

To the Ministry of Finance

Recommendation of 24 August 2006

Contents

1	Introduction	1
2	Sources	2
3	The Council’s considerations	2
3.1	The Council’s mandate regarding severe environmental damage	2
3.2	The Council’s definition of ”severe environmental damage”	2
4	About DRD Gold Limited	3
5	Allegations concerning severe environmental damage	3
5.1	The Tolukuma mine, Papua New Guinea	4
5.1.1	Riverine tailings disposal	7
5.1.2	Acid rock drainage	12
5.1.3	Environmental damage	12
5.1.4	Social impact	13
5.1.5	The company’s response to the allegations	15
5.2	Emperor Gold Mine, Vatukoula, Fiji	16
5.2.1	Health and environmental damage associated with air pollution	17
5.2.2	Pollution of rivers and drinking water	18
5.2.3	The company’s response	19
6	The Council’s assessment	19
6.1	Summary	22
7	Recommendation	23

1 Introduction

At a meeting on 4 October 2005 the Council on Ethics for the *Government Pension Fund – Global* resolved to assess whether the investment in the company DRD Gold Limited¹ may constitute a risk of the Fund contributing to severe environmental damage under point 4.4 of the Ethical Guidelines.

As of 31 December 2005 the Government Petroleum Fund, currently the *Government Pension Fund – Global*, held shares worth approximately NOK 6.5 million in the company, representing an ownership interest of 0.2 per cent.

DRD Gold has been accused of causing severe environmental damage and of contributing to serious health damage in connection with its mining operations in Papua New Guinea and Fiji.² In Papua New Guinea a natural river system is used for tailings disposal from DRD's Tolukuma mine. It has been substantiated that the company's activities generate considerable pollution, which in all probability causes extensive and lasting environmental damage to the riverine ecosystem as well as having far-reaching adverse effects on the local population's life and health. In Fiji the mining operation at Vatukoula produces significant air and water pollution. Here the company has been accused of inflicting serious and chronic health damage on the population.

In both countries the negative environmental impact caused by the company's activities has been known for many years, but the company has not implemented any appreciable measures to prevent or reduce this damage. Further details in this respect are discussed in Chapter 5.

In accordance with the Guidelines, point 4.5, the Council has contacted the company through Norges Bank, requesting comments on the aforementioned accusations and their foundation. The company has chosen not to respond to Norges Bank's inquiry.

In order to establish whether there is a risk of complicity in severe environmental damage, a direct link between the company's operations and the violations must be found. The Council takes as a basis that the damage must be significant, emphasizing whether it leads to irreversible or lasting effects and whether it has a negative impact on human life and health. Furthermore, the extent to which the company's actions or neglect have caused the environmental damage must also be assessed, including whether the damage is a result of violations of national law or international norms, and whether the company has failed to take adequate action in order to prevent or amend the damage. It must also be probable that the company's unacceptable practice will continue in the future. Based on an overall assessment, the Council finds that in the present case these conditions have been met.

The Council has reached the conclusion that the Ethical Guidelines, point 4.4, second clause, third bullet point, provide a basis for recommending the exclusion of DRD Gold Limited owing to an unacceptable risk of contributing to severe environmental damage.

¹ Also referred to as DRD.

² Having submitted its recommendation on 24 August 2006, the Council was later informed that DRD Gold, through its subsidiary Emperor Mines, on 5 December 2006 had decided to close the mine in Fiji. In the Council's view, this does not amount to a change in the basis for recommending exclusion. On page 21 in the present recommendation the Council states that "the environmental damage from the operation at Tolukuma and the company's failure to reduce the harmful effects represent, in themselves, an unacceptable risk of complicity in severe environmental damage and thus provide grounds for exclusion."

2 Sources

The recommendation is based on several sources, including information made available by the company itself on its website and other publicly accessible data. Moreover, the Council has contacted and received information from local NGOs in Papua New Guinea and Fiji, as well as international organisations, especially Oxfam Australia. Regarding the mine in Papua New Guinea, the Council has gained access to recent environmental studies conducted for Oxfam Australia in 2005/2006. Henceforth, the sources are listed in footnotes.

3 The Council's considerations

The Council shall assess whether the *Government Pension Fund – Global* may contribute to unethical actions through its ownership interest in the South African company DRD Gold.

3.1 The Council's mandate regarding severe environmental damage

The Ethical Guidelines' point 4.4, second clause, third bullet point states: "*The Council shall issue recommendations on the exclusion of one or several companies from the investment universe because of acts or omissions that constitute an unacceptable risk of the Fund contributing to: Severe environmental damage.*"

The Council will consider the question of exclusion of DRD Gold according to this rule.

The remaining alternatives listed in point 4.4 concerning violations of individuals' rights in situations of war and conflict; gross or systematic human rights violations; gross corruption; or violations of other ethical norms have not been assessed.

3.2 The Council's definition of "severe environmental damage"

On 15 February 2006, the Council recommended that the mining company Freeport McMoRan Inc. should be excluded from the Fund due to an unacceptable risk of complicity in severe environmental damage. In the aforementioned recommendation the Council elaborated on the concept of severe environmental damage.³

The Council concludes that the Fund, through its ownership in companies, can be said to contribute to severe damage to the natural environment. The Council emphasizes that there must be a direct connection between the company's operations and the violations in question, and that, in principle, the Guidelines include existing and future violations. However, previous violations may give an indication of future conduct. Essentially though, there must be an unacceptable risk of future violations.

In each case, the Council will make an overall assessment of whether there is an unacceptable risk that the Fund may contribute to "severe environmental damage", stressing whether:

- The damage is significant.
- The damage causes irreversible or long-term effects.
- The damage has considerable negative consequences for human life and health.

³ The recommendation on exclusion of Freeport McMoRan Inc. is available at www.etikkradet.no

- The damage is the result of violations of national law or international norms.
- The company has failed to act in order to prevent damage.
- The company has not implemented adequate measures to rectify the damage.
- It is probable that the company's unacceptable practice will continue.

4 About DRD Gold Limited

With headquarters in South Africa, DRD Gold Ltd is a mining company involved in mining operations in South Africa, Papua New Guinea, and Fiji.⁴

DRD currently operates 4 gold mines in South Africa, two of which are wholly owned by the company.⁵ In Papua New Guinea and Fiji the mines are run by Australian-based Emperor Mines Limited⁶, in which DRD holds 88.3 percent of the shares.⁷ Before the DRD takeover of Emperor in 2005, DRD owned and operated the Tolukuma gold mine and had a 20 percent stake in the Porgera gold mine,⁸ both of which are located in Papua New Guinea. These assets have been bought by Emperor as part of the takeover.

Moreover, Emperor owns and operates the Vatukoula gold mine in Fiji. DRD's CEO Mark Wellesly-Wood was Emperor's managing director from 2004 to April 2006.⁹ Three of DRD's directors also sit on Emperor's board,¹⁰ wielding considerable influence over its operations.

In 2004-2005 DRD's annual production of gold amounted to 375,000 ounces.¹¹ DRD's share of the Porgera mine yielded 195,400 ounces (52 percent), the Tolukuma mine 76,300 ounces (20 percent), and the Vatukoula mine 104,000 ounces (28 percent).¹² Additionally, the Tolukuma mine produced 168,300 ounces of silver.

5 Allegations concerning severe environmental damage

The company is accused of causing severe environmental damage through its use of a natural river system for tailings transport and disposal from the Tolukuma mine. There are also

⁴ <http://www.drd.co.za/>

⁵ See footnote 4.

⁶ Henceforth referred to as Emperor.

⁷ <http://www.emperor.com.au/>

⁸ The Porgera gold mine is owned by Porgera Joint Venture, of which Barrick Gold is the operator and holder of 75% of the shares, see <http://www.barrick.com/>. Porgera is the largest mine in Papua New Guinea. The tailings from the mine are dumped into the Porgera River. As is the case with the Tolukuma mine, the pollution from Porgera is associated with substantial discharge of sediments and heavy metals, particularly mercury, arsenic, lead and cadmium. DRD's share in Porgera generates approximately twice the revenue of the Tolukuma mine.

⁹ http://www.emperor.com.au/news/EMP_CEO_Appointment_270406.pdf

¹⁰ DRD Gold Form 10-K Filings to the Stock and Exchange Commission (SEC) 2004, p. 24; accessible at http://secfilings.nasdaq.com/edgar_conv_html%2f2005%2f04%2f29%2f0001156973-05-000583.html#FIS_COMPANY_INFORMATION.

¹¹ One ounce is the equivalent of 31.1 grams. DRD's production equalled approximately 10,630 kg of gold in the period between 30 June 2004 and 30 June 2005. <http://www.emperor.com.au/abouteml/Operations.html>.

¹² The mines produced 5,540 kg, 2,160 kg and 2,950 kg of gold respectively. <http://www.emperor.com.au/abouteml/Operations.html>

allegations that the environmental damage has adversely affected local people's lives and health.¹³

Furthermore, accusations have been raised against the company regarding environmental and health damage wrought by the Vatukoula mine in Fiji through SO₂ emissions from the processing facility and discharge of heavy metals and chemicals into the Nasivi River, which is the local population's main drinking water source.

In the aforementioned cases, local communities, often via NGOs, have for many years expressed their concerns to the company about serious threats to the environment and human health, seemingly without receiving any satisfactory response to their inquiries. With regard to the Tolukuma and Vatukoula mines this has led local representatives to approach Oxfam Australia's Mining Ombudsman¹⁴ requesting that the organisation plead their cause. In both instances, the Mining Ombudsman has chosen to pursue the matter further, publishing detailed case studies of the social and environmental impact of the mining activities.¹⁵

Other NGOs, such as the Australian Mineral Policy Institute¹⁶ and local organisations including Environmental Watch Group Inc. (NEWG) and Centre for Environmental Research and Development, have also reported on the negative impacts of the company's mining operations in Papua New Guinea. In Fiji, the Citizen's Constitutional Forum (CCF),¹⁷ among others, has voiced concern for the adverse health and social effects of the company's operations at Vatukoula. Strong allegations have also been levelled against the company regarding poor working conditions, low wages and deplorable security in the mines, which, according to the accusations, has caused many fatal accidents and injuries among the workers at Vatukoula. The Council has not investigated these claims any further.

5.1 The Tolukuma mine, Papua New Guinea

The Tolukuma mine is situated approximately 100 km north of Port Moresby in the Central Province of Papua New Guinea. US mining company Newmont obtained the mine in 1987, selling it to Dome Resources in 1993. DRD acquired Dome Resources in 2001¹⁸, and in 2005 the mine was sold to Emperor as part of DRD's restructuring.

Under the provisions of the Papua New Guinea Mining Act the authorities have granted a mining concession until 2012. This concession may be renewed for up to 10 years.¹⁹

¹³ Following various accidents in 2002, DRD Gold has also been accused of poor security when it comes to transportation and handling of hazardous material to and from Tolukuma. In 2002 4,000 litres of diesel was discharged because a helicopter en route to the mine had engine problems. In the same year another major accident occurred when a helicopter lost a ton of cyanide in the river valley of Yaloge, 20 km south of the mine. There were reports of considerable damage to the vegetation in the area as well as health damage and deaths among the local population. The company has also been blamed for failing to clean up satisfactorily. DRD claims to have improved its security procedures, and from what the Council has learnt there have not been reports of similar incidents after 2002. The Council has not investigated these circumstances any further.

¹⁴ The Mining Industry Ombudsman was set up by Oxfam Australia in 2000 to assist local and indigenous peoples who are adversely affected by the operations of Australian-based mining companies. More information available at <http://www.oxfam.org.au/campaigns/mining/ombudsman/>

¹⁵ See footnote 14.

¹⁶ <http://www.mpi.org.au/>

¹⁷ <http://www.ccf.org.fj/artman/publish/>

¹⁸ DRD Gold *Form 10-K Filings to the Stock and Exchange Commission (SEC) 2004*, p. 75.

¹⁹ See footnote 18, p. 40.

Largely containing intact rainforest and around 25 percent of what is considered ecologically fragile forests, the mining area is located at an altitude of 1,500-1,750 m above sea level in steep mountainous terrain without road access. Close to the mine is the Auga River, which

flows into the Angabanga River, in turn reaching the sea some 100 km from the mine.²⁰ The mine site covers 7.7 sq km, while the company's total exploration area is close to 10,000 sq km.²¹ As there are no roads in the area, all transportation of employees, materials and equipment to and from Tolukuma is done by helicopter.

The mine produces gold and silver. Underground mining accounts for 90 percent of the output, whereas opencast extraction yields the remaining 10 percent. Open-pit production began in 1995, and underground mining in 1997. The company expects to increase production in the future.²² The mine employs approximately 750 people.

The ore, which contains gold and silver, is trucked to the metallurgical plant where it is milled and treated.²³ First it is grinded into powder, and then it passes through a series of leach tanks containing sodium cyanide, where gold is dissolved from the ore. Activated carbon is added into the leach tanks to adsorb the gold-cyanide complexes. The carbon is then screened out, while the gold is eluted from the carbon and recovered by electrolysis.²⁴ After the gold has been extracted, the tailings (made up of finely ground ore, chemicals and water) are released directly into the Auga River²⁵ at a rate of 14,000 tons a month (168,000 tons a year). The mill has the capacity to process 18,000 tons of ore monthly.²⁶ Discharges have increased by nearly 70 percent since 2000, when DRD reported 100,000 tons of waste per year.²⁷ With full capacity utilisation the discharges will increase further.

According to the company's environmental reports, tailings and waste rock have been deposited in various waste rock dumps.²⁸ In the company's own environmental reports several deposits are mentioned - Saw Mill Waste Area, Karuka Waste Area, Gifunis Waste Area and Gulbadi Pit.²⁹ Currently, waste rock is disposed of by mine backfill.³⁰

In 2003 the waste rock mass amounted to approximately 187,000 bcm³¹, and accumulated waste rock will reach some 2,400 million bcm (incl. 2003) during the mine's lifespan.³² Run-off from the dumps also flows into the fluvial system, adding to river pollution.³³

The Minister of Environment and Conservation granted permission for the mining operation in 1994.³⁴ In the approval document, the Minister draws attention to the downstream river

²⁰ A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, p. 4; on file with the Council.

²¹ DRD Gold Form 10-K Filings to the Stock and Exchange Commission (SEC) 2004, p. 74.

²² <http://www.drd.co.za>

²³ See footnote 21, p. 76.

²⁴ See footnote 20, pp. 4-5.

²⁵ DRD Gold 2003: *Response to accusations from Oxfam Australia's Mining Ombudsman, Annual Report 2003*. Press release 18 September; available at http://www.drd.co.za/Our_mines/display.asp

²⁶ DRD Gold Form 10-K Filings to the Stock and Exchange Commission (SEC) 2004, p. 76.

²⁷ Oxfam Australia 2004: Mining Ombudsman case report: *Tolukuma Gold Mine*, p. 11; see <http://www.oxfam.org.au/campaigns/mining/ombudsman/2004/cases/tolukuma/index.html>

²⁸ During the initial years, waste rock was deposited in the *Eastern Waste Dump*. Later it was dumped in what the company refers to as the *Southern Area*. Minproc 2000: *Tolukuma Gold Mine*, p. 15; on file with the Council.

²⁹ Tolukuma Gold Mines Ltd. 2003: *Annual Environmental Report 2002*, p. 6, Tolukuma Gold Mines Ltd. 2004: *Annual Environmental Report 2003*, p. 7. The reports are on file with the Council.

³⁰ See footnote 29.

³¹ Bcm, bank cubic meter, denotes one cubic metre of rock measured before it is drilled and blasted.

³² Tolukuma Gold Mines Ltd 2004: *Annual Environmental Report 2003*, p. 6; on file with the Council.

³³ Minproc 2000: *Tolukuma Gold Mine*, section 5, p. 7; on file with the Council.

³⁴ See footnote 33.

system as an environmentally sensitive area, urging the company “to adopt a policy of continuous investigation/analysis and adoption of means and ways to contain mine waste on land rather than direct river discharge.”³⁵ The Minister also points out that “Social impacts will become a combined effect of physical environmental change and the changed lifestyles of the people at project site ...and possibly including those living along the Angabanga River System. [...] It will be necessary to establish and maintain dialogue with the affected people.”³⁶

The approval contains 12 ministerial conditions. Condition 4 states: “The company shall conduct dumping of waste rock with dumping strategies in accordance with sound mining practices and shall endeavour to minimise total suspended solids (TSS) input to the river systems during the construction and operational phases of the project, and thereafter”.³⁷

The discharge permit itself specifies water quality criteria for the Auga river system, including maximum levels of cyanide, ammonia and a series of heavy metals in the receiving river. It requires the company not to exceed these criteria at the compliance point, which is located 7 km from the discharge point.³⁸ In 2004 the government renewed the company’s waste discharge permit for another 40 years.³⁹

5.1.1 Riverine tailings disposal

DRD releases the tailings into the Auga River through a pipeline. The Auga River flows into the Angabanga River, which, in turn, drains into the sea some 100 km from the discharge point (see figure 1).⁴⁰

Sediments input

The daily dumping of 430 tons of tailings generates a sizeable input of suspended solids to the river system. The company’s own samples show that 7 km downstream of the discharge point total suspended solids (TSS) averaged 895 mg/l in 2003.⁴¹ Independent testing of water turbidity⁴² conducted in 2005 confirms that the whole river system from the discharge point to the coast contains considerable amounts of suspended materials. When compared with neighbouring rivers that have not been affected by such effluent, the Auga river system presents turbidity levels at least 250 times higher.⁴³

³⁵ See footnote 33.

³⁶ See footnote 33.

³⁷ See footnote 33, Chapter 5, p. 9.

³⁸ *Environment (waste discharge) permit for Tolukuma Gold Mines Ltd*, issued by the Director of Environment, PNG, on 26 April 2004; on file with the Council.

³⁹ See footnote 38.

⁴⁰ Tolukuma Gold Mines Ltd 2004: *Annual Environmental Report 2003*, p. 5; on file with the Council.

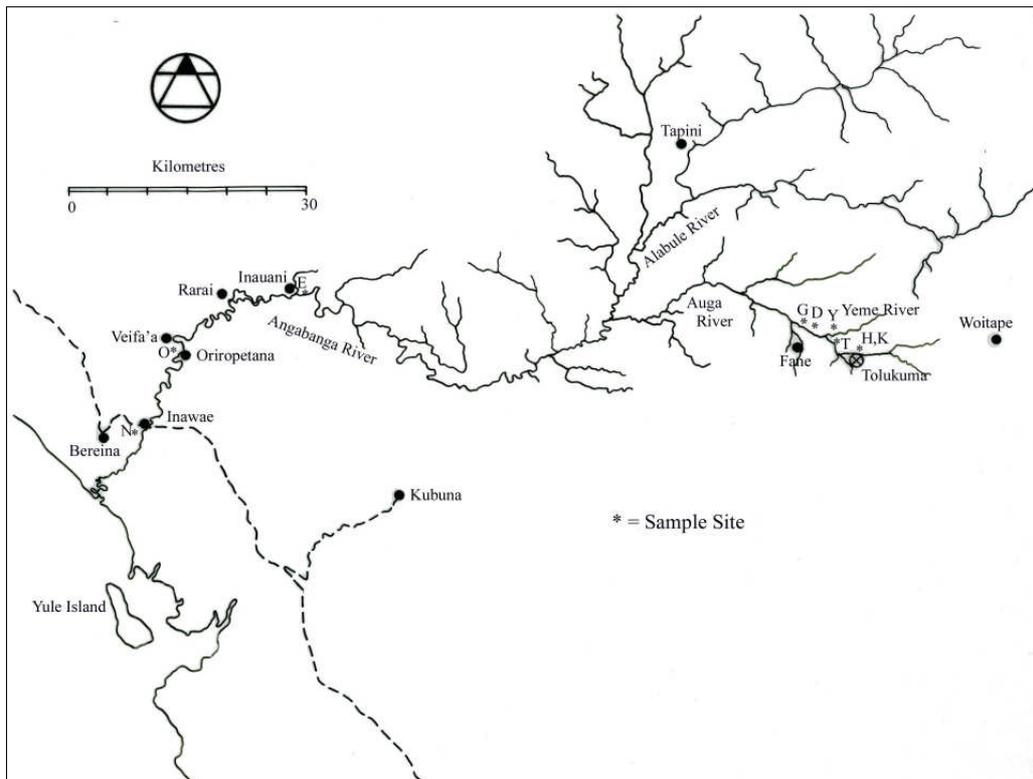
⁴¹ Tolukuma Gold Mines Ltd 2004: *Annual Environmental Report 2003*, table 7; on file with the Council.

Suspended solids are particles floating (“in suspension”) in the water.

⁴² Turbidity is a measure of water cloudiness/clarity, indicating the levels of suspended solids in the water. High turbidity is a sign of high solids levels. In this test, the turbidity is measured in NTU.

⁴³ A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, pp. 13-15; on file with the Council. At the discharge point, measured levels have been 2,500 NTU, and at the compliance point 7 km downstream of the discharge point, the values are just above 1,000 NTU. Control samples taken in nearby river systems which do not receive tailings show a turbidity of 4.3 and 17 NTU. In the Angabanga River, the values range from 52.4 to 71.7 NTU. Control samples in nearby rivers that are not affected by discharge show levels of 11.1 NTU. The WHO has set the turbidity limit for drinking water at 1 NTU.

Figure 1: The Auga-Angabanga river system⁴⁴



Suspended solids are carried downstream by the river. Some sediment is deposited along the river bank in low-flow zones, and some runs into the sea.⁴⁵ To the Council's knowledge, no detailed analysis of the sediment load has been performed. However, the environmental assessment commissioned by DRD in 2000 states that the tailings discharge will leave significant amounts of sediment in the river system during the mine's lifespan.⁴⁶ The study adds that "the sediment load which is discharged (or escapes) from the project area remains visible to the mouth of the Angabanga River, a distance of about 95 km." In 2003 NGOs reported that "high levels of sediments also are evident at the mouth of the Angabanga River where it flows into Haruapaka Bay"⁴⁷

In addition to the tailings discharge there is also substantial run-off from the waste dumps, a situation which contributes to the influx of sediments and heavy metals into the river (see also section 4.1.2). The company's own environmental reports confirm this.⁴⁸

The discharge permit does not specify limits for suspended solids.⁴⁹ Even so the company claims to have taken steps to reduce the effluent into the river.⁵⁰ According to the company's

⁴⁴ The figure is taken from A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, p. 4; on file with the Council.

⁴⁵ See footnote 43. Tingay, p. 2, states that "sediment in the tailings discharge had been deposited on the beds and margins of the Auga and Angabanga Rivers as layers of light grey-brown silt." On file with the Council.

⁴⁶ Minproc 2000: *Tolukuma Gold Mine*, p. 14; on file with the Council.

⁴⁷ Koma, Matilda 2003: *Water Quality in the Auga River*, p. 5; on file with the Council.

⁴⁸ Tolukuma Gold Mines Ltd: *Annual Environmental Reports 1999-2003*; on file with the Council.

⁴⁹ In comparison, the US Effluent Guidelines establish a maximum limit of 20 mg/l, measured as a 30-day average, for suspended solids in discharge from similar mining operations. Effluent limitations representing the degree of reduction attainable by the application of the best practicable control technology (BPT) are available at <http://ecfr.gpoaccess.gov/cgi/t/text/text->

environmental reports this has contributed to an annual decrease in discharges of 4,500 to 6,000 tons, depending on the production volume.⁵¹ The company argues that it complies with the authorities' requirements and that it has government approval for riverine disposal.

Heavy metals in tailings discharge

The ore from the Tolukuma mine is characterized by high heavy metals content, thus tailings and drainage from deposit sites generate a significant supply of heavy metals to the environment, in particular mercury, cadmium, chromium, arsenic, nickel and lead.

As early as 1993, the environmental plan for the Tolukuma Gold Project anticipated that tailings and waste rock would contain high levels of several heavy metals,⁵² something which was confirmed in an environmental assessment commissioned by the company in 2000: "Discharged tailings have a very high total heavy metals content"⁵³

Heavy metals are environmentally hazardous substances, and emissions of these substances represent a major environmental problem. The company's own data from 2003 show the following *maximum concentrations* found in the tailings at the discharge point:

- Arsenic:	80.7 mg/l
- Cadmium:	0.13 mg/l
- Chromium:	17.6 mg/l
- Copper:	25.3 mg/l
- Lead:	169 mg/l
- Mercury:	0.11 mg/l
- Zinc:	79 mg/l

The tailings contain high levels of heavy metals, among which arsenic, mercury and lead cause particular concern, even if copper emissions also are high.⁵⁴ Besides their toxicity to many aquatic organisms, the metals may bioaccumulate in organisms and sediments. Annual estimates for 2003 suggest that the river system received approximately 205 kg of arsenic and

[idx?c=ecfr&sid=bae798d13b2970811ff7febdc15c3d06&rgn=div8&view=text&node=40:29.0.1.1.16.10.5.3&i_dno=40](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_draftmining/$FILE/PMM_Guidelines_DRAFT_019_Final+for+Comments_.pdf). The International Finance Corporation's draft guidelines for the mining industry suggest a TSS discharge limit of 50 mg/l; see [http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_draftmining/\\$FILE/PMM_Guidelines_DRAFT_019_Final+for+Comments_.pdf](http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_draftmining/$FILE/PMM_Guidelines_DRAFT_019_Final+for+Comments_.pdf)

⁵⁰ DRD Tolukuma Gold Mine Ltd 2005: *Tolukuma Times April 2005*, Environmental Management at TGM; available at <http://www.drd.co.za/>

⁵¹ See footnote 48.

⁵² Arsenic, lead, mercury, nickel, copper, iron, zinc, antimony, bismuth, selenium, thallium and cadmium are mentioned specifically, so is sulphur. Tingay (2006) p. 5 refers to a report prepared by Natural Systems Research and David Ballach and Associates in 1993.

⁵³ Minproc 2000: *Tolukuma Gold Mine*, Section 5, p. 5; on file with the Council.

⁵⁴ Lead is acutely toxic to aquatic organisms and mammals. Even in low concentrations it produces chronic toxic effects in many organisms. Lead is bioaccumulated in fish and mammals. Lead absorption often occurs slowly and under long-term chronic exposure. The release of lead from organisms takes place over time. Even in small quantities, arsenic compounds can be both acutely and chronically toxic to many organisms, as well as carcinogenic. Mercury and lead can be highly toxic in concentrations only moderately above ambient levels. After being released they persist in the environment, circulating between air, water, soil and biota in various forms. By means of microbes, mercury can change into methylmercury, which concentrates up the food chain; see Norwegian Pollution Control Authority (SFT) at http://www.miljostatus.no/templates/PageWithRightListing_2833.aspx, and UNEP Global Mercury Assessment at <http://www.chem.unep.ch/>.

410 kg of lead.⁵⁵ Based on the fact that the mine has been in operation for 10 years and that the company's goal is to double its production by 2012,⁵⁶ the environment will have suffered the influx of considerable quantities of heavy metals during the mine's lifespan.

The government has approved riverine tailings disposal on the condition that the water quality in the Auga River does not exceed specified levels of cyanide, ammonia and certain heavy metals.⁵⁷ The company claims compliance with government water quality requirements,⁵⁸ substantiating this with annual mean monitoring results for various parameters.⁵⁹

Notwithstanding, a review of the company's own reports for the period 1999-2003 (2001 is not included) shows that the company has repeatedly exceeded the limits set by the government for mercury, arsenic, lead and others.⁶⁰ The Council notes that the company bases its assessment of compliance with regulatory requirements on the mean result of a series of samples taken throughout a whole year. However, the environmental permit states that the discharge of waste water "*shall not cause the water quality to exceed the criteria*" at the compliance point.⁶¹ In the Council's opinion the reference to annual mean values may give an erroneous impression. The average will conceal high concentrations in the discharge, which in a worst-case scenario might exterminate all life in a fluvial system, and, evidently, obscure the fact that the company does not comply with the requirements.

Moreover, the government has based its requirements on the concentrations of dissolved metals in the water and not on total metal content.⁶² In the environmental assessment from 2000, it is pointed out that the company would probably not have met the water quality

⁵⁵ Tingay, Alan 2006: Communication with the Council; on file with the Council.

⁵⁶ DRD Gold 2005: *Annual Report 2005*, p. 17; available at <http://www.drd.co.za/>

⁵⁷ *Environment (waste discharge) permit for Tolukuma Gold Mines Ltd*, issued by the Director of Environment, PNG, 26 April 2004; on file with the Council.

⁵⁸ The maximum levels set by the government are expressed in mg/l of dissolved metals as follows: Arsenic 0.05, Cadmium 0.01, Chromium 0.05, Copper 1, Lead 0.005, Mercury 0.0002, Nickel 1 and Zinc 5. In principle, water quality standards are created to protect aquatic life. When compared for example to Australian water quality standards, the PGN authorities permit much higher levels of cadmium, chromium and copper. The PGN maximum levels of arsenic and cadmium are also significantly higher than those established by WHO (or Australian) drinking water standards; see

http://www.who.int/water_sanitation_health/dwq/gdwq3/en/index.html, and the ANZECC Water Quality guidelines. In keeping with the Norwegian government water quality classification, some PNG limits exceed levels which the Norwegian Pollution Control Authority (SFT) would classify as highly polluted water, see SFT Guidelines 97:04, environmental classification of freshwater, available at www.sft.no.

⁵⁹ DRD Tolukuma Gold Mine Ltd 2004: *Social Responsibility Report 2004*, p. 20; available at <http://www.drd.co.za/>

⁶⁰ A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, p 31; on file with the Council.

⁶¹ *Environment (waste discharge) permit for Tolukuma Gold Mines Ltd*, issued by the Director of Environment, PNG, on 26 April 2004, Condition 13; on file with the Council. The maximum levels are absolute and shall not be exceeded as from the compliance point 7 km downstream of the discharge point.

⁶² Dissolved metals represent the metal concentration in the water once the water has been filtered to remove solids. Dissolved metals are thus bioavailable. Total metal content is the sum of particle-bound and dissolved metals. Particulate metal may, however, turn into dissolved metal, depending on pH, organic and particulate material content in the water, the water's hardness, and other factors.

guidelines if total metal content had been the basis.⁶³ PNG authorities have been criticised by NGOs for not setting guidelines that match international levels.⁶⁴

In the whole river system stretching down to the sea the water quality is most likely affected by heavy metals. The survey from 2005 shows highest metal concentrations in the Auga River (which forms the upper part of the system). Yet, the effects are also visible in the Angabanga River, even if metal levels decrease significantly downstream,⁶⁵ mainly as a result of water dilution from the many tributaries flowing into the Angabanga River.⁶⁶

Sediment samples collected from the river system in 2005 present high levels of arsenic and mercury in particular, but also of lead.⁶⁷ Arsenic and lead content is especially high in the Auga River and in the upper section of the Angabanga River, whereas mercury poses a problem in the river system as a whole.⁶⁸ These findings are in agreement with the company's own sampling results, which show much higher levels of such metals, as well as of copper and zinc, in the Auga and Angabanga Rivers than in neighbouring river systems unaffected by mine waste.⁶⁹ Compared to American standards for sediment quality,⁷⁰ the metal concentration levels indicate a likelihood of adverse effects in aquatic organisms.⁷¹

The sediments form a reserve of hazardous substances and are a potential source of extensive and lingering water contamination. The metals can be released over time and thus become more bioavailable to living organisms. This was also pointed out in the environmental assessment commissioned by the company in 2000, which says that "*this [discharged tailings] presents a pool of heavy metals which over time may become available for biological uptake by the Auga and Angabanga river system*".⁷² To the Council's knowledge, no investigations have been conducted regarding the metal release rate from sediment to water.

⁶³ Minproc 2000: *Tolukuma Gold Mine*, section 5, p. 11; on file with the Council.

⁶⁴ A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, p. 33; on file with the Council. Koma, Matilda 2003: *Water Quality in the Auga River*, p. 12; on file with the Council.

⁶⁵ A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, p. 16.

⁶⁶ Tingay, Alan 2006: Communication with the Council; on file with the Council.

⁶⁷ Sediment samples from the most affected area of the river system show the following levels: Arsenic 400-490 mg/kg, mercury 68-275 mg/kg, and lead 170-233 mg/kg; see Tingay 2006 (see footnote 64), p. 41. The concentrations of arsenic and mercury are much higher than those classified by the Norwegian Pollution Control Authority as extremely polluted sediments (for mercury, this limit is 3 mg/kg).

⁶⁸ A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, pp. 19-21; on file with the Council.

⁶⁹ Tolukuma Gold Mines Ltd 2004: *Annual Environmental Report 2003*, table 3 in attachment 1; on file with the Council.

⁷⁰ US National Oceanic and Atmospheric Administration (NOAA) Guidelines for Freshwater Sediments. These guidelines are a tool for evaluating whether a certain amount of toxic chemicals (level of toxicity) is likely to harm the ecosystem; available at [http://response.restoration.noaa.gov/topic_subtopic_entry.php?RECORD_KEY%28entry_subtopic_topic%29=entry_id.subtopic_id.topic_id&entry_id\(entry_subtopic_topic\)=88&subtopic_id\(entry_subtopic_topic\)=5&topic_id\(entry_subtopic_topic\)=2](http://response.restoration.noaa.gov/topic_subtopic_entry.php?RECORD_KEY%28entry_subtopic_topic%29=entry_id.subtopic_id.topic_id&entry_id(entry_subtopic_topic)=88&subtopic_id(entry_subtopic_topic)=5&topic_id(entry_subtopic_topic)=2)

⁷¹ See footnote 68, p. 30.

⁷² Minproc 2000: *Tolukuma Gold Mine*, Section 5, p. 5; on file with the Council; see also footnote 68.

In the company's opinion, the heavy metals discharges do not represent any environmental hazard. A study performed by the company in 2004 concluded that "*the current mining regime was unlikely to cause any particulate metal issues along the river system.*"⁷³

5.1.2 Acid rock drainage

Acid rock drainage is considered to be one of the most serious environmental problems connected with mining.⁷⁴ The environmental assessment commissioned by the company in 2000 found acid rock drainage from the waste rock dumps, stating that "*inspection of several seepage streams...clearly show evidence of acid generation and seepage.*" The report concludes that "*acid generation is a problem which is likely to increase as more sulfidic ore and less oxide ore is being generated.*"⁷⁵ This acid rock drainage contributes further to the influx of sediment and heavy metals into the Auga-Angabanga river system.⁷⁶

The company acknowledges that acid rock drainage is taking place. According to information in its environmental reports, erosion occurs in the waste rock dumps. These are drained by the Iwu and Illive Creeks that flow into the Auga River. Monitoring data for the creeks presented in the environmental reports show that the drainage is acidic, adding sediments and heavy metals to the river system.⁷⁷ According to the company's own assessment this suggests that the creek is affected by acid rock drainage.⁷⁸

DRD's environmental reports show that the company routinely monitors the run-off from the waste rock dumps. However, there are no indications as to whether the company has adopted or is planning to adopt measures aimed at limiting the drainage, nor is there any information about the expected development of acid rock drainage in the future. To the Council's knowledge no analyses have been conducted on how the riverine ecosystems will be affected.

The company does not seem to have any short- or long-term strategy aimed at reducing the effects of acid rock drainage from the deposit sites.

5.1.3 Environmental damage

In addition to the physical impact caused by daily dumping of discharge into the river, the heavy metals content also has a bearing on the damage. According to the Council's knowledge hardly any systematic or scientific investigations have been carried out regarding the impact of the discharge on the riverine and estuarine ecosystems or the future threats this poses to the environment in the short and long run.

⁷³ DRD Tolumkuma Gold Mine Ltd 2004: *Social Responsibility Report 2004*, p. 21; available at <http://www.drd.co.za/>

⁷⁴ Copper, gold, silver and other precious metals are often found in sulphide rock. Acid rock drainage occurs when sulphide minerals enter into contact with both water and air (oxygen) forming sulphuric acid. In this process heavy metals that occur naturally in the ore may be mobilised, resulting in the formation of acidic water which contains heavy metals and, consequently, contaminates the ground water and river systems. Once this process has started, it is irreversible and may continue for centuries. The environmental damage is closely linked to the long-term aspect of the process, which may involve an almost uninterrupted discharge of heavy metals over many years with a devastating effect on river systems and ground water.

⁷⁵ See footnote 72, Section 5, p. 19.

⁷⁶ See footnote 72, Section 5 p. 19.

⁷⁷ Tolumkuma Gold Mines Ltd 2004: *Annual Environmental Report 2003*; on file with the Council. The average pH in Iwu Creek was 3.72 in 2003 (Table A6) and 4.13 in 2002. In 2003 the average pH in Illive Creek was 4.41, and in 2002 it was 5.61.

⁷⁸ See footnote 77, p.15.

It is well known that riverine ecosystems are extremely vulnerable to the input of sediments in large quantities. Water quality samplings, including tests conducted by the company itself and independent surveys, clearly show that the Auga-Angabanga river system is heavily polluted. The contamination level in the Auga River is so high that in all probability most of the aquatic life has been destroyed. In the Angabanga River it is likely that fish and other aquatic organisms have been adversely affected through changes in species composition, population and damage to the whole river system's spawning areas as far as the coast.⁷⁹ Reduced abundance at lower trophic levels probably also leads to a decrease in fish stock.

The company's environmental report for 2003 contains a survey of the Angabanga River's aquatic fauna (the Auga is not included) and metal absorption in the fish.⁸⁰ This study presents a series of methodological weaknesses related to aspects such as the standardization of collection methods, the comparison of sample volumes and the assessment of reference values.⁸¹ All in all, the results indicate relatively scarce populations of fish and prawn in the Angabanga River. The survey also reveals elevated levels of copper and lead, which may be caused by pollution (reference samples had lower levels).

Since 2001 the local population has reported on a dramatic reduction in the fish, prawn and eel stocks of the Auga River,⁸² claiming that there is no longer any fish in the river. They also say that Angabanga fisheries have been so decimated that nobody fishes there any more.⁸³

Local people have lately observed more frequent flooding of the Angabanga River and rapid changes to the river course which have put several villages in danger of flooding. The inhabitants attribute these changes to the large sediment influx into the river system.⁸⁴ Although the river also changed its course before mining started in the area, the large sediment input may increase the flood danger, particularly in places where the river flows slowly.

5.1.4 Social impact

Four tribal groups live along the Auga and Angabanga Rivers.⁸⁵ Some estimates put the total population of the river system at some 5,000;⁸⁶ others suggest that 10,000-20,000 people have a traditional connection to the Auga-Angabanga river system.⁸⁷ The inhabitants are largely dependent on subsistence farming and fishing.

⁷⁹ A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, pp. 27-28; on file with the Council.

⁸⁰ Tolukuma Gold Mines Ltd 2004: *Annual Environmental Report 2003*, Aquatic Survey; on file with the Council.

⁸¹ Tingay, Alan 2005: *Memorandum on Tolukuma Gold Mine Annual Environmental Reports*; on file with the Council.

⁸² Oxfam Australia 2004: Mining Ombudsman's case report: *Tolukuma Gold Mine*, p. 13.

⁸³ Tingay, Alan 2006: Communication with the Council; on file with the Council. According to interviews with the local population, the Fuyuge people (who live near the mine, see below) used to fish in the Auga River and invited neighbouring villagers to do so as well. This is no longer common practice.

⁸⁴ Oxfam Australia Mining Ombudsman 2006: Communication with the Council; on file with the Council.

⁸⁵ The Fuyuge inhabit the highlands near the mine; the Kuni live in the area where the Alabule River joins the Angabanga; the Mekeo have their home on the alluvial Angabanga plain; and the Roro communities occupy the coastal estuary. See footnote 83 and Koma, Matilda 2003: *Water Quality in the Auga River*, p. 2; on file with the Council.

⁸⁶ See footnote 83.

⁸⁷ Koma, Matilda 2003: *Water Quality in the Auga River*, p. 2; on file with the Council.

For local communities the riverine tailings disposal has resulted in the loss of an important source of drinking water, potential health problems related to the use of polluted water, as well as loss of food resources, bathing sites and cultural sites.⁸⁸

According to the Mining Ombudsman's case report on the Tolukuma mine, several villages located within 7 km of the mine rely on the river for water and food, especially during the dry season.⁸⁹ It is not known how many communities continue to use the water, but it is reported that at least two villages depend on the Angabanga for their water supply.⁹⁰ A sampling of drinking water sources in 9 villages by the Angabanga River shows that in 3 of them, arsenic levels exceed WHO standards. High concentrations of lead were also detected in villages whose only drinking water source is the river.⁹¹ According to scientific evidence, both arsenic and lead are environmentally hazardous substances that can inflict serious and chronic damage on human health and the environment. Among other effects, lead compounds may cause fetal harm, and arsenic has carcinogenic properties.

Local communities have voiced serious concerns about the contamination's health impact.⁹² Two health surveys were conducted in 2003, but did not prove any direct link between the pollution and the inexplicable deaths and disease outbreaks reported in 2002.⁹³ To the Council's knowledge, no systematic investigations have been carried out in order to evaluate the long-term health hazards faced by the local population because of mine waste.

The environmental permit requires DRD to "*provide for adequate and reliable water supply facilities in all communities that rely on the Angabanga River as a source of drinking water during the dry season.*"⁹⁴ The company has built several wells to provide the local population with drinking water; however, from what the Council has learnt, the wells are not being kept in good repair and so are not considered safe and reliable drinking water sources.⁹⁵ This gives reason to doubt whether DRD actually has fulfilled the conditions of the discharge permit.

The loss of fish means that local people no longer have access to an important food and protein source. This has forced them to change their diet, which at present comprises mainly of vegetables and fruit, as there is little game in the area. Villagers also complain that the pollution has affected the fruit and vegetable crops along the Auga and Angabanga Rivers. No

⁸⁸ Oxfam Australia 2004: Mining Ombudsman case report: *Tolukuma Gold Mine*, p. 13.

⁸⁹ See footnote 88, p. 15 and footnote 83. One example is the Fuyuge people, who used to move closer to the river in the dry season as other water sources became scarcer in their villages further up the valley slopes. They no longer do this, but depend solely on the other water sources both for consumption and washing.

⁹⁰ A. & S.R. Tingay Pty. Ltd. 2006: *Pollution from the Tolukuma Gold Mine in the Auga-Angabanga River System, Papua New Guinea*, p 1; on file with the Council.

⁹¹ A. & S.R. Tingay Pty. Ltd. 2006: *Arsenic and Selected Metal Levels in the Domestic Water Supplies of Mekeo Villages near the Angabanga River, Papua New Guinea*, p. 1; on file with the Council.

⁹² Oxfam Australia Mining Ombudsman 2004: *Annual Report 2004*; available at <http://www.oxfam.org.au/campaigns/mining/ombudsman/2004/index.html>

⁹³ PNG Central Province Division of Health (DOH) 2003: *Environmental Health Investigation into the Allegations of Illness and Deaths relating to the use of the Auga-Angabanga River System*; on file with the Council. James Cook University in Queensland and Angau Memorial Hospital in Lae 2003: *An Investigation of Disease Outbreak in the Fane and Mekeo Areas of Central Province, Papua New Guinea (PNG)*, in *Tolukuma Gold Mine Annual Environmental Report 2003*. NGOs have criticised these studies for being based on a limited selection and having methodological flaws. The reports are on file with the Council.

⁹⁴ *Environment (waste discharge) permit for Tolukuma Gold Mines Ltd*, issued by the Director of Environment, PNG, on 26 April 2004, Condition 2; on file with the Council.

⁹⁵ A. & S.R. Tingay Pty. Ltd. 2006: *Arsenic and Selected Metal Levels in the Domestic Water Supplies of Mekeo Villages near the Angabanga River, Papua New Guinea*, p. 1; on file with the Council.

investigations have been carried out to determine the causes of this. Along the Angabanga it is possible that silt deposition during floods affects soil productivity. While flooding is a common occurrence in the area, the silt now contains pollutants from the mine. This issue has not been further examined either.

5.1.5 The company's response to the allegations

DRD Gold denies the accusations of negative repercussions from riverine tailings disposal on the environment and local communities, claiming that it has strengthened and revised its environmental management during recent years and that previous grievances have largely been addressed. *"Core to this policy is the integration of environmental management issues into the everyday business of running a mining Group. Needless to say, legal compliance and the adoption of best practice form the backbone of the policy."*⁹⁶ DRD maintains that riverine disposal is a safe and acceptable way of discharging waste from the Tolukuma mine.

Yet, according to the annual report for 2005, the company considers conventional tailings dam deposition to be an alternative once the mine becomes bigger, but it does not enter into any further details.⁹⁷ Moreover, the company claims to comply with all applicable government regulations boasting a comprehensive monitoring programme for discharge and the content of environmentally hazardous substances. The Council finds, however, that there is reason to doubt these assertions, with regard to both DRD's compliance with water quality requirements and its obligations to provide safe drinking water to the population, as described above.

In response to allegations of pollution-related diseases among the population, the company refers to its health surveys as well as water quality and fish analyses, concluding that such a connection has not been substantiated.⁹⁸ In this context the Council would like to point out that the aforementioned health studies have been subject to severe criticism and do not represent a basis on which to draw conclusions regarding the long-term health effects of elevated arsenic and heavy metals levels in the water.

DRD recognizes that mercury emissions may represent a problem for the company: *"Due to the fact that ore mined at the Tolukuma Mine, and the surrounding land in general, is high in mercury, the potential does exist that levels of mercury discharged into the river system might expose the company to criminal liability under Papua New Guinea legislation."*⁹⁹ However, the company claims not to be aware of any scientific studies which show that the discharge has adversely affected the health of neighbouring communities to the mine. The Council assumes this to be true, as such research has not been undertaken. On the other hand, the lack of studies cannot be used to support the argument that these health effects do not exist.

The company also points out that the villages downstream of the mine do not normally use the water from the Auga or the Angabanga for consumption *"as these communities rely on water from creeks, tributaries and strategically placed wells, many of which the company has*

⁹⁶ DRD Gold 2004: *Annual Report 2004*, p 17.

⁹⁷ DRD Gold 2005: *Annual Report 2005*, p. 19.

⁹⁸ DRD's response to Oxfam Australia 2003; see

http://www.drdgold.com/default.asp?PathId=our_mines/display.asp.

⁹⁹ DRD Gold 2005: *Annual Report 2005*, p. 97.

provided.”¹⁰⁰ As described above, the Council has been informed that this is not necessarily the case, since several villages are entirely dependent on the river as their water source.¹⁰¹

Based on the available information, the Council deems it highly probable that the pollution has caused severe adverse changes in the local population’s way of life, both with respect to drinking water, fish availability and food production.

5.2 Emperor Gold Mine, Vatukoula, Fiji¹⁰²

Two mines dominate gold production in Fiji. Vatukoula, owned by Emperor Gold Mines¹⁰³, is the biggest, with a yearly production of approximately 120,000 ounces.¹⁰⁴ DRD Gold controls 88.3% of Emperor.¹⁰⁵

The mine is located on the island of Vitu Levu, Fiji, some 380 km north of the capital Suva. According to the company, the mine is operated by labour intensive underground methods. Total ore extracted amounts to 500,000-600,000 tons a year.¹⁰⁶ The mine employs 2,200 workers and has been in operation since 1935.

Sulphides occur naturally in the ore. In order to remove the sulphur, the ore is roasted. Through this process sulphur and heavy metals are released into the air.¹⁰⁷ The tailings are deposited in an artificial dam. For many years there have been reports that the tailings are seeping out of the dam and running into the Nasivi River.

Oxfam’s Mining Ombudsman published a report on the Vatukoula mine in 2004, after receiving a request, in 2003, from the *Fiji Mine Workers Union* and *Citizens Constitutional Forum* to look into issues associated with health and security, workers’ rights, the environment, and social consequences of the company’s operations. At that stage a strike had been going on at the mine since 1991, with hundreds of workers refusing to work in protest against deplorable working conditions, many accidents and poor security in the mine, low wages, pollution from the mine, and highly unsatisfactory housing.¹⁰⁸ Emperor rejected negotiations with the workers and brought the case to court.¹⁰⁹ In 2004 a higher court issued

¹⁰⁰ See footnote 99.

¹⁰¹ A. & S.R. Tingay Pty. Ltd. 2006: *Arsenic and Selected Metal Levels in the Domestic Water Supplies of Mekeo Villages near the Angabanga River, Papua New Guinea*, p. 1; on file with the Council.

¹⁰² See footnote 2. DRD Gold, through its subsidiary Emperor Mines, on 5 December 2006 decided to close the mine in Fiji.

¹⁰³ Henceforth referred to as Emperor.

¹⁰⁴ The amount is equivalent to some 3,400 kg of gold per year.

¹⁰⁵ <http://www.emperor.com.au/>

¹⁰⁶ Emperor Mines Ltd. *Annual Report 2004*; available at <http://www.emperor.com.au/>

¹⁰⁷ Simtars Queensland 2004: *Ambient Air Quality Monitoring near Vatukoula Gold Smelter, for Emperor Gold Mining*; on file with the Council.

¹⁰⁸ Oxfam Australia 2004: Mining Ombudsman case report: *Vatukoula Gold Mine*; available at <http://www.oxfam.org.au/campaigns/mining/ombudsman/index.html>. The company provides housing, but is, according to Oxfam, the only company in Fiji allowed to make deductions of up to 25 per cent of employee wages for the cost of renting company housing and for any work-related costs. The latter includes protective clothing, insurance premiums, education, superannuation and health care. Housing conditions are reported to be very poor. The dilapidated dwellings made of corrugated iron and wood offer no bathroom or cooking facilities. Showers, toilets and taps are located outside and are generally shared by three or more houses. See also article in *The Age*, May 2 2004: *Gold digging Emperor and his minor royalties*; available at <http://www.theage.com.au/Articles/2004/05/01/1083224643894.html?from=storylhs#>

¹⁰⁹ Article in *The Age*, May 2 2004: *Gold digging Emperor and his minor royalties*.

an injunction declaring the strike illegal, but the workers lodged an appeal.¹¹⁰ To the Council's knowledge, the conflict has still not been solved.

The Council has not evaluated the issues related to the strike itself, working conditions, or security, but focuses at present on the allegations that the mining operation causes considerable health and environmental damage to the local population. This is primarily linked to air pollution from the roasting process and deficient handling of tailings that contaminate the river and the drinking water. Information received by the Council reveals that the pollution has taken place over many years without prompting the company to undertake measures that would improve conditions for the local community.

5.2.1 Health and environmental damage associated with air pollution

Some 3,500 people live near the mine.¹¹¹ For many years the inhabitants have reported SO₂ emissions from the roasting process. The emissions occur intermittently, and local residents experience it as sulphur clouds. From what the Council has learnt, sulphur clouds appear on average twice a week, and sometimes more, depending on the way the wind blows. The population claims that these sulphur emissions have become more frequent and intense than before.¹¹² The emissions are also reported to regularly reach the local primary school.

According to the residents, sulphur clouds cause breathing difficulties as well as sore and irritated eyes, affecting the elderly, young children and asthmatics in particular.¹¹³ Local doctors report that many babies develop respiratory problems from as early an age as 6 months.¹¹⁴ The population also claims that it is difficult to grow vegetables because of scorching. Moreover, they are concerned that the sulphur deposited on house roofs may seep into the water tanks installed to collect rainwater used for drinking.

It is common knowledge that concentrations of SO₂ in the air may cause severe respiratory disease, material damage (corrosion) and scorched vegetation.¹¹⁵ These are the same effects as those described by the population at Vatukoula.

The company acknowledges the formation of sulphur clouds, alleging that particular weather conditions make the clouds reach ground level.¹¹⁶ According to the annual report for 2005 the company has developed a "SO₂ complaint and roaster shutdown strategy".¹¹⁷ The concrete implications of this are not explained in any detail, and the issue is given no further attention in the annual report or in the environmental policy review. In a letter to its shareholders dated

¹¹⁰ Poni Ravula, CCF 2006: Communication with the Council; on file with the Council

¹¹¹ Mine workers and their families living in the following settlements at Vatukoula are adversely affected: Loloma, Loloma Rotuma, Matanagata, Newtown, Main Gate, Vunisina, Church Road and Narau barracks. They represent more than half the total workforce and counting their families, they make up around 90 per cent of an estimated population of approximately 4,000.

¹¹² Oxfam Australia 2004: Mining Ombudsman case report: *Vatukoula Gold Mine*, Poni Ravula, (CCF) 2006: Communication with the Council; on file with the Council. The residents report that they have to run inside and close windows and doors when sulphur clouds reach ground level.

¹¹³ See footnotes 110 and 112.

¹¹⁴ Interviews undertaken by Oxfam Australia Mining Ombudsman in 2005; on file with the Council. Poni Ravula, (CCF) 2006: Communication with the Council; on file with the Council.

¹¹⁵ Much research has been carried out on the environmental and health effects of sulphur dioxide emissions, for example related to the issue of acid rain.

¹¹⁶ Oxfam Australia 2004: Mining Ombudsman case report: *Vatukoula Gold Mine*, p. 20.

¹¹⁷ Emperor Mines Ltd 2005: *Annual Report 2005*, p. 13.

May 2004, the company rejects the criticism raised by Oxfam¹¹⁸: “*Emperor ensures that emissions from the roaster stack meet all regulatory guidelines. Further, in accordance with the Environmental Management Plans, there has been a 50% decrease in the addition of elemental sulphur into the roaster over the past three years through the utilisation of new technology.*”¹¹⁹ According to information received by the Council, the local population does not see the measures allegedly adopted by the company as contributing to pollution reduction. On the contrary, they report on more frequent emissions than before.¹²⁰

To the Council’s knowledge, the authorities have not established any requirements regarding SO₂ emissions. There are also indications that emissions from the roaster contain particles and heavy metals,¹²¹ but the company does not provide any information in this respect.

5.2.2 Pollution of rivers and drinking water

Information obtained by the Council shows that excessive spillage from the tailings dam into the Nasivi River is a common occurrence.¹²² Local media have also given such accounts: “*Many rivers and creeks in areas surrounding Vatukoula [have] changed colour and lost all aquatic life because of the dumping of waste by EGM [Emperor Gold Mines].*”¹²³

The company states that it has a monitoring programme for tailings disposal, water quality, and cyanide management. These reports are sent to the Department of Health, but are not accessible to the public. Consequently, there is no documentation available as to what substances are released into the river or how extensive the discharges are.

Previous investigations have described elevated levels of mercury and cadmium in the Nasivi River.¹²⁴ The company itself informs that tailings contain cyanide and arsenic. In 2003 Emperor’s operations were also discussed by the Parliament, revealing that: “*Government inspections and reports have periodically confirmed water and atmospheric pollution at Vatukoula. There have been cyanide traces in fish and water declared unfit for human consumption.*”¹²⁵ Local residents have contacted both the environmental authorities and the company to discuss water pollution, but have not received any response.¹²⁶

Emperor supplies Vatukoula’s population with drinking water from the Nasivi River. Without being filtered or purified, the water is conducted to residential areas. The Council has been informed that some 3,500 people are without access to clean drinking water and that most of them work for Emperor at the Vatukoula mine.¹²⁷ The company argues that it is not

¹¹⁸ Oxfam Australia 2004: Mining Ombudsman case report: *Vatukoula Gold Mine*.

¹¹⁹ Letter from Emperor to shareholders dated 11 May 2004; available at http://www.emperor.com.au/news/EMP_Shareholder_Update_110504.pdf.

¹²⁰ Ravula, Ponipate (CCF) 2006: Communication with the Council; on file with the Council.

¹²¹ Simtars Queensland 2004: *Ambient Air Quality Monitoring near Vatukoula Gold Smelter, for Emperor Gold Mining*; on file with the Council.

¹²² See footnote 120.

¹²³ Article in the *Fiji Times* 24 August 2005: *Gold Mine under Fire*; on file with the Council

¹²⁴ See footnote 123.

¹²⁵ Parliament of Fiji, Parliamentary Debates, The Senate, *Daily Hansard*, 20 March 2003, by Senator Atu Emberson-Bain; available at <http://66.249.93.104/search?q=cache:6EjNEjxayLYJ:www.parliament.gov.fj/hansard/viewhansard.aspx%3FhansardID%3D63%26viewtype%3Dfull+ESCAP+vatukoula&hl=no&ct=clnk&cd=6>.

¹²⁶ Oxfam Australia 2004, Mining Ombudsman’s case report: *Vatukoula Gold Mine*, p. 19.

¹²⁷ Ravula, Ponipate (CCF) 2006: Communication with the Council; on file with the Council.

responsible for providing clean drinking water to the local population and that it cannot afford to offer water treatment.¹²⁸

5.2.3 The company's response

Neither on its website nor in the annual report does the company address the accusations of environmental and health effects caused by the operation at Vatukoula. However, in a letter to its shareholders dated May 2004, written as a response to Oxfam's report on the mine, the company counters some of the allegations.

The company declares: "*Minimisation of its environmental impact is central to Emperor's operations. Emperor has developed a comprehensive Environmental Policy which is a public demonstration of its commitment to managing its operations in an environmentally responsible manner.*"¹²⁹

Furthermore, it announces that "*independent environmental audits of the company's operations have been conducted by internationally recognised companies. [...] Emperor's Environment Management System (EMS) conforms to ISO 14001 requirements and includes an Environment Management Plan and documented procedures for potential operational impacts of the mine.*"¹³⁰ This involves "*an objective understanding of the operations' environmental aspects and their impacts*", "*Objectives and Targets defining the environmental goals and the path towards achieving them*", and "*an environmental management system or programme defining how the objectives and targets are to be realized.*"¹³¹

The company also claims to meet all regulatory requirements for atmospheric emissions, without specifying what standards it complies with. Concerning effluents, the company declares that these are monitored daily. The Council, however, does not know what environmental requirements the company is obliged to meet in this respect.

The company denies that it is responsible for contaminating the Nasivi River through unsatisfactory tailings disposal practices. A newspaper article in the Fiji Times reveals that the company executives do not understand the accusations "*because they were very careful about protecting the environment.*"¹³²

6 The Council's assessment

The Council's task is to assess whether there is an unacceptable risk that the Fund through its ownership interest in DRD Gold may contribute to severe environmental damage, under the Guidelines, point 4.4, third bullet point, and in accordance with the interpretation of this provision presented in section 3.2 above.

Indisputably, the mining operation owned by DRD Gold is the cause of the environmental damage described in Chapter 4 of the present recommendation. The Council's point of departure is that DRD Gold has exercised and still exercises considerable influence over the

¹²⁸ See footnote 127.

¹²⁹ Letter from Emperor to shareholders, 11 May 2004.

¹³⁰ Emperor Mines Ltd 2005: *Annual Report 2005*, p. 12.

¹³¹ See footnote 129.

¹³² Fiji Times Online 28 August 2005: *EGM denies pollution accusation*; on file with the Council.

mining activities at Tolukuma and Vatukoula. In the Council's view, the restructuring of the company does not alter this.

Based on available documentation the Council will assess whether the environmental damage caused by the company is so severe that it constitutes a violation of the Guidelines. The evaluation is linked to the summary in section 3.2.

The first element in the assessment refers to the *scale of the damage and to what extent it causes irreversible changes*. The Council finds it probable that the riverine disposal near Tolukuma mine may lead to considerable and lasting environmental damage (see section 5.1.1). Moreover, the Council also deems it likely that the acid rock drainage from the waste rock dump will represent an increasing and substantial environmental problem in the future (see section 5.1.2). The Council therefore takes as its point of departure that the scale of the damage from the operation at Tolukuma is considerable and that there is an unacceptable risk of the resultant environmental damage being long-term and irreversible.

The Council also considers there to be an unacceptable risk that the pollution from the mining operations at both Tolukuma and Vatukoula may have substantial effects on *human life and health*. At the Tolukuma mine the pollution seems to have significantly deteriorated people's living conditions through the depletion of fish stocks that once were an important food source, loss of drinking water, and reduced harvests (see section 5.1.4). In the Council's view, the worries local residents have for their future health seem relevant, given the high values of arsenic and heavy metals found in the discharge and which also are detectable in water and sediment.

Furthermore, the Council finds that there is a considerable risk of DRD Gold inflicting severe and chronic health ailments on the local population at Vatukoula through the emissions from the mining operation (see sections 5.2.1 and 5.2.2). Even if the Council has not had access to concrete pollution level data, the reports from Oxfam Australia, numerous newspaper articles and information obtained by the Council from local NGOs in Fiji give a clear impression of a serious pollution situation, including both air and water, which has evolved over many years and may have a substantial and long-term impact on the environment as well as causing lasting health damage to the population.

The next element to be assessed is whether the company's practice violates *national law or international norms*. With regard to the mining operations in both Papua New Guinea and Fiji, DRD claims to comply with the authorities' environmental requirements. Nevertheless, one may question whether the company actually fulfils the conditions that the government has set for the operation at Tolukuma concerning discharge requirements and the obligation to provide safe water supply (see sections 5.1.1 and 5.1.4). To the Council's knowledge, in Fiji the company is not obliged to conform with any environmental requirements.

The Council would like to point out that the environmental requirements established by the authorities in these countries are either non-existent or significantly less rigorous than those applicable in, for example, Australia (Emperor's home country). Today Papua New Guinea and Indonesia are, as far as the Council knows, the only countries that allow riverine tailings disposal. The Council stresses that riverine disposal is internationally considered an unacceptable discharge method for mine waste, due to the environmental damage it

provokes.¹³³ On these grounds the Council assesses DRD's practice in Papua New Guinea as clearly in breach of international norms.

The authorities, in both Papua New Guinea and Fiji, have done little to enforce environmental regulations. This means that the consequences for the company of non-compliance with rules are relatively minor. Lax environmental requirements and deficient enforcement contribute to further enhance the risk of severe environmental damage as there is no system in place to prompt the reduction of damage caused by mining operations.

Moreover, the Council shall assess whether *the company has failed to act in order to prevent damage, including whether the omission is planned*. In the Council's opinion it does not seem as if the company has adopted measures that contribute to mitigate the damage to the natural environment, neither in Papua New Guinea nor in Fiji, despite undoubtedly being aware of the health and environmental impact of the mining activities.

The environmental damage resulting from riverine tailings disposal has been known for more than 15 years, and DRD's own environmental assessment of the Tolukuma mine in 2000 confirms that environmental damage could be considerable. To the Council's knowledge, the company has not taken significant steps to limit the damage even with an increase in the discharge of more than 70% since 2000.

The company's environmental reports from Tolukuma reveal that heavy metal run-off from the deposit sites may constitute a substantial environmental problem. DRD seems to have neglected this issue as well, and does not give an impression of having implemented measures to reduce the harmful effects. The Council finds that the environmental damage from the operation at Tolukuma and the company's failure to reduce the harmful effects represent, in themselves, an unacceptable risk of complicity in severe environmental damage and thus provide grounds for exclusion.

Furthermore, the Council deems the grounds for exclusion reinforced by the company's omissions related to the Vatukoula mine. The allegations against the company of poor environmental conditions and health damage among local residents have been known and reiterated for many years, but, as far as the Council knows, this has not prompted the company to implement concrete measures aimed at remedying the situation.

It seems as if the company on the whole chooses not to present scientific data to substantiate its assertions that the mining operation causes no severe environmental or health damage. Some surveys have indeed been conducted regarding the Tolukuma mine, but these have faced severe criticism for methodological weaknesses and are not, in the Council's opinion, conducive to a systematic overview and assessment of the environmental or health damage linked to the discharge. The Council is also aware that two independent surveys of the

¹³³ The World Bank no longer finances projects which make use of riverine tailings disposal. Neither does *The International Finance Corporation* accept this method unless specific discharge limits are observed, which in practice means that the effluent must be treated before being drained into water bodies. "The Extractive Industries Review" (EIR) from 2003 and the international project "Mining, Minerals and Sustainable Development" (MMSD) advise against riverine disposal because of the environmental damage it entails. EIR states: "Scientific evidence clearly demonstrates that this method of waste disposal causes severe damage to water bodies and surrounding environments... In practice, this technology is being phased out due to recognition of its negative consequences." The world's biggest mining company, BHP Billiton, has also declared that it will not use riverine disposal in new projects. Additionally, we refer to the Council's recommendation on the exclusion of Freeport McMoRan; available at www.etikkradet.no.

environmental and health conditions at Vatukoula were performed in 1981 and 1995 without being made public.¹³⁴ In 1995 the company (Emperor) succeeded in taking legal action to stop the report from being released. The company provides no information that may throw light on the environmental and health effects of the operation.¹³⁵ In the Council's view, the lack of environmental measures and information contributes to increase the risk of the Fund's complicity in severe environmental damage.

The Council regards the company's practice in Papua New Guinea and Fiji as a demonstration that DRD Gold systematically and over many years has failed to take steps aimed at reducing or preventing environmental damage despite the company's awareness of the impact.

Finally, the Council must assess whether *the company's unacceptable practice may be expected to continue in the future*. The Tolukuma mine has an operating concession until 2012, with the possibility of a 10-year extension. DRD informs that it plans to double the production by 2012. In the annual report for 2005 the company states that alternatives to riverine disposal may be considered once the production increases.¹³⁶ However, the Council does not find any concrete indications that such alternatives actually are being planned.

In 2004 Fijian authorities granted another 21 years of operation at Vatukoula. According to the company's website, here, too, investments and production increases are being planned during the coming years, but there are no signs here either that steps will be taken to reduce the pollution from the mine.

The Council therefore concludes that the company's unacceptable practice in all probability will continue.

6.1 Summary

Based on the documentation it has had access to, the Council finds that the Fund's ownership interest in DRD Gold implies an unacceptable risk of complicity in extensive and irreversible damage to the natural environment. According to the Council's assessment the company's practice of riverine disposal is in breach of international norms, and the question may be raised whether the company violates national environmental regulations as well. The Council finds that the company for many years has been aware of the serious health and environmental damage its operations have caused, but despite this the company has failed to put any measures into effect aimed at reducing the damage. Considering the plans presented by the

¹³⁴ In 1981 the *UN's Economic and Social Commission for Asia and the Pacific* prepared a report on the environmental situation in the Vatukoula area, describing environmental conditions as very grave and recommending that Emperor's concession in Vatukoula should be withdrawn. The report was never made public. In 1995 the so-called GP Lala Commission was appointed by the Fijian Parliament to investigate Emperor's mining activity at Vatukoula. The commission submitted the paper *"Inquiry into the Vatukoula trade Dispute report (Parliamentary Paper no 38 of 1995, Suva, Fiji)*. The report was never discussed in Parliament because Emperor was granted a judicial ruling ordering the report not to be made public; see for example Oxfam 2004 (footnote 126) and the record of the parliamentary debate (footnote 125). Nevertheless, the report has been quoted in several contexts, one of the reasons being that it claims Vatukoula is a disaster and that no improvements have been made since the last time the authorities examined the case – 14 years ago.

¹³⁵ According to the company, *"regular environment audits and reviews to monitor performance"* are carried out. The company claims to have a monitoring programme for daily sampling of effluent and water quality, including drinking water quality, but does not mention whether there is a similar programme for air emissions. Emperor's environmental policy is available at <http://www.emperor.com.au/abouteml/corporate.html#epolicy>.

¹³⁶ DRD Gold 2005: *Annual Report 2005*, p. 19.

company regarding investments and production expansion, there is reason to believe that the company's unacceptable practice will continue in the future.

7 Recommendation

The Council will, after this assessment of the contents of the allegations against DRD Gold Ltd and in light of the Ethical Guidelines, point 4.4, recommend that the company be excluded from the investment universe of the *Government Pension Fund - Global* owing to an unacceptable risk of complicity in present or future severe environmental damage.

Gro Nystuen
Chair

(sign.)

Andreas Føllesdal

(sign.)

Anne Lill Gade

(sign.)

Ola Mestad

(sign.)

Bjørn Østbø

(sign.)