

## DIAMOND MINING AND THE ENVIRONMENT FACT SHEET

The formal diamond mining industry constantly strives to strike a balance between its economic, social and environmental responsibilities, while making a positive and lasting contribution to the environment and communities in which it operates. However there is also a large amount of informal alluvial diamond digging – which is not currently regulated and therefore neither is its impact on the environment. This document, as the majority of diamond mining is formal, focuses on the environmental impact on this sector.

To recover diamonds, the industry is using modern mining methods and a more clinical approach to sustainability of mining and therefore the impact on the environment is being minimized while the benefits to the communities and countries where they are found are being maximized. These benefits are particularly true in Africa, where the prudent harnessing of natural resources by government is one of the fundamental platforms to help countries develop and pull their citizens out of the poverty cycle that blights much of the African continent.

### **The Diamond mining industry faces environmental challenges**

It must be recognised that mineral extraction by its very nature of mining does have the potential to impact the environment unless carefully managed. The key challenge is Land Disturbance; Diamond mining uses a variety of methods, some of which involve the removal of large quantities of soil from the earth. However it must be remembered that it is economically beneficial to recover the greatest amount of diamonds while moving the least amount of other material. Therefore diamond mines seek to have the minimum sized footprint, and move only that necessary material (known as waste) efficiently.

Modern day best practice calls for a full review of the plans for removal, storage and return of this topsoil/waste and the environmental impact it will have to allow the area to return to its previous state.

In addition to land disturbances there are a number of other associated challenges:

- Energy use and emissions
- Waste and recycling
- Use of water
- Impact on Biodiversity

However, importantly, diamond mining unlike other industrial processes and types of mining does not use hazardous material.

### **Environmental standards**

Today most modern diamond mines are managed to the ISO 14001 standards of environmental management, and the major companies have a policy of regularly publishing reports on their environmental performance. Many of the major diamond mining companies go beyond the ISO 14001 standard and use Environmental Impact Assessments and Social Impact Assessments to identify the environmental and social impacts of mines as well as to identify gaps at their operations. Generally, conducting these assessments is a legal requirement used by local authorities before permission to mine is granted. Predicting environmental and social impacts from the outset enables planners ways to identify reduce potentially negative impacts on the environment and then to shape the negative impact on the local environment and harness the positive impacts.

### **Community engagement**

Engaging with the community is an essential part of assessing environmental impact. Governments, local communities and non-governmental organisations all play a key role in identifying local issues, as well as influencing environmental management within the industry. By engaging day-to-day with these groups, the diamond mining industry benefits from shared

knowledge, constructive dialogue and improved relationships. This is fundamental to robust and successful environmental management.

Increasingly, governments and NGOs across the world are recognising the diamond industry's efforts to minimise its environmental impact. In many cases, they are joining forces with the diamond mining industry to develop effective and sustainable safeguards for their mining operations.

## **Mining challenges and management process**

### **The different environmental impacts from different types of mining**

Every diamond mine will have a slightly different environmental management plan, because its effect on the environment will differ according to its geographical, social and ecological situation. The location of the diamond mine and mining methods will also have an impact on the management plan. Here are the different types of mining and how their impacts are mitigated:

- ***Exploration***

The environmental impact of the land exploration involved in diamond mining is minimised in several ways:

- Vehicle tracks are reused
- Minimal amounts of soil are cleared during drilling and sampling
- Topsoil from exploration sites is refilled and replaced

- ***Open pit and underground mining***

In open pit mining, geological structures called Kimberlite pipes (funnel-like tubes of rock which extend far into the depths of the Earth) are mined to extract the diamonds. Because they are so deep and so old (the youngest known Kimberlite pipes are several tens of millions of years old), they are found in the ground often beneath overburden (such as sand and soil). This kind of mining can be done near the surface and up to, and in some instances, over 1km below ground.

This means that large quantities of surplus waste rock, sand, soil and processed Kimberlite can accumulate in the immediate vicinity of such areas which need to be managed accordingly and rehabilitated.

Plans are put in place by the mining companies for the removal, storage and return of this topsoil/waste to return the area to its previous state.

- ***Coastal and inland alluvial mining***

When diamond deposits are found in coastal areas, mining companies may be required to remove soil and plant life before they begin mining. Mining of beaches and inland alluvial diamond deposits can also require the removal of overburden (such as sand and soil) and the construction of sea-walls. This kind of mining does result in large-scale excavation along coastal areas and modification of the land.

However, once the mining is complete, soil and plant life is replaced and the visual impact and the impact on the surrounding land is removed over time by wind and wave motion. In areas with very low rainfall, special techniques are used to re-vegetate the area.

- ***Marine mining***

Diamond deposits are sometimes found on the seabed, seabed matter needs to be removed from marine diamond mining sites to access the diamonds beneath. To minimise the impact on the environment, the seabed matter is replaced in its original position. Research has shown that over a period of years, fish and marine mammals return to the mined seabed area.

- ***Informal diamond digging***

Small-scale informal alluvial diamond digging (artisanal diamond mining) is usually undertaken by individuals, families or small groups operating with the simplest equipment,

such as sieves and pans, to search for the diamonds. The majority of small-scale alluvial diamond mining is defined as 'informal' because it is undertaken on land which is neither licensed nor regulated for the mining activities taking place. Due to the very nature of this mining, it has little or no regard to the environmental impact or associated impacts on biodiversity and future agricultural land use. The formal diamond industry is seeking to formalise and develop a more ecologically sensitive approach to informal diamond digging through the Diamond Development Initiative. A Pilot was recently announced in Tanzania, involving Governments, Diamond companies, NGOs and the local community. The aim of the pilot is, if successful, the pilot can be extended to other parts of Africa where informal mining occurs.

### **Environmental challenges associated with the formal industry**

- ***Energy use, air quality and pollution***

Diamond exploration and mining use two forms of energy: electricity and hydrocarbons (diesel, marine gas, oil and petrol).

A by-product of both electricity and hydrocarbon energy is the release of carbon emissions<sup>1</sup> into the air, such as CO<sup>2</sup> (a naturally occurring gas).<sup>2</sup> Carbon emissions are considered to be a major factor in global warming and climate change.<sup>3</sup>

Industrial activity (including the production and use of electricity) creates emissions – greenhouse gases – and other chemical (synthetic and natural) substances. These are released into the air and cause a range of environmental problems, from climate change to smog, which threaten our health and our environment. Reducing energy consumption helps to protect the planet.

#### ***Taking action***

Energy efficiency and renewable energy programmes are widely used across the diamond mining industry. Emission levels are monitored through energy and carbon emission assessments.

Mines have reduced their energy use by introducing a range of schemes: installing timers on boilers, shutting off pressurised fans over weekends, running mud pumps in off-peak periods and introducing battery-powered vehicles that do not emit harmful gases. Furthermore, solar panels and energy-saving schemes have reduced the amount of electricity used at mines.

Mining company BHP Billiton has established an Energy Smart Program at their Ekati Diamond Mine in Canada's Northwest Territories. This programme has saved the equivalent of one million litres of diesel fuel per year since its inception.

Since 1996, the principal electrical energy source for Argyle Diamonds in Western Australia has been the Ord River hydroelectric power generator, which supplies up to 94% of Argyle's electricity. This initiative has realised greenhouse reductions of approximately 70 kilotonnes per annum.

- ***Waste and recycling***

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<sup>1</sup> In this context, emissions refer to the release of greenhouse gases into the atmosphere over a specified area and period of time. Outside of this context, emissions can refer to any substance released as a by-product of industrial or commercial activity.

<sup>2</sup> Carbon dioxide (CO<sub>2</sub>) is a by-product of burning fossil fuels and other industrial processes. It is the principal human-made greenhouse gas that affects the Earth's radiative balance.

<sup>3</sup> Climate change is a change in climate that is attributed either directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. Sometimes climate change is referred to as global warming, although this is only one part of climate change.

Diamond mines are no different from any other large industrial operation: their wastes can include oil, paper, scrap metal, batteries, tyres and small quantities of plastic and glass.

***Taking action***

To ensure that all types of waste are monitored and minimised, the diamond industry continues to investigate ways of reducing waste and increasing re-use (e.g. in the case of tyres used for the likes of road marking) and recycling (e.g. of scrap metal).

For example, waste materials are separated into categories at the mine to ensure appropriate disposal and recycling.

Over the last few years, a particular effort has been made to recover and recycle oil and grease. Used oil is mainly sent off-site for recycling, but at Namdeb some oil is recycled immediately at the mine site.

- ***Water: protecting water quality and minimising consumption***

Diamond mining uses water, rather than chemicals, for extraction, but of course, water is scarce in many parts of Africa, where diamond mining companies often operate.

This makes it even more important that the diamond mining process does not pollute natural water sources and that it uses as little as possible.

***Taking action***

The industry needs to conserve water in every way it can through reduction, recovery, re-use and recycling. There are strict targets for usage, which are carefully monitored; alternative water sources are investigated; and recovery and recycling programmes are put in place.

- ***Biodiversity: nature's need for balance***

The term 'biodiversity' refers to the existence of different kinds of plants and animals on earth, from humans to wild plants and animals and even farm animals and crops. Human activity can pose a threat to nature: the need for different kinds of plants and animals to exist side-by-side. Diamond mining takes place in a wide variety of environments across the world – from Canada to Africa. In Africa alone, diamond mines exist in a wide variety of ecosystems - the African Savannah [in southern Africa], the Karoo Biome [in South Africa], the Namib Desert and the Benguela marine ecosystem [in Namibia].<sup>4</sup>

***Taking action***

Minimising mining's impact on these ecosystems starts at exploration, continues throughout the mining process and carries on after a mine has been closed.

When a mining company moves into an area to mine for diamonds, the native plant life around a site is harvested and the seeds replanted. This keeps the native species around a site healthy and unaffected by the mining process, and protects local biodiversity by maintaining plant life (that is part of the wider local ecosystem). To do this diamond mining companies work with the Millennium Seed Bank (run by The Royal Botanic Gardens at Kew Gardens in London, UK) on a global seed conservation programme which collects, conserves and researches the world's seed-bearing plants.

Protecting local wildlife can be a harder challenge as animals are sensitive to change, and so the diamond mining industry runs and supports numerous wildlife conservation projects. Mining company Rio Tinto protects and promotes biodiversity at its Diavik Diamond Mine in the Northwest Territories of Canada by monitoring environmental impact through an Advisory Board, which was set up when mining began there in 2003. One of the Board's projects is a research study to protect fish species found at the mine site. The fish are an

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<sup>4</sup> The term 'ecosystem' essentially refers to the relationship between living organisms and their non-living environment. It is about the link between different species and physical and climatic factors. Ecosystems are constantly changing and evolving in response to environmental fluctuations.

important source of food for the local indigenous communities. As a result of the programme's success, the scope of the work has been widened to include water quality and monitoring the native arctic deer population.

The diamond industry has established a number of Nature Reserves, where there are breeding programmes for rare and endangered species which have introduced antelope, disease-free buffalo and white rhino calves into the population. Programs have also been set-up to re-introduce native wildlife, including the African elephant, wild dog and black rhino.

The diamond industry has worked with the South African National Parks and Peace Parks Foundation to develop a trans-frontier park (a protected conservation area that straddles international boundaries) incorporating large areas of land around the Venetia diamond mine in northern South Africa.

In Western Australia, Argyle Diamonds works with Aboriginal elders to ensure that mining areas are rehabilitated and plant species provide food and produce for the local community. Furthermore, local Aboriginal people are regularly employed in the seeding process and in other rehabilitation activities.

**An example of how the diamond industry uses ISO 14001 benchmarks for environmental management**

De Beers was an early adopter of ISO 14001, having its first mine certified in 1998. All except one of De Beers' mines and a number of other sites including exploration ventures and laboratories and the Diamond Trading Company are currently ISO 14001 certified, while all of the remaining mines should be certified this year. In 2000, the South African Department of Minerals and Energy introduced a new award scheme for Excellence in Mining Environmental Management (EMEM awards). De Beers has received a number of these awards at different mines.

**An example of how the diamond industry uses advanced planning to minimise environmental impact**

In 2002 EKATI Diamond Mine, owned by BHP Billiton Diamonds Inc. and two geologists Chuck Fipke and Stewart Blusson, a team of highly motivated employees founded the Energy Smart Program. In the year to June 2006, the program saved approximately 1.5 mega liters of diesel fuel, which saved the greenhouse gas equivalent of removing 1,600 cars from the road. The program has reduced the environmental impact of the site, raised the consciousness of employees about energy efficiency, and reduced costs. It demonstrates that by raising energy efficiency awareness we can all contribute to cost savings and reduce greenhouse gas emissions.

**An example of the how diamond industry works with the community to mitigate its environmental impact**

The Diavik mine in Canada is jointly owned by Rio Tinto plc and Aber Diamonds Corporation. Diavik mine entered into an Environmental Agreement which was developed with local Aboriginal groups, and the federal and territorial governments. Concluded in March 2000, the agreement formalizes Diavik's environmental protection commitments, establishes reclamation security requirements, and provides transparency and oversight to local communities.

**Additional sources of information**

Diamond Facts [www.diamondfacts.org](http://www.diamondfacts.org)

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