



Faculty of Law

Lund University

**Master of Human Rights and Intellectual  
Property programme, Law**

Master thesis

By

Scott Selby

**WHY THE KIMBERLY PROCESS DOES  
NOT WORK AND WHAT THE COMING  
FIGHT OVER MAN-MADE DIAMONDS  
MEANS FOR THE FUTURE OF BLOOD  
DIAMONDS**

Dr. Mpazi Sinjela

Fall 2006

# Contents

<b>SUMMARY</b>	<b>1</b>
<b>ABBREVIATIONS</b>	<b>3</b>
<b>1 INTRODUCTION</b>	<b>4</b>
<b>2 PROBLEMS NOT ADDRESSED BY THE KP</b>	<b>20</b>
<b>3 SUGGESTED REFORMS</b>	<b>28</b>
<b>4 CONNECTION TO TERRORISM</b>	<b>31</b>
<b>5 MAN MADE DIAMONDS</b>	<b>35</b>
<b>6 THE DIAMOND AGE</b>	<b>44</b>
<b>7 DISTINGUISHING MAN-MADE FROM NATURAL</b>	<b>47</b>
<b>8 DE BEERS AND PATENT PROTECTION</b>	<b>52</b>
<b>9 LIKELIHOOD OF CONSUMER CONFUSION AND THE FIGHT OVER LABELING</b>	<b>58</b>
<b>10 CONCLUSION</b>	<b>72</b>
<b>BIBLIOGRAPHY</b>	<b>73</b>

# Summary

This thesis analyzes blood diamonds and the human rights issues surrounding them. The problems they pose and the promises and limitations of the Kimberly Process are covered along with the development and future impact of man-made diamonds on the demand side of the blood diamond problem. There are two main sections--the first covers blood diamonds and the second man-made diamonds.

The introduction sets for the nature of the problem--what are blood diamonds and what has been done about them.

In section 2, I discuss possible ways to reform or improve the Kimberly Process, which the current method by which the world tries to limit the trade in and impact of these stones.

Section 3 covers human rights and related problems that the Kimberly Process does not address. So even if it were reformed to work as intended, those intentions do not cover all sorts of problems related to the diamond industry that go beyond the issue of blood diamonds.

Section 4 discusses the possible connections between the trade in blood diamonds and terrorism. As terrorism is the hot issue of the day and one that the U.S. as the sole remaining superpower is anxious to address, such a connection could impact how seriously this problem is taken.

An overview to man-made diamonds, their past and their present is contained in Section 5. Section 6 delves into the possibilities offered by the future technological advances stemming from cheaper and

better production of diamonds. This is necessary background to understanding some of the potential patent issues that will come up later.

Section 7 covers how man-made diamonds are distinguished from natural ones. Section 8 raises the spectre of De Beers and its efforts to patent diamond making technologies, perhaps so as to lock up such inventions. The possibilities contained in the TRIPS agreement regarding compulsory licenses are covered here.

Section 9 goes over the trademark like issues surrounding what label gets attached to man-made diamonds. The fight over labelling may well determine the future of this nascent enterprise.

Finally, Section 10 presents a short conclusion to this paper.

# Abbreviations

CIBJO	The World Jewellery Confederation
CVD	Chemical Vapor Deposition
FN	New Forces
FTC	The Federal Trade Commission
GIA	Gemological Institute of America
HPHT	High Pressure High Temperature
HRD	Hoge Raad voor Diamant
IDE	Israeli Diamond Exchange
KP	The Kimberly Process Certification Scheme
RUF	Revolutionary United Front
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
UN	United Nations
US	United States of America
USKPA	The U.S. Kimberley Process Authority

# 1 Introduction

The paperwork which now travels with a diamond all the way from where it is first found to when it is a polished stone is intended to stem the flow of what are known as blood or conflict diamonds. Some hard-core activists even use the term “gemocide,” but it has not gained widespread usage. The UN General Assembly defined them in 2001 as “rough diamonds used by rebel movements to finance their military activities, including attempts to undermine or overthrow legitimate governments.”<sup>1</sup> The diamonds themselves though are no different from diamonds mined anywhere else; one cannot see the bloodshed associated with them.

Some diamond rich countries have internal conflicts in which rebel groups start off using the stones to fuel their insurgency. Taking over areas with diamond extraction and then selling the rough stones or trading them directly for weapons enables militias to go on fighting. While a conflict may have begun over genuine issues of ideology, in time the fuel that keeps the conflict going becomes the reason for the conflict itself.

Rebels may still cling to old slogans, but their primary goal often evolves to be the accumulation of wealth in the form of diamonds. Sometimes the fighting involves warlords as opposed to rebel groups, but the outcome remains the same. The people living in the country suffer greatly. Meanwhile the leaders of rebel groups get rich--Jonas Savimbi, the

---

<sup>1</sup> UN Gen. Ass. Res. 55.56 (2001).

rebel leader in Angola made around \$4 billion dollars stealing natural resources from his country, especially diamonds.<sup>2</sup>

With such profitable criminal enterprises emerging out of rebel movements, ending a conflict becomes that much more difficult. Other rebel groups have to depend on financing from other countries whose interests align with theirs or contributions from members of the same ethnic group living elsewhere. When the money dries up, as much of it did with the fall of the Soviet Union, it's hard to go on fighting. With diamonds in the mix, though, it is the opposite, it is hard to stop fighting because there is so much money at stake.

Rebel leaders will be reluctant to put down their arms if that means giving up the tremendous income they receive from blood diamonds. There are no longer just political differences preventing peace, now there is an ongoing business that is too profitable to shut down voluntarily.

While civilians may not care all that much whether a rebel leader or a corrupt government official profits off of the diamond trade, the things that go along with a brutal fight for control of the areas that diamonds come hurt them directly. For instance, in the Congo alone it's estimated that up to 4.7 million people were killed with the vast majority of the dead being civilians.<sup>3</sup>

It's not just death that people living in these conflict zones have to fear. Atrocities beyond those in many horror movies have been well

---

<sup>2</sup> Cockburn, Andrew. "Diamonds: The Real Story." *National Geographic Magazine*, March 2002.

<sup>3</sup> Goodwin, Jan. "Silence=Rape." *The Nation*, 8 March 2004.

documented. In Sierra Leonean, the Revolutionary United Front (RUF) established a reputation for hacking off the arms or legs of anyone that got in their way. This included women and children. This horror was not the result of madness, though; it had an entirely rational reason behind it. The RUF wanted to make sure that no one dared to oppose them (for instance, by voting) or to hunt for diamonds in the rich artisanal alluvial deposits of Sierra Leone.

Unlike countries with mines, here anyone could shift through the soil and hunt for diamonds--the RUF hacked off the limbs of anyone caught doing so to prevent others from taking the diamonds the rebels wanted for themselves. Alluvial deposit means “clay or silt or gravel carried by rushing streams and deposited where the stream slows down.”<sup>4</sup> Here they are diamonds carried away from their original kimberlite deposits.

Besides getting their limbs hacked off, civilians also faced forced conscription. With the pointing of a gun to his head, anyone could find himself a combatant. Even children became soldiers. The rebels gave boys drugs before sending them off to kill while they forced girls into sexual slavery as involuntary “wives” to soldiers. Sometimes, the rebels burnt alive the women and children the rebels did not take.

With war comes increased poverty, incidents of rape, outbreaks of disease, slave labor and all sorts of other evils to plague the lives of those who through no fault of their own found themselves to be collateral damage in a fight for natural resources. Millions fled, transforming them from

---

<sup>4</sup> *WordNet* © 2.0, Princeton University, 2003. Available online at [www.dictionary.com](http://www.dictionary.com).



people with land, houses, and a functional community into aid-dependent refugees.

While the worst of these conflicts are over, the issue remains. Fighting in Angola, the Democratic Republic of Congo (former Zaire), Liberia, and Sierra Leone cost countless lives and deprivations. These were the classic blood diamond exporting countries. Plus, neighboring countries such as Guinea and Zimbabwe were dragged into the fighting. Meanwhile, those involved in this illicit diamond trade made billions of dollars with which to line their pockets and arm their followers.

A huge current problem is the blood diamonds from the Ivory Coast (Cote d'Ivoire) which are allegedly smuggled through Guinea, Mali, and Liberia. Of these three countries, Guinea is a Kimberly Process participant. The government of the Ivory Coast has lost control of its diamond fields to rebels known as the New Forces (FN). The rebels control the northern area of the country where they allegedly use forced labor to mine diamonds. The rebels then smuggle their newfound diamonds to one of these three neighboring countries.

This conflict will be a testing ground to see how well the Kimberly Process works towards shutting down the flow of rough diamonds from conflict areas and, ultimately, helping to bring the armed conflict itself to an end. "Ivory Coast is the first de facto live conflict diamond situation the KP

has had to confront since it was created,” said Kim Eling, chairman of the Kimberley Process Working Group on Monitoring.<sup>5</sup>

It’s not just the Ivory Coast that still has problems, though. There are still pockets of instability in the Congo where people continue to fight over access to diamond resources.

The diamond industry used to argue that it was impossible to stop the trade in blood diamonds, as they are indistinguishable from other stones. De Beers even admitted that they used to buy most of the diamonds sold by UNITA, thereby helping Jonas Savimbi become so rich and continue to buy arms for his soldiers.

The diamond industry wised up though and realized that this was bad for business. If the public associated diamonds with death and dismemberment instead of everlasting love, then it could be a real problem. Because of enlightened self-interest, the industry came together in Kimberly, South Africa, to try to put a stop to the trade in blood diamonds.

The U.S. Congress understood this when they later passed legislation implementing the Kimberly Process. One of their self-proclaimed reasons for doing so was that “Without effective action to eliminate trade in conflict diamonds, the trade in legitimate diamonds faces the threat of a consumer backlash that could damage the economies of countries not involved in the trade in conflict diamonds and penalize

---

<sup>5</sup> Kim Eling told this to the *Financial Times*. Innocenti, Nicol Degli. “Accord On ‘Conflict Diamond’ Smuggling.” *Financial Times*, 15 November 2005.

members of the legitimate trade and the people they employ.”<sup>6</sup> The industry did not want to go the way of the fur trade.

There is nothing wrong with industries doing the right thing for their own reasons, as long as the outcome is good (i.e. a process to reduce the trade in blood diamonds). The motives involved should not matter so much. But understanding the motives helps us consider what the unspoken priorities of this process might be. It’s possible that the KP’s highest goal is to control the perceptions of the diamond industry as not being drenched in the blood of African conflicts. The danger exists that this may at times be a higher goal than the actual end of such a trade itself.

With the cooperation of De Beers and others, a number of diamond rich countries came together in May of 2000 to formulate a system to ensure that consumers could be confident that the stones they are buying are conflict free. They named the system they came up with “the Kimberley Process Certification Scheme for Rough Diamonds” or the Kimberly Process (KP) for short. The name comes from the town they came together in, a town in which De Beers acquired its very first diamond mine a hundred twenty years prior.

Approved by the UN in 2002, all diamond exporting or importing countries needed to participate in order to be part of the legitimate diamond trade. Those who are not part of the process may legally trade with each other, but they cannot export diamonds to any participatory country. Not

---

<sup>6</sup> Clean Diamond Trade Act, 19 U.S.C. §3901(6) (2003).

every diamond-producing country is a member. Notably, Congo was kicked out while the Ivory Coast and Liberia have never been members.

As of January 1, 2003, all participant countries began using the Kimberly Process Certification Scheme. Each participant had to ensure the following: conflict diamonds do not come from their country; all rough diamonds they export would be in sealed containers have a KP certificate stating they are not conflict diamonds; all import and export of rough diamonds is only allowed with other KP countries. This is the heart of this process. Other requirements went along with these such as passing legislation implementing these requirements, setting up internal controls, and more.

While ostensibly voluntary, a country is at a huge disadvantage if they are not part of the Kimberly Process. Member countries will not allow the import of their stones and the threat of UN sanctions looms large. Also, many countries have incorporated the Kimberly Process rules into their own legal systems so importing or exporting diamonds without proper certification could have criminal liabilities for those involved. The U.S. accomplished this in the Clean Diamond Trade Act of 2003, which mandates that every rough diamond entering the country have a KP certificate.<sup>7</sup>

---

<sup>7</sup> “US participation in the KPCS is mandated by the Clean Diamond Trade Act of January 2003, signed into law by executive order 13312 of July 29, 2003 and supported by Rough Diamond Control Regulations issued by the US Treasury Department in August 2003. Additional regulations were introduced in September 2004.” Global Witness, *The Key to Kimberley: Internal Diamond Controls* (Oct. 2004) at 16., <<http://www.globalwitness.org/reports/show.php/en.00063.html>>.

Before passing this legislation, The U.S. Congress investigated the problem of blood diamonds and included its findings in Section Two of the Act. The language is surprisingly strong; the first two points drive home the problem:

1. Funds derived from the sale of rough diamonds are being used by rebels and state actors to finance military activities, overthrow legitimate governments, subvert international efforts to promote peace and stability, and commit horrifying atrocities against unarmed civilians. During the past decade, more than 6,500,000 people from Sierra Leone, Angola, and the Democratic Republic of the Congo have been driven from their homes by wars waged in large part for control of diamond mining areas. A million of these are refugees eking out a miserable existence in neighboring countries, and tens of thousands have fled to the United States. Approximately 3,700,000 people have died during these wars.
2. The countries caught in this fighting are home to nearly 70,000,000 people whose societies have been torn apart not only by fighting but also by terrible human rights violations.<sup>8</sup>

The U.S. Congress certainly understands the importance of this issue; the only question is how effective will the Kimberly Process turn out to be against this problem.

The purpose of this system is to establish that a given rough stone came from a conflict-free source. The country of origin issues a Kimberley

---

<sup>8</sup> Clean Diamond Trade Act, 19 U.S.C. §3901(2) (2003).

Process Certificate to each diamond mined there; only with this piece of paper can the stone be legally exported from a KP country and imported into another KP signatory. The paperwork stays with the stone.

At the start of 2003, the private parties that make up the diamond trade themselves, as represented by the World Diamond Council, agreed to regulate themselves “[i]n order to strengthen the credibility of the Kimberley Process agreement, as well as to provide the means by which consumers might more effectively be assured of the origin of their diamonds.”<sup>9</sup> “The World Diamond Council proposed that the industry create and implement a System of Warranties for diamonds. Under this system, which has been endorsed by all Kimberley Process participants, all buyers and sellers of both rough and polished diamonds must make the following affirmative statement on all invoices: ‘The diamonds herein invoiced have been purchased from legitimate sources not involved in funding conflict and in compliance with United Nations resolutions. The seller hereby guarantees that these diamonds are conflict free, based on personal knowledge and/or written guarantees provided by the supplier of these diamonds.’”<sup>10</sup>

The self imposed and self regulated requirements of private industry in relation to the Kimberly Process agreed to at that time include that “each company trading in rough and polished diamonds is obliged to keep records of the warranty invoices received and the warranty invoices issued when

---

<sup>9</sup> World Diamond Council, *The Essential Guide to Implementing the Kimberley Process* (2003), at 4 <<http://www.worlddiamondcouncil.com/wdcbk.pdf>>.

<sup>10</sup> *Id.*

buying or selling diamonds. This flow of warranties in and warranties out must be audited and reconciled on an annual basis by the company's own auditors. If asked for by a duly authorized government agency, these records must be able to prove that you are in compliance with the Kimberley Process.”<sup>11</sup>

Finally, “all industry organizations and their members have adopted the following principles of self-regulation: to trade only with companies that include warranty declarations on their invoices; to not buy diamonds from suspect sources or unknown suppliers, or which originate in countries that have not implemented the Kimberley Process Certification Scheme; to not buy diamonds from any sources that, after a legally binding due process system, have been found to have violated government regulations restricting the trade in conflict diamonds; to not buy diamonds in or from any region that is subject to an advisory by a governmental authority indicating that conflict diamonds are emanating from or available for sale in such region, unless diamonds have been exported from such region in compliance with the Kimberley Process Certification Scheme; to not knowingly buy or sell or assist others to buy or sell conflict diamonds; to ensure that all company employees that buy or sell diamonds within the diamond trade are well informed regarding trade resolutions and government regulations restricting the trade in conflict diamonds.”<sup>12</sup>

The World Diamond Council document goes on to explain that “[f]ailure to abide by the aforementioned principles exposes the member to

---

<sup>11</sup> *Id.*

expulsion from industry organizations. Under the terms of the Kimberley Process, it will be considered a violation to issue a warranty declaration on a sales invoice unless it can be corroborated by warranty invoices received for purchases. Failure to adhere to these principles will prompt investigation and could result in expulsion from the various diamond industry institutions.”<sup>13</sup>

At first glance, these appear to be a large number of commitments made on the part of the industry towards implementing the Kimberly Process. However, NGO Global Witness was able to break them down into three essential elements: “To implement a code of conduct to prevent buying or selling conflict diamonds; To implement a system of warranties requiring that all invoices for the sale of diamonds and jewellery containing diamonds must contain a written guarantee that diamonds are conflict free; To inform company employees about the industry’s policies and government regulations to combat the trade in conflict diamonds.”<sup>14</sup>

In an investigation conducted by Global Witness one year after this agreement was to be implemented, they found that only five companies out of the thirty ones they looked at in the United States were able to tell them in writing what their company policies were regarding blood diamonds and following this above agreement.<sup>15</sup> Only one of these five companies,

---

<sup>12</sup> *Id.* at 4-5.

<sup>13</sup> *Id.* at 5.

<sup>14</sup> Global Witness, Broken Vows: Exposing the "Loupe" Holes in the Diamond Industry's Efforts to Prevent the Trade in Conflict Diamonds (Mar. 2004) at 2.

<<http://www.globalwitness.org/reports/show.php/en.00050.html>>.

<sup>15</sup> *Id.*



Tiffany's, was able to provide more than mere lip service that they avoid blood diamonds.<sup>16</sup>

As a result of the paucity of evidence that retailers are abiding by the industry's self-imposed conditions, this Global Witness report features on its cover a parody of the language of the affirmative statements required on all invoices. It reads, "The diamonds herein invoiced have been purchased from unknown, suspect sources that may be involved in funding conflict and terrorism and may have violated United Nations Resolutions. The seller hereby guarantees absolutely nothing, and has no idea where these diamonds come from."<sup>17</sup>

The central flaw of the system is that it "is based almost exclusively on trust. The chain of warranties system laid out by the World Diamond Council is voluntary and has no basis in law. Few parcels of rough diamonds are opened by Customs on import, and almost none are inspected on export. The USKPA<sup>18</sup> [The U.S. Kimberley Process Authority] has no authority to verify the contents of a parcel being certified for export."<sup>19</sup>

---

<sup>16</sup> "Only five companies informed Global Witness in writing that they have a policy on conflict diamonds and that they are implementing a system of warranties: Fortunoff, Pampillonia, Tiffany & Co., the Signet Group and Zale Corporation. However, some of these written responses did not provide details about specific measures companies were taking to ensure that they were not buying or selling conflict diamonds or how the system of warranties is being implemented. A warranty that is simply a piece of paper stating that diamonds are not from conflict sources is, of course, meaningless unless it is backed up by actions and policies to monitor that the statement is true. One company, Tiffany & Co., stood out because it outlined its policies to back up the warranty in detail and described how it has strengthened its sourcing procedures and control over its supply chain to prevent dealing in conflict diamonds."

*Id.* at 3.

<sup>17</sup> *Id.* at cover.

<sup>18</sup> "The USKPA, along with the Federal government, is responsible for oversight of trade compliance with the Kimberley Process in regard to the export of diamond rough from the U.S. The organization is comprised of three industry volunteers: USKPA Chairman Dr. Martin Hochbaum of the Diamond Dealers Club; Director and General Counsel Cecilia Gardner, JVC; and Director and Secretary Mark Gershburg, Gemological Science

Having the actual documents accompany the stone all the way through to the retail buyer would help the system. Until the system is changed to ensure that Kimberly certificates accompany a stone *all* the way from its production to its sale to a retail consumer, public interest groups suggest consumers add an extra “c” to their list for a total of five. This new “c” is “conflict-free” and the consumer should ask retailers about their policies regarding blood diamonds and the origins of any stone they are going to buy. However, having actual paperwork means a lot more than some salesman saying “sure, don’t worry, no problem with these, I swear they are conflict-free.”

Amnesty International UK and Global Witness suggest that customers ask retailers specific questions about a diamond’s origins. They suggest asking a retailer if their diamonds are conflict free and if they a policy on this issue. The problem is that just because a company has a stated policy not to purchase blood diamonds or tells its customers their diamonds are conflict-free, who really knows where their stones come from? The best question Amnesty suggests asking is “can you show me a written guarantee from your diamond suppliers that shows that your diamonds are conflict free?”<sup>20</sup>

Even this is not enough, though. If the process itself is flawed, suppliers may believe their stones to be conflict free when they are not or

---

International.” Information accompanying release of a USKPA poster. Available online at <<http://gemscience.net/USKPA/>>.

<sup>19</sup> Global Witness, *The Key to Kimberley: Internal Diamond Controls* (Oct. 2004), at 19, <<http://www.globalwitness.org/reports/show.php/en.00063.html>>.

<sup>20</sup> “Are you looking for the perfect diamond?” Amnesty International UK and Global Witness. February 10, 2006.

they may simply lie with little risk of detection. These are the problems that emerge when the industry regulates itself--without meaningful supervision of the process from polished stone to retailer, who really knows what's going on?

The Kimberly Process has numerous flaws that the unscrupulous can exploit. One big problem is that there is no spot-checking to ensure that diamonds come from where their certificates say they do. Independent observers do not monitor the process. Instead, countries are responsible for policing themselves. No set policies exist for what a country should do in terms of internal controls to prevent blood diamonds from entering the legitimate diamond trade. Each country interprets this requirement in their own way and it appears there are many holes in the system as a result.

One of the main NGOs working on this issue, Global Witness, recently stated, "Kimberley Process certificates are not issued on the basis of conclusive evidence that diamonds are conflict-free. Some members of the diamond industry are using Kimberley Process certificates to legitimize conflict diamonds and illicit diamonds."<sup>21</sup>

Global Witness, along with three other major international human rights groups, initiated "Fatal Transactions"--a coordinated effort to raise public awareness of continuing human rights violations associated with diamond production.

To become a member of the Kimberly Process, a country has to do little more than send a postcard by diplomatic post to the

organization's president, South Africa. Whether the country meets the criteria set by the Kimberly Process, such as organized import and export, careful administration, combating corruption in the customs service, written invoices for diamond transactions, the presence of modern measuring and weighing instruments, and numbered and difficult to forge certificates, is of secondary importance.<sup>22</sup>

The postcard claim seems a bit strong, but it's true that countries do not face any sort of regular, independent monitoring. They can voluntarily request an inspection, but even that has its limits.

Exporting countries are always happier to have more diamonds rather than less in their official exports as this allows them to raise greater tax revenues. As such, they have a financial disincentive to prevent the inclusion of blood diamonds into their export process.

Other reported problems include allegations of forged documents, corrupt government officials, and insufficient audits or other controls to determine where rough stones actually came from. Depending on the extent of these problems, the KP certificates themselves may not mean much beyond serving as a fig leaf for the industry to hide behind as part of their public relations. If enough KP certified rough diamonds actually come from a conflict area, then the whole process could be worse than worthless. In

---

<sup>21</sup> Global Witness, *Making It Work: Why the Kimberley Process Must Do More to Stop Conflict Diamonds*. November 2005, at 23.

<sup>22</sup> Fatal Transactions, *Diamonds--The Kimberly Process*.

<<http://www.fataltransactions.org/natres/kimberly/>> accessed May 30, 2006.

such a case it would be detrimental, as consumers would be given false reasons to believe their diamonds are conflict free when they may not be.

It's not just some exporting KP participant countries that have allowed blood diamonds to mix in with legitimate stones. A similar problem exists in importing nations where polishing is done. Once a diamond is polished, it is no longer part of the KP. No documents need to accompany it, nothing properly documents where it originally came from. For instance, one could not legally import into Belgium a rough diamond without a KP certificate. If someone smuggled a blood diamond in to polish it himself or illegally sell to a polisher, once that polisher is done with it, there is no way to distinguish it from a legal stone.

## 2 PROBLEMS NOT ADDRESSED BY THE KP

While the Kimberly Process addresses the problem of blood diamonds, it does not deal with other problems associated with diamond production. Such concerns such as environmental impacts, working conditions, indentured servitude, human rights, child labor, indigenous people's rights, and corruption are not covered under this system. So while a Kimberly Process certificate in theory should mean that a given stone is conflict-free, it could still have been mined from land stolen from local tribes by workers exposed to naturally occurring asbestos in a country where the proceeds go to corrupt government officials.

The miners may even be child slaves as young as seven, such as those observed by the then UN Under Secretary General for Children and Armed Conflict, Olara Otunnu, in Sierra Leone diamonds mines. Rebels do not run these mines, the stones they produced are not considered blood diamonds, and as such, they sell as conflict free. After observing these conditions, Olara Otunnu said, "I cannot believe that in this day and age, so many children could be forced to slave away in the mines earning next to nothing; this is appalling. I was horrified by what I saw at the minefields."<sup>23</sup>

Dangerous work conditions plague many of those who mine for diamonds in the third world. It is common for companies to maintain a single sex work force in which men are separated from their families. Such conditions increase the risk of exposure to HIV with many men turning to

---

<sup>23</sup> Fofana, Lansana. "RIGHTS-SIERRA LEONE: UN Envoy Stunned by Magnitude of Child Slavery." 28 February 2003. *Inter Press Service News Agency*.

prostitutes who ply their trade in this environment. Mines themselves have a host of related environmental problems including exposure to hazardous chemicals for those working in them and the contamination of local water supplies.

As for indigenous people's rights, this problem results from the finding of diamonds in areas on which native peoples have lived, farmed and hunted. The wealth to be made from these finds can result in the indigenous people losing access to land they had previously used for many generations. There have even been incidents of tribal groups being forced to relinquish claims to property they live on and being evicted from their homes.

Even without conflicts, the mining of diamonds in countries with alluvial deposits "will never generate large amounts of revenue for the governments"<sup>24</sup> involved and "most artisanal diggers, working in a casino economy and hoping to strike it rich, actually earn an average of only a dollar. Their work is hard, dirty, and it is completely outside the formal job market. This places them squarely in the 'absolute poverty' income bracket. The slogan here is more one of 'poverty diamonds' than of 'prosperity diamonds'."<sup>25</sup>

From its place of origin, the rough stone might be shipped to Surat in the Indian state of Gujarat if it is too small to be profitably polished in Antwerp. The reason why such a stone would still be used for the gem

---

<sup>24</sup> Global Witness, Rich Man, Poor Man (Oct. 2004), at 1.  
<<http://www.globalwitness.org/reports/show.php/en.00064.html>>.

<sup>25</sup> *Id.*

market instead of relegated to the realm of industrial diamonds is the cheap labor available in the subcontinent. This cheap labor has often been the result of child labor. It's not just that children in India can be paid less than experienced polishers in Antwerp are, but they are sometimes paid nothing at all.

A form of slavery in which a child has to pay off debts of relatives that are difficult if not impossible to get rid off is known as debt bondage, making them bonded child laborers. By charging child workers various expenses and having a high rate of interest on this debt, children can be forced to work until they are too old to be of much use for working on small stones. Then their debt is transferred to a relative who is young enough to have the sharp eyes and small fingers needed to polish minute stones.

Press reports indicate that the use of child labor has dramatically declined in India with the rise of larger, more professional diamond polishing outfits.<sup>26</sup> However, it is not clear that this practice has yet been eradicated. The fact that the industry in Surat is controlled by Jains, (followers of a truly beautiful religion that emphasizes non-violence, vegetarianism, co-operation with other religions, and individual responsibility), could lead to the emergence of an organized movement within their ranks to eliminate this injustice. Not only would it be good for the area's reputation within the diamond trade, but also it would be a powerful tribute to the noble traditions of their religion.

---

<sup>26</sup> See, e.g., Adiga, Aravind. "Uncommon Brilliance: How Did India Come to Dominate the Vastly Lucrative Global Market for Cutting and Polishing Diamonds?" *Time Asia Edition*, 12 April 2004. But see "The Hidden Factory: Child Labour in India." *The SouthAsian*, 7 March 2005.



Even countries that have ostensibly solved their blood diamond problems by ending any ongoing-armed conflicts could still have violence inflicted on civilians by the military and police in the desire for diamonds. *Angola's Deadly Diamonds*, a report put together by human rights activists detailing governmental abuses linked to the production of diamonds suggests that we need to “reconsider the objectives of the Kimberley Process, so as to include within the category of ‘conflict diamonds’ all those gems that come from areas where mining is based on the systematic violation of human rights.”<sup>27</sup>

So a hypothetical diamond that went through all of these terrible processes before arriving on a woman's finger as an engagement ring in America would still be properly labeled conflict free and not be stopped by the Kimberly Process. Those involved in the trade may have isolated themselves from direct supervision of various ugly aspects of the diamond business by using independent contractors and ignoring certain practices, but this does not absolve them or the end consumer of complicity.

Not all diamonds go through all of these wrongs, however, and some may go through none of them. For instance, man-made diamonds do not have any of these problems associated with them.

As for naturally produced diamonds, those produced in Canada are free of child labor, slavery, and working condition problems. The Canadian diamond industry also cuts and polishes its own stones in accordance with strict governmental regulations. In a domestic equivalent to the Kimberly

---

<sup>27</sup> Marques, Rafael. *Lundas – The Stones of Death. Angola's Diamonds: Human Rights*

Process, certification that miners followed various environmental protections must accompany Canadian diamonds.<sup>28</sup>

The Great White North marks each of their stones by laser inscribing them with polar bears or snowflakes. They have cleverly marketed their stones based on where they come from and how consumers can feel secure that in buying them, they are not contributing to an atrocity somewhere.

One possible solution would be to create optional additional certificates as part of the Kimberly Process--like those used by Canada. Some of these would become mandatory after a grace period has passed. For instance, a certificate to accompany a stone stating that no child or slave labor mined it. A different certificate for polished stones could indicate that only free adults worked on it. Regulators and industry could create additional certification processes regarding environmental issues, indigenous people's rights, work conditions, etc...

If there is disagreement about exactly what criteria would establish a stone's eligibility for certification--it could have various criteria listed--those satisfied would be marked. This certification would then travel all the way to the end consumer so it would be up to them how to decide how much to value such guarantees. Inspectors could conduct spot checks to

---

*Abuses in the Lunda Provinces, 2004.* 9 March 2005.

<sup>28</sup> Even Canadian mined diamonds though have had environmental problems allegedly associated with them. "The Canadian Arctic Resources Committee cites the following impacts of the two diamond mines operating in the Northwest Territories of Canada: "Loss of fish habitat through draining of lakes, destruction of streams, changes in water quality. Water quality changes are measurable as far as 200 km downstream of Lac de Gras (Ekati mine), and there have been irreversible changes to water quality and possibly species composition in Snap Lake (De Beers diamond project). Twenty lakes have been eliminated altogether, with no fish habitat compensation measures in place." From greenKarat LLC at <<http://www.greenkarat.com/about/issuesanswers/gem.asp>>.

ensure compliance, with criminal penalties for offending companies and individuals. Countries with endemic falsehoods would face decertification.

#### IV. BOYCOTT

As for simply boycotting diamonds altogether, there is a certain appeal to that solution. However, Nelson Mandela himself has argued against a boycott because the industry provides a huge source of revenue to African countries including his own. It is hard to disagree with a living saint although not all the places where diamonds come from benefit economically from their extraction. For instance, even in post-conflict Sierra Leone with high levels of diamond export, the country is almost at the bottom of the UN Human Development index. Moreover, as a laborer for diamonds in Sierra Leone interviewed by the *LA Times* explained, "Diamonds destroyed this country. Right now there are no good roads around Kono, no light, no electricity, no water, and this is where all the diamonds are coming from."<sup>29</sup> Just because vast wealth is being dug out of the ground somewhere, does not mean it is trickling back to those who live in that country or even that specific area.

Who knows if a boycott would be all the effective anyways as the notion of diamonds as essential to the engagement process has been so well established by De Beers. Even if activists declared a boycott of diamonds starting tomorrow, it's hard to imagine that the vast majority of Americans would stop buying them.

---

<sup>29</sup> Dixon, Robyn. "Diamond Labor Yields Little." *Los Angeles Times*, March 31, 2006.

Also, human rights organizations dedicated to ending the trade in blood diamonds do not advocate a boycott. The consensus seems to be to a two-prong approach of pushing consumers to demand assurances the stones they are buying are conflict free while also improving the KP itself. Such groups have made a number of detailed suggestions on how Kimberly could be improved ranging from “regular, independent monitoring”<sup>30</sup> to sophisticated data collection, sharing and analysis by participating countries.

---

<sup>30</sup> Canadian NGO One Sky. They have a catchy slogan: “Blood diamonds are for never” with a diamond lying in a pool of blood.



### 3 SUGGESTED REFORMS

The KP should be extended to cover polished stones so the certification scheme goes all the way to the end consumer. At the very least, the existing KP should include better internal controls in countries with a diamond polishing industry. Polishers tend to have their own internal set of controls to ensure that that workers do not steal diamonds and to monitor productivity. These polishers could be required to provide detailed documentation regarding their input and output such that the amount of polished diamonds they produce can be audited to ensure it corresponds with the quantity of KP certified rough they used.

Spot checks along the way to check on the origins of randomly selected stones cannot currently be done. If an expert is given a group of rough diamonds that are from the same area, then he or she should be able to make an educated guess as to their origin. Once someone mixes rough diamonds, as De Beers does with all of its sight-holders, it is impossible to for an expert to identify their origins.

Research is being done into developing means of testing diamonds to establish where they were mined. Promising technologies include cathodoluminescence (examine internal structure) and secondary ion mass spectrometry (trace elements). The front-runner seems to be a combination of laser ablation (to vaporize a bit of the diamond) and plasma mass spectrometry (to measure the resulting plasma ions and compare them against a to-be-established database).

While this last test would destroy a bit of a stone and all of these tests look to be too cumbersome and expensive to be widely used, they would be perfect for spot checks of randomly selected stones. If something suspicious showed, then more testing could be done on any accompanying diamonds. It could be a strict liability offense so the burden would be on the diamond trader to make sure they did not even accidentally import a blood diamond. They would be the ones best suited to push those they buy from to make sure the diamonds come from where their KP certificates say they do.

Even now with the Kimberly Process in place, blood diamonds that are smuggled out of the Ivory Coast can be sold illicitly. A marketplace for such stones exists and rebels may not get as much money as they would before the KP, but they still make enough to make the trade worthwhile to them. Another option purveyors of blood diamonds have is to mix their tainted rough stones in with legitimate ones in a source country. Once a participant country issues a Kimberly Certificate for such stones, they are in the system and magically transformed from blood diamonds to ostensibly conflict-free ones.

For instance, diamond buyers can set themselves up in a hotel in the capital of Liberia and purchase blood diamonds. According to the Chairman of the UN Security Council Committee responsible for this problem, diamond traders “are buying illegal Liberian production and smuggling it to neighboring States where goods may be passed off as the domestic production of those countries and obtain Kimberley Process certificates, thus legitimizing the diamonds for trade in the international

market..”<sup>31</sup> Despite the KP restrictions, these Liberian blood diamonds have entered the legal stream of commerce; a merchant buying this stone then in Antwerp would have no clue that there was anything illicit about it. As soon as a rough diamond has a real KP certificate associated with it, as far as the industry is concerned, all the blood on it has miraculously washed away.

Beyond the KP, the UN has paid special attention to Liberia’s role in the blood diamond trade. In 2001, the UN Security Council passed sanctions against Liberia to prevent it from exporting rough diamonds. Every six months the Security Council reviews the sanctions to see if it is safe to lift them yet. As of the most recent vote, they still do not have faith that Liberia is no longer a clearinghouse for blood diamonds. Until Liberia qualifies to join the Kimberly Process, they should have problems selling their diamonds.

---

<sup>31</sup> Letter dated 16 March 2005 from the Chairman of the UN Security Council Committee established pursuant to resolution 1521 (2003) concerning Liberia addressed to the President of the UN Security Council.



#### 4 CONNECTION TO TERRORISM

Blood diamonds have a much tighter connection with terrorism than drugs, but the US government has yet to produce an ad on the subject. Imagine a TV spot with a just engaged couple in which they say, “We helped a suicide bomber get explosives. All couples getting engaged do it,” followed by the tagline: “Blood diamonds support terror. If you buy diamonds and are not one hundred percent certain of their origins, you might too.”

Instead, the US Office for National Drug Control Policy ran ads with drug users, including a pot smoker, saying, “drug money supports terror. If you buy drugs, you might too.” It’s hard to imagine how Al-Qaeda could possibly profit from some kid who in all likelihood is smoking grass grown right here in North America. Unlike the that between blood diamonds and terrorism, no one has established a meaningful connection between American marijuana usage and terrorism.

Al Qaeda made millions from trading in blood diamonds obtained from the RUF during their war in Sierra Leone. *The Washington Post* first broke the story back in November 2001; a direct connection between blood diamonds and those responsible for September 11<sup>th</sup> was established. Al Qaeda were not the only terrorists to profit from blood diamonds, Hezbollah preceded them in this illicit business.<sup>32</sup>

---

<sup>32</sup> “Most officials and researchers we spoke with recognized a highly probable link between Hezbollah and a part of the Lebanese diamond-trading network in West Africa. The U.N. Special Court Chief Prosecutor and the Chief Investigator in Sierra Leone both reported that the problem is current.” General Accounting Office, *United States General Accounting Office Report to Congressional Requesters: Terrorist Financing: U.S. Agencies*

It's not just the trade in blood diamonds that linked terrorism to diamonds. Even if the Kimberly Process managed to wipe out this particular evil, the connection between diamonds and money laundering would remain. Here the secretive, cash intensive nature of the trade combined with the ease of smuggling diamonds comes together to cause grave concern.

Authorities can trace and freeze bank accounts. Even the most secretive Swiss bank works to prevent terrorists from using their services. By avoiding banks, terrorists can lessen their risk of exposure. Informal cash transfer systems such as Hawalah are much harder for authorities to intercept, but government officials have been working on this problem. Cash is king, but it takes up space and, in large enough quantities, customs officials can find it. Just like drug dogs, customs now has cash dogs, which can smell if someone is smuggling currency.

As an alternative to carrying cash or wiring it, terrorists may find diamonds an attractive option for the same reason that more traditional criminals do--the small size, impossibility of tracing and easy conversion to cash.<sup>33</sup> *The Washington Post* further reported that al Qaeda apparently

---

*Should Systematically Assess Terrorists' Use of Alternative Financing Mechanisms* at 21 (Nov. 2003), GAO-04-163, <<http://www.gao.gov/new.items/d04163.pdf>>.

<sup>33</sup> “[D]iamonds can be used in lieu of currency in arms deals, money laundering, and other crimes. Diamonds are also easily smuggled because they have high value and low weight and are untraceable and odorless.(n35) [n35: According to the US Congressional Research Service, a pound of diamonds in 2002 was worth around \$225,000, compared with a pound of cash that was worth \$45,000 and a pound of gold, which was worth \$4,800.] The international diamond industry is fragmented, with numerous small mining operations located in remote areas of Africa, in countries that have porous borders and no rule of law. There is limited transparency in diamond flows owing to the complex way in which diamonds move from mine to consumer, the existence of significant data inconsistencies, and the industry’s historical avoidance of close scrutiny. Diamonds are often traded

transformed large amounts of cash into diamonds in preparation for the aftermath of September 11<sup>th</sup>. An American government official they quoted said, “When prices go up and supply goes up, it means someone is seeking to launder or hide cash, and we believe that is the case here. Diamonds don't set off alarms at airports, they can't be sniffed by dogs, they are easy to hide, and are highly convertible to cash. It makes perfect sense.”<sup>34</sup>

The fight against blood diamonds now goes hand and hand with the fight against the financing of terrorism. Using diamonds to transport wealth secretly is no longer just an issue of money laundering; it poses a security threat to all of us. Unfortunately, it appears that the US government has not been taking this threat seriously. Reportedly, only one government agent is working half time on the problem of diamonds and terrorism.<sup>35</sup> The government could take actions to try to cut down on this, such as requiring records of diamond transactions.

While the Kimberly process is a big step in the right direction, a switch from natural stones to man-made ones would wipe out the problem of blood diamonds in its entirety. Perhaps the diamond market will crash as a result of this emerging technology and/or as a result of the diamond myth<sup>36</sup> shattering. A combination of these two factors could result in a

---

fraudulently, and smuggling routes for rough diamonds are well established by those who have used such routes for decades to evade taxes or move stolen diamonds.” *Id.* at 20-21.

<sup>34</sup> Farah, Douglas. “Al Qaeda Cash Tied to Diamond Trade: Sale of Gems From Sierra Leone Rebels Raised Millions, Sources Say.” *The Washington Post*. 2 November 2, 2001, at A1.

<sup>35</sup> Transcript of Interview with Douglas Farah. “Outlook: Africa's Destructive Leaders.” *The Washington Post*. 24 April 2006.

<sup>36</sup> Diamonds have no inherent connection to engagement, marriage, or love. They are nothing more than shiny rocks, pretty pieces of carbon. As much as you might like them, you would pay no more for them than you would for quartz crystals if they were as

plummet of diamond prices to such lows that the industry as we know it would be over.

As long as diamonds have great value, there will always be someone to purchase them, no matter how shady their origins. If all they are merely pretty pieces of rock with wonderful industrial purposes, then that removes a huge incentive for fighting in unstable diamond rich countries. As such, future wars may be averted through the work of diamond makers. Plus diamonds role in money laundering and possible connection to terrorist activities would end.

---

common. While they still would have powerful industrial applications, those are not why people pay so much for them as gemstones.

This is a basic reality which underlies the entire diamond industry.

It's been over two decades since the quintessential publication that sounded a rallying cry against the artificial valuations of the diamond industry came out. By Edward Jay Epstein, it's British title was *The Death of the Diamond: The Coming Collapse in Diamond Prices*. The American one is not nearly as provocative--*The Rise and Fall of Diamonds: the Shattering of a Brilliant Illusion*.<sub>2</sub> Published in 1982, it presents a host of logical, compelling, historically based reasons for why the diamond market should collapse.

Epstein underestimated what he termed the "diamond invention" and what has also been referred to as the "diamond myth." The notion that "diamonds are forever" and they represent "eternal love" has so pervaded American culture that it has become almost unimaginable to get engaged without a diamond ring. Not just that, the diamond has to be an expensive. A diamond valued at two to three months salary is now the standard.

## 5 MAN MADE DIAMONDS

If man-made diamonds become plentiful enough and either indistinguishable from natural diamonds or valued in a similar manner, the market for blood diamonds would dry up as they would be cheap enough to wear on the soles of your shoes.

At the HRD, they have three categories of items for which they refuse to grant a certificate. The first of these is man-made or synthetic diamonds. The second is diamond simulants, which means fakes, stones that are not in fact diamonds although they simulate the appearance of them. Cubic zirconia is probably the most famous example; although Moissanite has replaced it as the simulant they encounter the most.

The third category includes diamonds that would be eligible for certification, if they had not been treated to enhance their value. There are a number of techniques employed for enhancing diamonds including, but not limited to, color enhancement via radiation, laser drilling to remove inclusions, and fracture filling through the use of sealants.

There are different terms for them, but man-made or synthetic diamonds are in fact diamonds. They have essentially the same optical, physical, and chemical properties as diamonds mined from the earth. Slight differences exist that can be used in sophisticated tests to distinguish the man-made from the natural stone. To the naked eye or even a jeweler looking through a loupe, they are the same. The difference here has to do with how the diamonds are formed: man-made ones are created as part of a

technological process while ancient geological forces made natural diamonds. One is made while the other is mined or gathered.

There is no 'if' as to whether man-made diamonds can be produced; they are already in production. On February 16, 1953, diamonds were first artificially created by the ASEA electrical manufacturing company in Sweden. ASEA kept this discovery secret; it was not until two years later that General Electric declared they had made their own diamonds in New York.

After the press conference they held to announce that diamonds could be made by man, "the diamond world was stunned and the world diamond market thrown into turmoil...De Beers stock fell precipitously, while the total value of General Electric's stock jumped overnight by more than \$300 million."<sup>37</sup> It quickly became clear that GE would only be producing low quality stones for the industrial market so gem quality stones regained their value. It was not until a decade later that GE first made diamonds of gem quality, but the company did not consider them cost effective.

Other companies, including De Beers, joined GE in manufacturing industrial grade synthetic diamonds. The industry in 2006 is estimated to have a one billion dollar market for which six hundred metric tons of man-made diamonds are made each year. In quantity, this dwarfs the market for gem quality stones.

---

<sup>37</sup> Hazen, Robert M. *The Diamond Makers*. Cambridge: Cambridge University Press, Rev Ed edition 1999, at 132-133.

Now, various startups have entered the man-made diamond business but this time with an eye to producing gem quality stones. This is not a pipe dream; these stones are currently being made. The HRD, along with the vast majority of other industry associations, refuses to certify man-made diamonds.<sup>38</sup> In April 2004, the Israeli Diamond Exchange (IDE) was the first exchange to ban its members from dealing in man-made diamonds. The IDE president, Shmuel Schnitzer, wrote that, "There is no doubt that we must take a firm stand against synthetic diamonds. These are imitations, and must not be handled by members of the legitimate trade."<sup>39</sup>

There are two ways of creating gem quality synthetic diamonds. The first is the same one used to produce industrial stones; it's called "HPHT" for High Pressure High Temperature (HPHT). The name does a great job describing how it works; the concept here is to recreate the conditions within the earth under which diamonds first formed. Massive, heavy presses apply enormous amounts of pressure and immense heat to carbon resulting in the creation of diamond. As General George S. Patton put it, "pressure makes diamonds." This technique now has fifty years of history behind it and is currently cheaper to use than its alternative.

A company in Florida called Gemesis, among others, currently uses this technology to create gem quality diamonds for the jewelry market. Here is how they make more than a hundred carats a week. In their own

---

<sup>38</sup> I wonder if this might have any potential anti-trust implications.

<sup>39</sup> Pikul, Corrie. "Nice Ice." *Salon.com*, 24 December 2004.

words, here are the three steps they use to induce “common carbon to rearrange its atoms into a superb rough diamond crystal.”<sup>40</sup>

1. “We begin with a tiny diamond seed that provides the template for the diamond growth.
2. We apply the proper pressure and temperature to create an environment where the carbon will change its phase and re-form into a diamond crystal.
3. At the end of the growth process, we have grown rough Gemesis-created diamond crystals, each with a unique shape, quality, and size.”<sup>41</sup>

The second method for creating diamonds is called “CVD” for “Chemical Vapor Deposition.” Developed in the 1980s, this technique eschews the brute force approach of HPHT and instead makes use of the carbon it turns into a gas. This carbon is then usually mixed with hydrogen and methane gases. The pressure involved is low while the heat is high, although not as high as with HPHT. The key is to break apart the various gas molecules, generally with the help of microwaves. Other sources of energy can be used though.

The individual atoms, now separated from the gas molecules they were once a part of, collect onto the surface of a small bit of diamond. One needs to start with a seed or kernel of diamond. In order to grow a diamond, the material collects around the existing bit, turning it into a larger and

---

<sup>40</sup> Official website of the Gemesis Corporation at <<http://www.gemesis.com/how.htm>> accessed April 3, 2006.

<sup>41</sup> Official website of the Gemesis Corporation at <<http://www.gemesis.com/how.htm>> accessed April 3, 2006.



larger stone. This can be thought of as the opposite of HPHT. Instead of forcing carbon into becoming diamond, carbon is freed into individual atoms that can then come together to form diamond.

CVD technology can potentially create bigger, cheaper diamonds than HPHT. More importantly, this process allows for the control of impurities. As for gemstones, this means one can make perfectly clear stones or all sorts of high-quality fancy colored stones. As this technology develops, the production of diamonds could become cheaper and cheaper until synthetic stones cost very little to make. Ones made from either technology already sell for cheaper than do comparable natural diamonds. Not only are the production costs lower than with a mine, but the supply chain is much shorter--diamond makers can sell their wares straight to the store without the many steps natural diamond producers go through. For instance, man-made diamonds do not need to pass through Antwerp's diamond district.

An American company that uses CVD technology to produce diamonds, Apollo, has refined the process to produce bigger, less costly stones in different colors. They can make anything from a pink to a black diamond. Here is how they do it:

1. "Apollo begins with a seed of diamond roughly the size of a shirt button.
2. Apollo places multiple seeds into the growth chamber.
3. Apollo rains carbon onto the diamond seeds, growing new diamond, one diamond crystal at a time, on top of the seed.

4. The newly grown diamond is then separated from the seed and carefully inspected to ensure that it meets Apollo's high standards."

42

The machines Apollo uses in their process come with glass windows, visitors can even see the process unfolding within them. The growth is too slow for the casual observer to note, but the pink gasses still make for a nice show.

As for where the carbon comes from that is used with both HPHT and CVD to grow diamonds, it can come from any source at all. Carbon is incredibly common and cheap; it is a basic building block of terrestrial life itself. This effectively means that a manufacturer can make diamonds out of an incredibly wide variety of items.

A source that resonates with the public imagination is coal. In explaining how diamonds are made, people often refer to them as the product of tremendous pressure and heat being applied to a lump of coal. For instance, Malcolm S. Forbes' quote that "diamonds are nothing more than chunks of coal that stuck to their jobs" or Henry Kissinger's that "a diamond is a chunk of coal that is made good under pressure."

When GE first announced they had made synthetic diamonds, a young boy named Chucky Singer sent them some coal along with a letter saying, "I am sending you a piece of coal I found for you to make into a diamond in your machine. Please send it back to me."<sup>43</sup> The GE

---

<sup>42</sup> Official website of Apollo Diamond, Inc. at <<http://www.apollodiamond.com/>> accessed April 3, 2006.

<sup>43</sup> Hazen, Robert M. *The Diamond Makers*. Cambridge: Cambridge University Press, Rev Ed edition 1999, at 133.

researchers were so amused that they went ahead and sent him a small synthetic stone.

To make diamonds one does not need to use coal, any source of carbon will do. Technology can even make diamonds from the dead. A service called “LifeGem” transforms ashes from a loved one into a gemstone. At first this struck me as rather morbid and I thought reading the testimonials would make my skin crawl. It sounded creepy. I mean, I miss my grandparents, but I would not want to wear them as gemstones. The company’s slogan “because love lives on” and their “pre-planning your LifeGem” twenty percent discount didn’t help.

But when I read the testimonials, it hit me that if this service helps people deal with their loss and feel some tangible connection to someone they loved, well then, maybe it’s not so creepy after all. I still wouldn’t want anyone to turn me into a gem, but that’s just me.

LifeGem adds two steps to the traditional HPHT process:

1. “Carbon Capture--...We...extract the carbon from existing cremated remains. This process begins with a portion of remains from any standard cremation.
2. Purification--Once captured, this carbon is heated to extremely high temperatures under special conditions. While removing the existing ash, this process converts your loved one’s carbon to graphite with unique characteristics and elements.”<sup>44</sup>

---

<sup>44</sup> Official website of LifeGem at  
<<http://www.lifegem.com/secondary/LGProcess2006.aspx>> accessed April 5, 2006.

You don't have to wait until death to be turned into a diamond though. A competitor to "LifeGem" called "New Age Diamonds" sells a patented product under the trademark "Your Personal Diamond." These are "personalized lab-grown diamonds created from human or animal hair. The product is for the funeral and pet market as well as other jewelry related industries such as weddings, gifts, and beauty salons."<sup>45</sup> Now, you can turn a lock of your own hair into a diamond. LifeGem has this same capability; they have even made three diamonds out of composer Ludwig van Beethoven's hair.

While the manufacturer of synthetic diamonds is well established for industrial stones and recently hitting the market for gem-quality ones, some production difficulties remain. HPHT techniques tend to produce yellow stones (which are more valuable on the gem market than white ones) while CVD tends toward brown. Colorless stones are rarer in synthetics than in nature, whereas colored stones are rarer among natural diamonds.<sup>46</sup> Manufacturers have learned how to overcome this problem, though, and they continue to develop more cost effective and faster ways to create diamonds.

Using a CVD method, scientists at the Carnegie Institution's Geophysical Laboratory in Washington, D.C., have already made 10 carat, half-inch thick, transparent single-crystal diamonds and believe they could create a 300-carat colorless diamond in the same manner. They did so at the

---

<sup>45</sup> Official website of New Age Diamonds at <<http://www.newagediamonds.com/>> accessed April 5, 2006.

<sup>46</sup> Mulrean, Jennifer. "Man-Made Diamonds: a Girl's New Best Friend?" *MSN Money*, 9 November 2004.

rate of 100 micrometers an hour. Their May 16, 2005, press release on this accomplishment got straight to the point with its title “Very Large Diamonds Produced Very Fast.”<sup>47</sup> Dr. Russell Hemley, a top researcher on this project proclaimed, “the diamond age is upon us.”

---

<sup>47</sup> Official website of The Carnegie Institution of Washington at <[http://carnegieinstitution.org/news\\_releases/news\\_0505\\_16.html](http://carnegieinstitution.org/news_releases/news_0505_16.html)> accessed April 5, 2006.

## 6 THE DIAMOND AGE

The Carnegie Institution did not undertake this research to get into the synthetic diamond gem market; their interest has to do with the technological implications of being able to produce customized, cheap diamonds. Man-made diamonds are valuable for more than their use as gemstones. The diamond age Dr. Hemley referred to is the widespread transformative effect on our daily lives that diamonds could have once they integrate into existing technologies.

Tinkering with the gasses used, pressure applied, temperature, and the sources of energy used to break apart the gas molecules, one can create different kinds of diamonds with specialized functions. For instance, laboratories can create purified diamonds that have the highest thermal conductivity known to exist in solid matter at room temperature. The implications of this are tremendous.

While computers now run on silicon based computer chips, they could one day run on diamond based ones. By adding boron or phosphorus to diamonds created using CVD methods, one can make diamond that conducts electricity. In other words, an n-type or p-type semiconductor. Element Six (formerly known as De Beers Industrial Diamonds) has already developed a man-made diamond diode--a key stage in the creation of diamond age semiconductor technology.

In order for computer chips to continue to follow Moore's law of doubling the number of transistors on integrated circuits every 18 months, handling the attendant increases in heat will need to be resolved (among other

future problems). Chips already run at up to 200 degrees Fahrenheit. According to Bernhardt Wuensch, an MIT professor of materials science. "If Moore's law is going to be maintained, processors are going to get hotter and hotter. Eventually, silicon is just going to turn into a puddle. Diamond is the solution to that problem."<sup>48</sup>

Professor Wuensch said diamond is the solution as chips based on diamond could work at temperatures well above what would melt silicon. This is because diamond has the highest thermal conductivity of any solid. In fact, diamond can handle about five times as much heat as silicon. Plus, diamond semiconductors would generate much less heat in the first place than silicon ones as electrons travel through them with less resistance.

This ability to generate less heat and handle more means that diamond could make much more powerful lasers; a major problem with advances in the field is all the excess heat they generate.

As an added bonus diamond also has a much greater ability to withstand chemical or radioactive abuse than does silicon--as such they could be used almost anywhere. This allows for greater miniaturization and power in electronics devices. Who knows what great things could be made with synthetic diamonds once industry can cheaply grow them in large enough quantities?

Speculation abounds. For example, one journalist wrote that diamond "could allow a cell phone to fit into a watch and iPods to store 10,000 movies, not just 10,000 songs. Diamonds could mean frictionless

---

<sup>48</sup> Davis, Joshua. "The New Diamond Age." *Wired Magazine*, Issue 11.09, September

medical replacement joints. Or coatings — perhaps for cars — that never scratch or wear out.”<sup>49</sup>

Diamond has so many useful properties that can be exploited as CVD techniques become cheaper and better controlled. Diamond could grow directly onto electronics. Tools covered with diamond would be exceptionally hard and able to resist ordinary wear and tear.

The first man-made diamond based tools are already in use-- Element Six sells Diamond Cosmetic Scalpels. In their own words, these “are much sharper than the best steel blades and as a result ensure that the plastic surgeon can make incisions with extreme precision and excellent maneuverability. Diamond Cosmetic Scalpels enable the cosmetic surgeon to make the cleanest possible cut, ensuring the best results for the patient.”<sup>50</sup>

There remains much research to be done to understand the chemical reactions involved in various CVD methods. To reach the diamond age, the area on which the diamond can be grown needs to be increased and the process needs to be cheaper, faster, able to grow more. This could happen in the near future; *Popular Science* recently estimated that diamond semiconductors would be available for purchase by 2011.

---

2003.

<sup>49</sup> Maney, Kevin. “Man-made Diamonds Sparkle with Potential.” *USA Today*, 6 October 2005.

<sup>50</sup> Official website of Element Six at <<http://www.e6.com/e6/page.jsp?pageid=1273>> accessed June 3, 2006.



## 7 DISTINGUISHING MAN-MADE FROM NATURAL

While the glorious diamond age may still be a while off, man-made diamonds are already being sold that are virtually impossible to distinguish from natural ones. Even trained diamond merchants need to use specialized equipment. Simply looking under a jeweler's loupe isn't enough anymore. For instance, in 2006 a reporter for *Newsweek* magazine showed three diamond dealers in NYC's diamond district man-made stones by Apollo, all three believed them to be real.<sup>51</sup>

Suspicious may be aroused though as man-made stones are often too perfect--a lack of flaws combined with rare color would make a cautious merchant uneasy. I like to think of this as the "if it's too good to be true" test. The problem is though that some synthetic stones do contain flaws and some natural ones do not.

Currently the diamond industry can distinguish between man-made and natural diamonds. Means of detection include the absence of flaws that natural stones tend to have and the presence of various contaminants known to result from existing manufacturing techniques. No simple test exists though, one needs more than one machine and they are not cheap. One way to find out if a stone is natural or not is to bring it to a diamond-grading lab such as the HRD for certification. They check all stones going through their certification process to make sure they are not man-made. The samples by which they compare stones against are on loan from De Beers. I looked at them and they looked real to me under a loupe.

The HRD works closely with De Beers to ensure that man-made diamonds can be told apart from natural ones. It's not just the samples that come from De Beers, so do the two main machines used to establish the natural vs. synthetic origins of a stone. De Beers has been working on this technology for a while now; they created the "Gem Defensive Programme" in 1982 to protect the natural diamond industry from the synthetic one. Research was done successfully to detect man-made stones, both HPHT and CVD ones. Since then, they have changed its name to the "Consumer Confidence Programme."

This was nothing short of a stroke of genius; perhaps even up there with De Beers convincing so many that a certain kind of polished rock is the key to an engagement and romantic love. If synthetic stones could be cheaply made that were impossible for even a lab to differentiate from natural ones, the diamond industry could collapse.

Protecting consumers' interests is an extremely smart way for De Beers to frame this issue. No one wants to see someone spending a bunch of money for a diamond only to find out it was not real afterwards. The reason why consumer protection groups would care is that, at this point, the market value of the stones currently differs greatly; natural ones are worth significantly more. As long as this price difference is the case, everyone, not just the industry, has an interest in ensuring that consumers know what they are getting.

---

<sup>51</sup> Hastings, Michael. "Romancing the Stone." *Newsweek International*, 14 February 2006.

The HRD's certification floor has both of De Beer's machines on hand, DiamondSure and DiamondView. The first, and generally only, test uses DiamondSure. According to De Beers, it "determines whether a polished stone is definitely a diamond or requires a further test to establish its identity."<sup>52</sup> Light streams through the stone and the machine measures how the diamond refracts it. In just seconds, the machine either proclaims a stone to be a natural diamond or not, or, in a very small minority of cases, indicates the necessity to run a second test. This time using DiamondView.

DiamondView uses intense short wave ultraviolet light to analyze a stone's fluorescence pattern and its growth or internal crystalline structure. De Beers explains the idea behind this test as follows: "Laboratory manufactured HPHT and CVD synthetics grow in very different chemical environments to diamonds, often over a period of only a few days. It may take three billion years or so for a diamond to form in the Earth's mantle. This different growth environment and time difference have given diamond properties and a structure, which is very different from synthetics. The synthesis process simply cannot bridge this time difference."<sup>53</sup>

The last line may just be wishful thinking. How can they be so very certain of what developments may come? As Yogi Berra allegedly said, "It's tough to make predictions, especially about the future." Perhaps one day researchers will come up with a way to manufacture diamonds that

---

<sup>52</sup> Official website of the De Beers Group at <[http://www.De Beersgroup.com/De Beersweb/About+De+Beers/De+Beers+World+Wide/Diamond+Trading+Company+\(Dtc\)/DiamondSure.htm](http://www.DeBeersgroup.com/DeBeersweb/About+De+Beers/De+Beers+World+Wide/Diamond+Trading+Company+(Dtc)/DiamondSure.htm)> accessed April 7, 2006.

<sup>53</sup> Official website of the De Beers Group at <[http://www.De Beersgroup.com/De Beersweb/About+De+Beers/De+Beers+World+Wide/Diamond+Trading+Company+\(Dtc\)/DiamondView.htm](http://www.DeBeersgroup.com/DeBeersweb/About+De+Beers/De+Beers+World+Wide/Diamond+Trading+Company+(Dtc)/DiamondView.htm)> accessed April 10, 2006.

contain a similar growth structure to natural ones. The industry has already acknowledged that future technologies may lead to future problems. The Gemological Institute of America's (GIA) report on "Synthetic Diamonds" admitted that "with the evolving developments--particularly in the CVD method--some challenges with identification are foreseeable."<sup>54</sup>

I asked my guide at the HRD if they found many man-made stones during the certification process. She told me, "It's still not a big problem as there is low productivity with current technologies." I next asked if when they found synthetics, did that usually mean someone had scammed an Antwerp dealer. "I don't believe dealers are being tricked. When a man-made stone is found, it's possible a dealer sneaked one in to see if it would pass."

Even though the diamond industry has the ability to tell man-made and natural diamonds apart, given the expense of the machines involved, consumers and many jewelers lack an effective way to do the same. Submitting a stone to a lab to be tested is a costly process. For a potentially valuable one it is clearly worth it, but for the small stones that play a huge role in the jewellery market, it's not worth it. Ever since diamond polishing shifted to India for small stones, it's been possible for merchants to make a profit off diamonds so tiny that they would have previously been used for industrial purposes no matter how high quality they were.

The easiest way for consumers to tell if a stone is natural or man-made would be if the manufacturer somehow marked the stone. Of course,

---

<sup>54</sup> The Gemological Institute of America's (GIA) report on "Synthetic Diamonds." May

even then, as technologies develop, someone, somewhere could still make diamonds without such markers and so the problem would ultimately remain. Gemesis laser inscribes its stones and adds trace amounts of nickel when making them. There is no legal requirement to do this; one of the technicians working at the HRD told me not all manufacturers add an intentional means of identification.

A manufacturer could simply inform the wholesalers or retailers who buy their stones they are man-made and it would be up to these others, farther down the stream of commerce, to make any required disclosures to consumers. This could be a problem, already an Indian company that bought man-made stones has admitted to selling them without disclosing their origins.

De Beers has come up with a converse strategy--to laser inscribe their stones with an identifying trademark so as to assure consumers they are buying a natural stone.<sup>55</sup> A trademark is "a name, symbol, or other device identifying a product, officially registered and legally restricted to the use of the owner or manufacturer."<sup>56</sup> Such a mark could take the form of a design inscribed on a stone, such as De Beers forevermark, or even just letters, such as "DTC."

---

2005.

<sup>55</sup> There are also all sorts of other great reasons for their new strategy of branding their products.

<sup>56</sup> "trademark." *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. 20 Sep. 2006. <Dictionary.com <http://dictionary.reference.com/search?q=trademark&x=0&y=0>>.

## 8 DE BEERS AND PATENT PROTECTION

De Beers is rumored to be spending millions of dollars on their continuing research into identifying man-made diamonds and making them. Both CVD and HPHT research has been done. In 1992, De Beers produced the largest ever man-made diamond--34.80 carats. The pace of research has not abated, for instance, one of their top research scientists, Geoffrey A. Scarsbrook, in Ascot, UK is listed as an inventor on eight pending US patents related to man-made diamond technologies.<sup>57</sup>

A patent is a "grant made by a government that confers upon the creator of an invention the sole right to make, use, and sell that invention for a set period of time."<sup>58</sup> As such, a patent can be considered a government granted monopoly on the production, use, and sale of a particular technology. The reason for this is to encourage invention--with a set monopoly, someone can have enough time to recoup their initial investment in developing their invention and make a profit of it. And so, future inventions are encouraged.

---

<sup>57</sup> These are Pub. App. No. 20050118349 (Layered structures; Pub. App. No. 20040229464 (Optical quality diamond material); Pub. App. No. 20040221795 (Single crystal diamond prepared by CVD); Pub. App. No. 20040194690 (Coloured diamond); Pub. App. No. 20040182308 (Thick single crystal diamond layer method for making it and gemstones produced from the layer); Pub. App. No. 20040180205 (Boron doped diamond); Pub. App. No. 20040177803 (Single crystal diamond); Pub. App. No. 20040175499 (Coloured diamond). Search done on August 3, 2006 at <<http://appft1.uspto.gov/netahtml/PTO/search-adv.html>> which is the US Published Application Full-Text Database Manual Search site. US Published Application Full-Text Database Manual Search site.

<sup>58</sup> "patent." *The American Heritage® Dictionary of the English Language, Fourth Edition*. Houghton Mifflin Company, 2004. 20 Sep. 2006. <[Dictionary.com http://dictionary.reference.com/search?q=patent&x=0&y=0](http://dictionary.reference.com/search?q=patent&x=0&y=0)>

The problem remains if the patent system as it currently exists has certain areas in which things do not work this way. De Beers and man-made diamond patents may pose just such a problem.

One goal of this research is to allow De Beers to stay in front of the science to ensure its continued ability to detect man-made stones. Another may be to stay at the forefront should the natural stone market collapse, the company could then move into this usurping market as a major player itself.

A third reason for the heavy investment in research might be to learn how to better identify man-made stones and to lock such processes down through patents. The idea of the patent system is not to try to discover things to prevent potential competition, but to reward ingenuity and research with protection against others piggybacking on one's discoveries. Unlike trademark law, patent law has no "use it or lose it" mechanism. In other words, an inventor does not have to make use of a patent no matter how much of a demand would exist for the product.

As such, if De Beer's patented process was only useful for say cheaply creating gem-quality diamonds that were indistinguishable from natural ones, they would be under no obligation to grant anyone a license to use this patent. They could just sit on it until it runs out. There are, however, exceptions--cases in which a government can issue a compulsory license which forces the patent holder to allow others to use their patented process although they still generally receive royalties for it. Such royalties are usually fixed by law or determined by arbitration or some other legal process.

In considering such potential future issues related to compulsory licenses of patent diamond making technologies, the first place to look is the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).<sup>59</sup> More specifically, Article 31 of the TRIPS agreement--Other Use Without Authorization of the Right Holder. This provision allows for a Member country's legislation to include compulsory licenses.<sup>60</sup> Paragraphs "a" through "l" of this article spell out the details of what is and is not permissible.

Interestingly, although discussion of this article tends to focus on issues of public health/medicine or military technologies, neither of these are specified as such. Only one particular field of technology has its own explicit rules set forth within this Article. Semi-conductor technology (such as that potentially related to man-made diamonds) "shall only be for public non-commercial use or to remedy a practice determined after judicial or administrative process to be anti-competitive."<sup>61</sup> Health and warfare though are two fields where governments have strong interests and issues such as compulsory licenses are often raised.

Article 44 of the TRIPS agreement covers the use of injunctions. In section 2, it sets forth that "Members may limit the remedies available against such use to payment of remuneration in accordance with

---

<sup>59</sup> TRIPS was signed in 1994 in Uruguay and came about as the result of a World Trade Organization initiative.

<sup>60</sup> "Where the law of a Member allows for other use of the subject matter of a patent without the authorization of the right holder, including use by the government or third parties authorized by the government, the following provisions shall be respected." Article 31, TRIPS agreement.

<sup>61</sup> Article 31, paragraph c, TRIPS agreement.



subparagraph (h) of Article 31.”<sup>62</sup> What this means is that the only remedy that rights holders are certain to have under TRIPS is to cash--payment for their patent and the ability to contest the amount set according to the formulas set forth elsewhere in this agreement. The United States, for instance, took full advantage of this provision by enacting legislation protecting the government from all remedies in a patent infringement suit other than remuneration.<sup>63</sup>

It is important to note that while the developed world has made extensive use of compulsory licenses, the developing world has not.<sup>64</sup> While the US routinely uses compulsory licenses as a way of resolving antitrust violations, the developing world is often afraid to do so for basic health needs because “[p]ressure from Europe and the United States makes many developing countries fear that they will lose foreign direct investment if they legislate for or use compulsory licenses.”<sup>65</sup>

Given De Beers continued antitrust violations in the past, it is not inconceivable that if they do lock down the patents required to manufacture diamonds of sufficient quality and low enough price to compete fully with

---

<sup>62</sup> Article 44, section 2, TRIPS agreement.

<sup>63</sup> 28 U.S.C. 1498. A rights holder can only sue in the U.S. Court of Federal Claims for any claim against the US government or its agents (including contractors). This would not be a patent infringement suit though, it is considered a form of eminent domain where the sole remedy is the "reasonable and entire compensation" for such use of the patent.

<sup>64</sup> “In the US, compulsory licensing has been used as a remedy in more than 100 antitrust case settlements, including cases involving antibiotics, synthetic steroids and several basic biotechnology patents,” the report adds....On the other side of the ledger, however, the report reveals a glaring discrepancy when it comes to compulsory licensing in the developing world. ‘Not one compulsory license has been issued south of the equator,’ it states.” Macan-Markar, Marwaan. “Inter Press Service: UN Report Sees Green Light for Generic AIDS Drugs.” July 10, 2001. Available at the Doctors Without Borders website <<http://www.accessmed.msf.org/prod/publications.asp?scntid=318200179503&contenttype=PARA&>> quoting the Human Development Report 2001, the United Nations Development Programme.

their natural ones, that this could result in Antitrust charges being brought by the US government or EU asking that compulsory licenses for these technologies be granted to their competitors.

Besides antitrust, other reasons for granting compulsory licenses for man-made diamond related technologies could include either health or military concerns. A given patent could even involve both of these grounds. Hypothetically, let's say someday De Beers patents a method for producing synthetic diamonds that could be used to make advanced microprocessors and they decide it is not in their larger interests to make use of this technology. Perhaps this might happen out of a fear of the effect of such an advancement on the overall diamond market.

The US government would want to use such a technology in ways that could transform the military while medical device manufacturers would want it to produce smaller, more powerful life-saving technologies. Better microprocessors would mean better machines controlling the various high-tech ways in which the military now wages war. Many different industries would want it, but these two groups might be able to get a compulsory license for national security and public health reasons respectively.

Numerous military related technologies could arise out of patented process De Beers develops in relation to man-made diamonds. Other possibilities abound. For instance, with terrorism a huge concern for the US government these days, the ability to better detect radiation emissions could potentially play a key role in someday thwarting a dirty bomb. De Beers

---

<sup>65</sup> *Id.*

has already applied for a patent for a diamond radiation detector.<sup>66</sup> As it states in their patent application: “Diamond is well known as a potential radiation detector. Its advantages include high radiation hardness, high thermal conductivity, rigidity, and simplicity of the detector design. However, its application has not been as widespread as anticipated, because of a range of practical problems.”<sup>67</sup>

Other health possibilities exist as well, recall the Diamond Cosmetic Scalpels that Element Six already sells that incorporates man-made diamond technologies in its production.

Using the legal system to help protect one’s business is not limited to the patent system, sometimes regulations that appear on their face to help consumers can have larger implications. For instance, De Beers had a reputation for tying up lands it knew had diamond deposits that it did not want to develop by placing them under environmental protections such as the creation of natural preserves.<sup>68</sup>

---

<sup>66</sup> Pub. App. No. 20060071169 (Diamond radiation detector). Whitehead; Andrew John; et al. April 6, 2006.

<sup>67</sup> *Id.* at “BACKGROUND OF THE INVENTION”.

<sup>68</sup> A well known example of this is in Arkansas. The only diamond mine in the US during the first half of the twentieth century became a state park. Crater of Diamonds State Park in Murfreesboro, Arkansas still is rich in diamonds; visitors can go there and dig themselves. About six hundred diamonds are found each year even though park visitors cannot use mechanized tools and can only dig down a limited depth. Crater of Diamonds State Park official website at <http://www.craterofdiamondsstatepark.com/digging-for-diamonds/> accessed June 15, 2006.

## **9 LIKELIHOOD OF CONSUMER CONFUSION AND THE FIGHT OVER LABELING**

As long as professionals can tell man-made diamonds apart from natural ones, the question arises how much consumers care about where their diamonds come from. Make no mistake, both are diamonds and if you buy a man-made stone, no one will be able to tell the difference just by looking at it. Man-made stones are less expensive than natural ones, so perhaps there is a point at which any preference buyers may have for natural stones can be overcome by the savings they stand to gain from buying synthetic. No one knows what this sweet spot would be. For now the natural diamond industry is fighting it out with the man-made diamond industry for the hearts and minds of future buyers.

A strange thing is that it is in the interest of both sides to maintain the diamond myth or at least the high price that diamonds fetch on the retail market. Manufacturers of gem-quality diamonds could increasingly make money from their uses in industry, but for now, the gem market appears to be where the profit lays. This potential common interest, though, has not prevented a fight between these two sides for the future of this market.

This fight takes place in realm of labeling, of words, of consumer perception, in all the intangible things that go through a consumer's mind before they decide whether to purchase a man-made or natural diamond. As Jean-Paul Sartre famously said, "Words are loaded pistols."

De Beers has already begun a campaign highlighting "authenticity" and the value of natural diamonds. They are working to develop a mystique that diamonds coming from the earth have certain feelings associated with

them that diamonds from a lab lack. In other words, they are pushing the creation of a new diamond myth, or really a corollary to the existing one. Basically, it says, you know all that stuff we told you about a diamond being a necessary part of the engagement process, diamonds are forever, and all that, we forgot to mention that it only holds true for diamonds mined from the earth or alluvial deposits, not ones created in a factory.

Ironically, flawlessness is now considered a flaw. With diamonds, having a stone that has no flaws, even under magnification, has been a desired trait; it still is in valuing natural stones. De Beers wants consumers to see the flaws in natural stones, no matter how small, as indicative of their being unique while the perfect stones that can emerge from a lab lack that individuality.

The notions of eternal love and forever have been closely associated with diamonds owing to De Beers' incredibly successful advertising. Some have argued that the tying in of notions of eternity and forever with diamonds was to avoid consumers flooding the market with used stones and exploding the diamond myth. When this campaign began in 1947, I doubt anyone imagined how useful it would be half a century later to maintain the value of natural stones. The emphasis here is that eternal love and forever come from a diamond's being created over millions of years, one made in less than a month in a lab will not have that intangible quality--a "miracle of nature" versus a "miracle of technology."

Sticking to the original diamond myth that diamonds derive their value from their rarity could be used to discredit man-made stones, which manufacturers will someday likely produce in huge quantities at a low cost.

Thus, natural stones would retain their value (such as it is) while man-made stones would not. One problem is that diamonds are not rare, but then again, De Beers has been making money hand over fist for a century despite this troublesome detail.

Another notion is one of authenticity. Even though man-made diamonds are diamonds, De Beers would rather consumers view that a shoddy imitators, more akin to cubic zirconia than to diamonds taken from the earth. De Beers emphasizes the word “real,” as in “real love” requires “real diamonds.” If only natural diamonds are real, then by implication man-made stones are fakes, involving tackiness and possible fraud. But, the reality is man-made diamonds are *not* fakes, they are real diamonds, albeit ones with a different origin from those previously sold.

When asked a question about selling man-made diamonds in the same way as natural ones, Stephen Lussier, executive director of marketing at De Beers, talked about telling “an imitation from the real thing.”<sup>69</sup> There is nothing imitation about man-made diamonds, they are not better versions of cubic zirconium; they are diamonds.

Changing the terms of discussion from man-made versus natural to imitation versus real appears to be De Beers’ marketing strategy. De Beers needs to create and spread the myth that there is something inherently different about two diamonds that a consumer could never tell apart on their

---

<sup>69</sup> NOVA. "The Diamond Deception" PBS Airdate: February 1, 2000.

own by highlighting that one was “created by nature billions of years ago” while the other “popped out of a machine last Wednesday in Kansas City.”<sup>70</sup>

Which analogies stick will determine the future of the diamond trade. Mr. Lussier drew a comparison between an authentic work of art and an imitation: “I always think it's a bit like a masterpiece from Picasso and a copy. In the end, one is worth \$30 million and is a magnificent treasure of the world, and the other is a worthless copy.”<sup>71</sup>

Meanwhile, the makers of diamonds put forth that how a stone was made doesn't matter. Carter Clarke, the founder of Gemesis claimed, “We have asked many women whether they would prefer a four carat synthetic diamond or a two carat natural diamond, if all else was equal: the characteristics, the features, the chemical composition, all those things were the same, which would they take? I've never had anyone say they wouldn't take the big one.”<sup>72</sup>

It's unclear how consumers really feel about this question. De Beers claims “94 percent of women tell us that they want the real thing” as opposed to “synthetics.”<sup>73</sup> One would need more details about how they conducted this poll to know gauge its accuracy; however, on its face the question is worthless. If asked whether one would prefer “the real thing” to a “synthetic,” it's no surprise people chose “real.”

Who knows how consumers would answer a hypothetical poll funded by the makers of diamonds asking whether they preferred “earth-

---

<sup>70</sup> NOVA. "The Diamond Deception" PBS Airdate: February 1, 2000.

<sup>71</sup> NOVA. "The Diamond Deception" PBS Airdate: February 1, 2000.

<sup>72</sup> NOVA. "The Diamond Deception" PBS Airdate: February 1, 2000.

grown” diamonds versus “cultured” ones if they were indistinguishable except in a lab, were both diamonds (not imitations) and one was a fraction of the price of the other?

A poll alongside USA Today’s online story “Man-made diamonds sparkle with potential” has what looks a neutral wording of this question-- “Would you buy a man-made diamond?” 80% said “Yes. It’s just like the real thing” while 17% said “No. I’m old fashioned that way.”<sup>74</sup> It all depends on what words the poll uses to describe the alternatives and it sets up the questions themselves.

While some diamond makers argue their stones are just as good as natural ones and at a fraction of the price, others, such as Gemesis, are taking the approach that their stones are in fact superior to natural ones. Going on the offense, they point out that man-made stones are one-hundred percent certain to be conflict-free. Plus, they are free of other substantial problems associated with natural stones such as the environmental impact of mining, asbestos danger to workers, monopolistic practices,<sup>75</sup> indigenous peoples' rights, endemic political corruption, and alleged child labor in India’s polishing industry.

---

<sup>73</sup> De Beers. “De Beers Speaks Synthetic: The Miner Spells Out Clearly Its Attitude to Lab-Made Diamonds.” *IDEX Magazine*, Issue 182, 5 June 2005.

<sup>74</sup> Out of 7,492 votes. 4% said “Diamonds? I prefer diamonelles!” results as of April 9, 2006 at <[http://www.usatoday.com/tech/news/techinnovations/2005-10-06-man-made-diamonds\\_x.htm](http://www.usatoday.com/tech/news/techinnovations/2005-10-06-man-made-diamonds_x.htm)>. Associated article: Maney, Kevin. “Man-made diamonds sparkle with potential.” *USA Today*, 6 October 2005.

<sup>75</sup> De Beers appears to have turned its back on its past violations of anti-trust laws so as long as it continues to abide by them, then this particular issue will not still pose an ethical problem for purchasers of natural diamonds.



One company that only sells man-made gems, greenKarat LLC, agrees with De Beers that “it matters how your materials are sourced.” But they believe that “process ethics become embedded in the end product,” meaning that whatever intangible qualities that attach to a stone as a result of its being mined or made in a lab point towards man-made diamonds as being superior to natural ones.

This environmental and fair trade minded retailer “oppose[s] diamond mining, with the unconscionable human and ecological sacrifice it extracts.”<sup>76</sup> “Since these created stones are in fact real diamonds, there is little remaining reason to endure the stigma now attached to natural diamonds. We feel the time has come to start transitioning those employed in diamond mining (particularly in the Southern Hemisphere) to sustainable livelihoods in other industries, while phasing out diamond mining altogether.”<sup>77</sup>

What is most interesting about greenKarat’s approach is their going beyond saying man-made diamonds are just as good as natural diamonds to saying they are actually better. Matthew White, greenKarat’s founder, said, “We’re looking toward to a time when, instead of being apologetic about wearing a synthetic stone, those who wear the natural stones will be draped in shame.”<sup>78</sup> Just as animal rights activists have transformed the way many people feel about fur coats, from objects of luxury to the end process of

---

<sup>76</sup> greenKarat LLC official website at <<http://www.greenkarat.com/about/philosophy.asp>> accessed April 10, 2006.

<sup>77</sup> greenKarat LLC official website at <<http://www.greenkarat.com/about/issuesanswers/gem.asp>> accessed April 10, 2006.

<sup>78</sup> Pikul, Corrie. “Nice Ice.” *Salon.com*, 24 December 2004.

suffering, so does this forward thinking company hope to make natural diamonds passé.

The main battleground between diamond makers and De Beers is in the realm of semantics. What words the industry uses to identify man-made stones may very well decide the future of this fledgling market and the \$60 billion dollar established diamond jewellery market. De Beers wants retailers to label man-made diamonds “synthetic” while diamond-makers prefer “cultured.” While Shakespeare may have believed that “a rose by any other name would smell as sweet,” both sides believe that a “synthetic” diamond would not be as valuable as a “cultured” one.

De Beers likes ‘synthetic’ as they have learned that “in the US, for example, we asked consumers their thoughts on hearing the words ‘synthetic diamonds’. The most common response was ‘fake’, but other responses included ‘imitation, ‘marked up cubic zirconia’, and ‘costume jewelry’. Synthetics just don’t have the emotional resonance that diamonds do.<sup>79</sup> However, man-made diamonds are none of these things--they are not fake, they are not imitations, they are not costume jewelry. They are real diamonds, just ones with a different origin. “Synthetic” emeralds, for instance, sell at around three percent of the price of their natural counterparts; this is the analogy De Beers wants to go with.<sup>80</sup>

Diamond makers, on the other hand, like the word “cultured” for its association with pearl production. Consumers are comfortable buying

---

<sup>79</sup> De Beers. “De Beers Speaks Synthetic: The Miner Spells Out Clearly Its Attitude to Lab-Made Diamonds.” *IDEX Magazine*, Issue 182, 5 June 2005.

<sup>80</sup> Although synthetic emeralds are easily distinguishable from natural ones unlike man-made diamonds and natural diamonds.

cultured pearls and are accustomed to the notion that man participated in the process that made them. Pearls incorporated into jewelry are nearly always cultured, not natural. So this is an analogy that consumers could relate to in a positive way that may make them feel that the man-made diamonds they are buying are as good as the more expensive natural ones.

Gemesis explains their reasoning as follows: “Like Cultured Pearls, man initiates the process. The resulting diamond consists of the same pure carbon crystal structure as a diamond grown by nature.” They go so far as to refer to natural diamonds as “earth-grown diamonds.”<sup>81</sup>

Natural pearls form when an irritant lodges in certain kinds of bivalve mollusks such as oysters. The mollusk then deposits layer after layer of mother-of-pearl (calcium carbonate with conchiolin binding it). Cultured pearls go through this same process, but instead of an irritant randomly entering a mollusk, people plant a polished bead or other irritant to form the nucleus of a pearl.

This discussion gets bogged down in the specific means of production such as the use of diamond seeds to start the process and the nature of the growth process. Unlike Gemesis, Apollo uses a CVD method that they believe the word cultured accurately describes. As their president, Bryant Linares, explained he uses the term cultured, “because we use a chemical vapor deposition process to cultivate or grow a real diamond from

---

<sup>81</sup> Official website of the Gemesis Corporation at <[http://www.gemesis.com/specs\\_1.htm](http://www.gemesis.com/specs_1.htm)> accessed April 3, 2006.

a diamond seed in a prepared medium of carbon gas; which results in a new diamond that is chemically and structurally identical to mined diamond.”<sup>82</sup>

The diamond seed then equals the polished bead around which the jewel forms. While the mollusk produces layers of mother-of-pearl, the CVD process creates layers of diamond to build upon the original seed.

Dr. Simon Lawson, the head of physics research for De Beers in England, asserted that “cultured” is “misleading and unacceptable. It makes people think (manufacturing diamonds) is an organic process, and it's not.”<sup>83</sup>

This is an argument about what words mean, not about physics. The dictionary definition of “cultured” makes no mention of any requirement that it involve an “organic” process. In fact, the only part of the definition that referred explicitly to pearls was that for its use as an adjective--as in cultured diamonds. *The American Heritage® Dictionary* defined cultured as “Produced under artificial and controlled conditions: *cultured pearls*.”<sup>84</sup>

There are a host of other potential words at stake, such as artificial, lab-created, man-made, lab-cultured, and created. The guiding concern should be something along the lines of: Would a reasonable retail purchaser of diamonds understand they are buying a man-made diamond?<sup>85</sup>

---

<sup>82</sup> Miller, Jeff. “Cultured, Conflict-Free: Diamond Terms in Review.” *Rapaport News*, 26 February 2005.

<sup>83</sup> Maney, Kevin. “Man-Made Diamonds Sparkle with Potential.” *USA Today*, 6 October 2005.

<sup>84</sup> The American Heritage® Dictionary of the English Language, Fourth Edition, 2000, Houghton Mifflin Company. Available online at [www.dictionary.com](http://www.dictionary.com).

<sup>85</sup> This is based on my experience studying and practicing trademark law wherein one often talks in terms of the likelihood of confusion among reasonable consumers as to the source of certain goods or services. My analysis of the words used to describe man-made versus natural stones stems from the way in which we talk about the meaning of words when prosecuting, corresponding or litigating in this field of law.

The Federal Trade Commission (FTC) revised two sections of its Guides for the Jewelry, Precious Metals and Pewter Industries, 16 CFR Part 23. Effective April 10, 2001, these revisions dealt with, among other issues, how jewelers should refer to diamonds created in a laboratory so as to “describe these products truthfully and non-deceptively” while avoiding “unfair or deceptive practices.”<sup>86</sup>

The problem is that while the FTC said that diamond makers need to add a qualifying adjective to the word diamond,<sup>87</sup> they did not mention whether “cultured” would be acceptable or not. While I agree with the FTC, asking for more than just “diamond” as disclosing information to consumers is generally in the public interest, it is not as straight forward an issue as it might appear. They are right though that as long as a price differential exists, then the potential for fraud exists if consumers buy diamonds they wrongly believe should be valued at the natural stone market price and not at the lower man-made stone market price.<sup>88</sup>

As for what word or words to put before “diamond” to convey to consumers that a stone is man-made, these guidelines are not clear.<sup>89</sup> We

---

<sup>86</sup> FTC Issued Summary for “GUIDES FOR THE JEWELRY, PRECIOUS METALS AND PEWTER INDUSTRIES,” 16 CFR PART 23. April 10, 2001.

<sup>87</sup> § 23.23 (a) “It is unfair or deceptive to use the unqualified ...name of...any ...precious ...stone to describe any product that is not in fact a natural stone of the type described.”

<sup>88</sup> However, if the difference is not detectible, then the only means by which this dichotomy could be maintained would be through an aggressive use of this legal determination combined with a system similar to the existing Kimberly system whereby it could be proven that a given stone was found in nature and not made by man. So for now, I agree with this disclosure requirement, but think that it needs to be revisited if or when the day comes that it is the only thing propping up the market for the stones De Beers is selling. In other words, if the day came that without this rule, consumers would value man-made diamonds and natural ones at the same price, then there would be no need to protect consumers against potential unfair practices.

<sup>89</sup> Looking at § 23.23(b) in isolation, it does appear to provide for only four ways of indicating that a product is man-made diamonds. And “man-made” is not one of them. But

know that “faux” is not enough--this is the only word specifically set forth as not being adequate disclosure. Four phrases clearly are adequate disclosure--these safe haven adjectives are "laboratory-grown," "laboratory-created," "[manufacturer name]-created," and "synthetic.” Diamond makers can use “some other word or phrase of like meaning” “so as to clearly disclose that it is not a natural gem.”<sup>90</sup>

The fight then will boil down to whether “cultured diamonds” clearly discloses that a stone is not natural. As of this writing, the FTC has not ruled on this issue. The only court case I ran across was from Munich, Germany. The ruling of a German district court has no precedential value in the US, but as the only court to hear this sort of case, the diamond industry might refer to it.

The German Central Office for Control of Unfair Competition (Zentrale zur Bekämpfung unlauteren Wettbewerbs) filed suit against Gemsmart Trading GmbH, a German company which distributed gem quality diamonds manufactured by the Gemesis corporation in Florida. The Unfair Competition office sued this company after it ran an ad saying,

---

the note to (b)’s specific mention of an alternative word that is not acceptable suggests that there may exist other words that are acceptable. More specifically, § 23.25(b) adds the following language to the above four safe indicators: “or by some other word or phrase of like meaning, so as to clearly disclose that it is not a natural gem.”

In understanding what language is sufficient to disclose to buyers that the diamonds for sale are man-made, I would argue that this clause should be read into § 23.23(b) in order for it to make sense both in terms of its note, its purpose and its not contradicting § 23.25(b). For purposes of this book, I will go with this interpretation and concentrate on the remaining ambiguities.

<sup>90</sup> § 23.25(b).

“cultured diamonds have the same chemical, optical and physical properties as their counterparts that were created in the ground.”<sup>91</sup>

A three judge panel ruled against Gemsmart in October of 2004. They ruled that “Zuchtdiamanten,” the German equivalent of “cultured diamonds” is misleading and that a distributor of Gemesis-manufactured diamonds must use the qualifier “synthetic” or “artificial” when referring to their product as diamonds. Should Gemsmart violate this order and use the term cultured again when marketing its products in Germany or refer to its diamonds without the proper qualifier, it would be subject to a fine of up to a quarter million euros. Repeated violations could result in criminal penalties.

The larger portent of this case is unclear. It should be limited to Germany though as it involves how Germans would perceive a word in their language, which could have different connotations in other languages. Furthermore, the court admitted to relying on a diamond industry trade group’s own definitions to make their decision. The World Jewellery Confederation’s (CIBJO) Diamond Book had been written by this group so as to exclude man-made diamonds from the definition of diamonds.<sup>92</sup> And this is what they used in coming to an understanding of what terms mean.

---

<sup>91</sup> Press release issued by CIBJO on October 29, 2004 titled "Court Orders Gemesis Corp's German Distributor To Cease Calling Synthetics 'Cultured Diamonds' In Germany." Available online at < [www.cibjo.org/press/release\\_291004.doc](http://www.cibjo.org/press/release_291004.doc)>.

<sup>92</sup> CIBJO’s Diamond Book, Article I, “The Definition of the Diamond,” Paragraph 3: ‘It is prohibited to use the word “diamond” to describe such products that have either partly or wholly crystallized or –re-crystallized due to human intervention, no matter which basic material or methods are used. Products made in this way can only be named as “synthetic diamonds” when their structural, physical, and chemical properties correspond in their total mass to diamond. The word “diamond” must then be clearly preceded by the terms “synthetic” or “artificial.”

The stones Gemesis produces appear to fit the definition of cultured and it is hard to think of how the word cultured could be associated with natural diamonds. Nothing in the way man obtains diamonds from nature involves any activity that the word cultured applies to. De Beers might argue that oysters are living creatures so cultured suggests an organic part of the process; however, that would only be true in cases where the natural process is organic. Living matter does not produce diamonds in the wild; geological processes do.

The term I've predominantly chosen to use is "man-made." While other terms such as synthetic or cultured also are accurate, man-made works best as it clearly indicates that a stone is not naturally occurring without suggesting that there is something fake or inferior about it. Simply put, they are diamonds and man makes them. My guide at the HRD even preferred the term herself "as man-made best explains this as they are actually diamonds. So synthetic is not quite right and cultured is not clear to consumers. They are all just a certain combination of carbon."

William Boyajian, president of the Gemological Institute of America admitted "to say it's not diamond is really false. It's just man-made diamond."<sup>93</sup> In fact, when GE first introduced laboratory created diamonds to the public in 1955, they called them "man-made diamonds." "Man-Made Diamonds" also served as the title of the article in the prestigious journal *Nature* on this discovery.<sup>94</sup>

---

<sup>93</sup> Mulrean, Jennifer. "Man-Made Diamonds: a Girl's New Best Friend?" *MSN Money*, 9 November 2004.

<sup>94</sup> Hazen, Robert M. *The Diamond Makers*. Cambridge: Cambridge University Press, Rev Ed edition 1999, at 132.



Maybe natural diamonds should be referred to as “earth-made.”

Now that there is more than one origin for diamonds, perhaps the generic term no longer truly indicates origin and both types of stone should require a qualifier. Until then, man-made diamonds have a second-class status, as they require an additional explanation that so-called “real” diamonds do not.

As a trademark lawyer, I find De Beers' use of “real” and “authentic” to refer to their product as, if not more, troublesome as diamond makers referring to their product simply as “faux.” Just as the FTC has forbidden the use of “faux”, they should consider the impact on consumers of De Beers telling them that only natural diamonds are “real” and “authentic” and thus by implication, man-made ones are not real and not authentic, i.e. fakes, imitations. If this results in consumers paying a premium for natural diamonds over man-made ones because they wrongly believe that man-made diamonds are not real or authentic diamonds, then perhaps the FTC may want to look into this someday.

## 10 CONCLUSION

The implications of the continued development of diamond making technologies and the fight over how retailers will situate them in the market place could make natural diamonds worthless. "If these synthetic-diamond manufacturers start putting a lot of stones in the market," says Robert M. Hazen, a scientist at the Carnegie Institution in Washington, D.C., "the diamond market could crash."<sup>95</sup>

While a bad thing for those whose livelihood depends on the diamond industry and the countries that have benefited from this trade, such a crash could finally end the suffering associated with blood diamonds and the diamond industry generally in a way that the Kimberly Process has not and, in all likelihood, will not. In the meantime, there are many things that could be done to strengthen the Kimberly Process and raise consumer awareness of this issue, but the true fight will be over how consumers value man-made versus natural diamonds and who wins the war over what words will be used.

The success of Gemesis and Apollo, for instance, could put an end to the blood diamond trade in a way that Amnesty and Global Witness with all their hard work and good intentions may never accomplish.

---

<sup>95</sup> Hastings, Michael. "Romancing the Stone." *Newsweek International*, 14 February 2006.

# Bibliography

“The Hidden Factory: Child Labour in India.” *The SouthAsian*, 7 March 2005.

Adiga, Aravind. “Uncommon Brilliance: How Did India Come to Dominate the Vastly Lucrative Global Market for Cutting and Polishing Diamonds?” *Time Asia Edition*, 12 April 2004.

Davis, Joshua. “The New Diamond Age.” *Wired Magazine*, Issue 11.09, September 2003.

De Beers. “De Beers Speaks Synthetic: The Miner Spells Out Clearly Its Attitude to Lab-Made Diamonds.” *IDEX Magazine*, Issue 182, 5 June 2005.

Dixon, Robyn. “Diamond Labor Yields Little.” *Los Angeles Times*, March 31, 2006.

Epstein, Edward Jay. *The Rise and Fall of Diamonds: the Shattering of a Brilliant Illusion*. New York: Simon & Schuster, 1982. Published in London by Sphere Books Ltd., as *The Death of the Diamond: The Coming Collapse in Diamond Prices*.

Farah, Douglas. “Al Qaeda Cash Tied to Diamond Trade: Sale of Gems From Sierra Leone Rebels Raised Millions, Sources Say.” *The Washington Post*. 2 November 2, 2001, at A1.

Fatal Transactions, Diamonds--The Kimberly Process.

Fleming, Ian. *The Diamond Smugglers*. London: Pan Books, 1960.

Fofana, Lansana. “RIGHTS-SIERRA LEONE: UN Envoy Stunned by Magnitude of Child Slavery.” 28 February 2003. Inter Press Service News Agency.

FTC Issued Summary for “GUIDES FOR THE JEWELRY, PRECIOUS METALS AND PEWTER INDUSTRIES,” 16 CFR PART 23. April 10, 2001.

General Accounting Office, United States General Accounting Office Report to Congressional Requesters: Terrorist Financing: U.S. Agencies Should Systematically Assess Terrorists' Use of Alternative Financing Mechanisms at 21 (Nov. 2003), GAO-04-163.

Global Witness, Making It Work: Why the Kimberley Process Must Do More to Stop Conflict Diamonds. November 2005.

Global Witness, Rich Man, Poor Man (Oct. 2004).

Hastings, Michael. "Romancing the Stone." *Newsweek International*, 14 February 2006.

Harlow, George E. *The Nature of Diamonds*. Cambridge: Cambridge University Press, 1997.

Hart, Matthew. *Diamond: A Journey to the Heart of an Obsession*. New York: Walker & Company, 2001. Published in London by HarperCollins as *Diamond: The History of a Cold-blooded Love Affair*.

Hazen, Robert M. *The Diamond Makers*. Cambridge: Cambridge University Press, Rev Ed edition 1999.

Kanfer, Stefan. *The Last Empire: De Beers, Diamonds, and the World*. Farrar, Straus and Giroux, 1995.

Letter dated 16 March 2005 from the Chairman of the UN Security Council Committee established pursuant to resolution 1521 (2003) concerning Liberia addressed to the President of the UN Security Council.

Macan-Markar, Marwaan. "Inter Press Service: UN Report Sees Green Light for Generic AIDS Drugs." July 10, 2001.

Maney, Kevin. "Man-made Diamonds Sparkle with Potential." *USA Today*, 6 October 2005.

Marques, Rafael. "Lundas – The Stones of Death." *Angola's Diamonds: Human Rights Abuses in the Lunda Provinces, 2004*. 9 March 2005.

Miller, Jeff. "Cultured, Conflict-Free: Diamond Terms in Review." *Rapaport News*, 26 February 2005.

Mulrean, Jennifer. "Man-Made Diamonds: a Girl's New Best Friend?" *MSN Money*, 9 November 2004.

NOVA. "The Diamond Deception" *PBS*. Airdate: February 1, 2000.

Pikul, Corrie. "Nice Ice." *Salon.com*, 24 December 2004.

Roberts, Janine. *Glitter & Greed: The Secret World of the Diamond Cartel*. New York: The Disinformation Company Ltd., 2003.

*The American Heritage® Dictionary of the English Language*, Fourth Edition, 2000, Houghton Mifflin Company.

The Gemological Institute of America's (GIA) report on "Synthetic Diamonds." May 2005.

Transcript of Interview with Douglas Farah. "Outlook: Africa's Destructive Leaders." *The Washington Post*. 24 April 2006.