

# THE INTRINSIC ROLES OF REGULATORY INSTRUMENTS IN MINING OPERATIONS

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## Abstract

Prospecting and exploiting natural mineral resources for economic growth and development could be beneficial if done in sustainable ways and manners. However, if the operation is done in such a way that cause harm to the environment and people, this will amount to unsustainable mining activity and anti-sustainable development. Therefore, there is need to ensure that appropriate and adequate plans and programmes are put in place in order to mitigate, minimise and avoid negative environmental impacts. Against the backdrop of these concerns and the need to ensure that the environment is not degraded and destroyed, South Africa, as part of the countries that promotes sustainable prospecting and mining has put in place and currently implementing tools known as environmental management plan and programme to regulate and control all prospecting and mining activities. These tools contain a bundle of remedial actions in the forms of compensation, rehabilitation and restoration of any harm done to the environment during the course of mining activities. They also contain information on mitigation, ingredients for good practice approach on how to conduct sustainable prospecting and mining. This article looks at the intrinsic roles of these tools and accentuates the importance and operations of their use in the decision making processes.

**Key Words:** Environmental mining hazards, Mining activities, Regulation, Sustainability, Remedies

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## 1. Introduction

Countries around the world strive to promote economic growth and development by tapping into and using their naturally endowed mineral resources (Barma et al., 2012). While doing this, they are expected to explore for mineral resources in a way and manner that will grow and develop the economy sustainably. This is generally known as development that meets the needs of current generation without compromising or degrading the development and aspiration of future generations. The developing country of South Africa is endowed with valuable natural mineral resources spread across its landscape (EPIR, 2011). The country relies heavily on prospecting and exploring these natural mineral resources for its economic growth and development (Reed, 2001). However, during the course of prospecting and mining, various harmful substances are released to the environment and atmosphere, polluting and destroying the water, ecosystems and causing health hazards (Ramlogan, 1997). There are various reports of environmental impacts and effects of mining on the land and the community causing land degradation and irreparable damage to the community and their agricultural products which are the main sources of food and livelihood (Dasgupta and De, 2009). The South African Constitution recognises the right to clean environment as expressed in section 24 which provides that

“everyone has the right to an environment that is not harmful to their health and wellbeing; to protect the environment for the benefit of present and future generations through reasonable legislative measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use natural resources while promoting justifiable economic and social development.”

Section 24 is against all activities that are harmful to the environment including harmful mining activities (Kotzé, 2007). Mining activities, although are being used to drive economic growth, they could also retard growth due to harm caused during exploration and excavation (Krausmann et al., 2009). The foregoing therefore presents a situation of conflicting economic and environmental goals as it is often hard to reconcile new developments with environmental protection and nature conservation simultaneously. In order to encourage sustainable economic growth and development there is need to minimise activities that will create burden, liability for the environment and atmosphere, hence creating more problems for the economy and development. Therefore, there is need to ensure adequate preparation and planning of mining activities from the beginning up until the end of any mining project. This will ensure that economic and developmental goals are met without compromising the environment, ecosystems, land and human wellbeing. To this end,

environmental management plan and programme (EMPs) are imperatives. They have emerged as important innovative support tools for purposes of ensuring that mining exploration and exploitation are carried out in such a way that seek to avoid negative environmental impacts during the course of mining operations and activities. In practice, the main role of these tools is often to reduce and mitigate, and at times to compensate for negative environmental impacts on those whose interest and livelihood have been affected.

## **2. Statement of the Problem**

Before any prospecting or exploring for any mineral resources can be done, there is need to study various environmental issues and components which would be affected, to assess the impact (negative and positive) of the proposed project and to prepare a detailed EMPs for purposes of minimising those adverse impacts on the environment, people and their livelihoods. Information and data from various environmental issues, components and assessments such as air, water, land, noise and socio-economic need to be collected with prediction and evaluation of impacts of the proposed project activities. It is incumbent on the mining company to identify measures to minimize the problems (adverse impacts) that may arise due to project and outlines ways to improve the project's suitability for its proposed environment. In order to embark on sustainable mining activities, EMPs are imperatively, forms of regulatory tools to guide the activities of mining companies.

## **3. The Impact of Mineral Exploitation on Human Wellbeing and Ecosystems**

Undoubtedly, mining operations, by the nature of the business and wherever they take place are known to have profound impacts on the environment, ecosystems and particularly people and community (Banks, 2002). There is therefore the need to be proactive through robust protective mechanism that will minimise or reduce the hazards. It is against the backdrop of this that EMPs are very important because, amongst other tools and interventions that are being used to protect the environment from being degraded as a result of mining activities, they are powerful regulatory instruments that seek to ensure that the right things are done by mining businesses in mining operations. More importantly, in South Africa, the State has constitutional obligation to protect the environment for the benefit of present and future generations, to ensure ecologically sustainable development of mineral and petroleum resources and to promote economic and social development (Jennings, 2011). There is therefore, the need to promote local and rural development and the social upliftment of communities that are affected by

mining. It is against the backdrop of this obligation to protect, that the Mineral and Petroleum Resources Development Act (MPRA, 2002) in terms of section 39 (1), provides that "every person who has applied for a mining right ...must conduct an environmental impact assessment and submit an environmental management programme within 180 days of the date on which he or she is notified by the Regional Manager to do so." The purport of this regulation is to ensure that any mining exploration and exploitation do not harm and destroy the environment at any stage whether during or after the mining operation. Furthermore, it is important to indicate that government and the institutions responsible for environment and mining activities should be mindful of the harm that these activities have on the world environment and community where they operate. Unregulated and unguided mining activities can be detrimental in many ways (Cosbey, 2001). According to Millennium Ecosystem Assessment (MEA, 2005) "farmlands under irrigation become saline, crop yields are reduced; this in turn may affect human nutritional security, child growth and development, and susceptibility to infectious diseases. Beyond threshold points, limited or degraded supplies of fresh water may exacerbate political tensions, impair local economic activity (and livelihoods)—including industry—and reduce aesthetic amenity. These dynamic, interacting processes jeopardize various aspects of human well-being" (Ju-Nam and Lead, 2008). Literature has also pointed out that mineral exploitation affects human health and organisms through physical and chemical modification of their environment, and indirectly in a variety of ways ( Ju-Nam and Lead, 2008). Ogola (2002) narrated various deadly procedures being followed during mining and their adverse effects on human beings.

During the course of exploitation and excavation in mining, landform, drainage and soil conditions are altered and destroyed (Oke and Ighanesbhor, 2013). Waste from excavation when disposed may cause pollution problems to the adjoining land and river or elsewhere (Müezzinog˘lu, 2003). The effect of exploitation on nature conservation is also a major concern because it damages and destroys the vegetation and habitat and other things classified as conservative in nature (Ratcliffe, 2005).

Even though mineral exploitation has, indeed, contributed to substantial net gains in well-being and development in many countries, (Corvalan et al., 2005) while some regions have benefited from this activity, a lot of groups of people have not benefited at all, instead their means of livelihoods and conditions of living have been massively degraded (WHO, 2005). Undoubtedly, mineral exploitation is having a toll on the ecosystems, the environment and human beings (Chambers et al., 2014). More so, in some areas, the pressure of the mining activities has led to loss of vital ecosystem services that purify and replenish water, soil and air resources essential to

health and also reduce the risks of contacting deadly diseases (Varga, 2014). In most instances, much of the gains from exploitation are associated with impact and cost to the environment and the ecosystems (Wackernagel and Rees, 1998). According to the World Health Organisations Report (WHO, 2005), “approximately 60% of the ecosystem “services” examined, from regulation of air quality to purification of water, are being degraded or used unsustainably” (WHO 2005).

While some of the negative impacts and consequences of mining activities may be physical and direct and can be felt immediately (Joyce and MacFarlane, 2001), indirect effects of the activities may take decades to have impact (Wackernagel and Rees, 1998). For example, scientific literature has revealed that “mercury has a long residence time in the environment and this makes its emissions from artisan mining a threat to health” (Ogola et al., 2002). Inhaling large amount of harmful and dangerous substances like siliceous dust is also a major cause of health hazards among miners (Ogola et al., 2002). The existence of water logged pits and trenches in the mining areas are also sources of health hazards (Ogola et al. 2002). Underground, where the mining is taking place, a large number of miners usually share poor quality air and this is also a major cause of health hazards (Gunson and Veiga, 2004).

It is therefore important that ample precautionary measure must be put in place at all times to protect the environment whenever any mining venture is going to be embarked on (Goklany, 2001). EMPs are important tools that must be used as guides to ensure full compliance with all the regulatory and precautionary measures (Jennings, 2011). By so doing, the popular adage which says that “prevention is better than cure” would have been seen to have been literally applied.

#### **4. Literature Review**

Environmental and ecological problems do occur in communities where mining companies operate (Daly, 1994). South Africa has witnessed several mining operations problems between the communities and the mining companies (Bridge, 2004). Mining companies have been criticised for destruction of land, ecosystems and the environment in which they operate (Azapagic, 2004). One of the reasons for this environmental degradation and destruction is, at the conception stage, lack of proper and adequate environmental impact assessments, planning and programme (Krishnamoorthy, 2008). While it is incumbent on the mining companies to be proactive by ensuring proper environmental management practices in order to curtail the problems (Escobar and Vredenburg, 2010), the government has also intervened by insisting that before any mining authorisation is approved, it must pass the litmus test as prescribed in the form designed by the Department

of Mineral Resources (DMR). To this end, it is pertinent to emphasise that, “South Africa’s unique environment is its greatest asset, making it one of the most sought after tourist destination in the world. In recognition of the need to effectively manage and protect this valuable environment, government has put in place and implementing numerous environmental interventions especially regarding sustainable mining exploration and activities environmental sustainability.”

The form contains robust regulatory instructions that are being used to assess and evaluate whether any proposed mining project has met the requirement and that the project is fit and proper to be authorised for execution. EMPs have continued to gain prominence in the search for solutions to reconcile prospecting for minerals in ways and manners that will not harm the environment and destroy land and ecosystems. These tools have evolved to encompass a wide variety of interpretations at the national and international spheres.

Therefore, this article uses a conceptual approach by using and relying on contemporary literature that relates to innovative environmental tools that are effective and efficient in ensuring that mining operations are properly planned and programmed before the operation is approved.

Apart from the EMPs, other environmental tools that regulate and manage the activities of mining industry are also important. For example, landscape approaches “seek to provide tools and concepts for allocating and managing land to achieve social, economic, and environmental objectives in areas where agriculture, mining, and other productive land uses compete with environmental and biodiversity goals” (Sayer et al., 2002).

Health tools are equally important, because they will detect potential health effects from any polluted water that caused harm to the water and impact on the health of the people as a result of mining operations” (Ogola et al. 2002).

In South Africa, the concept of corporate social responsibility (CRS) plays an important role in sustainable mining (R Hamann, P Kapelus 2004). Although, before the enactment of the legislation mandating the application of CRS by all corporations in all their endeavours, especially in the mining industry, the concept is used to be understood and interpreted by mining companies as charitable supports and donations to the people and the community (Hamann, 2004). These efforts have however failed dismally, because they are yet to address the issues of poverty alleviation and provisions of sustainable socio economics infrastructure, goods and amenities. In South Africa, businesses are now required under the laws to observe and implement CSR in all their ventures (PH Werhane 2007). The state, as a sovereign entity exercises right over all mineral resources and as such have legislated enforceable transformative

programmes and plans that foster CSR in the mining industry (McNamara, 2009). Hamann (2004) points out that *“while the interrelationship between companies and their institutional context has, in the past, brought about a vicious cycle of irresponsibility and minimal collaboration, this cycle may be reversed into a virtuous one, driven in particular by the State.”*

EMPs are undertaken by the prospector in order to provide relevant authority with full details of what will be done prior, during and after mining operations. This is important in order to minimise foreseeable environmental challenges such as pollution, degradation and conflicts of interests between the mining companies, government and the communities where the mining activity will take place. Bebbington et al. (2008) work describes recent trends of conflicts being triggered as a result of mining activity in various communities in the developing countries and accentuates that discovery of mineral resources usually associated with resource course and exploration which may improve the pathway for economic growth and development, it is also common to see social resistance and vicious protest in any community where mineral is discovered and to be mined (Velásquez, 2012). These incessant conflicts have impacted and changed the relationships amongst miners, the company, political and law enforcement agencies.

EMPs, when effectively used, will make companies meet their corporate social responsibility (CSR) and promote sustainable mining operations and socio economic development. These days, companies are enjoined to apply this global business concept in a way and manner that supports and promotes sustainable development hence, the need to strengthen compliance is imperative from the perspective of mining business. For this reason, partnership between companies, the government and civil society are impetus for effective and efficient strategy for CSR. Therefore competent authorities and the companies must ensure that all the conditions for issuing of license to explore are duly complied with (Hamann, 2003).

The mining industry is enjoined by government and compliance authority to promote authentic participation even during operation in order to address challenges as they unfold in the long and short run. Also, as part of self-assessment, they should, at all times, be able to measure their sustainability performances both in the short and long run (Azapagic, 2004). It is pertinent therefore that CSR agenda mandates that each company should *“document their performance through the disclosure of social and environmental information”* (Jenkins and Yakovleva, 2004).

The whole essence of the EMPs and the authorisations therefore, is to prevent ecological degradation, promote conservation, and secure ecological sustainable development (Jennings, 2011).

## 5. Curbing Environmental Hazards Using EMPs

In South Africa, to embark on any mining operations or any related operations, the applicant must comply with the environmental principles set out in section 2 of the National Environmental Management Act (NEMA, 1998). These principles serve as guidelines for the interpretation, administration and implementation of the environmental regulation of mining operations. More importantly, the MPRDA expressly provides that *“any prospecting or mining operation must be conducted in accordance with generally accepted principles of sustainable development by integrating social, economic and environmental factors into the planning and implementation of prospecting and mining projects in order to ensure that exploitation of mineral resources serves present and future generations.”* In order to right the wrong done to the environment, people, land and the community during prospecting and exploiting for minerals, in addition to other measures, in terms of section 38(1), the Act makes provision for integrated environmental management and responsibility to remedy. Sections 39(1) of the MPRDA prescribes environmental management programme and environmental management plan and enjoins *“every person who has applied for a mining right in terms of section 22 to conduct an environmental impact assessment and submit an environmental management programme within 180 days of the date on which he or she is notified by the Regional Manager to do so.”*

The applicant would have to submit an environmental management plan as prescribed and establish baseline information concerning the affected environment to determine protection, remedial measures and environmental management objectives; the applicant is also expected to *“investigate, assess and evaluate the impact of his or her proposed prospecting or mining operations on the environment; the socio-economic conditions of any person who might be directly affected by the prospecting or mining operation; and any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act.”* The applicant also need to *“develop an environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment.”* And more importantly, *“describe the manner in which he or she intends to—modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; contain or remedy the cause of pollution or degradation and migration of pollutants; and comply with any prescribed waste*

standard or management standards or practices.” The applicant must show the capacity it has to rehabilitate and manage negative impacts on the environment.

There are two important stages of what are expected to be done by an applicant seeking right to prospect and mine. The first stage requires that authorisation must be given by the appropriate and relevant competent authorities and institutions and before such authorisation is approved, the Department of Minerals Resources (DMR) mandates that the applicant must submit a form for environmental authorisations in terms of NEMA, 1998 and the National Environmental Waste Management Act, 2008 in respect of listed activities that have been triggered by applicant in terms of the MPRDA, 2002 as amended. The purpose of the form, according to DMR is to “serve as the application form and incorporates the requisite documents that are to be submitted together with the application for the necessary environmental authorisations in terms of the Act.”

Pursuant to the above stated, all information regarding any mining activity or authorisation of the right to prospect must be submitted according to the contents stipulated in the prescribed form. If any information is omitted or withheld, the issuance and approval of authorisation will be affected and result in outright refusal of the application in its entirety. It is pertinent to point out that as soon as the information is submitted to the competent authorities, it becomes public information unless protected by law. The implication of this is that the public has unrestricted access to this information and can retrieve and interrogate them.

Consequently, the contents in the form are but not limited to the nature and type of the authorisation being applied for; full details of the applicant, details of the environmental assessment practitioner (EAP). It should be noted that appointment of an EAP is mandatorily sanctioned by law. If an EAP is not appointed for purposes of the compliance with the provisions of the form, the process of authorisation cannot commence. More importantly, there should be clear description of the project being embarked on. The activities to be authorised must be clearly stated and explained in detail. Any activity that is not included will not be authorised and cannot be carried out during operations. More importantly, details of locations showing the sites of where the activities will take place are very crucial, the issue of public participation must properly be dealt with in line with the procedure and standards set out in the laws and policies on effective and efficient public participation. Compliance with good practice is also mandatory. Hence all consultations and processes engagements must be adequately documented and submitted.

There must be appropriate and adequate description of the assessment process to be undertaken and all environmental footprints and developments must be assessed and reported-all risks

impacts to be identified and consideration of alternative methods of technology must be considered and explored which is best suited for the job that will not pose risks to the environment.

Other authorisations relevant to the process must be considered and reported in addition to the information required in the form. Hence, all environmental legislation must be considered and applied and necessary approval sought and obtained before any authorisation.

It is therefore necessary at this stage to have a draft of the EMPs for purposes of a high level-approach to management of the potential environmental impacts and risks of each of the activities applied for. For example, for Prospecting “drill site, site camp, abulation, facility, accommodation, equipment storage, sample storage, site office, access route etc.” For mining- “excavations, blasting, stockpiles, discards dumps or dams, loading, hauling and transport, water supply dams and bore holes, accommodation, offices, abulation, stores, workshops, processing plants, storm water control, roads, pipelines, power lines, conveyors etc.”

All these phases of compliance and implementation will have to be shown and the size and scale of disturbances in terms of tonnages and hectares have to be worked out and disclosed. Sustainable mitigation measure is to be put in place in order to mitigate storm, water control, dust control, noise control, access control, rehabilitation and so on. All these must be properly outlined.

More importantly, compliance with the requisite environmental, engineering, architecture, civil engineering and other standards and practices must show how there will be compliance and meeting of all the standards in the prescribed environmental management standards and practices that have been identified by competent authorities.

The closure phase of the activities is significant because it has to indicate and show closure objectives and rehabilitation with the costs involved.

After successful realisation and meeting of all the conditions stipulated in stage one above, applicant still needs to continue to ensure that what have been planned and programmed for as stipulated in the duly approved form are strictly adhered to during operations. Hence, the Act in section 38(1) provides that “the holder of a reconnaissance permission, prospecting right, mining right, mining permit or retention permit— must at all times give effect to the general objectives of integrated Under the regulatory framework of the National Environmental Management Act, 1998 (Act No. 107 of 1998), an applicant applying for prospecting right must do the following: consider, investigate, assess and communicate the impact of his or her prospecting or mining to the competent authorities, must manage all environmental impacts based on the approved EMPs, must ensure prompt rehabilitation of the environment

in conformity with generally accepted principle of sustainable development, must take responsibility for any environmental damage, pollution or ecological degradation as a result the mining operations in the area and any affected areas even outside the boundaries covered by the approved EMPs.”

More importantly, the MPRDA, in terms of section 38(2) places a fiduciary obligation on the director of the mining company by providing that “notwithstanding the Companies Act, 1973 (Act No. 61 of 1973), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any unacceptable negative impact on the environment, including damage, degradation or pollution advertently or inadvertently caused by the company or close corporation which they represent or represented.”

## **6. Guiding Principles on Environmental Management**

Considering the different environmental hazards associated with mining and their impacts on both living and non-living things, it is important to ensure that robust interventions are put in place and implemented at any area where mining activity will take place (Moss et al., 2011). It is therefore important to make sure that all mining risks are adequately evaluated in order to minimise vulnerabilities and maximise opportunities (Cardona, 2011). Even though prospecting and exploring for natural resources will continue to have an important role to play in economic growth, there is a need to strive for a balance between this and sustainable economic development (Watkins and Ehst, 2008). To this end, innovative contemporary technology becomes important tool to achieving clean and sustainable excavation of the mineral resources (Giurco and Cooper, 2012).

Consequently, as part of strategy and measure to fulfilling its constitutional mandate and obligation on the protection of the environment, the MPRA in terms of section 37 outlines, reinvigorates and reinforces the national environmental management principles encapsulates in Section 2 of NEMA. For effective management of the environment, section 2 of NEMA provides amongst other things that the principles are applicable throughout all organs of state with regard to the environment. The purport of this is that all three spheres of government; national, provincial and local have responsibility to apply the principles. More importantly, it stipulates that the principles should serve as the general framework within which environmental management and implementation plans must be formulated. Undoubtedly, one of the tasks of the MPRA is to, in terms of sections 38 and 39 implicitly provide for mining regulations through the use of EMPs to protect the environment from dangerous mining practices and operations. This is in

recognition of the fact that development must be socially, environmentally and economically sustainable in order to serve present and future generations. Thus, in order to achieve sustainable mining operations, mine owners must ensure that “the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied; that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied; (iii) that the disturbance of landscapes and sites that constitute the nation’s cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied; (iv) that waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner; (v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource; (vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; (vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and (viii) that negative impacts on the environment and on people’s environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied” (NEMA, 1998).

One of the ways to effectively and efficiently manage the environment is to apply and use the ‘best practices’ approaches in order to ensure environmental justice where the interest and rights of all the parties are observed and protected especially the vulnerable, the poorest of the poor, and the disadvantaged people and communities (Langston, 2008). In this regard, the issues of health and safety of the workers, community and the people around the mining areas must be given the necessary attentions they deserve (Hamann, 2004). Also, corporate social responsibility that seeks to provide robust education that will empower and enlighten the mining community with regard to their welfare and well-being must be encouraged (Miles and Lilian, 2009). Environmental awareness through education should be shared and their applications taught (Hungerford and Volk, 1990). More importantly, the welfare of the rank and files that is the mine workers must be properly taken care of and the relevant labour laws and environmental standards pertaining to mine workers must be diligently observed and applied.

The mining companies must take responsibility for any harm done to the people, environment, (Ratner, 2001) the land, and persons affected by their operations and they should bear and pay the full costs of any rehabilitation in whatever forms (Yale-Kearney, 2012).

## **7. Strengthening Regulation and Compliance in Mining Environment**

Although the overarching importance of the EMPs has been well articulated, other measures that could improve and further enhance protection of the environment, land and the community are also parts and parcels of the tools that could be used to strengthen protection. Application of corporate social responsibility is essential in all aspects of mining operations (Jenkins and Yakovleva, 2004). Training of miners especially on precautionary measures and safety that will meet the best practice in the industry is very important (Sparks et al., 2001). Provision and mandatory use of necessary gadgets, guards and wearing of masks, gloves and protective gears are equally important to protect the mine workers. Inspection and monitoring for purposes of ensuring compliance with mining standard and compliance with all the control and regulatory mechanisms and measures should be part of business as usual and not exception (Ogola et al., 2002).

Appropriate economic and regulatory sanctions should be meted out at any time against erring and non-compliant mining company. Experts and skilled persons in the regulatory authorities need to perform their jobs without compromising any standards and resist the temptation of corruption of any sort.

At all times, the mining companies must cooperate with competent authorities by fully disclosing the impacts of any of their activities (Yongvanich and Guthrie, 2005). To do this, it requires strong leadership that would be able to confront the problem and ensure that solutions are offered promptly (Jenkins and Yakovleva, 2004). This type of voluntary enforcement of regulations and protections mechanisms in the industry is highly encouraging because it will assist in reducing costs associated with denials of risks and impacts which might end up in unnecessary protracted litigation in the court (Buzbee, 1995).

## **8. Conclusion**

Role players and stake holders in the areas where mining activities will, or are taking place have collective and shared responsibilities in ensuring that the activities are carried out without harming or compromising the environment, land, ecosystems, the community, area and the people. Pursuant to this, sustainable mining activities become essentially imperative. EMPs are therefore effective tools to foster responsible and sustainable mining if the contents therein are followed strictly and implemented.

Through the use of EMPs, mining companies' activities would be effectively regulated and controlled in line with the authorisation and permit approved by the relevant competent authorities. They are also effective and reliable tools being used for

assessment, evaluation and including monitoring in order to achieve sustainable mining activity that does not degrade the land, cause harm to the environment and damage the ecosystems.

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