Investigating the Occupational Health and Safety Issues Associated with Small-scale and Artisanal Mining in Ghana

Researcher: Danellie Lynas  
School/Centre: Minerals Industry Safety and Health Centre  
University/Institutions: Sustainable Minerals Institute, University of Queensland

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Research aims:  
This research sought to address the following:
• Understand the dynamics of small scale and artisanal mining  
• Identify the safety challenges  
• Gain knowledge to assist better management of associated “flow on” effects related to environmental and social issues

For further information on this action research:  
Contact person: Danellie Lynas  
d.lynas@mishc.uq.edu.au

IM4DC  
Action Research Report
Summary of Action Research Activity

Investigating the occupational health and safety issues associated with small-scale and artisanal mining in Ghana

From a development perspective, artisanal and small-scale mining is one of the most complex economic sectors of Ghana, but the extent of this type of mining is very difficult to quantify and a clear understanding of the country’s Occupational Health and Safety management in the sector is missing. The population engaged in particular in artisanal mining is largely nomadic and illiterate, and no reliable statistics exist for either small-scale or artisanal mining. There are no meaningful systems, processes or models in place from which to develop Occupational Health and Safety programs or deliver them once health and safety challenges have been identified. Additionally, the lack of formality in this sector significantly affects worker safety and the ability of the inspectorate to provide assistance to those engaged in activity.

Artisanal and small-scale mining is frequently labour intensive, and usually employs a semi-skilled or unskilled workforce, often with low levels of mechanisation, production, productivity, recovery and efficiency. Most recently, artisanal miners have been categorised as a vulnerable group in a document released by the United Nations Development Program.

This project involved visits to two artisanal mines, displaced communities and one large-scale mine in Ghana, where interviews were held with key personnel. Discussions were held with the Chief Mining Inspector and Senior Mining Inspectors regarding collaboration, and linkages were established with academics at the University of Mining and Technology in Tarkwa. The report details the findings from these visits and provides guidance on where to target interventions that will have the most impact on improving health and safety within the sector in Ghana. Technical assistance programs that may be developed aimed at improving practices in Ghana could be introduced and customised to the artisanal and small-scale mining sectors in other countries. Programs developed from this project may provide an opportunity to also minimise risk for large-scale mining companies, such as where artisanal and small-scale miners use the same underground workings as large scale mining operations, and may be used to direct further research interventions.
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Prepared by: Danellie Lynas
Research Fellow, Minerals Industry Safety and Health Centre
Sustainable Minerals Institute, University of Queensland
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1. Introduction

From a development perspective, small-scale and artisanal mining (SAM) is one of the most complex economic sectors of Ghana, but the extent of SAM is very difficult to quantify and a clear understanding of the country’s Occupational Health and Safety (OHS) management in the sector is missing. Recent discussions with visiting senior inspectors from the Inspectorate Division of the Minerals Commission (IDMC) of Ghana indicated they would welcome support from the Minerals Industry Safety and Health Centre (MISHC) within the Sustainable Minerals Institute (SMI) to assist with managing the OHS challenges they face within the small and artisanal mining sector. The opportunity to join the Africa-Australia Short Course OHS & E Group in Ghana in October of 2013 provided an opportunity to gain an understanding of the dynamics of SAM and to meet with representatives from the Minerals Commission to further discuss the problems they are encountering, gain an understanding of how they envisage assistance could be provided in this area and better understand the “flow on” effects related to environmental and social issues.

A major challenge facing the IDMC is that the population engaged in particular in artisanal mining activity is largely nomadic and illiterate. No reliable statistics exist and therefore no meaningful systems, formal reporting processes or models are in place from which to develop OHS programs, or deliver them once health and safety challenges have been identified. Additionally, the lack of formality in this sector significantly affects worker safety and the ability of the inspectorate to provide assistance to those engaged in SAM activity.

SAM is frequently labour intensive, usually employs a semi-skilled or unskilled workforce and operates with lower levels of mechanisation, meaning production, productivity, recovery and efficiency are significantly reduced compared to larger scale mining operations. Most recently, artisanal miners have been categorised as a vulnerable group in a document released by the United Nations Development Program.

While in Ghana, SAM sites were visited and interviews arranged with key personnel identified as able to provide insight into the SAM sector as it operates in Ghana. This report details the findings from this visit and provides guidance on where to target interventions that will have the most impact on improving health and safety within the sector. Technical assistance programs developed and aimed at improving practices in Ghana will enable development of programs that can be customised to SAM sectors in other developing countries. Programs developed from this project may provide an opportunity for large-scale mining companies to minimise risk in situations such as where SAM miners use the same underground workings and may also be used to direct further research interventions.

2. Background

Historically, artisanal mining has existed in Ghana both as illegal (galamsey) and legal mining operations and is concentrated within the greenstone belts (Birimian and Tarkwaian) and alluvial areas especially along the Offin, Pra, Ankobra and Tano rivers and their tributaries. SAM has attracted global significance because of its potential to contribute to sustainable
livelihoods in mining dependent economies; however, it brings with it a myriad of occupational health and safety issues pertaining not only to those directly involved in the mining process, but also to their communities and the surrounding environment. It is conservatively estimated that Ghana employs approximately 28,000 people in large-scale mining and over 1 million people in SAM. Historically, two main types of SAM activities exist in Ghana:

- **Surface Mining**
  - Colluvial/eluvial mining using Chinese-made processing equipment known as “Chang Fa”

- **Underground Mining**
  - Hard rock mining employing largely rudimentary methods of mining popularly called ‘ghettos’. Blasting is common practice in underground mining activities

The fatality rates for SAM are reported in the literature as up to 90 times that of large-scale mining in industrialised countries; however, as no formal reporting system exists for this sector it is difficult to accurately ascertain even the level and type of injury sustained, let alone accurately document fatality rates. The informal and unregulated nature of much of the SAM activity means it operates outside the scope of legislation or enforcement on health and safety issues. The knowledge base of health and safety issues is minimal within the SAM sector, the value of using personal protective equipment (e.g. helmets and dust masks, or machine guarding shields) is generally poorly understood and minimal technical expertise in analysis in underground workings leads to high incidences of unpredicted rock falls. Where miners have introduced more mechanised equipment and techniques, it is not uncommon for safety measures to be overlooked in favour of increasing site productivity.

Ghana has largely a prescriptive mining legislation process and a significant challenge faced by the Inspectorate is that while some SAM is legal, much remains illegal. The situation is further complicated by the presence of foreign miners working within this sector. The IDMC has jurisdiction only over legal SAM activity, that is, sites that have a license registered with the Minerals Commission. Obtaining a license is most often cited as a complex and costly process that often is too expensive for the individual artisanal miner to afford. Government efforts are beginning to focus on formalising the SAM sector by encouraging the formation of co-operatives where multiple miners can work the same site and also benefit from health and safety knowledge and management.
Mercury is still widely used by the SAM sector to recover free gold from concentrate. During regularisation in 1989, the Mercury Law was amended to allow small-scale gold miners to purchase limited quantities of mercury necessary for their operations, and largely this practice continues. Metal retorts were introduced in 1993; however, their use was not widely accepted as it was thought some of the gold remained in the retort and the metal took too much time to heat. More recently a glass retort was introduced, but it is costly, fragile and due to the smallness of the heating chamber the gold at times gets stuck in the chamber. While the glass retort has increased the miners’ understanding of how it works, mercury remains the most widely used method of free gold recovery amongst small-scale and artisanal miners across a number of African countries. The University of Mining and Technology (UMaT) has recently been involved in efforts to produce a locally made retort that may be more widely accepted.

Currently there is a significant focus on the environmental and socioeconomic impacts of SAM, and interventions undertaken by organisations working in this area, with limited research directed to OHS issues in this sector. Most of the available literature is focussed on the use of mercury (see box information), the “poverty trap” and negative health impacts of SAM, including substance abuse, alcoholism, gender issues, increased HIV/AIDS and sexually transmitted disease prevalence due to the large predominantly male squatter camps.

The sector is faced with the significant challenge of the continued use of mercury (and sometimes cyanide) in the process of extracting the gold - from both an individual OHS perspective and an environmental perspective. To date, the most significant OHS focus has been on the continued use of mercury. The Mercury Abatement Act and Clean Gold are examples of projects working towards the elimination of mercury from the extraction process used by SAM, with NGOs such as Solidaridad and the Red Cross working within communities. To date, OHS focussed intervention is negligible, in part because of a poor understanding of the sector’s dynamics.

3. Interviews

To better understand the dynamics of the SAM sector, site visits were undertaken and discussions held with major stakeholder representatives working in SAM arena. Three site visits were undertaken. Two formal (legal) SAM sites were visited, one in the Central Area and one the Western Area of Ghana, and one large scale mine site in the Western Area was also visited.

Discussions were held with the major stakeholder representatives working in the SAM arena. These were the Inspectorate Division of the Minerals Commission (IDMC); the Ghanaian National Association of Small Scale Mines (GNASSM) - the oldest and most recognised body representing artisanal miners in Ghana; and the more recently formed Artisanal Mining Africa Network (AMAN). The Africa Centre for Energy and Policy; the Centre for Social Impact Studies and the Energy Commission of Ghana were also represented in interviews. A meeting was also held with the Occupational Health and Safety division of the Ghanaian University of Mines and Technology (UMaT) to assist in understanding their perspective regarding OHS in the artisanal and small-scale mining sector. UMaT is the major University in
Western Africa to graduate mining engineers and has recently signed a MoU with the Ghanaian National Association of Artisanal and Small Scale Miners.

To gain a better understanding of the issues surrounding artisanal and small-scale mining and gather data to inform OHS interventions in this sector, discussions focused on four key areas:

1. Identifying the nature and magnitude of the challenges associated with health and safety in the SAM sector
2. Gaining an understanding of the appropriate tools and processes required to inform an effective OHS system
3. Understanding where to target intervention resources/strategies to have the most impact
4. Investigating potential ways of conveying information in a form that will be understood by those undertaking SAM practices

Additionally, the timing of the visit enabled short-course participants from a number of African countries to be interviewed to gain an understanding of SAM and current management strategies within their home countries. In total, 20 interviews were undertaken over the two-week period of the visit.

3.1. Key Informant Interviews

3.1.1. Inspectorate Division of the Minerals Commission (IDMC)

Prior discussion with the IDMC indicated they would welcome support from MISHC to assist with managing the OHS challenges they face within the small-scale and artisanal mining sector and helping stabilise the system. Discussions were held with key personnel within the Minerals Commission to better understand the problems encountered and how they envisage assistance could be provided in this area.

While lack of formality in the sector significantly affects worker safety, the ability of the inspectorate to provide assistance is limited to those engaged in formal (legal) SAM activity only. During interviews, the Chief Inspector of Mines commented on the high rate of fatalities in the illegal sector, stating it “was too high to quantify”.

Supporting this comment, in a recent press release the Chief Executive Officer of the Ghana Chamber of Mines indicated 300 people were reported to have died in 2012 from illegal small-scale gold mining activities in Ghana.

Whilst the IDMC recognises the many issues associated with managing the SAM sector, it is under-resourced and experiencing:

- Lack of man-power to oversee mining operations and deliver knowledge based courses
- A need for capacity building within, to ensure confidence in delivering and maintaining knowledge transfer within all levels and areas of the inspectorate
- Lack of availability of “local content ” relevant resources and training materials
The IDMC is comprised of senior mining inspectors, district mining inspectors (20) and District Officers covering 9 Regional Areas – all are mining engineers. Assistance focussed on capacity building within the Inspectorate – knowledge transfer, content preparation and co-delivery of an OHS program targeting inspectors and District Officers to enable them to deliver training to SAM operators within each region. District Officers are well placed to deliver information to local mining communities within their respective regions in their local language. An advantage of this model is the “flow-on effect” of information as formal and informal (legal and illegal) miners live and work in close proximity to each.

The challenges identified by the Inspectorate when dealing with the SAM sector are multifaceted. Generally, the population involved in SAM is largely illiterate and itinerant, often locked into the poverty cycle and with either a lack of skills to undertake any other income generating activity, or reluctance to move from the mining sector. Increasingly, foreigners are becoming the active face of informal mining activities.

Significant OHS challenges were identified in discussions, including:

- Generational involvement in artisanal mining – methods employed are essentially traditional and many consider this the only way of operating regardless of identified safety issues
- Poor safety management in SAM leading to loss of lives and property
- Improper handling of chemicals, such as mercury which links to water bodies causing both health and environmental hazards
- Blasting operations – blasting requires inspectorate supervision; however, both formal and informal artisanal miners are known to blast without supervision or permits

Policy challenges were also identified in discussions, including:

- Sale of mineralised land to illegal/informal miners by chiefs and without the formal process of concession license application through the Minerals Commission
- Lack of mineable land from the large-scale mining companies (LSM) and delays in the licensing process and correspondence from the Environmental Protection Agency (EPA) mean mining operations often begin illegally and without Inspectorate knowledge
- Complexity of the process for obtaining a mining license (time and money)
- Environmental issues – dredging of alluvial deposits polluting streams and rivers downstream of operations

Four key areas were identified by the IDMC where targeting of resources and knowledge would have the most impact. These areas align well with the areas of concern raised in interviews with other key stakeholders in the SAM area:

- General mining processes – pit stability, blasting, ventilation, drainage
- Basic health and safety
- Personal Protective Equipment (PPE)
• Environmental issues

An outline of a possible program is provided later in this report.

3.1.2. The Ghanaian National Association of Small Scale Miners (GNASSM)

The oldest and most recognised organisation representing almost 700 small-scale miners in Ghana, GNASSM has recently signed a Memorandum of Understanding (MoU) with The University of Technology and Mining (UMaT) to train members of the association in short courses such as surveying, mineral processing, geology, environmental management and land reclamation. The initial focus of the MoU is to help promote best mining and processing practices, environmental care and general wellbeing of all stakeholders in the small-scale mining sector. In the longer term, it is envisaged it will enable members of the association to acquire professional training to build their capacity in mining technologies. Currently, the program remains under discussion between both parties.

A spokesman for GNASSM indicated that lack of education was a significant contributor to the poor OHS practices of the SAM sector, remarking that:

“Just as one of the main reasons mercury is still used is that no immediate effect is seen by miners, so too other OHS practices, such as inhaling dust when grinding, are not well understood. Long term and cumulative health effects are generally not able to be related to personally by most engaged in the SAM sector”

He indicated better understanding of the risks facing SAM operators would encourage the necessary changes to work practices including using PPE. When asked what would best address the OHS needs of the SAM sector he reiterated that most engaged in the SAM sector were not educated, advocating:

“a process where a short course program was developed and delivered using local language, that had no academic language and was “all practical”

He indicated that help from the Minerals Commission (MC) and in particular the District Officers would be beneficial to a successful OHS focused program. Environmental concerns and geo-technical mapping of sites were also areas where programs may be helpful. He commented that challenges that may impact on a program included bribery and corruption (both are common place within the Ghanaian system).

3.1.3. Artisanal Mining Africa Network (AMAN)

Artisanal Mining Africa Network (AMAN) is a recently registered NGO in Ghana with the goal of:

“moving SSM from the uncoordinated largest employment of unskilled labor and fragmented mining into a well organised and efficient mining industry”
Included in the emerging health and safety related issues facing SAM in Ghana, AMAN has identified the following two key issues:

1. Accidents and loss of lives, especially in illegal mining areas
2. Unsafe handling of chemicals especially mercury and cyanide

As part of a way forward, AMAN is advocating:

- Ring fencing areas for SAM
- Formalising illegal SAM activities in designated areas and the formation of co-operatives and associations
- Providing support with equipment and working capital
- Capacity building
- Developing guidelines for SAM in Ghana
- Encouraging education in the mining areas
- Strengthening capacity of District Officers to monitor SAM activities as well as enforce provisions in the Act and legislations

AMAN, in conjunction with the MC and other key stakeholders, is advocating for the formation of a Chamber of Small Scale Mines in Ghana. Discussions with AMAN representatives concluded the association would welcome increased assistance from the MC in the area of SAM management.

### 3.2. Supporting Interviews

#### 3.2.1. University of Mining and Technology (UMaT)

An invitation was accepted from Professor Newton Amegbey (Dean, Faculty of Mineral Resources and Technology) to visit the University of Mining and Technology (UMaT) in Tarkwa to discuss the teaching program currently offered by UMaT and the recent signing of a MoU between the University and The Ghanaian Small Scale and Artisanal Mining Association (GNASSM). The purpose of this visit was two-fold; to commence building links between Universities and to better understand OHS issues in the context of Ghanaian artisanal and small-scale mining.

Discussions indicated UMaT would be interested in developing an inter-University partnership. Strengthening university links could provide a base and means for future collaboration on delivery of OHS programs targeted to issues relevant to both SAM and LSM sectors, and provide future research collaboration partnerships. UMaT is the major university graduating Mining Engineers across the whole of Western Africa.

UMaT has signed a MoU with GNASSM to train members of the association. The program is expected to comprise of course modules to promote best mining and processing practices, environmental care and general wellbeing of all stakeholders in the small-scale mining
sector. In the longer term, it is envisaged it will enable members of the association to acquire professional training to build their capacity in mining technologies. These courses are focused on small-scale mining and while providing a level of technical expertise, may be beyond the level of knowledge and financial ability of many formal and informal miners. Discussions with representatives from the IDMC indicated this was “formal” training and the process considered to work best was an “informal” knowledge transfer process within the Inspectorate, and subsequently between the Inspectorate and the SAM sector.

### 3.2.2. Other Government Representatives

It would appear from discussions, that many Government representatives with a background in policy and planning consider SAM activities in Ghana to be largely a marginalised economic industry, without an appropriate level of government support and receiving much less support than LSM activity enjoys. Problems identified in interview were similar to those identified by the IDMC; however, all interviewees indicated the solutions became complex as formal and informal mining activities mixed across sites, and community involvement was highlighted as imperative to success of any program implemented. Again, a program similar to that outlined by the IDMC was envisaged, with capacity building and training in OHS hazard identification and strategies to manage site-specific hazards. Generally, it was considered essential to involve not only the affected communities and SAM operators, but also the LSM operators with concessions in the area and the MC as the regulatory body overseeing the program.
3.2.3. Africa-Australia Short Course Participants

Most participants in the Africa-Australia Short Course OHS Group were familiar with issues surrounding SAM in their home countries and were willing to share experiences. All countries face similar mercury and OHS related issues, children and women on mine sites, poverty and environmental problems. Like Ghana, for most of these countries SAM opens up opportunities to work in the face of high unemployment; however, bribery and Chiefdom payment often confound the process.

In an attempt to better manage SAM activity, Sierra Leone has restricted artisanal mining to a depth of 10 metres where rudimentary equipment may be safely used and minimally invasive mining methods are employed, and the license is restricted to 50 persons. The site is GPS surveyed and the license is valid for 3 years with only two renewal periods. The Inspectorate closely monitors activity and failure to meet OHS requirements allows for closure of the site. Small-scale mining (SSM) is restricted to 50 metres in depth, with deeper deposits being the domain of large-scale mining activities. Mozambique, which has gemstone as well as gold mining, reports OHS issues similar to Ghana, with a major cause of injury being slope or pit instability with no planning in place prior to digging. The Inspectorate has embarked on a program of training in safe mining practices, where mining is restricted to a depth of 15 metres and no machinery is allowed, and an NGO is attempting to provide appropriate PPE.

Ghanaian Government Initiatives focused on improving small-scale mining practices:

- Policy initiatives to ensure geological data on all minerals amenable to small-scale mining is available to prospective miners
- The creation of 9 District Mining Offices of the Mineral Commission to facilitate licensing and monitoring of SAM
- The restructuring of the license fee structure to make it easier for Ghanaians to secure mining rights
- Blocking out areas for SAM and geologically mapping these areas
- Formation of SAM Associations
- Development of a strategic framework to address the challenges in the SAM sector
- Establishment of a National Security sub-Committee on Lands and Natural Resources
- Inauguration of an inter ministerial task force – to curb illegal mining
- Financial assistance to SAM co-operatives
- Sensitisation and Education programs
- EU supported Mercury Pollution Abatement project in conjunction with the UNIDO project
- Gold Buying Companies and Value Addition Efforts

The Kenyan Mining Inspectorate was assisted with Government and NGO (Solidaridad) funding between 2005 and 2012 to develop a program to assist SAM operators. Funding has now been withdrawn; however, the program continues in a reduced capacity. Target areas were similar to those discussed with the Inspectorate in Ghana, and it would be beneficial to discuss key learnings and program detail in greater depth when developing the program for delivery by the Ghana Inspectorate.
4. Site Visits

To better understand SAM in Ghana, three site visits were undertaken. Two artisanal mining sites were visited, one formal/legal site in the Central Area and one formal SAM site in the Western Area of Ghana (with some illegal mining activity in place). One was a very small site operated as a co-operative, the lease being individually owned, the other individually owned but with some illegal SAM activity occurring on part of the site. At both sites, rudimentary equipment was used to dig, wash and sieve the gold powder; petrol powered generators, compressors and pumps were in use; and PPE was generally not seen to be used. One large-scale mining site was also visited.

4.1. Artisanal Mine Site – Central Region

This was a smaller operation, with the lease individually owned. Gold extraction was labour intensive, with the site spokesperson (son of the lease owner) indicating approximately 3 weeks work was needed to gather around 10 drums of earth and stones. This was crushed, sieved and passed across washing boards and finally about a bowl of gold powder and dirt was extracted from the original digging (see images below). Mercury was used in the amalgamation process, with acid sometimes added to the mix to increase the quality of the gold end product.

Miners are most often paid fortnightly for their work, although some are paid daily. With payment linked to the current gold price, wages fluctuate with the current average being about $US10 (30 Ghana cedis) per day for 7 hours work. Individuals are able to sell their gold to sponsors; however, as part of the licensing agreement lease-holders must sell their gold to the Government and submit records to the Minerals Commission. Leaseholders pay taxes to the Government, whereas the informal SAM sector pays no tax.

Machinery on the site was mainly Chang Fa or Chinese and mostly generators, compressors and pumps, and one small excavator. The spokesman indicated that machinery became readily available as companies such as GhanaGold left the area to focus on oil exploration activities, but expensive to purchase. He commented that the machinery was dangerous and miners had sustained both injury and loss of limbs whilst operating it, because they did not know how to use it properly. No PPE was seen in use on the site where miners were working or repairing machines (Image 4). One young miner was seen attempting to repair a damaged motor whilst it was still operating and another was observed with mud splashes across his face, including his eyes, nose and lips (Image10). Heavy manual tasks including shovelling and lifting were common practice on site (Images 1, 3, 7, 9 and 11). It was indicated that when PPE was provided, most often it was either destroyed or only worn when the miners knew Inspectors were coming on site; however, when questioned further, it was agreed that if miners understood why they had to wear PPE and the Mines Inspectors enforced it, then PPE would be worn while working. The spokesman was unable to comment on how much PPE was available for use or whether wearing it was enforced on site. In brief discussions it appeared no one on site had any OHS training and none had been given to workers regarding tools or mining techniques used on site. The site was visited on a Sunday and women and children were present and working. It was indicated that with average earnings of around $US10 per day, most earnings would be used to pay school fees. Usually
women and children under the age of 18 are not allowed on the site, and generally children are not encouraged to be on site as a disincentive to their dropping out of school. Typically, women work on site as food vendors, selling water and food to the miners. The spokesman indicated the mine-site had good relations with the local community as they had paid money to the local Chiefs for the land and had provided electricity to the village.
4.2. Artisanal Mine Site – Western Region

A larger site, typical of SSM was visited in the Wasa region. While operating as a formal concession, the lease owner allowed some illegal mining on part of the lease, providing assistance with equipment to remove overburden and ensuring a level of OHS site management. Similar to the previous site, Chang Fa machinery such as compressors, generators and pumps was in use. No PPE appeared to be worn by the informal workers,
with women working alongside men on the site (Images 12-18). Again, the lease owner had provided community services to benefit the area, such as a hospital and other health facilities.
4.3. Large-scale Mining Site – Western Region

A large-scale mine site was also visited. The balance of viable mining land being made available to both SAM and LSM is an ongoing problem in Ghana. Illegal SAM exists throughout all areas with mining techniques used often impacting on water quality. It seemed from discussions, that much of the blame for water contamination reportedly placed on the larger mining activity was the result of poor SAM mining practices. The site visited was a low-grade ore site, therefore unattractive to illegal miners, but high-grade ore areas commonly attract illegal activity, often before the company is aware of their on site presence. Often company practice is to give these illegal miners a month to mine the area and then leave. Discussions indicated it is not uncommon to find illegal miners accessing the pits and shafts of legal mining operations, jeopardising not only the safety of the illegal miners but also the large-scale mine employees. Past attempts to manage the presence of illegal mining activities have included sectioning off parts of the large mine site for SAM operations; however, SAM operations frequently encroach on large-scale mining operations creating tension and adverse community relations between large mine operators and the SAM community. Many illegal miners are foreign miners (mostly Chinese) and recently the Ghanaian Government has initiated action aimed at flushing out foreign miners. One of the problems highlighted in interview was that wherever Chinese were, consequentially the area experienced a high crime rate.
5. Current Government Interventions

The Government of Ghana has recognised that while SAM operations undertaken in the country offer opportunities to support rural livelihoods, develop entrepreneurship and provide a source of raw materials for industry, the sector requires assistance in operating sustainably both economically and environmentally. The MC is working with Government agencies and is designing and implementing a range of measures aimed at improving SAM (see box information).

A key strategy of this framework is the development of guidelines on Health and Safety and training of SSMs in the use of environmentally friendly processing methods. The program discussed with the IDMC sits well within the strategic framework and also aligns well with strategies identified for SAM management in the Africa Mining Vision 2008.
6. Follow-up Activity and Other Opportunities

With the exception of mercury handling, OHS focussed interventions in the SAM sector are largely negligible. This in part is because of a poor understanding of the sector’s dynamics. This pilot study has confirmed other known dangers in the workplace that to date have not been well addressed, including lack of training, poor ventilation, lack of safety equipment, improper use of chemicals and obsolete equipment, as well as other occupational health problems including silicosis, noise-induced hearing loss and muscular strains from heavy lifting. Through this pilot project, a better understanding of the issues surrounding artisanal and small-scale mining has been gained, and significant data has been gathered to inform OHS interventions in this sector. It has assisted in:

- Identifying the nature and magnitude of the challenges associated with health and safety in the SAM sector
- Providing an understanding of the appropriate tools and processes required to inform an effective OHS system
- Providing an understanding of where to target intervention resources/strategies to have the most impact
- Providing a better understanding of potential ways of conveying information that will be accepted and used by SAM operators

In moving forward, it is recommended that MISHC work closely with the Minerals Commission to develop an OHS short program focussed on identifying and managing OHS risks specific to the SAM sector. Co-delivery of the training program will build capacity within the Inspectorate for both ongoing course delivery and future modification of the course as dictated by legislative changes within the SAM sector. The Chief Inspector of Mines and Senior Mines Inspectors identified the following areas as high priority:

- Basic Mining Processes – including digging, general mine site safety procedures, pit construction, scaffolding, collapse, ventilation
- Safe Working Practices – occupational hygiene including dust, PPE, manual tasks
- “Taking Care of Themselves” – a basic understanding of the health issues associated with artisanal mining, including short and long term health effects
- Basic environmental concerns and safety procedures to reduce environmental impacts at an individual level

Essentially, the program needs to be specific to SAM needs and address the major OHS issues identified by the Inspectorate. Program delivery needs to be user-friendly, streamlined and use informal language appropriate for artisanal and small scale mining workers. In the words of the representative of the GNASSM, it needs to be:

“a process where a short course program was developed and delivered using local language, that had no academic language and was “all practical”
It is envisaged the initial program would be delivered to the IDMC. Possible topics arising from discussions included:

- Working with IDMC (Small Scale Mines Section) to understand problems/issues from their perspective and gather relevant visual training materials
- Providing assistance with writing a basic informal knowledge transfer package (similar to “Train the Trainer” and delivered in English)
- Providing assistance with package co-delivery – the suggested initial outline of the program to be delivered across 3-5 days to both Inspectors and District Officers
- Review and modification – ongoing assistance with course delivery as recognised and requested by the IDMC, including the mechanism of program review
Appendix 1: Linkages Established

1. Inspectorate Division of the Minerals Commission (Accra):
   - Mr Michael K Botchway – Chief Inspector of Mines
   - Mr Joseph Frimpong – Senior Inspector of Mines
   - Mr Bernard K.Ntibrey – Western District Officer (Tarkwa)
   - Mr Isaac Abraham – Senior Public Relations Officer

2. University of Mining and Technology (UMaT):
   - Professor Newton Amegbey PhD – Dean, Faculty of Minerals Resource Technology

   - Mr Emmanuel Dzeble (Administrator)

4. Artisanal Mining Africa Network (AMAN):
   - Mr Eric Coffie Rivers (President)
   - Mr Peter John Amewu (Board Member) and Director Policy and Research, Africa Centre for Energy and Policy, Accra, Ghana

5. Centre for Social Impact Studies, Obuesi, Central Ghana:
   - Mr Richard Ellimah – Manager

6. Energy Commission of Ghana:
   - Social and Environmental Impact and Technology Assessment Division
     Mr Eric Ofori-Nyarko – Deputy Director/Head of Social and Environmental Impact and Technology Assessment Division

7. Mr Isaac Mate – PhD candidate MISHC and ex VP Health, Safety and Environment, AngloAshantiGold, based in Accra Ghana and currently working with UMaT