

THE NWT DIAMOND INDUSTRY

OPPORTUNITIES  
FOR DOGRIB  
PARTICIPATION



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A report prepared for the Dogrib Rae Band  
by Ellis Consulting Services

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Ellis Consulting Services  
*The NWT Diamond Industry:*  
*Opportunities for Dogrib Participation*  
A report prepared for the Dogrib Rae Band  
April 2002

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The Dogrib traditional (Monfwi) lands are represented on the map above.

# INTRODUCTION

The Dogrib Rae Band is part of the Dogrib (Treaty 11) region that includes the communities of Gameti, Rae-Edzo, Wekweti and Wha Ti in the Northwest Territories. The region has a relatively low population (2,700 in 1999) and over 90% of the population is Dogrib (Dene).

Until recently there has been little economic development in the Dogrib Nation and historically most of the cash income received by households has come in the form of direct employment with the government or through a mixture of grants and transfer payments.

In the past the area has had low levels of employment and with it low household incomes. For example, the employment rate<sup>1</sup> for the region from the 1996 Census was 37%, which compares to 80% in Yellowknife and 68% for the NWT as a whole. In 1997 in the Dogrib region average income was just over \$18,000. In Yellowknife it was \$42,000 while in the NWT the average was \$33,000.

The diamond mining industry is currently the largest source of wealth creation in the Northwest Territories (NWT) and presents opportunities to help develop the North and benefit the local population.

The EKATI Diamond Mine™ (EKATI™), the Diavik Diamonds Project and the De Beers Snap Lake Project are located on Dogrib traditional lands<sup>2</sup>. If the Dogrib and other Northerners are to develop their economies they must participate to the greatest extent possible in the wealth creation generated by the emerging diamond industry.

It has been said that mining is a form of wealth depletion since the resource is not renewable and hence it does not leave a lasting contribution to the local economy once the mining activity ceases. This is not necessarily the case. What matters is how the wealth generated by mining is transformed into other forms of wealth and income and how much of this wealth is available to generations over time.

If the diamond industry can enable the Dogrib and other Northerners to build wealth, business capacity and human capital (in terms of work experience and knowledge) then the industry can have a long-term impact on the North and the Dogrib and lead to greater prosperity for future generations.

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<sup>1</sup> The employment rate is calculated by dividing the employment labour force by the total labour force 15 years and older.

<sup>2</sup> A number of other Aboriginal organizations have also claimed this area as part of their traditional lands.

# OBJECTIVE OF THIS STUDY

The "diamond pipeline" includes all the steps or economic activities that are involved from taking the diamonds from the ground until they are sold to consumers as jewellery. The objective of this study is to examine the diamond pipeline and suggest where potential opportunities exist for the Dogrib and other Northerners to more fully participate in the value-added process.

The wealth creating (or value-added) opportunities created by the diamond mining industry include:

## 1. Primary Production

There are three main areas where the Dogrib and other Northerners can participate in the primary production process.

- Direct employment at the mines: Employment at the mines not only provides a high level of income, but also work experience and knowledge (i.e. in economic terms it builds "human capital").
- Selling goods and services to the mines: There will be many opportunities to establish or participate in businesses that supply goods and services to the mines. The formation of new businesses or the expansion of existing ones will help build business capacity in the Dogrib and other Northern communities.

- Equity participation in the mines: Another important method of benefiting from the wealth creation of the diamond industry is to secure an equity or ownership position in the ventures. Securing an equity position will require an investment by the Dogrib and/or other Northerners (and is not without risk) but if the mines are successful it will provide a future income stream for other investment opportunities and/or income distribution.

2. Sorting and valuation of the rough diamonds for royalty purposes.
3. Sorting and valuation of the rough diamonds for marketing purposes.
4. Marketing and selling of rough and polished diamonds.
5. Cutting and polishing of rough diamonds.
6. Jewellery manufacturing and retailing.

This report is presented in three sections. The first is a brief review of the current world and NWT diamond industries. The second is a review of the experience of the Argyle Diamond Mine in its attempts to establish a secondary diamond industry in Western Australia. The third is a review of where it may be possible to expand or build diamond-related value-added activities in the NWT.

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# THE DIAMOND INDUSTRY

The diamond industry, while relatively large in value, is very small and has relatively few participants. On the production side only a few companies control the resource and the industry is what economists refer to as an "oligopoly". An oligopoly is a market where there are so few sellers of a commodity that the actions of each seller affect the other sellers. In these types of markets normally one business will take the lead to set prices and the others will follow. In an oligopoly, the normal rules of price competition do not apply.

The objective of any business is to maximize its value to its shareholders (normally accomplished by maximizing profit over time). The ability to ensure price stability at a level sufficient to cover all costs is crucial to achieving the objective as well.

Traditionally De Beers has taken the lead to ensure price stability in the diamond industry. De Beers has established a regulating mechanism, namely the quota provisions in the contracts it has with its partners in the Diamond Trading Company (DTC)<sup>3</sup>, to control the stock of diamonds offered for sale. The operating principle of the DTC is very simple; when there is a significant shortfall in demand in relation to current supply, rather than having competitive selling with the inevitable drop in prices, the participants in the DTC "share" the market, based on a formula that allocates sales to each participant.

The absence of price competition also gives the DTC the opportunity to "squeeze" the production chain (i.e. increase the price of rough) to capture

any increases in value-added in the diamond pipeline that may result from market changes.

In recent years the DTC is becoming less dominant as more independent producers (in particular from Angola and Russia) offer their product for direct sale on the open market and bypass the DTC. Currently the DTC markets about two-thirds of the value of all diamonds traded in the world. But in spite of the increased level of independent selling there is no evidence yet to indicate that the independent sellers will "disturb" the current market sufficiently to introduce effective price competition between sellers.

Another important development in the diamond industry is the recent trend for producers to attempt to "capture" more value-added activity related to the production of rough. Producers have and are moving towards greater vertical integration by forming "strategic alliances" with partners or establishing their own operations for further processing of their most profitable products. For example Aber (40% owner of the Diavik Diamonds Project) has entered into an agreement to sell directly a large portion of their share of the Diavik production to the US-based retailer Tiffany and Co. This will allow them to bypass portions of the diamond pipeline and secure more of the value-added process.

<sup>3</sup> Previously it was known as the Central Selling Organization (CSO).

# THE DIAMOND PIPELINE

The diamond pipeline is a representation of the activities that take the diamond from the ground to the customer in the jewellery store. The pipeline can be looked at on a gross basis (the value of sales) or a net (value-added basis).

Table 1 gives the gross value for each activity of the diamond pipeline for the world in 2000. It must be emphasized that the values presented are only estimates.

In 2000, the final retail price received for diamonds was \$86.0 billion (Canadian dollars). Primary producers, (mines) sales were \$11.6 billion. Dealers purchased \$13.1 billion of rough stones and then resold them to manufacturers for \$14.3 billion. The manufacturers, after cutting and polishing the stones, sold the product to jewellers for \$20.4 billion. Jewellers set the stones and resold the final product for \$86.0 billion.

Another way to look at the pipeline is to look at each stage of the process to find what it contributed to the final value of the diamonds at the retail level. Table 2 represents the additional (incremental) value-added at each activity or sector.

As can be seen in Table 2, from the respective activities in the pipeline, the greatest value-added is achieved at the jewellery retail level which accounts for 75.7% of the value. The second largest is the mining sector, which accounts for 13.5% of the value. Manufacturers added \$4.8 billion to the value of diamonds, which was 5.6% of the total.

While it is significant to look at the value-added at each level of economic activity, it does not reveal one of the most important aspects of the pipeline, which is how profitable each activity is. For example, while the producing mines earned \$11.6 billion in sales they also incurred costs related to this production (which of course benefited other industries). Similarly the jewellery manufacturing/retail sector has a very high value-added but also incurs very significant inventory, production, marketing and sales costs.

If these costs are a small proportion of the sales value then the industry will be profitable; but if they are high, the industry might be only marginally profitable.

**Table 1: The Diamond Pipeline in 2000 - Gross Sales by Activity**

Activity/Sector	Sales CAN\$ Billion <sup>4</sup>
Producer Sales	11.6
Dealer Purchases - Rough	13.1
Manufacturer Purchases - Rough	14.3
Manufacturing Sales - Polished	19.1
Jeweller Purchases - Polished	20.4
Jewellery Manufacturing/Retail Sales	86.0

**Table 2: The World Diamond Pipeline in 2000 - Value Added by Activity**

Activity/Sector	Value CAN\$ Billion	Percent
Producers	11.6	13.5%
Dealer Purchases	1.5	1.7%
Manufacturer Purchases	1.2	1.4%
Manufacturing Sales	4.8	5.6%
Jeweller Purchases	1.3	1.6%
Jewellery Manufacturing/Retail Sales	65.5	76.2%
Total	86.0	100.0%

Source: US Bureau of Labour Statistics, Argyle Diamond Mines

<sup>4</sup> In this study Canadian dollars are used for all valuations.

# THE NWT DIAMOND PIPELINE

Currently only portions of the diamond pipeline exist in the NWT. The NWT pipeline consists of primary producers, sorting for royalty purposes and a small amount of cutting and polishing. There is no resale market for rough or polished diamonds and no commercial jewellery manufacturing.

## The NWT Primary Producers

EKATI™ Diamond Mine is the only mine that is currently in production in the NWT. The Diavik Project has received regulatory approval and is under construction and should begin production in 2003. De Beers (Snap Lake) is another project that is currently in the regulatory process and could begin operation as early as 2006. In addition there will likely be other diamond mines developed over the next two decades. There is also likely to be an expansion of production or extension of existing mine lives, as new economic pipes are identified. But for the purpose of this analysis we will examine only the first three projects.

Table 3 gives estimated operating data and approved or expected mine lives for the three mines/projects<sup>5</sup>.

The EKATI™ Diamond Mine opened in 1998 and currently has an approved mine life of 18 years. The Diavik Project is scheduled to begin production in 2003 and operate for 20 years. The De Beers Project is currently projected to open in 2006 and will have a mine life of 20 years as well.

As shown on Table 3 it is estimated that the three diamond mines in the NWT will produce over \$25.3 billion in revenues over the period 1998-2025; an annual average of \$1.0 billion. The mines will produce a total of 223 million carats, an average of 8.9 million annually.

Table 4 presents the estimated revenues, costs and margins of the diamond mines. It is estimated that with total revenues of \$25.3 billion the diamond mines will spend over \$18.7 billion (74% of revenues) on labour and other goods and services and corporate taxes and royalties. The mines will have an estimated margin of \$6.6 billion or 26% of total revenues.

The mines will also generate employment and other benefits as a result of the direct expenditure on labour and other goods and services. These expenditures will produce GDP (value-added), labour income and employment opportunities for

Project	Start Date (Year)	Life (Years)	Tonnes (Million)	Carats per Tonne	Carats (Million)	CANS /Carat	Value \$Million
Ekati	1998	18	75.2	1.02	77.0	126	9,726
Diavik	2003	20	25.7	4.15	106.7	97	10,320
De Beers	2006	20	22.8	1.72	39.2	136	5,326
Total			123.7	1.80	222.8	114	25,373
Annual Average 1998-2025			4.9		8.9		1,015

<sup>5</sup> This analysis is presented only to give a rough estimate of the economic impact on diamond mining on the NWT and Canada. The estimates are from a number of sources and have been developed by Ellis Consulting Services. Further work is needed to refine the estimates.

the Dogrib, the North and the rest of Canada. The impacts on Southern Canada will be significant because, while most of the goods and services will be purchased in the NWT, much of the production of the goods takes place in Southern Canada. Table 5 presents estimates of these impacts.

It is estimated that the producing mines will contribute \$17.8 billion in direct GDP, \$1.6 billion in indirect and \$704 million in induced GDP in the NWT over the period 1999-2025. In addition another \$1.4 billion in direct GDP, \$5.3 indirect GDP and \$2.9 billion in induced GDP will be generated in Southern Canada as a result of the diamond industry in the NWT. In total it is estimated that the three producing mines will contribute over \$29.8 billion to Canada's GDP during the period 1999-2025.

The mines will also make significant contributions to labour income. It is estimated that the producing diamond mines will generate almost \$3.8 billion in labour income in the NWT and another \$6.1 billion in Southern Canada for a total of \$9.9 billion.

The mines will also generate large employment impacts in the NWT and the rest of Canada. It is estimated that the mines will contribute 50,000 person years (PY's) of employment in the NWT and another 132,000 in the South for a total of 182,000 person years of employment in Canada.

## The NWT Sorting and Valuing Industry

There are two forms of sorting and valuation. The first is for the purposes of calculating royalties and taxes. The second is for marketing purposes.

### Sorting for Government Valuation

Government valuation is required in order to determine the value of the production for calculating royalties and taxes. The government of Canada policy is that all diamonds are to be valued in the NWT for royalty purposes. Sorting for government valuation is a highly skilled occupation and offers only a handful of employment opportunities.

### Sorting for Marketing

The EKATI™ marketing program involves two primary channels. Thirty-five per cent of run of mine production goes to De Beers and the DTC. The remaining 65% is sold through the BHP Billiton Diamonds sales office in Antwerp, Belgium. It takes EKATI™ about two months to value, ship and sort the rough diamonds for sale.

Most of the sales through the Antwerp office are made to a group of core clients. Each core customer receives a distinct assortment of rough diamonds on a five-week cycle. In addition there are what BHP Billiton calls "window" sales,

**Table 4: NWT Diamond Mines Revenues and Gross Margins 1998-2025 (CANS Million)**

	Revenue	Costs <sup>1</sup>	Costs % Revenue	Margin	Margin % Revenue
Diamond Mines	25,373	18,727	74%	6,631	26%

<sup>1</sup> Includes estimates of capital, operating, closing costs, federal royalties, federal and territorial corporate taxes. It does not include fuel, property and other miscellaneous taxes.

involving the sale of smaller, more refined allotments to manufacturers. The main purpose of the "window" sales is to monitor and test current market conditions.

All diamonds go first to Antwerp for market sorting then back to the BHP Billiton sorting facility for sale. From there sales are made to three manufacturers in the Northwest Territories. BHP Billiton has an agreement with the Government of the Northwest Territories (GNWT) to make available up to 10% of the value (about 6000 to 7500 carats every five-week period) of the EKATI™ production to these facilities.

### Sorting in the NWT

Sorting for marketing purposes depends on the marketing method chosen by the producer. If the producer is selling to the Diamond Trading Company (DTC), rough diamonds have to be sorted into several thousand categories to determine the selling price. If the producer is selling on the open market then the number of categories might fall to less than two hundred.

BHP Billiton has a diamond valuation facility in Yellowknife that is used for government valuation and its facility employs about 15 persons.

Diamonds are sorted for market purposes at BHP Billiton's office in Antwerp.

Diavik currently has a sorting facility under construction that is of similar size and located next to BHP Billiton's in Yellowknife. It will be used to sort rough for royalty purposes while sorting for marketing will be done in Antwerp. It is likely that De Beers will do the same.

### The NWT Cutting and Polishing Industry

The Canadian government has taken the position that because of restrictions under North American Free Trade Agreement (NAFTA) it cannot dictate how and where mines sell their output and therefore has no plan to introduce legislation to force producing mines to sell a portion of their output locally or in Canada. Again, because of the NAFTA and The World Trade Organization (WTO), there are also no opportunities for the federal government to use subsidies (for example

**Table 5: Estimated Economic Impacts of Diamond Mines on the NWT**

	1999-2025			Annual Average		
	NWT	South	Total	NWT	South	Total
<b>GDP (\$Million)</b>						
Mine Site	17,818	1,443	19,261	636	52	688
Indirect	1,552	5,318	6,870	55	190	245
Induced	704	2,921	3,626	25	104	129
<b>Total</b>	<b>20,074</b>	<b>9,683</b>	<b>29,757</b>	<b>717</b>	<b>346</b>	<b>1,063</b>
<b>Labour Income (\$Million)</b>						
Mine Site	2,331	1,306	3,637	83	47	130
Indirect	934	3,092	4,026	33	110	144
Induced	500	1,692	2,192	18	60	78
<b>Total</b>	<b>3,765</b>	<b>6,090</b>	<b>9,855</b>	<b>134</b>	<b>217</b>	<b>352</b>
<b>Employment (PY's)</b>						
Mine Site	27,079	13,594	40,673	967	485	1,453
Indirect	14,477	70,882	85,360	517	2,532	3,049
Induced	8,604	47,246	55,850	307	1,687	1,995
<b>Total</b>	<b>50,161</b>	<b>131,723</b>	<b>181,883</b>	<b>1,791</b>	<b>4,704</b>	<b>6,496</b>

subsidizing the price of rough to local cutters) to promote the establishment of a cutting and polishing industry in Canada. Nonetheless, the federal government has stated that it fully supports the development of an economically viable cutting and polishing industry in the NWT.

The GNWT has stated that the establishment of secondary diamond activities is a high government priority and has introduced a number of substantial governmental incentives, both in the form of grants for training and acquisition of equipment as well as loan guarantees to facilitate purchase of the raw material<sup>6</sup>.

### Producer Support to Local Industry

BHP Billiton has agreed to make a limited amount of rough available to qualified diamond manufacturers in the Northwest Territories<sup>7</sup>. In total BHP Billiton has agreed to allocate up to 10% of the value of the output or about 6,000 to 7,500 carats per five-week period to local companies. The rough is sold at market prices and there is no difference between the raw material price in Antwerp or in Yellowknife. The producers in Yellowknife do have an advantage over many of their competitors in that they pay what major

sightholders do for rough in Antwerp. Without this agreement they would be forced to buy rough much further down the pipeline and incur higher costs due to dealer markups and other marketing costs.

In order to take advantage of BHP Billiton's allocation of rough diamonds to the NWT a prospective company must first apply to the GNWT for approval before it begins negotiations with BHP Billiton. BHP Billiton is not obligated to supply rough to all or only government approved proposals but it is very unlikely that someone without approval would be successful.

BHP Billiton does not want to develop a secondary rough market in Yellowknife or in the Northwest Territories. It therefore supplies the local cutting and polishing plants with exactly the assortments and the types of goods that they require. This means that there is no need for them to sell off excess goods that cannot be used in their own manufacturing. Currently BHP Billiton is supplying local producers with better quality rough; from 0.7 up to 4 carats in size.

**Table 6: Estimated Impact of Cutting and Polishing Industry on the NWT Economy at Full Employment and Productivity**

Impacts on the NWT Economy	GDP at Factor Cost (\$000's)	Labour Income (\$000's)	Employment (number)
Direct	11,271	6,448	120
Indirect	633	549	12
Induced	2,041	988	24
<b>Total</b>	<b>13,944</b>	<b>7,985</b>	<b>156</b>
Impact of Labour Income on Taxes	Federal (\$000's)	Territorial (\$000's)	Total (\$000's)
Direct Taxes	1,623	395	2,018
Indirect Taxes	245	227	472
<b>Total</b>	<b>1,868</b>	<b>622</b>	<b>2,490</b>

<sup>6</sup> The GNWT makes training funds (subject to budget restrictions) available for any company coming into the Northwest Territories. The GNWT has offered loan guarantees to the diamond industry that are not normally made available to other industries.

<sup>7</sup> The agreement is with the GNWT. It is likely that Diavik and other producers will formalize similar agreements.

## The Local Cutting and Polishing Industry

Currently there are three local cutting and polishing operations in the NWT. All three are of similar size with a capacity for about 50 cutters and are in the process of recruiting and training local residents.

### *Sirius Diamonds NWT Ltd.*

Sirius Diamonds was the NWT's first cutting and polishing operation and began production in June of 1999 at its location at the Yellowknife airport. The investment in plant and equipment cost was about \$2.0 million. The facility employs about 25 cutters and another five people in administration and management. Currently about five of these employees are Aboriginal. It processes mid-grade to higher quality stones and markets its output primarily in Canada and the United States under the Polar Bear brand.

### *Deton'Cho Diamonds*

Deton'Cho Diamonds Inc. (DDI) was formed in 2000 for the purpose of establishing a diamond processing, manufacturing and marketing organization in Ndilo, Northwest Territories. The company's mandate is to process rough diamonds into high quality finished diamond products. DDI provides economic benefits through training, employment, purchasing and investment opportunities that reside in the North. The Deton'Cho plant officially opened in April of 2000 and has a similar size and cost as Sirius Diamonds.

### *Arslanian Cutting Works (NWT) Ltd.*

Arslanian Cutting Works is a family-owned and operated business with major operations in Armenia and offices over the world. Recently, Rosy Blue, one of the world's largest diamond trading companies, entered into an alliance with Arslanian Cutting Works. Arslanian began production in 2000 and is located at the Yellowknife airport. Arslanian produces triple A Ekati cut diamonds (a high end product) and markets them in Canada. The major portion of workers come from Armenia on a six-month contracts but there are some Aboriginal apprentices.

## Estimated Economic Impact of the NWT Cutting and Polishing Industry

Table 6 presents the estimated impact of the current cutting and polishing industry on the NWT economy when it is operating at full productivity.

It is estimated that the industry will directly and indirectly contribute almost \$14 million to the NWT GDP annually and employ 156 persons with a gross payroll of almost \$8 million.

In addition, it is estimated that the federal and NWT governments will receive \$1.9 million and \$0.6 million respectively in annual tax revenues as a result of the labour income generated by the industry.



*The GNWT has stated that the establishment of secondary diamond activities is a high government priority and has introduced a number of substantial governmental incentives ...*

## Profitability of the NWT Cutting and Polishing Industry

It is too early to determine how successful the NWT secondary processing industry will be. All of the operations are currently receiving forms of financial support and productivity levels are still rising as training takes place. The establishments are also in the early stages of developing a presence in the polished diamond market and developing marketing strategies and specialized products.

Table 7 presents forecast profitability of the existing NWT cutting and polishing industry, which consists of three operations.

Once all employees are adequately trained and expected productivity is reached there will be roughly 120 employees and a gross payroll of \$6.5 million. This represents an average wage of about \$53,700 per year or just under \$4,500 per month.

It is projected that the industry will purchase and process almost 73,000 rough carats at a cost of almost \$75 million, an average cost of just over \$1,000 per carat. The cost of rough will account for 85% of the final production value.

Total costs are estimated at 12% of sales. Labour costs, other manufacturing costs and depreciation and interest account for 7%, 3% and 2% of total costs respectively.

It is estimated that the industry will sell almost 33,000 polished stones for revenues of over \$88 million, an average selling price of \$2,700 per gem, and have a profit (before taxes) equivalent to 4% of sales.

**Table 7: NWT Diamond Cutting and Polishing Industry Estimated Financial Data at Full Employment and Productivity**

	(\$000's)	% of Sales
Revenue	88,455	
Rough Carats purchased (Number)	72,800	
Purchase price (\$)	1,027	
Cost of rough (\$000's)	74,789	85%
Yield (Polished/Rough)	0.45	
Polished Number of carats	32,760	
Selling price (\$)	2,700	
Gross Margin (\$000's)	13,666	15%
Costs	10,299	12%
Labour	6,448	7%
Other Manufacturing	2,396	3%
Depreciation and Interest	1,456	2%
Profit	3,367	4%

# THE ARGYLE EXPERIENCE

## The Argyle Diamond Mine

The Argyle Diamond Mine (Argyle) is located in the Kimberley region of Western Australia. Argyle is a conventional open pit mine supported by a small alluvial operation and is one of the world's leading producers of diamonds. The mine opened in 1985 as a joint venture between Rio Tinto<sup>8</sup> (57%), Ashton Mining Ltd (38%) and the Western Australian Diamond Trust (5%).

In 1998 Argyle accounted for 37% of the world production of diamonds but, because only a small portion of its output is of gem quality, Argyle's production represented less than 5% of the annual world diamond supply by value. About 5% of Argyle's production is of gem quality (the famous Argyle pinks constitute only about 0.1% of total production), 45% is of near gem quality and 50% is industrial grade. The gem quality diamonds generate 50% of revenues while the near gem grade contribute 45% of revenues. The industrial grade diamonds contributed just 5% of revenues.

Argyle markets all of its gem and industrial quality diamonds independently through its own sales office in Antwerp, Belgium. A small portion of its

rough gem diamonds, mostly the large pink gem diamonds, are further processed in Australia prior to final sale.

## The Relevance of Argyle's Experience to the NWT

The Argyle mine is required by law to meet certain targets in developing a local value-added industry and has spent many years and millions of dollars in research and testing to determine what development is possible and what is not. There was considerable effort and expertise put forward in attempting to develop these activities and much of what they learned is very relevant to the NWT.

The situation faced by the Argyle mine in attempting to develop secondary processing in Australia has many parallels to those faced in the NWT. Both Australia and the NWT are located far from the major trading centres for polished diamonds and both have similar labour and other costs. Table 8 and Chart 1 present comparisons of labour costs for manufacturers in a number of countries in the diamond processing business. The numbers adjusted for exchange rates are presented in index form with Canada equaling 100<sup>9</sup>.



**Table 8: Hourly Compensation Costs for Production Workers in Manufacturing**

Index Canada = 100	1998	1999	2000
Canada	100	100	100
United States	119	122	123
Australia	96	100	88
Israel	77	76	80
India	5	5	4

Source: US Bureau of Labour Statistics, Argyle Diamond Mines

<sup>8</sup> Rio Tinto has since purchased Ashton Mining Ltd and now owns 99.8% with the remaining 0.2% being owned by the Western Australian Diamond Trust. Rio Tinto also owns 60% of the NWT Diavik Project.

<sup>9</sup> The US Bureau of Labour Statistics does not publish an average manufacturing wage rate for India. The estimate for India was developed using information supplied by Argyle Diamond Mines.

Australia and Canada generally have comparable labour costs (although the recent fall of the Australian dollar has put them in a more competitive position). The United States has the highest labour costs, almost one-quarter higher in 2000. In India labour costs are only about 5% of those in Canada while in Israel they are about 80% of those in Canada.

It must also be noted that labour costs in the NWT are generally higher than those in Southern Canada, which would put the NWT at a further competitive disadvantage to Australia and the other cutting centres.

### **Argyle's Obligation to Support a Secondary Diamond Industry**

When the Argyle mine was being developed there was a strong expectation among the public and the State Government that there should be some processing of Argyle's diamonds in Western Australia.

When it began production the Argyle Joint Venture Group was required by the State Government to do its best to develop a secondary diamond industry in Western Australia. The obligations, which are subject to penalty if not met, are contained in the Diamond (Argyle Diamond Mines Joint Venture) Agreement Act 1981, No. 108, which contains the following provisions:

- \* Argyle was required to establish sorting facilities within a year of the start of mining.
- \* Argyle was required to investigate the feasibility of further processing and use their best endeavours to promote the establishment of facilities to achieve the maximum further processing of diamonds within the State.
- \* Within five years after the start of production, Argyle was required to undertake further processing activities to increase the sales value of diamonds by the equivalent of 20% of profit before tax, less royalty payable.
- \* The contribution of sorting to the increase in sales value achieved is limited to a maximum of 50% of the required increase.
- \* If Argyle did not meet this obligation, penalties in the form of additional royalties are prescribed. The maximum additional royalty is equal to 10% of the normal royalties due<sup>10</sup>. The actual percentage penalty depends upon the increase in the sales value of diamonds that is achieved.
- \* The Agreement provides that Argyle will be released from the obligation to pay the additional royalty if they can reasonably demonstrate that further processing at the level necessary to achieve the prescribed increase in sales value would not likely to result in an after-tax internal rate of return of 10%.

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*It must also be noted that labour costs in the NWT are generally higher than those in Southern Canada, which would put the NWT at a further competitive disadvantage to Australia and the other cutting centres.*

<sup>10</sup> The prescribed royalty rate for diamonds in Western Australia is 7.5% of the value so the maximum penalty could reach 0.75%.

## History of Argyle's Cutting and Polishing Activities

Argyle's initial sales contract in 1982 was with the Central Selling Organization (now the DTC) and under this contract, Argyle's access to its gems was severely restricted. Argyle was allowed to retain only sufficient stones to maintain an Australian processing facility with a capacity of up to 20 polishers. There were also restrictions on what stones could be selected.

Argyle established a pilot scale cutting and polishing facility in October of 1984. The operation began with the recruitment of 8 experienced polishers from Belgium and South Africa. The primary objective of this facility was to assess the technical and economic feasibility of further processing Argyle's gems in Western Australia and determine the extent to which polishing could satisfy their further processing obligations. The facility undertook research in as wide of a range of goods as possible.

In 1987, after two years of experience with operating of the pilot scale facility, a feasibility study was produced. It concluded that:

1. Further processing in Western Australia would be economically viable for only a limited range of rough diamonds. The extent to which cutting and polishing could satisfy Argyle's further processing obligations was limited.
2. Of the rough processed to that time, about 65% would not be profitable to manufacture in Australia.

3. That by concentrating on large pink diamonds and some other large gems there was some scope for increasing the capacity of the facility to about 6,000 carats of rough per annum (compared to the capacity of the pilot facility of about 4,000 carats per month).

In 1991 a new sales contract was negotiated with the CSO that allowed Argyle access to all of its pink diamonds, but access to other gem material for further processing was still restricted. Argyle had to sell and buy back its own gems from the CSO and pay a 10% commission on the transaction.

Over the next five years the level of polishing in Australia remained almost the same although, because it was found that it was not economic to process the smaller pink diamonds, they were sent overseas for toll processing (to low labour cost countries such as India). Argyle continued to process profitable non-pink rough (large gems) in Australia as there were healthy margins and the marginal production and overhead costs were low.

In 1996 Argyle made the decision not to renew its sales contract with the CSO and began to sell all of its production on the open market. This had an immediate impact on the profitability of polishing operations because it had the impact of increasing the "opportunity" cost of the rough by 10%. This occurred because Argyle was no longer paying a 10% commission to the CSO and could in effect sell the gems for 10% more on the open market rather than processing them. This reduced the margins on polishing and it became more profitable to sell some of the stones that would previously have been manufactured as rough.

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*Further processing in Western Australia would be economically viable for only a limited range of rough diamonds.*

Argyle reviewed its polishing strategy in 1998. The objective of the review was to analyze the economics of manufacturing the various broad categories of rough and to determine the optimum strategy to maximize net revenue.

The review concluded that:

1. The large pink gem material was the only category of Argyle's rough production that was more profitable to manufacture than to sell as rough. Argyle has a significant competitive advantage in this area because it is the only mine that produces a regular supply of pinks and they are generally of more intense colour than pinks from other mines.
2. For all other gem diamonds, Argyle is at a competitive disadvantage relative to other cutting centres. This is because its labour costs are high and it is removed from the trading centres.

## Argyle's Experience in Further Processing by Product Group

Argyle's work with testing potential products that could be processed was extensive and it included a wide range of initiatives that are summarized below:

### Industrial Diamonds

Industrial diamonds are used to produce a number of products including diamond grit and powders, polishing wheels, drill bits, diamond saw blades, files and power tools.

Between 1986 and 1994 Argyle Diamonds undertook a number of projects at the cost of about \$4.5 million AUD (Australian Dollars) to test the economic viability of producing a wide range of products. They concluded that all options were uneconomic because of the competition from better-quality and cheaper synthetic diamond products. The average price of Argyle's industrial diamond production fell by 75% since 1986, reflecting the lack of demand for this product in industrial applications. Below is a summary of the applications tested and found to be uneconomic:

### *Production of Diamond Grit*

The main use of low-grade industrial diamonds is for crushing to produce diamond grits and powders. When Argyle began operations it nearly doubled the world's production of natural diamond grit. Only a very small proportion of world demand for diamond grit is supplied by natural grits and synthetic grits have about 95% of the market.

Argyle opened a pilot scale grit production facility in 1986 to test the industrial applications of its production. Its objective was to produce and sell a higher value-added product than rough and develop downstream applications incorporating Argyle grit. After reviewing the initial results Argyle concluded that although it had the capability to produce natural grits comparable to other natural grits, their ability to be competitive in this production was not encouraging, especially given the low yields achieved to that time.

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*Argyle concluded that all options were uneconomic because of the competition from better-quality and cheaper synthetic diamond products.*

In an effort to increase yields and test further options Argyle relocated the test grit production facility and upgraded its capacity and equipment. After experience with the upgraded plant Argyle determined that:

- \* Argyle grit had no technical advantages relative to grits produced from other productions (i.e. there was no competitive advantage).
- \* Distribution was a major barrier to entry for the industrial grits business.
- \* The increasing competitiveness of synthetic grits against natural grits undermined the long-term viability of the enterprise.

Argyle concluded that it had no competitive advantage over other producers and faced disadvantages in marketing and distribution. Argyle discontinued the project in late 1991.

#### *Drill Bits for the Minerals Industry*

Several diamond impregnated drill bits were manufactured and tested incorporating Argyle grit. The results were that while the bits performed comparably to bits with other natural grits they were still inferior in performance to bits containing synthetic grit.

Argyle also pursued a project to utilize the special hardness of Argyle diamonds but problems with heat generation made the development costs too high to likely be recouped in the highly competitive market.

#### *Diamond Saw Blades*

A number of organizations, including Diamond Saws of Melbourne, the University of Melbourne and Dembicon (an Adelaide-based diamond tool manufacturer), tested Argyle grit in diamond saws to assess the performance relative to synthetics.

The findings were that, while Argyle grit is comparable to other natural grit, synthetic grit outperforms natural grit in most applications.

In total Argyle spent just under \$3 million AUD on the above three projects.

#### *Diamond Impregnated Scaifes (Polishing Wheels)*

Argyle's diamonds are significantly harder to polish than diamonds from other sources because of their twisted grain structure. Tests were undertaken that determined that Argyle diamonds took on average, more than 50% longer to polish than similar diamonds from other sources. Some manufacturers in India found that by using impregnated scaifes (polishing wheels) imported from Belgium they could increase the productivity of polishing Argyle diamonds.

The only producers of diamond scaifes at the time were in Belgium and the cost was beyond the reach of most Indian manufacturers. Argyle conducted research to develop a process to manufacture the impregnated scaifes and provided technical and financial support to an Indian diamond tool manufacturer to assist it in establishing a domestic supply of the scaifes.

After substantial technical and logistical problems Argyle ceased its involvement in this project. The total cost of this project to Argyle was \$250,000 AUD.

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*Distribution was a major barrier to entry for the industrial grits business.*

### *Diamond Compacts/Composites*

In industrial applications where a large grinding surface is required diamond composites are often used. Diamond composite contains diamond powder mixed with a binder. The diamond content in composites is generally in the range of 60% to 90%.

Argyle commissioned a number of consultants and research organizations including CSIRO Division of Materials Science and PA Consulting (UK) to undertake research to develop a diamond composite but, even though some patents were applied for, the research did not result in the development of a commercial product.

The total estimated cost to Argyle of this research was \$170,000 AUD.

### *Seed Scarifiers*

Following enquiries from a Western Australian clover seed processor, Argyle developed a seed scarifier to improve the germination rates of hard seed. Although a successful product was developed the demand was insufficient to justify production. Argyle spent about \$5,000 AUD on the project.

### *Diamond Nail Files*

Argyle developed several prototypes ranging from inexpensive models to ones with gold plating incorporating polished diamonds. Some test marketing was done but it was determined the demand was too small and there was no real competitive advantage over other products. The estimated cost to Argyle was \$8,000 AUD.

### *Thermo-Chemical Processing*

Argyle researched a process that allows the controlled removal of diamond material using a nickel template acting against diamond in a heated furnace containing certain gases. It was found that due to technical problems there was a low probability of success and the project was discontinued. The cost to Argyle was \$60,000 AUD.

### *Market Studies of Power Tool Opportunities*

Argyle conducted market research studies in Australia and the United States of America to assess the potential for expanding the market for power tool accessories containing diamond grits for handymen and tradesmen. Argyle could not find a diamond tool manufacturer that was interested in pursuing the testing and development necessary to incorporate a new raw material into their process. Argyle spent about \$30,000 AUD on this project.

### *Other Projects*

Argyle also pursued several other projects aimed at reducing the final cost in using its low-value but labour-intensive small gem diamonds. The object was to reduce the costs of using these diamonds and thereby increase the demand for them. These other projects included robotic development work to set polished diamonds in jewellery, a system to automate the sorting of polished diamonds and a process that would attach small polished diamonds to fabric. Although some limited success was met with these projects they were all found to be uneconomic or had technical problems that remained unresolved. The cost to Argyle of this work was \$383,000 AUD.

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*Argyle's report to the Minister on further processing in November of 1995 stated that the "bottom end" of the large white material being processed at the time was, in many cases, producing financial losses.*

### Small Gem/Near Gem Diamonds

The small, low-quality diamonds that are very labour-intensive are generally processed in India where average labour costs are less than 5% of what they are in Australia. Argyle found that the costs of manufacturing this material would far exceed the value of the polished product.

### Small Pink Gem Diamonds

In 1995, at the request of the government, Argyle estimated the net present value (NPV) of manufacturing all of Argyle's small pinks in Australia. Argyle estimated the NPV at negative \$73 million AUD. The processing of this material is extremely labour-intensive and Argyle concluded that there is no likelihood that manufacturing this material in Australia would be viable during the life of the Argyle mine.

### Medium-Size Gem Diamonds

The major cutting centre for medium-size, better-quality stones is Israel, where labour costs are less than 50% of Australian labour costs. The average value-added to the rough by the Israeli cutting industry is around 10%. Argyle concluded that as it was only marginally profitable to manufacture this material in Israel, it is clear that the higher labour costs would make it uneconomic to process in Australia.

### Large White Gem Diamonds

Argyle's report to the Minister on further processing in November of 1995 stated that the "bottom end" of the large white material being processed at the time was, in many cases, producing financial losses. Argyle has determined that the economics of processing the larger white material has deteriorated even further since that time.

The estimated contribution to profit from processing larger white diamonds is given in Table 9. Over the period 1994 to 1997 Argyle earned a small profit before tax on these operations but in 1998 incurred a loss. On average, over the period 1994-98, the cost of rough constituted 75% of the value of sales, other direct costs 14%, the gross margin 11% and pre-tax profit 8%.

Most of the world's large white gem material is processed in Israel or, for rough with a value of more than US\$ 1,000/ct, in Antwerp. For high valued gems the benefit of low labour costs is marginalized, as they are a smaller component of the more expensive goods, and therefore centres such as India lose their competitive edge in that area.

**Table 9: Argyle Sales of White Diamonds Polished In Western Australia 1994-1998**

	1994	1995	1996	1997	1998	Average
	(000's of Australian Dollars)					
Sales Revenue	4,734	4,119	5,560	2,940	2,618	3,994
Less:						
Cost of Rough	3,708	3,158	4,096	1,796	2,173	2,986
Other Direct Costs	611	520	607	558	497	559
Subtotal Costs	4,319	3,677	4,703	2,354	2,670	3,545
Gross Margin	415	442	858	586	-53	450
Less:						
Corporate Costs	110	94	109	207	185	141
Profit before Tax	305	348	748	378	-237	309
	Percentage of Total Sales					
Cost of Rough	78%	77%	74%	61%	83%	75%
Other Direct Costs	13%	13%	11%	19%	19%	14%
Gross Margin	9%	11%	15%	20%	-2%	11%
Pre-Tax Profit	6%	8%	13%	13%	-9%	8%

This means that other factors, such as closeness to markets and the skill and experience of the local labour force become more of a deciding factor. These factors give cutting centres like Israel an advantage over India. The Israeli cutting and polishing industry has lower labour costs than Australia and is located in a developed marketing centre for diamonds which gives them a competitive advantage over Argyle for this product.

## **Argyle's Experience with Sorting Operations**

In 1991 when Argyle took over responsibility for sorting, it employed and trained its own workforce. It took six months of intensive training followed by six months of on-the-job training before the employees were ready to begin the job. Argyle found that several more years of experience of production sorting were usually required before they became proficient in sorting the more valuable rough.

The job of sorting requires great concentration skills and the ability to do repetitive tasks. Argyle developed a sophisticated screening and testing methodology to recruit suitable sorting personnel and found that the proportion of applicants with the necessary attributes is only about 2% of the applicants. Therefore over 50 applicants had to be screened to get just one employee who was suited for the position. This means that the local labour pool must be fairly large to support the industry - unless the labour is to be imported from other areas of the world.

Argyle also found that as a result of major technological improvements an increasing amount of the material is sorted by machine only. When Argyle first starting sorting, 45% of production (by volume) was sorted by machine; today it is over 95%. This has resulted in the number of persons employed in the sorting operation at Argyle falling from a peak of 60 to about 25 persons.

Argyle currently hand-sorts all material that is +2 carats and gem quality.

## **Argyle's Success at Meeting its Further Processing Obligations**

Under the Diamond Agreement Act, Argyle Diamonds is to increase the sales value of polished diamonds by a certain target or pay a penalty of further royalties. Argyle was to be given an exemption from the penalty if they could demonstrate that they could not achieve an after-tax internal rate of return of at least 10% on the value-added operations.

Argyle has applied for release from the obligation to pay additional royalties on three occasions. On each occasion the Minister waived the additional royalty for a period of three years on the basis that the additional further processing to achieve the increase in sales value required to satisfy the Diamond Agreement Act obligations would not result in the required rate of return.

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*Argyle developed a sophisticated screening and testing methodology to recruit suitable sorting personnel and found that the proportion of applicants with the necessary attributes is only about 2% of the applicants.*

## Argyle's Impact on the Local Economy

### Impact of Further Processing Obligations on the Local Economy

It is clear from Argyle's experience that the further processing obligations imposed by the State have not made a significant contribution to the local economy. In total only about 50 people are employed in Argyle's manufacturing and sorting business.

Argyle determined that the majority of its products could not be viably processed in Australia. Only large pink (0.1% of total production) and selected large white gems could be profitably processed locally.

### Impact of Cutting and Polishing on the Local Economy

In 1996 Argyle had about 45 people involved in polished manufacturing, sales and sales support. However about half of these employees were involved in the preparation of rough for overseas toll processing and the grading and sale of the resulting polished. Since then, with the fall in the demand for polished since 1997, the total number of employees engaged in further processing activities, including sales, has fallen to 20.

### Impact of Sorting and Valuation on the Local Economy

Since the Argyle mined opened, the sorting and valuation operations have gone through a series of changes. Due to changes in the method of selling (i.e. from the CSO to the open market) and significant technological improvement, the number of sorting staff employed by Argyle has fallen from 60 to about 25.

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*Argyle determined that the majority of its products could not be viably processed in Australia. Only large pink (0.1% of total production) and selected large white gems could be profitably processed locally.*

# OPPORTUNITIES FOR DEVELOPMENT IN THE NWT

## Opportunities for Involvement in Primary Production in the NWT

### Direct Employment at Diamond Mines in the NWT

As shown on Table 5, it is estimated that the diamond mining industry will provide over 50 thousand person-years of employment in the NWT and another 132 thousand in Southern Canada during the period 1999–2025.

The direct jobs at the mines are relatively high-paying with full benefits. The division of employment between the North and South is based on the experience of the EKATI™ and the targets adopted by Diavik.

The Dogrib have aggressively pursued employment guarantees through Impact Benefit Agreements<sup>11</sup> (IBA's) and work at the mines provides an important source of income and work experience.

One major obstacle to expanding the opportunity for employment at the mines and their suppliers and advancement into the trades and professional positions is the relatively low educational levels in the North.

If the NWT is to take full advantage of employment opportunities presented by the mines more success has to be achieved in basic education and trades and apprenticeship programs.

## Supplying Goods and Services to the NWT Mines

As shown on Table 4, the diamond mining industry will spend over \$18.7 billion on goods and services over the life of the three mines. It is expected that about 70% of these purchases will be made in the NWT<sup>12</sup>. These purchases will provide a host of opportunities for building the business capacity of the Dogrib and the North in general.

The Dogrib have been moderately successful to date in pursuing business opportunities through negotiations, and with the expansion of mining activities these initiatives should provide even more benefits in the future.

## Opportunity for Equity Participation in NWT Mines

The diamond mines that are, or will be, operating in the NWT will very likely be profitable and return significant earnings to shareholders. Equity ownership in the mines presents one of the best opportunities for wealth generation. Equity ownership carries with it a risk and the requirement for capital contributions, but it presents the prospect of a long-term stream of earnings that can provide an investment pool to build wealth and business capacity in the North.

The pursuit of policies that will permit the Dogrib to obtain equity participation in the diamond industry should be a priority.

*11 These are private and confidential agreements signed with Aboriginal groups who historically shared the land on which the mines are located. They usually include provisions for employment and business opportunities and a form of cash payment. With BHP Billiton they were referred to as Impact Benefit Agreements (IBA's) while in the case of Diavik they were referred to as Participation Agreements (PA's).*

*12 While the purchases will be made in the NWT the vast majority of goods will be produced in Southern Canada. The impact from the purchase of goods in the NWT is often any wholesale, retail or transportation margin associated with the purchase.*

## Opportunities for Expansion of Sorting in the NWT

### Expansion of Sorting for Royalty Evaluation

The Government of Canada has ruled sorting for valuation purposes to determine royalties must be done in the NWT. Currently BHP Billiton operates a facility that employs about 15 people performing duties mainly associated with royalty evaluation purposes. Diavik has a sorting facility currently under construction in Yellowknife that will serve a similar function and it is expected that De Beers will do the same.

Even if all three mines were to establish sorting operations, the total expected employment to support operations of this type would not likely exceed 45 to 50 persons.

### Expansion of Sorting for Marketing

It is expected that Diavik will follow BHP Billiton and sell most, if not all, of its output on the open market. When the Snap Lake Project<sup>13</sup> begins production it is expected that its output will be sold through the DTC.

There are limited opportunities for sorting for marketing purposes in the NWT. Like the Argyle mine, the NWT is located far from the major diamond markets and that would make it difficult to develop a sorting for marketing industry in the North. There would also be problems associated with drawing from a small and inexperienced labour pool.

## Opportunities for Expansion of Cutting and Polishing in the NWT

The cutting and polishing industries are what are referred to as "footloose" businesses. This means that they are not tied to one specific location because of physical, economic and logistical factors and are free to locate where most advantageous. For example, it is obvious the location of a diamond mine is fixed because it has to be located at the site of the resource; but a sorting or diamond cutting and polishing facility is not tied to any specific location because its raw material (the rough) is very small and easily transportable. So unless restrictions are put on the movement of rough by governments, it will eventually be moved to and processed at locations that have a "comparative advantage".

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*There are limited opportunities for sorting for marketing purposes in the NWT. Like the Argyle mine, the NWT is located far from the major diamond markets and that would make it difficult to develop a sorting for marketing industry in the North.*

<sup>13</sup> The Snap Lake Project is wholly owned by De Beers.

A comparative advantage means that a location has an advantage over other possible locations because it has lower input costs and/or has more favourable access to some other required resource.

What this means is that just because the rough is produced in the NWT, it does not necessarily follow that it makes economic or business sense to process it here. One could argue that if the NWT had a comparative advantage in sorting, cutting or processing diamonds, then a facility might have been built prior to diamonds being discovered in the North. For example, consider the NWT's oil and gas industry's experience where the only oil refinery in the NWT closed in 1996 because it was uneconomic in comparison to refineries in Edmonton.

As a result of economic forces, diamond cutting and polishing is done in many locations around the world. Each centre focusses on a particular section of the market.

The location where a stone is cut generally depends on the size and quality of the stone. Smaller "near-gem" stones are cut by a large number of skilled, low-wage workers in Southeast Asia and India. Mechanized factories with skilled workers cut mid-range stones in Israel and Belgium. Master cutters work on large stones in New York.

Recently India has begun to move into the cutting of larger stones and is starting to directly compete with Israel and Belgium.

Generally the industry is becoming one in which a "niche" has to be identified where the prospective operation has a distinct advantage over other locations. An obvious example of this is Argyle's decision to process its large pink diamonds where it has a near-monopoly on the source of the product.

There are several obstacles that have to be overcome before a "niche" market can be established. These include the need to undertake significant and expensive research and development work, as well as the requirement to develop and implement a successful (and usually expensive) marketing strategy.

### *Industrial Diamonds*

Industrial diamonds are used to produce a number of products including diamond grit and powders, polishing wheels, drill bits, diamond saw blades, files and power tools.

The current market is very specialized and it is very unlikely to have any potential for development in the North.

Between 1986 and 1994 Argyle undertook a number of projects to test the economic viability of producing a wide range of products. They concluded that all options were uneconomic because of the competition from better-quality and cheaper synthetic diamond products.

### *Small Gem/Near Gem Diamonds*

India has become a dominant force in polished diamonds under a half carat. Small, low quality diamonds that are very labour-intensive are generally processed in India where average labour costs are less than 5% of what they are in Australia and Canada. Argyle found that the costs of manufacturing this material in Australia would far exceed the value of the polished product.

Due to high labour and other costs there would be no opportunity to develop this type of cutting and polishing operation in the NWT.

### *Medium-Size Gem Diamonds*

As with the smaller stones, Argyle found that it could not profitably process medium-sized diamonds. In Israel the average value-added to the rough by the cutting industry is 10%. The NWT, with similar labour costs to Australia, would not likely be able to economically process this range of product. As shown in Table 6, estimated manufacturing costs of the larger gems constitute 12% of the sales value of the polished product. It is almost certain that with this level of costs, the NWT could not compete with the Israeli cutting industry.

### *Large White Gem Diamonds*

The benefit of low labour costs is reduced with large gemstones, as labour costs are a smaller component of expensive goods. This results in other factors becoming more dominant when determining locations that have competitive advantages.

For example Argyle found that they could profitably process some of the larger white gem diamonds, but it was only for a range of select stones.

As shown on Table 7, it is estimated that it may be possible to cut and polish large white gem diamonds in the NWT, but only marginally so. The expected NWT profit rate of 4% of sales is lower than that of Argyle's, which averaged 8% of sales for their processing of large white gems. Argyle found that it was uneconomic to process most of the large white diamonds, and there is no reason to believe that the NWT producers would be more successful. As with Argyle (with the large pink gems), the only way the NWT industry will be able to succeed is to increase productivity and carve out a niche market of its own.

Diavik has entered into a Memorandum of Understanding with the Government of the Northwest Territories relating to the availability of rough diamonds to secondary diamond industry manufacturers based in the NWT<sup>14</sup>. The MOU contains a commitment to negotiate an agreement on issues related to making some of its production available for sale to NWT producers.

Although no commitments have been made by De Beers, the owner of the Snap Lake Project, it is likely that they would also agree to some form of commitment to local supply.

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*Argyle found that it was uneconomic to process most of the large white diamonds, and there is no reason to believe that the NWT producers would be more successful.*

<sup>14</sup> Diavik Diamond Project Socio-Economic Monitoring Agreement. Part IV, Article 4.2

If the cutting and polishing industry can be demonstrated to be viable (profitable) and with access to rough provided by three mines, there could be an expansion of the existing operations.

The Argyle experience demonstrates that the opportunities for further processing were limited and marginal in Australia. The competitive position of the NWT is very similar to Australia in terms of labour costs and distance from markets.

In short, there is a very significant risk in entering the cutting industry in the NWT and it will take a number of years before the success of the current ventures can be assessed. It would be more prudent at this time for the Dogrib to pursue other areas where benefits may be greater and risks lower.

## **Opportunities for the Jewellery Manufacturing/Retail Sector in the NWT**

There is a wealth of artistic talent and skills in the North that could be used to create a distinctive range of Northern jewellery. Production of jewellery is very labour-intensive and often labour costs are higher than material costs. While low-value products could be designed in the North, it may be necessary to out-source the manufacturing to countries such as India that have very low labour costs. Having said that, there may be an opportunity for some higher-end jewellery to be designed and manufactured in NWT communities.

Potential opportunities may exist to form joint ventures with Southern firms to establish manufacturing operations in the North. If commercial jewellery manufacturing is established in the communities, it could present small retail business ownership opportunities for the Dogrib.

# CONCLUSION

The diamond industry is the largest source of wealth creation in the NWT and currently offers the greatest opportunity for economic development in the North.

On the production side, employment and business opportunities provided by the diamond industry promise to provide long-term benefits to the Dogrib and other residents in the NWT. To maximize the benefits available, more training and education must take place and greater efforts must be taken to build capacity of all types in Northern communities. The Dogrib are responding by increasing capacity and developing businesses to access the opportunities available in providing goods and services to the diamond mines.

The area of equity participation in mine development presents an excellent opportunity to participate directly in wealth creation and would provide a source of cash flow that could be used to invest in infrastructure and business, helping the Dogrib and Northern communities build their economies.

Opportunities to develop a large secondary diamond processing industry are limited by high labour costs and distance from markets. The NWT does not have a competitive advantage over existing diamond cutting and polishing centres. For it to become successful it would take significant productivity gains and the development of a "niche" market where it could compete with the lower cost centres. This would likely require a long period of business losses or public subsidies. The secondary cutting and polishing industry currently carries significant risks with no offsetting prospects for reasonable profit levels.

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# GLOSSARY OF DIAMOND TERMS

## **bort**

Natural, polycrystalline diamond which occasionally forms as single crystals; it is milled for use in industrial abrasives.

## **bourse**

Organization of diamond dealers, manufacturers, brokers, and wholesalers who join together to transact business and protect their mutual interests. There are diamond bourses in almost every major manufacturing centre.

## **carat**

Metric carat, the standard unit of weight used for gem stones. One carat equals 0.200 grams (or 200 milligrams). Usually abbreviated ct.

## **crushing bort**

Lowest quality of industrial diamond; crushing bort is ground into diamond powder for use as an abrasive.

## **diamond pipeline**

Metaphor describing the various stages through which diamonds pass, from mining to marketing, before they are sold to the consumer.

## **polished goods**

Finished diamonds available for sale.

## **rough**

Diamond of either gem or industrial quality, as it is recovered from the earth, prior to undergoing any manufacturing process.

## **sightholder**

Diamond dealer or manufacturer invited by the DTC to buy rough diamonds at a sight. The number of sightholders may vary according to economic conditions.