

PRESIDENTIAL MINE HEALTH AND SAFETY AUDIT

DEPARTMENT OF MINERALS AND ENERGY



Prepared by the Department of Minerals and Energy
For The President

To: The President of the Republic of South Africa

As a consequence of the serious concern about health and safety at mines expressed by the Minister of Minerals and Energy, Ms Buyelwa Sonjica, Labour Unions and the public at large, the President directed that an audit of compliance with the health and safety legal requirements at mines be conducted. This audit is herein referred to as the Presidential Mine Health and Safety Audit.

The audit was targeted at a representative sample of the South African mining industry across all nine provincial boundaries.

It gives us great pleasure to present this report to you.

Ms. Buyelwa Sonjica, MP
Minister of Minerals and Energy

Adv. Sandile Nogxina
Director-General

PRESIDENTIAL MINE HEALTH AND SAFETY AUDITS

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ABBREVIATIONS

ODMWA	Occupational Disease of Mines and Works Act
COIDA	Compensation of Occupational Injuries and Diseases Act
MHSA	Mine Health and Safety Act
MHSI	Mine Health and Safety Inspectorate
CoM	Chamber of Mines
CIOM	Chief Inspector of Mines
NUM	National Union of Mineworkers
MHSC	Mine Health and Safety Council
MOHAC	Mine Occupational Health Advisory Committee
MRAC	Mining Regulation Advisory Committee
SIMRAC	Safety in Mines Research Advisory Committee
SAMODD	South African Mining Occupational Diseases Database
SAMRASS	South African Mines Reportable Accident Statistical System
CSIR	Council for Scientific and Industrial Research
MPRDA	Mineral and Petroleum Resources Development Act
PAJA	Promotion of Administrative Justice Act
DME	Department of Minerals and Energy
OHS	Occupational Health and Safety
ISO	International Standards Organisation
ABET	Adult Basic Education and Training
MQA	Mining Qualifications Authority
WSP	Workplace Skills Plan
ATR	Annual Training Report
COP	Code of Practice
ILO	International Labour Organization

DEFINITIONS

Silicosis is scarring of the lungs due to excessive levels of crystalline silica at work for long periods. As the scarring increases, the lungs are less able to extract oxygen from the air and supply it to the blood

Pulmonary Tuberculosis is the disease of the lungs caused by infection with an inhaled bacterium called Mycobacterium Tuberculosis. It is a compensable disease in terms of the Occupational Disease in Mines and Works Act

Silico-Tuberculosis refers to Pulmonary Tuberculosis in a person with established silicosis.

INTRODUCTION

Unsafe working conditions, if unchecked lead to tremendous human suffering. This is often compounded and complicated by social conditions prevalent in developing like South Africa. Our mines have since inception sourced labour from our neighbouring countries of Mozambique, Botswana as well as Lesotho. This has always been reinforced by the recruitment of workers from the remote areas of our country. The social and economic impact of these unsafe working conditions and they affect communities beyond our borders.

In this day and age of open economies and competition for markets by nations and countries, unsafe working conditions can and often have negative consequences for continued growth of the economy. This often leads to reduced competitiveness and productivity due to loss of experienced labour force through occupational death and injuries, damage to equipment, associated loss of production and tainted image of the country as secure investment destination.

Even more important in South African developmental state context, unsafe work negates government's efforts to reduce poverty, create employment and maintain a sustainable economic growth path.

Unsafe work ends with the death of two hundred mine workers and injure close to five thousand a year. Some of these injuries are amputations of limbs that translate into loss of an ability to earn income, loss of quality of life and increased medical bills. In the last couple of years the fatalities in the mines have stagnated around plus minus two hundred. This figure is too high by any measure. All in the sector need to stop and think about what can be done to improve the safety performance on mine operations and eliminate deaths.

In October 2007, three thousand two hundred workers were trapped underground for 42 hours. Had this workers not been brought to safety, this event could have been the worst disaster in the history of mining, not only for South Africa but the rest of the world. This incident prompted the Head of State, President Thabo Mbeki and the Minister of Minerals and Energy, Ms BP Sonjica to call for a country wide health and safety audit of

mines to determine the levels of compliance to legal requirements as set out in the Act (Mine Health and Safety Act of 1996) of parliament.

1. AUDIT APPROACH

Auditing of a mine health and safety management system can take a substantial amount of time to complete. A number of companies are starting to adopt ISO 18001 as a health and safety management system, the adoption of the system is voluntary. So designing an auditing tool around the system will have serious limitations because it is not widely adopted by industry. Hence, in preparing for these presidential audits all these factors were taken into consideration. An auditing methodology that is rigorous yet less intensive on resource and time input side of the equation had to be developed and adopted.

The Presidential audits were split into two focus areas; one covering the subject of occupational health and safety legal compliance and the second looking at specific high risk technical considerations of mining process e.g. shafts and shaft installations, rockburst and rockfalls. The technical audit were going to determine amongst other things maintenance of key installations and the design life of current mine installation and possible risk to safety of mine workers. Two attempts were made to outsource the technical audit with no success. Both tenders did not attract suitable companies with the competency to conduct technical audits. The difficulty here being that the local establishments that could possibly do the job depend on mines for their sustainability, hence, they are not keen to do this work on behalf of government. Hence, this report only covers the legal compliance.

In total eleven legal compliance themes were chosen for the audits and auditing tools or protocols were developed to address the Presidential call for a countrywide mine health and safety legal compliance audits.

A total of 333 mine audits were planned and a total of 355 were conducted. The audits were planned and conducted in all nine provinces (regions as per the Act division) under the leadership of the Deputy Chief Inspectors of Mines:

- Mr D Msiza : Gold & Platinum;

- Mr T Dube : Offshore, Coal and Other;

And nine Principal Inspector of Mines:

- Mr M Madubane : Gauteng
- Mr X Mbonambi : North West
- Mr P Bezuidenhout : Free State
- Mr T Doyle : Eastern Cape
- Ms V Nontso : Western Cape
- Ms E Babuseng : Northern Cape
- Mr L Bezuidenhout : Mpumalanga
- Mr M Cemané : KwaZulu Natal
- Mr J Dodds : Limpopo (Acting Principal Inspector)

Before the audits were conducted, members of tripartite health and safety formation in the sector were briefed by the Chief Inspector of Mines on the purpose of the audits and how they will be conducted.

The Chamber of Mines (CoM) together with the National Union of Mineworkers (NUM) on behalf of the mining industry made inputs on the scope and formulation of the audit tools.

Proposals from NUM highlighted the need to address issues of training and the impact of mining on communities. And the CoM proposals addressed the need to be transparent and inclusive in the conduct of audits.

To the extent possible this matters were addressed by encouraging regional offices to inform mines well in advance of their intention to audit and to also allow employee representatives and employer representative to be part of the audit teams at mine level.

2. AUDIT TOOLS OR PROTOCOLS

The following table shows eleven legal compliance themes and their scopes.

a. **Design and Maintenance**

Scope: Mine design with regard to the provision of healthy and safe working conditions, Servicing and maintenance of all equipment and, Communication systems

b. **Legal Appointments**

Scope: Statutory appointments and duties of the employer, managers, engineers, occupational medical practitioners, occupational hygiene practitioners and other statutory appointments as required in terms of the MHSA.

c. **Occupational Health and Safety Policy**

Scope: The content of the OHS policy, the employer's commitment (signature) and how widely the policy is published on the mine, do all employees know of its existence and contents.

d. **Occupational Health and Safety Risk Management**

Scope: An examination of the mine's baseline risk assessment on all occupational health and safety hazards and significant risks. An examination of issue based and continuous risk assessment outcomes. An examination of medical surveillance systems and occupational hygiene measurements.

e. **Training**

Scope: An examination of employee training records in relation to health and safety training as well as to their job specifications. Training in relation to the hazards and risks in their workplaces.

f. **Health and Safety Representatives and Committees**

Scope: Examine the existence of health and safety representatives and committees, election of representatives and training of representatives

g. **Reporting**

Scope: Check whether all statutory reports have been submitted e.g. accident and fatality statistics, occupational hygiene returns, labour data etc.

h. Mandatory Codes of Practice

Scope: Check whether all required Mandatory codes of practice have been compiled and implemented – full list available for the audit.

i. Explosives Control

Scope: Inventory control of all explosives that are received, stored, used in the working places and the destruction of old explosives.

j. Water Management

Scope: Storage and usage of water, mudrush risk, control of water in working places, water quality for drinking purposes.

k. Public Health and Safety

Scope: Pollution emissions from the mine site (radioactive dusts etc), water contamination (rivers, streams etc), unprotected mine openings, complaints from surrounding communities and how they are dealt with.

An audit template was developed to address each audit theme. Each template started with the **purpose** of the audit for that theme and the **method** or the **how** to conduct the audit to guide the operational staff in collecting the relevant information and carrying out the necessary verification through inspection of certain installation or observation of certain practices to confirm the documentary evidence of compliance to health and safety standards.

For later analysis of the audit results, a quantitative measure of compliance was allocated for each compliance item addressed in a question format on the template. These measures have been weighted according to their significance in terms of health and safety and in obtaining the necessary protection for the employees and in some instances surrounding communities.

The protocols for legal compliance audits are attached (**Annexure A**) for ease of reference.

The technical audits will address more fundamental engineering, design, maintenance and challenges relating to legal sanctions with regard to health and safety at mines. Technical audits do not form the subject matter of this report as discussed earlier.

3. BROAD PROJECT GOALS

- To determine level of compliance on each one of the audit themes.
- To take steps to improve the situation.
- To report to the President on levels of compliance and make recommendations to improve health and safety performance.
- To record observations on all areas impacting on mine health and safety (recorded chapter one through to five) of this report
- To make recommendations that will lead to improvements on mine health and safety legislation and its implementing structures.

4. AUDIT PLAN AND LIMITATIONS

The audit approach and methodology was presented and discussed in full with all the nine regions on the 14th and 15th of November 2007 to allow regional offices to give detailed plans of how they are going to carry out the audits. This was important because at bigger mines, regions will preferably use audit teams to cover the full spectrum of the audit. Resources and time becomes very critical at this stage. Some regional offices do not have the full competency profile to conduct the audits due to shortage of engineering inspectors. Therefore cross pollination of skill sets and synergies between regions was of utmost importance.

Regional offices were requested to give an indication of how many operating mines they have in their region, secondly to prioritise the audit in terms of operational complexity and health and safety risks. They would then group mines in terms of high, medium and low risk mines (see Annexure B). The idea being that the high risk and operationally complex mines will be given priority in line with available resources.

The Western Cape is a good example of the planning complexity of this task. The region is not considered as a serious mining region and this is supported by the staffing levels in the region; six inspectors in total. The region has 107 mines operating with low employment levels as compared to other regions like North West and Gauteng. If the region was to audit every single mine, then it will take the regional office eleven months to complete their

mine audit. However, if they were to concentrate on the high risk ones (38); it will take them on average five months to complete.

The list in annexure B may appear to indicate that a substantial number of mines were left out of the audit, however a closer look at the mines in the low risk category will reveal that they are in the main sand works, brickworks and other smaller operations and medium sized operations. To a greater extent this operations were covered during the audits in the less intensive mining regions. A meaningful extrapolation of compliance on this operation has been made. The 333 high risk mines that were chosen employ well over 80% of employees in the mining and mineral sector. Not negating the above argument, it is important to note that the audit did not cover all mines in the country.

5. STRUCTURE OF REPORT

The report has been structured in a chapter format. Each chapter discusses a topic that has a major impact on health and safety performance at mines and is concluded by relevant recommendations, which were seriously considered to address the problems that were identified. The view was that it will be difficult to understand the problems and the recommendations without first looking at the different pieces of the health and safety puzzle. The main chapter of this report is **chapter six** on mine health and safety compliance audits. The final chapter is a summary of all the recommendations made in the different chapters of this report.

6. SUMMARY OF AUDIT FINDINGS

The detailed discussions of mine health and safety compliance audit can be found in Chapter 6 of the report. This chapter took the structure of the audit itself and mainly discusses the findings under each main audit theme. The overall results of the audits should be of serious concern to all involved in mining and minerals sector considering that they were structured to simply establish compliance to legal requirements. If an establishment has achieved eighty percent (full compliance **less twenty percent (20%) compliance**, what are the implications for the worker on the workplace drilling a stope face, a tunnel, removing blasted rock or doing any other work at that mine? Chapter one and two gives the insight to these questions.

Chapter One

1. MINING AND MINE SAFETY

1.1 Country and Industry Profile

South Africa, as one of the mineral rich countries, is a producer of a vast array of minerals that are used for different applications. The country is known for possessing some of the world's largest known reserves of mineral commodities and is ranked amongst the world's top 5 producers for commodities like gold (2nd), platinum group metals (1st), coal (5th), diamond (5th), manganese ore (2nd), chrome ore (1st), titanium minerals (2nd), vanadium (1st), vermiculite (1st), fluorspar (4th), etc¹.

Mining in the country ranges from sand winning for construction, to deep level mining for gold and platinum. A choice of which mining method to apply is informed by the depth of the ore body, the geometry of the orebody, physical properties of rock being mined and available technologies. These factors determine whether mining can be carried out using labour-intensive or capital intensive methods. Whether underground or surface methods will be employed. South African mining establishments are in the main labour intensive when compared to similar operations in other countries like Australia and Canada. This means that a greater number of South African workers are exposed to health and safety risks than their counterparts in other parts of the mining world.

The industry is an important contributor to the much needed employment in the country and employs 2.7% of the economically active population. The mining industry provides approximately 500 000 direct employment.

Since the advent of democracy in 1994, South Africa has implemented a number of policy and legislative changes that are aimed at fast tracking economic growth in pursuit of a better life for all. This has resulted in a much needed economic growth in the country that is driven by government's investment in infrastructure development programmes, private

¹ Department of Minerals and Energy-Mineral Economics Directorate, South African Minerals Industry 2006/2007

companies investing into new business ventures, and the country winning the bid to host the FIFA 2010 World Cup with its incidental projects.

This economic growth has had a significant impact on the mining and mineral sector. Quarrying and brick works have increased substantially due to major construction projects, leading to 2010 FIFA Soccer World Cup. Prices of commodities like gold and platinum have reached record levels. This has resulted in the projects that were dormant becoming viable and thus being re-opened and the development of new ones. In addition, South Africa derives more than 95% of its electricity from coal-fired power stations, and the increasing electricity demand related to the economic growth has also put an increase on demand for production of coal.

The current economic growth is coupled with a greater demand for engineering skills. Mines are normally found in remote areas with very harsh working environments as compared to most other industries and having to compete for the same scarce skills with these industry poses a serious recruitment and retention challenge for the mining sector. The mining industry has over the last few years trained people in the engineering fields but as soon as they qualify they move to other sectors of the economy, like manufacturing, construction and banking.

The country's experience in the last few years has indicated that there is a serious shortage of skills. A stable economic growth path will need an urgent focus and massive investment in skills development. The mining industry has been seriously affected by this shortage.

Different mining methods are employed to mine coal, diamond, gold, platinum and other orebodies. These mining methods introduce or create different health and safety hazards and risks for mine workers. The following section of the report introduces the reader to these hazards and risks.

1.2. Mine Safety Related Hazards

The following section attempts to sketch a picture of what the actual working environment is like in South African mines. The four major commodities that contributes to employment and accidents are discussed.

1.2.1 Gold Sector

Gold mining in this country is mainly from a tabular gold bearing deposit called the Witwatersrand Basin. The basin cuts across the provinces of Gauteng, Free State and North West, and is predominantly a narrow tabular hard rock ore body currently being mined at great depths using labour intensive underground “conventional” drill and blast techniques.

Mining operations at great depths encounter high temperatures ($\pm 60^{\circ}\text{C}$) caused by auto-compression of air and heat transfer from the surrounding rocks. To keep the temperatures within acceptable levels (28°C), fans are used which often produce a lot of noise and heat.

Drill and blast method in gold mining predominantly entail the use of hand-held pneumatic drilling machines to drill holes into the in-situ rock. The rock is charged with explosives and then blasted. The blasted rock is then removed from the working places by means of scraper winches and water-jet guns and then transported by locomotives to the shaft stations from where the rock is hoisted to surface using rock winders. Materials being used in working places like support units, explosives, etc, are normally transported via the same access points which is used for transporting workers in and out of an underground mine establishment.

In winning minerals from the ground, the rock breaking and handling processes liberate dust into the atmosphere. Silica and silicates form a very high percentage of the earth’s crust associated with rocks with a high quartz content found in most of our hard rock mines like gold and platinum and dimension stone mining. The gold bearing ores in South Africa have very high silica content and thus the dust emanating from them contain crystalline silica².

The reported employment figures at gold mines for the 2007 calendar year were an annual average of 152 587 persons at work. Eighty four percent (84%) of these employees work underground. As illustrated by Table 1 below, this indicates that 26% of the total mining workforce in the country is employed underground in gold mines compared to the 60%

² SIMRAC: Handbook of Occupational Health Practice in the South African Mining Industry, 2001

contribution of the people employed in the entire mining industry being underground workers. A significant number of these underground operations have their workings at depths greater than 1.5km which are by definition deep mines. Associated with these depths, are fall of ground, rockbursts and seismic activities due to pressure built up in the rockmass. Half of the entire mining workforce is by definition employed in deep mines. As a matter of fact, South African gold mines are by far the deepest in the world with many working places as deep as 3000m and a number of projects are going to 4000m depths.

As mines go deeper, the problem of seismicity and seismicity induced fall of ground will no doubt increase. Currently, there is no way that the enforcement authority can get access to seismic information for proactive prevention work. This information is often only made available by mines after injuries and deaths and cannot be relied on because it always indicates that there were no major warning before the main incidents that injure and claims lives. The Stillfontein accident, in 2005, that damaged the shaft, trapped many miners underground and caused serious damage to that town's infrastructure provide a good example of the risks associated with deep mining for both the public and mine employees.

1.2.2 Platinum Sector

Platinum is mined from the Bushveld Igneous Complex which cuts across the provinces of North West, Limpopo and Mpumalanga, with an ore body with similar characteristics as the Witwatersrand Basin. As a result similar mining techniques and methods that are employed in mining gold are also used in mining platinum.

The reported employment figures in the platinum sector for the 2007 calendar year were 175 806 people at work. Well over half of these employees, that is 131 784 work underground. As illustrated by Table 1 below, this indicates that 27% of the total mining workforce in the country is employed underground in platinum mines.

Commodity	Underground	% Contribution	Surface	Open Cast	At sea	Total
Gold	127 629	26%	24 727	231	0	152 587
Platinum	131 784	27%	40 376	3646	0	175 806
<i>Combined % Contribution to total</i>		<i>53%</i>			<i>0%</i>	<i>68%</i>
Total	293 299	60%	157 517	33708	1376	485900*

Table 1: Combined Contribution of Gold & Platinum sectors to the mining industry employment figures³

Occupational safety hazards related to the Gold and Platinum sectors are predominantly characterised by:

- Rock falls and rockbursts as a result of the mining depths;
- Interaction of people and machines in confined spaces;
- Falling materials and rolling rocks;
- Inundations by mud or broken rocks;
- Falling into excavations or from structures;
- Exposure to dust, gases and fumes;
- Explosives and Fires;
- Seismicity and
- High temperatures (up to 58°C if uncontrolled.)

1.2.3 Coal Sector

Coal mining in South Africa occurs in various coalfields spread across the provinces of Mpumalanga, Free-state, KwaZulu Natal and Limpopo and the coal seams are generally soft rock, shallow and relatively flat with wider ore bodies (seams). The coal seam also mostly contains the explosive methane gas⁴. The mining methods employed in the coal sector are generally mechanized with a fair mixture of underground and surface operations. Rock breaking operations in both surface and underground operations is

³ Department of Minerals and Energy , Mineral Economics Directorate

⁴ South African Colliery Managers' Association, Surface Strip Mining Handbook, 2005.

through largely carried out mechanised drill and blasting techniques. The blasted rocks are removed either with draglines on surface or mechanised loaders (LHD's) and conveyor belts from underground mines.

Another prevalent mining method used mainly in underground operations makes use of machines (called continuous miners using similar mechanisms used by Tunnel Boring Machines) that cuts the coal in-situ and the coal is transported via conveyor belts ⁵to the surface.

The coal sector was reported to have been employing a gross average of 57 955 persons during the 2007 calendar year, which translates to almost 12% contribution to the entire industry workforce. Of these 18 687, which translates to a 4% contribution to the entire mining industry's workforce are employed in underground operations. The sector is to a greater degree mechanised and hence a much lower number of employees than for gold or platinum operations.

The occupational safety hazards associated with the coal operations are predominantly:

- Rockfalls
- Coal dust explosions
- Methane explosions
- Machinery coming into contact with persons
- Fires from spontaneous combustion
- Falling into or from excavations

1.2.4 Diamond Sector

Diamonds occurs in volcanic kimberlite pipes or fissures found at various locations across the country from Musina in Limpopo, Cullinan in Gauteng, Swartruggens in North West, Koffiefontein in Free State, Kimberly in the Northern Cape and Heidelberg in the Western Cape. In addition to that, diamonds also occur as alluvial deposits along old and current

⁵Fauconnier et al, Increased Underground Extraction of Coal, 1982

river courses in gravels criss-crossing the country up to the west coast, where there are off-shore deposits⁶.

The kimberlite volcanic deposits, from which most of the country's production comes from, are generally massive orebodies that are near vertical and outcrop on surface and are normally initially mined using surface mining methods and then migrated to underground methods. The mining is also predominantly mechanized in both the underground and surface operations where heavy machinery in the form of drill rigs, heavy duty trucks are used and the underground production uses caving mining methods.

The diamond sector has been reported to have been employing 19 776 persons during the 2007 calendar year, which translates to a 4% contribution to the industry's employment figures. Of these persons, 3 506 are employed in underground operation, which 0.7% of the entire mining industry employment figures.

The occupational safety hazards related to the diamond sector are:

- Mudrushes
- Airblasts
- Machines coming into contact with persons
- Rockfalls
- Rolling rocks (from drawpoints)
- Falling into or from structures
- Vehicle accidents

1.2.5 Other Mines

This category includes all mines that do not form part of the top four contributors and comprises of a diversity of mineral commodities including base metals, rare minerals, sand works, granite quarries etc.

These are predominantly surface operations with the significant number of small scale mines housed under this category and the mining operations ranging from artisanal mining methods to very sophisticated earth moving machinery.

⁶Lurie J, South African Geology for Mining, Metallurgical, Hydrological and Civil Engineering (7th edition), 1994

There has been significant increase of economic activity in this area of mining since the promulgation of the Minerals and Petroleum Resource Development Act (MPRDA) of 2004. The other mines category contributes approximately 15% of the mining industry employment figures. The reported increase in fatalities at mines last year of 10% was mainly due to other mining operations.

1.3 Mine Safety Statistics

One of the main social problem that is associated with the afore-mentioned hazards related to mining is the risks of occupational injuries and deaths. South African mining industry has a history of unacceptably high accident rates that result in fatal and disabling injuries. The injuries being quoted in this case are reportable accidents as required by law.

The following table presents accident data for mines for the last 24 years and it shows that there has been a significant reduction in the number of people that die from occupational injuries from well over 700 in the mid 1980's to the current levels of over 200. Of serious concern is that the fatalities have been steadily decreasing since 1995, but over the last two calendar years, the decrease stagnated with a negligible reduction in 2006 and an increase of about 10% more deaths in 2007. Closer analysis of accident statistics reveal that the increase comes from other mines and in particular smaller operations in the diamond operations where there is increased activity and new entrants into the sector with limited knowledge of health and safety management.

Key to Table 2 below

Fatality rate which is generally referred to as Fatal Injury Frequency Rate (FIFR) is calculated as follows:
$$\text{FIFR} = \frac{\text{Number of Fatalities or Injuries} \times 1 \text{ million hours worked}}{\text{Total hours worked}}$$
 the formula is the same for the injury rate (IFR).

In South Africa, the rate of per 1000 persons at work has traditionally been used. Internationally the trend is towards a million-hours worked. Hence, in 1999 the million hour work measure was introduced for international benchmarking purposes.

Year	Fatalities	Fatality rate/ 1 000 persons at work	Fatality rate/ mill. hours	Injuries	Injury rate/ 1 000 persons at work	Injury rate/ mill. hours
1984	774	1.12		15 745	22.81	
1985	737	1.04		15 080	21.34	
1986	855	1.20		13 315	18.68	
1987	756	1.07		11 478	16.26	
1988	677	1.00		10 374	15.36	
1989	744	1.12		10 657	16.02	
1990	684	0.98		9 830	14.09	
1991	602	0.95		9 058	14.24	
1992	551	0.94		8 795	15.00	
1993	586	1.08		8 524	15.66	
1994	482	0.95		7 934	15.71	
1995	533	1.02		7 717	14.76	
1996	463	0.94		7 426	15.00	
1997	415	0.86		7 095	14.66	
1998	366	0.85		6 059	14.12	
1999	309	0.76	0.34	5 488	13.42	6.10
2000	285	0.72	0.33	4 733	11.93	5.26
2001	288	0.75	0.34	4 728	12.34	5.61
2002	290	0.75	0.34	4 461	11.52	5.24
2003	270	0.65	0.29	4 301	10.32	4.69
2004	246	0.56	0.25	4 268	9.66	4.39
2005	201	0.45	0.20	3 985	8.92	4.06
2006	200	0.44	0.20	4 169	9.10	4.14
#2007	220	0.45	0.21	3 867	7.96	3.62

Table 2: Accident Data; 1984-2007

= provisional

For meaningful comparison to be made between different mining operations and countries, the number of persons exposed is factored in. The rate per thousand persons at work at which these fatalities and injuries have been occurring over the last 24 years is depicted in the graph below (with different scales for fatalities and injury graphs). This shows a welcomed reduction over the years, though it is worrying that fatality rates seem to have started to stagnate and have actually increased in the last calendar year.

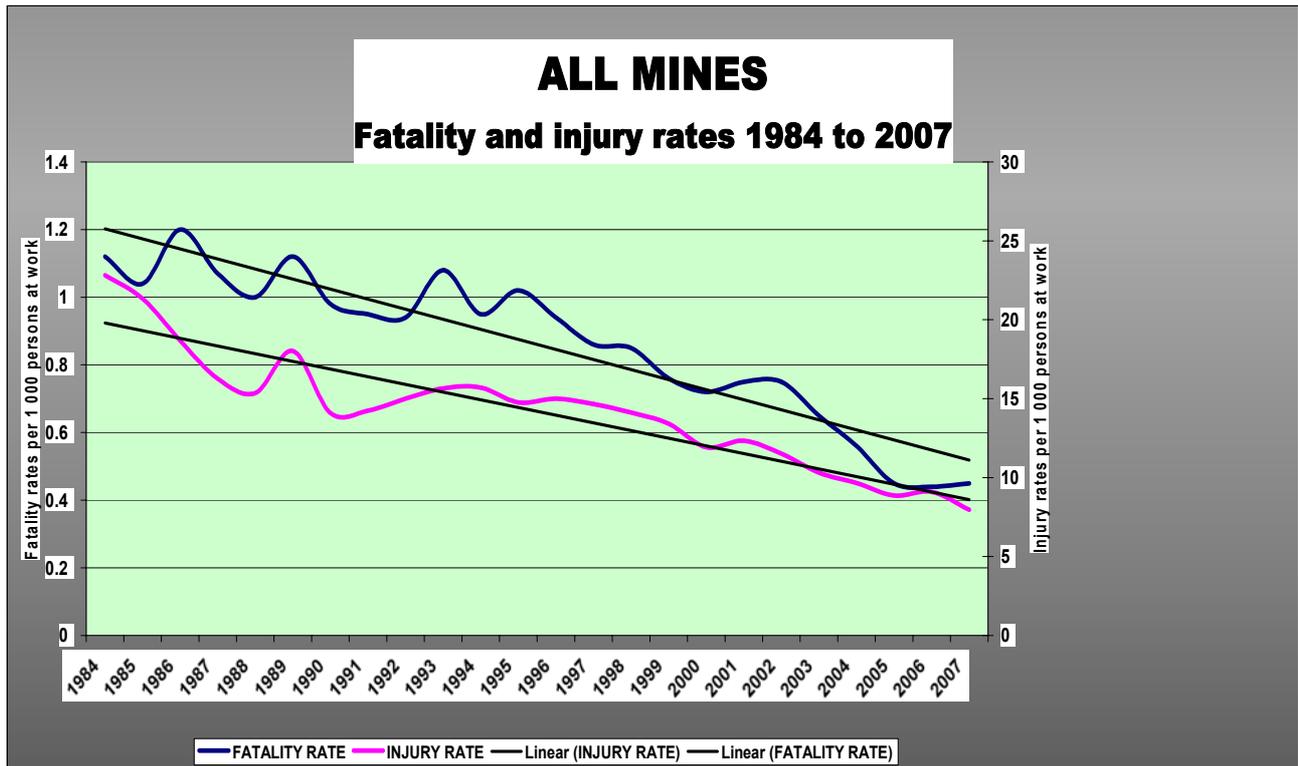


Figure 1: Casualty Accident Rates: 1984-2007

The following table 3 compares the contribution of each commodity to the labour and fatality statistics and it shows that gold (52%) and platinum (24%) are the main contributors to fatal deaths at mines.

The statistics from the diamond operations are most probably linked to influx of new entrants in the form of diggers of alluvial diamonds since the liberalization of the local minerals industry through the introduction of the Minerals and Petroleum Resources Development Act (MPRDA) in 2004. The accident statistics indicate that diamond sector fatality rates have been increasing since early 2007. A recent Global Report on Artisanal

and Small-scale Miners⁷ sites the following as some of the reasons for poor safety in small scale mines:

- Economic considerations: Many of the owners and miners are using their proceeds for daily living and they see non-revenue generating cost drivers like safety as low priority.
- Exaggerated safety requirements that are not applicable discourage them and inspire them to ignore all advice as they see it as “utopic”.
- Lack of hazard and risk awareness.

	Labour 2007		Fatalities 2007*	
	Persons	% Contribution	Fatalities	% Contribution
All mines	485 900		220	
Gold	152 587	31.4%	115	52%
Platinum	175 806	36.2%	53	24%
Coal	57 955	11.9%	15	6.8%
Diamonds	19 776	4.1%	12	5.4%
Copper	3 912	0.8%	1	0.1%
Chrome	9 723	2%	4	1.8%
Iron ore	14 042	3%	4	1.8%
Manganese	3 176	0.7%	0	0
Other	48 923	10.1%	16	7.2%

Table 3: Commodities of labour and fatal accidents.

The table 4 below reflects a comparison of accidents by cause and the safety performance between the 2006 and 2007 calendar years. The top four agents of deaths in the South African mines (excluding health related matters) are:

⁷ World Business Council for Sustainable Development, Global Report on Artisanal and Small-scale Miners, 2002.

1. Rockfall accidents (unsupported rock, seismic induced etc) 35%
2. General accidents (slip and fall, falling objects etc) 23%
3. Transportation and mining 21%
4. Machinery 9%

	Fatalities				
	Actual		Rates		Rates % change
	2006	2007*	2006	2007*	
All mines	200	220	0.20	0.21	5.0
Fall of ground	86	76	0.09	0.07	-22.2
Machinery	15	19	0.01	0.02	100
Transportation and mining	46	47	0.05	0.04	-20.0
General	35	50	0.03	0.05	66.7
Conveyance accidents	2	5	0	0	0
Electricity	6	4	0.01	0	-100
Fires	0	0	0	0	0
Explosives	5	8	0	0.01	0
Subsidence/caving	0	1	0	0	0
Heat sickness	0	1	0	0	0
Diving sickness	0	1	0	0	0
Miscellaneous	5	8	0	0.01	0

Table 4: Comparison of accident causes and year on year rates performance

Table 4 also shows that among the main contributors, the rate at which the fall of ground and transportation and mining fatal accidents occurred decreased by a commendable 22% and 20% respectively, whilst electricity also decreased by 100%. A very worrying development is that the general class of accidents increased by 67% in addition to the fact that it has overtaken machinery related accidents in that period to become second biggest contributor. The overall rate change is an unwelcome 5% increase. The overall actual performance looking at the number of bodies reflects a disturbing 10% increase year on year.

1.4 Interventions

In order to deal with the overall occupational health and safety challenges facing the industry, a number of interventions have been adopted which are elaborated on below. The interventions largely emanates from legislative stipulations. In the past year in particular, due to serious shortage of inspectors, regulatory approaches and enforcement action were intensified.

1.4.1 Regulatory practice

The department has offices in all the nine provinces and mine inspectors operate from these offices in conducting regular inspections and audits at mine workplaces. During inspections and audits, inspectors employ differing approaches to secure compliance to health and safety standards and thus improving the work environment for mine workers. These approaches range from advice for all operations, to improvement notices to, non compliant employer. In extreme cases that pose immediate danger to employees, workplaces are stopped to allow for corrective action to be taken before work is resumed.

These two main functions of inspectors could be greatly improved by employing current technologies to enhance planning, targeting problematic workplaces out of the thousands workplaces that have to be inspected and audited. For sustained improvement in safety performance this situation needs immediate attention given the dwindling capacity of the mine inspectorate.

The challenge however is that with such high levels of injuries and deaths, inspector's time is spent more on reactive work (accident investigations and inquiries) as opposed to proactive work (inspections and audits).

1.4.2 Safety Research

Mines are required to pay a safety risk levy which is used for health and safety research under the auspices of the Mine Health and Safety Council (MHSC). MHSC is a tripartite council that draws mining expertise from employers in the mining industry, mine employee

through their unions and state representatives to advise the Minister of Minerals and Energy on health and safety at mines.

Annual research programme is informed by the hazards and the main causes of injuries, illhealth as well as death as identified earlier. To support health and safety improvements, Council runs a research programme that covers rockfalls, engineering and health.

1.4.3 Safety Training

Although safety is part of our day to day lives, in an industrial context like mining, it becomes a rather complex pursuit due the unnatural environment of mining, introduction of machines, explosives, electrical energy, people etc. Training becomes very important and was identified so by the legislature when the Act was promulgated in 1997. Mining Qualifications Authority (MQA) was established to set standards of education in the mining sector.

Since its establishment, the MQA has done a lot of work in developing unit standards that are widely used in the sector for training. The details of this appear in chapter 3 of this report.

1.5 Assessment of Interventions

Measuring impacts of regulatory interventions has never been straight forward; hence, over the years more obvious measures have been used. These measures include number of accident and deaths. This practice of measuring regulatory performance has been further entrenched by the lack of sophisticated technologies and tools to collect and assess safety intelligence at workplaces. The issue at hand is that it is often difficult to establish a direct link between the impacts of the above-mentioned interventions on the state of safety. It is however useful to review how current safety statistics compares with the same period last year.

In summary, the performance in the first five months of 2008 when compared to the same period in 2007 reflects the following trends:

- The number of overall occupational accidents are less by 9.5%
- Total injuries reported are less by 5.5%
- Disabling injuries (i.e. incapacitated for 14 days or more) declined by 50%. This is not a very reliable measure due to low compliance to reporting in this category.
- Fatalities have declined by 28.1%.

An overall assessment of safety statistics in the last ten years since the promulgation of the MHSA and the establishment of MQA and MHSC suggests that the interventions are making an impact.

1.6 Recommendations

- The current structures established under the MHSA, (that is MHSC, MQA and the Inspectorate) need to be strengthened to continue to make a meaningful impact in rapidly reducing the levels of injuries and death in the mining sector.
- In the ever changing and complex regulatory mining environment, the mine inspectorate needs to employ available technologies to improve planning, targeting and effective regulatory contacts with the regulated community.
- There is an urgent need to develop a national mine seismic network that will fully be integrated with the Council of Geoscience's seismic network.

Chapter Two

1. MINE OCCUPATIONAL HEALTH

Chapter one detailed the mining landscape and a variety of minerals that are mined in the country. Some of the occupational health hazards in South African mines are:

- Heat due rock temperatures at depth
- Exposure to silica dust
- Noise often made worse by confined spaces
- Fumes
- Lack of light

Incidence of some occupational illnesses due to the aforementioned hazards is often compounded by HIV/Aids and tuberculosis. The problem of occupational health is complex. The complexity emanates from the multifactorial causation of disease such as environment, lifestyle and disease causing agents. Manifestation of disease is not uniform in all individuals exposed to the same working conditions. Disease may be the result of a number of causes, some of which are specific to the workplace and others unrelated to occupation. More often occupational and lifestyle effects co-exist in the causation of disease for example smoking and silicosis.

The relationship between exposure and manifestations of the detectable health effects is complicated by the long period before the health effect can manifest itself.

The Leon Commission into the state of health and safety at mines identified, amongst others, the following occupational health problems in the South African mines which to a greater degree still contextualise the occupational health problem for the sector:

- Exposure to occupational health hazards and risks during the process of winning minerals.
- Failure to identify and properly manage health risks in the mining industry.

- Failure to link environmental measurements to individual workers.
- Latent interval between the exposure to harmful substance or environment and the first manifestation of the disease.
- Manifestations of the disease coming at a time when the relationship between the former worker and the employer has ceased.
- Failure to collect, keep, analyse reliable data on occupational exposures and diseases.
- Poor quality of statutory reports.
- Compensation of mineworkers is fragmented i.e. administered under ODMWA Act, Compensation for Occupational Injuries and Disease Act (COIDA) and through Rand Mutual Assurance.
- Lack of facilities for conducting benefit examination of ex-mine workers.
- Failure to assess the impact of mining on the public health.
- Discriminatory medical interventions and compensation practices.
- Access to mine information for research.
- Absence of a systematic approach to certification of occupationally related respiratory diseases.

2. INTERVENTIONS

Given the above situation, the legislature responded swiftly in 1996 by passing the Mine Health and Safety Act, No 29 of 1996 which stipulates a framework to address the

occupational health problem at South African mines. Compensation matters were not addressed because they fall outside the scope of the Act. The interventions are discussed in detail below.

2.1 Occupational health regulation

Operating and new mines are required to employ qualified occupational health practitioners who are required to establish a system of hygiene measurements (environmental measurements) and establish a system of medical surveillance for mine employees exposed to health hazards. Both hygiene and medical inspectors conduct regular inspections and audits of mines to ensure that these systems are in place and functioning.

Under the MHSC, a permanent committee dealing with occupational health policy and research was established. Mine Occupational Health Advisory Committee (MOHAC), has been instrumental in the past ten years in developing occupational health regulations for mine workplaces.

The MHSC has been conducting research on occupational health to support the mining industry health targets. One research study has been commissioned through the Council of Science and Industrial Research (CSIR) to look at the HIV and Aids problem in the sector and establish the amount of work that has been carried out to address the problem in the mine occupational setting.

2.2 Occupational Health Statistics

To address the problem of collection of occupational health data an attempt was made to develop a health management system called South African Medical Occupational Disease Database (SAMODD). While the initiative must be applauded, it also failed to integrate the environmental measurements and effects on employees. At best this system is a collection of occupational diseases which is of limited value from a policy point of view and from a compensation perspective.

Environmental measurements are conducted and reported to the Department (DME) at established intervals depending on the risk or exposure levels. This data is not linked to persons and its storage has been to a greater extent defined by the functional structure of the data collector than the overall aim of collection and storage of the data.

2.3 Mine Health and Safety Council Initiatives

Setting and adoption of health performance targets at the 2003 biennial mine health and safety summit was positive and a bold step by the mining industry stakeholders. This initiative was augmented by research programme on noise and silicosis. Proper monitoring of trends in occupational health will be and is key to the attainment of these goals. An integrated system of occupational health management is a need for the sector. The social cost and burden of failing to address the question of worker health is and will continue to be unbearable for developing economy of South Africa.

The following health milestones were endorsed by all the stakeholders during the above mentioned summit.

Elimination of Silicosis

- By December 2008, 95% of all exposure measurement results will be below the occupational exposure limit (OEL) for respirable crystalline silica of 0.1 mg/m^3 (these results are individual readings and not average results); and
- After December 2013, using present diagnostic techniques, no new cases of silicosis will occur amongst previously unexposed individuals (Previously unexposed individuals equals individuals unexposed prior to 2008, i.e. equivalent to a new person entering the industry in 2008);

Elimination of Noise Induced Hearing Loss

- After December 2008, the hearing conservation programme implemented by the industry must ensure that there is no hearing deterioration greater than 10% amongst occupationally exposed individuals; and

- By December 2013, the total noise emitted by all equipment installed in any workplace must not exceed a sound pressure level of 110 dB (A) at any location in that workplace (includes individual pieces of equipment). (Note: The present noise exposure limit specified in the MHSR Regulations is 85 DBI_{Aeq,8h} meaning an average noise exposure level of 85 dB throughout an eight hour exposure period)

2.4 HIV/AIDS Tripartite Committee

A mining and minerals sector committee chaired by the Minister has been established to facilitate the implementation of the National Strategic Plan on HIV and AIDS. The sector stakeholders (Unions, Employers, DME), Department of Health, Department of Labour and the Presidency are represented in the committee.

The committee meet on a quarterly basis to review progress and refocus initiatives in the sector. Big established mining houses as opposed to smaller and medium sized operators have wellness policies and programmes in place which among other things address HIV and Aids as it relates to the occupational environment.

Mine employees are encouraged to enrol for voluntary counselling and testing (VCT) with a view of knowing their HIV status. There are mining establishments where up to ninety percent of the workforce knows their status and those who are positive are receiving counselling, treatment, care and support. These initiatives must be encouraged on a wider scale because of its potential effect on worker health and safety, productivity and operational sustainability. Some of the issues addressed by the committee in support of the National Strategic Plan (NSP) are:

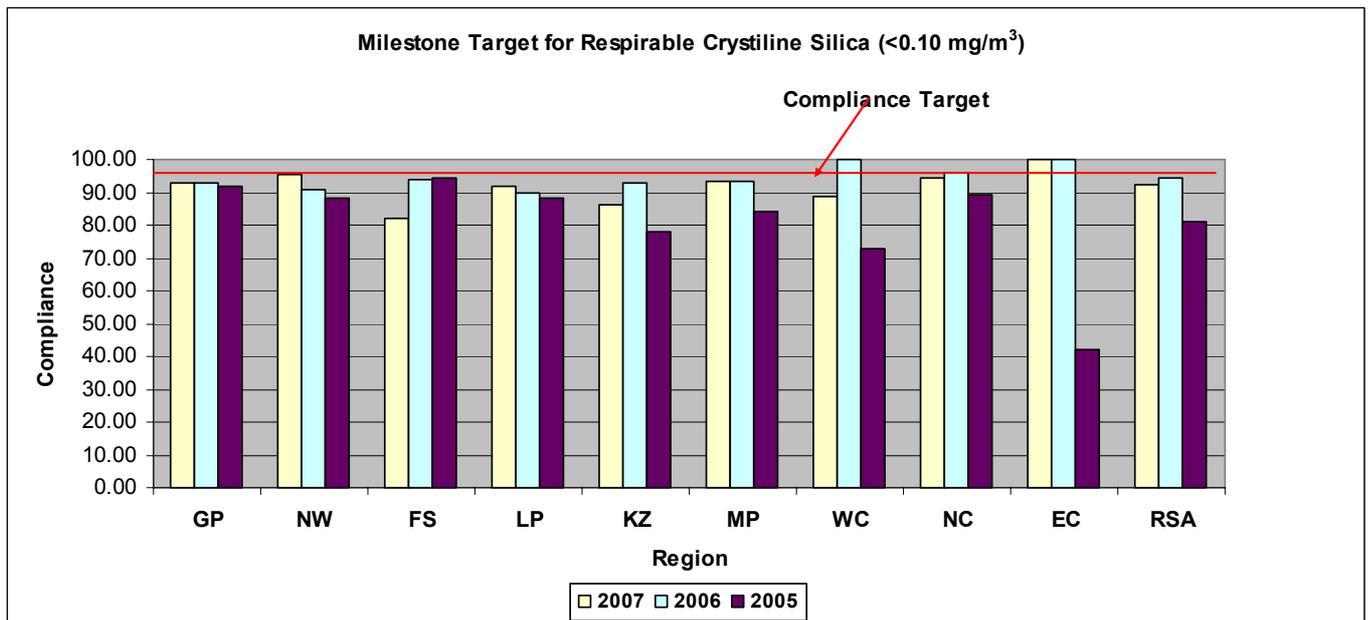
- Conversion of single sex hostels into family units.
- Treatment, care and support for HIV/Aids positive workers.
- Research
- Monitoring and surveillance

While applauding the initiatives by the sector, one has to highlight a worrying and growing trend by some unscrupulous employers who during accident investigations and inquiries into miner's death advances arguments that an employee had Aids hence they cannot be held liable. This practice need to be addressed because it raises serious questions around confidentiality of employee's health status information and possible discrimination by unethical employers.

3. INTERVENTIONS

The mine inspectorate has been inspecting and collecting data on environmental measurement to establish improvements in dust exposure. The chart below shows a general improvement from 2005, since the start of this initiative, to 2007.

Achievements on the Milestones

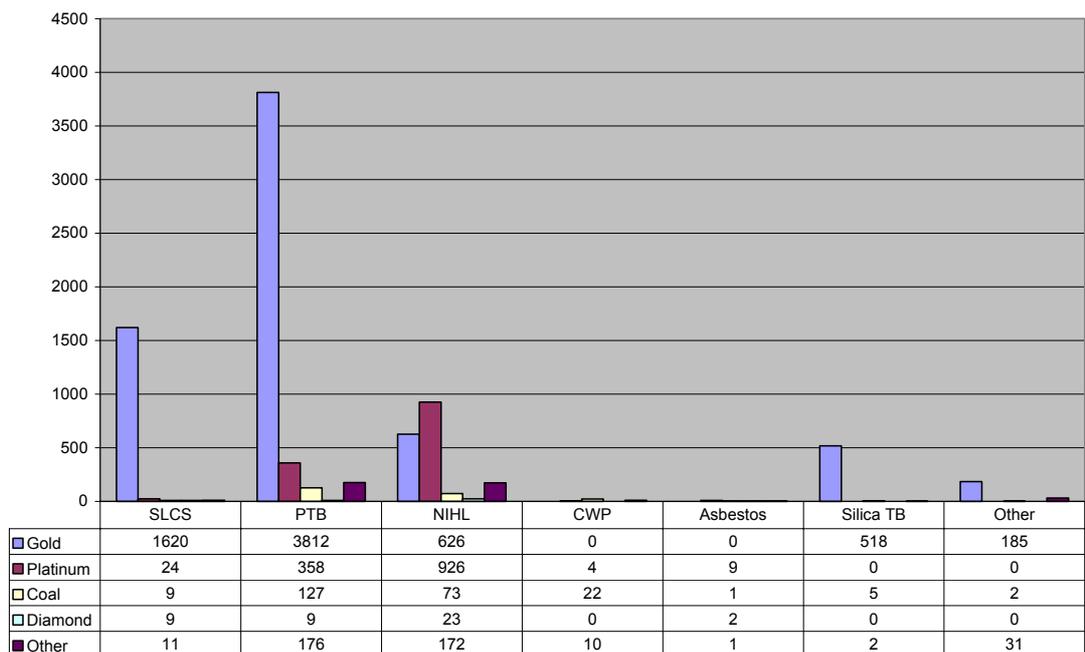


In terms of Section 16 of the Mine Health and Safety Act, Act 29 of 1996, every occupational medical practitioner at a mine must compile an annual medical report; covering employees' health based on the employees records of medical surveillance, and give an analysis of the status of the mentioned employees medical conditions as far as occupational diseases are concerned.

The information helps the inspectorate to analyse disease trends in different commodities and see if the industry will be able to achieve the milestones set in terms of eradicating silicosis and NIHL by 2013.

The following graphs show diseases of significance that were captured from the annual medical report. A total number of 493 annual medical reports have been submitted for the year 2007-2008 as compared to the previous reporting period, where only 226 mines submitted annual reports in terms of section 16 of the Act.

OCCUPATIONAL DISEASES CAPTURED PER COMMODITY FROM ANNUAL MEDICAL REPORTS 2007



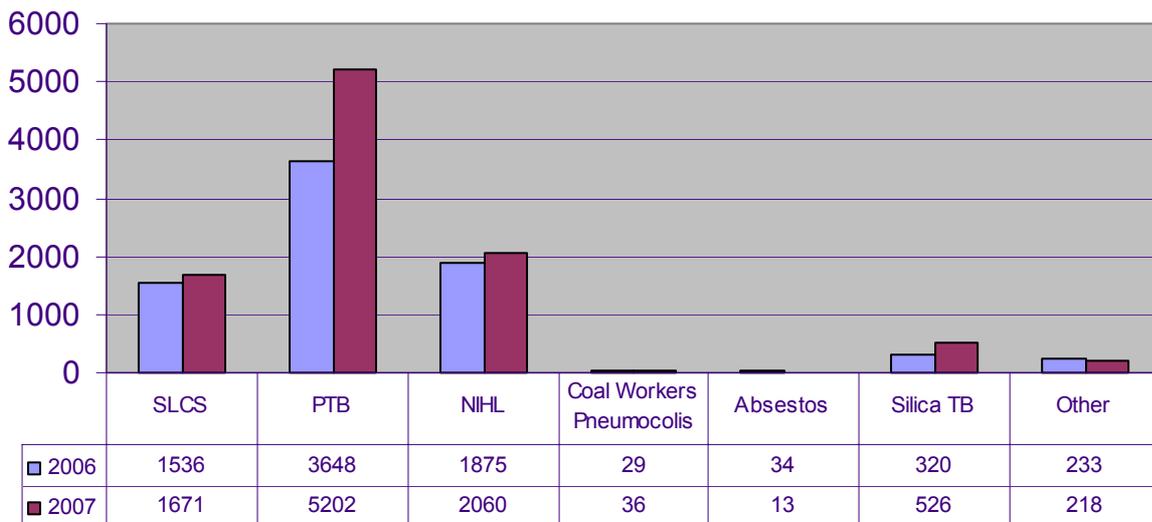
Legend

- SLCS Silicosis
- PTB Pulmonary Tuberculosis
- NIHL Noise Induces Hearing Loss
- CWP Coal Workers Pneumoconiosis
- TB Tuberculosis



Gold mines have the highest incidence of silicosis and PTB in the mining industry as compared to the platinum mines. PTB cases are even higher since silicosis predisposes employees to TB and concomitant HIV infection exacerbates the situation. NIHL is significantly high in the platinum mines but this could be due to influx of employees from the gold mines to the platinum mines who already had NIHL.

**Comparison of Occupational Diseases Captured from Annual Medical Reports:
2006 & 2007**



In terms of the milestones set for silicosis and NIHL, the cases of silicosis and NIHL seem to be increasing *than decreasing*. This might be due to early recognition of the two occupational diseases in an effort to eradicate them by 2013, hence an increase in reporting of the diseases. The fact that we have had more submissions of annual medical reports could also be contributory.

4. RECOMMENDATIONS

There is a pressing need for an integrated system of occupational health management for the mining and minerals sector that links occupational exposure to harmful substances and the effects on a worker.

Chapter Three

1. OHS CAPACITY AND SKILLS SHORTAGE

The chapter on mining and mine safety attempted to explain the different mining methods and complexity of deep level mining in South African. Compounding the problem of safety and health is also the general low literacy levels of employees in the sector. Purely judging by the complexity of South African deep level mining, knowledge that is the “what to do” and the skill that is the “how to do it” becomes one of the most important drivers of good health and safety performance, productivity and sector growth. There is no doubt that improvement of health and safety knowledge will contribute greatly to the reduction of injuries and deaths at mines.

1.1 MQA Role

The promulgation of the Mine Health and Safety Act in 1996 following Judge Leon’s recommendation in his commission report, saw the establishment of the Mining Qualifications Authority (MQA) which was subsequently established as mining Sector Education and Training Authority by the Skills Development Act of 1998. The MQA is responsible for facilitating skills development in the mining industry. Their work is geared towards eliminating illiteracy in the mining sector. This is done through training and encouraging Adult Basic Education and Training (ABET).

MQA is required as a SETA to identify the scarce and critical skills needs. Workplace skills plan (WSP) and annual training reports (ATR) from different organizations are analysed to get an indication of where there is high shortage of skills. The following table indicates that almost a quarter of employees in the mining and minerals sector have no basic education and on average eighty percent have below grade twelve education.

Educational level	Year 4	Year 5	Year 6	Year 7	Year 8
	%				
No schooling/pre-ABET	20.2	29.9	27.9	27.8	22.8
Grade 3/Std 1/ABET 1	5.0	9.2	7.2	8.6	6.3
Grade 4/Std 2	6.5	5.9	3.5	3.0	4.7
Grade 5/Std 3/ABET 2	4.3	4.2	5.4	5.7	5.2
Grade 6/Std 4	4.3	4.0	4.5	3.7	4.6
Grade 7/Std 5/ABET 3	6.3	6.7	8.4	8.6	8.0
Grade 8/Std 6/Form 1	3.9	4.5	5.4	4.3	6.3
Grade 9/Std 7/Form 2/ABET 4	20.3	4.3	5.2	5.1	7.3
Grade 10/Std 8/Form 3/N1	7.9	7.6	6.5	6.9	7.1
Grade 11/Std 9/Form 4/N2	4.2	4.8	4.8	5.7	6.1
Grade 12/Std 10/Form 5/N3	10.9	12.4	13.5	13.3	15.0
Post school qualifications	6.1	6.4	7.7	7.3	6.6
Total	100.0	100.0	100.0	100.0	100.0

Table 1: Educational Profile in the Mining Sector

Since the promulgation of the Minerals and Petroleum Resource Development Act in 2004, the mining and construction industry has been booming, creating challenges in terms of skills shortage in the mining industry. The country does not have an adequate skills pool, especially in the engineering fields. Economic growth means that demand for scarce skills have increased significantly and this is affecting the mining sector seriously.

1.2 Challenge of Communication

Most of the mining workforce lacks basic literacy and numeric skills. The workforce speaks a range of languages resulting in constraints in terms of communication. Mining lingua franca called 'fanakalo' has been used by the mining industry to try and overcome the problem of communication. This is inadequate to convey the nature and extent of the dangers in the occupation of mining. The safe and healthy operation of the industry depends, inter alia, on effective communication. Lack of literacy renders written communication with most of the workforce impossible.

The lack of common communication undermines the efficiency of oral communication and has a negative effect on skills development. South Africa's standard of education in the mining industry is on average several years behind that of the developed world with our similar mining economic structure. Education and training of the countries mining workforce is much more pressing.

Section 10 of the Mine Health and Safety Act 29, 1996 stipulates that the employer must provide job specific health and safety training for their employees. This training cannot be easy in the context of high illiteracy and innumeracy coupled with the complexity of deep level mining. Hence, the experience of the mine inspectorate is that very little of this training is done and where it is done is not documented. The chapter on the audits confirms this observation.

1.3 Government Certificate of Competency

Government certificates of competency are required for appointment at management and supervisory levels in the sector. The purpose of these certificates is mainly to ensure that the appointees know their legal duties and responsibilities with respect to mine health and safety. Competency certificates are issued by the department for explosive handling and blasting, winder engine drivers (driver of mine conveyance for underground mines accessible through shaft installation), onsetters (controller of conveyance movement) mine surveyors, mine managers and engineers.

The current competency regime does not cater for subsequent changes in legislation and technological development. Once a person obtains the competency certificate he or she is qualified for life. This is a serious shortcoming when one thinks that a supervisor in the mining sector may be responsible for up to three hundred workers. Front line supervisor receive no formal education on occupational health and safety and so are managers.

1.4 Interventions

The establishment of MQA as a SETA provided a much needed platform for the sector players to come together and tackle the skill development need of the sector. MQA

through its various technical committee developed standards of training and implemented other sector specific programme as indicated below.

- MOA facilitate and support provision of Adult Basic Education and Training to eliminate illiteracy.
- It addresses skills shortage through interventions like Graduate Development Programme (GDP) and the introduction of bursary and practical training scheme.
- The MOA also embarked on a process of building the capacity of skills development facilitators in the mining industry.
- To assist companies, especially the small ones, the MOA appointed independent skills development facilitators
- Relevant unit standards and qualifications have been registered on the National Qualifications Framework.
- 15 new qualifications and 81 unit standards have been developed and registered on the NOF for utilization by the sector.(see table below).
- A language policy is in the process of being developed to address the gaps of communication and challenges of learning in the mining industrial context.

	Name of Qualification	
1	FETC: Jewellery Setting	Level 4
2	NC: Electro-Mechanics	Level 2
3	NC: Electro-mechanics	Level 3
4	FETC: Electro-Mechanics	Level 4
5	NC: Laboratory Practice	Level 2
6	NC: Engineering Fabrication	Level 2
7	NC: Engineering Fabrication	Level 3
8	FETC: Engineering Fabrication	Level 4
9	FETC: Laboratory Analysis	Level 4
10	NC: Mineral Processing	Level 2
11	NC: Generic Management	Level 5
12	NC: Occupational Safety	Level 5
13	ND: Occupational Safety	Level 5
14	NC: Diamond Processing	Level 3
15	NC: Rock Engineering: strata Control Operations	Level 2

Table 2

1.5 Assessment of the Interventions

While acknowledging the work done by the SETA, overall educational profile of the workers has largely remained the same. Recently, MQA commissioned a study to establish whether the sector initiative on education and training are bearing fruit. This result of the study was disappointing as shown by table 1. Health and safety as a subject has not been adequately addressed like the technical standards.

1.6 Recommendations

- There is a need for formal health and safety training at all levels of education and training in the sector.
- A mechanism of updating health and safety competency for managerial and supervisory appointees must be developed as a matter of urgency.
- There is a need for massive investment in skills development in the mining sector for its sustainability.

Chapter Four

1. ENFORCEMENT

1.1 Structure and Composition

The Mine Health and Safety Branch is one of the six branches or programmes in the Department of Minerals and Energy. It is headed by a Deputy-Director General with a functional title defined in the law as the Chief Inspector of Mines (CIOM). The CIOM is the chairperson of both the MQA and MHSC. To ensure effective regulation of mine health and safety at mines; the Inspectorate has offices in all the major centres of the nine provinces. Each province is led by a director with a functional title defined in law as the Principal Inspector of Mines. The regional or provincial offices have functional structure with four disciplines namely: mining, engineering, hygiene and medicine represented.

The inspectorate mainly draws its staff from people with experience skilled in the mining industry. The core disciplines being mining, electrical and mechanical engineering, mine environmental management and occupational health. At head office there is a centralised function of mine surveyors, medical inspector who is a medical doctor with occupational health training and experience, and lawyers. The inspectorate draws from a wide array of disciplines. A large proportion of the staff is drawn from the engineering positions.

For many years the employment pattern of the inspectorate was defined by the movement of people from the mining industry who felt that they had their fair share of work at mines and now they would like to add value in a different setting, as inspectors. This employment pattern has been shifting to employment of certificated engineers and technologists. Many of these professionals still require experiential training which the department arranges but as soon as they qualify they go back to the industry because of attractive remuneration packages offered by the mines that are in desperate need for qualified professionals.

1.2 Changes in the sector impacting on MHSI

The previous chapter discussed the impact of the MPRDA on the skills needed in the mining and minerals sector. Excluding new operations that have started, commodity prices have skyrocketed and as a consequence the mines have resumed operations in areas that were previously not commercially viable (low grades areas). This led to the growth and expansion of the entire sector due to new ventures. While these developments are good for the country's economic well being and growth, they have not been equally good on the health and safety regulation. Scores of engineering inspector in particular, have returned to the industry because of better conditions of employment. This development is making it increasingly difficult to carry out the all important proactive work of effective regulation.

1.3 Current Situation

Concern about the Inspectorate's ability to build and maintain capacity was expressed in 1994 by the Leon Commission of Inquiry into safety and health in the mining industry. In its report the Commission indicated that the Inspectorate is under resourced and under funded and that this is one of the critical factors contributing to the poor performance of the mining industry on health and safety performance. The Commission also acknowledged that the remuneration packages are inadequate to attract candidates of the right quality and calibre in adequate numbers.

The Leon Commission also recommended that the Inspectorate should recruit, and train a group of learner inspectors and encourage them to study for higher qualifications to further their careers within the structure of the Inspectorate. A group of fifty (50) learner inspectors were subsequently recruited and trained in collaboration with Technikon Witwatersrand. The programme was completed in December 1998. After completion of their training, these learners were appointed as assistant inspectors at regional offices throughout the country. A number of these officers have subsequently completed tertiary qualifications with the assistance of bursaries awarded to them by the Department. A good number also obtained industry qualifications such as Mine Manager's Certificates of Competency and Mine Environmental Control Certificates. The Inspectorate has unfortunately been unable to retain the services of most of these officers because as soon as they qualify, the industry employs them for reasons articulated in the previous section of

the report. Of the 50 that completed the program, only twenty eight percent (28%) are still employed with the department.

A project to analyse the capacity of the MHSI to meet the challenges of its mandate under the Mine Health and Safety Act, 1996 (Act No 29 of 1996) and to oversee the implementation of interventions to enhance service delivery was completed at the end of 2005. With regard to capacity, the study clearly showed that the staffing profile of the Inspectorate, because of job reservation legacy, availability of qualified and experienced staff and remuneration competitiveness, resulted in a totally skewed demographic and staffing profile. The following issues in this regard were documented in the project report:

- 30% of the staff will either retire or be physically incapable of fulfilling their roles within a period of 3 to 5 years.
- Attracting and retaining resources in a scarce skilled environment is becoming increasingly difficult because of inadequate funding of the Inspectorate.
- Sustainable human resource development in the public sector context is impossible within the current remuneration structure.
- Administrative processes resulted in inspectors spending less than 50% of their available time on their core functions (inspections and audits)

The current establishment of the MHSI provides for 325 posts (**Annexure C**). The vacancy report for July 2008 shows 98 vacancies within the MHSI which constitutes a vacancy rate 29%. Of the 98 vacancies, 82 exist within the technical ranks. A very worrying factor is that a number of these vacancies have previously been advertised without any suitable candidate applying.

1.4 Current Initiatives to Address the Capacity Challenges

A number of initiatives are under way to try and address the problems identified above. To tackle the capacity in the Inspectorate the following initiatives were introduced since 2006:

1.4.1 Restructuring of the Inspectorate

A major restructuring of the MHSI Head Office components was completed in May 2007 to ensure that the structure meets the needs of the Inspectorate. This included the establishment of dedicated Policy, Technical Support and Support Services Units, which alleviated the administrative burden on regional inspectors leaving them with more time to attend to their core functions (i.e. inspections, audits and investigations). The structure of the Inspectorate appears on page 47.

1.4.2 Recruitment and development of staff

In view of the difficulties that the MHSI experience with regard to the recruitment of qualified staff, especially in the engineering professions, the Inspectorate had to develop innovative programmes to attract suitable candidates for appointment in the inspector ranks.

As part of the talent development and establishing a skill pool for the MHSI, a learner inspector programme was introduced in August 2007 whereby 23 learners were appointed on a two-year training programme. The programme is intended to be extended to include the appointment of 25 new learners on an annual basis. The benefit of this programme will really be felt after four years once learners have covered the two year experiential training at mines and another two years in regulatory practice.

1.4.3 MHSI Bursary Scheme

The Mine Health and Safety Inspectorate awarded eight full-time bursaries to students to study towards engineering and mine survey qualifications in the 2007 academic year. Funding was secured to award eight more bursaries in this financial year. The benefit of the scheme will only be felt eight years down the line.

1.5 Assessment of Current Initiatives

Although it is too soon to determine whether the restructuring of the MHSI will have a positive influence on the Inspectorate's ability to attract and retain staff, it has provided flexibility for the Inspectorate to deliver on its mandate around safety and health in the mining industry.

The Learner Inspector Programme is a new project and results about its success will only be available once the first group complete their training. It is, however, anticipated that the programme, in tandem with the bursary scheme, will yield a sufficient pool of qualified candidates to be appointed in the inspector ranks. The successful candidates will to an extent be retained by means of them being contractually obligated to work for the MHSI for a period equal to the duration of their training.

So far there have been no drop-outs and all the bursary holders are continuing their studies. As in the case with the Learner Inspector Programme, this initiative should augment the pool of qualified candidates from which the MHSI can appoint inspectors in the scarce skills employment categories.

The education and training programmes are long term in nature. Taking into account the country-wide skills shortage and the growing mining sector, these two interventions may not necessarily be adequate to deal with the challenges faced by the department because of defined conditions of employment in a highly competitive labour market. Looking at the current situation, it appears that the inspectorate will continue to struggle with recruitment and retention and the subsequent lack of capacity for effective regulation of the mining and minerals sector.

1.6 Recommendations

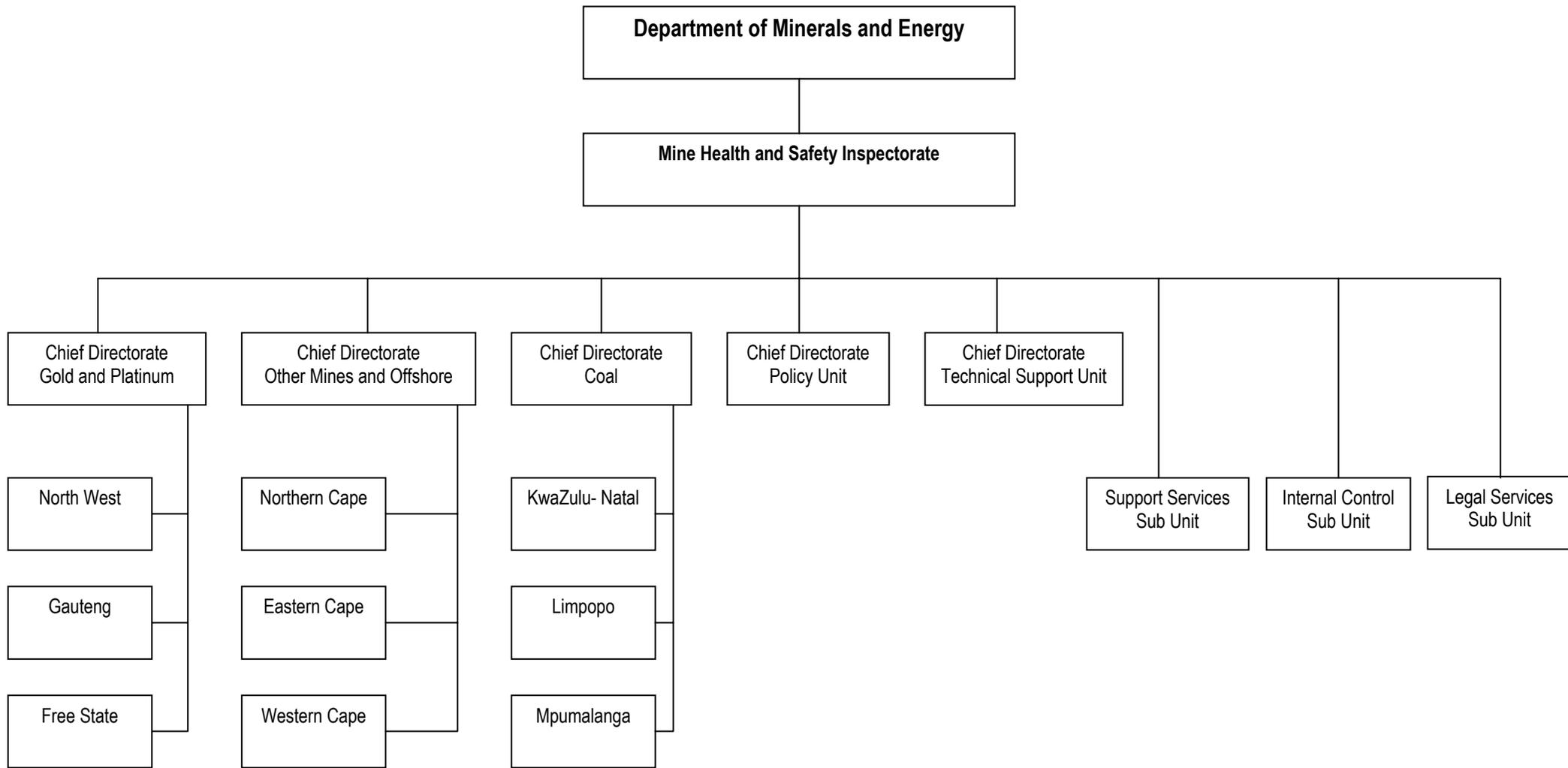
To solve this seemingly intractable problem of recruitment and retention of skilled staff in the inspectorate; two recommendations are made.

- a. A high level committee of officials from the Department of Minerals and Energy, Department of Transport, Department of Public Service and Administration and

National Treasury should be established to look at a comprehensive package of occupation specific dispensation for the inspectorate.

Or

- b. Establish the inspectorate as an organ of state or a public entity outside the public service regulation to allow it flexibility to deal with its capacity challenges.



Chapter Five

1. HEALTH AND SAFETY REGULATION

1.1 Regulatory Environment

Health and safety regulation in South Africa falls under the umbrella of social regulation. However, South Africa has different enforcement agencies or establishments to regulate health and safety in different sectors of the economy. There are broadly six inspections agencies or establishments in the occupational health and safety inspectors in the Department of labour with the responsibility of regulating all sectors of the economy excluding mining, nuclear, maritime, rail infrastructure and environmental health issues in the provinces. Mining industry is regulated by the Department of Mineral and Energy through the Mine Inspectorate, nuclear installations through National Nuclear Regulator (NNR), Rail infrastructure through Railway Safety Regulator (RSR) and so forth.

1.2 Mine Health and Safety Act

The present Act that covers the management and regulation of mines and quarries is the Mine Health and Safety Act, 1996 (Act No. 29 of 1996). The introduction of this Act in 1996 was a break from the past that was characterised by mixed regulation of prospecting, mining licensing, rehabilitation and predominantly safety to the exclusion of health. The Act incorporated the International Labour Organisation (ILO) conception on health and safety regulation that articulated state, employers and employees duties and rights. A Progressive world's view at the time and largely still is. The following are some of the fundamental principle emanating from this conception:

- The state has the duty and responsibility for effective regulation of health and safety conditions at workplaces.

- The employers have a duty and responsibility to protect the health and safety of their employees exposed to occupational health and safety hazards and risks.
- The employee has the right to refuse to work in an environment that may endanger his/her health or safety.

The Act is prefaced by the following objectives which the mining and minerals sector largely values and should strive to fully embrace:

- a. to protect the health and safety of persons at mines;
- b. to require employers and employees to identify hazards and eliminate, control and minimise the risks relating to health and safety at mines;
- c. to give effect to the public international law obligations of the Republic that concern health and safety at mines;
- d. to provide for employee participation in matters of health and safety through health and safety representatives and the health and safety committees at mines;
- e. to provide for effective monitoring of health and safety conditions at mines;
- f. to provide for enforcement of health and safety measures at mines;
- g. to provide for investigations and inquiries to improve health and safety at mines; and
- h. to promote -
 - (i) a culture of health and safety in the mining industry;
 - (ii) training in health and safety in the mining industry; and
 - (iii) co-operation and consultation on health and safety between the State, employers, employees and their representatives.

When one looks at the chapter on mining and mine safety, providing the South African mining context and past safety performance, it can be said with caution that to some degree we have made progress in pursuing the above goals. However, we must acknowledge given the high level of injuries, death, skill shortage in the sector and its impact on safety, concerns around enforcement capacity and lack appropriate health and safety systems, concerns around health and safety culture that led to this very report that we still have a lot of work to do in addressing the health and safety question.

The Act signalled a shift from prescriptive (rule based) regulation to a more target setting (outcome based) legislation. This is important because we have one piece of legislation regulating all size and form of mining in the country. So the Act requires employers to do what is reasonably practicable to fulfil their duties and responsibility of health and safety of their employees and surrounding communities. While this is a progressive way of regulating a varied and complex industry like mining in South Africa, this shift needed investment in training, both for the regulator who was largely familiar to an easy rule based approach, and the operators in the sector who are oriented towards a tick box approach to compliance.

The Act fell short of requiring mine employers to implement a comprehensive health and safety management system but it does however; require key elements of a health and safety management system to be implemented. These elements are:

- Section 8 requires a development of a health and safety policy.
- Section 10 requires job specific training that takes into account hazards and risks.
- Section 11 to 13 requires a system of health and safety risk management at mines
- Section 16 and chapter 23 of the regulation introduces a framework for accident reporting.

- Section 2 to 7 establishes health and safety and management duties for employers.

Other key sections of the Act are:

- Section 47 to 58 establishes the Mine Inspectorate and its powers to secure compliance.
- Section 60 to 74 establishes a framework for accident investigations and inquiries
- Chapter 6 of the Act codifying the Minister's powers
- Chapter 7 of the act covers legal proceedings and offences

The mine health and safety audits were in the main, structured around elements or themes of the health and safety management system's required by the Act. The audit covered the following areas:

- Design and Maintenance
- Legal Appointments
- Occupational Health and Safety Policy
- Occupational Health and Safety Risk Management
- Training
- Health and Safety Representatives and Committees
- Reporting
- Mandatory Codes of Practice
- Explosives Control
- Water Management
- Public Health and Safety

The Chief Inspector of Mines is an official appointed by the Minister to implement the Act and administer the Inspectorate. The Chief Inspector of Mines and Inspectors of

mines have wide statutory powers in terms of the MHSA. They are empowered to enter any mine at any time, conduct investigations, examine or seize documents, remove any article, substance or machinery. If the Chief Inspector or Inspector is not satisfied with the conditions relating to health and safety at the mines, he or she may:

- Order compliance by issuing instructions requiring the employer to improve the working conditions at mine within a specified time;
- Issue an instruction to suspend or halt the operations or part thereof;
- Issue an administrative fine; and or
- Conduct further investigations or if necessary recommend prosecution.

1.3 Regulatory Challenges

1.3.1 OHS Culture

Effective regulation needs a clear policy and legislative framework, ability to enforce legislative requirements and adequate sanctions for failing to comply. Good legislation is only good as far as it can be enforced. Although there a growing small and medium player in South African mining, its general character is that of a well established and well resourced industry. This situation requires a strong and well resourced enforcement agency to fearlessly take on the mining industry on compliance to health and safety regulations.

The bigger mining establishments have institutional arrangements to comply with legislative requirements. But as the audits confirm the findings made by Judge Leon in his Commission report, there is a pervasive culture of non compliance to legislative requirements. Inquiry after inquiry makes findings to the effect that risk assessments are not conducted, training is not done, early morning examinations are not done, equipments not maintained and the list goes on and on.

These problems are more pronounced in some commodities than the other; gold and platinum being the two commodities of serious concern. When coming to compliance with health and safety requirements and interactions with the regulator, operators in these two commodities tends to be intransigent. And this perhaps explains the tough stance taken by the inspectors to stop workplaces where there is no compliance. This regulatory approach is often interruptive and can be very costly but in the absence of any effective sanctions for non compliance, inspectors have used this approach to impress on the minds of mine operators and owners that the current status of high injuries, deaths and exposure to harmful substances is not acceptable.

1.3.2 Administrative Fines

The system of administrative fines for non compliance failed to serve as a deterrent for non compliance because it is very low (maximum fine of R200 000). Secondly mines do not want to pay even when they are fined because they see it as an admission of guilt. So the inspectorate which is seriously stretched for resources is inundated with piles of files from mines' legal councils appealing the fines. Processing a single fine can take up to one year six months.

1.3.3 Health and Safety Prosecution

Provision is made in the Act for referral of cases to the Director of Public Prosecution where negligence has resulted in death or serious injury of someone. Every year referrals are made but no prosecution has ever taken place. Recently there has been a public outcry for justice where clear negligence has been established. **Annexure D** gives a sample of cases referred for prosecution.

Matters related to the enforcement authority ability to effectively regulate the sector have been fully discussed in the chapter discussing enforcement.

1.4 Interventions

Section 41 (1) and (2) of the MHSA establishes the Mine Health and Safety Council that advises the Minister on health and safety issues and its permanent committees, namely:

- Mine Regulation Advisory Committee (MRAC);
- Mining Occupational Health Advisory Committee (MOHAC); and
- Safety in Mines Research Advisory Committee (SIMRAC).

MRAC meet regularly in order to review cumbersome set of regulations that were developed under the Mineral Act of 1991 and develop new codes of practice. This is done in order to keep up with changing technological environment in the workplace and the related risks and hazards to employees' health and safety at the mines.

Since in the past there was very little regulation on health environment at mines, MOHAC meets regularly to develop new regulations and codes of practice for the occupational health at mine establishments.

SIMRAC also meet regularly to establish health and safety areas of concern that need to be researched to support the sector's initiatives to improve health and safety performance.

The Mine Health and Safety Policy unit in the Inspectorate continuously scans the health and safety environment to establish gaps in regulations and makes recommendations for new regulations or improvement of existing ones. Because of high injuries at mines for example, the unit recently developed a policy paper on disability management with a view of reintegrating disabled workers into the workplace.

To improve regulatory contacts with the regulated community and promote administrative consistency across the nine regional offices, the following internal policies and procedures in the department have been developed and implemented.

- major incidents and disasters
- Audits
- Inspections
- Investigation and inquiry
- Statutory instructions (Improvement notices)
- Enforcement policy statement

A legal unit comprising of a Director and two senior legal officers was established within the MHSI. The Legal unit will amongst other key responsibilities train the inspector on legal aspects to assist them in enforcing the MHSA, particularly with conducting investigation and inquiries.

1.5 Assessment of Interventions

The effect or impact of the intervention relating to any change in legislation coupled with associated training will only become apparent some time after implementation of the change has taken effect.

1.6 Recommendations

1.6.1 The Mine Health and Safety Amendment Bill

After ten years of implementation of the Act, it has become necessary to review and address the gaps that have been observed over the past ten years. Amendment to mine health and safety legislation have been proposed and will be subject to public hearings in August before the Bill can serve before parliament.

The Bill seeks to amend the MHSA so as to review the enforcement provision; simplify the system; tighten offences and strengthen penalties. It also seeks to substitute and

remove ambiguities in certain definitions and expressions; effect certain amendments necessary to ensure consistency with other laws, particularly the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

The Bill further seeks to harmonise the administrative processes in the MHSA with the sound administrative practices and the objects of the Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000).

The Bill further amends section 47 of the MHSA to establish the Inspectorate as an entity of government. This will allow the inspectorate to develop plans and programmes to address skill shortage, improve its capacity for effective regulation.

1.6.2 Recommendations

- a. Parliament to strengthen mine health and safety legislation and enforcement thereof by approving the Bill.

- b. Department of Justice, Department of Labour and Department of Minerals and Energy to work on a national framework of facilitating prosecution of industrial cases.

Chapter Six

1. MINE HEALTH AND SAFETY AUDITS FINDINGS

1.1 Background

Following a spate of serious accidents that occurred last year, the State President requested the Department of Minerals and Energy (DME) to conduct a full audit of all mines to determine whether they meet health and safety standards as prescribed by the law.

The underlying philosophy of the mine health and safety compliance audit was to establish good health and safe practices and compliance within the industry concerning all aspects of mining in as far as health or safety is concerned. Also, the aim was to provide guidance on the manner in which safe and healthy mining operations could be conducted and with the emphasis on accident and incident prevention and avoidance, hazard identification and risk assessment and competency of persons at a mine.

1.2 Planning for the Audit

The main focus areas or themes of the compliance audit were based on the key elements of the Act supporting an establishment of a comprehensive health and safety management system at mines. In total eleven legal compliance themes were investigated and auditing tools or protocols were developed to address the Presidential call for countrywide mine health and safety audits.

The protocols for legal compliance audits are attached (**Annexure A**) for ease of reference.

Extensive consultations have been made with stakeholders in the sector to ensure that maximum value is obtained from the audit. The Chamber of Mines has made a submission that addressed the scope and resource requirement of the project.

National Union of Mine workers also made verbal submission with regard to health and safety training and concerns around legal sanctions for non compliance to health and safety requirements,

The legal compliance audit was conducted in-house by the Mine Health and Safety Inspectorate. The audit approach and methodology was presented and discussed in full with all the nine regions to allow the inspectors to give detailed plans on how they are going to carry out the audits.

The regional plans indicated that auditing all mines in the country will take 16 months. However, the audit was planned such that priority was given to high risk mines as identified by the respective Principal Inspectors of Mines in the nine regions. A total of 333 high risk mines were prioritized to be audited by the 31 May 2008.

Audit teams comprising of the mine safety, equipment, and occupational hygiene and medicine inspectors were formed and used to cover the full spectrum of the compliance audit. The team leader would brief the management and employee representatives of the approach and expectations prior to commencing with the audit at the mine. The respective team members would be accompanied by the relevant mine officials to provide any assistance required during the audit.

The audit process involved checking whether the mines are implementing the health and safety management system by scrutinizing the statutory documents and then verifying its effectiveness by conducting inspections at the respective working places.

At the end of the audit, the team members would brief management and employee representatives on their findings and steps that should be taken to ensure compliance with the provisions of the Mine Health and Safety Act (Act No. 29 of 1996).

Reports were then prepared by the respective team members after each individual mine audit and these reports would be collated into a single report for feedback to the mine management and employee representatives. Where necessary, the mine management were required to rectify the contraventions revealed during the audit

and respond in writing to the Principal Inspector of Mines on the steps taken to comply and prevent recurrence and where necessary follow-up inspections were arranged.

1.3 Assessment of the outcome of the mine health and safety audits

The Mine Inspectorate completed a total of 355 mine health and safety audit during the period 1 December 2007 to 31 May 2008. The summary of findings includes all the 355 mines. Specific mine reports were given to the mines after the audit. Graphical representation of compliance by the five commodity groupings (Gold, platinum, coal, diamond and other mines) and a chart that cluster all of them to allow for comparison between the commodities are included as an annexure to this report.

The assessment of the combined audit results indicated that the overall compliance achieved by the mines is 66% (Table 1). The gold and coal sectors achieved the highest overall compliance of 70% and the other mines the lowest of 60%. The other mines generally consist of small mining operations which do not generally have the health and safety management systems.

According to the overall results of the audits, there is poor compliance on occupational health risk management, occupational health and safety policy and codes of practice (Table 1).

	GOLD	PLATINUM	COAL	DIAMOND	OTHER	OVERALL %
Mine Design	73	69	71	71	67	70
Statutory Reports	73	75	70	59	55	66
Legal Appointments	80	72	77	78	69	75
Safety Risk Management	71	69	73	64	61	68
Occupational H&S Policy	61	60	62	58	55	59
Health Risk Management	53	62	66	47	52	56
Codes of Practice	69	67	68	60	45	62
Occupational H&S Training	74	71	70	59	57	66
H&S Reps. and Committees	73	69	67	64	57	66
Mine Explosives Control	66	58	69	81	77	70
Mine Water Management	74	71	70	74	69	72
Public Health & Safety	69	60	73	71	50	65
Overall Percentage	70	67	70	66	60	66

Table 1: the overall percentage compliance by Commodity

The main issues of concern which were observed during the audits are the following:

1.3.1 Mine Design and Maintenance

The lack of adequate second outlets was identified as a major cause of concern on several big mines and also the number of employees that can be evacuated during an emergency was of concern in that the conveyances were designed to carry few employees at a time with a relatively slow speed.

Non adherence to mine planning was revealed as a problem at some of the mines where management controls around pillar mining were poor. Some mines had reached and past their design limits and had not effectively changed mining operation to suit the current changes.

At some of the mines, there is no proper system of maintaining machinery and equipment.

Although the audit did not specifically look at the design life of key mine installations like shafts, underground rail, processing plants etc; the following general observation is worth noting. Most of the key mining installations have a design life of twenty to twenty five years. Given that most of the country's deep level mines are much older than twenty years, there is a need for massive capital investment in refurbishing, replacing and improving the current installations.

1.3.2 Statutory Reporting

Some of the mines were not submitting occupational hygiene returns, annual medical reports and accident reports on time.

1.3.3 Legal Appointments

It was revealed that some of the mines undermined the size of their operations, resulting in understaffing of the mine. The appointment letters of legal appointees were not updated and were without any certificates of competency attached to the appointment letters. Also, the legal appointments were not signed by appointees and the sub-ordinate manager's duties were in some instances not clearly stipulated. There was overlapping of responsibilities, creating grey areas, where there was no accountability. Majority of appointments were found incorrect from CEO downwards.

High labour turnover was experienced in the industry and the employees were migrating consistently between mines. This has also resulted in some managers being in charge of more than one operation than permitted by legislation.

Some senior managers did not have the mandatory qualifications. Competency of persons and managers, responsible for relatively smaller operation and also the competency of persons responsible for mining equipment and machinery, taking into account that machinery and equipment are one of the major causes of accidents is a cause for concern.

1.3.4 OHS Management

1.3.4.1 Safety Risk Management

Not all major hazards were identified during the hazard identification and risk assessment process and records were not kept as proof that risk assessments were conducted. There was a lack of issue based risk assessment.

The main problem in this area is that the risk assessments and management are not adequately addressed. When hazards are identified, safety measures to control or deal with those hazards are not adequate and there is lack of appropriate hierarchy of controls.

The identified hazards and risks were not reviewed periodically and the records of the risk assessments were not made accessible to employees.

Most mines approach to safety risk management is a major cause of concern.

1.3.4.2 Occupational Health Risk Management

In most mines occupational health risk assessment is inadequate or is not addressed at all. Medical surveillance system is non-existent in a majority of the mines, especially exit medical examinations. And in most mines there is no linkage between identified occupational hygiene hazards and the system of medical surveillance.

1.3.5 Occupational Health and Safety Policy (OHS Policy)

The content of policy does not meet minimum requirements as outlined in the legislation i.e. the policy does not describe the scope of work and include the protection of persons who are not employees but who may be affected by mining activity. The relevant stakeholders are not consulted when drawing up OHS Policy, and the policy is not signed by relevant stakeholders.

At some mines the policy is not widely communicated and displayed on the notice boards and waiting places, the policy is only available in the managers' office.

1.3.6 Codes of Practice (COPs)

It appears that the COPs have been compiled by most of the big mines with most of smaller operations not having COPs, however implementation of their requirements appeared to be a problem. The Mine Health and Safety committee members or Health and Safety representatives were not consulted on matters for which COPs are necessary and did not sign the COP.

This is a major cause of concern since these COPs form basis of standard working operating procedures or mine standards.

Some of the mines did not revise their COPs with the changes in the nature of their operations. There were no voluntary codes of practice at the small mines. Some of the mines that happen to have COPs have not submitted copies to the Department of Minerals and Energy.

1.3.7 Occupational Health and Safety Training

It appears that some of the mines did not have accredited training providers. There was also a lack of formal training on hazard identification and risk assessment. On the job training was not done by most of the mines. There was generally poor provision of occupational health and safety training. Most of the training provided, mainly with the small mines, was not formalized and there were no records kept on

training matters and there was a lack infrastructure to ensure effective training provision.

Mines with own training centres train employees more frequently than those mines that have to send employees away for training. At some mines employees were not trained periodically and refresher training was not provided for ex-leave employees.

1.3.8 Health and Safety Representatives and Committees

Some mines did not have Health and Safety Representatives on all their designated working places. Also, some mines did not ensure that all Health and Safety Representatives are appointed by the mine manager. Some mines were not following proper election and appointment procedures.

Mines did not have formal structures to establish the health and safety committees. The appointed health and safety representatives were inadequately and improperly trained in executing their tasks as per the legal requirements. The exercising of their rights and powers was not sufficiently understood. Also, at some mines there was no procedure and or no training on withdrawal or refusing to work in an unsafe working place.

Ad hoc meetings were held without involving the employees, instead of a formally planned meeting with minutes at the end of each session. The health and safety representatives were not issued with books to record hazards and risks observed in the working environment.

1.3.9 Mine Explosives Control

Some mines did not comply with the provisions of the new explosives legislation, and were still relying on the repealed regulations. The audits revealed poor explosives record keeping by supervisors, and records on explosives control were kept for a short period. Also, the miners were not filling the explosives control book correctly.

Explosives deliveries, handling, storage, usage, and so forth were not audited as frequently as possible. It appears that awareness on who may handle explosives needs more attention. In some instances the explosives were abandoned at the worked out areas.

The majority of small mines are not using explosives. In most of small mines consultants are mostly used to perform the blasting operations and are found to have appropriate competencies.

1.3.10 Mine Water Management

At some mines the water management system was still in the draft state. Also, there was no specific and competent person appointed to be in charge of mine water management. Few mines have appointed a competent person in charge of underground water storage.

The hazards are sometimes not fully understood. Some mines had water flow charts but did not indicate the capacities of the pumps and dams. Some pumping stations were found in poor condition. Some mines do have an emergency procedure to address water flooding. Smaller mines depend on renting of pumps in case of emergency or flooding.

1.3.11 Public Health and Safety

The risk assessments did not take public health and safety risks into consideration and most mines did not have a complaint book for members of the community. Those mines utilising a system of complaint book, conduct meetings with the communities on regular basis. Also, there was no programme in place to control all risks to members of public emanating from the mine site or activities related to mining.

Although some mines have a register in place, records of hazards were not recorded and hence no programme instituted to control risks to members of the public. Some

mines do keep a register for contaminants that might affect the communities and are measured and monitored on a regular basis.

1.4 Recommendations

- Mine Health and Safety Council to urgently develop and implement a programme that will promote a culture of health and safety at mines.
- Management of health and safety to be part of the same management structure that is responsible for production and regulations that compartmentalise health and safety must be reviewed as a matter of urgency.
- The extent to which the Mine Health and Safety Inspectorate (MHSI) is understaffed makes it impossible to run an adequate system of audits and inspections to assess compliance with legislation. The current institutional framework of the MHSI need to be urgently revisited to allow flexibility around recruitment and retention of inspectors.
- Follow up audits and inspections should be conducted to ensure that there is a significant improvement on the mines' health and safety management systems.
- Training of health and safety representatives must be prioritized as this will assist greatly in improving vigilance around health and safety issues at workplaces.
- The Inspectorate need to urgently work with industry to identify all old installations at mines and ensure that programmes of action are developed to replace old installations were necessary.

Chapter Seven

1. SUMMARY OF RECOMMENDATIONS

1.1 Chapter one Recommendations

- The current structures established under the MHSA, (that is MHSC, MOA and the Inspectorate) need to be strengthened to continue to make a meaningful impact in rapidly reducing the levels of injuries and death in the mining sector.
- In the ever changing and complex regulatory mining environment, the mine inspectorate needs to employ available technologies to improve planning, targeting and effective regulatory contacts with the regulated community.
- There is an urgent need to develop a national mine seismic network that will fully be integrated with the Council of Geoscience's seismic network.

1.2 Chapter two Recommendations

- There is a pressing need for an integrated system of occupational health management for the mining and minerals sector that links occupational exposure to harmful substances and the effect on a worker.

1.3 Chapter three Recommendations

- There is a need for formal health and safety training at all levels of education and training in the sector.
- A mechanism of updating health and safety competency for managerial and supervisory appointees must be developed as a matter of urgency.
- There is a need for massive investment in skills development in the mining sector for its sustainability.

1.4 Chapter four Recommendations

- To solve this seemingly intractable problem of recruitment and retention of skilled staff in the inspectorate; two recommendations are made as follows:
 - a. A high level committee of officials from the Department of Minerals and Energy, Department of Transport, Department of Public Service and Administration and National Treasury should be established to look at a comprehensive package of occupation specific dispensation for the inspectorate.

Or

- b. Establish the inspectorate as an organ of state or a public entity outside the public service regulation to allow it flexibility to deal with its capacity challenges.

1.5 Chapter five Recommendations

- The Mine Health and Safety Amendment Bill.

After ten years of implementation of the Act, it has become necessary to review and address the gaps that have been observed over the years. Amendment to mine health and safety legislation has been proposed and will be subject to public hearings in August before the Bill can serve before parliament.

The Bill seeks to amend the MHSA so as to review the enforcement provision; simplify the system; tighten offences and strengthen penalties. It also seeks to substitute and remove ambiguities in certain definitions and expressions; effect certain amendments necessary to ensure consistency with other laws, particularly the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

The Bill further seeks to harmonise the administrative processes in the MHSA with the sound administrative practices and the objects of the Promotion of Administrative Justice Act, 2000 (Act No. 3 of 2000).

The Bill further amends section 47 of the MHSA to establish the Inspectorate as an entity of government. This will allow the inspectorate to develop plans and programmes to address skill shortage, improve its capacity for effective regulation of mine installations and work-place needs.

Mine health and safety legislation and enforcement thereof needs to be strengthened by approving the Bill.

- Department of Justice, Department of Labour and Department of Minerals and Energy to work on a national framework of facilitating prosecution of Industrial cases.

1.6 Chapter six Recommendations

- Mine Health and Safety Council to urgently develop and implement a programme that will promote a culture of health and safety at mines.
- Management of health and safety to be part of the same management structure that is responsible for production and regulations that compartmentalise health and safety must be reviewed as a matter of urgency.
- The extent to which the Mine Health and Safety Inspectorate (MHSI) is understaffed makes it impossible to run an adequate system of audits and inspections to assess compliance with legislation. The current institutional framework of the MHSI need to be urgently revisited to allow flexibility around recruitment and retention of inspectors.
- Follow up audits and inspections should be conducted to ensure that there is a significant improvement on the mines' health and safety management systems.
- Training of health and safety representatives must be prioritized as this will assist greatly in improving vigilance around health and safety issues at workplaces.

- The Inspectorate need to urgently work with industry to identify all old installations at mines and ensure that programmes of action are developed to replace old installations were necessary.