterised by the unique symbiosis of industry and academia. A key to their success is generous corporate sponsorship. 12 IKC was no exception, and we sincerely thank all our sponsors for their contribution to making the conference such a resounding success as we celebrated '30 Years of Diamonds in Canada' in the diamond capital of North America, Yellowknife. Here we acknowledge our major sponsors: Cullinan, Diamond, Gold and Silver, as well as the numerous other sponsors and In-Kind sponsors who contributed so significantly to enhancing many aspects of the conference. We are particularly proud of continuing the IKC tradition of providing financial support to students and young scientists, with 38 individuals from five continents and 11 countries sponsored to attend 12 IKC.

12 IKC-21



*Dr. Chris Jennings
and
Jeanne Jennings*



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Figure 12 IKC-22

IKCs are known for offering diverse field trips including non-standard ones not possible to undertake on an independent basis. Kicking off the 12 IKC was the main field trip FT01 – Northwest Territories Diamond Mines, which was a truly unique and unforgettable experience for the participants. FT01 offered a rare opportunity to visit the scenic and remote Canadian tundra of the Slave Geological Province and all three of Canada's operating diamond mines, each for a full day: Ekati - Canada's

12 IKC-22



 **12TH INTERNATIONAL
KIMBERLITE
CONFERENCE**
30 YEARS OF DIAMONDS IN CANADA
Field Trip 01

first diamond mine, Diavik and Gahcho Kué. The fourth day was spent at the Kennady North Project core facility. Field trip leaders were Chris Hrkac of Aurora Geosciences and Barrett Elliott of the Northwest Territories Geological Survey. The field trip was based in Yellowknife with the group (top photo) being transported to and from the mines each day in an Air Tindi De Havilland Dash 7 (bottom right; Gahcho Kué Mine airstrip) and one evening was treated to the northern flair supper at an outdoor patio at the legendary Wild Cat Café in the Old Town.

Each day had its own unique flair and focus. The mine tours included up-close views of the kimberlites as well as the operation, and the opportunity to talk with the year-round mine personnel, like Senior Advisor Alex Clinton, tour guide at Diavik (far right, red helmet in top photo) who gave a one-of-a-kind commentary. The day at the core facility in Yellowknife gave a unique hands-on view of drill core focussing on Kimberley-type pyroclastic kimberlite (KPK) from the Kennady North Project, the adjacent Gahcho Kué Mine, and the Renard Diamond Mine in Quebec. Each of the mines (Diavik, Gahcho Kue and Ekati) are thanked for their permission and support for the mine visits. This field trip would not have been possible without the much-appreciated sponsorship towards the air charters by each of the mines as well as Air Tindi (bottom right photo).

Figure 12 IKC-23

The first day of the FT01 to the Northwest Territories Diamond Mines was a visit to the Diavik Mine, Canada's second diamond mine. Following a short, early morning flight from Yellowknife and a bus ride to the main camp, participants put on the required Personal Protective Equipment (PPE) and were welcomed with an introductory talk by Matt Breen, Chief Operating Officer. The bus tour of the mine site took the group around each of the dyke walls that isolate

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the mined kimberlite pipes A154, A418 (top left photo) and A21 from the lake water of the 60km long Lac de Gras. Other stops included the A21 lookout bunker for a great photo opportunity of the open pit as well as visits to the wind farm, solar farm and the reclaimed north country rock pile (NCRP). The reclamation that occurred on the NCRP took approximately 70,000 hours of CAT operation travelling a distance equivalent of making six trips around the globe.

The afternoon started with a tour of the processing plant (top right photo) followed by an extensive core shack display where the group could examine drillcore (bottom photo) from each of the mined kimberlite pipes. These Fort à la Corne-type pyroclastic kimberlite (FPK) pipes display a wide array of textures well represented in the drillcores: from primary mainly airfall deposits composed of melting-bearing pyroclasts and olivine pyrocrysts to resedimented FPK containing very variable amounts of material derived from the uppermost poorly consolidated country rocks shales. Hypabyssal kimberlite occurs as minor intrusions including dykes. One afternoon was not enough time for a group of geologists to examine so many metres of kimberlite drill core!

Diavik Diamond Mines and its owners - Rio Tinto, are thanked for their permission and support for the mine visit as well as the sponsorship towards the FT01 air charters. Special thanks to Matthew Breen and Kari Pollock for organising such a great visit.

Figure 12 IKC-24

On the second day of field trip FT01 to the Northwest Territories Diamond Mines, after a scenic flight over the tundra and its innumerable lakes, participants visited the Gahcho Kué Mine (top photo) – Canada’s youngest diamond mine jointly owned by De Beers Canada and Mountain Province Diamonds Inc.. A welcome by the Mine Manager Kevin Gostlin included an informative presentation (bottom



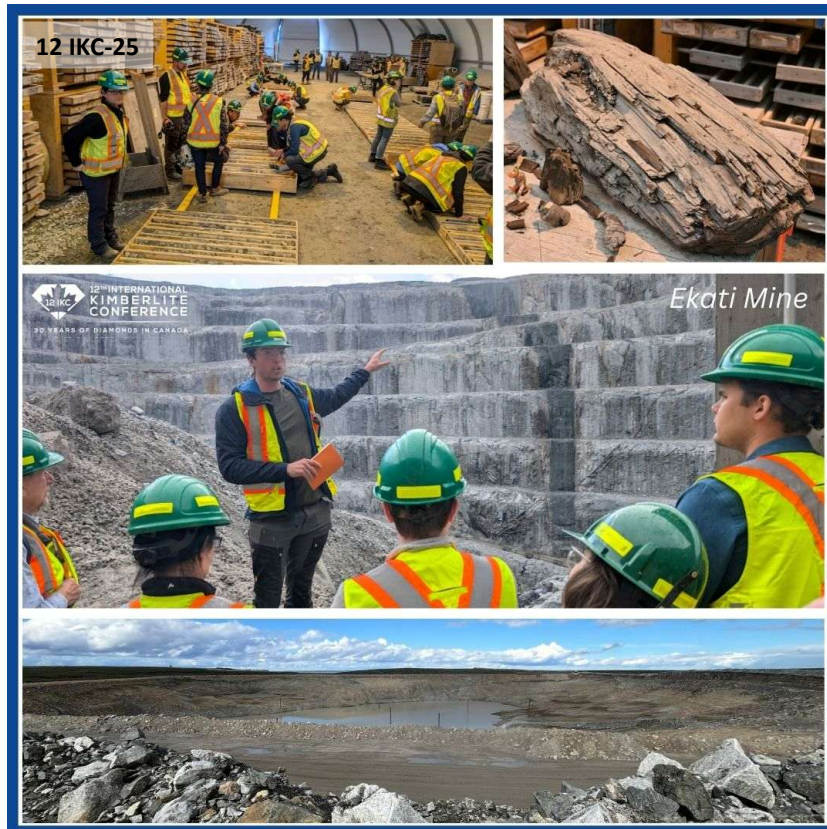
left photo) illustrated with printed 3D models of the different pipes within the mine as well as a remarkable display of the latest run-of-mine diamonds and some carefully selected drillcore. The five rows of core (bottom right photo) are representative of the range of textures characteristic of the pipes within this mine, which range from hypabyssal kimberlite (HK; bottom row) to Kimberley-type pyroclastic kimberlite (KPK formerly tuffisitic kimberlite or TK; top row) with intermediate gradational textures occurring in between. KPK textures contrast with the other two mines visited on this field trip, which are Fort à la Corne-type pyroclastic kimberlites.

The tour of the mine included the 5034 and Hearne Pit (centre left photo) as well as the gymnasium, fitness room and Emergency Response Centre. Rounding off the day was a visit to the truck shop with each participant having the opportunity to climb and sit in large haul trucks (centre right photo) proving that, no matter the age, everyone still has a desire to drive the big trucks. Participants were shown a video shot at Gahcho Kué, featuring actress [Lily James](#), produced by the Natural Diamond Council showcasing responsible mining activities.

Gahcho Kué Mine, De Beers Canada Inc. and Mountain Province Diamonds Inc. are thanked for their permission and support for the mine visit as well as the sponsorship towards the FT01 air charters. Special thanks to Kevin Gostlin for organising such a great visit.

Figure 12 IKC-25

On the third day of field trip FT01 to the Northwest Territories Diamond Mines participants visited the Ekati Mine, the first diamond mine to open in Canada and presently owned and operated by Burgundy Diamond Mines Ltd.. Ekati's resident geologist, Peter West, welcomed everyone with an orientation before guiding the group around the mine (centre photo), which covers a large area of over 30km. The first stop was the Ekati drill core facility where participants could view a large amount



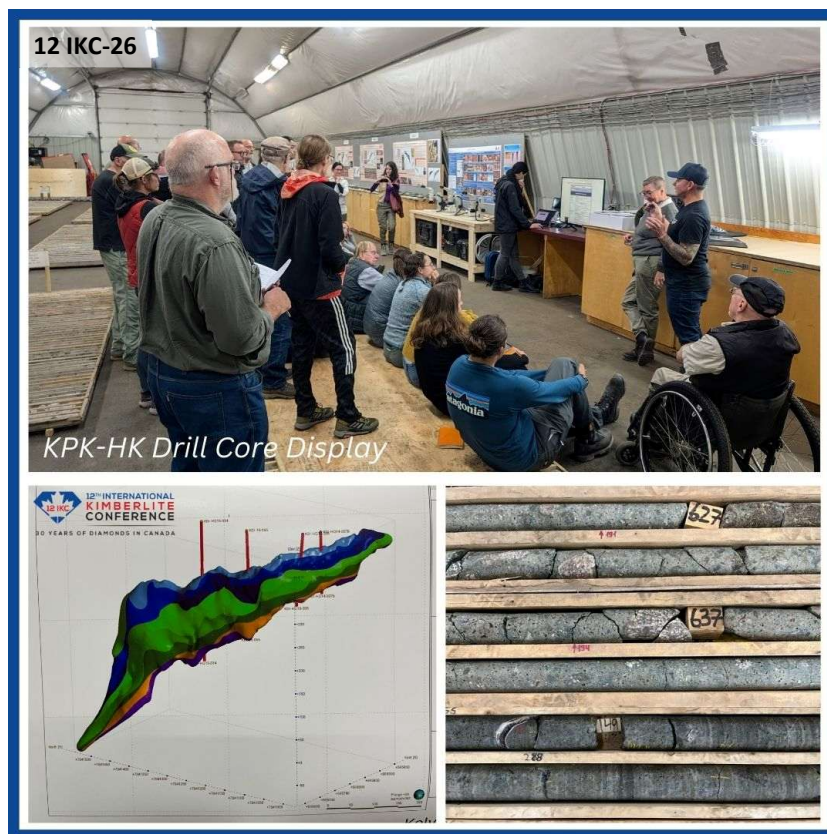
of diverse Fort à la Corne-type pyroclastic kimberlite drillcores from multiple pipes within the property (top left photo). In addition to core, another display of note included a perfectly preserved piece of wood estimated to be 53 Ma old, identified as a type of redwood which was common in area in the Eocene times (top right photo). The wood derives from within the kimberlite pipe infill having fallen into the pipe during or after eruption.

The mine tour included the Sable kimberlite open pit and ore pile where the group could examine kimberlite up close as well as the Misery pit (centre photo) and its underground portal activity. The visit concluded at the Point Lake pipe (bottom photo) which was the first kimberlite to be discovered in the Northwest Territories. The announcement of the recovery of diamonds from this kimberlite in 1991 started the great Canadian Diamond Rush, the beginning of the '30 Years of Diamonds in Canada' which 12 IKC celebrated. Development of this pipe for future mining had started by draining the lake water and stripping the overburden for an open pit operation.

[Ekati Mine](#) and Burgundy Diamond Mines Ltd are thanked for their permission and support for the mine visit as well as the sponsorship towards the FT01 air charters. Special thanks to Peter West for making the visit a great success, especially for the geology.

Figure 12 IKC-26

The last day of Field Trip FT01 was a trip to the Kennady Diamonds Inc. (KDI) core facility in Yellowknife, where participants were treated to hundreds of metres of kimberlite drillcore, polished slabs, posters (top photo), photomicrographs, drillcore scans and 3D geological models from KDI's Kelvin (bottom left photo), Faraday 1, Faraday 2, and Faraday 3 kimberlites. In addition, drillcores from the nearby Gahcho Kué Mine



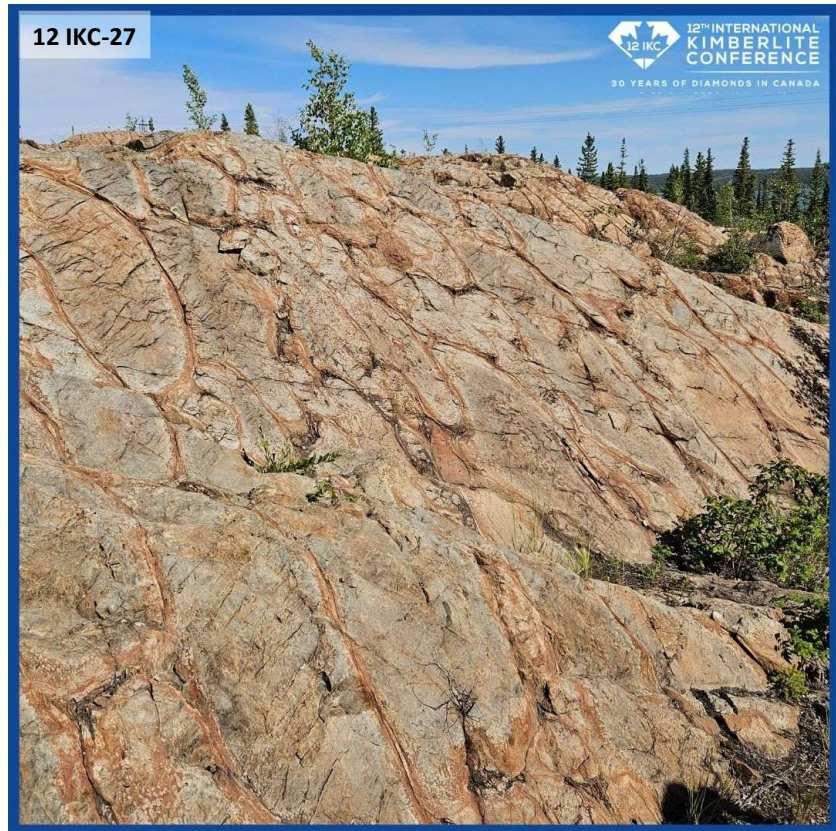
(5034 pipe; bottom right photo) and the Renard Mine in Quebec were also on display. All the drillcores together, from both the Slave and Superior Cratons, are representative of Kimberley-type Pyroclastic Kimberlites (KPK, formerly known as 'tuffisitic kimberlite') in Canada, providing an exceptional opportunity to learn about their unique geology (bottom left photo) and emplacement style. Participants enjoyed overviews from, and in depth discussions with, KPK specialists Casey Hetman, Colleen Muntener Laroulandie, Kimberley Webb, Barbara Scott Smith and from KDI Tom McCandless; top photo).

The KDI kimberlites are eroded, unique shallow-dipping, subterranean, tubular bodies with complex external morphologies (e.g. Kelvin, bottom left photo). The bodies comprise multiple phases of kimberlite separated by sharp internal contacts subparallel to the external contact that resulted from multiple emplacement events. The textures of each phase are mainly KPK as well as hypabyssal kimberlite (HK) and KPK-HK transitional textures. These KPK and related textures must have been produced deep within the volcanic plumbing system providing a real insight into KPK formation.

Special thanks to Mountain Province Diamonds Inc., Kennady Diamonds Inc. and Aurora Geosciences for hosting, supporting and organising this drillcore display. De Beers Canada and Mountain Province Diamonds Inc. as well Stornoway Diamonds are gratefully acknowledged for supplying drillcore from their mines.

Figure 12 IKC-27

In contrast to FT01 which focussed on the operating Canadian diamond mines all of which are in Northwest Territories, Field Trip FT03 offered delegates the opportunity to see some very local spectacular geology not directly related to diamonds. Yellowknife, the host city of 12 IKC, is located within the Slave Craton, one of Earth's best exposed cratons and the focus of Field Trip 03. A short distance outside town there are exceptionally well-exposed Archaean volcanic rocks in the



Yellowknife Volcanic Belt. Along the famous Giant Mine section, participants traversed spectacular exposures of pillow lavas as seen here. These tholeiitic basalts form part of the Yellowknife Bay Formation and interspersed felsic tuff beds have U-Pb zircon ages of 2701 and 2702 (+/- 1) Ma. These weakly to moderately deformed rocks were only exposed to lower greenschist facies metamorphic conditions, making them some of the best-preserved rocks in the Yellowknife greenstone belt. This unmatched section displays evidence of the dynamic nature of greenstone belt formation.

Visit <https://12ikc.ca/downloads/> to view the detailed field trip guides for each of the Field Trips organised for 12 IKC.

Figure 12 IKC-28

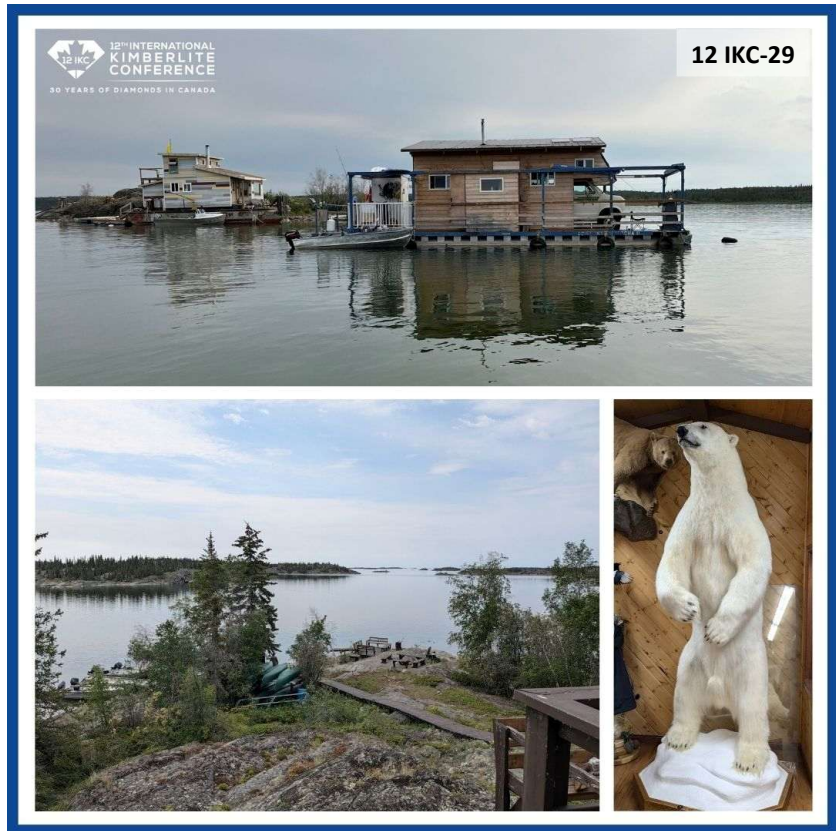
12 IKC, in addition to its excellent Social Programme for all registered delegates, put on exciting daily events for the delegates' Accompanying Persons (AP), which were extremely popular. 22 APs who signed up to participate in the 12 IKC social events, had an opportunity to customise their experience of Yellowknife. Half of the APs pictured here (top photo) took advantage of the full week AP programme which started with two full Day Tours in and around Yellowknife. Monday kicked



off with a meet-and-greet over coffee at the Explorer Hotel, followed by a delicious lunch at the renowned Bullocks Bistro, famous for serving freshly caught local fish, an iconic must-visit restaurant whilst in Yellowknife. An afternoon tour showcased many of Yellowknife's highlights: the northern airline Buffalo Airways (home of the popular TV series "Ice Pilots") with a visit to their hangar with both vintage and active aircraft, the downtown core, the Old Town and the legendary northern supplier Weaver and Devore, Latham Island, the unique Ragged Ass Road reflecting the history of Yellowknife, and some of city's famous arts and crafts shopping sites. The last stop was at the Bush Pilot's Monument which rests on top of "the Rock" accessed by a long winding wooden staircase. The monument, dedicated to the bush pilots and engineers whose lives were lost as they flew the wilderness skies of the Northwest Territories, also offers amazing views (bottom photo) over Yellowknife and Back Bays which lead into Great Slave Lake.

Figure 12 IKC-29

The second Day Tour for the Accompanying Persons (APs) began with coffee at the Explorer Hotel, followed by a boat cruise to experience the beauty of only a small fraction of the amazing Great Slave Lake, the 10th largest lake in the world. The APs boarded the boats at the dock in Old Town harbour for a scenic tour along the lake shore and its houseboat community (top photo). The group was taken to the Aurora Island Lodge on an island where they were treated to a northern



gourmet lunch of freshly caught Great Slave Lake whitefish, whilst enjoying the scenic views (bottom left photo).

Once back on land, the group visited the one-of-a-kind Nature's North Wildlife Gallery, a unique taxidermy museum which opened in 2023, for a tour with the owner. The Gallery showcases a large variety of animals from polar bears (bottom right photo) to birds from all over the Northwest Territories. The exhibits are designed to immerse you in the artful beauty of these animals, offering a unique opportunity to appreciate their majesty from an intimate perspective while learning about their behaviours and habitats. Everyone was captivated by the vibrant wildlife and the artistry that preserves their essence.

The rest of the week was filled with other activities and shorter tours, including a guided visit to the Legislative Assembly of the Northwest Territories, and the Prince of Wales Northern Heritage Centre with the highlight of viewing the behind-the-scenes collections not on display to the general public. All APs thoroughly enjoyed each and every event.

See Flavours of Yellowknife and the conference here <https://12ikc.ca/highlights/>

As you can see, 12 IKC was an excellent conference and will be remembered by many and to continue its tradition we took a group photo of all the attendees (**Figure 12 IKC-30**) as well



as the special image of our IKC veterans (**Figure 12 IKC-31**).

