



global witness

Conflict Diamonds

POSSIBILITIES FOR THE IDENTIFICATION,
CERTIFICATION AND CONTROL OF DIAMONDS

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Global Witness is a British based non-governmental organisation which focuses on the links between environmental and human rights abuses, especially the impacts of natural resource exploitation upon countries and their people. Using pioneering investigative techniques Global Witness compiles information and evidence to be used in lobbying and to raise awareness. Global Witness' information is used to brief governments, inter-governmental organisations, NGOs and the media. Global Witness has no political affiliation.

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Introduction

THIS REPORT SEEKS TO examine the possibilities for controlling the entry of conflict diamonds into the legitimate diamond industry and to establish a basis of understanding about whether diamonds can be identified by country of origin.

The basic debate is that several of the most destabilising and destructive conflicts in Africa are partly funded through the mining and marketing of high quality gem diamonds. These diamonds end up for sale in jewellery shops around the world as beautifully crafted gifts of love, a paradox that the international consumer is beginning to feel increasingly conscious and wary of.

Currently the diamond trade, as a unified whole, have failed to put recognisable or verifiable controls in place that will render the certification of diamonds as being conflict free. If any of these diamond funded conflicts in Africa are to have a chance of peaceful conclusion and if the threat to the international market is to be negated, then the international community, through the G8, G77, UN, SADC and EU must act swiftly and decisively to prohibit the sale and marketing of these 'blood diamonds'.

Since late 1998 there has been a shift in world opinion on the issue of conflict diamonds, which in itself is a new term. No longer is the 'soaking up' of 'open market goods' from areas of conflict deemed to be an inevitable consequence of the need to stabilize the world price of diamonds. Governments have ceased to accept this as an argument for non-interference, as have consumers. Indeed, perhaps most importantly, in terms of long-term change, the commercial part of the diamond industry has itself begun to change its position on this issue. There have been encouraging actions and statements but these have been in response to pressure from governments, the United Nations and from a small number of non-governmental organisations including the Fatal Transactions campaign, comprising Global Witness, Niza, Medico International and Novib, which is seeking to encourage consumers to insist upon conflict free diamonds.

It is vital that a long-term solution to this very complex problem be found, and that can only work if some of the underlying structures are addressed rather than the commercial sector of the industry dealing with each problem country on a case-by-case basis. This is no way to deal with the atrocities and horrors inflicted upon the peoples of affected countries nor protect the legitimate diamond economies. It is clear that there is a need to create a 'chain of custody' within the diamond trade – an auditable trail from the mine to the consumer that can work with existing structures and patterns of trade. The initiative of the South Africa Government on bringing together government and

industry in a Technical Forum, for the 11–12th May 2000, to work on ways to address the problem is to be welcomed and should be widely supported. It is the first meeting of government and industry and should be a starting point for coordinated reform by government and industry.

Global Witness, in this report, has a number of key recommendations, building towards a system of control that we believe is implementable and necessary. These recommendations need much debate and are not intended to be exhaustive. We look to governments and the commercial sectors of the industry to use this report as a building block towards controls that will severely reduce the flow of conflict goods and enable a diamond to once again be "A girl's best friend." Initial research, which was not exhaustive, has identified applicable technology that is either developed, or is being developed. Global Witness advocates that trade and governments consider the following existing possibilities. Currently there are systems that can: calculate and record the individual surface profiles of rough diamonds; confirm the identity of a parcel of stones that has been registered using this method; mark rough diamonds with individual bar codes or other readable inscriptions; mark cut diamonds with codes, bar codes and logos; identify and verify the identity of cut or rough diamonds that have been coded; record and verify the individual optical signature that a cut diamond exhibits using laser refraction.

A system using elements of these coupled with improved regimes in exporting countries, and the introduction of relatively low technology identification techniques including work on surface features and profiling of run of mine production could be used as a basis for reform by both governments and trade.

CONFLICT DIAMONDS

What exactly are conflict diamonds and why do they have such an impact? There is much debate as to what constitutes a conflict diamond and it will require detailed discussion before an exact definition is concluded. The extremely high profile role that this commodity is having in funding some of Africa's civil wars it makes it logical that we should start there. However the definition of conflict diamonds should not be restricted just to Africa and could feasibly cover any country.

In Africa it is possible to be clear as to what constitutes conflict diamonds. Diamonds that originate from areas under the control of forces that are in opposition to elected and internationally recognized governments, or are in any way connected to those groups should be considered as conflict diamonds. Drawing on their considerable experience in this area De Beers has recently defined conflict diamonds to be, as 'diamonds which originate from areas in Africa controlled by forces fighting the legitimate and internationally recognized government of the relevant country.' This is, in fact, a working definition.

Diamonds are one of the most concentrated forms of wealth known to man and as a result they offer potentially huge financial returns. In addition they are small and easily concealed. They occur in many countries across the globe – many in Africa. They can be mined using sophisticated equipment and techniques or they can be manually dragged from the earth by hand often in terrible and unsafe conditions. Tragically Angola, Sierra Leone, Liberia and the Democratic Republic of the Congo are beset with a terrible paradox – enormous mineral wealth and devastating civil conflict.

Rebel armies need financing to buy arms and munitions, to pay and feed troops and to keep strategic allegiances alive. Since the end of the Cold War the protagonists in these wars have not had access to the funds needed to maintain the apparatus of a military or a political regime. Instead they have turned to any commodity that has a fiscal worth and a readily accessible and consumable market such as timber, animal trophies, gold or diamonds. The wars in Angola, Sierra Leone and the Democratic Republic of the Congo are currently the most notable examples of where rebels have used diamonds in this way. However diamonds and the wealth they generate are not sensitive to borders and the profits have been used to finance conflict abroad as in the case of Liberia.

This can be readily seen by the staggering amount of revenue that Unita were able to generate during the 1990s – over a 6 year period they amassed US\$3.7 billion, which was far more than they ever received during the period of the cold war. Due to this funding they were able to maintain a sophisticated military operation which effectively ensured that no peace process in Angola would work. In Sierra Leone the Revolutionary United Front were transformed into a well equipped and lethal fighting force due to the control and sale of high value gem diamonds. The UN urgently needs to tackle the problems of the RUF generating continued revenue from diamonds. Despite deploying the largest force in its history as of February 2000, it did not have a single member of staff responsible for monitoring diamonds. Current work by the international community to strengthen the official diamond sector are very positive but action must be taken over rebel diamond sales. The current crisis in Sierra Leone is also a chance to for the diamond industry to prove to the seriousness of its intent to deal with conflict goods. It should use the opportunity of the South African technical forum on conflict diamonds to take immediate steps to end the purchase of RUF origin diamonds. The strategic control of the diamond producing areas in the DRC is one of the key driving forces in the conflict and the control of them will be critical to a lasting negotiated peace settlement.

This report is divided into six sections:

Section 1 ‘The Structure of the Diamond Industry’ seeks to provide those who are not diamond-

industry experts with a grasp of the scale of the industry and how the different parts of the diamond pipeline relate to each other; providing outline information on the most significant diamond producers, the main polishing countries and the final end markets.

Section 2 ‘Diamond Identification Methodologies’ examines the different ways in which diamonds have been studied to aid exploration, mine development and geological understanding. However it can be seen that a number of these techniques have resulted in the ability to identify the production from a diamond mine and in some cases individual diamonds.

Section 3 ‘Legislative Overview’ identifies the loopholes in the international diamond trade from a customs perspective and looks at import and export regulations for a number of key countries, and briefly looks at trade and consumer issues.

Section 4 ‘Technologies and Control Systems in Use in the Diamond Industry’ describes some of the newer technologies used in working with diamonds which could be applied to diamond controls and looks at current control systems in the trade.

Section 5 ‘Certification Systems for Other Products’ gives examples of verification schemes in operation in other industry sectors.

Section 6 ‘Recommendations for a Control System’ draws upon the rest of the report to make a series of recommendations regarding controls to address the problem of conflict goods.

I

The Structure of the Diamond Industry

THIS SECTION SEEKS TO provide those who are not diamond industry experts with a grasp of the scale of the industry and the way in which the different parts of the diamond pipeline relate to each other; it provides some outline information on the most significant diamond producers, the main polishing countries and the final end markets.

The total world production of diamonds for 1999 is estimated at \$6.8 billion¹. Of this total \$3.8 billion was from countries that are well regulated, namely South Africa, Namibia, Botswana, Canada and Australia. Russia produced US\$1.6 billion, but it is difficult to assess regulatory capacity due to lack of information. The remaining US\$2.4 billion came from Angola (US\$600 million), which appears to be attempting to reform controls, and also smaller production from a wide range of countries, which accounts for \$800 million (Democratic Republic of Congo would account for a significant proportion of this). In other words, just over half of the world's production by value came from five countries with tightly controlled diamond production, and just a small number of mines. If one includes Russia that would total approximately 70% of world production.

Diamonds are mined in a total of approx. 26 countries. The overwhelming majority of diamonds are mined under government control and about 80% of all diamonds mined are used for industrial purposes². Working of diamonds takes place in about 30 countries worldwide³.

Polished production in 1998 amounted to approx. 860 million stones³. India polished the vast majority of these stones, at an average size of 2.3 points³. This is a very small average size, given that there are 100 points to a carat and does point to considerable difficulties in an individualised product audit trail. Worldwide about 600,000 diamonds of half a carat or more were polished. Interestingly the value of these two different categories of diamond were roughly equal³. Standard Equities, using 1996 data, gives a country and mine analysis that points to 4.195 million carats of rough gem diamonds of over 2 carats with an average value of \$560 per carat and a total value of \$2.352 billion, or approx. one third of the market⁴. This is detailed in

their 1998/1999 report "De Beers/Centenary and the global diamond industry" in which they note "Estimates such as this are highly complex and the latest available data we have is for 1996."⁴

In 1999, \$13 billion worth of diamonds were sold in jewellery worldwide with a wholesale value of approx. \$27 billion, which in turn was worth \$56 billion in retail sales. The diamond content of jewellery varies widely and an accepted average is that 23% of diamond jewellery retail value is actual diamond value. The wholesale market breaks down as follows: the USA was the largest market with \$6.24 billion (48%); Japan the second largest with \$1.82 billion (14%); Asia Arabia \$1.43 billion (11%); Europe \$1.56 billion (10%); Asia Pacific \$1.3 billion (10%); the remainder was \$0.65 billion (5%). In terms of retail sales of jewellery which included diamonds the percentages are very similar, although the values are much higher: the USA accounted for 44% of sales (\$24.6 billion); Japan for 19% (\$10.6 billion); Europe 14% (\$7.8 billion); Asia Pacific 5% (\$2.8 billion); and Asia Arabia 4% (\$2.2 billion). De Beers has estimated that the value of diamond jewellery at wholesale terms was \$27 billion in 1999.^{5,6}

The diamond industry is a major player in the economies of a number of countries. In Africa it is a significant contributor to the South African economy, the Guinean economy and to others, and is the dominant revenue source in Botswana and Namibia. In Russia the picture is less clear but the country produces about \$1.6 billion of diamonds. In Canada the importance of diamonds is growing fast, with a projected 12% share of total world production within the next few years⁷. Belgium is the world's biggest market for rough diamonds, with an estimated 80% of rough and more than 50% of polished diamonds passing through Antwerp⁸, although tax income to government is very low. Switzerland is important because it is the country through which large quantities of diamonds are transferred by De Beers' London based Central Selling Organisation (CSO) for, it seems, tax purposes. Britain plays a unique role as it is the country from which De Beers, through its sightholder system, sells its diamonds, which alone account for approx. 70% of all diamonds mined.

EXTRACTION

The majority of the world's diamonds are mined by a handful of companies:

De Beers which mines approx. 50% of world production, some of which is in partnership with governments; Debswana which is equally jointly owned by the Government of Botswana and De Beers; Namdeb which is also equally jointly owned by the Government of Namibia and De Beers; Alrosa which accounts for all official Russian production, with the Udachny mine alone producing approx. 75% by value and 68% by output in 1998, although this is due to change in the very near future as another mine increases output⁹; Argyle of

Australia, which includes a 60% holding by Rio Tinto¹⁰, and 40% by Ashton Mining¹¹; BHP Diamonds Inc. (a wholly owned subsidiary of Broken Hill Proprietary Company Ltd), in a joint venture with Dia Met Minerals Ltd and two geologists, is currently mining all the production from Canada's North West Territories under the Ekati name¹². The mine produces circa 3 million carats per year, about 5% of world diamond production¹²; MIBA (80% shares held by Government of DRC and 20% by the Belgian Sibeka), which controls the mines at Mbuji Mayi in DRC¹³. There are also a significant number of medium-sized companies.

About \$300 million is spent on exploration annually, of which about \$145 million is spent by De Beers⁴. Standard Equities forecast that world rough production will increase by about 2–3% per year⁴. Tacy Ltd has pointed out the astonishing returns that are possible from mining; "It is not unusual for diamond mines to recover their capital expenditure within two years. The capital expenditure of the new small Marsfontein mine [in South Africa] was recovered in five days."¹⁴

TRADING AND MOVEMENT OF DIAMONDS

Trading of diamonds falls into several broad categories: diamonds traded by large companies that have been involved in the mining of the stones; government bodies selling official production; companies licensed to buy diamonds mined by others; small scale mining companies selling their own production; licensed buyers; unlicensed buyers buying unlicensed production; extensive trading in diamond bourses and between companies/individuals.

Whilst there is definitely some intra-Africa trading of rough diamonds, the majority of diamonds bought on the open market are flown directly to Antwerp or other trading centers such as Tel Aviv, New York and Bombay. It has been claimed that most of the diamonds are mixed whilst in Africa and then imported to Belgium as mixed goods, thus rendering identification of the stones impossible. This seems initially plausible, and was an argument put forward by De Beers in early 1999. However, profit on trading of rough is based upon swift turnover of capital, the faster a deal is turned around the quicker a trader can move onto the next parcel of goods and hence build overall profits on a percentage basis. It does not make commercial sense to hold up goods, away from the market place whilst waiting to put together a suitable mixed parcel. Additionally, security is an important issue, as the moving of stones across national borders in Africa may call for either smuggling or for paying-off officials¹⁵. This not only increases costs but raises risk. Furthermore, current implementation of country of origin and country of provenance is very lax, resulting in no real need to mix parcels overseas to disguise true country of extraction. It is, of course, true to say that mixing does occur before entry to the key markets, as does some sorting of

goods. This involves sorting goods from an area by size or value. Once the original export from country of extraction has been made, a process of sorting, mixing and trading-on does take place. It has not been possible to ascertain what percentage of the annual production is traded in this way, and what percentage has a much more direct trading history up to being set in jewellery and sold to the public. Global Witness recommends that this work be carried out, hopefully with the co-operation of key industry players including De Beers, sightholders, traders and manufacturers and invites information from any of these groups to complete this analysis.

De Beers holds its diamond stocks in the 100% owned Diamond Corporation (Dicor) apart from those held at the mines, and those held by "...the various CSO trading companies to the point of sale by the Diamond Trading Company (gem) at the ten sights per year, and through regular sales by the various industrial diamond companies."¹⁴ Diamond brokers have traditionally played an important role in the sightholder system. There are only a small number of brokers and their role is to liaise between the client and the CSO and to introduce new sightholders. They are paid a one per cent commission by the client on an ongoing basis¹⁶.

The polished goods are traded and sold on to jewellery manufacturers, or are set in jewellery by the polishing company. The total timeframe from point of extraction to the final sale to the consumer is known as the pipeline. This appears to be shrinking from approx. two and a half years to about two years and may shrink further¹⁷.

CUTTING CENTRES

There are around thirty countries worldwide where diamonds are cut, polished and processed into jewellery. Details are given below of a number of the main countries to give an indication of the scale of the business. It is not meant to be an exhaustive list.

INDIA

India overwhelmingly dominates the polished diamond market with exports worth over \$6 billion and about 50% by value of the world market share of polished diamonds (approx. 90% by weight). The industry provides an estimated 700,000 jobs^{18,19}. An estimated 95% of all those employed in cutting diamonds work in India²⁰. It is said that "Nine out of ten diamonds set in jewellery are cut and polished in India."¹⁸ India has a polished production of 820 million stones³.

BELGIUM

More than half of the world's rough and polished diamonds are traded in Belgium through over 1,500 companies. There are approx. 60 De Beers sightholders, some of whom are also manufacturers, which total

about 320 companies. Most of the companies employ a small workforce of less than 20 people, and in 1998 there were only 40 companies whose workforce was more than 40 people. There are a small number of companies employing very large numbers of people.²¹ In 1998 the total workforce was estimated at 3,000 but there are a number of figures from different sources²¹. The High Diamond Council (known by its Flemish initials HRD) states that 30,000 people are directly and indirectly employed in the diamond sector⁸. The HRD also states that the industry accounts for 8% of Belgian export activities⁸.

ISRAEL

Israel exports approximately half of its diamonds to the USA. In 1999 it exported more polished diamonds, by value, than India and Belgium combined. This was worth a total of \$4.2 billion, which is 46.5% of the USA import market.²² India was the second largest exporter with \$2.2 billion which formed 24.9% of the USA import market and Belgium was the third largest with \$1.8 billion of exports forming 20% of the import market.²² Israel was initially affected by the Asian crisis, and the workforce decreased to an estimated 4,000 people. There has since been some recovery, and the workforce has begun to increase.^{21 23} In addition there are an estimated 2,000 workers employed by Israeli companies overseas, in countries with lower labour costs.²⁴ Israel processes about 75% of the annual production of higher value gem diamonds, and so is very significant in terms of any control system³.

THAILAND

The diamond cutting industry of Thailand was badly affected by the Asian financial crisis of 1997. Diamond exports are an important part of gemstone exports and the country is ranked as the world's ninth largest diamond exporter. There are about 30 companies that polish or provide services to manufacturers and about 70% of these are foreign owned. There are approx. three De Beers sightholders, and another 16 that are described as having direct access to CSO goods. The industry employs about 5,000 people²¹.

THE USA

The USA is also a very important cutting centre, see section immediately below for further information.

KEY CONSUMER MARKETS

The world diamond jewellery retail market was worth \$56 billion in 1999, and the figure is on a continuous growth curve⁵, with the major market being the USA. Diamond jewellery sales worldwide are dominated by sales of rings, which account for 79% of sales, followed

by pendants with 8% of sales (a very fast growing sector), and earrings with 7% of sales.²⁵

THE USA

The USA is the world's biggest diamond market²¹. New York has about 1,800 licensed dealers supplied mainly through 25 De Beers sightholders and there is long-running concern about obtaining sufficient supplies of rough diamonds to meet demand. It is often described as the most skilled cutting centre because it polishes many of the larger very high quality diamonds, usually specialising in stones of 2 carats and over. There are about 100 manufacturers employing about 600 cutters. The industry tends towards companies employing small numbers of polishers, with only a few companies having more than 20 polishers. Also, a lot of the work is sub-contracted out to independent polishers. Some polishing is also carried out in other countries including Thailand and Mauritius as well as Israel and Antwerp. Although this tends to be for smaller stones of less than half a carat polished^{21, 23}.

The structure of the industry has altered somewhat in recent years with middlemen being forced out of business and diamond manufacturers working more closely with retailers, and increasingly being involved in selling finished jewellery to retailers directly²³.

In 1999 American jewellery sales (not just diamond), as noted by Gemkey Magazine, accounted for approx. 25% of all consumer sales including clothing, consumer electronics, toys and sporting goods. This trend looks set to continue. In 1998, 33 million pieces of diamond jewellery were sold in the USA with an average price of \$655 per item, worth \$22 billion.²⁶ However the market is dominated in quantity terms by diamonds of half a carat or less, which in 1999 accounted for 78% of imports²².

The importance of the American market can be understood by the fact that diamond exports form the largest product export category by value from Israel, India and Belgium.

ASIA AND SAUDI ARABIA

Asia and Arabia tend to prefer large diamonds of good quality, as does the US market and Japan⁴. Many such stones have potentially come from conflict areas, hence the need for all importing countries to get involved. Of particular concern are developments in the United Arab Emirates about which there is credible information of factories having been set up to polish Unita and other conflict goods for which Indian cutters have been sought²⁷.

The following diagram from Terraconsult/Diamond International, although dating from 1997, gives a useful breakdown of the flow of goods and the increase in value along the pipeline from mining to sale of finished item to the consumer²⁸.

BANKS

A small number of banks specialise in diamond financing which requires very fast and short-term loans; the most well known is the specialist banking arm of the Dutch ABN Amro Bank. In Antwerp, just two banks handle about 90% of the financing²⁹. ABN has estimated that the Israeli diamond industry puts up \$1.5 of its own capital for every \$1 borrowed⁴. The banks are closely involved in the financing of the diamond industry and this gives them a unique perspective on the actual flows of diamonds and a responsibility to ensure that their financing does not support the trading of conflict diamonds. To date, they have been very reluctant to take any actual measures on conflict goods, although recently this does appear to be changing^{30,31}.

CHANGING STRUCTURE OF THE INDUSTRY AND NEED FOR REFORM

Charting the changes in the worldwide diamond industry is a never-ending task. The industry seems to be permanently in the throes of some crisis or major change. The latest of these is the much talked about and reported review undertaken by Bain & Co. for De Beers, which has resulted in some seemingly major shifts in the way the company plans to operate in the future. The details of this review have been extensively covered in the media and the long-term implications will doubtless become clear in due course.

It is, however, true to say that this current period is a time of real change within the trade, and specialist observers are noting some changes which do seem to be of long-term importance and impact on the structure of the industry. They point to the fact that the diamond trade is dynamic and responsive to change even if it takes a while to come to terms with the need for change.

In August 1999, B. Janowski, a diamond industry consultant, was quoted on the Tacy Ltd website describing how “The search for profits and market position has produced a multi-level market, with each segment seeking viable profits through a variety of techniques – consolidation, product differentiation, exclusivity, disinter mediation, technology, geographic expansion and both lateral and vertical alliances and acquisitions. The evolution of the industry, most visibly at the retail level, has accelerated to such a point that entire segments are at risk, often without the principals being adequately aware of changes afoot.” Janowski points to about 40 shopping mall jewellery operations that have disappeared in the last seven to eight years as an indication of the speed of change³². HSBC, reporting on the 2nd International Rough Diamond Conference in Tel Aviv in March 2000, states “It is clear players in the rough diamond industry have to adapt or die.”³¹ And pointing to the rough industry it notes that, “in coming years, [it will face] significant levels of threats to consumer confidence, market equilibrium

and price stability, and from a shorter pipeline. These are as a result of social and technological change and, most importantly, De Beers’ strategic review...A shake-up is imminent. Maybe it has already begun? All components of the pipeline will be impacted.” Additional reasons for changes in the diamond pipeline are “The ‘Just in Time’ supply method, production efficiencies and faster store turnovers.”¹⁶

Linked to these changes are growing concerns within the industry about the impact that synthetic diamonds and sophisticated treatments such as heat treatments and laser infilling of imperfections, could have upon consumer confidence. The industry has begun debates about how to tackle these problems because of the threat they pose to consumer confidence in the integrity of the industry and to the perceived value of natural diamonds. The GIA has already talked of a passport for diamonds, and many have raised the need to find a way to ensure consumer confidence in the product. It would seem clear that these business considerations overlap with the ethical considerations over conflict diamonds and together form an overwhelming case for the industry to institute reforms to address these issues.

Diamond Identification Methodologies

THIS SECTION EXAMINES some of the current ways in which diamonds have been studied. These studies have primarily been carried out to increase understanding about the formation of diamonds as an aid to exploration and geological understanding, and not as a way of determining whether diamonds originated from one country or another as potential conflict goods. It clearly shows that it is possible to identify diamonds and that more research focusing on product audits and conflict diamonds is needed. The first two methods described, studying surface features and profiling of mine production, are clearly of use and could be developed immediately to assist in any control scheme. Some of the more technical methodologies, including mass spectrometry, need further research.

Kimberlite and alluvial diamonds have the same crystalline structure but they have different surface characteristics. The most well known is that many alluvial diamonds have a frosted surface as a result of abrasion during transport from the volcanic pipe. There are other surface features such as differing patterns of chips and scratches.

“The locations of diamond deposits are determined by the geologic fact that diamonds are found primarily in two rare types of rocks – kimberlite and lamproite. These rocks occur as ‘pipes’ (cone structures pushed to the surface by volcanic activity) only in cratons; those portions of the earth’s crust that have been stable for long periods of time. When a diamond-bearing kimberlite or lamproite pipe reaches the surface of the Earth, it is subject to weathering and erosion, which results in the release of its diamonds. The diamonds thus released can be transported for varying distances before they become concentrated into any one of a variety of secondary deposits. Such concentrations can remain close to the primary source and form deposits referred to as eluvial (above a pipe) or colluvial (adjacent to a pipe), as at Mbuji-Mayi in DRC. When greater distances are involved, alluvial (stream-transported) deposits are formed, such as those found in

India, Brazil and Angola. When diamonds are transported for even greater distances, to a marine environment, either onshore or offshore marine deposits can form, such as those in Namibia.”³³

THE ISSUE OF DIAMOND IDENTIFICATION

Why has the question of whether one can identify a diamond’s country of extraction become so central to the debate over conflict goods? The importance can be judged from the comment by George Burne, recently retired president of De Beers’ Canada Corporation “It’s very evident to our buyers what a parcel of Sierra Leone goods looks like. It’s not rocket science.”²⁹ Indeed P.Wagner writing in 1914 noted “The leading South African experts are agreed that, between the diamonds of the mines of certain definite areas, there exists a more or less pronounced family resemblance, clearly implying community of origin. This holds good for example, with regard to the various occurrences in the vicinity of Kimberley, notwithstanding the fact that parcels from the principal mines may be distinguished even by a novice.”

IDENTIFICATION AND SECURITY

In “The Diamond Fields of Southern Africa” (published in 1914) P. Wagner described

“PRECAUTIONS AGAINST ILLICIT TRAFFIC:

As a precaution against illicit traffic, all diamonds purchased on the River Diggings have to be submitted to the experts of the Detective Department at Kimberley, whose powers of discrimination have come as an unpleasant surprise to quite a number of adepts in the gentle art of gem trans-plantation. Thus, to a certain gentleman who would persist in finding typical Damaraland stones in his claim at Bloemhof; and to another bright individual who, in direct defiance of the fundamental law of hydrostatics which teaches us that water flows from a higher to a lower level, succeeded in extracting from Klipdam gravels quite a number of Koffyfontein diamonds. Happily for the peace of mind of South African geologists the lining of the digger’s coat was examined!”³⁴

However it is possible that that the issue of single stone identification (the word here is used in terms of country of extraction rather than whether synthetic or treated) has become a red herring; an attempt by some players in the diamond industry to divert attention away from the broader issue of controls on conflict goods and the well-established principle that a parcel of diamonds can, in many circumstances, be identified to country of extraction, or at the very least provide good

grounds for doubt in cases of intentional mis-declaration of origin of goods. It is of course true to say that a mixed parcel would be very difficult to identify, although this would depend on the nature of the diamonds being mixed and the rigour of the examination to which the parcel were subjected. The majority of such problem parcels would be alluvial goods from a small number of countries such as Sierra Leone, Angola, DRC, Liberia and would tend to be the higher-value goods.

In the last 16 months there has been a radical shift in international attitudes to conflict diamonds. Even the term is new. Prior to this point, it was well known, and widely reported, that diamonds from conflict areas such as Angola, Sierra Leone and Liberia were being sold on the open market and were being purchased by a wide range of companies. Not only was this accepted business practice but it was actively promoted by De Beers, the world's largest diamond company, who in its literature and press relations promoted its role as the stabilizing force on world diamond prices throughout the 1990s. De Beers' 1995 Annual Report stated, typically, "Our outside buying operations are a vital ingredient of our management of the world market for rough gem diamonds."³⁵ In 1996 Julian Ogilvie Thompson in his Chairman's Statement in the Annual Report wrote, "Outside Buying. The CSO buys diamonds in substantial volumes on the open market, both in Africa and in the diamond centres, through its extensive network of buying offices, staffed by young diamond buyers often working in difficult conditions. Purchases in 1996 reached record levels largely owing to the increased Angolan production. Angolan diamonds tend to be in the categories that are in demand, although in the main these buying activities are a mechanism to support the market."³⁶ A clear illustration of just how far the issue has shifted is the statement from a De Beers director, in a letter to *The Times* in August 1999, "The fact that the sale of diamonds by UNITA has helped to fund the continuing civil war is without question."³⁷ It is to be welcomed that De Beers is including a guarantee not to supply conflict goods on all its sight holder boxes, beginning with the March 27th sight. This is the first formal recognition that conflict goods are not acceptable to the end consumer, and a move that the rest of the trade need to make. However, to be credible, De Beers needs to show how the guarantee will be independently audited. The initial press announcement of 29th February 2000 and subsequent press statements did not commit to never buying such goods again, however following a rigorous interview on BBC Radio 4's Today Programme the Chief Executive, Gary Ralfe, made an on-air commitment on this issue.³⁸

Perhaps not surprisingly, governments moved before the commercial diamond industry began to shift. There was a fairly immediate understanding from a number of governments that the humanitarian and economic impacts of conflict funded or perpetuated by diamonds was simply too high a price. Within the commercial trade there was initially considerable reluctance

to face up to the scale or nature of the problem, however an increasing range of players have accepted the issue and are looking at ways forward.

DE BEERS AND UNITA DIAMONDS: A CASE OF CORPORATE AMNESIA?

In October 1997 Gary Ralfe, De Beers' CEO, during a press conference in Russia stated, "You are absolutely right to say that in fact it is Unita that has over the recent few years been responsible for most of the production in Angola. One of the essential jobs that we De Beers [sic] carry out worldwide is to ensure that diamonds coming onto the markets do not threaten the overall price structure and therefore although we have no direct relationship with Unita, there is no doubt that we buy many of those diamonds that emanate from the Unita-held areas in Angola, second-hand on the markets of Antwerp and Tel Aviv. And as the diamond markets have weakened recently (inaudible)...in buying up this Angolan production which otherwise will be threatening the overall price structure has increased."³⁹

On June 20th 1999, in a letter to the UK Observer newspaper, Tim Capon, a director of De Beers, stated unequivocally "We have never purchased diamonds from Unita."⁴⁰ And again on August 22nd 1999 "Contrary to your assertion, we have never purchased diamonds from Unita..."³⁷ This assertion was repeated following the publication of the UN Expert Panels report on Angola in March 2000.

The South African Mail & Guardian article of 17th March 2000, "Unita gems went to De Beers" points out "Before then [UN diamond sanction of 1998], the situation was murkier – the company said it did not knowingly buy Unita diamonds with the qualifier that it could not identify where the diamonds came from."⁴¹

Whilst it is repeatedly stated by De Beers that they may never have directly purchased diamonds from Unita, this is a complete abdication of corporate responsibility, and it further raises the question of whom exactly the De Beers staff, who were based in DRC along the Angolan border, thought they were paying for the diamonds that flooded across that border up until the fall of Mobutu in 1997. Perhaps the answer is contained in their monthly field reports that detailed diamonds bought and monies spent?

WHAT TRADERS SAY ABOUT THE IDENTIFICATION OF ROUGH DIAMONDS

Diamond traders, especially when talking off the record, are open about the fact that they can identify the country of origin of diamonds. Parcels of run of mine production are described as being relatively easy to identify, as are distinctive diamonds, especially in larger sizes. One trader noted that mixing diamonds

does make it difficult to be certain of origin, again, depending on the stones mixed, but that it would normally be likely to raise a question as to the origin of the diamonds. Even De Beers has admitted that it can identify specific production. In October 1998, Jim McCluskie of De Beers admitted to a journalist “we can identify Angolan production with 90% accuracy and 50% of certainty [to] Unita production.”⁴²

DIAMOND EXPERTS

Worldwide there are a small number of academic experts studying diamonds. Several of the leading experts work for, or are consultants to, De Beers. Their expertise could be brought to bear upon the issue of identification in regard to conflict goods. De Beers itself has a GeoScience department that looks at a range of identification methodologies, mostly in terms of exploration, but also mine security⁴³. The department, despite its obvious expertise and knowledge, does not seem to have been briefed to look at ways to bring this to bear upon the issue of identification. Indeed, the detailed briefing given to Global Witness, in February 2000, though very interesting in itself, was all the more so for what it did not say. The team raised legitimate concerns about some of the methodology currently being used (see section below) but were clearly very sceptical about any possibilities for identification. They did not appear to have looked at the issue from a constructive point of view and this would seem to be a direct result of management policy.

One independent expert is Dr. Jeff Harris of Glasgow University, who also works as a consultant for De Beers and has carried out detailed research on the surface features of diamonds, and on run-of-mine output. His work on statistical analysis of such output for size and shape produces interestingly individual graphs (see case study below). Doctor Harris has concluded that it is entirely possible to identify run of mine production using a combination of these techniques, and has further noted that many surface features are unique to particular production⁴⁴. Indeed, he has noted the possibility of combining such techniques to help build a methodology for identification, and feels there would be potential to use detailed analysis of surface features as a way of checking parcels - as part of a regulatory framework. He notes that this is a slow process, and could take one to two weeks to check a parcel limiting its usefulness if used in this way. Nevertheless, possibilities of combining human expertise with ‘intelligent’ computer software to speed up the process should be explored.

Detailed below are a number of different identification techniques which point to the ability to identify the provenance of diamonds to a fairly significant level.

I. SURFACE FEATURES

There is a wide variety of surface features, some of which are the result of the growth of the crystal, e.g. terracing, and others which are the result of external factors such as distinctive patterns of scratches caused by abrasion from other diamonds or stones due to the brittle nature of the diamond⁴⁴.

In 1994 Swash, Whiley, Nqidi, Mzobe and Ncube, noted that “Over seventy distinct diamond surface textures exist and allow for the quantification and characterization of diamond populations. In Southern Africa numerous localities have one or more distinct surface textural feature or morphological peculiarity which allows them to be characterized.”⁴⁵ However, they point out that “Problems in diamond studies are that few real differences exist between populations...The use of provenance studies is that they provide an extra piece of information to the exploration jigsaw...”⁴⁵

It is clear that the numerous, and in many cases, individualistic surface features of different diamonds could be of immense use in identifying country and even mine of origin. For example, Dr. Jeff Harris notes that there are 44 surface features for the octahedron, which, when coupled with statistical analysis of run-of-mine production and known colour characteristics, could lead to a practical and relatively low-tech methodology to assist identification. This coupled with an audit system that involved producer and importing countries would provide a practical and fairly immediate system of controls. Some interesting work has been done on surface features which clearly indicates the potential importance of such information. It is not clear what work has been done by De Beers but it would be surprising if it had not looked at this issue.

CASE STUDY I: SOUTHERN AFRICA

This is taken from “The Genesis of the Diamond” by Alpheus F Williams, General Manager of De Beers Consolidated Mines, Ltd which dates from 1932.⁴⁶ The book gives a very detailed analysis of diamonds from the production of different mines in South Africa, a number of which are no longer operational, and it clearly demonstrates the level of detailed information that can be gathered on surface features which could be of use in providing a comprehensive understanding of the production of different countries. The author notes that “As pointed out elsewhere, every diamond mine produces a diamond characteristic of it...”⁴⁶.

Williams describes the capacity of diamond sorters to identify individual diamond production: “The term ‘sorter’ is applied to an expert who classifies parcels of diamonds from the economic aspect - that is, according to purity, colour, size, shape, etc. An expert diamond sorter can nearly always allocate any diamond put before him as coming from a particular mine or field, as there are peculiarities which definitely place a stone. In every production there are stones which per-

haps would not be considered typical of a particular mine, but there is almost always some peculiarity in marking or colour which helps the sorter to decide. It is, of course, sometimes difficult to decide about a single stone, but an average parcel of, say, 100 carats from any mine or field would not present any difficulty to an expert to decide where it came from.”

Williams describes alluvial diamonds, noting “This [sic] should be subdivided, as different areas have their peculiarities.” And he goes on to differentiate between eight areas across South Africa and modern day Namibia. “Lichtenburg production has its own characteristics and is like no other alluvial production. Diamonds from this area differ according to the farms from which they are produced...Blue-white stones from Uitgevonden were distinct, having a roughened surface as though made by filling, but this marking is also distinct from the water wear of the diamonds from the Lower River”; He notes that several areas produce alluvial goods that do not show signs of wear, this includes the stones from Lichtenburg and from Upper River; of the latter he writes “These diamonds have a lustre or sheen which is very distinct, but they seldom show signs of wear.”

Williams also looks at the issue of drainage systems and associated gravel-bearing deposits. He describes the Congo River as draining the whole of the DRC, the north-eastern part of Angola and a large part of the Cameroons. In West Africa he notes that “...there are a number of smaller rivers that run direct to the sea, and it is on this drainage area that the diamond-bearing gravels are found.” He goes on to write “It will thus be seen that each of these great drainage areas may have derived its diamonds from quite different formations than those in the Union of South Africa, and the character of some of the diamonds indicates this. For example, in the Congo the diamonds found in Bushimaie [Mbuyi Mayii] gravels are quite different in appearance from any other diamonds found in any other part of the world...In other parts of the Congo and Angola the diamonds, although smaller, could have been derived from kimberlite formations similar to those in the Union.”

CASE STUDY 2: SIERRA LEONE

This case study is included to give people who are not familiar with studies on surface features an understanding of the detailed level of research carried out on this subject.

In 1960 D. R. Grantham and J.B. Allen’s paper “Kimberlite in Sierra Leone”⁴⁷ under the auspices of the Geological Survey Department of Sierra Leone described the results of a detailed morphological analysis on a representative sample of diamonds from a kimberlite dyke in Sefadou in the north east of the country. The analysis of surface features was carried out by Grantham, who was a consulting geologist to Sierra Leone Selection Trust Ltd. This case study gives a clear

indication of the potential value of detailed analysis of the surface features of diamonds.

The paper notes “While the types of diamonds show some variation in individual dykes, an immediate distinction can be made between the clear diamonds of which a large proportion is of good quality, and the coated diamonds which belong to the industrial grades or crushing board...The octahedron with related modifications is the dominant morphological type and crystallographically perfect octahedral with splendid faces occur throughout the whole size range. Cubic crystals are restricted to coated stones, and the dodecahedroids are relatively rare.”⁴⁷

It notes “The clear diamonds not only occur with completely plane faces or with faces slightly curved edges, but may have the following topographic modifications or growth features:

1. *Layers*: plane-surfaced layers extending nearly to the crystal edges, usually very thin but sometimes stepped up abruptly in a series of terraces.

2. *Plates*: similar to above but not extending to the crystal edges. The triangular plates may be single or multiple, and can be symmetrically or irregularly placed.

3. *Shields*: similar to plates, but with curved edges and often with curved surfaces roughly triangular in outline. A ‘crinkled’ surface is produced by a mass of small shields, irregularly placed, building up the faces so that the octahedron becomes ovoid.

The above growth features, which are depicted in Text-fig. 2 (not included here), grade into each other without sharp distinction and they may build up faces without adding to the original edges so that re-entrant angles are produced along these edges. Trigons are triangular pits, either pyramidal or flat bottomed, and occur where growth plates have not covered the whole surface. Rhombic dodecahedral faces invariably have a crêpe-like pattern parallel to the longer diagonal of the rhomb. None of the above growth features occurs on fully-coated stones. The great majority of the stones are colourless, although some variation is recognized in the trade. A slightly yellow tinge is common in plane-faced and layered stones; the plated and crinkled are usually pure white, but other colours are pearly white, yellow, pale brown, deep clove-brown and brownish black. Striking lemon-coloured, curved-faced dodecahedroids occur occasionally. A small proportion of the diamonds, invariably good octahedral, have a pale leaf-green colour of unknown origin. More numerous are stones with occasional tiny green or dark-green spots immediately below the surface.”

The paper also describes inclusions (see iii below, in this section): “Although the inclusions in the Sierra Leone diamonds have not been studied intensively, four main types may be distinguished: highly refractive grains, irregular blocks, black plates, and black dust. Brilliant colourless inclusions in the diamonds have a high refractive index and often show crystal forms, but x-ray investigations are required to establish their identity. The black blocks are angular and may be granular

or very irregular; exposed portions suggest they may consist of magnesium ilmenite.”

The paper goes on to note “The results of a precise study of the stones from one particular kimberlite source in Sierra Leone are here recorded as a matter of scientific interest, but although the source contains most of the types known, their proportions and sizes cannot be regarded as necessarily characteristic of any other source, or of the field as a whole...The parcel on which these observations were made weighed 285 carats, comprising 422 clear stones and 196 coated of +2 mm. size, together with an estimated number of 910 of both clear and coated stones of -2 mm. size.”

Patches, or particulate spots, are another surface feature that is a subject of study. They are found in a range of colours including yellowish-brown and dark brown as well as green. Green and brown patches sometimes occur on the same diamond,⁴⁸ and are a distinguishing feature⁴⁴. Diamonds from kimberlite deposits have been found with green patches, and diamonds from placers in areas such as the Urals, the Lena region in Yakutiya and in Brazil⁴⁸.

II. PROFILING OF MINE PRODUCTION

This process involves building up profiles of a mine's production using a variety of classifications. The information gathered can be used to analyse whether the diamonds originated from the same mantle source and it can also be used to try to understand the forces and dynamics involved after this point. The measurements taken build up a statistical profile of the diamond production. The paper, which is quoted extensively below, points to a useful technique for identification of mine production if one focuses upon events that happened to the diamonds after they were first formed. This would include the study of the varying shape characteristics of the diamonds and of levels of plastic deformation. Doctor Jeff Harris notes that profiling of production has already been carried out for some official mines, including South Africa, Botswana, Australia and some unpublished data on Namibia.⁴⁴ Russian production has been profiled but using different sieve sizes which would make comparative checks difficult. Thus, it would appear that work has already been carried out for well over half the world's production by volume. This leaves Angola (for which some profiling may have been done⁴⁴), DRC and Brazil – which are very significant producers (although DRC is predominantly industrial grade goods). In addition to this is the comparatively small volume percentage of production from the other diamond producing countries that would need to be done. It would seem probable that De Beers has profiled the production from its Williamson mine in Tanzania.⁴⁴

CASE STUDY

In 1984 J Harris, J Hawthorne and M Oosterveld published a paper, “A comparison of diamond characteristics from the De Beers pool mines, Kimberley, South Africa”⁴⁹, which describes how mine output varies on a statistical basis and the paper includes graphs that clearly demonstrate this.

“Two diamond valuation parcels from each of the four mines at Kimberley have been examined using a classification scheme which determines physical properties of diamond as a function of their size.”

“Diamonds from the four Kimberley mines (the so-called De Beers Pool Mines – comprising Bultfontein, De Beers, Dutoitspan and Wesselton) have been recovered for over 100 years, but little recent information is known about the diamond characteristics from these sources. In part, this dearth of knowledge arises because a single recovery plant serves all four mines and therefore diamonds from individual mines cannot generally be obtained. In recent years, however, samples of diamonds have been recovered and accumulated from the individual mines for the purposes of mine valuations [an interesting pointer towards the need for mining companies to profile production] and it is from such samples that the comparisons of diamond characteristics reported here are compiled.

Valuation parcels from each of the four mines have been classified according to the scheme devised by Harris et al. (1975, 1979) With the first set of parcels, crystal habit, colour, UV fluorescence and plastic deformation levels were determined for at least 1500 stones, or the total number of diamonds, in each of ten sieve size classes covering all but the smallest diamonds...In addition the relative abundances of syngenetic inclusions within the diamonds in the smallest sieve size class (-6+5 maximum diamond diameter 1.83mm) were determined.

With the second set of valuation parcels, the classification procedure only included variations of crystal habit and colour with diamond size, but this allowed comparisons to be made with the first set. However, in addition, a detailed shape breakdown of the irregular diamonds from this set was completed. This work determined the primary shape characteristics of the diamonds from Kimberley (see Harris et al. 1975) and from a comparison of these and other characteristics, allowed some conclusions to be drawn as to whether the diamonds at Kimberley could have a common upper mantle source.”

“The results from the six studies completed on the diamonds from De Beers Pool mines fall into two groups. Inclusion abundances, primary crystal shapes, colours and UV variations provide information pertinent to the original growth environments of the Kimberley diamonds. The levels of plastic deformation and diamond shape characteristics, where irregular diamonds are a major category, provide insights into events which have affected the diamonds after their

formation. If diamonds from Kimberley are derived from a common source, results for the first group of studies should show close similarity. Excluding colour from further consideration because of the problems of reproducibility, the results from the three remaining studies all indicate a strong uniformity in characteristic between mines. The growth environment is overwhelmingly 'peridotitic' in its mineralogy, with octahedral diamonds, which exhibit similar UV characteristics, dominant over other primary crystal habits.

In the second group of studies, similarities between the mines are not necessarily to be expected, because these results relate to events which may influence each of the four kimberlites differently. For example, if plastic deformation of the Kimberley diamonds is caused by the dynamics associated with the separation of four kimberlites from a common reservoir in the upper mantle, then the stresses associated with such an event may well be different for the four kimberlites involved; hence, distinctive plastic deformation levels amongst the diamonds recovered from these kimberlites. Similarly, differences in the rates at which the individual kimberlites move upwards or the number of magma pulses involved, could determine the final proportions of dodecahedral crystals derived from octahedra in a particular kimberlite. Also, the percentages of irregular (usually broken) diamonds at each of the mines will be strongly influenced by such factors as 1) differential expansion of syngenetic inclusions which may break the diamond, or 2) whether the kimberlite was associated with internal explosive brecciation during uplift, or 3) near the surface, whether the kimberlite eruption was phreatic.

From the results of these studies the bulk of the diamonds from the four Kimberley mines could well be derived from a single source. The primary characteristics of the diamonds are very similar. Major differences in diamond characteristics between the mines relate to processes acting on the diamonds once they have formed, and these most probably occur in response to differences in the dynamics of the individual kimberlite eruptions."

III. MINERAL INCLUSIONS

In brief, inclusions are normally impurities of microscopic minerals and have been the subject of a considerable amount of study as they throw light upon the formation of the diamond and factors subsequent to this⁵⁰. These are analysed using a number of techniques including x-ray diffraction, electron microprobe, neutron activation analysis and a specially designed mass spectrometer. Harris and Gurney⁵⁰ describe a study that looked at the occurrence of a number of mineral inclusions from the mines of Premier, Finsch and Kaffiefontein and found that there "... are marked differences in the relative abundances of inclusions in the diamonds from these three sources."⁵⁰ However, mineral

inclusions can occur in diamonds from very different geographical areas and geological times. Harris and Gurney note that work on inclusions is being carried out at the mines listed above and elsewhere. Global Witness invites the various experts in this area to bring their collective expertise and knowledge to this issue, and perhaps to help build a database of such information. This could be linked to the academic and commercial DIAKIM database currently under construction, which will compile information on world diamond occurrences and production from a very wide range of sources⁵¹.

IV. SURFACE SCANNING

The concept of profiling the surface of a diamond using either x-rays or optical scanning as a way to fingerprint a diamond, relies on the principle that each diamond has unique characteristics and that the technology exists to record this. If there exists a technology that can fingerprint a diamond in its rough stage, and this fingerprint can be stored in a database to be recalled for comparison, then there exists a method by which to track the movement of rough diamonds, without the need to tag or otherwise mark them. Surface profiling tends to be done as part of the process of evaluating rough diamonds. The aim of the evaluation process is to build a very detailed model of the rough diamond that becomes the basis on which a computer will calculate the different cutting options for the diamond.

Issues to bear in mind is the minimum size of diamonds that can be scanned, the speeds at which surface profiling can be done, and the transfer of the profile as stored information. This would require the movement of large amounts of data across computer networks. However, with the current advancements in data processing and transfer speeds, as witnessed in information technology industries everywhere, this does not seem to be an insurmountable barrier.

Sarin is an Israeli diamond technology company that has been a pioneer in the field of precise diamond measurements and grading, which changed the methodology for analysing the proportions of a diamond in preparation for cutting.⁵² Using Sarin's evaluation technology, it is possible to map rough and cut diamonds. The system is based on image processing, with the diamond being placed on a revolving disc in the path of a parallel beam of light. A silhouette of the object is created and captured as an image on a computer. The diamond is continuously sampled in this way until the system using triangulation geometry software can recreate the 3D structure of the diamond.⁵³ Currently, the system profiles a single stone at a time, taking approx. 25 seconds to do so, though this does depend on the size of the stone.⁵⁴ With specific development, the company expects the time could be reduced to approx. 15 seconds per stone.⁵⁵ This system could also quite conceivably be designed into a workstation that could scan more than one stone at a time. It

was suggested by Global Witness, and agreed by a representative from Sarin, that designing such a workstation was a feasible option.⁵⁵

VERIFICATION / MATCHING CORRESPONDING STONES

Information derived from surface profiling must be stored on a database for the subsequent verification of stones. Repeating the profiling scan allows the identification of diamonds by matching corresponding information held on a database. To overcome the issue of recognising the stones at different angles, software development would be necessary, though again this was discussed and was not considered to present a problem.⁵⁴ It is important to note that the amount of information that is produced by profiling can be somewhere in the region of one megabyte of computer memory. This information could also accompany parcels of diamonds in a CD-ROM format which could address this problem. The information could easily be encrypted and thus could not be read by anyone other than the intended recipient, such as customs, using widely available but secure encryption software.

V. OCTONUS

OctoNus is a Moscow State University-based company that develops software for the diamond industry at the stage of diamond manufacturing. Its systems include those similar in purpose and methodology to the Sarin rough evaluation machines mentioned above. Since 1997, and using a system known as PaCor, OctoNus developed what it describes as “Electronic Passports” for rough and polished diamonds. The developer of this application stated that the idea of the electronic passport for the diamond was raised from the problem of correspondence between a regular diamond certificate and the actual diamond. According to the designer of the system, Sergei Sivovolenko, there is no reliable and fast way to decide if the certificate corresponds to a given diamond. Again, this is a technology that has the potential to be applied to a chain of custody.⁵⁶

VI. MICROTOMOGRAPHY

Tomography is defined as ‘a technique for displaying a cross section through the human body or other solids using X-rays or ultrasound’⁵⁷ Computer Tomography (CT) scanners can be used to visualize the 3D internal structure of objects in a non-destructive way and without any special preparation. CT scanning is currently applied widely in medicine to diagnose the internal pathology of organs. Micro Tomography is principally the same technique as CT scans but is far more powerful, scanning with resolutions up to 8 microns.⁵⁸ Micro Tomography is widely used to perform non-destructive testing, and representation of a variety of solids – such as bones, fossils, and metals and of course diamonds.

The relevance of microtomography, in this instance, is not so much its internal analytical capacity, but because it can also be used to create a unique external profile of a diamond.

Two scientists at the University of Antwerp have developed a miniaturized version of the medical CT scanner. They claim that their microtomograph is the only scanner that can be used to scan the external contour of a diamond at such a high resolution. It may be that such a high resolution is not needed though this needs to be examined in practice. As yet, microtomography has not been optimised for surface scanning and further research and development would incur a reengineering to increase processing capabilities of the machines. In any case the developers of this application believe that their technology can be applied. However they raise the important issue of speed being central to applications being considered for use in an industry which works with very high units of goods. “We are confident that we can realize a system that can be used to fingerprint rough diamonds in a unique way, but the market needs to decide what measuring time is acceptable”.⁵⁹

VII. INDUCTIVELY COUPLED PLASMA/MASS SPECTROMETRY LASER ABLATION ICP - MS

Any method to reliably determine the origin of diamonds would be an important tool for diamond prospecting, industry security (identifying stolen diamonds by mine) and for helping to identify diamonds that have originated in conflict zones.

“Determining the provenance of diamonds”⁶⁰ a 1998 article in *Diamond International*, described how recent developments in analytical techniques are making it possible to identify the source pipe of individual diamonds. The article described the work of John Watling, associate professor in the School of Applied Chemistry, Curtin University, Western Australia.

In a 1994 paper⁶¹ based upon Watling’s limited study, it was concluded that;

“Studies so far have shown that it is possible to identify the provenance of different diamonds on the basis of their unique trace element association patterns...[and that]...it is hoped that the identification of a particular diamond will be achieved using a computerised database of mass spectra.”⁶²

The pursuit of quantitative chemical data for the presence of trace elements within the diamond is not the intention of the fingerprinting technique described by Watling and his workers, it relies entirely upon the relationship between prescribed elements within the diamond.⁶³

The reliability of such a qualitative approach has been questioned, and it was stated by a leading expert in this field, Professor W.L. Griffin, who conducts analyses of diamonds using the same technology, that he would regard the qualitative approach as invalid and

probably misleading.⁶⁴ From recent research carried out using a quantitative method Professor Griffin concluded that it was unlikely that individual diamonds from different sources could be identified using this method.^{65, 66} However it was also agreed that more research on other pipes was needed and that results from certain pipes did suggest that some pipes may prove to be identifiable.

The technique also rests on the existence of a representative database which has yet to be established. One projected cost of doing this was \$2 million and that it would take three years⁶⁷; another estimate was that this would take five years⁶⁸, but it is not clear how either of these were arrived at (nor is it clear how much already exists, or what samples exist ready for analysis).

An attempt to clarify the situation was made by the HRD Institute of Gemmology, who tried to bring together several current researchers working on this issue, for an 'origin determination conference'.⁶⁹ The conference was planned for January 2000, but according to one source at the HRD, there was insufficient response by the organisations and individuals approached to attend, and the conference never took place.⁷⁰ The HRD also conducted its own research at the University of Leuven, Belgium; this failed to provide any conclusive results.⁷¹

It is likely that current research using LA ICP-MS will throw up more information in the near future. The Royal Canadian Mounted Police, (as part of a wider plan to address the law and order implications of having a diamond industry), is involved in research using LA ICP-MS technology. The RCMP are making contact with producing companies worldwide to seek their participation through the collection of data on the unique identifying feature characteristics of diamonds from their mines.⁷²

However, the RCMP remains cautious in its approach in terms of its expectations of what this technology might be able to offer. With regard to determining the provenance of an individual diamond, a source from the RCMP stated that; "All indications are that this would be difficult to accomplish. The ability of the science involved hinges on a representative database that has yet to be established. Validating the profiling process needs to be accomplished through application and not conjecture. The application is very complex, just as comparing the chemical signature of diamonds is very complex. While it would be very optimistic to think that the science will provide for a 100% certainty of source, it may support other existing circumstances that are indicative of source. Of equal importance, it may be more conclusive that a sample did not come from a specific location."⁷³

Also of relevance to the future prospects for this technology is that there is a major initiative currently underway at Curtin University, Australia, to establish a Cooperative Research Centre (CRC) in Forensic Science.⁷⁴

Inductively Coupled Plasma Mass Spectrometry (LA ICP-MS) involves vaporising a small sample of

matter (in this case a diamond) with a laser, then subsequently analysing the trace impurities present in a diamond. The ablated sample is carried in a stream of inert gas, usually argon, into a high-temperature field. This causes the dissociation of molecules and the ionisation of the resultant atoms. The ions are finally passed to a mass spectrometer detector where the ions are identified and quantified in terms of their mass and charge such that the relative intensities of the elements present are recorded.^{75/76} The system is so sensitive that the presence of 65 elements can be determined at concentrations down to a few parts per billion.⁷⁷

Legislative Overview on the Export and Import of Diamonds

THIS SECTION PRESENTS a brief overview of customs procedures for countries with significant diamond interests. It is intended to highlight the failures and loopholes of the global trading system which is partly a result of the increased deregulation of trade through the World Trade Organisation (WTO) and partly due to various country's legislative oversights, the weakness of information provision about diamond trade patterns and interest in customs enforcement – except for tariff provision. The overriding conclusion is that international legislative change is needed regarding the country of origin declarations for rough diamonds. Global Witness believes that the true country of extraction must be declared and not just the last country it was exported from if the issue of conflict diamonds is to be resolved. There needs to be a comprehensive and detailed review of national and international legislation and trade agreements to determine a legislative basis for requiring country of extraction on import documents. Such a review is a major undertaking and is beyond the scope of this report. It is also not clear which is the best way to achieve such legislative change, for example it might be best done via a UN Security Council resolution that would oblige member states to take action. Alternatives to the UN would include the EU-ACP, the WTO, G8 and G77. Consideration should also be given to which government body should implement controls. Currently there is a lack of international mechanisms to deal with diamond trade from countries such as Sierra Leone where there are diamonds from both rebel and official sources.

Global Witness asked the major exporters and importers of diamonds to clarify their procedures and requirements for the trading of diamonds. The picture that emerges, overall, is one of few requirements for Certificates of Origin (CO) relating to diamonds. Although import and export documents require

exporter, importer and origin information as standard, there are various loopholes in the system with regard to defining the 'origin' of goods.

It should be noted that Global Witness has included information about the WTO, but this should not be read as an indication of support of the WTO framework.

THE EUROPEAN UNION

All diamonds entering the EU are zero rated for duty and do not require COs unless they are Angolan diamonds (UNSC RES.1173), in which case they must be controlled through the Certificate of Origin scheme operated by the Government of Unity and National Reconciliation of Angola (GURN).

Under Council Regulation (EEC) No.2913/92⁷⁸, the origin of diamonds is determined by the country from which they were extracted. This is the origin which should, where known to the importer, be declared to Customs. This information is for trade statistics purposes under Council Regulation No (EEC) 1172/95⁷⁹ Article 10. At present there is no requirement to give the country of origin, but this could be changed by the EU. For manufactured goods, where no preferential rate of duty is involved, country of origin is based on the last substantial processing under Council Regulation No (EEC) 2913/92.⁸⁰ In cases where the importer does not know the country of origin, Commission Regulation No (EC) 840/96⁸¹ requires the country of consignment to be shown where the country of origin is not known.

IMPORTERS

THE EUROPEAN UNION

Europe is a key player in the international trading of diamonds. Antwerp and London are major funnels for diamonds reaching the world market. Most of the world's rough diamonds are sent to the London CSO for sorting while Antwerp's main business is the trading and re-routing of diamonds.

BELGIUM

Diamonds imported or exported from Belgium must go through the Diamond Office in Antwerp which takes care of all import and export formalities on behalf of the Government of Belgium. Customs officers and diamond experts are present at the Diamond Office and all parcels entering or leaving Belgium are opened and checked by sworn-in experts under the supervision of an officer of the Ministry of Economic Affairs.

In the case of diamonds coming from outside the EU from 'developing countries', the importer has to pay 'Social Funds' i.e. one-third of the value of the goods,

on the import of rough diamonds (valued at more than 300 Bf/ct, return shipments excluded).⁸²

SWITZERLAND

Diamonds arriving at the Swiss border have to be declared at a Customs Office. Again, parcels are opened on a discretionary basis. This is determined by how clear the information on the standard import documents is and whether there is any doubt as to its veracity. Not all parcels will be opened – only those where information is deemed insufficient or suspect.⁸³

USA

When importing diamonds to the USA no special documentation requirements and no special procedures must be followed. Diamonds imported to the USA are free of duty, and basic Customs documentation and procedures apply under Part 177 of Customs Regulations (19 C.F.R. 177)⁸⁴

CANADA

Canada's Trade Policy and Interpretation Directorate confirmed to Global Witness that diamonds imported to Canada are free of duty and there is no certification requirement on imports of diamonds. The Directorate states that the origin of the diamonds must be declared on the import documents at time of importation.⁸⁵

ISRAEL

Israel's Diamond Controller confirmed that standard documentation should accompany imports of diamonds except for Angolan diamonds where a Certificate of Origin is required. The Diamond Controller also stated that all imported shipments of diamonds are opened and inspected by diamond evaluators – without exception.⁸⁶

INDIA

Diamonds imported to India are free of duty. Certificates of Origin are not, in general, required documents. However, they may be requested from time to time by importers or banks. Imports to India are made under licences obtained from the Director General of Foreign Trade. India is an adherent to the 'Standards Code' negotiated under GATT and now assumed by the WTO and has also taken up the implementation of ISO 9000 quality systems standards.

ASIA-PACIFIC / OTHER

The Asia-Pacific Region is the largest retail market for cut and polished diamonds and diamond jewellery next to the United States.

THAILAND

For imports to Thailand, Certificates of Origin are generally not required documents. Most goods can be freely imported. Import licenses are still required for items including certain raw materials. Although unable to obtain detailed information from Thai customs, 'A Diamond Imprest Licence' may be issued, in advance, for the import of rough diamonds from any source.⁸⁷ According to Thai customs notice No. 2/2514 of 1971 it requires the country from which goods were purchased and the consigning country, as well as the country of origin of imported goods to be stated.

JAPAN

Diamonds imported to Japan are free of duty and only require Certificates of Origin if they are Angolan. Japan also determines the origin of goods according to "wholly produced criterion" and "substantial transformation criterion". Wholly produced criterion means that the origin of the goods is the country where the goods have been wholly obtained, whereas substantial transformation criterion are used when more than one country is involved in production of the goods; the origin of the goods to be the country where the last substantial transformation has been carried out. Japan describes its policy as to the opening of parcels and the carrying out of physical examinations as being when it deems necessary. These rules originate from the Director-General of the Customs and Tariff bureau, and are based on the WTO Agreement on Rules of Origin.⁸⁸

EXPORTERS

RUSSIA

In the Russian Federation, processing and trading firms must obtain a special licence from the local governmental power. The export of both rough and polished diamonds is under the control of the federal government which maintains a list of approved exporting firms. For rough gem diamonds there are two exporters: Alrosa and Almazyvelirexport. Every processing firm can export its polished diamonds directly. The President regulates by decree the export of special size rough (over 10.8 carats) and diamonds with special properties.⁸⁹

AFRICA

SOUTH AFRICA

Diamonds exported from South Africa are packed and sealed in standardised containers by the South African Diamond Board. The Export Permits issued by the Department of Trade and Industry include the harmonisation code, weight, carat, value, description, exporter's name and client's name and address. Cus-

toms in South Africa operates in an administrative capacity to verify and perform final checks on the South African Diamond Board procedures. It also works in conjunction with the South African Police service which has a diamond and gold squad. In cases where Customs is unsure about a parcel or procedure relating to diamond exports they refer it to the SA Diamond Board.⁹⁰

NAMIBIA

There are only three companies that export diamonds from Namibia - Namco, Namdeb and Namgem. Namgem, a 100% owned subsidiary of De Beers, is the only company which imports diamonds to Namibia. Namibian diamonds are mined on and offshore and transferred directly to Windhoek, arriving sealed at Government offices. Diamonds are then evaluated with representatives from the Minerals and Energy department present at all times. In the final stages, a Government Diamond Valuation (GDV) takes place and an export certificate is produced.

BOTSWANA

Diamonds from Botswana are entirely under the supervision of one company, Debswana, and all diamonds go to the CSO in London. Goods are exported with an accompanying barcode that contains pertinent information: consignment number, weight, value, shipping date, and which mine the diamonds came from. This information is computerized and can be checked at the point of export and import. Remarkably, Botswana customs and police do not have the power to open packages of diamonds being shipped out. Diamonds may only be exported from Botswana under and in accordance with an export permit issued by the Mining Commissioner.⁹¹

SIERRA LEONE

To export diamonds from Sierra Leone, applications for Export Licences must be approved by the Minister of Mineral Resources on the recommendation of the Director of Mines. An Exporter's Licence is issued for a year. Each exporter is allowed to employ buying agents approved by the Director of Mines. Diamond parcels are sealed at the Government Gold and Diamond Office (GGDO) in the presence of Customs and other security personnel. Thereafter the exporter is free to leave Sierra Leone without further checking or the parcel being opened again at the airport.⁹² This is the theory, in reality exporters openly flout the GGDO and official exports have reduced to an all time low in 1999 of approx. \$1.2 million.

EXISTING INFRASTRUCTURES TO BUILD ON

The infrastructure to support a Certificate of Origin scheme for all diamonds already exists. Most major trading countries are parties to the International Convention on the Simplification of Customs Formalities 1923, under which they have agreed to accept Certificates of Origin issued by official authorities. Under the Convention, Customs officials in various countries can check the reliability of Certificates of Origin by referring to a list of authorized organizations officially designated by their respective Governments.⁹³

The formulation and application of origin rules is supported by the Harmonised System, the international classification tool administered by the World Customs Organization (WCO). Under the Harmonised System, imported and exported goods have to be declared under nomenclature subheadings. This determines what rate of customs duty applies and how the goods are treated for statistical purposes. Effectively everything depends on this classification, as all trade measures use the nomenclature to describe which treatment is to be given to what goods. This instrument is crucial when the precise description of goods and classification has to be used for trade legislation. It is also used in formulating and applying origin rules, as they are based, to a large extent, on the end product being in a different tariff heading than the imported products used in manufacture.⁹⁴

The EU's single market has generated the legal framework for all its members, but there needs to be greater cooperation and integration if smuggling is to be combated.

Every country has technical requirements for the import and export of goods and services. In the main these laws aim to protect the health, safety and welfare of citizens; protect the environment and national security, and guard against fraud. However, with the growing international acceptance that some natural resources in international trade are responsible for funding conflict, (re: timber in Cambodia and diamonds from Angola and Sierra Leone) there is an urgent requirement of governments, policy makers and trade bodies to monitor and regulate the trade in these associated industries to ensure that they do not contribute to the funding of conflict.

The expansion of world trade has meant that governments have looked at ways to reduce so called technical barriers so that goods can move across borders without delay or added cost - this has often been to the detriment of social, economic and environmental considerations. Most trading nations are members of the World Trade Organisation (WTO) which dictates world trade policies, through the General Agreement on Tariffs and Trade (GATT) and the General Agreement on Trade in Services (GATS). Most WTO members use the internationally recognized standards of the International Organisation for Standardisation (ISO). Currently, trade requirements generally consist of the

following components. Regulations, which are mandatory and cover labelling, country or origin, packaging, product characteristics and environmental protection. Standards, which are voluntary technical specifications for products and are developed in conjunction with the relevant industry. Standards may become mandatory when included in a regulation. And, Conformity Assessment, which is the process of qualifying whether a product meets a standard or complies with a regulation.

Regulations relating to the declaration of a product's country of origin has become a contentious area, as for many products there are serious environmental, social and welfare issues to be considered. With the harmonization of rules of origin in the 1980s, an increased number of origin disputes and a surge in the use of anti-dumping laws occurred. This led to the issue of country of origin being included in the Uruguay Round of trade talks during which the principles governing the application of rules of origin were established. In fact there is work to simplify the rules on country of origin.

COUNTRY OF ORIGIN: WTO DEFINITION

'Rules of Origin can be defined as the criteria needed to determine the territorial origin of a product. The Agreement on Rules of Origin is concerned primarily with those used in non-preferential commercial policy instruments, such as in the application of most-favoured-nation treatment, anti-dumping and countervailing duties, safeguard measures, marking requirements and any discriminatory quantitative restrictions or quotas. By definition, each good can only originate in one territory. In a world where more and more goods are produced from parts coming from other origins, conferring origin to a product is not always an easy task.'⁹⁵

In 1998, the WTO Committee on Rules of Origin harmonised the rules of origin. Due to WTO members having differing rules of origin there were barriers for exporters, particularly for those from developing countries. In 1998 the Committee examined the 'substantial transformation' test which would determine item-by-item where a product originates. This approach has allowed products to carry certificates of origin according to where the 'substantial transformation' from raw materials to finished or semi-finished goods has taken place. Agreement has been made on granting country of origin status to some product categories according to this criteria. Examples include furs, lubricants and concentrates from metal ores.⁹⁶

Recent labelling disputes between the US and the EU over textile rules of origin and hormone treated beef highlight how important rules of origin are to trade and, indeed, international relations. In the case of the EU-US textile dispute under the USA 1996 rules of origin, the USA considered for labelling purposes the country of origin for a finished product as the country which produced the raw material used in the textile

product.⁹⁷ The dispute was finally settled in July 1999, when it was agreed that European textile imports could bear 'Made In Europe' labels for products transformed in Europe from fabric produced in third countries. The country of origin textile issue is considered so important that a Textile Monitoring Body is in operation. More recently in 1999 the US offered to label US beef exports with its country-of-origin in order to end an EU ban on US beef products. The EU did not accept the offer stating that the US did not include crucial information on the label which was the central issue of the EU ban.⁹⁸

There has been draft agreement that the country of origin for rough diamonds should be the "country in which the goods of this substance are obtained in their natural or unprocessed state." This means where they were extracted. However this only applies to unsorted rough diamonds and as diamonds are routinely sorted before the first export takes place, for example Botswana's production, it excludes most of the rough diamonds in trade. There needs to be clarification about how the term 'unsorted' is applied.

THE EUROPEAN COMMUNITY: CONSUMER AFFAIRS

It is established that consumers have a legitimate right to information regarding products they are buying. This can range from sufficient labeling of ingredients on food to stating which country a particular garment was made in. As a consumer product, diamonds are in the same category for information provision. As De Beers Director Tim Capon said, 'The consumer is much more aware, and the diamond industry has to respond to that consumer awareness and interest in what it is that they are buying, and I think that is not a bad thing.'⁹⁹

The European Community has a fully functioning and very active consumer policy action plan for 1999-2001. Within this plan, the protection of the consumer with regard to safety, disclosure of information and quality guarantees is set to gain momentum. Indeed, the French and Belgian delegations to the EU on 7th December 1998 put forward a recommendation to the Council 'requesting the Commission to lay down a legal framework for establishing a "social label" for consumer products and for enterprises that respect the basic social rights, as determined in the ILO Convention, in their production.'¹⁰⁰ This is clear evidence that there is a political will to have labelling for consumer products that are based on social and ethical considerations. At this same meeting the Council approved a resolution on consumer policy action plan for 1999-2001 which contained the following points:

'whereas under certain circumstances self-regulation by business or voluntary agreements between consumer organizations and business can be an appropriate complement or, in specific cases, an alternative to legislation in particular as they allow for faster reactions to market developments;

whereas such self-regulation and agreements must meet the objective of a high level of consumer protection, safeguard consumers' rights to information and not restrict competition; whereas the proper enforcement and monitoring of self-regulation and voluntary agreements are essential for their effectiveness and whereas failure of self-regulation and voluntary agreements may require the adoption of binding rules.⁷¹⁰¹

CARAT ACT

A significant recent development for the diamond industry occurred on November 1st 1999 when United States democrat congressman Tony Hall of Ohio introduced the Consumer Access to a Responsible Accounting of Trade Act or CARAT act. He has recently been joined by a co-sponsor of the bill, Republican Frank Wolf. The bill intends to introduce legislation that will require that the rough source of all gem quality polished diamonds and gem diamond products sold in America should be certified with a label indicating their country of origin (extraction). Strict penalties for non-compliance are also legislated for with violators facing fines of upto \$250,000 or one year in prison. The proponents state that purpose of the carat act is to give American consumers information about diamonds that they have about other products they buy. It is proposed that this will in turn put pressure on the diamond industry to not deal in conflict diamonds as the American diamond buying consumers will not want to buy diamonds that have financed conflict in Africa but rather economic development and democracy. It does not intend to block the import of diamonds from any conflict zone, but it would force fairly extensive changes in industry practice.

Technologies and Control Systems in Use in the Diamond Trade

THIS SECTION PROFILES some of the current technology and control systems used within the diamond industry to show how the control systems are already in wide use within the industry, particularly where the profitability of the industry is concerned. The case study below gives details of the chain of custody that is in the process of being implemented in Canada's North West Territories.

The diamond industry is certainly no stranger to technology, indeed it has welcomed it with open arms. Since the 1970s technology has significantly changed many of the processes that take the diamond from its natural state to deliver it to the consumer as a finished item. It is fair to say that all the technologies, as well as the procedures needed to introduce a successful chain of custody into the supply chain of diamonds, already exist in some form within the diamond industry. It is not a valid argument that the current scale and performance of some technologies disqualifies them from being considered for use as part of a larger industry-wide chain of custody.

The technologies in the diamond industry that could theoretically be applied to a chain of custody currently exist for the evaluation of rough diamonds, the branding and grading of cut diamonds, assisting in manufacturers' inventories and the tracing of lost and stolen cut diamonds. These all rely on either sampling and recording the properties of individual diamonds, or creating some form of tag, in the form of a code or a logo, that is used to identify the diamond. By combining the sampling and marking, by the application of a code or a bar code, it will be possible to quickly verify the identity of a diamond by checking on a database. The creation, cost and administration of a database to store the details of the diamonds will need to be addressed.

Initial research, which was not exhaustive, has identified technology that is either developed, or is being developed that can: calculate and record the individual surface profiles of rough diamonds; confirm the identity of a parcel of stones that has been registered using this method; mark rough diamonds with individual bar codes or other readable inscriptions; mark cut diamonds with codes, bar codes and logos; identify and verify the identity of cut or rough diamonds that have been coded; record and verify the individual optical signature that a cut diamond exhibits using laser refraction.

Global Witness believes that the adoption of some or all of these processes, along with corresponding procedural methods, could play an important part in any chain of custody system. It is recommended that extensive further research and information-sharing is established. Below are brief descriptions of some existing technologies that could be applied to a chain of custody, although there are issues of concern around the dominance of northern based technologies.

I. CREATING A RECORD OF A POLISHED DIAMOND

This is currently being done by one company under patent, the Gemprint corporation, based in Canada, and is known as the Gemprint system. The company provides equipment to perform a non-invasive examination of a cut diamond, and the computer systems and back-up that store the results of the examination on a secure database to be recalled on demand. The Gemprint corporation has also been chosen to establish and administer the GNWT 'chain of custody' programme, which monitors the flow of diamonds from the Ekati mine in Canada's North West Territories to local cutters and on the retail market. Gemprint has been marketed in areas where authenticating the identity of a single stone is needed. It has, for example, been used as a means of recovering diamonds that have been stolen, it is also used by manufacturers and cutters for inventory identification and comparison.

Drawing on technology developed in Israel during the 1970s, Gemprint uses laser refraction to produce an image that is the 'unique optical signature' of a cut diamond and other gemstones that possess a high degree of brilliance such as sapphires and topaz¹⁰². A low-powered laser is directed into the diamond perpendicular to the centre of the table. The light that is reflected is projected onto a screen to form a scattered image. From here the image is captured, digitised, and becomes the unique fingerprint of that diamond. The information can be sent via a modem to a database to be recalled whenever the need to verify the details of that diamond arises.

The method can be used on any suitable gem above 5 points, but is usually used on stones over 25 points. Usually a diamond is Gemprinted at the point of purchase. An incentive is that various insurance

companies offer reduced premiums typically in the region of 10%. Diamond owners may also be tempted to use this technology when diamond-containing jewellery is sent for repair and where the practice of swapping diamonds for an inferior one is not unheard of.

To recognise a Gemprinted diamond, the initial procedure is repeated. This is known as a verification scan. Again, light is passed through the diamonds in the same manner to form a scattered image, once digitised, the image is matched to a corresponding partner in the Gemprint database. Any relevant information held about this stone can then be checked.

The strength of the Gemprint system relies on the fact that every polished diamond is unique regardless of how similar its characteristics are to another. This has been proven by testing against examples of standard cut diamonds and has been confirmed by the HRD.¹⁰³ Technological progress in the diamond industry including computerised evaluation of rough stones and laser cutting mean that standardised cut diamonds have been made possible and are demanded. Gemprints have been tested against stones that expert gemmologists have claimed to be identical.

Importantly, the optical signature of a diamond, as captured by Gemprint has been accepted as evidence of a criminal standard in a ruling in a Californian court case. The case, 'People Vs MAKI 1984'¹⁰⁴ accepted that Gemprint evidence, on the identity of two stolen diamonds and criminal liability befell Maki et al.

II. LASER TECHNOLOGY

As in other industry sectors, the introduction of lasers into diamond manufacturing has transformed the industry, particularly the diamond-cutting process. Lasers have opened up the possibility to mark diamonds, in either their rough, or their cut stage, with a code, or a bar code that can help to identify that diamond whenever verification is required. If this technology could be applied widely then there seems to be no reason why each diamond could not be traced back to the point that it was coded as rough and back further still, as far as the chain of custody, and the records that go with it, will allow.

Importantly, it has allowed diamond companies to brand their diamonds with logos, taking advantage of the value added whilst also helping to increase consumer confidence. This has become increasingly prevalent as branding develops in the industry.

In the 1970s, it was discovered that laser beams could be used to burn out black inclusions and improve greatly the appearance of diamonds that were otherwise unwanted. Later that decade, lasers were used to inscribe diamonds and in 1983 Lazare Kaplan International (LKI) developed an internationally patented laser engraving system. LKI inscribed its entire 'ideal' cut diamonds (those with optimum reflection and refraction of light) with a serial number and logo that identify the stone. By this, Lazare Kaplan can recall

from their database the characteristics of any stone they have inscribed.¹⁰⁵

Recently, another company in the United States, 3Beams Technologies, has been working on developing higher speed, lower cost and more accurate laser inscription for both rough and cut diamonds; this is still at the developmental stage. 3Beams aims to create similar inscriptions to its Focused Ion Beam technology (see section 4, iii) but at much lower cost.

The lower size range of these laser inscriptions is currently set at two microns, which is .002mm, and is smaller than early versions of the De Beers 'Marque' – De Beers' branding inscription. Interestingly, it is the cost of a microscope needed to see any smaller than two microns that sets this. Two microns would not be considered to affect the grade of a stone up to and including internally flawless.

BAR CODES ON DIAMONDS

Using existing bar code examples but on a much smaller scale, 3Beams technologies expects to be able to bar code rough diamonds at the rate of one every 15 seconds¹⁰⁶. This higher speed of inscription, is possible because the minute inscriptions on cut diamonds are not necessary, as the bar code will be polished off. There is of course the issue of a larger bar code affecting the grading process of a rough diamond, but this needs to be established in practice. The expected cost of bar coding a rough diamond is under \$6. If this technology is applied on a high-volume basis the prices will lower.¹⁰⁷ Another advantage of the larger bar codes that might be applied to rough is that they can be read using a digital video method, which is a newer method of reading bar codes.¹⁰⁸ 3Beams is currently working on adapting a video-based scanning system which works by taking a video snapshot of the diamond to capture the image of the bar code. The reader then uses a sophisticated digital image processing technique to decode the bar code. In practice this means that the actual orientation of the bar code is irrelevant, and that as long as the whole image of the bar code is available to the camera then the bar code can be read.¹⁰⁷ By overcoming the problem of orienting the bar code of the diamond to the bar code reader the system should become more easily automated.

The costs of the laser bar code generator would be in the region of \$60, 000 to \$210, 000, with the lower end of the price range being for rough diamonds. The bar code scanners would be priced somewhere in the region of \$800¹⁰⁷

THE DATABASE

Any bar code system would need to have the support of a database. It is not only the presence of the bar code on the diamond but the related information about that diamond, held on a database that is needed. The information about the diamond checked at any point would need to correspond with all the other information held

on it. The worth of the database will be related to its accessibility, in terms of authorities and the industry being able to access it speedily and easily from any location at different points of the manufacturing process. Large volumes of data would need to be transferred at high speeds. All measurements would need to be standardized and machines calibrated.

At the end of the process, once the diamond is cut, it should, in theory, be possible to obtain the entire history of the diamond, which would include its country of origin, its original weight and where it was cut.

THE FUTURE

3Beams is currently working on a system whereby a bar code could be embedded within a diamond. Removal of this would prove to be very difficult without altering the diamond, which is not thought to be much of a problem with normal laser inscription. It has been suggested, and subsequently agreed, that it may be possible to insert a hologram into a diamond.¹⁰⁹ It has also been suggested that embedding magnetic materials of a specific signature may be of some use.

III. FOCUSED ION BEAM TECHNOLOGY

In September 1998, De Beers announced its use of a new technological application to the branding of diamonds. In collaboration with a chain of jewellers in Manchester, England, De Beers unveiled what they described as a 'unique customer service', a new method of branding diamonds, called the 'Marque'. The Marque is a De Beers logo and an eight-digit serial number, which their publicity describes as representing to the customer "a confidence and knowledge that [any diamond bearing it] represents one of the world's finest diamonds, unique and personal to the buyer."¹¹⁰

While the diamond press was examining the prospects for the concept and its uses which "may prove revolutionary to the trade", De Beers was intent on not disclosing the method that was being used to brand its diamonds.¹¹¹ Even today, the De Beers 'Marque' method is not disclosed. "The hallmarking technology is a proprietary secret of the De Beers company. Due to its unique nature, the hallmark appears to be three-dimensional. It is unlike any other inscription in that it is not carved into the diamond with a laser but is actually a part of the diamond itself. It is microscopic and both transparent and invisible under normal viewing standards. However, utilizing the special De Beers viewer your select prestige jeweller will make the invisible hallmark appear before your eyes."¹¹²

In fact, a company called Norsam Technologies holds the patent for this application, which it developed in conjunction with Los Alamos National Laboratories. Norsam Focused Ion Beam technology works by directing a beam of gallium ions onto a diamond's surface; the high-energy beam converts the very dense crystalline structure of diamond into the less dense

form of carbon i.e. graphite. Graphite has a greater volume, and it is this that creates a bulging effect, being seen as puffed or raised letters on the surface of the diamond.¹¹³ Graphite, because of its conductive properties appears to glow under infrared, is visible under infrared radiation, making detection easier.

Alternatively, the softer graphite can be etched from the diamond leaving an extremely shallow indentation that again can only be seen by a special microscope.

Focused Ion Beam technology can be used to implant ions, but for the branding of diamonds it is set to deliver a low dose of ions, enough to transform the diamond to graphite, yet not enough to leave a trace of the ions. In a telephone call Global Witness made to retailers of De Beers 'Marque' diamonds, the retailer was unaware of how the 'Marque' was made, claiming that the method is kept secret to all but a few people at De Beers¹¹⁴. In reality, the mystery is not the technology but perhaps why De Beers tries to maintain the perception of uniqueness. Though this becomes clearer when taking into account the premium that stones with the 'Marque' are sold at compared to stones of a similar grade. It is now clear that De Beers has used two methods to brand its diamonds with the 'Marque'.¹¹⁵ The first, 'electron beam lithography', is a time-consuming and expensive method. The other method uses 'Focused Ion Beam' technology and is a faster, more precise method. De Beers currently uses this method and along with several large diamond manufacturers in the USA will use this in the future for the inscription of logos and serial numbers on some of its diamonds.

Unlike the cruder laser inscriptions of the past, Focused Ion Beams are extremely precise, creating inscriptions that are sub-micron, that is, they are less than 0.0001 mm. Norsam can direct a beam of ions leaving lettering on a diamond that is 20 nanometres – equivalent to the width of a human hair. The drawback of this method is the cost. Focused Ion workstations cost in the region of \$800,000. However, once the initial outlay for the machine has been made, the unit costs do not appear to be very high. It is expected that it will be applied to brand all diamonds 0.3ct and higher with both a logo and a serial number.¹¹⁶

The Focused Ion Beam technique, can effectively be used as a printer. Images and text can be etched onto surfaces as shown in the example above. Using this method, the entire Genealogical record of the Mormon Church is being inscribed onto a series of 2 inch nickel discs, each disc capable of holding 200,000 (8 1/2 x 11 inch) pages at 200–300 dpi resolution. More recently this has been increased to 350,000 pages per disc.

IV. INDEPENDENT GRADING REPORTS FOR POLISHED DIAMONDS

It is now accepted diamond industry practice that diamond grading reports are needed for diamond jewellery with almost every valuable stone receiving a gemmo-

logical report. The International Gemmological Institute states that, "these reports have created a link between the jeweller and the client. They make it much easier for the jeweller to explain the characteristics of the item and give a feeling of security to the client".¹¹⁷ The reports are essentially statements attesting to the authenticity of a polished diamond and provide a reliable and accurate statement of its identity and grade based on an internationally recognized system. There are several competing trade bodies and firms that offer these grading reports and the methodology used is the same. Each diamond is studied by gemmologists who produce descriptions of the characteristics of the diamond and the quality of its cut based on the 4C's: Carat Weight, Color, Clarity and Cut.

There are five major laboratories that issue detailed grading reports. They are: the Gemmological Institute of America (GIA), the European Gemmological Institute (EGL), the International Gemmological Institute (IGI); the American Gem Society (AGS) and the High Diamond Council (HRD). The laboratories do not actually certify diamonds as many jewellery retailers claim, they simply grade the diamonds according to agreed industry standards. The importance of such reports to the retail trade is illustrated by the IGI, which states; "Jewellers now consider supplying such information as an integral part of any sale and modern retail training programmes stress the importance of providing independent gemmological reports for gems and jewelry in addition to educating the consumer."¹¹⁸

There is considerable concern within the industry about issues such as the creation of synthetic diamonds, the practice of fracture filling and the proliferation of colour treatment enhancements upon rough diamonds. These have made certification within the industry a key issue, indeed the President of the GIA, William Boyajian, has stated of colour enhanced diamonds "These diamonds must be disclosed at every level of the pipeline."¹¹⁹ In 1999, diamonds, treated with colour enhancement techniques by US diamond company Lazare Kaplan (LKI) and General Electric entered into the market with the diamonds being marketed by the LKI company Pegasus Overseas Limited (GE-POL). It is now possible to take a specific brownish type of rough diamond, (known by geologists as Type IIA, mostly found in De Beers' Premier Mine in South Africa, in De Beers' Orapa mine in Botswana and in Russia)¹²⁰ and turn them into pure white stones, enhancing their brilliance and brightness. The diamond industry sees this as a very real threat to the confidence of the diamond buying consumer as can be seen again from comments made by the President of the GIA, "The trade insists that if diamonds are treated in any way, then the trade has a right to know and ultimately so does the consumer. The integrity of the industry is at stake." This concern has led to all Pegasus treated diamonds being laser inscribed on the girdle and to be GIA certified as having been processed or treated by this method.

V. THE GEM DEFENSIVE METHOD

As part of the De Beers 'gem-defensive' against the proliferation of synthetic diamonds, fracture filling and colour enhancements (as mentioned in section iv above) they have implemented a trial run branding initiative that is intended to ensure consumer confidence and promote brand loyalty. Promotional statements declare that 'the provision of a service for the inscription of selected polished stones with the De Beers name and an individual security number will give consumers greater confidence when purchasing diamonds.'¹²¹ This has several possibilities relating to the issue of conflict diamonds. As Chaim Even-Zohar, the editor of Diamond Intelligence Briefs has noted "...if environmental or child labour issues would come up at any time in the future, it will become easier to defend the diamond industry by showing that all labour practices from the mine to consumer pipeline of De Beers branded diamonds are well defined and controlled, and retailers can guarantee that these problems don't apply to their diamonds. No branding would ever be applied to diamonds produced by child labour, the branding becomes an incentive for the pipeline to behave accordingly."¹²² This was written before the issue of conflict diamonds became a key issue for the industry, but obviously applies equally.

CASE STUDY: NORTH WEST TERRITORIES PROGRAMME – THE FIRST CHAIN OF CUSTODY FOR THE DIAMOND INDUSTRY?

In what appears to be a first¹²³ for the diamond industry, the Government of the Northwest Territories (GNWT) has devised a chain of custody system that is currently in the early stages of implementation. It is for diamonds mined from the Ekati mine and subsequently manufactured in the North West Territories. It is an audit trail from the mine to the manufacturers and downstream to the consumer, i.e. a chain of custody.

The Ekati mine in the North West Territories of Canada has been in production since October 1998. The largest stakeholder and operator of the mine, BHP, has agreed to provide up to ten per cent in value terms, or approx. 7,000 carats, of higher-end quality diamonds to the producers currently operating in the NWT.¹²⁴ In 2003, the Diavik mine will come on stream and there is a similar agreement to sell ten per cent of production. The GNWT chain of custody scheme ensures that the owner of a diamond from one of the three manufacturers operating in this programme may easily verify that their diamond corresponds with what is written on its accompanying certificate of origin. Speaking of the scheme, the GNWT describes tracking diamonds through an auditing and monitoring system as 'a relatively simple process'.¹²⁵

Conceived to protect the GNWT's investment in the diamond manufacturing industry, and at the same time protect the delicate market for Canadian-produced diamonds, the programme has been developed

through the collaboration of the GNWT, the Royal Canadian Mounted Police (RCMP), Broken Hill Proprietary (BHP), Gemprint Corporation and current and future diamond manufacturers in the NWT.

CHOOSING THE TECHNOLOGY AND PROCEDURES

The GNWT chose the Gemprint corporation to design and administer the audit trail for its chain of custody programme. Gemprint's optical signature system was chosen as the method by which the finished stones could be identified as NWT stones and hence authenticated. A security-printed certificate of origin also accompanies GNWT diamonds.

The GNWT worked to the local RCMP detachment which reviewed technologies and procedures that could be applied to tracking diamonds. Laser inscription and the optical signature method of Gemprint were both considered, but it was decided to use Gemprint because laser inscription had the weakness of being visible and erasable.¹²⁶ For branding purposes though, it is believed that all the manufacturers will also use laser inscription.

In the GNWT programme, Gemprint's role comprises the following:¹²⁷ Establishing a secure local database and specific software; fingerprinting every stone that is produced by manufacturers in the territory; corresponding grading data of each diamond to the Gemprint registration number, including the laser inscription number of the diamond (if it has one) on the certificate of origin and adding it to the database; designing, producing and maintaining control over a certificate of origin; passing the certificate of origin downstream with the diamond along with its grading certificate and providing for subsequent verification on demand, by a check facility on the central database.

Diamonds leaving the Ekati mine have been reclaimed by x-ray sorting machines that pick out the diamonds from the crushed rock. They are then transferred to the BHP sorting and valuation office in Yellowknife. All diamonds must be valued by GNWT in accordance with Federal Mining Regulation. After valuation, a proportion of the diamonds are shipped directly to the CSO in London, and the remainder are shipped to the BHP offices in Antwerp. After sorting in Antwerp, the stones are shipped back to Yellowknife, to the BHP sorting and valuation facility. Custody of the diamonds is transferred here. When the manufacturer, Sirius Diamonds, which is currently the only manufacturer in operation, receives its parcel of rough, an invoice provided by BHP accompanies it. This invoice lists the stones with the following: number of stones and weight – precise to three decimal points and value. A copy of this invoice is also provided to the GNWT.

Once the rough stones are received in the cutting facility they are registered to the local database which is used to record the history of all stones that are purchased by the NWT manufacturers whilst these stones remain in the NWT. Detailed information on the

stones is entered directly onto computers networked with the local database. The user interface uses specially designed software and the cutter is presented with an input screen with various blank fields that are subsequently filled. The stones are registered by weight (to three decimal points), shape, colour and clarity. As this is done, the software assigns each stone a tracking number. Once the stones have been registered on the local database the registration details are made available to the GNWT. This is done on a monthly basis and the detailed inventory of the rough received by the manufacturers will be consolidated with the listing on the original BHP invoice.

The manufacturing stage: from the point that the stone is logged and given a tracking number it can be traced until it reaches the consumer. Also at this stage the stone is assigned a number which will stay with it and will appear on the Certificate of Origin. Ensuring that the registered rough stone corresponds with the cut stone is done through what is known as 'forecasting'. Forecasting is standard practice and relates to the accurate prediction of the yield that the rough stone will make as a diamond. This is a standard procedure, carried out as part of the evaluation of a rough stone.¹²⁸ Forecasting has been made easier and more accurate through commonly used rough-evaluation computer technologies such as the Sarin Dia-Scan. Such a machine will scan the rough diamond and then allocate cutting shapes and also forecast the weight of the stone when it is cut. One estimate of how closely related the forecast is to the actual weight of the cut stone is that in 80-90% of cases the stone will match the forecast exactly. This rises to 95% when laser cutting methods are used.¹²⁹

Hence, once a stone is cut, though it will have lost some of its original identifying weight and shape properties, it conforms closely to what has been forecast of it. This is important in the chain of custody because it effectively bridges a weak link in the chain. When a stone has been cut the cutter returns the new dimensions, the 4 C's of the stone, to the database using sophisticated technology that is both accurate and objective. Details on the database are made available to the GNWT on a monthly basis, providing the GNWT with an effective audit trail. At this stage the stone is also recorded with the Gemprint optical signature technique (see Gemprint section). This uses a low-level laser refraction technique to capture the unique optical signature of a diamond. This optical signature, along with the full description of the stone, is then transferred to the main Gemprint Database in Toronto.

After cutting, but before the stone leaves the manufacturer, the stone is issued with a certificate of authenticity. As well as containing a miniature Gemprint scatter pattern, the certificate has numerous inbuilt security features. Each certificate has a running number, as well as the tracking number of the stone that was assigned to it while still a rough stone. In addition, the certificate has numerous security features, similar to banknotes, to deter counterfeiting. This

ensures that it is extremely unlikely that any non-bona fide diamond could be passed off as a genuine NWT stone.

CERTIFICATES OF ORIGIN FOR DIAMONDS FROM
ANGOLA :

The problem of counterfeit country of origin certificates can begin to be addressed by applying the most current features that have been developed to protect the authenticity of certificates and banknotes. There does however continue to be serious problems with counterfeiting especially with the advent of high quality colour copiers and scanners. However, if individual countries adopt what is considered to be best practice for the issuing of certificates then they have bridged another weak point in the supply chain.

Ideally certificates should be printed with a unique number and should incorporate features such as fluorescent inks and watermarked sensitized paper. Printing itself can incorporate both lithographic and intaglio (raised) printing, thus with specifications similar to many banknotes.¹³⁰ In late 1999, the Angolan parastatal diamond company, ENDIAMA, took delivery of a large batch of security printed certificates from the British company De La Rue. Since then, other diamond-producing countries have approached De La Rue with similar motives.¹³¹

The strength of a certificate is no stronger than the ability to recognise the difference between a genuine certificate and a counterfeit one, which is an issue to be worked out by the relevant authorities. Standardisation would seem to be able to go some way to addressing this problem. Equally important is the integrity of the systems of diamond control that lead up to the issuance of the certificate. For example if the Angolan government is unable to demonstrate how it is ensuring that no Unita diamonds are able to leak into the official system then the new certificates will be meaningless.

In December 1998, Global Witness produced the report 'A Rough Trade', which highlighted some of the significant loopholes that existed on the first Country of Origin certificates for Angolan diamonds. These included: no printed name under the signature; repeated failure to supply lists of names of officials authorised to sign to importing countries or the United Nations; easily forgeable documents; conflicting official stamps and failure to provide authorised examples of stamps to importing authorities.

Certification Systems for Other Products

THIS SECTION GIVES examples of existing certification systems for equally challenging products.

CERTIFICATION SCHEMES

The increase in the access to information on products based on ethical and quality control provisions has increased substantially in the last decade, largely through consumer pressure. Increased globalisation coupled with lax regulation of industries, preventable public health scandals and environmental disasters has led to consumers demanding their legitimate right to know detailed information on how their product has been created, extracted, fed, shipped or manufactured. With this increase in right to information, comes an obvious need to independently verify companies' claims, which have often been deliberately fraudulent. Certification can be broadly split into two categories – products that need independent quality-control testing and verification if they pose a serious hazard or health risk if manufactured to poor standards, and products that need to meet certain ethical, social or environmental criteria due to consumer pressure. Outlined below are two, of many, of recent examples of certification schemes currently in operation. They were chosen to outline how a chain of custody scheme can work for products with a very complicated lifecycle history containing many chains and also with significant quantities of the product.

I. FOREST STEWARDSHIP COUNCIL – FSC.

Growing public awareness of forest destruction in the 1980s led to consumers demanding that their purchases of wood and other forest products did not contribute to this destruction. As a result, certification programmes of wood products proliferated in the marketplace, often with misleading and fraudulent claims. In response, the

Forest Stewardship Council (FSC) was formed in 1994 to provide consumers with reliable information about forest products. The FSC is an independent, non-profit, non-governmental organisation comprising representatives from environmental and social groups, the timber trade and the forestry industry, which accredits certification organizations in order to guarantee the authenticity of the claims.¹³²

How does the FSC work: The basis of an effective certification system is the involvement of an independent certifier and the establishment of a chain of custody for the product from source to end product. The independent certifier establishes the chain of custody for the product by monitoring all the processes in the life-cycle of the product. The certifier would establish that harvesting was being conducted according to the required FSC standards and the establishment of a chain of custody by the certifier (product audit trail/ on-site inspection etc.) then guarantees that the timber from the well-managed sources actually ends up in the finished product, without being mixed with timber from other non-certified sources. Currently 20% of UK timber products are FSC certified with similar percentages for European countries. Verification is only achievable with compliance with FSC criteria, which are based on agreed social and environmental principles. Only products that are certified are legally authorized to carry the FSC Trademark. This provides an incentive in the marketplace for good forestry practice, as a premium can be charged for FSC certified products and provides the consumer with a guarantee.

II. MARINE STEWARDSHIP COUNCIL (MSC)

The Marine Stewardship Council (MSC) was established in February 1997 with the objective of promoting sustainable and responsible fisheries and fishing practices worldwide. Chronic over-fishing on certain stocks has driven staple species almost close to commercial extinction in some areas, resulting in the loss of thousands of jobs in regions dependent on these fisheries for a livelihood. Some fisheries that have sustained coastal communities throughout the world for generations have suffered catastrophic declines over recent years.

In developing a third-party, independent standard that will facilitate the assessment of marine resource sustainability, the MSC aims to promote responsible, environmentally appropriate, socially beneficial and economically viable fisheries practices, while maintaining the biodiversity, productivity and ecological processes of the marine environment. Its principles and criteria are implemented through a standardised certification scheme whereby certification of products is awarded subject to an assessment, carried out by independent certification bodies. When a fishery undertakes the Certifier Selection Process and chooses its accredited Certifier, it then undergoes a Gap Analysis

against the requirements of the MSC Fisheries Standard. If the results of the gap analysis are acceptable, the Certifier then undertakes a pre-assessment visit. Following a review of the pre-assessment results, the fishery management team decides whether or not to proceed. If it chooses to proceed, the Certifier undertakes a full assessment of the fishery to the MSC standard. The Certification team will decide whether or not to award Certification according to the outcome of the assessment. Should a fishery determine that the results of the initial gap analysis are not acceptable, then the fishery may opt to implement corrective action and the pre-assessment process begins again. A governance structure that ensures that all stakeholders' views and opinions are heard and debated and where no single interest predominates also underpins this process. Consumers buying products bearing the MSC logo know that those fish products have been derived from sustainable, well-managed sources.¹³³

CASE STUDY: THE USE OF BAR CODES FOR ESTABLISHING A CHAIN OF CUSTODY FOR THE TIMBER TRADE:

SGS Forestry deploys a system of field inspection, together with the capacity to store large quantities of data using a unique system of bar codes, which are attributed to each harvested tree, as a method of maintaining a chain of custody from harvest to end product. All harvested logs are allocated a bar code tag, which together with detailed information about their species, date of harvest etc., are entered on a hand-held palm reader, and the data is subsequently forwarded, using satellite technology, to a central computer for storage. At each stage in the journey of the log from harvest through to processing, and even following the manufactured product through to the point of sale, the movement of the log and its products is monitored, with the data being forwarded to the central computer.

This means that at any stage during this journey, it is possible to obtain a detailed history for the whole life of the product in question. On an inspection of any particular site on the audit trail, if logs are discovered which do not possess a bar code tag, they must by definition have been laundered into the system, and must therefore be illegal. This system also removes the possibility of the smuggler being able to launder logs using a fraudulent bar code, because on inspection, the database indicates that the log in question does not have a chain of custody audit trail – once again, the log would be clearly illegal. Using such systems allows for relatively inexpensive and easily portable field equipment. The unique bar code, which is allocated for each item (in this case, say a parcel of diamonds), allows for complex details to be rapidly recorded and stored at a central database, which further removes the possibility of laundering illegal stones through the system.

III. IMMUNOASSAY TECHNIQUES

BioCode Ltd, is a UK and USA-based company, which through its product, also called BioCode, makes use of techniques first used in medicine. It is currently applied to a wide range of products that include edible and potable goods, car parts, CD-ROMs, pharmaceuticals and tape cassettes. The marking of rough diamonds with an invisible, indelible compound could be a useful method of covertly detecting the movement of diamonds at certain points in the supply chain. This would be useful for determining a number of things, including the presence of illicit (uncertified) diamonds alongside certified diamonds.

BioCode has been identified as one method capable of being applied to marking diamonds. It is the commercial application of immunoassay, a methodology that is widely used in medicine. It is used in the form of BioCode for the covert marking of products that suffer from counterfeiting, and diversion from their intended markets. The marker agent is a custom-made chemical compound and is normally applied to the product in an aqueous solution, and in quantities of parts per billion. Detection of the marker relies upon a similarly custom detector kit. Without this detector kit, the marker is virtually undetectable. BioCode's Immunoassay method of detection involves the interaction between the marker chemical, which is an antigen, and an antibody, which is the specific protein present within the test kit. The antibody binds specifically to the antigen's binding site. In other words, there must be an exact match (binding of the antibody to the antigen) for an antibody/antigen reaction to take place. The concept is often explained using the example of a lock and key. If the key fits the lock, then the lock opens.

The company stresses that the identity of the marker would need to be kept secret – if it could not then the process could be forged and would become useless.¹³⁴ Verifying the presence of the marker would require dissolving the marker that is present on the rough diamond and going through a process whereby the marker was held in aqueous solution that could be tested with one of the kits. The company has similar systems in place to test for its markers in fuels.

The company that markets BioCode 'suspects' that it could apply it to the marking of rough diamonds.¹³⁵ This would be done with the use of an organic solvent, so that once applied, the marker would be resistant to moisture encountered during handling etc. To actually determine the marker stability on the diamond in the various conditions that diamonds would encounter, there would need to be a testing period lasting somewhere in region of 4 to 6 months. Cost for these trials would be in the range of \$50,000 to \$100,000.

BioCode is licensed to users on yearly terms. Under these annual licences customers are supplied with the consumables – markers and test kits – on a free-of-charge basis within the agreement. The licences

are related to the overall value of the product that is being marked, number of test kits required. The minimum annual licence fees, for other applications, are usually in the region of \$100,000, yet in this case different agreements would need to apply. Market inspection and product testing is usually arranged through agreements with marketing partners, one of which is SGS with whom the company currently works in the East African fuels sector.

IV. TAGGING

Tagging is a methodology employed when an object is required to yield more information, or a specific type of information, that it cannot otherwise do. It may also be that the tag is used to derive information more quickly, securely and more accurately than by other means. The tag, in the case of a simple logo, provides no more information than the associations made with that logo – in the case of a branding scheme the logo is advertised so that the logo becomes associated with a set of constructed images and beliefs. If the logo, like a security hologram, cannot be reproduced, then the logo represents a genuine article, an easily reproduced logo does not have the same level of protection, if counterfeiting is a problem. In the case of diamonds tagging/ branding methods have been applied primarily to brand and track diamonds. The laser inscriptions as applied by the retailer have been used to verify the ownership and history of a stone. Lazare Kaplan International have a database of all the diamonds that have been laser inscribed on their premises.¹³⁶ The important point here is that anybody buying a stone that has been inscribed with the LKI logo and serial number can verify the authenticity of the stone, because of the information held on the LKI database.

If a serial number relates to a particular stone of 2.3 carats, but has been illicitly inscribed on a stone of 1 carat this will be deduced. The important point here is the following; the tag is only the medium through which information about an object can be reconciled with that same object. It creates an identity that the stone does not otherwise have. It is when this otherwise intangible information, (information about the history of the stone, its country of origin) is required that a tag may be needed. In this sense the tag is the 'key' to unlock a specific information about a diamond. The tag itself has no further significance unless it corresponds with information held somewhere else – the database.

There is currently a situation in the diamond industry that illustrate the weakness of tagging, yet at the same time is useful to explain the difference between logos put on to increase the liquidity and worth of a diamond and those put on to reduce the liquidity and worth of a diamond. GE POL diamonds have been put through an artificial process that results in a higher grading for the diamond when it is evaluated. The process has outraged many in the diamond industry because it is a difficult to detect artificial treat-

ments. The result is that the purchaser is unaware if he or she is paying a premium for a stone which prior to treatment was worth less. The result is a loss in confidence in diamonds as a whole, because it is difficult to discriminate against those which have been treated. GE POL diamonds have been inscribed on the girdle of the stone and so it is not hard for the inscription to be polished off and this is seen as a problem in the industry.

For diamonds that have been tagged to indicate their legitimacy the problem is not so much from the tag being deleted but from the counterfeiting of tags. The problem can be overcome by the control of tags for example by making each tag unique to the object that it is on. By definition a tag unique to a single stone cannot exist on two stones. Determining which stone is legitimate are determined either by circumstantial evidence, or by checking on a database the details, such as the precise weight etc of the stone that was legitimately registered.

For the tracking of parcels of goods tracking technologies which lend to automation, and non counterfeiting exist. Secure barcodes on tamper proof packages are one method, another method is by the use of a technology commonly known as RFID. This allows the 'smart' tracking and identification of goods which may play an important role in administering and auditing a chain of custody.

Radio frequency identification (RFID) is a relatively new technology that first appeared in tracking and access applications during the 1980s. These wireless systems allow for non-contact reading and are used in manufacturing hostile environments where barcodes cannot be used. RFID is used for example in livestock identification and in tracking moving vehicles. This technology is used widely in automated data collection, identification, and analysis systems worldwide. RFID tags work using radio frequencies and do not need to be seen to be read, they can be placed inside parcels of goods.

The tagging of diamonds on an individual basis is clearly possible using the similar methods currently employed in the diamond industry that are used to inscribe messages, serial numbers and logos. De Beers, Lazare Kaplan and other significant diamond producers already have schemes in place to track diamonds that have been inscribed by them. The tagging of rough diamonds is also possible using similar methods of inscribing, but this is apparently less established.

It is clear that the tracking of parcels of stones be accomplished with more accuracy with the use of secure tagging devices. RFID offers the chance to embed information about a package of goods within the package. Combined with tamper proof packaging this represent an important method for assuring the integrity and monitoring the transit of diamonds whilst in transit.

V. OTHER VERIFICATION SCHEMES

There are a growing number of certification and verification schemes in operation and in development that have mainly been created through environmental, health or consumer safety concerns. Global safety standards for genetically modified foods are being set up and a European food agency is to be created to trace food throughout the chain due to recent food scares in Europe. The UK Ministry of Agriculture Fisheries and Food has a Cattle Tracing System (CTS) and has just announced the creation of a similar system for sheep. These are comprehensive systems for identification and registration of livestock due to the BSE crisis. The animals are given a unique number and records are kept by farmers, they have passports and there is a database monitoring the animals within the United Kingdom.

Recommendations for a Control System

INTRODUCTION

This section, drawing upon the rest of the report, makes a series of recommendations aimed at developing both a regulatory framework by governments and a self-regulatory system for the trade. It should be emphasised that these are recommendations and are intended to frame the terms of a debate for reform rather than be a set of finalised instructions. Initial research, which was not exhaustive, has identified applicable technology that is either developed, or is being developed. Global Witness advocates that trade and governments consider the following existing possibilities. Currently there are systems that can: calculate and record the individual surface profiles of rough diamonds; confirm the identity of a parcel of stones that has been registered using this method; mark rough diamonds with individual bar codes or other readable inscriptions; mark cut diamonds with codes, bar codes and logos; identify and verify the identity of cut or rough diamonds that have been coded; record and verify the individual optical signature that a cut diamond exhibits using laser refraction.

A system using elements of these coupled with improved regimes in exporting countries, and the introduction of relatively low technology identification techniques including work on surface features and profiling of run of mine production could be used as a basis for reform by both governments and trade.

Governments and the trade must finally accept it is their responsibility to ensure that diamonds are not involved in the funding of conflict, and take action accordingly. The key point is that government and industry whilst having different responsibilities do need to work together and produce a co-ordinated system that comprises both regulation and self-regulation. The recommendations are more detailed for governments than for trade. This reflects work already undertaken by governments and their national trade bodies, particularly those that have recently come under severe criticism. The recommendations for the trade provide a structure but do not go into the same level of detail because Global Witness believes a different approach is

needed for the trade. The complexities of developing meaningful self-regulation within an industry that does not have a co-ordinating body that can act as a focal point for all the different parts of the industry mean that for Global Witness to develop a series of detailed recommendations at this stage in the process would not be particularly productive. Instead this section gives some outline recommendations to give the trade an indication of what are minimal acceptable standards for controls. An important and urgent first step would be for the diamond trade to set up an industry taskforce or reform committee to immediately begin working on the issue. The taskforce should be representative of the industry and able to reflect the views of the different parts of the diamond pipeline (see Recommendations below for more detail). This would be an important forum for the trade, enabling the different parts, traders, polishers, retailers and so on, to ensure that they are working in concert rather than producing contradictory initiatives and reforms. It will also ensure that different sectors of the diamond industry can be fully involved at every stage in developing a self-regulatory framework. The taskforce should be small and comprised of representatives of different sections of the industry that have a real, and perhaps already proven, interest in reform and controls.

Global Witness would be happy to co-operate with such a taskforce, and recommends that it seeks co-operation from government representatives to ensure that the self-regulatory measures can work in tandem with government regulations.

This taskforce should be a short term one, and part of its' mandate should be to work with governments and ngo's to set up a permanent International Diamond Committee (the name is a suggested working title) which would oversee the implementation of self-regulatory measures developed by the taskforce. It may seem initially confusing to have two bodies but they would serve quite distinct functions, the first being a shortlived initiative to get the reform process moving, the second would be focused on implementation and regulation (see recommendations below for more detail). The membership of this committee needs to be carefully and equally balanced between different parts of the trade, government importers and producers, labour representatives and non-governmental organisations.

It is preferable that the industry be fully involved in the developing of solutions as the alternative scenario would be for governments to impose a stringent series of measures upon the trade, which is likely to make implementation of controls far more difficult.

Global Witness is proposing that governments of diamond producing and importing countries should play a central role in setting a regulatory framework within which industry self-regulation can be a meaningful part of the process of controls. It is clear that governments and the commercial trade are looking to address the problem of conflict goods. If this is to be done effectively both parties will need to significantly

address the core problems within the trade as a whole. These include lack of infrastructure, and corruption in some producing countries, a willingness by some importing countries to accept the flow of conflict diamonds, lack of transparency within the commercial trade and the complexities of the movement of rough and polished diamonds.

Unfortunately, due to the high value and fungibility of these goods, a system based solely on the trade making unverifiable declarations of self-regulation, is unlikely to significantly address these core problems, and may even lead to consumer cynicism about claims made by the diamond trade. The trade is well aware of the importance of consumer confidence and has already begun to look at how to maintain industry integrity and consumer confidence on issues such as synthetic diamonds and value enhancing treatments. If these issues are not properly addressed they pose a serious threat to all diamond producing countries. It is clearly time for radical changes within the diamond sector, about how it operates and about the need for an ethical basis to its operations linked to greater transparency. Global Witness believes that a strength of the industry is the importance placed on trust – there are very few industries where a deal worth perhaps a million dollars or more can be agreed with a handshake, and in some countries, the phrase “Mazel U’bracha,” without the involvement of corporate advisors, lawyers or even contracts. This is possible because although the diamond trade is a truly international and far-flung network it is also one in which the majority of the people one trades with are known quantities and are in a pattern of repeat business. This will be an important factor in the reform process.

The HRD stated recently “The diamond sector needs a transparent, consistent and responsible structure with strong, efficient self-regulating mechanisms.” A key part of such controls will be the rigour with which they are implemented by the industry. As British Foreign Secretary, Robin Cook noted in December 1999 “If the [diamond] industry could do it itself by self-regulation and by other proposals, that would be very welcome and I think the more we are seen to be pursuing this earnestly, the more it is likely they will do so.” Indeed while the mystique of the diamond will doubtless always continue, the mystique of the diamond companies is an anachronism that has to change.

The key issue at stake within the industry that has to date made it possible for companies and importing countries to evade their responsibilities and claim ingeniously, and often incorrectly, that either they could not identify the origin of their goods, or that even if they could, and knew them to be from a conflict area, if they didn’t buy them someone else would. True country of origin, i.e. of extraction, has never been made an important part of the business. However this has to change, and indeed, for different reasons already has, as Australian and Canadian producers have begun to use country of origin as part of their marketing strategy. This is not to say that overnight ‘Country’ is going to

become the fifth ‘C’ (joining the current four ‘Cs’ - colour, clarity, carat and cut), but it does point to a need to be clearer about product history.

GLOBAL WITNESS RECOMMENDATIONS

I. PRODUCER GOVERNMENTS

OVERVIEW

A certain amount of responsibility for the success of any proposed control system unquestionably lies with the countries that actually produce the diamonds. A number of these countries, such as Namibia, Botswana, South Africa, Australia, Russia and Canada are already operating systems that are well controlled or that have the potential to easily be developed as part of a wider control system. Other producer countries face problems with infrastructure and capacity, others again with the will to improve regulation and with deep-rooted corruption. Despite the wide variations in the type and scale of mining, as well as the security situation in different diamond producing countries, there needs to be a degree of uniformity to controls. This will form an important basis for tightening up import regimes and for developing meaningful self-regulation. If producer countries operate widely differing control systems (if any) and differing export regimes then it will be difficult to develop controls further down the diamond pipeline. As a minimum there needs to be agreement on some underlying principles.

This is an issue of such importance to a number of countries across Africa in terms of revenue, and a resource that can help reconstruction and development, that regional bodies including SADEC, ECOWAS and the Organisation of African Unity (OAU) needs to be looking more closely at protecting its members’ interests on this issue. The initiative by a number of African diamond producing countries including Namibia, Botswana, Angola and led by South Africa, to seek ways to control conflict diamonds is an important and welcome development. It is hoped that the technical forum on the issue of conflict diamonds “African diamond industry – challenges in the 21st Century” which is being held by the South African Government on 11th and 12th May 2000 will produce a serious start to the process of reform.

Global Witness believes that producer countries are the first point of any effective control system and as such, importing countries and the international community need to look at how they can assist producer governments to develop and improve existing systems or to introduce controls and security where none exists. An important benefit of any such work would be the strengthening of a country’s revenue and of fiscal transparency around what is often a key potential revenue provider. The scale of the issue varies greatly from

country to country, and this does make the introduction of workable systems more complex. For example, compare the scale and complexity of the trade in DRC with the US\$5 million of production from Guyana.

The need for a meaningful system is well exemplified in the "Report of the Panel of Experts on Violations of Security Council Sanctions Against Unita" (10th March 2000). The report describes how the funding of Unita was facilitated by the ease with which the true origin of diamonds can be obscured under current trading and import-export regimes. The report states "The Panel's investigations confirm that diamonds have been and continue to be the main source of Unita's wealth and the primary source of its funding." (The report goes on to note that Unita also raised significant funds from charging landing fees to supply aircrafts). The way documentation and import procedures operate has facilitated the funding of other rebel groups. This currently includes the Revolutionary United Front.

PROPOSAL

A system is needed that can encompass the differing types of production and controls possible in different countries. It needs to include the development of expertise to enable governments and their diamond control bodies to be able to guarantee that the goods that they are certifying for export are from a known point of origin. It needs to be adaptable to the infrastructure, scale and type of production in individual countries but to have an underlying set of principles that will make it possible to verify where diamonds have been mined. There should be a special focus on the problems faced in controlling alluvial production. A combination of financial incentives and penalties are needed to encourage better controls and to improve transparency around alluvial production, particularly small-scale local mining. An important benefit of this would be localised wealth generation and increased revenue to governments. Some buyers will undoubtedly lose out, but they will be the ones, such as those in Sierra Leone that are paying very low prices to diamond miners and smuggling the goods out.

Surprisingly Angola and Sierra Leone, two countries facing massive challenges within their diamond sectors, do point the way forward for possible reforms. The Angolan government in an attempt to address international criticism has put forward detailed plans that if fully implemented could have a positive impact within the country's corrupt diamond sector. Global Witness is extremely cautious about the possibilities for true reform in Angola but it is important that the government should be given the chance to prove whether or not it is seriously trying to reform its diamond sector and as a necessary part of that, what level of transparency it will achieve. Indeed there is understandably an almost overwhelming amount of international scepticism about the possibility of such controls actually working in Angola, due to well known and deep rooted corruption within the country. These reforms will be an

important test case for the Angolan government, and it needs to accept that there will be intense cynicism within the international community about the proposed control measures. Equally the international community needs to find (non-financial) ways to help the Angolan government, because if the government does not manage to bring in greater controls and transparency to the diamond sector, then its' continued exports must be seriously questioned. Transparency is needed both in operations to demonstrate that diamonds are not being purchased from Unita, and also fiscally. Some of the reform measures, developed with the Belgian HRD, could also be used as a basis for the development of reforms within other countries. Sierra Leone, also a country with longterm problems in the diamond sector, does in fact have the remnants of simpler system of controls that with assistance from the international community to build capacity and infrastructure could be made to work.¹³⁷ The systems involve local expertise about alluvial mines capacity and production and could be linked through to the official export office. Many people will, understandably, be highly sceptical that either Angola or Sierra Leone could offer solutions to the problems of dealing with conflict diamonds. However those involved in trying to develop reforms need to approach the process with an open mind.

RECOMMENDATIONS

- a. The producer countries, with sovereign government oversight, verify their control over the production of goods within their territory. This applies to government mining, joint ventures or private production under government license.
- b. All goods extracted, bought or exported are routed through a government-run Diamond Office or equivalent structure.
- c. A licence is required for all extraction whether it is a large company, an alluvial digger or a village cooperative.
- d. Countercheck paperwork is required on extraction licences and applications for export. This system exists in Sierra Leone, but without infrastructure.¹³⁸ This would enable production of an export document on which the date and place of extraction could be verified. If queried by importing authorities, the product trail could be accessed. There needs to be a careful assessment of what information issuing authorities, i.e. producer governments, could provide to importing authorities both routinely and in the case of queried parcels.
- e. A government-run Diamond Office or equivalent structure should be responsible for registering and quantifying the traders active in the informal buying market. Only those officially registered would

be legally authorized to possess rough diamonds. All buyers would be obligated to record and receipt purchases, including maintaining records of whom goods were purchased from, and the number of carats. The purchase records would then be cross referenced against applications for export.

- f. Seized goods. This needs further consideration. For example, the current Angolan proposals could provide a loophole for confiscated goods because the reward system provides the finder with 60% of the value of found goods and the remainder goes to government. Care will need to be exercised to ensure that this doesn't become a way of laundering large quantities of illegally mined goods possibly with some official involvement. The quantities involved will be a useful indicator of this, particularly when compared against other countries that are currently operating such schemes. These countries include South Africa and Botswana and they use a lower finder's fee, also because the more easily secured kimberlite mining predominates one would expect lower amounts of found goods.
- g. Dealing with corruption. This requires further research. One possibility would be to exclude holders of government office, the military and the police, as well as close family members of the aforementioned from being registered to mine or trade in diamonds.

II. TRADING AND IMPORTING COUNTRIES

OVERVIEW

In the same way that producer countries are needing to, in some cases, radically alter or improve their control systems, it is clear that importing countries will have to make some equally important changes in import procedures if there are to be meaningful controls on conflict goods.

Importing countries can be broadly divided into two types: countries where diamonds are predominantly legitimately traded, and this would include countries such as Belgium, Israel, the UK and elsewhere; and secondly, countries where trading of diamonds is carried out with the express purpose of hiding the original country of extraction because the diamonds are conflict goods, or because they are smuggled or stolen. An outstanding example of such a country would be Liberia. DRC has also been, up until 1997, another striking example of a route for laundering diamonds. This was well documented as a Unita route as early as 1993.¹³⁹ Other countries tend to be shorter term staging posts, including the Central African Republic, Congo Brazzaville, and countries such as Rwanda.¹⁴⁰ Such countries that are not willing to

implement reforms need to be excluded from trading systems. This does not mean excluding African countries from the possibility of becoming important rough diamond trading centres, it simply means that there needs to be a uniformity of import and export procedures for diamonds. Any country that wants to benefit from trading diamonds should not be able to do so at the expense of its neighbours or other more far-flung countries. Thus, importing procedures need some simple but radical improvements to address this problem.

One of the main reasons that the last decade has seen such a growth in conflict diamonds is because getting access to world markets has been so tragically easy. This has been partly due to the appalling laissez faire attitude of a small number of importing countries. The European Union, in particular, has to shoulder responsibility for the billions of dollars' worth of conflict goods that entered the EU during the 1990s because customs and import procedures are an EU matter. Liberia, for example has been a conduit for diamonds from Sierra Leone and elsewhere. The partnership Africa Canada report 'The Heart of the Matter: Sierra Leone, Diamonds and Human Security' details discrepancies between actual mining output and export figures. "While the estimates of Liberian diamond mining output are between 100,000 and 150,000 carats, the HRD records Liberian imports into Belgium of over 31 million carats between 1994 and 1998 – an average of over six million carats a year". The Ivory Coast is another example, as their "...small diamond industry was essentially closed in the mid 1980s, [yet it] exported an average of more than 1.5 million carats between 1995 and 1997."

The UN Expert Panel's report notes that "...the ease with which illegal diamonds can be sold and traded on major diamond markets, particularly in the largest diamond market – Antwerp" is one of the facilitating factors, and goes on to recommend that "a conference of experts convene for the purpose of determining a system of controls that would allow increased transparency and accountability in the control of diamonds from the source or origin to the bourses." Such a system could also be used to address the increasing concerns about the development of such problems as money laundering and the involvement of various mafias, as well as age-old problems of smuggling and the 'grey' and 'black' markets.

PROPOSAL

Importing countries need to urgently review and amend their legislation to close the loophole on country of origin. There should be a requirement to detail the country of extraction on import documentation. Further, there needs to be a significant improvement in enforcement regimes linked to a system to adequately verify the true country of extraction of imported diamonds. Major diamond importing countries should look at what technical assistance they can provide to producer countries seeking to develop and improve

controls. The importing countries also need to look at ways to require their diamond trade sectors to implement meaningful and measurable self-regulation.

RECOMMENDATIONS

- a. Importation regulations should be amended to insist on the country of extraction appearing on import documents. Further work is required to determine what is the best way to achieve such legislative change, for example it might be best done via a UN Security Council resolution which would oblige member states to take action.
- b. The country of import would require the export documents for rough diamonds as already recommended. All documentation would be checked against forwarded information of import. Further work needs to be done to ascertain the quantities of mixed parcels of rough, and how to develop documentation to handle the information required.
- c. There should be physical inspection of parcels, either on a basis of all parcels or a system of random sampling of parcels. The former is the Belgian model in which every parcel is opened, and apparently the Israeli model. The importer governments need to ensure that their customs are fully implementing control measures. If random sampling is used it should be set for a fairly high percentage for the initial phase of the new system, and be truly random so that findings are not biased. For example, parcels containing a high percentage of stones over one carat could be subject to a higher sampling percentage than smaller and lower value goods. Diamond expertise needs to be improved amongst those countries that operate a policy of parcel inspection.
- d. Countries should look at developing a centralised Diamond Office that handles all import and export formalities, this could be similar to the Belgian HRD.
- e. Customs should have access to an international database that details the production capacity of diamond countries and profiles each country's different goods, possibly with images. This database would also profile the activity of diamond trading countries to assist in risk assessment. For example, if a country that hitherto has not been significantly involved in trading diamonds suddenly experiences a large increase in exports, the documentation and parcels would need to receive rigorous scrutiny.
- f. There needs to be a detailed review of national and international legislation and trade agreements to determine a legislative basis for requiring coun-

try of extraction on import documents. Such a review is a major undertaking and is beyond the scope of this report.

III. DIAMOND TRADERS, POLISHERS, MANUFACTURERS AND RETAILERS OVERVIEW

The diamond industry is currently facing one of the most serious crises in its history. It has to face up to the fact that its current systems of trading are having devastating impacts on people, economies and regional security in Africa, as well as damaging the international image of diamonds with implicitly worrying implications for diamond producers and affecting perceptions about the integrity of the industry. Some sectors of the diamond industry are slowly realising this and recent developments are encouraging.

In March 2000 Sean Cohen, President of the International Diamond Manufacturers Association in a speech to an international diamond conference in India stated, "Recently we have also seen the advent of consumer issues affecting the diamond industry, such as those of 'conflict diamonds'. I know that many in our trade feel that if we ignore these issues or talk about them less, that they will go away. The reality is that no consumer will want to buy a product symbolizing love and emotion if it is seen to be tainted with the blood of innocent lives...If we are silent, we will find that particularly in consumer markets, governments will impose laws and regulations, while they may be ineffective, will certainly be costly to us as an industry...the test to us as a global industry is to see whether we can stand together as a global industry and deal with the issue."

As described elsewhere in this report, the diamond industry is already discussing the need to build consumer confidence in diamonds, particularly due to threats posed by synthetic and treated diamonds. But it must also consider the ethics of a business being involved in funding rebel conflict and diamonds from these areas pose a similar threat to public perceptions about the integrity of the industry.

PROPOSAL

The industry has to aim to be able to verifiably demonstrate that its diamonds are conflict free. It has to develop a system that can encompass all diamonds traded. This will require the setting up of a product audit trail for all gem diamonds. For diamonds above a certain size a system for individual marking should be seriously considered. The product audit must be carried out by accredited and independent product certifiers which report to the International Diamond Committee. There are a range of companies that have the skills to carry out such work, and similar accreditation is the norm within international business. The aim of the product audit would be to establish a chain of custody for diamonds. Self-regulation will need to include secu-

rity measures and penalties to ensure that unscrupulous companies or individuals do not undermine the efforts of the legitimate players.

RECOMMENDATIONS: ACROSS THE INDUSTRY

- a. The industry needs to set up a diamond taskforce or reform committee, as briefly noted in the introduction to this section. The purpose of this taskforce would be to bring the industry together, to co-ordinate the various statements of general intent that have been made by different sectors of the industry and turn them, rapidly, into a series of measures to develop self-regulation, including independent monitoring. It should co-ordinate the interests and concerns of the different sectors, enabling them to be involved in every stage of the reform process. Membership should include those who have already proved themselves active on the issue of conflict goods and trade associations that can represent a wide range of interests, as well as experts from within the industry. The taskforce should not be dominated by one or two large companies but should have a balanced membership and operate transparently. This taskforce should liaise with those government bodies seeking to develop regulation within the industry to ensure that self-regulatory systems fit into the regulatory context developed by governments. The taskforce needs to begin work urgently and the International Diamond Manufacturer's Association World Diamond Congress on 16-17th July 2000 would be the latest date to start such a process.
- b. The taskforce, once set up should work with governments, labour representatives and ngo's to set up a permanent International Diamond Committee to oversee the trade's implementation of control measures, and ensure independent product auditing and enforcement of penalties. To be credible this committee must have a membership equally balanced between governments, industry, labour representatives and non-governmental organisations. The South African Government diamond conference of 11th and 12th May 2000 is an important opportunity to start discussion about the format and membership of the Committee. Funding of such a committee should be through the industry, but the formula needs to be agreed upon.
- c. The industry should only trade in rough and polished diamonds with a provable product audit trail. This would extend throughout the diamond pipeline from extraction through to final end sale to the consumer. The different sectors of the trade should undertake only to use product audit trail goods, and would also be subject to random spot checks and penalties if found in contravention.
- d. The diamond taskforce needs to make a detailed study of how to ensure an effective product audit trail beyond the first point of import. What is not clear at present is what percentage of goods are worked after being traded only a few times and what percentage are sold on many times. For example diamonds from Argyle mine in Australia being sold by the Argyle office in Antwerp to leading Indian companies who export the goods directly to their factories in India where they are worked. Another example would be the CSO sight holders that buy and then manufacture a significant proportion of the goods. A better understanding of this is needed to develop self-regulatory measures. Global Witness will be carrying out more research on this but notes that the industry has unique access to such information.
- e. The taskforce needs to give serious consideration to and carry out research on existing marking technologies that can be applied to both polished and rough stones. It might be feasible to begin with marking all goods over a certain size and extending this as technology improves.
- f. There needs to be a register of legitimate companies and individuals involved in the diamond trade. What needs to be decided is whether such a register should be held by governments or by the permanent committee responsible for oversight of controls
- g. A rigorous system of penalties needs to be developed. This could include any polisher, trader or manufacturer found to be trying to launder in other goods temporarily forfeiting their ability to import and export goods. Although this would not address goods polished and sold in one country. In addition goods could be confiscated and held upon appeal, and the company or individual could temporarily lose the right to assert that their goods are certified. World Federation of Diamond Bourses, which has approx. 13,000 traders of rough and polished diamonds worldwide, currently punishes serious transgressions such as defaulting on payment by withdrawing a member's access to the 21 member bourses worldwide, effectively ending a trader's ability to trade legitimately. This could be a useful precedent that other parts of the industry could develop.

IV. TRADERS

- a. Traders should be required to keep track of the diamonds that they trade, and be able to provide verifiable information to the international diamond committee upon request within an agreed timeframe. The actual information required needs to be agreed as this is not meant to be a back-door route for fiscal controls, thus the information would focus on country of extraction and quantities of goods. This is information that could be cross-referenced with export and import documents if required.
- b. Diamonds would only be bought and sold on through companies and individuals registered with national governments and the international diamond committee. Purchase of diamonds on the so-called 'grey market' would result in the same penalties.
- c. All transactions, whether for initial import or for goods that have been sorted and mixed would need to meet the verification requirements of the International Diamond Committee. This is a complicated requirement and requires the co-operation of the diamond trade working with the international diamond council and the input of expertise from product accreditation bodies.

V. POLISHERS

- a. The product audit trail would continue through the polishing process, and could link in with existing software used by many manufacturers to maximize yield on polishing which involves individual records being created for the diamonds processed, and provides records of all the goods processed. Companies that polish diamonds already have to keep track of stock, and to analyse and plan the maximum yield from their diamonds. Most also keep a close check on the results from individual polishers against the instructions they are given. Companies that outsource large amounts of polishing work also ensure that they can keep track of their goods.

VI. MANUFACTURERS

Manufacturers of jewellery should undertake to purchase supplies from polishers and traders of polished that were registered with the international diamond committee. And should ensure that their goods have a verifiable product audit trail.

VII. RETAILERS

- a. Retailers should undertake that they will insist on a supply chain from certified, conflict-free sources. A product audit trail would provide the additional significant benefit of a guarantee to the consumer that the goods are untreated and are not synthetic.
- b. Retailers are the public face of the diamond industry as far as consumers are concerned. This places a special responsibility upon them and they must ensure that they co-operate fully with the rest of the industry.

Conclusion

THE AIM OF THIS REPORT is to try and provide an overview of the issues involved in conflict diamonds, to outline some of the technology that could be applied to diamond controls, to delineate the scale and complexity of the business and to point the way forward. This edition was produced as a working document to be made use of at the technical forum on the issue of conflict diamonds hosted by the South African Government on the 11th and 12th of May. A final version will be printed and widely distributed immediately after the conference which will detail and analyse the results of the forum.

Global Witness urges individual governments, regional groupings the international community, and equally the trade to take urgent action. Recent events in Sierra Leone, including the murder and kidnapping of UN troops and increasing instability should be a reminder of just how fragile peace is and how easy the potential to undermine it. To date the UN has still not tackled the issue of diamond revenue continuing to fund the RUF. The role of diamond revenue in Angola's continued conflict shows what a dangerous mistake it is to ignore the funding of rebel groups.

The issue of conflict diamonds has, since December 1998, come to the fore on international agendas in just 16 months. By some measures this is a remarkably short period of time for the issue to be understood and established, governments begin to move, UN initiatives to happen, and for the trade to begin to accept it is a problem and to begin to address the issue. And credit should go to many people for this. However when set against the suffering and devastation caused by conflict, and the impact day by day on the lives of people in affected countries this issue is moving far too slowly. It is now time for all those involved in the industry to work urgently towards practical and measurable controls to combat conflict and strengthen legitimate producers and markets.

Glossary

Alluvial: The name of a type of diamond and the type of shallow mine it is extracted from, with diamonds found in river beds and in shallow deposits. A form of mine that can be exploited by artisanal techniques.

Boart: A general term for diamonds that are suitable only for industrial purposes.

Carat: Unit of diamond measurement; one carat is equivalent to 0.2 gram (200 milligrammes).

Points: A smaller unit of measurement than the carat. There are 100 points to a carat.

Colour: Diamonds come in a wide range of hues, tints and colours; they can be described as whitish, yellowish, greenish, brownish, pinkish, bluish and so on. Stones from different countries can vary in colour.

Comptoir: Small-scale diamond buyers, who act as middlemen.

Craton: A large stable block of the earth's crust, forming the nucleus of a continent.

CSO: Central Selling Organisation – De Beers marketing arm.

ECOWAS: Economic Community Of West African States.

Fluorescence: The visible glow of light that is produced when a diamond is irradiated with light sources.

Focused Ion Beam: A method of directing ions into a material to change the nature of that material. Directing Gallium ions onto the surface of a diamond can change it to graphite, which can be used to mark diamonds.

Four 4's–Colour, clarity, cut and carat: These four factors are considered when valuing a stone.

Fancies: A “fancy” diamond is a natural diamond of color – such as red, green, purple, violet, orange, blue and pink – not be confused with a “fancy cut”, that refers to shape. Fancy colors vary from faint to intense.

Garimpeiros: Illegal miners; usually artisanal.

Gem quality: The highest quality of diamond, which is normally in high demand and commands top prices.

GURN: The Angolan Government of Unity and National Reconciliation.

HRD: The Belgian Diamond High Council usually known by its Flemish initials.

Peridotite: a dense, dark-green rock that forms the earth's mantle and that is composed mainly of the silicate mineral olivine.

Peridotitic: A term used to describe diamonds that have formed in peridotite in the upper mantle. Determined by peridotite inclusions.

Lamproite: An unusual diamond bearing igneous rock (formed from molten rock material) Relatively unstudied before the 1970s when large concentrations of diamonds were found in Lamproite in North Western Australia.

Inclusions: Pristine mineral samples contained inside a diamond. A single mineral inclusion rarely defines a specific rock, but two or more minerals may enable interpretation of rock associations and origin. Some inclusion minerals are virtually unique to diamond sources and are thus sought in the exploration for diamonds.

Ion: a molecule or an atom with a net electrical charge achieved through the loss or gain of electrons. This can be either positive (cation) or negative charge (anion).

Inductively coupled plasma / mass spectrometry (ICP-MS): A technique to analyse materials by measuring the atomic weights of a sample.

Mixed parcel: This is parcel of rough diamonds from more than one country.

Parcel: This is a quantity of diamonds, and can vary from 10 carats up to thousands of carats.

Placers: Deposit of sand or gravel in the bed of a river or lake containing heavy particles of valuable minerals such as diamonds and gold.

Polished: The term used to describe stones when they have been worked. Up to fifty per cent of the diamond can be lost when polished, depending on the shape of the stone.

Sights: Approximately ten sights a year are held by the CSO at which Sightholders are allocated a quota of diamonds for purchase at a price determined by De Beers. Sightholders are chosen by De Beers and numbers are strictly limited; there are less than 150 sightholders worldwide.

Run of mine: All the diamonds are from the same mine.

RUF: Revolutionary United Front: rebel forces in Sierra Leone

SADC: Southern African Development Community

Surface Features: A large number of distinct diamond surface features exist. These include features such as pits, plates, and coloured patches, and can be used to help locate the origin of a diamond.

Tomography: is defined as ‘a technique for displaying a cross section through the human body or other solids using X-rays or ultrasound’

Outside market: The market in which rough diamonds, not under official control are sold.

UNITA: National Union for the Total Independence of Angola

UNSC: United Nations Security Council

X-Ray Diffraction: A commonly used, chemical analysis technique. Every element gives off a unique spectrum of characteristic electromagnetic waves. It is possible to identify the elements by matching wavelengths with known values

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- ¹²⁷ Letter from John Shpeherd, Gemprint Corporation to Global Witness. November 5, 2000.
- ¹²⁸ Email from Aerodiam (Sarin) Belgium to Global Witness. March 20, 2000.
- ¹²⁹ Ibid
- ¹³⁰ Email from De La Rue Security Print to Global Witness. March 27, 2000.
- ¹³¹ Ibid,
- ¹³² FSC UK Working Group.
- ¹³³ From MSC website.
- ¹³⁴ Email from Robin Jenkins, Biocode to Global Witness. February 21, 2000.
- ¹³⁵ Email from Biocode Ltd. to Global Witness. February 21, 2000.
- ¹³⁶ Sheldon Ginsburg, of Lazare Kaplan International quoted in *National Jeweller*, [TechNews] July 16,1997,
- ¹³⁷ GW Research trip, Sierra Leone, February 2000.
- ¹³⁸ P.A Wagner, 'The Diamond Fields of South Africa', 1914. p159,
- ¹³⁹ Chris McCreal, *The Guardian*, 4 March 1993.
- ¹⁴⁰ GW Investigations, various, 1998 & 1999.