

# Diamonds

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## **SUMMARY**

The Canadian diamond industry reached new heights in 2004 with mine production increasing to 12.6 million carats (Mct) valued at \$2.1 billion, compared to 10.8 Mct valued at just under \$1.6 billion in 2003. On a value basis, it contributed to about 16% of the world production of natural rough diamonds, which is estimated at 162.3 Mct valued at about US\$10.4 billion, in 2004.

Canada is the third largest producer of rough diamonds by value after Botswana and Russia. Its production comes from two mines, Ekati™ and Diavik, both located in the Northwest Territories (N.W.T.) about 300 km northeast of Yellowknife. Together these mines are the largest private employers in the N.W.T. The companies employ 1270 people. In addition, it is estimated that at least an additional 2800 indirect jobs have been created because of the mining operations. Canada also has a small but growing diamond cutting and polishing industry comprising seven factories operating in Yellowknife (N.W.T.), Vancouver (British Columbia), Toronto (Ontario), and Matane (Quebec).

Major events in the Canadian diamond industry during 2004 included the following:

- BHP Billiton announced on May 4, the approval of the \$227 million Panda underground project at Ekati™.
- In December, Diavik Diamond Mines Inc. approved a \$360 million program for construction of the mine's second dyke to allow open-pit mining of the A418 pipe and for an underground mining feasibility study of the A154 and A418 pipes.

- On June 1, De Beers Canada was granted its final permit to proceed with the development of a diamond mine at Snap Lake.
- Diarough N.V., an Indian company with headquarters in Antwerp, Belgium, announced on June 14 an investment of US\$14.5 million to establish a new cutting and polishing factory in Matane.
- Across Canada, diamond exploration expenditures involving 129 companies reached \$260 million during the year.

## **CANADIAN DEVELOPMENTS**

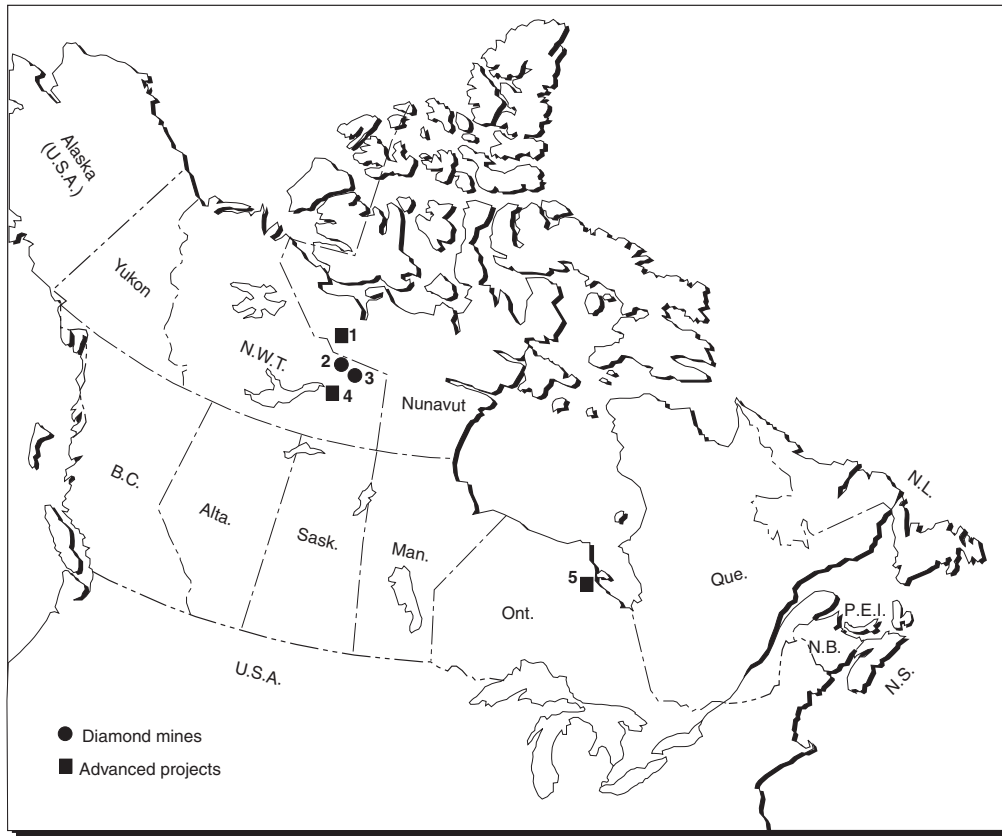
### **Mine Developments**

#### **Ekati™ Mine**

Canada's first diamond-producing mine, Ekati™, came into production in 1998. It is located near Lac de Gras about 300 km northeast of Yellowknife in the N.W.T. (refer to Figure 1). The mine is owned 80% by BHP Billiton Ltd. Mr. Chuck Fipke and Dr. Stuart Blusson, who discovered the diamond deposit in 1991, each have a 10% interest in the mine. Ekati™ achieved production of 5.05 Mct in 2004, registering a drop of 25% compared to 2003. However, despite this lower output, the value of production increased by 12.5% on account of better-quality stones and higher international rough diamond prices. BHP Billiton markets the entire production from its sales office in Antwerp, Belgium. The company announced on May 4, 2004, the approval of the \$227 million Panda underground project at Ekati™. The project is expected to deliver approximately 4.7 Mct of high-value Panda diamonds over a six-year production life. Initial production is expected in early 2005 and full production is expected in early 2006.

BHP Billiton continues to meet its commitments to purchase goods and services from northern companies and to hire northern Aboriginals and Northerners on a priority basis. The company employs about 550 people. Some 80% of the Ekati™ mine's staff are Northerners, of which over 50% are Aboriginals.

**Figure 1**  
**Diamond Mines and Advanced Projects in Canada, 2004**



1. Jericho
2. Ekati
3. Diavik
4. Snap Lake
5. Victor

Additional information is available on the Internet at [www.ekati.bhpbilliton.com](http://www.ekati.bhpbilliton.com).

### **Diavik Mine**

Canada's second diamond mine to come into production, Diavik, began operating in late 2002 at a cost of \$1.3 billion. It is located 300 km northeast of Yellowknife, N.W.T. The mine is an unincorporated joint venture between Diavik Diamond Mines Inc (DDMI), which owns 60%, and Aber Diamond Mines Ltd. (ADML), which owns 40%. DDMI is a wholly owned subsidiary of Rio Tinto plc of London, United Kingdom, and ADML is a wholly owned subsidiary of Aber Diamond Corp. of Toronto, Ontario. The two joint-venture participants retain the right to market, independently, their respective share of the diamonds produced from the Diavik diamond mine. DDMI is the manager of the mine.

Production at the Diavik mine in 2004 reached its designed capacity of 7.6 Mct, a level it is expected to keep or even exceed in the coming years. At year-end, Diavik's reserves included 29.8 Mt of ore at 3.2 ct/t. In December 2004, owners of the Diavik diamond mine approved a capital construction program worth approximately \$360 million for construction of the mine's second dyke, a process plant optimization study, and an underground mining feasibility study of the A154 and A418 pipes. Construction of the A418 dyke to allow open-pit mining of the A418 orebody is expected to cost \$240 million and will start during the summer of 2005. First production from the A418 pit is scheduled in early 2008.

In 2004, the work force at the Diavik diamond mine operations averaged 720 employees. Employment of Northerners averaged 518 workers, or 72%. The Diavik mine employed an average of 259 Aboriginal Northerners, or 36% of the average total work force.

Additional information on the project can be found on the Internet at [www.diavik.ca](http://www.diavik.ca) and [www.aber.ca](http://www.aber.ca).

### **Snap Lake Project**

The Snap Lake diamond deposit, 100% owned by De Beers Canada, part of the De Beers Group, is located approximately 220 km northeast of Yellowknife in the N.W.T. The deposit is unique in that the diamondiferous kimberlite is in the form of a dyke as opposed to the more common carrot-shaped pipe. The dyke is a tabular-shaped structure about 2.5 m thick that dips at a shallow angle of 15 degrees. Because of its shape, the company plans to use a modified room and pillar underground mining method to mine the deposit.

On June 1, 2004, De Beers Canada was granted its final permit to proceed with the development of a diamond mine at Snap Lake. With receipt of this permit, a "Class A" Water Licence, De Beers can now begin pre-production development of the mine. This work will focus on underground development and bulk sample plant testing. Construction of the mine, which is estimated to cost \$625 million, is anticipated to begin in 2005 after full mobilization to the site over the 2005 winter road. The mine is expected to begin production in 2007 and to produce about 1.5 Mct/y when it reaches full production in early 2008. The kimberlite to be mined over the project life is estimated at 18.3 Mt grading 1.46 ct/t. The average value per carat is estimated at US\$109. The mine is expected to have a life of just over 20 years and will create about 550 direct jobs. De Beers is dedicated to hiring and developing Aboriginal and northern workers. Employment practices have been put in place to ensure that 40% of employees are hired from the N.W.T. during construction and 60% during operations.

More detailed information is available on the Internet at [www.debeerscanada.com](http://www.debeerscanada.com).

### **Jericho Project**

Canada's first diamond mine outside the Northwest Territories is expected to be the Jericho project located in Nunavut about 420 km northeast of Yellowknife and about 170 km north of the Diavik mine at Lac de Gras in the N.W.T. The project is owned by Tahera Diamond Corporation, a Canadian company located in Toronto.

Approval of the project's "Class A" Water Licence was announced by the company in mid-January 2005. Tahera now needs to finalize the land leases for the project before mobilization and construction of the open pit can start. Commercial production is scheduled for early 2006 and will enable the production of about 350 000 ct/y over the nine-year mine life. Tahera announced in November 2004 that it has entered into a diamond purchasing and marketing agreement and a \$35 million credit agreement with a wholly owned subsidiary of Tiffany & Co. Under this

agreement, the latter will purchase a portion of the diamond production from Tahera's Jericho mine for its own manufacturing requirements and will sell the balance of the production on behalf of Tahera into the international market for a fee. Additional information is available on the Internet at [www.tahera.com](http://www.tahera.com).

### **Victor Project**

In northern Ontario, about 90 km west of the coastal community of Attawapiskat on the James Bay coast, the 100%-owned De Beers Victor project is undergoing a federal government environmental assessment (EA) led by Natural Resources Canada. A Comprehensive Study submitted for review by De Beers on March 8, 2004, was put on hold until August 2004 while De Beers reviewed access and power alternatives. The company has been working with the Province of Ontario to identify provincial EA and permitting requirements.

The final decision to proceed with construction of the mine is subject to approval of the federal and provincial EAs, the receipt of permits and authorizations, conclusion of a signed and ratified Impact and Benefit Agreement with the Attawapiskat First Nation, the successful implementation of the agreements related to the winter road, and approval from the De Beers Board of Directors for the funding necessary to build the mine.

Initial permits and authorizations to construct and operate the open-pit mine are anticipated in the fall of 2005 with construction to begin in 2006. De Beers plans to begin commercial production in 2008 and to recover about 600 000 ct/y over a 12-year open-pit mine life. The final product will be shipped off-site to a central valuation and sorting facility. Capital costs for the project have been estimated at about \$800 million. During construction of the mine, up to 600 people will be employed and 380 permanent positions will be created during production.

Victor is one of 18 kimberlite pipes discovered on the property, 16 of which are diamondiferous. Additional information can be found at the De Beers web site noted above.

## **Exploration Developments**

Across Canada, diamond exploration involving 129 companies is also under way in the Northwest Territories, Nunavut, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, and Newfoundland and Labrador, with expenditures reaching \$260 million in 2004. Projects at an advanced stage of exploration are located in the Northwest Territories, Saskatchewan and Quebec.

The **Northwest Territories** remains a focal point for diamond exploration. The Gahcho Kué project is located on the AK claim block, south of Lac de Gras, 80 km south-east of the Snap Lake project and approximately 300 km

northeast of Yellowknife. Gahcho Kué is a joint venture between De Beers Canada Exploration Inc. (51%), Mountain Province Diamonds Inc. (44%) and Camphor Ventures (4.9%). Eight diamondiferous kimberlites, along with several sills and dykes, have been found to date on the Gahcho Kué property. The larger 5034, Hearne and Tuzo kimberlite bodies are currently considered potentially economically viable. Conceptual studies were completed in 2000 and again in 2003. These studies indicate the potential to mine 2 Mt of ore per annum over a 10-year project life with an average grade of 1.64 ct/t. As of August 2004, the weighted average modelled values per carat for the three pipes were US\$74.20 for 5034, US\$61.00 for Hearne and US\$49.00 for Tuzo. These three kimberlite bodies are the subject of a full technical study scheduled for completion by mid-2005 at a cost of \$25 million. If economical, the project could be put into production by 2011. More details can be found at the De Beers web site noted above.

In **Nunavut**, joint-venture partners Stornoway Diamond Corporation (70%), BHP Billiton (20%) and Hunter Exploration Group (10%) pursued exploration of the Aviat project located on the Melville Peninsula, north of Hudson Bay. In 2004, a \$12 million exploration program was carried out on the property, including 1 142 m of diamond drilling. This drilling produced 2.5 t of kimberlite from the Lake zone for macrodiamond analysis. Six diamondiferous kimberlites have been discovered on the property so far, including the AV-1 kimberlite, which has produced an initial sample grade of 0.83 ct/t from the processing of 10.4 t of kimberlite. Diamond counts from AV-4 and AV-5 look promising, having released 565 diamonds in 540 kg of sample material and 93 diamonds in 48 kg of sample material, respectively. A follow-up 30-50 drill-hole, \$7.25 million exploration program planned for 2005 will test 25 targets. More information is available on the Internet at [www.stornowaydiamonds.com](http://www.stornowaydiamonds.com).

Kennecott Canada Exploration Inc., also active in **Nunavut**, has been actively exploring for diamonds on the Brodeur Peninsula since 2001. The 2004 \$3 million exploration program included geological mapping, till and sediment sampling, diamond drilling, and airborne magnetometer survey. Early in the year, Kennecott announced the discovery of three diamondiferous kimberlites on the Brodeur Peninsula, the largest of which measured 250 m x 150 m. This kimberlite was drilled and produced 1520 kg of drill core for a mini-bulk sample. A total of 319 diamonds were recovered from the sample. Little information has been released about the other two kimberlites. Additional information is available on the Internet at [www.kennecottexploration.com](http://www.kennecottexploration.com).

BHP Billiton is also working on its 100%-owned Qilalugaq property, located near Repulse Bay, on the Melville Peninsula in Nunavut, where the company has announced the discovery of nine diamondiferous kimber-

lites. A 9.37-t mini-bulk sample from one of the pipes has been processed and 70 stones weighing 2.36 carats of diamonds greater than 0.85 mm in diameter were discovered for a grade of 0.25 ct/t. The economic significance of the results is not yet known.

In **Saskatchewan** in the Fort-à-la-Corne region, there are two projects. The Star diamond project, owned and operated by Shore Gold Inc. ([www.shoregold.com](http://www.shoregold.com)), proceeded in 2004 with the mining of a 25 000-t bulk sample from a 235-m-deep concrete-lined shaft. By year-end, diamond counts from a total of 19 738 t of kimberlite were available resulting in the recovery of 2738 ct. The company is optimistic it will recover the expected 3000 ct from the total sample.

Nearby is the Fort-à-la-Corne diamond project owned by a joint venture between De Beers Canada Inc. (42.25%), Kensington Resources Ltd. (42.25%), Cameco Corp. (5.5%) and UEM Inc. (10% carried). With over 69 diamondiferous kimberlite bodies identified on the property, the Fort-à-la-Corne field forms one of the largest diamondiferous clusters in the world. Inside this land position, 25 kimberlite bodies are found within a 5-km radius in the southern portion of the claims. This area is the focus for the current advanced exploration and evaluation program, which is designed to explore and evaluate kimberlites larger than 20 hectares with a goal to prove a resource of close to 100 Mct. In September 2004, De Beers, the operator of the project, undertook a \$7.6 million diamond drilling program, including large-diameter mini-bulk drill-holes. Most of this work is targeted on the 140/141 and 122 kimberlite bodies. For more information, visit the De Beers' web site noted above or [www.kensington-resources.com](http://www.kensington-resources.com).

In north-central **Quebec**, Ashton Mining of Canada Inc., in a 50/50 joint venture with SOQUEM INC., pursued the exploration of its Foxtrot property where nine kimberlite bodies have been identified. The 2004 program included the drilling of 180 core holes and reverse circulation holes for the collection of a 664-t bulk sample from Renard 2, 3, 4 and 65, four of the six kimberlitic bodies in the Core Area of the Renard cluster. Processing of this sample recovered 457 ct of diamonds with 25 stones exceeding 1 ct, the largest being a 4.3-ct clear, colourless octahedron. Data from holes drilled through the end of 2004 indicate that four of the six bodies within the Renard Core Area contain more than 17.7 Mt of kimberlitic material. Since most of this tonnage is between surface and 200 metres in depth, and results to date indicate the bodies are open at depth, there exists significant potential to expand the tonnage through further drilling. The joint venture is proceeding with a \$12 million drilling program in 2005 to further evaluate the known kimberlitic bodies and to identify new ones. Additional information is available on the Internet at [www.ashton.ca](http://www.ashton.ca).

A more comprehensive report of all exploration projects in Canada can be found on the Internet at [www.nrcan.gc.ca/mms/pdf/explor/2004/toc04-e.pdf](http://www.nrcan.gc.ca/mms/pdf/explor/2004/toc04-e.pdf). Also, additional web sites of some companies active in diamond exploration in Canada can be found at [www.diamondplay.com](http://www.diamondplay.com) and [www.thediamondhunter.com](http://www.thediamondhunter.com).

## CANADIAN GOVERNMENT DIAMOND VALUATOR

In the Northwest Territories (N.W.T.) and Nunavut, the Canada Mining Regulations require that all diamonds produced in the territories be examined by a government valuator in order to establish a value for the diamonds for the purposes of calculating royalties owed to the Crown. The valuation must be done before the diamonds are sold or exported out of the territories. The Canadian government, represented by Indian and Northern Affairs Canada, currently has a three-year contract with Diamonds International Canada (DICAN) Ltd. for the valuation of the N.W.T. diamond production. DICAN is a Canadian incorporated company with headquarters in Yellowknife, N.W.T. The company is a partnership between Aboriginal Diamonds Group Ltd. (51%) and WWW International Diamond Consultants Ltd. (49%). This contract may be extended for a two-year period when it expires in 2006.

DICAN has a team of nine individuals with expertise in the valuation of rough diamonds and in statistical analysis of rough diamond production. As required by regulation, DICAN provides the government with a value of diamond production from both the Ekati™ and Diavik mines for use in the calculation of royalties that will be paid to the Crown.

In addition to providing its valuation services, DICAN is also committed to providing valuation training to Canadians. Northern Aboriginals have priority for the training program.

## CANADIAN DIAMOND MANUFACTURING

### Diamond Cutting and Polishing

At the end of 2004 there were seven diamond manufacturers operating across Canada located in Yellowknife (N.W.T.), Vancouver (British Columbia), Toronto (Ontario) and Matane (Quebec). In comparison to other countries with cutting and polishing industries, the Canadian industry is still quite small. With the expansion of mine production in Canada, there is a growing interest in establishing new facilities in this country.

### Yellowknife, N.W.T.

There are four cutting and polishing factories operating in Yellowknife that employ about 150 people. The first facility to open in Yellowknife was established by Sirius Diamonds Ltd. in June 1999. The company employs about 25 people, most of whom are Northerners. Sirius went into receivership in August 2004 when the Government of the N.W.T. (GNWT) called in the company's \$8 million loan guarantee as a result of the company's viability being questioned. By year-end, the company was still being run by a receiver while discussions continued with potential buyers of the plant. Sirius diamonds are marketed as Polar Bear diamonds.

The second factory was constructed by Deton'cho Diamonds Inc., majority owned by the Yellowknives Dene; it began production in March 2000. The factory is located in Ndilo, a Yellowknives community adjoining Yellowknife. It has about 30 employees, most of whom are Aboriginal trainees. The company suffered a setback in 2002 when it was forced to close its doors, leaving the territorial government to cover its \$2 million loan guarantee. As part of its settlement agreement, the company has 10 years to pay back the money owed and the government will pay the interest for the first five years. The operation re-emerged as Canada Dene Diamonds in January 2003 with the backing of Schacter and Namdar, based in Israel.

Arslanian Cutting Works Ltd. (NWT), Yellowknife's largest plant with about 50 employees, began production in December 2000. As in the case of Sirius Diamonds Ltd., the company was forced into interim receivership in August 2004 when the GNWT called in the company's \$9.2 million loan guarantee. Basal Diamonds later acquired a 75% stake in the Arslanian plant by repaying the loan. In order to maximize production, Arslanian uses experienced polishers from its factories in Armenia. The company also established a one-on-one training program to train Northerners.

Laurelton Diamonds, 100% owned by Tiffany & Co. of New York, is the most recent addition to the diamond manufacturing scene in Yellowknife. The company has a rough diamond supply agreement with Aber Diamond Mines Ltd. and employs approximately 40 people in its Yellowknife factory. Its polished diamond production is marketed through Tiffany's retail outlets.

BHP Billiton Diamonds Inc. has contracts to supply three of the facilities with up to 2500 ct each five-week period. The factories require a specific assortment of diamonds, which BHP Billiton prepares at its sales offices in Antwerp, Belgium. The assortments are then shipped back to the company's sorting and valuation facility in Yellowknife where sales to the factories take place.

Diavik, through its parent company Rio Tinto, also fulfills its obligation to the GNWT by supplying up to 10% by value of its rough diamond production for manufacture in the N.W.T. by selling specially selected rough diamonds from its offices in Antwerp, Belgium, to be cut and polished in the North.

The GNWT has a long-standing policy to only support those diamond projects whose owners agree to supply a portion of their production for manufacture in the N.W.T.

### **Matane, Quebec**

In Matane, Diamants du St-Laurent started its operations in October 2000 and employs about 20 workers. It has links with Group Collegia, a continuous learning agency offering training in diamond cutting and polishing that is associated with the Cégep de Matane and the Cégep de la Gaspésie et des Îles.

Also, Diarough N.V., an Indian company with headquarters in Antwerp, Belgium, announced on June 14, 2004, an investment of US\$14.5 million to establish a new cutting and polishing factory in Matane. Operations at this plant should start in early 2005 and provide work for about 50 workers. A Quebec government contribution of \$1.6 million has been allocated to train about 30 people in diamond cutting and polishing. The plant is expected to have a production capacity of more than 11 000 ct and to specialize in the production of cut diamonds of 1 ct and more destined for the North American and Asian markets.

### **Other Cutting and Polishing Plants**

The two other cutting and polishing plants are the HRA Investments plant in Vancouver, B.C., owned by Sun Diamonds of Belgium, and the Gem Star Inc. plant in Toronto.

## **Diamond Tools and Equipment Manufacturing**

These products include drill bits, segments for circular blades, grinding wheels, and specialty tools. The major manufacturing plants are: Fordia at Ville Saint-Laurent, Quebec; Diamond Production Canada Ltd. at Montréal, Quebec; North Star Abrasives at Montréal, Quebec; Diacan at Québec City, Quebec; Diamond Systems Inc. at Dorval, Quebec; Dimatec at Winnipeg, Manitoba; JKS Boyle, Longyear, JKS-Lamage, and Pilot Diamond Tools, all in North Bay, Ontario; Daset Products at Delta, British Columbia; and Hobic Bit Industry at Richmond, British Columbia.

## **Diamond Jewellery Manufacturing**

There are approximately 20 major plants located mainly in the Toronto region with a few in Montréal. There are also several smaller plants in Montréal.

## **Synthetic Diamond Production**

Crystalline Manufacturing Ltd. of Calgary, Alberta, produces synthetic diamond films using the Carbon Vapour Deposition (CVD) method.

## **KIMBERLEY PROCESS CERTIFICATION SCHEME**

The Kimberley Process (KP) derives its name from the city in South Africa that is synonymous with diamonds and was the location of the first meeting of countries whose ultimate goal was to develop a scheme to prevent conflict diamonds from entering into legitimate diamond trade. Conflict diamonds are those diamonds sold by rebel forces to purchase arms for use in conflict against legitimate governments.

Throughout 2001 and early 2002 there was a series of meetings attended by governments of diamond-producing and trading countries, non-governmental organizations and industry. The meetings focussed on the negotiation of a working document that, when finalized in 2002, became the Kimberley Process Certification Scheme. Under the Scheme, all government participants agreed that exports of rough diamonds would be accompanied by a certificate (issued by the government or an agency authorized by the government of the exporting country) and that trade would only occur between participants. In order to be a participant, governments are required to have appropriate legislation in place that allows for adequate enforcement of the terms and conditions of the Scheme. At a plenary meeting in Ottawa in March 2002, all participants agreed that the Scheme would come into force on January 1, 2003. Canada chaired the KP in 2004 and Russia is the chair for 2005. More information is available on the Internet at [www.kimberleyprocess.com](http://www.kimberleyprocess.com).

The Kimberley Process was based on a consensus agreement between some 35 countries, numerous representatives of civil society, and industry. On December 31, 2004, there were 43 Participants in the Kimberley Process, including the European Community, which has 25 member countries. These Participants are believed to represent 99% of the world trade in diamonds. In addition to the above-noted site, there are several other sites with information on the Kimberley Process: Partnership Africa Canada at [www.pacweb.org](http://www.pacweb.org), the World Diamond Council at [www.worlddiamondcouncil.com](http://www.worlddiamondcouncil.com), and Global Witness at [www.globalwitness.org](http://www.globalwitness.org).

In order for Canada to meet its obligations as a Participant, new legislation and regulations needed to be created. On October 12, 2002, Bill C-14, the *Export and Import of Rough Diamonds Act*, was passed into law and permitted Canada to begin implementation of the certification scheme on January 1, 2003. Canada is a participant in the

Kimberley Process Certification Scheme. For more information on the Kimberley Process in Canada, go to [http://mmsd1.mms.nrcan.gc.ca/kimberleyprocess/note\\_e.asp](http://mmsd1.mms.nrcan.gc.ca/kimberleyprocess/note_e.asp).

## WORLD NATURAL ROUGH DIAMOND PRODUCTION AND DEMAND

### Production

World production of natural rough diamonds in 2004 is estimated at 162.3 Mct valued at US\$10.4 billion, for an average price of US\$64.08/ct. This represents a 3.3% increase in production on a carat basis and an increase of 13.4% on a value basis over that of 2003. Please refer to the table below for production estimates from the main producing countries and to Figures 2 and 3 for the relative share of the world rough diamond production of each of the main producers.

More details on the world's rough diamond production are available on the Internet at [www.iti.gov.nt.ca/diamond/industry.htm](http://www.iti.gov.nt.ca/diamond/industry.htm).

### Demand

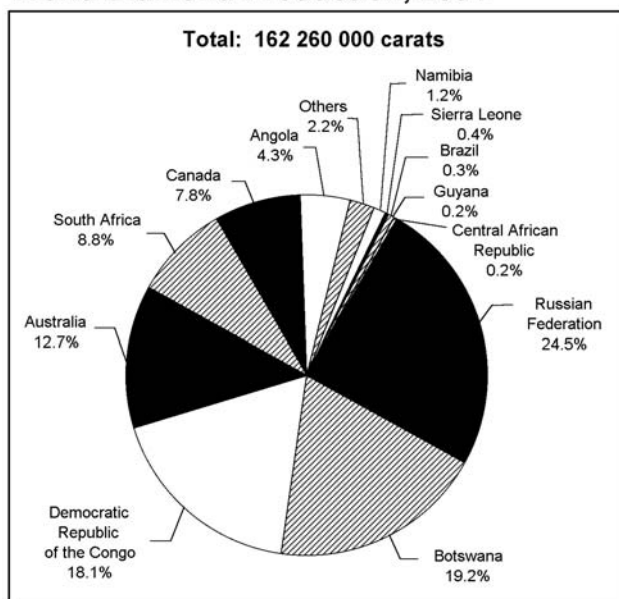
At the retail level, world demand for diamonds in 2004 is estimated to have been dominated by the United States (53%) while Japan accounted for 13%, Asia-Middle East and others for 12%, and Europe and the Asia-Pacific region for 11% each. Note that demand in emerging markets such as China and India is growing strongly.

#### ESTIMATED WORLD ROUGH DIAMOND PRODUCTION, 2004

Country	Mass		Value	
	(carats)	(%)	(US\$)	(%)
Angola	7 000 000	4.3	900 000 000	8.7
Australia	20 680 000	12.7	338 000 000	3.3
Botswana	31 130 000	19.2	2 330 000 000	22.4
Brazil	500 000	0.3	25 000 000	0.2
Canada	12 620 000	7.8	1 712 000 000	16.5
Central African Republic	400 000	0.2	60 000 000	0.6
Democratic Republic of the Congo	29 450 000	18.1	723 000 000	7.0
Guyana	250 000	0.2	15 000 000	0.1
Namibia	1 950 000	1.2	671 000 000	6.5
Russian Federation	39 810 000	24.5	1 988 000 000	19.1
Sierra Leone	600 000	0.4	129 000 000	1.2
South Africa	14 310 000	8.8	1 273 000 000	12.2
Others	3 560 000	2.2	232 000 000	2.2
<b>Total</b>	<b>162 260 000</b>		<b>10 396 000 000</b>	

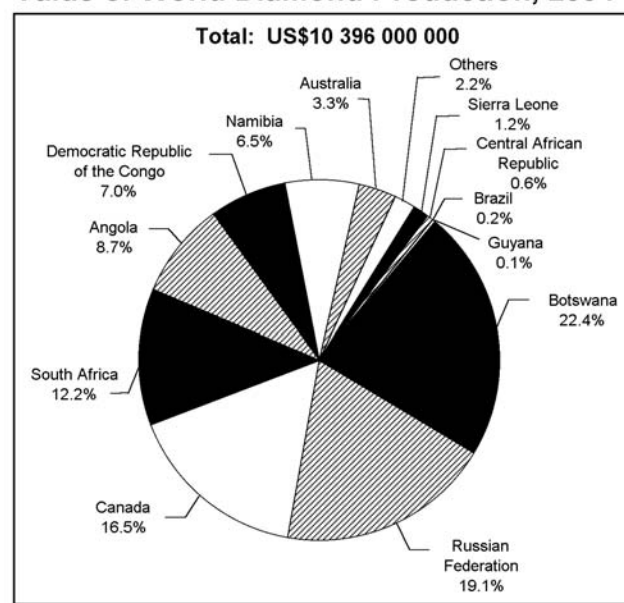
Sources: Natural Resources Canada; company reports.

**Figure 2**  
World Diamond Production, 2004



Sources: Natural Resources Canada; company reports.

**Figure 3**  
Value of World Diamond Production, 2004



Sources: Natural Resources Canada; company reports.

## FACTORS AFFECTING DIAMOND MINING

### Grade

Grade is the weight of diamonds expressed as carats per tonne (ct/t) of ore. It varies widely from one mine to another, but generally falls somewhere between 0.3 and 1.3 ct/t. The value of the ore per tonne equals the grade times the average value per carat of all the individual diamonds in the deposit.

### Size (Weight) of Rough Diamonds in the Deposit

Individually, rough diamonds can range in size from micro-sized to stones weighing in excess of 1000 ct. A much more telling measure of a mine's production is the average size of its rough diamonds. Depending on the mine, the average size of rough diamonds recovered can vary from 0.01 ct (about 1 mm in size) to more than 0.7 ct.

Many mines in the world average about 0.4-0.5 ct per stone. It is interesting to note that the number of stones larger than 1 ct (0.2 g) produced at mines is very small (about 400 000 stones per year) and, in terms of total carats produced, represents only about 0.5% of world production.

### Mine Production Costs

According to different sources, production costs (excluding depreciation and interest) for kimberlites and lamproites can be as low as US\$5-\$6/t for large and easy-to-access diamond mines operating in good climatic conditions and are up to about US\$35-\$38/t for small mines located in remote areas and operating under harsh climatic conditions. The total production costs for these mines are around US\$15/t and US\$40-\$45/t, respectively.

## PRICES

There are no internationally set prices for rough diamonds such as there are for precious metals like gold, silver and platinum, and for base metals such as copper, lead and zinc. The market prices for rough natural diamonds are almost constantly in a state of flux.

### Natural Diamonds

**Gem-quality rough diamonds:** While there are no internationally set prices for rough diamonds, De Beers SA (which controls nearly half of the world rough diamond supply) is indicated as having increased its prices by about 14% in 2004 compared to 2003, while observers estimate

free-market prices increased by 20% during the same period. The price of a rough stone depends on its carat weight, shape, clarity and colour. The prices vary widely, but the following is an indication of the prices paid at cutting and polishing factories for gem-quality rough stones: a 1-ct stone that sells for around US\$20 is very low quality, US\$200 is medium quality, US\$400 is good quality, and US\$1000 is top quality.

**Natural industrial diamonds:** Crushing bort sells for about US30¢/ct, casting sells for US\$1-\$2/ct, industrial stones sell for US\$7-\$10/ct, flets (e.g., a high-quality thin macle) sell for US\$50/ct, and dies (larger diamonds of high quality but with poor [often yellow] colour that makes them unsuitable as gems) sell for up to US\$200/ct.

### Synthetic Diamonds

Synthetic diamond prices depend on their particle strength, size and shape, and whether or not the diamonds are coated with a metal, etc. For this reason, there are several hundred prices for synthetic industrial diamonds. Generally speaking, synthetic diamonds used in grinding and polishing vary in price from US30¢/ct to US\$1/ct. Strong and blocky material for use in sawing and drilling, and known in the trade as SDA and MBS (Saw Diamond Abrasive and Metal Bond Sawing), produced respectively by De Beers Group and General Electric, sells for up to US\$3/ct. Large single crystals with excellent structure for use in specific applications sell for several hundred dollars per carat.

## OUTLOOK

Although Canada's status as an important diamond-producing country is recent, this industry already generates mining revenues estimated at \$2.1 billion, provides an estimated 4000 direct and indirect Canadian jobs, and is the source of numerous opportunities. This only marks the start of Canada's diamond history as more mines are scheduled to come into production in the coming years. These and other advanced exploration projects ensure prosperous times to come for the economy of many Canadian regions. These include Aboriginal communities and major Canadian cities as hubs for the financial markets, equipment manufacturing companies and allied industries.

The global diamond industry is in a period of change, the effects of which will continue for the short to medium term. A number of industry players are positioning themselves to be present at all levels of the diamond pipeline from "mines to market" to ensure their supply of rough diamonds and to maximize their profits. At the same time, mining-based countries aim to encourage the development of a domestic downstream industry to maximize the benefits accruing from the mining of their resources.



While rough diamonds are currently believed to be in tight supply relative to demand, market observers only estimate an average yearly increase of 1.8% in the world production of rough diamonds until 2010, while demand is forecast to increase yearly by nearly 5% over the same period. This situation should result in further price increases in the coming years. For its part, Canadian rough diamond production is forecast to reach 12.8 Mct in 2005.

In the polished diamond industry there has been a movement towards branding and associating the product with purity or high quality of colour, clarity and cut, or with other known brand names as seen with the Canadian Arctic North certificate of the GNWT, the Aurias and Canada Mark diamonds from BHP Billiton, which guarantee the source as Canada and the quality of cut to be up to triple excellent, and the joint marketing agreement between De Beers and Groupe LVMH, the European marketer associated with luxury goods. However, the success these brands gain with customers will require significant long-term marketing efforts.

After two years of operation, the implementation of the Kimberley Process Certification Scheme (KPCS) has already demonstrated significant benefits in curbing illicit

trade in rough diamonds. For example, Sierra Leone's certified exports were valued at US\$130 million in 2003 versus US\$10 million in 2000. However, much more could be done to better implement the KPCS in developing countries, such as increasing their capacity to compile and publish accurate trade statistics.

*Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 64. (2) Information in this review was current as of January 1, 2005. (3) This and other reviews, including previous editions, are available on the Internet at [www.nrcan.gc.ca/mms/cmy/com\\_e.html](http://www.nrcan.gc.ca/mms/cmy/com_e.html).*

#### NOTE TO READERS

**The intent of this document is to provide general information and to elicit discussion. It is not intended as a reference, guide or suggestion to be used in trading, investment, or other commercial activities. The author and Natural Resources Canada make no warranty of any kind with respect to the content and accept no liability, either incidental, consequential, financial or otherwise, arising from the use of this document.**

#### TARIFFS

Item No.	Description	Canada			United States	EU	Japan
		MFN	GPT	USA	Canada	Conventional Rate (1)	WTO (2)
7102.10	Diamonds, unsorted, whether or not worked, but not mounted or set	Free	Free	Free	Free	Free	Free
7102.21	Diamonds, industrial, unworked or simply sawn, cleaved or bruted, but not mounted or set	Free	Free	Free	Free	Free	Free
7102.29	Diamonds, industrial, other	Free	Free	Free	Free	Free	Free
7102.31	Diamonds, non-industrial, unworked or simply sawn, cleaved or bruted	Free	Free	Free	Free	Free	Free
7102.39	Diamonds, non-industrial, other	Free	Free	Free	Free	Free	Free
7105.10	Natural or synthetic diamond dust or powder	Free	Free	Free	Free	Free	Free

Sources: Canadian *Customs Tariff*, effective January 2005, Canada Border Services Agency; *Harmonized Tariff Schedule of the United States*, 2005; *Official Journal of the European Union* (October 30, 2004 Edition); *Customs Tariff Schedules of Japan*, 2004.

(1) The customs duties applicable to imported goods originating in countries that are Contracting Parties to the General Agreement on Tariffs and Trade or with which the European Community has concluded agreements containing the most-favoured-nation tariff clause shall be the conventional duties shown in column 3 of the Schedule of Duties. (2) WTO rate is shown; lower tariff rates may apply circumstantially.

TABLE 1. CANADA, DIAMOND PRODUCTION AND TRADE, 2002-04

Item No.	2002		2003		2004 (p)		
	(carats)	(\$000)	(carats)	(\$000)	(carats)	(\$000)	
<b>PRODUCTION</b> (all forms)							
Northwest Territories	4 936 616	791 821	10 755 654	1 587 738	12 618 080	2 140 121	
<b>EXPORTS</b>							
7102.10	Diamonds, unsorted, whether or not worked, but not mounted or set						
	United Kingdom	1 546 808	258 292	6 224 372	1 061 515	5 098 790	1 089 320
	Belgium	3 427 203	594 556	2 754 913	343 913	4 130 651	442 806
	United States	3 666	7 035	2 573	361	824	119
	Armenia	118	15	438	105	60	22
	South Africa	-	-	..	..	5	1
	Hong Kong	-	-	-	-	12	1
	India	315	90	-	-	-	-
	Thailand	-	-	-	-	-	-
	Total	4 978 110	859 988	8 982 300	1 395 915	9 230 342	1 532 269
7102.21	Diamonds, industrial, unworked or simply sawn, cleaved or bruted						
	Bulgaria	-	-	-	-	3 684	71
	United Kingdom	-	-	393	4	1 695	25
	Belgium	-	-	10 364	30	1 220	20
	United States	17 130	249	2 174	12	1	3
	Total	17 130	249	12 931	46	6 600	119
7102.29	Diamonds, industrial, other						
	United States	54 404	249	61	92	4 527	81
	United Arab Emirates	-	-	-	-	6 842	64
	Germany	1 748	16	1 438	13	-	-
	Japan	1 302	12	-	-	-	-
	United Kingdom	6 875	58	701	6	-	-
	Total	64 329	335	2 200	111	11 369	145
7102.31	Diamonds, non-industrial, unworked or simply sawn, cleaved or bruted						
	Belgium	30	33	984 185	126 089	3 093 493	342 293
	United States	1 267	1 668	56	78	3 071	7 450
	Israel	-	-	987	1 392	1 957	3 090
	United Kingdom	-	-	19	12	3 016	2 468
	Australia	7	4	25	15	3 957	906
	China	-	-	379	51	424	54
	Hong Kong	-	-	26	16	-	-
	Total	1 304	1 705	985 677	127 653	3 105 918	356 261
7102.39	Diamonds, non-industrial, other						
	United States	12 306	42 556	20 916	79 212	26 123	87 836
	Belgium	410	1 233	804	1 808	2 686	7 509
	Israel	-	-	211	217	1 023	2 043
	Australia	-	-	-	-	521	1 269
	United Kingdom	10	20	115	1 545	263	608
	Japan	55	154	171	505	124	380
	Hong Kong	73	302	12	19	373	113
	United Arab Emirates	-	-	-	-	135	80
	Thailand	-	-	-	-	140	76
	Netherlands	-	-	-	-	18	28
	Singapore	-	-	-	-	14	20
	South Africa	6	-	-	-	9	17
	Chile	-	-	-	-	6	7
	Denmark	-	-	-	-	2	2
	Ireland	-	-	-	-	1	7
	India	-	-	106	169	5	6
	Bermuda	-	-	6	7	3	4
	Armenia	288	55	-	-	-	-
	South Korea	3	3	-	-	-	-
	Italy	-	-	2	3	-	-
	Switzerland	-	-	1	6	-	-
	Total	13 151	44 323	22 344	83 491	31 446	100 010
7105.10	Natural or synthetic diamond dust and powder						
	United States	96 708	103	19 228	19	8 524	12
	South Korea	2 200	3	-	-	-	-
	Switzerland	4 842	7	-	-	-	-
	Ireland	-	-	10 606	16	-	-
	Total	103 750	113	29 834	35	8 524	12
	Total exports	5 177 774	906 713	10 035 286	1 607 251	12 394 199	1 988 816

TABLE 1 (cont'd)

Item No.	2002		2003		2004 (p)	
	(carats)	(\$000)	(carats)	(\$000)	(carats)	(\$000)
<b>IMPORTS</b>						
7102.10	Diamonds, unsorted, whether or not worked, but not mounted or set					
	Japan	..	...	-	-	1
	United States	5 525	3 663	62	14	..
	Belgium	6 071	3 096	-	-	...
	Brazil	54	158	-	-	-
	Canada	348	87	-	-	-
	China	..	10	-	-	-
	Colombia	..	9	-	-	-
	Germany	..	9	4	1	-
	Hong Kong	329	78	-	-	-
	India	9 015	5 221	-	-	-
	Israel	3 751	8 729	-	-	-
	Jamaica	24	6	-	-	-
	Russia	..	2	-	-	-
	South Africa	67	16	-	-	-
	Switzerland	..	152	-	-	-
	Taiwan	1	...	-	-	-
	Thailand	..	78	-	-	-
	Ukraine	..	8	-	-	-
	United Kingdom	..	...	4	1	-
	Peru	-	-	10	1	-
	Total	25 185	285	80	17	1
7102.21.00.10	Diamonds, industrial, bort and black, diamonds for borers, unworked or simply sawn, cleaved or bruted, but not mounted or set					
	Ghana	107 343	441	53 465	208	29 180
	Botswana	17 524	92	13 960	91	17 141
	South Africa	5 458	33	5 314	37	9 452
	United States	45 570	180	17 792	75	8 062
	United Kingdom	22 084	150	44 150	145	6 559
	Australia	9 963	22	4 381	26	3 343
	Russia	-	-	275	3	3 209
	Belgium	48 119	346	3 746	27	1 617
	Hong Kong	2 656	20	-	-	-
	India	3 434	9	595	5	-
	Ireland	10 000	15	-	-	-
	Kenya	-	-	1 260	4	-
	Total	272 151	1 308	145 938	621	78 563
7102.21.00.90	Diamonds, industrial, other, unworked or simply sawn, cleaved or bruted, but not mounted or set					
	Ghana	56 908	358	66 423	350	18 987
	United States	60 416	370	33 359	205	12 761
	Russia	-	-	8 861	71	9 911
	United Kingdom	4 562	37	8 752	53	5 743
	Belgium	20 876	159	13 063	84	3 925
	Hong Kong	-	-	-	-	3 427
	Japan	20 515	111	7 957	42	5 428
	Australia	1 325	10	2 562	13	2 169
	Mexico	-	-	-	-	1 347
	Botswana	-	-	373	3	1 518
	India	15 061	114	-	-	329
	Sierra Leone	-	-	6 130	25	318
	South Africa	3 823	21	12 407	69	237
	Germany	4 184	35	5 503	36	-
	Ireland	7 724	42	3 000	16	-
	Italy	15	-	-	-	-
	South Korea	802	7	-	-	-
	Angola	-	-	318	3	-
	Guyana	-	-	916	10	-
	Total	196 211	1 264	169 624	980	66 100
7102.29.00.10	Diamonds, industrial, other, bort and black diamonds, for borers, but not mounted or set					
	Ghana	7 919	61	37 092	123	145 874
	United States	42 880	152	10 488	135	148 936
	Belgium	-	-	-	-	3 000
	Australia	82	23	82	5	181
	South Africa	-	-	-	-	2 608
	India	-	-	49	15	8
	Hong Kong	12	2	-	-	3
	France	1	...	1	...	1

TABLE 1 (cont'd)

Item No.	2002		2003		2004 (p)		
	(carats)	(\$000)	(carats)	(\$000)	(carats)	(\$000)	
<b>IMPORTS (cont'd)</b>							
	Germany	6	2	1	—	2	...
	Thailand	30	8	—	—	—	—
	Botswana	—	—	61	14	—	—
	Switzerland	—	—	1	—	—	—
	Total	50 930	248	47 776	292	300 613	724
7102.29.00.90	Diamonds, industrial, other, other than bort and black, for borers, worked but not mounted or set						
	United States	1 138	173	1 120	91	2 781	184
	Belgium	1 226	256	885	175	521	163
	Ghana	242	12	319	17	4 060	98
	Australia	—	—	1 431	271	313	72
	United Kingdom	817	168	783	113	384	68
	South Africa	805	197	4 227	63	192	36
	Italy	—	—	—	—	2 178	19
	India	18	...	73	3	231	15
	China	—	—	1	...	4	2
	Switzerland	20	6	13	6	1	1
	Israel	39	15	37	14	3	...
	Taiwan	—	—	—	—	12	...
	Hong Kong	119	3	—	—	—	—
	Sweden	1 000	3	—	—	—	—
	Germany	—	—	16	4	—	—
	Guyana	—	—	113	8	—	—
	Russia	—	—	18	3	—	—
	Total	5 424	833	9 036	768	10 680	658
7102.31	Diamonds, non-industrial, unworked or simply sawn, cleaved or bruted, not mounted or set						
	Canada	—	—	2	3	3 482	3 418
	Israel	2 301	1 453	1 204	794	1 526	1 758
	South Africa	—	—	167	71	1 798	1 271
	Brazil	—	—	—	—	953	1 185
	Belgium	3 303	2 003	3 865	2 789	1 282	1 092
	Botswana	486	188	488	171	368	251
	Congo	—	—	—	—	179	82
	Sierra Leone	—	—	—	—	6	8
	India	674	315	8 992	1 954	7	5
	United States	460	240	108	93	5	4
	Australia	280	107	—	—	—	—
	Namibia	376	173	—	—	—	—
	Bolivia	—	—	327	211	—	—
	China	—	—	1	—	—	—
	Thailand	—	—	20	9	—	—
	Total	7 880	4 479	15 174	6 095	9 606	9 082
7102.39.00.10	Diamonds, non-industrial, other, of a weight not exceeding 0.5 carats each						
	India	40 719	12 947	34 886	14 138	86 591	36 177
	Israel	41 524	39 825	24 113	17 838	32 282	22 893
	Canada	361	1 394	4 988	11 846	11 117	17 413
	Belgium	23 941	25 448	20 748	16 437	38 027	15 125
	United States	24 131	15 231	15 652	11 797	13 407	6 924
	Australia	64	28	2 799	1 647	1 395	1 616
	Thailand	1 591	486	1 591	731	904	410
	Botswana	—	—	12	25	146	223
	United Kingdom	—	—	—	—	164	152
	China	1 338	259	32	67	384	137
	Netherlands	105	149	166	528	36	117
	Hong Kong	968	515	396	199	159	87
	Germany	25	14	77	49	157	72
	United Arab Emirates	—	—	46	135	75	70
	Russia	66	48	828	523	23	29
	Brazil	41	51	23	191	87	19
	South Africa	8	21	1	1	11	11
	Saudi Arabia	—	—	—	—	13	11
	Mexico	—	—	—	—	8	9
	Ghana	—	—	—	—	2	7
	Lebanon	—	—	—	—	130	6
	Spain	—	—	—	—	12	6
	France	60	37	54	12	6	3
	South Korea	52	157	—	—	20	2
	Switzerland	—	—	—	—	2	1
	Italy	3	2	8	8	...	...
	Japan	—	—	—	—	1	...
	Peru	—	—	—	—	2	...

TABLE 1 (cont'd)

Item No.	2002		2003		2004 (p)	
	(carats)	(\$000)	(carats)	(\$000)	(carats)	(\$000)
<b>IMPORTS (cont'd)</b>						
	Ireland	2	3	–	–	–
	Indonesia	1 508	321	10	4	–
	Iceland	26	58	–	–	–
	Taiwan	1	1	–	–	–
	Austria	1	...	–	–	–
	Congo	–	–	2	2	–
	Ukraine	–	–	20	19	–
	Armenia	5	8	–	–	–
	Niger	10	25	–	–	–
	Total	136 550	97 028	106 452	76 197	185 161
7102.39.00.20	Diamonds, non-industrial, other, of a weight exceeding 0.5 carats each					
	Israel	70 127	73 068	71 344	70 566	70 503
	Belgium	75 159	62 381	72 475	55 721	71 642
	United States	58 937	45 888	52 099	51 507	51 462
	India	59 267	30 834	82 286	39 043	134 543
	Australia	6 850	8 602	8 691	10 962	14 107
	Canada	449	395	1 043	2 298	1 770
	South Africa	1 856	6 021	1 819	4 330	2 277
	Russia	331	663	173	448	447
	United Arab Emirates	–	–	780	629	2 592
	Thailand	1 956	856	1 944	711	3 454
	Hong Kong	2 745	1 062	992	557	1 202
	Japan	57	37	1	...	404
	China	14	3	253	147	301
	Saudi Arabia	1	7	–	–	273
	Singapore	412	103	569	244	360
	Botswana	–	–	–	–	83
	Germany	29	36	55	39	49
	United Kingdom	–	–	41	12	32
	Guyana	–	–	–	–	40
	Lebanon	1	–	1	2	35
	Iceland	22	98	–	–	16
	Ghana	2	2	2	3	11
	Brazil	8	139	96	109	25
	Mexico	–	–	–	–	10
	Ukraine	–	–	–	–	2
	Poland	–	–	–	–	2
	Bulgaria	–	–	–	–	4
	Taiwan	–	–	1	...	17
	South Korea	–	–	3	9	2
	Switzerland	325	214	572	615	..
	Sri Lanka	6	6	61	19	–
	Sweden	1	...	–	–	–
	Armenia	9	22	139	319	–
	New Zealand	–	–	2	3	–
	Italy	7	13	13	15	–
	Zimbabwe	–	–	3	15	–
	Ireland	1	9	–	–	–
	Indonesia	239	66	35	48	–
	France	98	30	102	26	–
	Colombia	193	411	1	7	–
	Netherlands	59	97	12	76	–
	Austria	39	11	183	85	–
	Total	279 200	231 074	295 791	238 565	355 665
7105.10.00.10	Diamond dust for borers; dust mixed with a carrier in cartridges or in tubes					
	United States	316 876	847	312 493	751	423 308
	United Kingdom	777	3	997	4	2 081
	China	–	–	–	–	1 897
	Ghana	4 473	17	5 775	11	2 100
	Italy	–	–	30	...	–
	Total	322 126	867	319 295	766	429 386
7105.10.00.91	Natural diamond dust and powder					
	Ireland	685 884	1 214	475 071	858	990 121
	United States	115 829	252	132 666	286	90 454
	China	–	–	–	–	43 510
	Ghana	1 914	5	17 972	54	14 008
	Iran	–	–	800	4	12 913
	Belgium	5 000	12	24 780	50	27 229
	United Kingdom	837	3	12 415	60	3 910
	Israel	–	–	602	2	748
	Germany	28	...	–	–	471
	Sweden	–	–	–	–	210
	Total	1 494 613	1 483	1 025 299	1 250	1 162 292

TABLE 1 (cont'd)

Item No.	2002		2003		2004 (p)	
	(carats)	(\$000)	(carats)	(\$000)	(carats)	(\$000)
<b>IMPORTS (cont'd)</b>						
	India	15	...	—	—	—
	Mexico	692	3	—	—	—
	Botswana	—	—	1 641	7	—
	Switzerland	—	—	42 583	64	—
	Total	810 199	1 489	708 830	1 385	1 183 574
7105.10.00.92	Synthetic diamond dust or powder					
	United States	2 052 590	2 605	1 324 762	1 974	2 080 990
	Ireland	2 010 196	2 845	930 382	1 784	1 462 922
	Belgium	161 329	234	287 185	289	240 818
	China	148 016	390	12 784	50	152 287
	Russia	611	2	13 151	38	63 196
	South Korea	5 348	10	—	—	60 024
	United Kingdom	25 365	60	102 884	52	127 728
	Switzerland	—	—	—	—	10 009
	Germany	—	—	958	3	4 346
	Taiwan	—	—	—	—	11 000
	Australia	—	—	—	—	10 002
	Thailand	—	—	—	—	6
	Ghana	3 826	7	8 500	6	—
	India	2 650	2	611	2	—
	Iran	4 395	16	6 472	30	—
	Japan	994	4	—	—	—
	Bulgaria	—	—	39	...	—
	Canada	—	—	3 161	10	—
	France	—	—	800	2	—
	Spain	—	—	557	2	—
	Total	4 415 320	6 175	2 692 246	4 242	4 223 328
	Total imports	6 521 176	365 050	4 509 942	329 928	6 842 677

Sources: Natural Resources Canada; Statistics Canada.

— Nil; . . Not available; . . . Amount too small to be expressed; (p) Preliminary.

Note: Numbers may not add to totals due to rounding.