Gold Fields

Water Disclosure

CDP 2012

June 2012

Report compiled by:

PROMETHIUM CARBON

CDP Water Disclosure 2012

Introduction

Question Pathway for the Introduction

0.1 Introduction

Please give a general description and introduction to your organization.

Gold Fields is one of the world's largest unhedged producers of gold with attributable, annualised production of 3.5 million gold equivalent ounces from eight operating mines in Australia, Ghana, Peru and South Africa. Gold Fields also has an extensive and diverse global growth pipeline with four major projects in resource development and feasibility. Gold Fields has total attributable gold equivalent Mineral Reserves of 80.6 million ounces and Mineral Resources of 217 million ounces.

Gold Fields is listed on the JSE Limited (primary listing), the New York Stock Exchange (NYSE), NASDAQ Dubai Limited, Euronext in Brussels (NYX) and the Swiss Exchange (SWX).

Gold Fields is responsible for mining and concentrating the gold and copper at the operations, from where it is sent to be refined further at various refineries. These refineries are not under the sole ownership of Gold Fields.

The location and nature of Gold Fields operations is as follows:

The South African operations are all underground mines:

1. KDC West & KDC East (26° 24'S and 27° 36'E)
2. Beatrix (28° 15'S and 26° 47'E)
3. South Deep (26º 25' S and 27º 40' E)

The Ghanaian operations are all open pit mines:

1. Tarkwa (5° 15' N and 2° 00' W)
2. Damang (5° 11'N and 1° 57'W)

The Australian operations are a combination of underground and open pit mines:

1. St Ives (31° 12'S and 121° 40'E)
2. Agnew (27° 55'S and 120° 42'E)

Cerro Corona is an open pit copper and gold mine located in Peru (6° 45'S and 78° 37'W)

Annual Report:

http://www.goldfields.co.za/reports/ar_dec_2011/index.php

Company Revenue for the period of 01 Jan 2010 – 31 Dec 2011:

R41,877 million

ISIN number:

ZAE000018123

CUSIP number:

38059T106

SEDOL number:

6280215

0.2 Reporting Year

Please state the start and end date of the year for which you are reporting data.

Enter Periods that will be disclosed
01/01/2011 To 31/12/2011

0.3: Reporting boundary

Question 0.3: Please indicate the category that describes the reporting boundary for companies, entities, or groups for which water-related impacts are reported.

Companies over which financial control is exercised- per consolidated audited financial statements

Question 0.4: Are there any geographies, facilities or types of water inputs/outputs within this boundary which are not included in your disclosure?

No

Water Management and Governance

1.1: Does your company have a water policy, strategy or management plan?
Yes

1.1a: Please describe your policy, strategy or plan, including the highest level of responsibility for it within your company and its geographical reach.

Different Sustainable Development policies per region as regulatory compliance is different per region.

Geographical reach	Description of policy, strategy or plan (2,400 characters)	Position of responsible person
South African Region	For the South African Region, a **water protocol** has been approved (February, 2011) with the purpose of providing an illustration of the desired end state for the Gold Fields' operations. The water protocol combines the ***water strategy*** with implementation principles, implementation processes, background information on the water issues and water regulatory framework. Gold Fields' water strategy for the South African region is incorporated in the long term Sustainable Development vision for the area. This vision is: *'to maintain our license to operate within a low carbon economy and to close all our operations with self-sustained and integrated land end uses, without residual liability.'* The following **mechanisms** for achieving this vision have been identified: 1. *Identifying and implementing a long-term sustainable solution for legacy issues in the region.* 2. *Ensuring clean water and a healthy river system.* 3. *Developing a regionally integrated land management plan.* Water management plays a central role in the implementation of the vision. The implementation process should be legally compliant and safeguard Gold Fields' social license to operate. The following additional implementation principles have been identified; • Safeguarding Gold Fields' reputation. • Following a regional appropriate approach • Active engagement of all relevant stakeholders. • Focus on community involvement. • Building capacity through strategic partnerships, alliances and coalitions. • Continual improvement.	**Other**: Regional Sustainable Development Vice President

	• Economies of scale. • Sustainable closure of operations. The following 4 water related environmental objectives, focussing on water management have been defined and will be implemented in the long term: 1. Zero discharge of process water. 2. Potable water quality discharge of fissure water. 3. Uranium (and other heavy metals) discharges elimination. 4. Minimisation of secondary impacts. Appropriate technical solutions and effective stakeholder engagement are seen as key success factors to the implementation of the water strategy. All South African operations are certified to comply with the International Cyanide Management code (description of code can be found below) and are ISO 14001 certified.	
West African region	In addition to complying with national regulations and being ISO 14001 certified, both Tarkwa and Damang have been certified to comply with the International Cyanide Management Code. *The International Cyanide Management Code is a code of best practice. This code is a voluntary industry program for gold mining companies which focus on the safe management of cyanide and cyanidation mill tailings and leach solutions. Certification is done by an independent third party, which audits compliance with the specific requirements of the code.* Through compliance with this code, cyanide spillage and pollution of water with cyanide risks are reduced. At the West African operations, continuous focus is on reducing the amount of (non-toxic) discharges into the environment. The mineral deposit that is mined is inert and therefore there is no risk of Acid Mine Drainage. However, the nature of the mining operation can result in silting of surrounding areas.	Regional Environmental Manager
Australian region	Both Australian operations have developed Water Strategies to make sure that Gold Fields complies with all relevant water related regulations and maintains its licenses. Changed regulations or conditions are incorporated into the strategy. For	Environmental Manager at the mines (Agnew and St. Ives)

	example, Agnew as of 2011 has a renewed Groundwater Licence. The Groundwater Licence has brought about new conditions for the Agnew water management strategy. Changes include installation of a cumulative water meter and the condition that ground water monitoring summaries should be compiled each year and that if a noticeable drop in the aquifer occurs, the Department of Water will be notified. St Ives updated its Environmental Licence in 2011 (to number 8485). Following this licence's requirements, St Ives must include a site water balance and water monitoring program within the operating strategy. For each dewatering operation, water flows, volumes and abstraction and discharge points will be reviewed annually. Surface water will be managed through the use of control dams, dewatering and removal of sediments before releasing into Lake Lefroy. Furthermore, both strategies specify that raw water consumption should be reduced, for example through; increased recycling of water, regular checking for water leaks, identification of new opportunities to increase water use efficiency and sharing of any additional unwanted water with other users of water, where practicable. Both Australian operations are certified to comply with the International Cyanide Management Code and ISO 14001.	
South American region	Water management is of high importance at Cerro Corona. This is due to a history of poor environmental management by other mining companies in the Hualgayoc region, which has led to ongoing complaints by communities with regard to water pollution. As a result Gold Fields is involved in a joint water monitoring programme led by the National Water Authority. In addition to ensuring compliance with National Standards Cerro Corona's water strategy adopted and implemented the following commitments; - Employment of a closed circuit water system. Discharge of water from the tailings storage facility is required in case of excess water in the tailings storage facility due to heavy rainfall events. - Use of groundwater, rain and domestic and industrial waste water only; no water is withdrawn from local rivers. Rain and wastewater is stored in a controlled way in	Environmental Manager

	the tailings dams. - Continuous control and modelling of volumes of water stored in the tailings storage facility using water balances, bathymetries, weather modelling and forecasting. - Water compensation to the Hualgayoc basin, using treated water from the mining pit. - Water compensation to the Tingo River, using treated water from the tailing storage facility. For this purpose a new treatment system is going to be implemented in order to comply with new National Regulations for effluent discharge and water quality standards in rivers (to come into effect in 2014 and 2015 respectively). - Implementation of diversion channels for runoff water control. - Continuous government verification of downstream water quality. As Acid Rock Drainage (ARD) has been recognized as a potential risk at Cerro Corona, a comprehensive lifecycle risk mitigation strategy has been developed. Cerro Corona is OHSAS 18001 and ISO 14001 certified and became compliant with the International Cyanide Management Code in 2011. Gold Fields appointed an independent tailing dam review board, which consists of tailing dam experts, to monitor the tailing dam at Cerro Corona.	

1.1b: Does the policy, strategy or plan specify water-related targets or goals?
Yes

1.1c: Please describe these water-related targets or goals and the progress your company has made against them.

Geographical reach	Category of target or goal type	Target/goal description	Progress against target or goal
South African region	Quality of discharges	It is part of Gold Fields vision to 'ensure clean water and a healthy river system'. In the short term this target is described by complying with current	Gold Fields South Africa is compliant with National Water Regulations. Though environmental, water related, incidents took

		legislation. In the long term the following objectives / targets have been set: 1. Zero discharge of process water. 2. Potable water quality discharge. 3. Uranium (and other heavy metals) elimination from discharged water. 4. Minimisation of secondary impacts.	place in 2011, appropriate remedial action was taken. No fines were issued to Gold Fields for breaches in water management.
West African region	Quality of discharges	Reduce the amount of non-toxic suspended solid discharges into the environment.	A water clarification plant has been installed at Tarkwa. Discharge quality is planned to be further improved through the installation of another clarification plant. The construction of a water treatment plant is being considered.
Australian region	Absolute reduction	Reduced water consumption through increased water recycling and water efficiency measures within the operations. Key performance indicators are currently being developed. Based on historical performance of these key performance indicators, targets will be set.	The amount of water withdrawn in Australia was reduced in 2011 compared to 2010 by approximately 30%.
South American region	Absolute reduction	Cerro Corona describes minimization of fresh water consumption as a main objective. This objective should be achieved through maintained wastewater and rainwater storage in tailing dams and continued recirculation to	Cerro Corona's water usage is expected to increase in the coming years, as the company is still expanding this mining operation. However, Cerro Corona consumes only 17% of the water it is permitted to use under

		the concentrator plant.	its license. The company strives to use the minimum amount of water, based on best water management practices.
South American region	Quality of discharges	The Peruvian Ministry of Environment has announced new water quality and liquid effluent regulations. The new effluent regulation will come into effect from October 2014 and the water quality regulation from December 2015. A new water treatment system will be implemented at Cerro Corona to comply with these regulations	This target will only come into effect in 2014. From then, the progress on this target will be reported on.

1.2: Do you wish to report any actions outside your water policy strategy or plan that your company has taken to manage water resources or engage stakeholders in water-related issues?

Geographical reach	Type of action	Description of action and outcome
South African Region	Direct operations	Liquid Gold is Gold Fields' key initiative in relation to water management in the South African Region. The Liquid Gold Project focuses primarily on achieving a technical solution for the treatment of good quality fissure water and contaminated process water to produce water of potable quality. During 2011, a pre-feasibility study was completed and an environmental license obtained. A detailed Feasibility study will commence in 2012.
South African Region	Other: Research and Development	Gold Fields has commissioned research and is developing technologies for treatment of polluted mine water. ASTER$_{TM}$ is a biologically-based process, which removes cyanide and thiocyanate from residue streams after the leaching process. This offers important benefits in terms of environmental stewardship, water management, efficiency and safety. Gold Fields is examining the potential application of this process in both Ghana and Peru.
South African Region	Transparency	Gold Fields discloses on a regular basis information related to its operations and associated impacts. Water related information is reported on in, amongst others, the company's Annual Reports, Sustainability Reports, the Dow Jones Sustainability Index and Water Disclosure Project. Through transparency, Gold Fields aims to increase trust in Gold Fields' as a company and therefore strengthen its social license to operate.
South African Region	Collective action	Gold Fields was an active participant in the formation of the Mining Interest Group (MIG), which represents the industry in the steering committees set up by government to deal with legacy issues, including water related issues, in the region. The MIG engages with stakeholders and carriers out monitoring of water in the Wonderfonteinspruit region. Based on the successful interaction of the MIG with local government, external consultants have been appointed to develop an action plan to help remediate the Wonderfonteinspruit. Gold Fields is actively involved in this process through the MIG.
West African Region	Community engagement	Gold Fields has established a water and sanitation committee (WATSAN) in Ghana with the mandate to increase local community access to potable water, educate local people on hygiene and sanitation and to train local people to maintain the established water infrastructure. Community engagement has triggered changes and actions within both the community and the company.

		In 2011, six Small Town Water Supply (STWS) programmes were implemented as part of the work of the WATSAN committee. These programmes focused on the construction of deep boreholes and overhead tanks for local communities. Through community engagement, amongst others on water related issues, Gold Fields' aims to maintain a standing relationship with its surrounding communities and thereby maintain its 'social license to operate'.
Australian Region	Direct operations	Process water for Australian operations used to be obtained from boreholes. In order to have a more secure supply, both mines have started to diversify their supply sources. For example, Agnew is sourcing groundwater from a nearby decommissioned open pit, while St Ives is using water from a freshwater dam. In 2011, St Ives commissioned a detailed study on the future viability of its current bore fields – with particular focus on future consumption patterns and alternative sourcing. Agnew received in 2011 a license authorising the construction of a new bore field in a location known as the 'Mosquito Well Area'. These actions anticipate improving water supply security.
Australian Region	Direct operations	In 2011, trials of solar desalination of the Thunderer Pit water were completed at St Ives. The purpose of the project is to improve the water quality in the pit, without increasing conventional energy usage.
South American Region	Transparency & community engagement	Gold Fields' Cerro Corona operations implemented a comprehensive water monitoring process. This programme is managed by the National Water Authority and provides assurance to local communities on water quality. The quality of these samples are tested externally every six months. In addition, Gold Fields requested an external and independent study on water quality in downstream areas, as well as precautionary monitoring at two springs close to Cerro Corona. Through this external, independent verification of water samples, Gold Fields' provides transparency on its impacts on surroundings to local communities. The intended outcome of these actions is to maintain a good reputation and a continued social license to operate.
South American Region	Collective action	A comprehensive water monitoring process has been put in place by Gold Fields in cooperation with water consumers, the regional director for agriculture and the local water authority. Through collective action and the involvement of independent parties, such as the National Water Authority (which leads the programme), the quality and trustworthiness of the programme is increased. The outcome of collective action on a water monitoring programme is increased quality and trustworthiness of the results and therefore effectiveness of the programme.
Other: Peru, Chucapaca exploration	Supply Chain and Watershed Management	The Gold Fields-Buenaventura JV, is planning to fund the construction of a 30 Million m3 water reservoir at its Chucapaca growth project. Of this water, 20 million m3 is for local use in agriculture, etc. The remaining 10 million m3 will be sold to the Gold Fields JV. The income created from these sales will be used to maintain the water reservoir's

		infrastructure and reduce the costs for the users of the 20 million m3. This water reservoir will be built before the mine starts operations, following Gold Fields commitment to take care of water issues before starting to mine. This project will supply the Chucapaca operation with the required water, as well as improve living conditions for local communities and thereby strengthen its social license to operate.

Risk indicators - operations

2.1: Are any of your operations located in water-stressed regions?
Yes

2.1a: Please specify the method(s) you use to characterize water-stressed regions.

Method used to define water stress	Please add any comments here:
World Business Council on Sustainable Development (WBCSD) Water Tool	**Mean annual relative water stress index** has been used. This index compares the total water availability to total water use (domestic, industrial and agricultural use).

2.1b: Please list the water-stressed regions where you have operations and the proportion of your total operations in that area.

Country	Region within country	Proportion of operations located in this region (%)
South Africa	Both the Freestate, as well as the Gauteng based operations are in areas that experience physical water stress.	47% (C2011)
Australia	Western Australia	18% (C2011)

2.2: Are there other indicators (besides water stress) which you wish to report which help you to identify which of your operations are located in regions subject to water-related risk?

Yes

2.2a: Please list the regions at risk where you have operations, the relevant risk indicator and proportion of your total operations in that area.

Country	Region within country	Proportion of operations located in this region (%)	Indicator
Peru	Hualgayoc Region	10%	**Economic water scarcity.** Economic water scarcity occurs when low water supply is caused by inadequate water management practices due to lack of financial resources or capacity.
Ghana	South Ghana	Tarkwa & Damang =25%	**Economic water scarcity.** Economic water scarcity occurs when low water supply is caused by inadequate water management practices due to lack of financial resources or capacity.

2.3: Please specify the total proportion of your operations that are located in the regions at risk which you identified in questions 2.1 and/or 2.2.
100%

2.4: Please specify the basis you use to calculate the proportions used for questions 2.1 and/or 2.2.

Basis used to measure percentage	Please add any comments here
Production volumes	Production contribution is a percentage of overall ounces produced.

Supply chain

2.5: Do any of your key inputs or raw materials (excluding water) come from regions subject to water-related risk?
Yes

2.5a: Please state or estimate the proportion of your key inputs or raw materials that come from regions subject to water-related risk.

Inputs	Proportion of material that comes from region at risk (%)	Unit for calculating percentage	Regional information or further comments
Timber	0%	Volume or weight of material purchased	Timber is used in South African operations and obtained from KZN and Mpumalanga which are not water stressed.
Cyanide	17%	Volume of weight of material purchased	South African operations obtain their cyanide from Sasol in Sasolburg, which is in (according to the Mean Annual Relative Water Stress Index) a water stressed area.
Electricity	89%	Volume of weight of material purchased	South African and Australian electricity utilities have power plants in water stressed areas.
Diesel	2%	Volume of weight of material purchased	South Deep (South African region) buys diesel from Sasol in Sasolburg, which is located in a water stressed area.

Risk assessment - operations

3.1: Is your company exposed to water-related risks (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?
Yes

3.1a: Please describe
(i) The current and/or future risks to your operations,
(ii) The ways in which these risks affect or could affect your operations before taking action,
(iii) The estimated timescale of these risks, and
(iv) Your current or proposed strategies for managing them.

Country	Risk Type	Timescale	Potential business impact	Risk management strategies
South Africa	Physical: flooding	1-5 years	Flooding of mines could result in: o Contamination of shallow ground water sources o Flooding of urban areas o Increased seismic activity o Safety risk to mine workers This could result in payment of liabilities and disruption of production.	The risk of mine flooding is currently being managed and is expected to be managed in the future through water pumping, to separate mine water from fissure water. Clean water is released into the natural environment, while contaminated water is cleaned to required levels and measurement before discharge.
South Africa	Physical: Declining water quality	Current	Decanting of Acid Mine Drainage water could cause: o Serious negative ecological impacts o Regional impacts on major river systems This could result in payment of liabilities.	This risk is managed through mine water pumping, cleaning and discharge. Gold Fields has got a monitoring programme in place to continually check the volume and quality of water that is released into the natural environment. In addition other relevant actions were taken, such as: - Review of emergency scenarios in the event of flooding. - Active participation in the Mining Interest Group. - Expansion of a continuous water monitoring and analysis system across the West Wits catchment area. - Continuous support of local water forums, enhanced engagement with environmental

				monitoring groups and active cooperation with external consultants. This risk is expected to remain relevant to Gold Fields in the future, even after mine closure. To address long term acid mine drainage, a feasibility study on the Liquid Gold Project is expected to commence towards the end of 2012.
South Africa	Physical: Other - tailing dam stability	1-5 years	In the case of extreme weather events (cyclonic rainfall), tailing dams are at risk of collapse. A collapsed tailing dam will have an environmental impact and might, depending on its location, damage infrastructure and cause casualties.	A centralized tailings storage facility, designed to withstand 1 in 200 year rainfall events, was completed in 2011 and the first tailings deposited. The freeboard was increased in 2011 on all Gold Fields' South African tailing dams to mitigate against flash flood risks.
South Africa	Physical: Increased water stress	1-5 years	South African operations are situated in areas which experience medium water stress. Increased water stress might disrupt water supply. Water shortages might disrupt operations.	This risk is managed through increased water efficiency, water recycling and water storage at the operations. The Liquid Gold Project is also envisaged to manage this risk in the future.
Peru	Physical: other – Tailing dam stability	Unknown	In the case of extreme weather events (cyclonic rainfall) and seismic events, tailing dams have a risk of acid rock drainage and in the worst case collapse. A collapsed tailing dam will have an environmental impact and might, depending on its location, damage infrastructure and cause casualties.	Gold Fields appointed an independent review board, consisting of international tailings dam experts, to monitor the tailings dam at Cerro Corona. This board meets four times per year and reviews construction of the dam wall, filling procedures, stability, water management and conducts site visits to investigate whether the tailings dam is hydrological contained. The tailing dam at Cerro Corona has been designed to withstand seismic events.
Peru	Physical: other - Acid Mine Drainage	current	Cerro Corona actively manages the Acid Rock Drainage (ARD) risk. ARD could cause pollution of local rivers and streams and probably result in high	The ARD risk is currently managed in the following ways: - The implementation of a full lifecycle risk mitigation strategy. - Continuous and

			cleaning costs and payment of liabilities.	comprehensive leach testing. - The integration of relevant design measures into its Tailings Storage Facility. - Integration of ARD management into the mine's environmental management systems. This risk is expected to require continuous management in the future.
Australia	Physical: Increased water stress or scarcity	1-5 years	Water shortages might disrupt production capacity.	Australian operations are situated in water stressed areas. Process water for Australian operations used to be obtained from boreholes. In order to have a more secure supply, both mines have started to diversify their supply sources. For example, Agnew is sourcing groundwater from a nearby decommissioned open pit, while St Ives is using a freshwater dam. In 2011, St Ives commissioned a detailed study on the future viability of its current bore fields – with particular focus on future consumption patterns and alternative sourcing. Agnew received in 2011 a license authorising the construction of a new bore field in a location known as the 'Mosquito Well Area'
Australia	Physical: flooding	Current	Employee health risk when this happens while working underground. Furthermore it is likely that operations will be disrupted	Cyclonic events might interrupt mining operations and process and create an employee health risk. St Ives is incorporating a storm water management plan to manage this risk.
Australia	Physical: Declining water quality	Current	Gold Fields has identified the early development of an underground salt plume at a Tailing Storage Facility created by a previous mine owner at Agnew.	The risk of the underground salt plume further developing, spreading and contaminating underground water is currently being managed through commencement of a study to inform the additional actions that should be taken.

Ghana	Physical: Increased water stress or scarcity	Current	During the dry season, water shortages have been experienced at the Ghanaian operations. If water shortages are experienced over longer periods of time, this could cause disruption of operations	This risk is being managed through increased recycling and water efficiency practices. Furthermore, new water balances are being developed which will model the entire mine (instead of aspect specific) and differentiate between seasons.
Ghana	Physical: declining water quality	Current	The nature of the mining operation can result in silting of surrounding areas. Such pollution could cause breakdown of relationships with the local communities and eventually weakening of the company's social license to operate.	A water clarification plant has been installed at Tarkwa with the purpose of removing suspended solids in the water. Discharge quality is planned to be further improved through the installation of another clarification plant. The construction of a water treatment plant is being considered.
Other: Global	Regulatory: increased difficulty in obtaining operation permit	6-10 years	Conditions to renew or obtain water use license have been found to become stricter at all operations. Stricter license conditions will increase the water cost for the company. If a water license can't be obtained or renewed, this might either increase operational costs (water has to be purchased elsewhere) or potentially close down operations which don't have access to alternative water resources.	By complying with regulations, supporting local communities in clean water access (as is done in Ghana and Peru) and continuously showing its commitment to minimize its impact on water resources, Gold Fields proves to take sustainable water management seriously. This reputation and commitment increases the likelihood for Gold Fields to obtain new or renewed water licenses.

3.2: What methodology and what geographical scale (e.g. country, region, watershed, business unit, facility) do you use to analyze water-related risk across your operations?

Risk Methodology	Geographical scale
Integrated multi disciplinary risk management process. This system is based on the risk management requirements of King III code on corporate governance and the ISO 31000 International guideline for risk management.	**Facility**

Supply chain

3.3: Do you require your key suppliers to report on their water use, risks and management?

No

Evaluation of the means to undertake screening of suppliers is currently taking place. This screening will focus on human rights components, but is expected to also include water indicators.

3.4: Is your supply chain exposed to water-related risks (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?

Yes

3.4a: Please describe
(i) the current and/or future risks to your supply chain,
(ii) the ways in which these risks affect or could affect your operations before taking action,
(iii) the estimated timescale of these risks, and
(iv) your current or proposed strategies for managing them.

Country	Risk Type (to supplier)	Potential business impact	Timescale	Risk management strategies
Ghana	Physical: increased water stress or scarcity	Electricity in Ghana is mainly derived from hydropower. Due to a drought in 2009, reduced electricity amounts were generated in the Volta Delta. This caused operation disruption at the Ghanaian operations and associated loss of income.	Current	In response to this shortage back up diesel generators were installed. Additionally, the Ghanaian operations started investigating the potential of alternative energy sources such as biomass waste to energy.
South Africa	Physical: increased water stress or scarcity	Rand Water supplied 15,816 ML of water, mainly through the municipalities, to Gold Fields operations in 2011. Two risks have been identified related to the water supply from Rand Water: 1. According to a recent news article ('Eskom, Sasol sound warning over water supply', 18 March 2012, Mail & Guardian), one big drought in the Vaal River catchment area over the next eight years could jeopardise the region's agricultural and industrial output. The article continues to state that 'particularly vulnerable would be large industrial	1-5 years	Increase water efficiency, water recycling and water storage capacity. The Liquid Gold Project is also envisaged to manage this risk in the future, by producing potable water from mining water.

		water users, agriculture and municipalities located in and around the country's economic heartland, Gauteng'. 2. As there is currently not enough water available to fulfil demand from industry, domestic users and the agricultural sector, Rand Water sources part of its water from the Orange River, Tugela River and the Lesotho Highlands. Though these supply schemes have been functioning well, and are protected through (international) agreements, it is perceived as a risk when water is not available locally but needs to be sourced externally and reliance is on third parties fulfilling agreements and managing its water sources professionally.		
Other: global	Physical: increased water stress or scarcity	Gold Fields recognizes water stress or scarcity to be a risk which might impact its supply chain. Disruption is most likely to occur in water stressed areas for water intensive products. Examples of such products which are expected to have a relative high exposure to water stress risk: - Electricity generated in South Africa - Electricity generated in Australia - Cyanide production in South Africa	1-5 years	Currently, the potential and likelihood of Gold Fields supply chain being disrupted by water stress is still being investigated. A system is being developed that will ask suppliers to disclose their water use and dependency. Supply alternatives will be determined for suppliers / products which have a high risk exposure.
Other: global	Regulatory: higher water prices	Water is increasingly recognized as a valuable commodity, partly caused by increased water stress experienced worldwide. Water prices have increased significantly over the past few years and are expected to continue increasing. Higher	1-5 years	By encouraging good water management practices, partly through setting an example, Gold Fields aims to decrease the impact of increased water prices on its suppliers and its product

		water prices for Gold Fields' suppliers are expected to cause increased product prices, which will increase Gold Fields' operational costs.		prices.

Impacts to business

Question 4.1: Has your business experienced any detrimental impacts related to water in the past five years?

4.1a: Please describe
(i) These detrimental impacts,
(ii) Their financial impacts, and
(iii) Whether they have resulted in any changes to company practices.

At Tarkwa, the Teberebie pit was flooded 6 times in 2011 (in 2010 flooding of this pit also occurred). Mining activities were halted during each event for the pits to be dewatered and cleaned up. A total of 161,359 budget tonnes of ore was therefore not mined. At an average gold concentration of 0.03 ounce of gold/tonne ore, a total of approximately 5,000 ounces was not mined as a result of the floods. At an average gold price (during 2011) of R10,642/ounce, income was reduced by R53.2 Million. At an average Notional Cash Expenditure of 39%, a profit of approximately R32.5 Million was lost. An additional 4 high lift pumps and accessories were installed, at a total cost of R6.7 Million, to manage this risk.

Low rainfall in Volta River catchment area in Ghana reduced hydro power availability in 2009. To compensate for reduced power availability, on-site diesel generators were installed, which caused diesel consumption to be increased by 250%. The financial implications of this event are mainly related to the capital cost required to buy diesel generators and the cost of operating the diesel generators. To produce electricity with the diesel generator is approximately R1.6/kWh more expensive than electricity purchased from the grid.

In 2010, increased rainfall in the Gauteng region in South Africa caused increased water decanting, which required additional pumping (therefore increased energy costs) at #10 shaft at KDC East mine. For this specific shaft, pumping requirements increased with approximately 8 ML/day with associated costs of R27,200/day. Except for additional pumping, there is nothing else the company can do to manage this water related risk.

Approximately 57 Ml/day of extraneous water is pumped daily from the KDC-East workings. The bulk of the water, an average of 40 Ml/day, is currently abstracted from Libanon 10 Shaft. This water is clean dolomite water that meets the Class I water of the Department of Water Affairs (DWA) guidelines. There is a risk of contaminated water in the area (from rivers, dams, neighbouring mines and tailings dams) to affect the quality of this water, due to the interconnective nature of the geology. This has been observed in 2011 and reported as an incident to the Department of Water Affairs. Water monitoring frequency at the KDC-East mine was increased during the time that water quality was found to have been impacted.

Opportunities

5.1: Do water-related issues present opportunities (current or future) that have the potential to generate a substantive change in your business operation, revenue or expenditure?

Yes

5.1a: Please describe (i) the current and/or future opportunities, (ii) the ways in which these opportunities affect or could affect your operations, (iii) the estimated time scale, and (iv) your current or proposed strategies for exploiting them.

Country / geographical area	Opportunity description	Timescale (years)	Potential business impact	Strategy to exploit opportunity
South Africa	The Liquid Gold Project was initiated in 2008, and focuses primarily on achieving a technical solution for the treatment of good quality fissure water and contaminated process water to produce water of potable quality. By-products generated during the water treatment process would be utilized in secondary processes, such as being sold-off as fertilizer feedstock. In the long term the water treatment process should provide a sustainable, institutional solution in the form of a water utility that can focus on zero discharge from the mines with managed closure liabilities with respect to water.	1-5 years	Additional source of income (potable water), reputational advantage, reduce liabilities.	During 2011, a pre-feasibility study was completed and an environmental license obtained. A detailed Feasibility study will commence in 2012.
Australia	In 2011, trials of solar desalination of the Thunderer Pit water were completed at St Ives. The purpose of the project is to clean the water in the pit, without increasing conventional energy usage. Agnew plans to treat salty ground water and transform it into potable water for employees. Both these projects are seen	Current	Reduce environmental liability, reputational advantage, water supply diversification	Solar desalination trials were completed. A decision to upscale the project is currently awaited.

	as opportunities to the company to increase environmental sustainability, diversify its supply options and to be part of the development of relatively new technologies.			
Peru	The Gold Fields-Buenaventura JV, is planning to fund the construction of a 30 Million m3 water reservoir at its Chucapaca growth project. This project is envisaged to supply local agriculture with 20 million m3 of water and the remaining 10 million m3 of water to be sold to the Gold Fields JV. The income created from these sales will be used to maintain the water reservoir's infrastructure and reduce the costs for the users of the 20 million m3.	1-5 years	This project will supply the Chucapaca operation with the required water, as well as improve living conditions for local communities and thereby strengthen its social license to operate.	Gold Fields is currently investigating the potential of this project.

Managing trade-offs between water and carbon emissions

6.1: Has your company identified any linkages or trade-offs between water and carbon emissions in its operations or supply chain?

Yes

6.1a: Please describe the linkages or trade-offs and the related management policy or action.

Linkage or trade-off	Policy or action
Linkage: through the implementation of this project not only energy (and therefore carbon emissions) but also water usage is reduced.	Energy efficiency in chilled water systems at underground operations. Mine cooling at underground operations is applied through chilled water which is pumped down shafts. An increase in energy efficiency of this system results in an associated reduction of chilled water requirements. Systems like Pelton wheel turbines and 3 chamber pipe feeder systems recover energy and reduce water consumption. A 3 chamber Pipe System is planned to be implemented at KDC-West Shaft

	#1 and has been implemented in 2011 at KDC-West Shaft #5.
Linkage: through the implementation of this project not only energy (and therefore carbon emissions) but also water usage is reduced.	<u>Switch from water to ice for cooling purposes at underground operations.</u> Traditionally, chilled water is pumped down shafts to supply cooling to underground workings. All water pumped down the shaft must be pumped out of the mine again at a high energy expense. A possibility to reduce this energy use entails the replacement of chilled water with ice. As the amount of energy carried down the shaft with ice is significantly more on a mass basis than water, the use of ice significantly reduces the amount of water that needs to be pumped out of the shaft again and thereby reduces the energy consumption of the mine.
Linkage: through the implementation of this project not only renewable energy will be generated (and therefore carbon emissions reduced) but also water cleaning facilitated.	<u>Renewable Energy</u> The Driefontein renewable energy project is currently in feasibility stage and proposes the establishment of energy crops (either fast growing grasses or trees) at the Driefontein property. This biomass will be used in energy technologies for the generation of electricity, while cleaning the soil from heavy metals, providing work to local communities and reduce emissions associated with conventional electricity generating technologies. Part of the pumped mine water will be used at the energy plantation to increase growth of the energy crops, while at the same time cleaning the water. For this reason, phyto remediating crops, with the potential to incorporate heavy metals and other pollutants into its structure, will be used. These pollutants can be extracted from the fly ash after combustion has taken place.
Linkage: by supplying waste water to the areas of land being rehabilitated, not only a sustainable waste water solution has been found, but land rehabilitation improved and therefore carbon sequestration increased.	<u>Mine land Rehabilitation</u> In Australia, waste water from the Biomax plant has been used for irrigation since 2009. The waste water contains nutrients and therefore provides a good medium for growth, especially at the Australian operations, where mine land rehabilitation is found to be very challenging due to low rainfall and low nutrient levels in the natural soil.
Linkage: solar desalination used at the Thunderer pit at St Ives not only improves the water quality, but also prevents conventional (fossil fuel based) energy usage and therefore increased carbon emissions.	<u>Renewable Energy</u> Solar desalination trials at St Ives have been completed in 2011. A decision to upscale the project is currently awaited.

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Withdrawals and recycling

Question 7.1: Are you able to provide data, whether measured or estimated, on water withdrawals within your operations?
Yes

Question 7.1a: Please report the water withdrawals within your operations for the reporting year.

Country or geographical reach	Withdrawal type	Quantity (ML/y)	Proportion of data that has been verified (%)	Comments
South Africa: Gauteng	Groundwater	31,553	76-100%	
	Municipal	12,092	76 – 100%	
South Africa: Free State	Groundwater	6,503	76 – 100%	
	Municipal	3,724	76 – 100%	
Ghana	Surface	4,103	76 – 100%	
	Groundwater	4,624	76 – 100%	
	Municipal	84	76 – 100%	
Australia	Surface	369	76 – 100%	
	Groundwater	10,867	76 – 100%	
	Municipal	737	76 – 100%	
Peru	Groundwater	1,463	76 – 100%	
	Surface	2,120	76 – 100%	

Question 7.2: Are you able to provide data, whether measured or estimated, on water recycling/reuse within your operations?

Yes

Question 7.2a: Please report the water recycling/reuse within your operations for the reporting year.

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Country or geographical reach	Quantity (ML/y)	Proportion of data that has been verified (%)	Comments
South Africa: Gauteng	39,280	0%	90% of water withdrawn at the South African operations is recycled and reused. Losses are due to discharge to prevent the build up of total dissolved solids (TDS) due to evaporation.
South Africa: Free State	9,204	0%	90% of water withdrawn at the South African operations is recycled and reused. Losses are due to discharge to prevent the build up of total dissolved solids (TDS) due to evaporation.
Ghana	11,954	0%	In 2011, water recycling increased due to the application of closed circuit water processes during the

			heap leaching process. For example, at Tarkwa, 35% of water used in the Carbon in Leach process is recycled.
Australia	1,105	0%	Australia is limited in recycling potential owing to the fact that the water has a high salt content. St Ives groundwater is made up 25% of salt which is the highest salt content within the Australia operations. Agnew ground water is next highest in salt concentration and lastly St Ives dam has the lowest salt concentration. St Ives is attempting to increase water recycling in order to reduce raw water consumption.

Question 7.3: Please use this space to describe the methodologies used for questions 7.1 and 7.2 or to report withdrawals or recycling/reuse in a different format to that set out above.

Withdrawals and recycled amounts of water are determined based on water balances supported by on site water flow measurements.

Question 7.4: Are any water sources significantly affected by your company's withdrawal of water?

Unknown

Question 7.4a: Please list any water sources significantly affected by your company's withdrawal of water. Please explain why you do not know if any water sources are significantly affected by your company's withdrawal of water.

None of the water bodies Gold Fields withdraws water from is a Ramsar listed wetland. Furthermore, it is not expected that any of these water bodies are particularly sensitive, as all required permits for withdrawal were obtained. It is however not known how the withdrawal rates relate to the annual average volume of the relevant water bodies. All (potential) impacts are listed below, but significance will be further investigated:

In Ghana, groundwater is extracted from wells which could potentially cause reduced groundwater table levels. To prevent groundwater table level reduction, operations in Ghana aim at minimizing groundwater usage by recycling as much water as possible. Furthermore, a limited amount of water is obtained from the Taman River. As water is also discharged into this river, impact is expected to be minimal.

Water supply for the Cerro Corona (Peru) operation is obtained through ground water extraction from wells (from open pit dewatering) and from storage of rain water in the tailings storage facility. The impact due to the extraction of ground water is reduced water flow in the streams in the Hualgayoc valley. To reduce this impact water is compensated for to the Coymolache area (5l/s) and Tingo River (10 l/s) during the dry season. Furthermore, water stored in the tailings storage facility (TSF) is recycled to be used in the process plant, thereby reducing water consumption. Water compensation to the rivers from the Tailing Dams is still ongoing. The building of a water treatment plant has commenced beginning of 2012 to comply with new, stricter National Water Discharge Regulations.

At Australian operations, water is extracted from fractured rock aquifers. Due to the even spread of dewatering and abstraction on local aquifers, groundwater levels seem to be maintained. At St Ives, limited amounts of water are obtained from a freshwater dam. Agnew obtains water from a nearby decommissioned pit (rainwater storage) and received in 2011 a license authorising the construction of a new bore field in a location known as the 'Mosquito Well Area'

Dolomitic compartments in the West Rand (South Africa), historically filled with water, have been drained due to continued mining activities (fissure water pumping) in the area. This is a result of all joined mining activities in the areas and cannot be linked to a single company. As water from compartments might leak into underground mines and cause Acid Mine Drainage it is undesirable to fill compartments with water. The current plans are to keep the compartments drained.

Gold Fields South Africa obtains about a quarter of its water supply from Rand Water. Rand Water sources majority of its water from the Vaal River, Tugela River and the Lesotho Highlands. This water is transferred into the Vaal dam from which it is extracted. Due to the large amounts of water extracted by Rand Water, water sources are expected to be **significantly** affected by these actions. Less water will be available downstream of these rivers and water sources then would be the case without water diversion and extraction.

Discharges

8.1: Are you able to identify discharges of water from your operations by destination, by treatment method and by quality using standard effluent parameters?
Yes

8.2: Did your company pay any penalties or fines for significant breaches of discharge agreements or regulations in the reporting period?
No

8.3: Are any water bodies and related habitats significantly affected by discharge of water or runoff from your operations?

Unknown

8.3a: Please list any water bodies and associated habitats which are significantly affected by discharge of water or runoff from your operations.

None of the water bodies Gold Fields discharges water into are Ramsar listed wetlands. Furthermore, it is not expected that any of these water bodies are particularly sensitive, as all required permits for discharge were obtained. It is however not known how the discharge rates relate to the annual average volume of the relevant water bodies. All (potential) impacts are listed below, but significance will be further investigated:

In **South Africa** (Gauteng operations only, as Beatrix operates a closed water circuit), Gold Fields discharges permitted levels of treated water into Loopspruit, Wonderfonteinspruit and Leeuspruit. This water is partly relied on by downstream communities and for downstream agricultural practices. The 'Liquid Gold' project, currently in pre-feasibility phase, plans the production of potable water from the dolomitic aquifers in the West Wits Area. This company action will reduce water discharge into surrounding water bodies, though Gold Fields will at all times comply with the minimum amount of water that should be discharged to fulfil downstream water demand (as determined by the Department of Water Affairs).

In **Ghana**, non-toxic solids are discharged into the environment below pollution limits set by the Environmental Protection Agency. The mineral deposit that is mined is inert and therefore there is no risk of Acid Mine Drainage. However, the nature of the mining operation can result in silting of surrounding areas. To prevent this from happening, water purification procedures are monitored and final water quality is tested on a regular basis. Depending on the nature of flow and quality, testing can be done daily, weekly or monthly. If the release is for a special purpose, then hourly testing may be applied. Pit dewatering at Damang mine could increase the volume and concentration of polluted water being discharged into the Beni River. This risk is managed through monitoring of water that is to be discharged from the pit. A new clarification plant has been built in 2011 and another one is currently being built. A pre-feasibility study on a water treatment plant has commenced.

The potential impact of Cerro Corona (**Peru**) on the Mesa de Plata and Corona creeks is mainly due to 'total suspended solids' seepage into the creeks by runoff water. The following actions have been undertaken to minimize the potential impact of 'total suspended solids' seepage into the creeks:

- Design, implementation and maintenance of diversion channels and erosion control practices.

- Design and implementation of a sediment pond and an automatic flocculation system to control sediments.

Due to these actions, sediment concentrations comply with the Peruvian Maximum Limits for discharge.

Cerro Corona's most important potential impact is from water discharge from the Tailing Storage Facility into the Tingo River. Water is stored in the Tailings Storage Facility (TSF) for usage in the process plant. The TSF has ponds to capture seepage from the dam and new ponds are going to be implemented to improve hydraulic contention of the TSF. Water levels and quality in the TSF are continuously monitored and water discharged from the TSF complies with National water standards.

In Australia, St Ives discharges water into Lake Lefroy which is within the lease boundary and therefore not reported as discharge. Agnew has no discharge as the mine works with a closed system. Almost all of the water is reused except for excessively salty water which is placed within a tailing dam to allow for evaporation to take place.

Water intensity

9.1: Please provide any available financial intensity values for your company's water use across its operations.

Country or region	Financial metric	Water use type	Financial intensity (US$/ML)	Please provide any contextual details that you consider relevant to the understand the units or figures you have provided
South Africa: Gauteng	Revenue	Withdrawn	49,785	
South Africa: Free State	Revenue	Withdrawn	54,324	
Ghana	Revenue	Withdrawn	173,768	
Australia	Revenue	Withdrawn	88,095	
Peru	Revenue	Withdrawn	156,316	

9.2: Please provide any available water intensity values for your company's products across its operations.

Country or Geographical Region	Product	Product Unit	Water Unit	Water Intensity (kl water withdrawn/ounce of gold)	Water Use Type	Please provide any contextual details that you consider relevant to the understand the units or figures you have provided
South Africa: Gauteng	Gold	Ounce	kL	31.79	Withdrawn	
South Africa: Free State	Gold	Ounce	kL	29.49	Withdrawn	
Ghana	Gold	Ounce	kL	9.42	Withdrawn	
Australia	Gold	Ounce	kL	18.18	Withdrawn	
Peru	Gold	Ounce	kL	9.35	Withdrawn	