Tarnished Legacy: A Social and Environmental Analysis of Mali's Syama Goldmine

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Foundation for the Development of the Sahel
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FOREWORD

In Mali, gold recalls the greatness of the Malian empires, and evokes images of the Trans-Saharan salt and gold trade, of Islamic scholars and the ancient cities of Timbuktu and Djenné. Yet at the same time, a popular Bamanankan saying warns, "Sanu ko balaw ka ca": gold mining stirs problems.

In modern day Mali, it remains to be seen which of these images most accurately depicts reality. Gold production is growing quickly in Mali, which is now the 3rd largest gold producer in Africa (after South Africa and Ghana). Gold has replaced cotton as Mali's leading export and has been promoted by the Bretton Woods Institutions as a key driver of Mali's national development. The Syama goldmine discussed in this report was the first large mine constructed during Mali's current gold boom. In a country ranked 164 out of 172 on the Human Development Index and with 90.6% of the population living on less than $2 per day, it is hard not to see the allure of gold's earning power.

Nonetheless, multiple examples from the continent raise questions about the real benefits of mineral extraction and the potential costs: Liberia, Sierra Leone, and Democratic Republic of Congo. Even apparently successful cases such as Botswana remain plagued by poverty and underdevelopment. The Oxfam America report, *Extractive Sectors and the Poor*, indicates that around the world, oil and mineral dependence is strongly correlated with higher poverty rates, income inequality, economic vulnerability, corruption and conflict.

In the context of globalization and increasing trade liberalization, many developing countries face a terrible bargain: weighing the need to generate foreign exchange and their obligations to protect the social and economic rights of their citizens. Pressure to reduce standards in order to create an attractive investment environment pits developing countries against each other in a race to the bottom. Simultaneously, the World Bank has promoted revision of mining codes across the continent, resulting in codes which clearly create favorable conditions for the private sector, but have questionable impacts on social development and environmental quality. Questions about economic development based on mining and other extractive industries were recently examined by the World Bank's Extractive Industries Review. The Review's final report contains a number of recommendations directly relevant to Syama; most notably that the Bank should set aside funds to cover the long-term social and environmental impacts of projects its finances, even after it has exited a project.

As an organization dedicated to combating poverty and injustice, Oxfam America is concerned about the effects of mining on poor communities. For the past twelve years, our West Africa program has supported local organizations working with poor communities to know and advocate for their rights. This report points to a number of human rights issues that have implications not only for the community around the Syama mine, but also Mali and the sub-region more broadly. What are the rights of mining communities to information, to participate in decisions, to benefit from mineral extraction? What are the responsibilities of private companies, states and international actors to respect and safeguard these rights? What are the responsibilities of financial institutions like the World Bank for the long-term social and environmental liabilities of the projects they finance? We hope that the questions raised in this report can serve as the basis for a wider dialogue in the sub-region.

Lastly, le Fondation pour le Développement au Sahel, Oxfam America and the research team would like to thank all the local community members, civil society organizations, and government representatives, who contributed their time and knowledge to the preparation of this report. We also thank the Randgold Corporation for their cooperation and information.

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1. EXECUTIVE SUMMARY

This study, drawing on the lessons learned from Syama, examines the contribution of Mali's gold industry and its potential as a tool for development and poverty reduction. This study presents data on a range of impacts (direct and indirect, positive and negative), tied to the operation and closing of the Syama gold mine. The intent is to:

- Inform the public about present and potential impacts, and the important questions communities should be asking;
- Sensitize and increase awareness of the main actors (local communities, the mining company, financial institutions, the mining administration, and civil society) in the social and environmental follow-up plan of the Syama mine;
- Positively influence environmental practices at other operating and planned Malian mines;
- Contribute positively to the dialogue that will hopefully lead to more informed mining legislation in Mali, and other countries of West Africa;
- Encourage the creation of a cooperative mechanism to minimize the adverse impacts of gold mining and to strengthen the positive impacts in the framework of sustainable development;
- Persuade the national authorities, mining companies, and financial institutions to include preservation of the ecosystem and development of local communities in mining policies;
- Constructively influence the environmental oversight roles of the International Finance Corporation (IFC), and to strengthen the abilities of Malian non-governmental-organizations (NGOs) to influence the manner in which such projects proceed.

Gold mining has a considerable impact on the Malian national economy and on local communities. The discovery of large, world-class deposits such as Sadiola, Morila, and Yatéla relaunched gold exploration and exploitation in Mali in the 1990s. With an annual production estimated at more than 65 tonnes, auriferous exploitation has become the country's main foreign currency earner. Given the rapid growth of the gold sector, learning from the Syama experience presents an important opportunity to apply its lessons to other mining projects. The Syama case offers insight into the real tensions and negative impacts that gold mining can cause and potential ways to mitigate some of these, as well as some positive examples to build on.

The desire to see mineral resources play a more effective role in socio-economic progress is a preoccupation held by the mining communities and by civil society. Unfortunately, this hope has remained unfulfilled in the case of Syama. From January 1990 until 2001, the Syama Gold Mine was operated in southern Mali, first by BHP and then by Randgold Resources Limited. The Malian government and the IFC were minority partners throughout the operational life of the mine. Despite the immense mineral wealth, the social indicators point to the fact that the living conditions of local populations have only deteriorated, especially after the cessation of mining activities. The many issues discussed in the following pages explain the weak contribution of the Syama mine to socioeconomic development.

The communities near the mine clearly had an unrealistic understanding of the potential environmental and economic impacts that would result from the operation and closing of the mine. They are tremendously disillusioned that the economic and social benefits ended as soon as the mine closed. Even the infrastructural improvements they assumed would have long-term benefits have largely collapsed due to the lack of technical support and funds.

Despite the involvement of both the national government and the IFC, this relatively modern mine operated with little meaningful environmental monitoring or oversight. As is often the case in developing countries, the company was essentially engaged in "self-regulation." Operations contaminated local ground and surface waters, the air, and probably degraded the quality of local soils. The health of the mine workers was placed at risk due to unacceptable exposure to metal and cyanide-laden dusts, and inadequate worker safety and health monitoring programs. These conclusions are stated in environmental reports prepared by Randgold's consultants, and were corroborated by our investigation.

Perhaps most concerning is the fact that it appears that few if any of the environmental reports or data have previously been accessible to the general public. Thus, there has been no meaningful way for civil society to understand the extent of the problems, or to promote change. It is unclear to what extent the Malian government has actually evaluated these reports. Even if these documents had been publicly available, they contained monitoring information that was totally inadequate for making reliable and quantitatively useful conclusions about, for example, baseline (pre-operational) water quality or the extent of air or water contamination. Despite the fact that the Syama processing plant consumed approximately 83 tons of cyanide per month, the environmental reports do not routinely report the cyanide concentrations in waters, tailings, soils or plants.

The environmental practices, reporting processes and lack of transparency regarding environmental impacts at Syama would not be acceptable in any comparable environmental setting in Western Europe, Canada or the United States. Clearly, environmental and living standards and practices differ greatly between rural Mali and those in highly developed countries. Nevertheless, such IFC-supported mining projects can offer opportunities to raise existing standards rather than to simply provide cheap sources of gold with weak environmental oversight.

At the Syama Mine the IFC and Malian government are faced with an inherent conflict of interest; they are minority financial partners in the project (IFC sold its shares in 2002) and are responsible for both promoting mineral development and environmental oversight. This conflict of interest may have made them reluctant to aggressively enforce environmental guidelines. Numerous Syama Mine documents make clear that the IFC, and the Malian regulators, have been aware of many of the environmental and reporting problems for at least 10 years, but the major shortcomings remain unchanged. Active mining ceased in February / March 2001, and the site is now on "care and maintenance" status. Regardless of the technical designation, the site has still not been adequately remediated. Neither the operating companies nor the minority partners have any legal or financial responsibility for correcting the environmental and socioeconomic impacts. In April 2003, Randgold optioned the rights to Syama to Australia-based Resolute Mining.

In an emerging mining country like Mali, the need for the jobs and revenue that mining can generate must be reconciled with the development of neighboring communities and minimizing negative effects on the environment. Gold mining should not cause irreversible ecological effects, and the exhaustion of these non-renewable mineral holdings should be compensated with long-term economic and social development for the local communities. To this end, environmental issues and the community development should be included in the project's initial planning stages and span across all the phases of the mining operation.

2. RECOMMENDATIONS

- Mali's legal and regulatory framework on mining should be strengthened to increase environmental protection and the promotion of local development benefits. Poverty reduction at the local level should be made a priority consideration of the government's mining policies.

- The Malian government needs to develop a specific national Environmental Code, pertinent to large-scale mining projects. This Code should be legally binding, and mechanisms for its actual enforcement need to be put in place. The IFC should act as a positive stimulus to this process. Such a Code needs to have enforceable provisions that provide actual legal and financial consequences for environmental degradation.

- The Malian government should reform its environmental and social oversight to minimize the inherent conflicts of interest that exist when a national government is a financial partner in a mining investment, is responsible for promoting national mining investment, and at the same time is responsible for overseeing environmental and socioeconomic performance. Similar structural changes need to be made within the IFC to correct the inherent biases that result where the IFC is ostensibly a leader in setting environmental guidelines, but stands to profit from the operation.
- Mechanisms for community participation in mining-related decision-making should be implemented and strengthened. The capacity of local communities to participate in an informed way in these mechanisms should be strengthened. All actors – the Malian government, the mining company, and civil society organizations – should take proactive steps to ensure inclusion of marginalized groups (women, youth, elderly) in decision-making and in socio-economic benefits from the mine. Civil society, both the general public and the NGOs, need to develop the capacity to effectively interact with both the companies and the government. This will require:
    - Education concerning the technical issues (operational, environmental and socioeconomic);
    - Training in basic environmental monitoring techniques and the interpretation of information.
    - Transparency and access by affected communities to documents relating to the socioeconomic and environmental impacts of mining projects should be increased. Environmental and socioeconomic reports for Malian mines should be made readily available to the general public and government agencies. These reports should be available in both English and French.

- A multilateral dialogue involving civil society, affected populations, the government, and the mining company should be established to develop recommendations for resolving problems related to mining.

- The IFC and Randgold should fulfill their commitment to put in place a community development fund and create the necessary conditions so that the local population can benefit from it.

- In case of the resumption of mining activities at Syama, an independent mechanism for the monitoring of the evolution of socio-economic aspects and the development of local communities should be put in place.

- The Malian government should establish a transparent and participatory mechanism for managing and distributing mining revenue to mining-impacted communities.

- All new mines should be required to prepare a comprehensive environmental assessment (EA) document, which conforms to international standards. As part of the preparation of such a document, the pre-mining social and environmental baseline conditions must be defined in a quantitative manner. The general public must be engaged in this process and provided accurate information regarding the processes to be implemented, dangerous chemicals employed, use of natural resources, and potential long-term impacts and consequences.

- Prior to project approval, the EA document and proposed project should be reviewed by an independent party or team. Funds for such an independent review should come from the project proponent, but the company should have no financial or political control over the selection, guidance, conclusions or payment of the independent reviewers.

- All environmental monitoring must conform to internationally-acceptable standards. This should be true for both the preparation of the EA document, and for monitoring performed during project operation. All reports should supply information adequate to demonstrate that such standards are being met.

- Mining companies in Mali should be required to post bonds prior to mining that are sufficient to cover the rehabilitation and restoration of mining sites.

- The World Bank should promote the development of a Lender's Code of Conduct, which would define environmental and sustainable development guidelines that all lenders to mining projects would adhere to-- both commercial banks and international finance institutions. This Code should reflect the highest standards of social and environmental best practice and would also include stipulations requiring all mining operators to provide some form of sound financial assurance held by an independent trustee. IFC should not participate unless such viable financial assurance has been put in place, and its adequacy is verified throughout the life of the project, even after IFC participation ceases.
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- Where the IFC intends to play a role, it should be required to carry out a detailed investigation of the past financial and environmental history of any mining company and its related parents or subsidiaries, including relevant company-investor issues. The findings of such investigations should be made public.
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3. PROJECT FRAMEWORK & METHODOLOGY

3.1 Project Framework

This report is a collaborative effort between Oxfam America's West Africa Program and the "Fondation pour le Développement au Sahel" (FDS; Foundation for the Development of the Sahel), to examine the environmental and socioeconomic impacts of mining in Mali, particularly the case of the Syama gold mine.

FDS is a national non-governmental organization that supports development initiatives to improve living conditions for poor communities. The organization conducted community support (education) programs in the Kadiolo area in 1986–2000. During this period, the organization proposed to the Syama mine a sharing of experience on environmental issues. These initiatives did not culminate in concrete collaborations with the mining company.

Oxfam America (OA) is an international nonprofit organization that supports long-term development projects and programs in Africa, Asia, Latin America, the Caribbean, and North America. The organization has supported communities around the world impacted by extractive industries. It has also sponsored research on the impacts of extractive industries, including a recent study which analyzed the links between extractive industries and poverty in developing countries. The study found that in countries highly dependent on the mining sector, the standard of living is low, rate of poverty high, and the economy very vulnerable to external shocks.

Mali's vast gold potential could be a resource to support the country's development process. Unfortunately, legislative reforms in the mining sector over the last decade, while certainly providing incentives for mining investment, have paid scant attention to the environmental, social and economic impacts on local communities. In addition, civil society and local communities are often only minimally consulted during the critical phases of the project. Given the way in which the Syama mine and other sites have operated, the public and much of the Malian government have been poorly informed regarding the actual and potential environmental impacts. As such, during this site visit, the research team often referred to the process as, "opening the box"---the box where all that arcane and hidden information has been kept.

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It is not the intent of this report to prevent future gold mine development in Mali. Discussions with local citizens and officials indicate that they generally desire any form of development that might improve their lives. As such, this report is intended to provide information and ask questions not normally discussed in the consulting reports paid for by the mining companies. Such information will assist Malian citizens and communities to understand the broader consequences of such mining activities, helping them to make their own development decisions.

“Opening the box” should contribute to a lessening of the inevitable negative project impacts, and may improve the chances that future impacts at this and other Malian mines are actually paid for by the mining companies, not the Malian public or the donors to the development institutions. It may also contribute to a more sophisticated evaluation of the question: Do such mining projects contribute to “sustainable development”?

3.2 Methodology

This study was carried out by Robert Moran, a hydrogeologist and specialist in water quality issues related to mining, and Seydou Keita, a geologist and representative of the Malian Association for Environmental Impact Assessment (AMEIE), under the leadership of FDS in collaboration with Oxfam America. A delegation of three members of OA’s Dakar and Washington offices and a representative from Ghana, who leads an association of communities living near a gold-mining project in Ghana, were also invited to participate in part of the study. The list of members of the research team and invited delegates, as well as the working schedule is included in Appendix 1. All activities leading to the preparation of this report have been supported by funds from Oxfam America.

Section 5 on Social and Economic Impacts was authored by Seydou Keita, and Section 6 on Environmental Impacts by Robert Moran PhD. All other sections of the report are collaborative products of Robert Moran, Seydou Keita, Tiémoko Souleymane Sangare, Keith Slack, and Jenn Yablonski.

The opinions and findings in this report are based on:

- Review of Syama Mine environmental reports (prepared by SOMISY and their consultants, Digby Wells) provided by the national consultant (AMEIE) in Bamako, and additional reports made available by SOMISY at the mine site. Additional IFC and Malian government documents relevant to Syama were also reviewed. These include a conceptual closure plan (SRK, March 2003), parts of which were given to the team following our site visit.
- Travel and meetings conducted in Mali between March 9 and March 22, 2003. Activities involved meetings and interviews with local and national NGOs/ community associations; local and community authorities; national, decentralized, and local state services; national laboratory personnel; members of the media, local villagers; Syama mine staff (in Bamako and on site) . These activities were conducted in Bamako, Sikasso, Syama, Loule, Fourou, Kadiolo, and Tembelini.
- A site visit at the Syama Mine, conducted between March 13 and March 18, 2003, where the facilities and documents were reviewed, and water quality samples were taken. The team was guided at the mine site by an agent of the Randgold company, who facilitated access to the site and other facilities. The research team was unable to coordinate the timing of the site visit with the presence of the Randgold environmental management staff.
- Interviews and community meetings with the local populations and resource persons[1].
- A *restitution*[2] workshop in Kadiolo on March 19 to discuss preliminary findings of the team's research and to seek input. This meeting included participation of community representatives from villages near the mine, local NGOs, media, state technical services, local authorities, a member of a Ghanaian NGO, Oxfam America and FDS staff, and an environmental management representative of the mine.
- Combined, more than 32 years of applied hydrogeology, geochemistry experience, 20 years of geology and environmental impact assessment experience, and 25 years of community development.

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[1] Based on these sessions and other reports on the mine, statements are made throughout the report regarding community experience and perceptions. These are reflections of community opinion, backed by qualitative research. However, no community is a monolith and these statements but do not preclude other views.

[2] The French term *restitution* refers to a meeting to present information for feedback, contributions, and validation of findings.

4. BACKGROUND

4.1 General

An agro pastoral-oriented Sahelian country, Mali has emerged as a mining country in the last ten years with the advent of world-class gold mines such as Syama, Sadiola, Yatéla and Morila. With a population of 10.6 million (DNSI, 1999) in an area of around 1,240,000 square km, Mali is a landlocked country in the heart of West Africa bordering seven other countries.

Under economic reforms and political democratization, the last decade was on the whole characterized by growth and a significant commitment to the development of democracy. Yet despite systematic efforts towards political, economic, and social reforms, Mali is still saddled with a series of acute structural problems and poverty, which affects about 64% of the population. With a per capita income estimated at US$240 and an agricultural productivity weakened by climatic vagaries, Mali is ranked 166th on the UNDP Human Development Index and is counted among the world's Heavily Indebted Poor Countries (CSLP, 2002).

LOCALIZED MAP OF MALI

Mali's subsoil contains numerous indications and deposits of gold, diamonds, iron, manganese, bauxite, base metals, uranium, phosphates, and calcium, among others. Over the last ten years, the performance of the Malian mining sector, tied exclusively to its gold production, rewarded prospecting and mining-inventory efforts undertaken since 1960. Responding to this important potential, large mining companies, including Anglogold, Iamgold, Randgold, and Ashanti Goldfields, undertook massive exploration and mining-inventory programs that led to the discovery and exploitation of the Syama, Sadiola, Morila, and Yatéla mines. Industrial gold production thus grew from less than four tons in 1993 to more than 60 in 2002 (DNGM, 2002).

4.2 Institutional Framework of the Mining Sector

Mali's emergence as a major gold producer was stimulated by a development policy that focused on the mining sector as one of the driving forces of economic growth for the short to medium term. The development of the sector today constitutes a strategic priority of the Malian government, which has set up a national policy oriented toward the following:

- Consolidation of the legislative and regulatory framework;

- Promotion of private investment;
- Diversification of mining research and the emergence of a domestic market for mining products;
- Protection, rehabilitation, and restoration of the environment surrounding mining operations.

Role of Governmental Institutions

The Ministry of Mines, Energy, and Water is the supervising department responsible for the management of Mali's mining sector. The office carries out its mission through the National Department of Geology and Mines (DNGM), which is the technical department that handles the implementation and monitoring of mining legislation. It is additionally charged with developing elements of national policy in the field of research, development, exploitation, and processing of subsoil resources and seeing to the coordination of services and public and private bodies to effect the implementation of this policy.

The Ministry of Environment oversees the implementation of the national policy on environmental protection as well as the rational use of natural resources. It coordinates and controls the implementation of laws, regulations, and agreements on the preservation of Mali's ecosystems and relies on a number of technical departments, including:

- The Permanent Technical Secretariat in charge of environmental issues ;
- The National Department of Purification and Pollution Control ;
- The National Nature Conservation Department.
- The ability of the Malian government to fulfill these multiple responsibilities in practice will be discussed later in the report.

Legislative and Regulatory Framework Related to the Mining Environment

The national policy of environmental protection relies on a set of national laws and international agreements that bind the government, development partners and economic operators to include environmental protection in all the decisions pertaining to the conception, planning, and implementation of development policies, programs, and projects. The mining legislation adopted in 1999 consists of a basic law that contains measures relating to environmental protection, hygiene, and workers' health and security. In the absence of national standards applicable to the mining sector, the majority of mining projects adopted references applied by certain international institutions, such as the World Bank, ILO, or UNEP.

The legal instruments regulating environmental and social issues did not exist or at least were not national requirements at the launching of the Syama mining operations. The Syama mine was thus brought into production in a weak national regulatory environment[3], and the Malian government did not require adequate environmental due diligence as a condition for exploiting mineral resources.

Although efforts have been made to update legislative and regulatory laws in the mining and environmental fields, certain weaknesses have hindered their effective application on the ground. For example, there is no procedure for monitoring the implementation and application of the legislation in place, no mechanism to involve local authorities and administration to ensure a wide diffusion of information related to mining activities, nor a mechanism for regular monitoring of environmental activities in the field. Shortcomings are equally noted in the dissemination of reports on the social and environmental impacts of the mining operations, in which little attention is paid to the involvement of populations living near the mining sites. These reports are often only available in English and only to the company and the mining administration.

4.3 Introduction to the Syama Gold Mine

Physical Setting

The Syama Mine is located about 300 km to the south of the capital, Bamako, and within 25 km of the borders of Mali with both Ivory Coast and Burkina Faso. The mine is located in the district of Fourou, which has a population of 21,739. There are eight villages near the mine, the closest being Syama, Bananso, Fourou, and Tembiléni. Access to the mine is by an unpaved road stretching over 80 km between Fourou and Kadiolo and joining the Bamako–Abidjan road in the vicinity of Zégoua.

The mine is located at about 10 degrees 30 minutes S latitude, placing it in a zone of tremendous weather extremes. Normal years have distinct wet (from about April- May to October) and dry seasons, with mean annual rainfall being about 1165 mm / yr. Rainfall ranges from about 675 to 1925mm /yr (SRK, Dec. 2000). Such rainfall appears moderate until one realizes that essentially all of it falls within the few months of the wet season. The highest reported monthly rainfall is 377mm, about 14.8 inches, which may actually have fallen in one storm event (SOMISY and Digby Wells, Mar. 1999, pg. 24). Such rainfall data, together with the obvious signs of significant water erosion, and the nature of the local soils indicate that the mine site is subject to serious flooding during the wet season.

While significant rain falls during the wet months, relatively little of this water is recharged into the bedrock, and most flows out of the area as surface water or evaporates. The reported mean evaporation rate is 1761mm per year, which greatly exceeds the mean annual rainfall. Much of the region suffers from extremely arid conditions during the dry months. For these reasons, sources of water at the mine site, both surface and ground water, have been insufficient to supply the needs of the various mine processes.

History of the Mine

[3] It is important to note that despite weaknesses in the national legislative environment, both BHP and Randgold were based in countries with stronger environmental and social legislation, and were well-aware of international standards. Additionally, the involvement of the IFC should have promoted adherence to these international standards.

Artisanal miners have extracted gold from this region for hundreds and possibly thousands of years. The Syama ore body was discovered and defined in the late 1970's by an exploration team of geo-scientists as part of the Bagoe Gold Project under a multilateral cooperation program with the United Nations Development Program (UNDP).

In 1987, BHP (Broken Hill Proprietary), an Australia-based multinational corporation, signed an agreement with Mali's Ministry of Mines to pursue the exploration and development of the Syama deposits and satellite indices. In December 1988, the Mali government authorized the creation of the Mining Company of Syama (SOMISY; Société d'Exploitation des Mines de Syama), with BHP acting as the operator, on the basis of the following shareholding agreement: BHP (65%), Mali government (35%). The first ingot casting took place in January 1990, and in April the mine was operating at full capacity. The IFC first became a partner in the operation with BHP and the Malian government in 1991-92 (IFC Project Summary Sheet).

In the continuing exploration work, an important mineralized, sulfide ore body was identified under the oxidized surface. Unfortunately, mining of the sulfide ore did not meet the profit forecast in the feasibility study. Numerous factors created financial losses that drove BHP to sell the mine. (DNGM, 2002; SOMISY, Jan. 2002)

After a detailed audit, the South African company Randgold Resources decided to acquire BHP's investments in August 1996 and assumed management of operations in October 1996. BHP's withdrawal led to the reorganization of the ownership structure for SOMISY's as follows: Randgold (75%), Malian government (20%), IFC (5%).

As a result of the poor performance of the metallurgical plant and the fall of gold prices on the international market, Randgold management decided to halt operations at Syama mine despite the existing investments and the remaining exploitable mining potential of around 45 tons. Included in this decision were plans for:

- Cessation of mining extraction;
- Progressive laying-off of personnel;
- Maintenance of an environmental team to follow up the closing;
- Establishment of a Consultative Committee for Community Development;
- Rehabilitation of satellite sites and waste rock piles;
- Sale of assets which would deteriorate during the care and maintenance phase, including certain equipment such as generators, light vehicles, chemicals, etc.

(DNGM, 2002; SOMISY, Jan. 2002)

Actual mining ceased in February/ March 2001, but gold processing continued until December 2001. Since that time the mine has been on what the regulators refer to as "care and maintenance" status, or provisional shutdown.

After halting mining operations, Randgold was mandated by SOMISY shareholders to find other partners to revive the mine. On April 16, 2003, Randgold reported that it has signed an option agreement with the Australian firm, Resolute Mining Limited, which provides them a one-year option to purchase Randgold's 80% stake in the mine. At the writing of this report, Resolute is currently conducting a feasibility study on mining and treatment of the main ore zone (Dow Jones Business Review, July 24, 2003).

Description of the Operations and Mining Techniques

At Syama, ore was extracted using open-pit methods, down to a depth of about 235 meters in the main pit. Several other accessory pits were also excavated to depths of about 20 to 80m (SRK, 2003). The main pit was originally anticipated to be developed to a depth of about 500m (SOMISY and Digby Wells, Mar. 1998). Some oxide ore was processed in the first two years, but the majority of ore processed was sulphide-rich. Gold and silver were recovered from the crushed rock using chemical extraction techniques. Massive volumes of chemicals such as cyanide, lime and organic flotation compounds were added to the ore at the on-site processing facility to allow the collection of the gold. Following gold extraction, the majority of the rock that originally entered the processing plant was discharged into an unlined tailings impoundment as a combination of liquid-solid wastes. The recovered gold (and silver) were poured into bars and transported by plane from the mine airstrip directly to Bamako for verification and estimation of tax. The bars were then sent to Metalor in Switzerland to separate out the gold and silver.

The mine includes the facilities described below. All the facilities described constitute potential sources of negative impacts that could affect and disturb the local environmental and socioeconomic equilibrium (noise, dust, chemical and waste products, weakening of the local natural environment, etc.). A detailed analysis of these impacts is made in the Environmental Impacts section of this report.

- Quarry: Mining at Syama is done by open pit methods using explosives and heavy equipment. Ore and waste rock are excavated in a series of five-meter-high tiers. Ore is loaded onto dumpster trucks and dropped into crushers. The low grade materials are stockpiled as surface waste rock piles.

- Processing Plant: The ore processing method is based on a system of extracting gold from oxidized and sulfide materials. The extracted ore is transported from a silo to the crushers before being forwarded to the mills. Some lime or caustic soda is added in the mills to adjust the pH of the sludge, which is then pumped into 10 leaching vats. These metallic vats, each with a capacity of about 1300 m^3, are fitted with rakes and feeding tubes from which are injected a solution of cyanide, which breaks up the gold. This technique starts the whole process, and the washed paste moves along to adsorption, where the gold, in solution, is adsorbed on the active carbon. The carbon, thus charged with about 3000 grams of gold per ton, is washed in acid and stripped in the elution circuits.

  The gold is collected by an electric system installed on stainless steel fibre cathodes, and the electrolyte used is sent back to the washing circuit. The cathodes are then washed, and the product is filtered and dried and then melted in the induction furnace for the production of gold ingots.

- Tailings Impoundment (or tailings dam): The silt from the processing plant is discharged into a basin of waste materials, where the solids settle and clarified water is returned to the plant in an attempt to keep pollutants in a closed system. The tailings impoundment is located inside a large, shallow area, the downhill part of which is enclosed by a laterite escarpment. Designed without any synthetic liner at the base, the tailings dam covers an area of around 45 hectares. A coffer dam was constructed downhill of the tailings dam to collect contaminated water seeping from the tailings dam. Seven monitoring wells were also constructed for collection of water samples and to monitor migration of contaminants.

- Testing Laboratories: The mine had a preparation and analysis laboratory equipped with an atomic absorption spectroscope and accessories. Water samples --- both from the ground and from rock --- were taken from the mine and from around the plant and tested daily[4]. The laboratory used a number of chemical products, including, among others, lime, caustic soda, cyanide, and hydrochloric acid. The effluents from the laboratory were also dumped into the tailings impoundment and recycled back into the processing circuit, on its way to the plant.

- Garage and Mechanic Shop: All the maintenance and repairs of light vehicles and hydraulic engines are carried out in a garage equipped with a drainage system for draining effluents. Grease and waste oils are stocked in drums.

- Mining Town**:** The mining town's facilities include a camp about two km from the mine, warehouse stores, recreation facilities, and a cafeteria. The entire property is surrounded by security fencing, part of which was removed when mining work was put on hold. Housing constructed of durable materials was constructed in Fourou for mine workers. A modern clinic, no longer operational, was also established in the village. When the mine was up and running, the clinic was fully equipped and had qualified personnel capable of giving treatment and performing common tests on site. The clinic is currently closed.

- Water Supply: After expansion of the mine, SOMISY required approximately 8,000 cu. meters per day of water to operate the mine, of which 5500 cu. meters / day was diverted from the Bagoe River and pumped more than 20 km to the site. The remainder of the water was obtained from the pits or dams at the mine site (SOMISY and Digby Wells, 1999). During mining operations, the water pumped from the Bagoe River was tapped by surrounding villages for drinking water. This supply system is no longer functional, following the removal of equipment by the mine's management for security reasons.

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[4] However, this data was not public and not published in environmental reports.

5. SOCIAL AND ECONOMIC IMPACTS OF THE SYAMA MINE

by Seydou Keita

5.1 Positive Impacts

In the 1990's gold mining at Syama helped to support the national economy and to diversify industrial and economic activity. This assessment was made in different studies carried out by BUGECO ("Evaluation of the Mining Sector's Contribution to the National Economy," December 1998), BECIS (studies, 1998), AIRD ("Impacts of Gold Mining on the National Economy," September 2001), and IDRC ("Study of the Development of the Mining Sector and the Environment in Central Sahelian Countries in West Africa," March 1999). These studies indicate that the Syama mine was a catalyst for micro- and macroeconomic integration and development. However, although the primary effects, taxes, and salaries are easily quantifiable (see tables), evaluating the mine's broader effects and its impacts on human resources and development is much more complicated.

At the National Level

Gross Domestic Product (GDP), the indicator most often used to measure a country's wealth creation, represents the sum of added value created by its various economic sectors in a particular year. The table below charts the growth of gold exports as a percentage of Mali's GDP between 1996 and 2002.

Gold Exports as Percentage of GDP

1996	1997	1998	1999	2000	2001	2002
2.0	5.4	6.3	6.8	7.5	12.7	15.1

Source: IMF

These figures indicate the dramatically increasing importance of gold production to Mali's ecomomy.

In terms of direct financial contributions, Randgold (2000) reports that between 1995 and 15 May 2000, the Syama mine had contributed US $ 110,000,116 to the Malian economy in taxes, salaries, benefits and local purchases.

In addition to the mining sector's contribution to the GNP, other positive impacts can be cited. The mining sector contributed to the following changes at the national level:

- Rise in the state's foreign currency revenue;
- Strengthening of the national bank's stability;
- Cut in the deficit of the balance of trade;
- Increase in exports;
- Additional source of state revenue;

- Development of sub regional trade and a business ethic;
- Construction and improvement of development infrastructure;
- Development of mining potential and a hub of industrial activity.

(AIRD, September 2001; BCIS/BUGECO, December 1998; Randgold Resources Ltd., October 2001)

At the Regional Level

The economic impacts of mining excavation at Syama manifested themselves in more-intense commercial activity in Sikasso, Zégoua, and Kadiolo, where significant volumes of financial transactions were recorded. As a result of the financial flows generated by the mine, Sikasso became an active business and trading center. In addition to tax revenue that afforded improvements in sanitation and education in the region, funds directly injected into the Sikasso regional economy by the Syama mine affected many domains, including:

- Facilities at the regional hospital;
- Construction and improvement of sports facilities;
- Construction and improvement of roads;
- Supply of safe drinking water;
- Strengthening of the capacity of public services and civil protection;
- Support to vaccination and HIV-screening programs;
- Training of local representatives in decentralization and conflict-management issues.

(AIRD, September 2001; BCIS/BUGECO, December 1998; Randgold Resources Ltd., October 2001)

At the Community Level

The Syama mine had a significant impact on the community through the number of jobs it created in the community. When operations resumed in 1996 under Randgold, the Syama mine hired a total of 514 employees - 447 Malians and 67 expatriates. The number of employees increased rapidly in 1998, reaching 1,211, with a progressive decrease in the number of expatriate workers. The total wage bill thus went primarily to local workers, making Fourou the wealthiest district in the region. As a result of this financial inflow, certain villages in Fourou moved from a subsistence economy to a monetary one, with an improvement in the general standard of living and an increase in family and individual incomes. Evidence of this increase in revenue was seen in Fourou, where shopkeepers arrived en masse to open up new stores and where mopeds, bicycles, houses with sheet-metal (and not thatch) roofs, and stereos abound. Many families sent their children to school and paid their medical expenses with salaries from the mine. The mine's indirect economic contributions should also be considered, given the spirit of solidarity in the village and the extensive structure of the traditional family: in effect, each employee at the mine supported between 15 and 20 people.

Among other benefits from the mine, the following can be cited:

- Construction of rural roads and bridges;
- Creation of community development projects;
- Construction of recreational facilities;

- Construction of homes and improvement of local housing;
- Construction of schools and health centres;
- Development of rice-growing areas;
- Development of trade and of a business ethic;
- Local training and skills improvement in mining techniques.

(AIRD, September 2001; BCIS/BUGECO, December 1998; Randgold Resources Ltd., October 2001)

The information above points towards the Syama mine's potential to make a significant contribution to Malian development. However, the overall positive economic effects of Syama ultimately fell far short of the general public's expectations, particularly at the community level[5]. A more detailed analysis of the national, regional, and local economy reveals some weak points and requires further commentary.

Randgold's investments at the local level, which were primarily initiated only on the eve of the suspension of the mine's operations, reflect its weak contribution to the community. Initially they was confined to the building of schools, mosques, clinics, paying teachers salaries and introducing water reticulation, sewerage removal and the limited provision of electric power. The extension of community projects was governed by cash restrictions and the requirement to put the mine on a sound financial footing before the looming full closure of the operation became a reality. If the effects at the macro level are perceptible in places, the effects on the "lower end" are virtually nonexistent; strengthening of infrastructure and human resources was modest and usually limited to populations in zones immediately surrounding the mining site. Care provided by the Fourou clinic is a good example of this: access to the clinic was authorized exclusively to mine workers and their close relatives.

The analysis of these factors raises questions from the perspective of long-term development, particularly given the volatility of the price of gold on the global market. How will the mine's economic effects impact the lives and future prospects of Malians, and particularly local communities? The remaining gold reserves at Syama are still substantial and constitute an important asset for Mali. But the overall socio-economic impact of mining can only be properly assessed if the local share of the profits is specified in terms of investments and sustainable infrastructure that meet the real needs of the population.

5.2 Negative Impacts

In addition to its limited positive impacts, the Syama mine operation had a number of negative social and economic impacts, both while it was in operation and when it was put on care and maintenance.

[5] Public expectations around the potential benefits of gold mining are complicated by many factors, including high hopes in economically depressed areas and lack of adequate information.

The opening of the Syama mine caused a large influx of people from various backgrounds looking for work. This situation had negative consequences on certain traditional values, such as:

- The emergence of cultural conflicts following the settlement of migrant workers having different customs or belonging to different ethnic groups;
- The emergence of conflicts around access to local resources such as land;
- The erosion of social mores, including the rise of prostitution and alcoholism, as a result of the settling of workers (most of them single) with substantial finances at their disposal; and the development of criminal behaviour in an area known for being safe;
- The emergence of HIV/AIDS cases, previously unheard-of in the area; the proliferation of other illnesses, such as sexually transmitted diseases, linked to the migration of populations;
- Inflation in the price of basic foodstuffs at the local level;
- The appearance of a local socio-economic divide, with a group of rich miners (mostly foreigners) who were often disrespectful towards the customary practices of solidarity in a very poor society.

Another negative impact experienced by local communities was the loss of land through:

- Location of the mine facilities on pasture land (the plant, quarry, tailings dam, administrative town, etc.);
- The use of collective land for the construction of housing exclusively for mine workers.
  (DNGM, July 2001; CRDI, March 1999; DNACPN, October 2001)

The cessation of operations at Syama mine created major socio-economic impacts at the national and regional levels as well as at the local. At the various levels, the ending of the mine's activities created an economic vacuum. This economic result, in turn, had negative social consequences.

<u>At the National Level</u>**:** the main impact of the mine's closing were:

- A dip in national gold production and a reduction in national revenue;
- The weakening of the gold mining sector;
- A fall in economic sector activity;
- A fall in fiscal revenue and the reduction of the state's sources of revenue;
- A reduction in sub regional trade;
- Loss of the local communities' trust in the government.

<u>At the Regional Level:</u> Syama's closing had the following regional consequences:

- A fall in regional revenue;
- The cessation of economic activities connected to the mine;
- A reduction in financial circulation for local banks;
- The degradation of development infrastructure;
- Workers in search of jobs;

- Weakening of the regional economy.

At the Community Level: The neighboring communities, were ill-prepared for a suspension of operations at Syama and were hit very hard by the negative consequences, including:

- Loss of jobs and financial resources;
- Deterioration in purchasing power and standard of living;
- Loss of initiative and widespread community malaise;
- Exodus of workforce to urban centers and new mining sites;
- Degradation of housing and facilities inherited from the mine;
- Loss of parental authority and a disruption of family equilibrium;
- Increased conflicts over land use and access to natural resources, as mine workers tried to return to agricultural production on a reduced amount of land (due to land used or affected by the mine);
- Loss of hope and trust in the administration and in mining projects.

The provision of some of the mine's facilities to the community, rather than bringing lasting improvements to local living conditions, instead created a situation of dependence for the local population, tying them to the mine infrastructure. The establishment of most of these facilities was done without an adequate analysis of their future devolvement or their management by the community. As the period of actual gold extraction was limited in duration, the mining company needed a more thorough analysis of the long-term impact of their activities and their cessation. This major flaw today manifests itself in a disruption and weakening of existing socio-economic conditions, such as:

- The cessation of development activities along water pipes, where water supply points were installed across villages;
- The closing of the clinic and the abandonment and dilapidation of houses, following the closing of central electricity;
- The deterioration of hygiene and health conditions resulting from the lack of refuse collection.

In the end, the area's original socio-economic situation was deeply disrupted by the presence of these facilities, for which sustainable management and financial resources were not put in place. (DNGM, July 2001; DNACPN, October 2001)

5.3 Evaluation of the Key Actors

Mali's mining ministry had little experience managing large mines like Syama when operations began. Indeed, the exploitation of the mine was started in a legislative vacuum, marked by a weak regulatory framework and by a lack of specialized personnel capable of handling the technical and financial aspects inherent to the sector. In addition, the local communities and civil society were unprepared to participate in the new operations, and incapable of effectively engaging in this sector, which was outside their normal domain. All these elements must be understood and analyzed as contributing factors to the behavior of key players.

The State and Local Technical Services

The role of the state and of technical services was very limited in monitoring socio-economic aspects of the mining at Syama. At the time of the adoption of the plan to suspend mine operations, specific recommendations were formulated to ask the administration to see to the resumption and management of certain basic facilities, such as the clinic, the pumping station and central electricity. Unfortunately, no such concrete actions were taken.

The district of Fourou had long suffered the lack of a local treasury association or savings bank. Such a structure would have helped develop a culture of savings among the local population and could have been an incentive for reinvestment into revenue-generating activities.

The Mining Company

Throughout the life of the mine and the process of placing the mine on care and maintenance, the development of sustainable socio-economic infrastructure never appeared to be a priority concern for the company. While the Syama mine was operational, Randgold paid out significant wages to its workers but did not promote the development a culture of savings. Many of the commitments made by Randgold as part of the Consultative Committee for Community Development were not fulfilled. The cessation of mining activities and the removal of the pumping station and central electricity plunged local communities into an increasingly difficult situation. The clinic that was handed over to the population, who were unprepared and lacking financial resources, began to dilapidate.

To overcome these shortcomings, the mining company should have developed a plan in conjunction with the community from the outset for long-term development, including:

- A participative mechanism for cooperation and information;
- Training and strengthening of human resources which supported long-term development of local skills and capacities ;
- A judicious choice of infrastructure and community development projects that better incorporated local realities and the collective needs of the population.

IFC

The IFC, as a partner in the project, demonstrated little real interest in overseeing the socio-economic aspects of Syama, even though an environmental and social evaluation was carried out at its instigation. The IFC did not fully play its role in the process, to ensure that:

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- Randgold's projected investments for community development were supported by asufficient budget;
- The functioning and management of development infrastructure could be carried out by the beneficiary populations.

The Neighboring Populations

The neighboring populations have not been able to utilize the resources provided by the mine to overcome the difficult post-mining period. The lack of investment by local communities in savings or diversified economic activities became clear with the closing of the mine. In some cases, mine workers used their wages for improving family housing or for the purchase of small farm machinery. In others, wages were used for luxury purchases or for ceremonial expenses (marriages, festivities, ritual ceremonies, etc.). Although earnings could have helped to improve the community's economic security, the lack of savings made the community more vulnerable to the economic shock of the halt of active mining at Syama.

Civil Society

In Mali, around 4,000 NGOs operate in various domains of development, including advice, training, strengthening and capacity-building of local communities (CSLP, 2002). Unfortunately, in the case of Syama, these support structures were only involved in carrying out occasional projects, often for the mining company. Civil society thus played no concrete role in ensuring that communities were fully informed of their rights and the full range of potential impacts of the mine, or in helping local populations take advantage of the financial resources and community infrastructure that came from the mine. The high security and the difficulties of access to information and documentation prevented civil society from undertaking any study on the subject. Nevertheless, targeted initiatives could have been carried out by the NGOs among the populations in the area around the mine, to which access was much easier.

This situation raises the issue of information sharing and the necessity of strengthening civil society's capacity to adapt to mining development. Strategies for poverty alleviation need to include the real involvement of civil society in the implementation and follow-up to the completion of mining development policies. Civil society must emerge as a credible partner capable of influencing decisions in a constructive way at the national and local levels.

5.4 Policy Issues

Capacity-building

A key step in confronting the aforementioned socio-economic aspects is to involve the concerned beneficiaries at the outset. However, in order for them to participate in an authentic and informed manner, capacity needs to be strengthened at several levels – local populations themselves, but also the civil society organizations and state services that support these communities. In addition, mechanisms need to be established for multi-party dialogue and negotiation to ensure local communities a voice in development decisions.

To this end, the accompaniment and support of civil society is necessary in providing information, training, and sensitization to local communities as tools for managing the long-term the positive and negative impacts of the mining operation. Civil society needs to support local communities in accessing and understanding studies and legal texts, training in environmental issues, and ensuring access to credit and savings services. The development of a culture of savings and reinvestment is a also key strategy, given that financial resources coming from the mining project are limited to the duration of the mine. This support must also be oriented toward the search for financing for investment programs initiated under the Consultative Committee for Community Development, with the view to ensuring the redeployment and reinsertion of former workers. This partnership assumes a reorientation of activities and a strengthening of civil society's capacity in order to more effectively carry out the activities that need to be undertaken.

Concerning the management of facilities, the local state administration and technical services should play a central role in finding the necessary funding and the best solutions to rehabilitate and develop the equipment given to the local government by the company.

Support to marginalized groups

The mining area of Syama is characterized by the coexistence of many socio-economic groups, among which women, children, and the elderly constitute the most disadvantaged segments. Despite the role of these groups in the organization of the traditional family structure, they have few rights and benefit only marginally from the by-products of the mining resources.

Women in the Syama area, for example, are the main users of natural resources, as they are responsible for the supply of water and fuel. They are active in the protection of the environment by participating in reforestation, the creation and upkeep of nurseries, etc. As mainstays of their families, they contribute to the family's income and often diversify the sources of revenue, an important strategy for vulnerable populations. However, no lasting system was established in the Syama mine's development plan to take into account women's contribution or particular needs. The combination of traditional expectations of men and women and the mining company's approach to negotiating with the community meant that women rarely had input into the articulation of community development priorities.

The challenge is thus to move towards a more global and inclusive approach, taking into account the specific needs of the different socio-economic groups affected by the project. To this end, development programs and policies of agencies operating in the mining sector (state, private sector, civil society) should include certain concrete initiatives to benefit the most vulnerable segments of the population, such as:

- Promote and systemize gender analysis in the elaboration and implementation of mining projects in order to strengthen gender equality;
- Promote inclusion of marginalized groups in community decision-making;
- Improve the ability of marginalized groups to access essential social services, particularly health and education;
- Strengthen communities' economic capacity in a way that benefits all segments of the population;
- Involve marginalized groups in the monitoring of socio-economic initiatives and environmental protection programs;
- Initiate and consolidate income-generating activities for women;
- Promote broad access to micro-credit and local savings;

- Create/strengthen mechanisms for cooperation, training, sensitization and information for marginalized and vulnerable segments of the population.

ENVIRONMENTAL OBSERVATIONS AND IMPACTS

by Robert Moran, PhD

This section of the report is intended to provide an independent review of the environmental conditions at the Syama Mine focusing on aspects relating to water and water quality issues.

The information gathered during this research describes mining activities and conditions that were constantly changing between about 1990 and 2003. It is not the intent of the present report to ascribe specific responsibility for individual environmental problems to either BHP or Randgold. (This team has not had access to any of the BHP Syama environmental documents, thus can only make inferences about the actual practices.) However, environmental practices at the Syama Mine have suffered from numerous major deficiencies, most of which are still uncorrected.

The following section is a partial discussion of these conditions and deficiencies. As stated previously, these observations are based on extensive international experience at many similar mines, and on the information presented in the references cited. The national consultant, Dr. Keita, provided the team access to several Syama Mine documents that had been prepared by Digby Wells and SOMISY on our arrival in Bamako [Digby Wells (January 1997); Digby Wells (16 July 1999); Randgold Resources Ltd.(June 2000); Digby Wells and Assoc.(2 Nov. 2000)]. Most of the other project documents cited were initially obtained and reviewed in the Document Room at the mine site. These observations are also based on written and verbal comments (via teleconferences) made by several members of the Randgold staff and Graham Trusler of Digby Wells after reviewing an initial draft of our report. Mr. Trusler also supplied two additional reports following his review of our initial draft report (DWA, mid-2000, and DWA, March 20, 2002). The primary sources for the findings presented in this section of the report are statements in these documents, authored by SOMISY and/or their consultants.

Our review of these documents and discussions with Randgold / SOMISY and DWA staff make clear that additional environmental reports and data have been produced for the company, but these materials were not available to us during our visit. Following teleconferences with Randgold / DWA representatives, the team was provided with additional materials the company felt important to a more complete understanding of the situation. The contents of these additional materials were later incorporated into the findings of this report. Most of the observations in this section are supported by written statements made by Randgold's own consultants in the cited reports.

As can be seen from the references cited, numerous environmental studies were conducted at the Syama Mine. However, active mining occurred from 1990 until early 2001, and mineral processing ceased in December 2001. Thus it is important to note that the majority of these studies were conducted near the end of active operations or following cessation of active mining in early 2001. Also, improper water quality monitoring (sampling and handling) methods were employed during the active life of the mine. Hence, despite the numerous studies, the public and regulators had no way of realistically evaluating environmental performance during the period of active operation.

Our team is sensitive to the criticism that we are comparing the environmental practices at Syama with those in the predominantly developed countries. In part, this is true. Randgold, and their predecessors at Syama, BHP, are both companies based in developed countries, and they claim to operate by those standards. Unfortunately, that has not been the case at Syama, and this report may assist in improving such conditions.

The team is also aware of the practical difficulties of operating a mine according to developed world standards in Mali, or in most other developing country. One specific example that became apparent during our studies: the lack of adequate laboratory analytical capabilities. We, like the mine operators, found that there are no analytical laboratories in Mali capable of performing reliable cyanide or trace metal analyses. For several chemical constituents, adequate labs are lacking in all of West Africa. This same limitation exists in numerous other developing countries. Nevertheless, a reliable solution to these problems must be found if the public and regulators are to have trust in the environmental data presented. No such reliable solution was developed throughout the operational life of the Syama Mine.

6.1 Dissemination of Environmental Information / Transparency

Prior to the present study, none of the environmental reports reviewed and cited in this study have ever been made available to the general public. Thus, the public was not informed about the environmental or socio-economic impacts of this site. These environmental reports had been prepared for the company management and, in some cases, the IFC. Randgold states that these documents had been shown periodically to members of the Malian government. It is clear, however, that the documents were not written in a way that would reveal environmental details to the public or regulators.

Randgold contends that there was no intention to prevent the public from viewing these documents, and, in general, the public demonstrated little interest in these environmental issues. Nevertheless, conferences with Randgold and their consultants indicate that no specific program existed to disseminate information on detailed environmental impacts. Prior to 2000, the mine had no specific manager for environmental issues, despite being in operation since early 1990, indicating the relatively low priority of the environmental program.

The IFC Fact sheet for the Syama Mine (available at: http://www.ifc.org/ogmc/eirprojects/docs/Randgold.pdf), begins by stating that: "An EIA was prepared by BHP-Utah when the mine opened in 1989." SRK (2003) also makes mention of an EIA (PG.4). Judging from the quality of the information reviewed in the present study, it is likely that the original EIA did not contain any substantive environmental data. In fact the Syama reports we reviewed state that no water quality data were collected by BHP prior to 1992.

Only one of the environmental documents we reviewed was available in French, all the rest were in English; none were in Bambara. There had been little substantial communication between the mine operators (both BHP and Randgold) and the Malian authorities regarding environmental issues from about 1990 until at least 1999. The various reports make clear that environmental information and conclusions were seldom shared with the SOMISY mine staff, and "There was almost no communication of information to the Malian authorities and the IFC." (Digby Wells, January 1997). The major method of disseminating environmental information to the local communities involved supporting radio broadcasts on Radio Yelen, a Christian evangelical station in Kadiola. Our team interviewed the staff of this station and listened to representative examples of past broadcasts. The contents were essentially public relations presentations and failed to provide substantive environmental information to the public.

6.2 Environmental Reports—Content / Quality

The Syama documents fail to provide the data and information necessary to answer the basic environmental questions the public and regulators most need to know. In fact, it is clear that, with the exception of the recently-completed Conceptual Closure Plan (SRK, March 2003), these documents had not been prepared in a manner suitable to inform the general public. The following is a partial list of the more serious shortcomings in several technical areas.

Hydrogeology

The reports fail to adequately define the specific locations of the ground water, the quantities present, the hydraulic properties of the rocks, and the directions of ground water flow over time. Digby Wells (January 2002) and SRK (2003) both mention many of the same inadequacies. These reports also lack detailed maps showing the locations of environmental monitoring locations and their relationships to other facilities, water bodies, etc. Most of the maps and graphs provided are often unreadable and largely useless.

No significant details regarding environmental monitoring methods were presented for ground waters. For example, well drilling, completion and development details were totally lacking, as were water quality sample collection and handling methods. Analytical details were inadequately presented.

None of the reports present any form of a useful water budget or balance for the site. In fact, several of the reports state that one should be compiled.[6]

Water quality

Most of the water quality data for metals (i.e. copper, lead, mercury, zinc, etc.) and metalloids (i.e. aluminum, arsenic, selenium, etc.) presented in these reports is *quantitatively unreliable* due to the inadequate sampling methods that were employed. Interviews with mine staff indicate that samples were filtered and preservative was added in the mine buildings long after sample collection. This approach is completely contrary

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[6] The company states that a water budget was prepared in 2001.

to internationally-accepted sampling procedures. For decades it has been standard practice to either add preservative to unfiltered samples immediately after collection, or to filter and preserve in the field, at the time of sample collection. *This poor technique likely led to the recording of lower measured concentrations of many chemical constituents.*

Randgold representatives state that correct sample collection and handling procedures were provided to the mine staff, but they were not implemented because the local staff failed to understand the significance of these details. Even if this is correct, no one took responsibility to see that truly representative samples were actually collected. G. Trusler of DWA states that water quality samples from the new boreholes (those constructed in late 2001) have been acidified within a half-hour following sample collection. Because the Malian government provides no independent regulatory oversight and monitoring, we can only accept this assertion.

While the metals analyses (for samples collected during active operation) are largely useless for quantitative purposes, it is also informative to note that no metals data were collected for the three years ending in December 1999 (Randgold, June 2000, pg. 34).

In addition to being collected and handled in an unacceptable manner, the Syama water samples were also analyzed for an inadequate list of constituents. Because mine wastes are chemically quite complex, such water samples from mining sites should include the following:

- <u>field measurements</u> of temperature, pH, and specific conductance
- major cations—calcium, magnesium, sodium, potassium
- major anions- sulphate, nitrate, ammonia, chloride, carbonate (alkalinity), boron;
- metals- aluminum, antimony, arsenic, barium, cadmium, copper, chromium, cobalt, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc);
- cyanide (WAD, weak acid dissociable and Total CN) and related breakdown compounds (metal-cyanide complexes, cyanate, thiocyanate);
- possibly radioactivity (uranium, gross alpha and beta);
- scans for numerous organic compounds, determining organic carbon, oil and grease, fuels, etc.

Several of the metals / constituents that were determined were done so using analytical detection limits that were unacceptably high, thus providing unusable results. The anions (i.e. chloride, nitrate, sulphate, bicarbonate, ammonia), some of the most useful indicators of water quality contamination, were frequently left out of the analyses. No water quality monitoring data were reported for natural radioactivity (i.e., gross alpha and beta, uranium, radium, potassium-40) which can be significant contaminants at gold processing facilities that produce alkaline wastes.

Despite the use of approximately 83 tons per month of cyanide reagent (Digby Wells, 2 Nov. 2000, pg. 8), *cyanide monitoring data were not routinely presented* in most of the environmental reports reviewed. Randgold Resources Ltd., June 2000, Pg. 13-33) presented summary tables showing that *free cyanide* (see explanation below) had been determined for numerous surface and ground water samples, and that they were always below 0.1 mg/L. Several of these reports (i.e. SOMISY and Digby Wells, March 1999, pg. 49; Randgold Resources Ltd., June 2000, Pg. 13-33) also stated that cyanide determinations had been made at least weekly in the mine lab, but none of these data were presented in these reports.

Cyanide used at mining sites is normally in the form of sodium cyanide (NaCN). This white solid dissolves readily in water, yielding sodium ion and cyanide ion. Some of the cyanide ion then converts into HCN, hydrogen cyanide or hydrocyanic acid. The cyanide ion and hydrogen cyanide, HCN, are often collectively called *free cyanide*. Unfortunately, determination of free cyanide is of little or no value for environmental purposes as there is no quantitatively reliable analytical method for determining free cyanide (verbal communication, Dr. Craig Johnson, U.S. Geological Survey, March 2001). Also, this analytical technique fails to detect most of the additional forms of cyanide and toxic cyanide decomposition products that are routinely found in mining wastes (Moran, Robert E., 1998; Moran, Robert E., 2002; Boening and Chew, 1999; Johnson, C.A., et al., 2002). Based on data collected at similar gold mining sites, it is almost certain that significant concentrations of *total cyanide* would have been measured in the tailings during operation, and possibly even now. Furthermore, the World Bank has effluent guidelines for other forms of cyanide (WAD CN and Total CN) which, while they are largely inadequate, would provide more meaningful results---yet such determinations were not performed, or they were not reported.

Randgold confirmed that frequent (weekly) cyanide monitoring was performed at the site. [Les Heads, Project Manager: Environmental, Health and Safety, SOMISY: Email to R. Moran, March 29, 2003; G. Trusler, DWA, confirms that weekly cyanide analyses were performed by the Metallurgical Department on unpreserved samples, and that free cyanide determinations were always low.]

Most gold processing facilities perform frequent cyanide determinations primarily to evaluate the effectiveness of the cyanide recovery processes. Cyanide is one of the most expensive process chemicals used at a gold mine, especially when used in such great quantities—83 tons per month. Such cyanide recovery monitoring could be accomplished using the relatively imprecise free cyanide method. However, this method is not adequate for environmental purposes.

The consultant’s reports make clear that no laboratory in all of Mali could adequately perform routine cyanide and trace metals analyses in water samples, and that this was a problem from the start of the mine operation in about 1990, and continues to the present. Nevertheless, a mine operator must find an adequate solution to such problems, or the public and regulators remain uninformed. No adequate solution was found during the active life of this mine.

Reported Syama specific conductance and pH measurements are essentially useless for quantitative purposes, because they were made in the laboratory, long after samples had been collected. This is especially unfortunate as they are some of the most useful, simple and inexpensive indicators of contamination and general water quality. Since at least the early 1970’s, standard water quality textbooks have stated that pH should be measured *in the field.*

No adequate baseline water quality data set was ever compiled for the area. Without such (statistically-adequate) baseline data it is not possible to reliably determine whether contamination has occurred and what processes are causing it. Thus, it is difficult to hold a company responsible for negative impacts that might occur. Some of the Syama reports have disingenuously suggested that baseline water quality should be considered comparable to that in the Bagoe River, which is more than 20 km away, and which is not in the mineralized zone.

Syama ground water monitoring lacks historical continuity. That is, the same wells have not been monitored throughout the operational history of the mine. The original wells constructed by BHP were monitored, somewhat sporadically, by both BHP and SOMISY, until they showed obvious indications of contamination. At that point, it was stated that several of these wells had construction problems and would be replaced. Unfortunately, it is all too common to observe this pattern at numerous mine sites where contaminated wells, which had apparently functioned correctly for years, are abandoned, thereby destroying the historical perspective.

G. Trusler, DWA, states that new wells were constructed in late 2001 because most of the original wells had been too shallow, and that there had been no attempt to “disguise” contamination. He also notes that the new wells were located very near the original geographic positions of the previous wells. Nevertheless, these new wells were not installed until after active mining had ceased, thus the public and regulators have no adequate means of comparing pre-mining, early, and post-mining conditions.

A comparison of the World Bank water quality guidelines with those from other international sources (see Appendix 3) indicates that they are inordinately lax, and the application of these guidelines at Syama contribute to the shoddy monitoring. As an indication, Digby Wells (2003), pg. 21-22 describes water at two surface water points in the following manner: “This water is not fit for livestock watering or human consumption but meets World Bank guidelines except for iron on occasion.”

The following comment (Randgold, 31 March 2001) seems to sum up the unenlightened view regarding Syama water quality monitoring: “The site has had no reports from downstream users of the water source that water quality is substandard. We conclude there has been no net effect on downstream users apart from aquatic life immediately. Waste rock stacks do not contribute to pollution.” Firstly, unacceptably high concentrations of numerous chemical constituents often cannot be detected without analysis of samples because they may not generate any unusual taste or smell. Secondly, this attitude implies that it is the responsibility of the villagers to monitor water quality, not the company’s. This stance is clearly counter to internationally-accepted best practices.

Geochemical information

Any adequate EA or similar report should include tables summarizing the following:

- Elemental composition of the rock types to be mined and the elemental composition of the various waste types, including tailings, waste rock, etc. Such a table should summarize simple statistical data from many samples of representative geological materials (i.e. number of samples (n), range of values, mean, median).
- Acid-base accounting data, including sulphide content (summarized statistically as described above) for all ores and wastes. These data should be tied to figures of the ore body (plan views and cross sections) that allow the reader to determine whether the geologic materials have been adequately sampled.

In the Environmental Audit and Site Visit Report, Syama Gold Mine; Jan. 2002, Digby Wells states that such geochemical sampling and testing should have been performed. These data should have been collected during the exploration phases and would normally be reported in any reasonable EA prior to the beginning of active mining. None of these types of geochemical information were collected during the active life of the mine. Following mine closure, DWA prepared a report (DWA, Mar. 20, 2002) that discusses some of the basic geochemical characteristics of selected rocks at the site. Unfortunately, such a report should have been conducted during the exploration phase, prior to 1990, and should have been much more detailed. This report was based on only 8 samples, all from different rock types. Most similar, reliable, studies at other mines would evaluate at least tens of samples per rock type for acid-base accounting (ABA) characteristics, and would have included numerous long-term kinetic tests, often of one or more years duration. The DWA report contains some telling words at the end of the opening paragraph: "There is a question regarding the choice of samples and whether they are representative of the ores. For this reason, the interpretation should be viewed in this prejudiced context."

This report also discusses results of a single Meteoric Water Mobility Procedure (MWMP) test (that was conducted on a composite sample blended from all the rock types, in an attempt to indicate the expected quality of rock effluents. Because the present report is intended for a general audience, this is not the place to discuss the details of geochemical testing. Nevertheless, it should suffice to say that such an approach---using a single, composited sample--- is largely useless when it comes to predicting future water quality. Also, it is well known amongst geochemists, that short-term (10 day) MWMP tests are of little or no value for predicting long-term water quality.

The geochemical data, or rather the lack of them, make clear that none of the parties---BHP, Randgold, the IFC, or the Malian government---were sufficiently concerned with the ability of these rocks and wastes to release contaminants until the mine was about to close.

Despite these and other *serious* inadequacies, the report together with our site observations allow us to draw several general conclusions regarding the chemical reactivity of the pit rocks, tailings, and waste rocks. These are discussed in subsequent sections.

Chemical / Waste Information

The documents reviewed lack detailed information summarizing all of the chemical reagents, explosives, oils, fuels, and other potentially toxic substances (i.e. herbicides, pesticides, etc.) used and stored at the site. Such summaries should include the quantities used per month or year, and their common chemical names (in addition to their commercial names), etc.

These reports contain no discussion of the potential toxicity of these compounds and materials to various forms of life. Even the commonly used flotation compounds such as xanthates can be toxic to aquatic life (Australian Government Publishing Service, 1995). For example, Digby Wells (2 Nov. 2000, pg.8) reports that the mine utilized about 6,000 kg per month of methyl isobutyl carbinol (MIBC), which can be toxic to workers if inhaled or absorbed through the skin. In fact, MIBC is listed on the U.S. Centre for Disease Control's compilation entitled "Documentation for Immediately Dangerous to Life or Health Concentrations," which is available at: http://www.cdc.gov/niosh/idlh/108112.html. Presumably this chemical would also be toxic to aquatic organisms. None of these toxicity issues are mentioned.

Lastly, none of the Syama soil and water environmental monitoring detects any of the potentially-toxic organic compounds (process reagents, fuels) routinely used in massive quantities at mine sites.

6.3 Site Contamination

Ground and Surface Waters

Local ground waters and surface waters have been contaminated by ground water seepage and surficial spills from the tailings impoundment, and by runoff from the process facilities and other waste sources. As early as 1996 (Digby Wells, January 1997), the Syama consultants were reporting that seepage and spills from the tailings were contaminating the local ground water and “the river water below the tailings dam.” Observations made during our site visit in March 2003, indicate that most of the same sources continue to contaminate local surface and ground waters (see Appendix 3).

The historical data in the references cited and the data from our samples confirm that local surface and ground waters have been negatively impacted by increases in concentrations of mobile salts, and major ions. Unfortunately, the poor quality of the historical monitoring data makes conclusions about the release of other chemical constituents (metals, metalloids, organics, cyanide forms, etc.) less certain.

Randgold and their consultants, Digby Wells and Associates (DWA), agree that water contamination has occurred, but contend it is limited to increases in concentrations of salts (salinity), and that concentrations of other chemical constituents are largely unimpacted.

It has been argued that when this mine began in 1989-1990, tailings impoundments in general were not constructed with synthetic geomembrane liners and therefore the lack of one is not a reasonable criticism. However, at numerous sites around the world tailings impoundments had such liners in the 1980’s and even in the late 1970’s. The mine operators should have known that ground waters would be contaminated as result of an unlined impoundment.

Randgold further contends that the tailings impoundment was constructed without a liner because the original operators assumed that only oxide ores would be mined. If one charitably assumes this was true for the original operator, BHP, it does not explain the subsequent decisions by Randgold, once they knew they would be mining in sulfide-rich ores. More to the point: tailings from oxide ores also generate contaminants capable of contaminating nearby waters, thus liners are routinely installed.

Air Emissions

Several Digby Wells reports state that the process plant equipment operated so poorly that air emissions were obviously contaminating the local air, soils, plants, etc. It is clear that air monitoring focused on sulphur dioxide and particulate emissions, but generally failed to monitor other potentially toxic constituents. G. Trusler, DWA, states that one or two samples for arsenic content were also collected. The results of these samples are unknown to us. Digby Wells (2 Nov. 2000), pg. 7 reports that air emissions are very high; the ES (electrostatic) precipitator is "… not working at all." Page 20 of the same report states that: "The stack sampling for dust content has not been done for at least a year, presumably because the values will be beyond the sample range and exceed IFC guidelines." A Randgold report from 2001 states that excess dust emissions were discharged by the roaster stack (Randgold, 31 March 2001). Criticisms of air quality operations were found in documents produced by Digby Wells throughout the period 1997 to late 2001, as mine closure was being planned.

Oils and Fuels

Oils and fuels were contaminating soils and waters in the process plant area, tailings seepage to ground and surface waters, and in the waste rock areas. The Annual Monitoring Report released at the time actual mining was ending (Randgold, 31 March 2001), states that oils were observed migrating from the power generating and workshop areas. This same document (section 3.1) also states that oil drums were placed in a solid waste disposal area constructed on the northern waste rock stack, and that the area was leaking. It further notes that, "….. the area in the immediate vicinity is polluted." All of the wells monitored in the Digby Wells Jan. 2003 report showed some level of oil and grease contamination. Some of the presence of oil and grease in water analyses probably results from the spreading of oil on local roads and the airstrip to settle the dust. Most mine sites in developed countries spray water on roads for dust suppression.

Waste Rock Piles

It is reasonable to assume that Syama waste rock piles contribute to contamination of local surface and ground waters during the rainy season and storm events. This is true at most hardrock mine sites throughout the world. Degraded drainage from waste rocks does not require the production of acid leachates, but can also occur under neutral and alkaline pH conditions.

As stated previously, no adequate rock geochemical testing has been performed at the site. None was conducted while the mine was actually operating. Mine sites in developed countries are routinely required to perform detailed geochemical analysis of potential waste rock materials *prior to* the commencement of mining, so that logical waste disposal decisions can be made. The geochemical report previously cited (DWA, Mar. 20, 2002) fails to provide any detailed analyses of the actual waste rock materials. The DWA data indicate that some of the rocks (not waste rock, specifically) has a low or insignificant tendency to generate acid, as one would expect from the shallow oxide zones. The meager data also indicate that some of these rocks have significant neutralizing capacity, and would thus be useful for preventing the formation of acid leachates. Three of the eight rock samples analyzed show some potential to generate acid leachates, or as a minimum, the potential is uncertain. While these three samples also contained significant neutralizing potential, it is incorrect to assume that net acid would not result from reaction of these rocks. Frequently the neutralizing minerals react much more rapidly than the acid-producing minerals, so that initial alkaline leachates may subsequently become acid.

The number of ABA samples is totally inadequate, and especially inadequate for characterizing the acid-producing-tendencies of the deeper, sulfide rocks. Such rocks would undoubtedly make up the majority of the new waste rock if the mine were to reopen. Once again, all waste rock has a tendency to release elevated concentrations of chemical constituents because the broken waste rock has increased rock surface area that is chemically reactive---regardless of the presence or absence of acid-producing minerals.

Given that much of the waste rock was mined from the sulfide zones, that waste rock piles around the world usually yield degraded leachates, and the fact that these piles are not revegetated, it is reasonable to assume the existing Syama waste rock piles are degrading local water quality. Clearly, the public and regulators would be able to evaluate these conclusions more definitively if monitoring wells had been constructed downgradient from these piles.

As noted above, some waste rock piles have been used as disposal sites for solid wastes and oils, creating additional sources of contamination.

Randgold contends that all waste rock piles will eventually be recontoured and covered with clay (saprolite). Unfortunately, such reclamation has not occurred, and may not occur in the near future if the mine reopens.

Open pits

The lower walls of the main pit, obviously within rock zones of higher sulphide content, are yellow-orange stained, indicating that acid drainage is occurring. This means that acid, metals, and several non-metal loads are being added to the pit lake waters and local ground waters. The quality of these waters varies drastically depending on whether samples are collected during wet or dry periods. Additional contamination (nitrate, ammonia, oils) at both pits and waste rock areas would also result from the washing of explosive residues (ANFO ammonium nitrate + fuel oil) into these waters. The Environmental Audit Report (Digby Wells, 2 Nov. 2000, pg.5) notes that water from the main pit is pumped down the roads surrounding the mine. The fact that this water is not contained means it therefore is liable to contaminate soils, plants or waters it contacts and could easily percolate into ground waters.

Rangold states that acid pHs have never been measured in the site pit lakes, so that degraded pit water quality is not a concern. As the historical water quality data were collected incorrectly, it is not possible to defend this argument. Also, local pH measurements have always been made long after sample collection, in the lab not the field, thus they are useless for determining accurate pH readings. The colors of the lower main pit walls indicate that sulphide oxidation is occurring, and that chemical constituents in the wall rocks are being mobilized. It is likely correct that the local neutralizing potential of these rocks has been sufficient to prevent significantly depressed pHs from developing in the pit lake itself. However, it is nevertheless likely, that the pit lake waters are chemically degraded. Also, if the mine reopens, production would occur predominantly from the lower sulphide-rich zones, further degrading pit lake water quality.

Pit lake waters, like leachates from waste rock piles, often become chemically degraded even when acid conditions do not develop. Many metals and metalloids also become mobilized under alkaline pH conditions.

6.4 Facilities Management

The following comments discuss conditions during both the operational and post-closure phases of the mine site. It is recognized that certain practices and conditions appropriate during operational periods, such as public access and security, might be different during the closure period. Wherever possible, such distinctions have been noted.

It appears that environmental reviews conducted by the Malian government were limited to sporadic evaluations of revegetation success at various facilities.

Remediation

Despite the halt of active mining in early 2001 (late 2001 for mineral processing), many of the site facilities and disturbed areas are still not remediated. The mine site may, in fact, not receive much additional remediation any time soon due to the fact that Randgold signed an option agreement with Resolute Mining in April 2003. Thus, if conditions are deemed financially-suitable, the mine may reopen.

Some remediation, such as selected waste rock dumps, has been partially completed but seems inadequate, or only partially successful. The revegetation experiments at the tailings have clearly been unsuccessful. The following describes impacts that still represent problems, despite some attempts at remediation. The impacts that are normally the most costly to remediate, such as ground water contamination, have not been adequately addressed by the company.

The majority of the waste rock piles have not been adequately recontoured or revegetated. SOMISY has made some attempts at revegetating many of these areas, but they have not succeeded. Similar attempts have been made to cover the tailings with topsoil and to plant various seedlings. Information from the SOMISY staff indicates that essentially all of these plants failed to survive.

Randgold's consultants prepared a Mine Closure and Reclamation Plan (Digby Wells, 16th July 1999), which presented preliminary descriptions and costs for mine reclamation totalling $ 3,463, 363 (US). Another "Conceptual Closure Plan" (SRK, March 2003) has also been prepared, but the copy given to the authors did not include costs. (This document is discussed further below.) Presently it is uncertain whether the mine will be reopened or will remain closed. Thus, there is no way of knowing whether the remediation activities proposed in these closure plans will be initiated or completed. It is also unclear whether sufficient funds exist to perform these reclamation tasks.

Waste Rock Disposal

Waste rock was deposited on the land surface with no compacted clay or any liner underneath. Given the probable chemical composition of these rocks, soluble chemical components are being leached into the underlying ground water. It is common practice around the world to deposit waste rock in this manner, but it is inaccurate to claim that such practices do not degrade local water quality. Such degradation almost always occurs. The 2003 Steffen, Robertson & Kirsten (SRK) report states that this is a concern and also notes that no monitoring wells have been constructed to shed light on this potential contamination.

Waste rock dumps had internal cavities which Digby Wells (2 Nov. 2000, pg. 12) described as dangerous. Other wastes were sometimes deposited on top of these porous waste rock piles , such as oils (see discussion above), presenting a perfect situation for soil and water contamination.

Syama waste rock piles are presently unstable and are potential safety hazards.

Pits

Numerous reports state that the walls of the main pit are unstable, failing, and dangerous. This is reiterated in SRK (2003). The water-filled pits at the Syama Mine act as breeding sources for mosquitoes and other insects, and increase the chances of villagers contracting malaria.

Tailings

In addition to the company's environmental consultants' frequent comments about the contamination of surface waters caused by runoff and spills from the top of the tailings, they also note that the tailings dam leaks, indicating seepage into ground water as well. Digby Wells (2 Nov. 2000, pg. 10-11) states that there are areas where surface water flows towards and into the dam.. This situation has existed for several years and persists in the present. [G. Trusler, DWA, contends that this condition was temporary, implying it has been corrected.] The same Environmental Audit Report (pg. 24), which was conducted shortly before the mine was closed, listed the following "….problems at the mine which require urgent attention:"

-Reduce emissions from the main stack, etc.
-Control surface water and ground water contamination from the plant, pit and tailings dam.

Noise Monitoring

No noise monitoring was conducted by BHP (Randgold, June 2000). It appears that none was performed by Randgold either.

Solid Wastes

Digby Wells (2 Nov. 2000, pg. 14) reports that solid wastes were disposed of in pits dug into the northern rock dump. As reported above, oils were disposed here, but the nature of other solid wastes is not made clear. This discussion also states that oils were disposed of in pits and around the site in an uncontained manner.

Citizen Health and Safety

While the mine was operational, security was likely quite competent and villagers could only gain access with official permission. Under present conditions, however, portions of the mine site are not fenced, allowing both humans and animals access to the facilities. Some local residents use this access to water their cattle at pit lakes during the dry season and to collect sediments from which they wash and extract small amounts of gold. Other citizens reportedly fish in the pit lakes and other surface waters, including the contaminated river-coffer dam.

Such open access puts the public at risk from accidents at the pit lakes, such as rock falls and drowning. The fish caught in the various water bodies are likely contaminated and may be a health hazard. Animals allowed to drink from such contaminated waters and graze on plants growing from various mine wastes may develop contaminated milk. Individuals,, especially children, may come in contact with abandoned hazardous chemicals or even undetonated explosives. It would appear that the public has not been adequately informed about the details of such risks.

Worker Health and Safety Issues

The 1996 Site Visit Report (Digby Wells, January 1997) states that during BHP's operation, there was no formal safety training program, and that no routine medical monitoring of workers was done. It also states that "The worker doing cyanide transfer at the leach section was covered in cyanide dust." (p. 5.) The same report mentions that malaria was a major worker health problem, and several reports describe mine practices that had made mosquito breeding a greater concern. This report also noted that the potable water for the mine workers had no residual chlorine content.

Uncontained cyanide at the site was a problem, as is made clear in the 1999 Annual Monitoring Report (Randgold Resources Ltd., June 2000, pg. 45). It states that, prior to December 1999, solid cyanide was not stored in a secure manner. Of greater concern is the comment that "high cyanide levels in the tailings are treated by dousing with sodium hypochlorite." Unfortunately, such treatment leads to the formation of a highly toxic gas, cyanogen chloride (Flynn and Haslem, 1995; Boening and Chew, 1999).

Digby Wells, states that the chemical storage area (where sodium hydroxide, various acids, etc. was stored) was insecure (Environmental Audit Report, 2 November 2000 pg. 9). This seems to mean that toxic chemicals were unreasonably exposed to rainfall and possible dispersal.

Domestic Waste

A contractor was paid CFA 246,000 (approximately $339) per month to collect domestic waste from Fourou village. These materials were later simply dumped in the bush (Digby Wells, 2 Nov. 2000, pg. 20). This same document (pg. 22) states that numerous other solid waste sites exist in unknown locations.

Security

Most mine sites, including Syama, contain massive quantities of basic chemicals that can easily be utilized as explosives. The standard explosive used at the mine site is ANFO, a combination of ammonium nitrate and fuel oil.. Additionally, the simple combining of cyanide (solid or liquid) with calcium hypochlorite (household bleach), creates an extremely toxic gas, cyanogen chloride.

There is no evidence that security problems related to these chemicals existed at the Syama Mine when operational, and it is assumed that all such chemicals have been removed from the facility. Nevertheless, the presence of massive quantities of such chemicals at all operational mine sites makes clear the need for serious and competent security capabilities before and after closure.

6.5 Policy Findings

Roles of Parties

Several parties have contributed to the poor environmental performance and lack of transparency at Syama. Clearly, the operating companies (BHP and Randgold), the Malian government, and the IFC have all been aware of the shortcomings, to varying degrees, for more than 10 years. [There were frequent comments in the reports reviewed stating that the report findings had been sent to the IFC, and that IFC representatives had made several visits to the mine.] Yet, few substantive improvements have been made. There appear to be few real financial or legal consequences in Mali for such poor performance. Mining companies routinely sell negatively-impacted sites to other mining companies, usually smaller, junior companies, and depart with little or no liability.

Likewise, the lack of transparency in mining projects in Mali and elsewhere, means that civil society is unable to provide the necessary pressure to promote responsible environmental behavior. The low level of technical knowledge on the part of the general populace and most of civil society also perpetuates this imbalance.

Thus, communities in Mali are generally faced with a trade-off. If a mine project is approved, some citizens will obtain jobs and some sectors of the local economy will benefit, in the short term. However, the region in general will also be assured of some negative environmental and social impacts in the long-term. Given the present system of company self-regulation and lack of monitoring or enforcement by the Malian government, these impacts, such as water contamination, will not be.

Discussions with the local citizens near the mine make clear that they are tremendously disillusioned that the promised economic and social benefits have ended as soon as the mine closed. In addition to the loss of employment and a languishing local economy, they decry the departure of some of the population. For example, the formerly active Fourou Cite, which was built by the mine, is now largely deserted and there has been significant out- migration from the village of Fourou. Even the infrastructural improvements they assumed would have long-term benefits (schools, health centers, water pumps, electricity) largely lie idle or are in disrepair due to the lack of technical support and funds. Some of this disillusionment comes from unrealistic expectations, or possibly from lack of full disclosure during the early project stages. Unlike at almost all other modern mine sites, a high-quality paved road was not constructed. Because the gold was transported via plane from the site airstrip, local roads were of secondary importance.

Mining companies are quite adept at removing minerals from the ground, but have not proven particularly successful at promoting development. Yet, at places such as Syama, they are responsible for both extracting the minerals and promoting socio-economic development activities. Our observations show that both BHP and Randgold did not conduct adequate consultation with the local villagers. Thus the various socio-economic projects they attempted were not "owned" by the local populations and most of these projects have failed as sustainable efforts.[7]

The IFC is also faced with an inherent dilemma. They were a lender, an interested financial partner in the project, and at the same time claim to function as a development agency. Observations at Syama indicate that the IFC operates much more as a taxpayer-subsidized bank rather than a public body promoting development.

In 2002, the IFC sold its shares in the Syama Mine, and so is no longer a partner. Nevertheless, it seems reasonable to ask: Given the mineral and economic realities of this mine, did the IFC undertake adequate studies to evaluate the reasonableness of investing in such a project? That is, the high sulphide content of the Syama ore made processing expensive, when compared to comparable mines with predominantly oxide ores. SRK (March 2003, pg.7- 8) describes early exploration drilling activities (by BHP) that seem to have inadequately defined the extent of the sulphide ores, when compared to drilling at most comparable gold sites in the developed world. Data provided by Randgold shows that Syama initially produced gold at relatively low cost, presumably because relatively little of the ore had significant sulphide content. By 1997, however, the break-even production costs were almost equal to the world price of gold per ounce. Syama gold production costs were about $ 242 per ounce in 1994, while the world gold price was about $385. (While the first Syama gold was produced in January 1990, we have no figures for pre-1994 production costs.) By 1997, however, costs had risen to about $338 per ounce and world gold prices were between $345 and $360 (Les Heads, Randgold data, and SOMISY and Digby Wells, March 1999, pg.18). If these figures are accurate, there was little room for profit.

No company or bank should be expected to reliably predict the price of gold several years in the future. However, it is normal practice to perform sufficient exploration drilling and feasibility studies such that production costs can be adequately predicted many years forward. Thus, one might question the soundness of the IFC's business investment,

[7] The company states that local communities were involved in designing such projects.

especially when one considers that long-term environmental and social impact costs were not factored into the cost-benefit analysis.

Financial Assurance

Digby Wells, 1997, Interim Environmental Audit Report, pg. 10, mentions a Financial Provision, stating that the mine is currently making provision for $25,000 per month for rehabilitation activities. It was not possible in our investigation to independently verify whether such a fund has been established or is adequate to fully cover rehabilitation costs. The company states that the fund does exist.

Despite the contamination described previously, it appears that none of the past mine operators or partners have legal or financial responsibility to fully reclaim the site. It is reasonable to assume that now, or ten years in the future, local communities may wish to use some of the presently degraded ground water for agriculture or domestic purposes. In order to render this water potable, some party would need to pay to treat the water---a very costly endeavour. Clearly environmental costs such as these have not been calculated when the costs and benefits of this project are discussed.

Some form of sound financial assurance covering environmental liability needs to be developed in Mali in order to hold companies responsible and ensure that Malian citizens do not bear the costs. Many developed countries governments now require mining companies to provide some form of reclamation bonding---guaranteed funds intended to ensure that operations are conducted responsibly and that limit public liability in the event that mining companies fail to remediate adequately. Enforceable provisions also need to be promulgated to ensure that the local population receives funding to promote sustainable socio-economic development.

This process most often requires the mining company to purchase a bond from an insurance company, which is then held by an independent trustee. It is presently common in the USA and Canada for bonds to cover all anticipated costs of post-closure earth moving and revegetation. However, programs requiring mining companies to post bonds covering long-term water quality problems are in an early stage of development and application. Regulators have usually required companies to supply adequate financial assurance only for impacts they can reasonably *predict* will occur. The predictions have usually been developed by consultants paid by the mining companies and results have often been too optimistic. As a result, post-operational impacts, especially the very expensive impacts involving long-term water quality problems, were often unforeseen, leaving the governments with inadequate funds to complete (or often begin) a clean-up.

RECOMMENDATIONS OF THE KADIOLO RESTITUTION WORKSHOP

The restitution workshop held in Kadiolo grouped around 45 participants representing the state administration, technical services, the mining company, local populations, the press, civil society, the Oxfam America team, and experts. At the end of the meeting, recommendations were formulated in the areas of socio-economic aspects, the environment/ecology, information/communication, and management of the post-mine era.

An analysis of these recommendations highlights three overall themes:

- The socio-economic development of local communities, protection of the environment, access to information, transparency and the management of the post-mine period, are priority issues to which the state, the mining company, and the financial institutions should pay particular attention in evaluating and implementing gold mining operations.
- The main actors, particularly the civil society and local populations, must commit to being involved in the issues of gold mining at Syama, if this activity is to be an instrument in development and poverty alleviation.

- The state, with its ambiguous role as both shareholder and department of control, is simultaneously responsible for developing legislation to provide incentives for the growth of the mining sector and monitoring activities of mining companies. In addition, the state relies upon resources generated by the mining sector to support the national economy. This situation constitutes a major weak weakness that prevents the state from fully and independently leading coercive measures against the mining company.

7.1 Socio-economic Aspects

- Role of the state and technical services
- Brief the local councils and civil society on the content of the agreement between the state and mining companies;
- Strengthen the intervention capacity of local populations to implement micro-projects;
- Inform and sensitize the local populations on Mali’s environmental policy;
- Prioritize issues of health and water supply in the contracts that the state holds with mining companies;
- Transfer part of the state revenue from the mine to local government, in accordance with the regulations governing decentralization and the management of local resources
- Role of the mining company
- Respect the laws and the agreements signed with the state;
- Create health, sanitation and water facilities that fulfill the real needs of the population;

- Adopt a policy of recruitment and employment of residents as far as their competencies allow.
-
- Role of financial institutions
- Ensure the independent monitoring of the improvement of living conditions for the local populations;
- Set up a mechanism for equitable distribution and a transparency of revenue generated by auriferous resources.
-

Role of local communities

- Support community-development programs based on self-sufficiency and the real needs of the locality;
- Diversify sources of income, reinvesting earnings from mining production into sustainable activities;
- Cultivate a spirit of savings at the local level.
-

Role of civil society

- Get training and build specialization in the mining sector as a basis for advocacy;
- Accompany mining communities to effectively oversee commitments made by the mining company;
- Train, sensitize, and strengthen the population’s capacities in the optimal use of the mine’s benefits.

7.2 Environment /Ecology

Role of the state and of technical services

- Strengthen institutional capacity for the monitoring of the mining companies;
- Strengthen legislative instruments and develop the environmental code;
- Adapt and apply laws governing environmental protection;
- Conduct independent environmental evaluations;
- Regularly inspect the management of chemical products used in the mines;
- Demand the restoration and rehabilitation of the mining sites.
-

Role of the mining company

- Abide by the recommendations of the impact study;
- Involve local communities and civil society in the monitoring of restoration and rehabilitation programs of the mining sites.

Role of the financial institutions

- Support the financing of independent environmental studies;
- Ensure the monitoring of rehabilitation programs for the sites.

Role of civil society

- Strengthen the technical capacity and environmental knowledge of local populations;

- Carry out environmental studies to ensure the effectiveness of existing systems;
- Lobby for protection of the environment.

Role of local communities

- Share traditional knowledge for better management of natural resources;
- Participate in the monitoring of restoration and rehabilitation of the sites;
- Initiate environmental programs at the community level.

7.3 Information / Communication

Role of the state and of technical services

- Ensure the wide dissemination of legislative and regulatory laws;
- Organize an open house to sensitize and inform the populations about Mali's mining industries;
- Create a platform for dialogue about environmental issues in mining areas.

Role of the mining company

- Ensure greater transparency in the dissemination of information concerning mining operations, involving local communities and civil society;
- Ensure a wide distribution of reports on the impacts of mining and other relevant documents pertaining to the lives of local populations.

Role of the financial institutions

- Provide a greater visibility of the mining site and publish experiences of good and bad practices at the international level;
- Strengthen the capacities of civil society to play an intermediary role in the dissemination of information at the national and local levels;
- Encourage and facilitate local and regional cooperation.

Role of civil society

- Participate in communication programs set up by the mining company;
- Develop a strategy of communication and experience-sharing with local communities;
- Sensitize, inform, and train the populations and the local government.

Role of local communities

- Relay information through the traditional communication channels;
- Sensitize leaders of opinion on communication and the dissemination of information regarding mine activities.
-

7.4 Management of the Post-Mine Era

Role of the state and technical services

- Demand a report on the closing of the mine, including the costs, chronological planning and the program of rehabilitation of the sites;
- Create a framework of cooperation and follow-up of the closing plan involving all the actors concerned.

Role of the mining company
- Set up a rehabilitation fund at the beginning of operations that covers the total expenses;
- Carry out the rehabilitation of the sites respecting the calendar and work proposed.

Role of the financial institutions
- Require the establishment of a rehabilitation fund;
- Follow and monitor the implementation of the rehabilitation program abiding by the established chronology;
- Certify the execution of rehabilitation work.

Role of civil society
- Follow the progress of the rehabilitation program proposed by the mining company;
- Check the functionality of the existing equipment and facilities;
- Encourage the local populations to reinvest in sustainable development projects.

Role of local communities
- Participate in the rehabilitation program of the mined areas;
- Sensitize and encourage the target groups to reinvest earnings in lasting income-generating projects;
- Encourage communities to participate in productive investments and savings.

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APPENDIX 1: CHRONOLOGY OF ACTIVITIES AND RESEARCH TEAM MEMBERS

DATES	ACTIVITIES	PLACE/LOCALITY
March 10-11	- Initial contact with partners - Document collection and exploitation	Bamako
March 12	- Travel Bamako- Sikasso	-
March 13	- Meeting with Sikasso regional authorities - Travel Sikasso- Kadiolo - Meeting with Kadiolo local authorities - Travel Kadiolo-Syama	Syama/Kadiolo
March 14	- Briefing with managers of the mine - Information analysis - Meeting with local authorities - Visit to the mine and adjoining facilities - Visit to rehabilitated sites	Syama/Tembiléni/Bananso
March 15	- Visit to development projects and to health centre - Visit to drillings and water sources - Visit to neighboring villages and the mining town	Fourou/Syama/Loulé
March 16	- Meeting with the local communities of Tembiléni	Tembiléni
March 17	- Collection of supplementary data	Syama/Fourou
March 18	- Summary meeting - Preparation of the restitution workshop	Syama
March 19	- Travel Syama-Kadiolo - Restitution workshop in Kadiolo - Travel Kadiolo-Sikasso	-
March 20	- Return to Bamako	-
March 21	- Meeting with Randgold managers	Bamako

Research Team

Seydou KEITA	Malian Consultant
Bob MORAN	International Consultant
Tiémoko Souleymane SANGARE	Executive Director, FDS
Jaffar THIAM	Translator
Jenn YABLONSKI	West Africa Program Officer, OA

Invited Delegates

Mamadou BITEYE	West Africa Senior Program Officer, OA
Daniel OWUSU-KORANTENG	Executive Director, WACAM
Keith SLACK	Policy Advisor, Extractive Industries
Ibrahima THIAM	West Africa Program Regional Director, OA

ANNEX 2: LIST OF PARTICIPATING ORGANIZATIONS AND PEOPLE

PLACE	NAMES	INSTITUTIONS	POSITIONS
FOUROU	- Issa KONE - Souleymane KONE - Touna KONE N°1 - Touna KONE N°2 - Sékou TOURE - Manin SANGARE - Zoumana SOGODOGO - Moussa BAGAYOKO - Adama DIARRA - Yaya BERTHE - Seydou KONE -Moussokoura SANOGO - Ouazéné KONE - Aly KONE - Lassina KONE - Drissa KONE	- District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou - District of Fourou	- Imam - Member Syama Consultative Committee - Notable - Notable - 3rd Deputy Mayor - SLACAER representative - Notable - Notable - Youth Representative - NGO AESS - Notable - Women's Representative - Hunters' Representative - Farmers' Association Representative - Notable - 1st Deputy Mayor
SYAMA	- Lamine SARRE	- Randgold	- Branch manager
TEMBILENI	- Konimba DIARRA - Tiémoko DIARRA - Moumine BAMBA - Yacouba SANOGO - moussa DANIOKO - Yacouba DIARRA - Dramane DIARRA - Yaya DANIOKO - Lamissa DIARRA - Issa SANOGO - Issa BAMBA - Bakary DANIOKO	- Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village - Tembiléni Village	- Village chief - Notably - Former SOMISY employee - Former SOMISY employee - Notable - Village Counsellor - Village Counsellor - Former SOMISY employee - Notable - Notable - Notable - Notable
KADIOLO	- Ousmane TRAORE - Soumaîla DAGNOKO - Amadou SAMAKE	- Kadiolo Sub-prefecture - Radio Yeelen - Conservation of Nature	- Deputy to the Kadiolo Prefet - Director - SLCN Representative
SIKASSO	-Boukary SAMASSEKOU - Samuel COULIBALY - Fousséyni DIABATE - Arkoye FASKOYE -Souleymane SOUMANO - Modibo DIAKITE - Dougoufana TRAORE - Aguibou DIAW	- SIKASSO High Commission - DRACPN - AMAP - ANPE - INPS - INPS - ORTM - Regional Branch of Geology	- High Commissioner - Chef Section - Regional Correspondent - Regional Director - Regional Director - Regional Controller - Regional Director - Representative of regional branch
BAMAKO	- Modibo COULIBALY - Mahamadou SAMAKE	- National Department of Geology - Randgold	- National Director - Director of Mining

	- John STEELE - Les HEADS	- Randgold - Randgold	- Director of Operations - Director of Environment

APPENDIX 3: WATER QUALITY DATA, SITE VISIT, MARCH 2003.
SURFACE WATER-COFFER DAM

Variables	Units	DAKAR Analyses		BAMAKO Analyses		Site Analyses	
		Result	Methodology	Result	Methodology	Result	Methodology
Temperature (field)	°C					32.4	
pH value (field)						7.7	
pH value (lab)		7.41	NFT 90 - 008	8.10			
Color	UCV			108			
Turbidity	UTN			24.6			
Specific Conductance (lab)	µS/cm			6430			
Total D. Solid	mg/l			3904			
Calcium	mg/l			849.7			
Magnesium	mg/l			359			
Sodium	mg/l			38			
Potassium	mg/l			10.6			
Total Alkalinity as CaCO3	mg/l			95			
Cloride	mg/l	710	NFT 90 – 014	13			
Sulfate	mg/l			1903.5			
Nitrate	mg/l	4.5	NFT 90 –012	2.30			
Fluoride	mg/l						
Bicarbonate HCO3	mg/l			116			
Carbonate CO3	mg/l						
Total Iron	mg/l	0.812	SAA	1.20			
Mercury	mg/l	< 0.001	SAA				
Arsenic	mg/l	< 0.00032	SAA				
Lead	mg/l	<0.10	SAA				
Total Chromium	mg/l						
Hexavalient Chromium	mg/l						
Cadmium	mg/l	< 0.032	SAA				
Copper	mg/l	0.072	SAA				

Nickel	mg/l						
Zinc	mg/l						
Total Suspended Solids	mg/l						
Biochemical Oxygen Demand	mg/l						
Oil and Grease	mg/l						
Selenium	mg/l	0.0053	SAA				
Molybdinum	mg/l	6	Calorimètrie				
Cyanide(total)	mg/l						
Cyanide(free)	mg/l						
Cyanide WAD	mg/l						

APPENDIX 4: INTERNATIONAL WATER QUALITY GUIDELINES

Variables	Units	WHO Guidelines[1]	World Bank Guidelines[2]	US EPA	US EPA Aq. Life[4]		Canada Agricultural[5]		South African Guidelines[6]		
		Drinking water	Open pit mining	Drinking Water[3]	Acute	Chronic	Irrig.	Livest.	Livestock	Drinking water	Aquatic environment
pH	Units	6,5 -8,5	6,0 -9,0	6.5—8.5	6.5	9				6,0 -9,0	
Conductivity	mS/cm										
TDS	mg/l	1000		500			500-3500	3000	2000	450	
Tot Susp Sol	mg/l		50								
Turbidity	NTU	5									
Biochem Ox Demand	mg/l		50								
Oil and Grease	mg/l		20 (10*)								
Total Phos	mg/l										
Calcium	mg/l								1000	32	
Magnesium	mg/l								500	30	
Sodium	mg/l	200							2000	100	
Potassium	mg/l									50	
Chloride	mg/l			250			100-700			100	
Cl, tot res	mg/l		0.2*		0.019	0.011					
Sulfate	mg/l			250				1000	1000	200	
Sulfide	mg/l		1.0*			0.002					
Nitrate	mg/l	50 as NO3		10 (as N)				100 as NO3	100 as NO3	6	
Ammonia (as N)	mg/l		10 as NH3*		0.002 to 0.325	0.032--0.049				1.0	0.007
Fluoride	mg/l		20*	2.0-4.0			1.0	1.0-2.0	2	1	0.75
Aluminum	mg/l			0.05—0.2	0.75	0.087	5.0	5.0	5.0	0.15	0.005
Antimony	mg/l			0.006							
Arsenic (tot)	mg/l	0.01	1.0				0.10	0.025	1	0.01	0.01
Arsenic (dis)	mg/l			0.05 (0.01)	0.34	0.150					
Cadmium	mg/l	0.003	0.1	0.005	0.0043	0.0022	0.0051	0.08	0.01	0.005	0.15

Chromium, hex	mg/l	0.05	0.05 (0.1*)		0.016	0.011	0.008	0.050	1.0	0.05	0.007
Chromium (tot)	mg/l		1.0 (0.5*)	0.1							
Copper	mg/l	2	0.3 (0.5*)	1.3 (1.0)	0.013	0.009	0.2-1.0	0.5--5.0	2	1	0.0003
Iron (tot)	mg/l	0.3	2 (3.5*)	0.3		1	5.0		10	0.1	
Lead	mg/l	0.01	0.6 (0.1*)	0.015	0.065	0.025	0.20	0.10	0.1	0.01	0.0002
Manganese	mg/l			0.05			0.2		10	0.005	0.18
Mercury	mg/l	0.001	0.002 (0.01*)	0.002	0.0014	0.00077		0.003	0.001	0.000001	0.00004
Molybdenum	µg/L						10-50	500		10	
Nickel	mg/l	0.02	0.5		0.47	0.052	0.2	1.0	1		
Selenium	mg/l			0.05		0.005	0.20-0.05	0.05	50	0.02	0.002
Silver	mg/l		0.5*	0.1	0.0034	0.0019					
Thallium	mg/l			0.002							
Uranium	µg/L			30 (2003)			0.01	0.2			
Zinc	mg/l	3	1.0 (2.0*)	5	0.12	0.12	1.0-5.0	50	20	3	<0,002
Alpha, Gross	picoCi/L			15							
Radium	picoCi/L			5							
Cyanide(total)	mg/l		1.0								
Cyanide(free)	mg/l	0.07	0.1	0.2	0.022	0.0052					
Cyanide WAD	mg/l		0.5								

1 - World Health Organization, 1996—Drinking Water guidelines.

2 - WB Mining and Open Pit Guidelines, August 11, 1995: L:\wpeu\guidelns\current\word6\min_pit.doc, and World Bank General Env.-Proc. Wastewater discharges to surface waters: Pollution Prevention and Abatement Handbook, July 1998: http://wbln0018.worldbank.org/essd/PMExt.nsf/d798dd11401b4e068525668000766b9d/cb6c29e967664f658525666e00705a4e?OpenDocument]---Values denoted by an*.

3 - U.S. Environmental Protection Agency (US EPA) Drinking Water Standards: http://www.epa.gov/safewater/mcl.html#inorganic Arsenic standard in ( ) becomes effective January 2006. Uranium standard becomes effective in 2003. Complete EPA list of regulated constituents is more extensive than listed.

4 - US EPA Water Quality Criteria for Aquatic Life: http://www.epa.gov/OST/standards/index.html#criteria Due to space limitations, A=acute, and C=chronic.

5 - Canadian Guidelines for the Protection of Agricultural Water Uses(1999)—Irrigation (Irrig.) and Livestock (Livest.): http://www2.ec.gc.ca/ceqg-rcqe/agrtbl_e.doc   Due to space limitations, I=irrigation, and L= livestock.

6 - South African Guidelines First Ed, 1996: http://www-dwaf.pwv.gov.za/IWQS/wq_guide/field.pdf

APPENDIX 5: PRESENTATION ON THE MINING EXPERIENCE OF GHANA BY DANIEL OWUSU-KORANTENG (EXECUTIVE DIRECTOR OF WACAM)

I consider the invitation to the Mali meeting extended to me by Oxfam America and Foundation for the Development of the Sahel (FDS), a great opportunity to have a first hand information of the performance of the mining industry in Mali. This meeting has helped me to fulfill a long awaited dream. I am grateful to the organisers for this opportunity.

Upon the advice of the World Bank, many developing countries in Africa including Ghana decided to increase its reliance on the extractive sector for the resolution of economic and social problems of these poor but naturally endowed African countries. In line with this objective, the World Bank actively participated in the extractive sector reforms of Ghana. The result was the attraction of massive Foreign Direct Investment (FDI) into the extractive sector of the Ghanaian economy .The Ghanaian economy could be described as an agrarian economy in view of the contribution of agriculture (the contribution of agriculture to GDP is about 40 percent) to the national economy.

In the Wassa West District of Ghana where WACAM operates, about 8 surface mining companies were concentrated in the area. The Wassa West District is an important agricultural and mining district which is noted for the production of Oil palm, valley bottom rice production, cocoa, vegetables, pineapples, and staples like cassava, plantain, coco yam etc. The Wassa area has a long history of mining spanning over 400 years. Underground mining and indigenous mining had been in harmony with the livelihood activities of the people in the area such as farming with minimal conflicts.

The recent mining boom which is described as the 4^{th} jungle boom in Ghana has generated a lot of conflicts because of its high capital intensive nature and the resulting high degree of environmental degradation .The increased surface mining in the Wassa area has generated conflicts between surface mining and farming; surface mining and small-scale miners usually called "galamsey" operators. Conflicts between surface mining companies and farming The problems of mining includes but not limited to the following;

- Forced evictions
- Human right abuses
- Re-settlement/re-location problems
- Inadequate compensation
- Loss of livelihood
- Air/water pollution including cyanide spillages
- Environmental degradation
- Destruction of sacred sites
- Youth unemployment

Whenever the affected communities raise issues relating to the impact of mining on their lives ,the companies try to use the strategy of ‘blaming the victim ‘by saying that the company sought the consent of the communities in the EIA process before commencing mining .In the Ghanaian situation the EIA consultation process is a flawed. The community consultation is a one-day event where the benefits of mining are espoused to the communities impacted upon by the operations of mining.

The EIA document is a voluminous technical document prepared by experts. Apart from the difficulties in understanding what is in the EIA document, sometimes the document is not easily accessible. In practical terms, the day for the public hearing in the EIA consultation process is a public relations gimmick for what might have been concluded with the traditional and opinion leaders already. The communities have sometimes been forced to react violently to unanticipated mining problems.

The mining industry in Ghana has been referring to the weak regulatory framework of Mali as providing a competitive advantage to Mali for the attraction of mining investment. The Chamber of Mines in Ghana has been pressurising our government to lower mining standards so as to be able to compete with countries like Mali, and Tanzania for mining investment. With the global nature of mining investment, it is easy for poor African countries to get involved in a race to the bottom by voluntarily lowering mining standards and as such minimise the contribution of mining to the economies of the developing nations. The question then is, has the increased reliance on the extractive sector been able to provide the needed solution to the problems of developing countries that heeded to the advice of propping up an extractive sector led economic recovery? The reverse is rather true especially in the Ghanaian situation where we have moved from a poor country to a highly indebted poor country (HIPC). Besides, there is worsening living conditions for mining communities. Though mining is officially reported as being the number one foreign exchange earner, by the Ghanaian mining regulatory arrangement, a greater percentage of the foreign exchange is kept in offshore accounts of the mining companies.

WACAM was formed out of the need to harness the resentments in mining communities for effective engagements with mining companies .We have used advocacy ,lobbying and campaign as legal instruments to hold the mining companies accountable for the negative mining impacts in communities. There is an urgent need to build a strong network of civil society organisations working on mining issues in the West African sub region as a way of protecting the interest of our poor communities against the power of the multinational mining companies. It is also the surest way to increase mining benefits to our respective countries.

I thank you and hope that this would mark the beginning of a long lasting relationship with the mining communities in Mali.

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