INFLUENCE OF ICT ON EFFECTIVENESS OF INVENTORY CONTROL
IN TANZANIA MINING INDUSTRY
A CASE OF BULYANHULU GOLD MINE LIMITED
INFLUENCE OF ICT ON EFFECTIVENESS OF INVENTORY CONTROL
IN TANZANIA MINING INDUSTRY
A CASE OF BULYANHULU GOLD MINE LIMITED

By
Dickson Luwumba

A Dissertation Submitted to Mzumbe University Dar Es Salaam Campus
College in partial fulfillment of the Requirements for award of Master degree in
Procurement and Supply Chain Management (MSc. PSCM) of Mzumbe
University

2013
CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by the Mzumbe University, a dissertation entitled “Influence of ICT on Effectiveness of Inventory Control in Tanzania Mining Industry, A Case of Bulyanhulu Gold Mine Limited” in partial fulfillment of the requirements for award of Master degree in Procurement and Supply Chain Management (MSc. PSCM) of Mzumbe University Dar Es Salaam Campus College.

Signature

__________________________________________
Major Supervisor

Accepted for the Board of

...........................
Signature

__________________________________________
DEAN/DIRECTOR,
FACULTY/DIRECTORATE/SCHOOL/BOARD
DECLARATION
AND
COPYRIGHT

I, Dickson Luwumba, declare that this thesis is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature ___________________________
Date________________________________

©
This dissertation is a copyright material protected under the Berne Convention, the Copyright Act 1999 and other international and national enactments, in that behalf, on intellectual property. It may not be reproduced by any means in full or in part, except for short extracts in fair dealings, for research or private study, critical scholarly review or discourse with an acknowledgement, without the written permission of Mzumbe University Dar-es-Salaam Campus College, on behalf of the author.
DEDICATION

This piece of work is dedicated to my lovely wife Elna Solomon, my son Daniel Luwumba and my beloved father Mr. Venance Luwumba for their love, support, and encouragement toward the accomplishment of this report as well as to my employer African Barrick Gold for sponsoring my studies. I value their support.
ACKNOWLEDGMENT

This study could not have been undertaken and completed without assistance of many people from proposal writing to data collection and report writing.

First and foremost, I thank God for the strength he gave me throughout the study. My sincere thanks go to my supervisor Dr. Felician Barongo, whose guidance and encouragement has been very valuable to me.

I also owe thanks to the research instructor Prof. Okoso Amaa and all lecturers of Mzumbe university, Dar es Salaam college for their assistance in one way or another to bring me in this academic position, Also my thanks should go to all non academic members of staff at Mzumbe university, Dar es Salaam college.

My great thanks goes to the management of African Barrick Gold, at Bulyanhulu gold mine and more specific to the site Supply Chain Manager (SCM), Mr. Francois LeRoux, and the Senior Inventory Analyst Mr. Richard Mashalla, for allowing me to conduct my research in their offices. I extend my thanks to Mr. Francois Kriel ABG Supply Chain Co-Ordinator and Wesley Ebenezer ABG Regional Inventory Controller for their support on providing brief on the process and standard operating procedure that are applicable to manage inventory control at ABG.

I do also appreciate the contribution of my fellow students who in one way or another assisted me for the success of this work. Just to mention a few as Digna Masika, Adolph Bugara, Evans Adrians, Alto Luhikula, Dotto Kirangi, Flora Mosha, Matilda and all MSc. PSCM students of 2011-2013 academic year.
ABSTRACT

The objective of the study was to investigate the Influence of Information and Communication Technology on effectiveness of inventory control in Tanzania Mining Industry. Specific objectives were: to determine the role of ICT on effectiveness of inventory control; to investigate the influence of ICT on the effectiveness of inventory control; and to investigate the challenges faced the mining industry on the use of ICT during inventory control.

The researcher used a case study design in conducting this study. The study was conducted at Bulyanhulu gold mine which is located in Shinyanga Tanzania. Convenience sampling was applied in collecting data. Data collection methods used was interviews, observations and documentary analysis and instruments used were interview questions, observation and documentary interview schedules as well as questionnaires.

Qualitative data was analyzed in order to obtain the relationships that exist among data groups by the use of computer software. Descriptive statistics was used to summarize the data in frequency tables and percentages and findings were presented using graphs and charts.

Findings show that Bulyanhulu Gold Mine Limited has a well-defined inventory control policies that has reduced the inventory labor costs and helpful to supply chain performance in the inventory management. However, challenges facing the organization on executing ICT on inventory control were found to be high initial cost on its application, unreliable experts to use the system, incompatible with other systems, complexity in its operation, mis-function of other parts, and unreliable training on staff.

The researcher recommended that the effectiveness of ICT on inventory management system has a great Influence on the effectiveness of inventory control in Tanzania Mining Industry. It was recommended that the mine should increase its budget to meet high initial cost and attract more experienced and well skilled experts to use the ICT system in inventory control. Also should make sure that the system is compatible with all other systems used in other departments and sections or units.
TABLE OF CONTENTS

CERTIFICATION .................................................................................................................. i
DECLARATION ................................................................................................................... ii
COPYRIGHT ....................................................................................................................... ii
DEDICATION ..................................................................................................................... iii
ACKNOWLEDGMENT ......................................................................................................... iv
ABSTRACT ........................................................................................................................ v
LIST OF ABBREVIATIONS ............................................................................................... x

CHAPTER ONE .................................................................................................................... 1
INTRODUCTION AND BACKGROUND TO THE PROBLEM ............................................ 1
1.0 Introduction ................................................................................................................ 1
1.1 Background to the Problem ...................................................................................... 1
1.2 Statement of the Problem ....................................................................................... 3
1.3 Research objectives ................................................................................................. 4
1.3.1 General Objectives ............................................................................................ 4
1.3.2 Specific Objectives ............................................................................................ 4
1.4 Research questions .................................................................................................. 5
1.5 Significance of the Study ....................................................................................... 5
1.6 Limitations and Delimitations of the study ............................................................ 5

CHAPTER TWO .................................................................................................................. 7
LITERATURE REVIEW ...................................................................................................... 7
2.1 Introduction ............................................................................................................ 7
2.2 Theoretical Literature ............................................................................................ 7
2.2.1 Information and Communication Technology ................................................. 7
2.2.2 The role of ICT on Inventory Control .............................................................. 9
2.2.3 Direct impact of ICT on effectiveness of Inventory Control ......................... 11
2.2.4 Advantages of ICT in inventory management and control functions .......... 13
2.3 Empirical Literature review ................................................................................ 15
2.4 Conceptual framework ......................................................................................... 18
2.5. Research gap ........................................................................................................ 19
CHAPTER THREE ........................................................................................................................................... 21
RESEARCH METHODOLOGY ......................................................................................................................... 21
3.1 Introduction ............................................................................................................................................ 21
3.2 Area of the Study .................................................................................................................................. 21
3.3 Research Design .................................................................................................................................... 21
3.5 Population and Sample ......................................................................................................................... 22
3.6 Sampling Techniques ............................................................................................................................. 23
3.7 Data Collection Methods and Instruments ............................................................................................ 24
3.7.1 Interview and Interview Questions ................................................................................................... 24
3.7.2 Observation and Observation Schedule ............................................................................................ 25
3.7.3 Questionnaires .................................................................................................................................... 25
3.7.4 Documentary Analysis and documentary Analysis Schedule ......................................................... 25
3.9 Data Analysis Procedure ....................................................................................................................... 26
3.9.1 Data cleaning ................................................................................................................................... 26
3.9.2 Data Coding ..................................................................................................................................... 26
3.9.3 Data Classification ............................................................................................................................. 26
3.9.4 Data Analysis Procedure .................................................................................................................. 26
3.9.5 Data Processing ................................................................................................................................ 26
3.9.6 Specific Analytical Techniques used for Achieving Research Objectives ........................................ 27

CHAPTER FOUR ........................................................................................................................................... 28
DATA PRESENTATION, ANALYSIS, AND DISCUSSION .............................................................................. 28
4.1 Introduction ........................................................................................................................................... 28
4.2 Characteristics of Respondents ............................................................................................................ 28
4.2.1 Respondents’ Ages ............................................................................................................................ 28
4.2.2 Respondents Gender .......................................................................................................................... 29
4.2.3 Respondents Education .................................................................................................................... 29
4.2.4 Respondents Working Experience in the Organization .................................................................. 30
4.3 Role of ICT on effectiveness of Inventory Control in mining Industry .............................................. 32
4.3.1 Inventory Control Systems used Gold Mine Industries .................................................................. 32
4.3.1.1 PRONTO-Xi Enterprise Management System ........................................................................ 33
4.3.1.2 Livelink ANSI Programme ...................................................................................................... 34
4.3.1.3 QlikView ................................................................. 34
4.3.2 Effectiveness and Efficiency of ICT on Inventory Control ............... 35
4.3.3 Impact of ICT on inventory control in Mining industries .................. 36
4.3.4 Role of ICT on Inventory Control .................................................. 37
4.4 Influence of ICT on the effectiveness of Inventory Control .................. 41
4.4.1 ICT and cost reduction on inventory control ..................................... 41
4.4.2 Qlikview Helpfulness’ on Inventory Management ............................ 43
4.5 Challenges facing mining Industry on the use of ICT on inventory control.. 52
4.5.1 Challenges facing the Organization on executing ICT on inventory control. 53

CHAPTER FIVE .................................................................................. 55
SUMMARY, CONCLUSION AND RECOMMENDATION .................. 55
5.1. Introduction .................................................................................. 55
1.2. Summary .................................................................................... 55
5.3. Conclusion .................................................................................. 56
5.4. Recommendations ........................................................................ 57
6. REFERENCES ................................................................................ 59
Appendix 1. Research Questionnaires .................................................. 63
Appendix 2. Management of Inventory Procedure (Rev2) - SOP7099 .......... 67
Appendix 3. Procurement Purchasing of Inventory Items Procedure (Guide _Rev2) - SOP7095 ................................................................. 74
Appendix 4. Obsolete and Slow Moving Inventory Version ...................... 83
LIST OF FIGURES

Figure No. 4.1  Respondents Age Distribution Structure  ...........................................28
Figure No. 4.2. Respondents Gender Distribution Structure  .........................29
Figure No.4.3  Respondents Education Distribution Structure  .....................30
Figure No.4.4  Respondents Working Experience in the Organization .............31
Figure No. 4.5  System of Inventory Control used by Bulyanhulu Gold Mine
  Limited  ...............................................................................................................32
Figure No. 4.6  Extent of system effectiveness and efficiency on Inventory
  Control .............................................................................................................35
Figure No 4.7  Impact of ICT on inventory control at Bulyanhulu Gold Mine
  Limited  ..............................................................................................................37
Figure No 4.8  Role of ICT on Inventory Control  ..................................................38
Figure No 4.9  Extent of ICT yielding to the achievement of organization
  objectives ...........................................................................................................40
Figure No 4.10 ICT advantages in reducing cost associated with inventory control
Figure No.4.11  Qlikview helpfulness’ on inventory management
Figure No.4.12  Qlikview helpfulness’ on Procurement  .................................41
Figure No.4.13  Qlikview Helpfulness’ To the FPA Team  ...................................44
Figure No.4.14  Challenges facing the Organization on executing ICT on
  inventory control .................................................................................................53
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABG</td>
<td>African Barrick Gold</td>
</tr>
<tr>
<td>ERP</td>
<td>Enterprise Resource Planning</td>
</tr>
<tr>
<td>EDI</td>
<td>Electronic Data Interchange</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communications Technologies</td>
</tr>
<tr>
<td>MRP</td>
<td>Material Requirement Planning (MRP)</td>
</tr>
<tr>
<td>NGO’s</td>
<td>Non-Governmental Organizations</td>
</tr>
<tr>
<td>PO</td>
<td>Purchase Order</td>
</tr>
<tr>
<td>PSCM</td>
<td>Procurement and Supply Chain Management</td>
</tr>
<tr>
<td>SCM</td>
<td>Supply Chain Manager</td>
</tr>
</tbody>
</table>
CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE PROBLEM

1.0 Introduction

Information and Communications Technology or (ICT), is often used as an extended synonym for information technology (IT), but is a more specific term that stresses the role of unified communications and the integration of telecommunications (telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information (Anyakoha, 1991).

ICT (information and communications technology) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as video conferencing and distance learning. ICTs are often spoken of in a particular context, such as ICTs in education, health care, or libraries (Lysons and Farrington, 2006).

ICTs lies less in the technology itself than in its ability to create greater access to information and communication in under-served populations, and thus, many countries around the world have established organizations for the promotion of ICTs, because it is feared that unless less technologically advanced areas have a chance to catch up, the increasing technological advances in developed nations will only serve to exacerbate the already-existing economic gap between technological "have" and "have not" areas.

1.1 Background to the Problem

The rapid growth of technology has contributed much on progress of all classification of industry. However, the Warehouse management today has seemed to be left behind in adapting the use of different computerized storage procedures of storing items to have progress on their parts. For many years the warehouse function together with its handling system were perceived as the bit on the end of production. Inventory control of activities such as demand forecast, stock status, receipt, issue, and return of materials generations of data were done by using manual storage procedures, Inmon (1992).
Traditionally, Inventory Control has been used as a safety valve between the separate components within the pipeline – thus leading to large and expensive stocks of products. There are so many weaknesses with a manual system, for instance it becomes relatively more expensive to operate as institution grows and its information requirements become more sophisticated. It is nearly impossible to efficiently and cost-effectively operate a large as there is an extension of warehouse storage management using a manual system (Anyakoha, 1991).

It has shown that, the warehouse under this manual system Production is generally lower as activities involved simply take more time to be completed through manually. It has been also observed on the warehouse that under manual system can sometimes impede the development of storage warehouse memory that historical knowledge base of policies and practices, and their results over the life of the warehouse key information tends to reside in the memory of the staff at the time, not in formal documents. As a result, important knowledge can be forgotten or lost over time (Saxena, 2001).

Supply chain management aims to alter this perspective of using manual system in inventory control, whereby ICT took into place to enhance effectiveness of Inventory control. The adoption of Information Communication Technology (ICT) in Procurement and Supply Chain management is termed as E-Procurement. Information and Communication Technology tools include Warehouse Management System (WMS), Enterprise Resource Planning (ERP), Material Requirement Planning (MRP) and Electronic Data Interchange (EDI), Rushton and Et al (2010).

Tanzania achieved notable progress in deploying ICT notwithstanding the 1974 Prohibition Order on Electronic Computers and Television Sets. The achievements were a result of various adjustments since the early nineties in policy, regulatory and commercial facets, both macroeconomic and within ICT’s converging sectors. The private sector has actively contributed to these achievements by investing in among others, support facilities, training centers and sales outlets. These efforts have enabled government departments, institutions of learning, Non-Governmental Organizations (NGOs), as well as other entrepreneurs; acquire ICT solutions that address their individual problems most appropriately, National Information and Communications Technologies Policy (2003)
Development of ICT technology has created new World whereby most of activities such as Procurement activities, Warehouse Management, Human resources development and Knowledge management are practiced electronically. The ICT is found to be important tool in Inventory control because yield to reduce inventory holding costs, minimizes inventory holdings cost, avoid the problems of stock out, reduce operational/administration costs, and eliminate duplicate of information, (Abdallah, 2011).

1.2 Statement of the Problem

The dependency on ICT as an essential tool for development is increasingly rapidly in Tanzania. The use of ICT in day – to – day activities such as e–Business, e–Procurement and e– government is the good example to justify the influence of ICT on effectiveness of Inventory control (Abdallah, 2011). The prospects of using Information and Communication Technology look promising, however implementing of ICT system and setting up a good Inventory control tool to extract the useful and relevant information, for monitoring and managing Inventory operations, is not a simple task. This usually takes several years and requires large funds (Heck, 2009).

Despite of complexity and costly of implementing of ICT in inventory control, there are several benefits of adopting ICT in managing inventory in the organization. ICT integrates all business activities internally and externally, reduce holding inventory cost, yield automatically calculate the required materials and create a production planning, the list with required materials is again passed to the purchase department where materials can either be ordered automatically (via EDI), the logistics can easily be coordinated as well and it is immediately clear where the materials are required and have to be delivered, provides the possibility to monitor in real-time, the planning status and predicted delivery times (Beheshti, 2006).

Inventory is spread throughout the supply chain and includes everything from raw material to work in process to finished goods that are held by the manufacturers, distributors, and retailers in a supply chain. Holding large amounts of inventory
allows a company or an entire supply chain to be very responsive to fluctuations in customer demand (Anyakoha, 1991).

However, the creation and storage of inventory is a cost and to achieve high levels of efficiency, the cost of inventory should be kept as low as possible (Hugos, 2006). The inventory control function monitors the day-to-day management of purchased and in-process inventory at each using location. This activity often relies on sophisticated equations or algorithms to facilitate balancing the product or service demand requirements with the required purchase inputs for each location (Monczka et al, 2009).

Therefore, because the importance of ICT in inventory control, most of industry companies, deployed Information and Communication Technologies to ensure that Inventory is managed effectively so as to reduce all costs and risks associated with managing Inventory. Hence the researcher was motivated to investigate the impact of ICT in inventory control in Tanzania mining industry and recommend the measures to be undertaken to improve its effectiveness and efficiency at Bulyanhulu gold mine.

1.3 Research objectives

The following was our research objectives

1.3.1 General Objectives

The general objective of the study was to investigate the Influence of Information and Communication Technology on effectiveness of inventory control in Tanzania Mining Industry.

1.3.2 Specific Objectives

Specific objectives are as follows;

1. To determine the role of ICT on effectiveness of Inventory Control in the organization of the study
2. To investigate the influence of ICT on the effectiveness of Inventory Control
3. To investigate the challenges faced the mining Industry on the use of ICT during inventory control.
1.4 Research questions

The study was guided by the following Research questions.

1. What are roles of ICT on effectiveness of Inventory Control in the organization of the study
2. What is the influence of ICT on the effectiveness of Inventory Control
3. What are challenges faced the mining Industry on the use of ICT during inventory control

1.5 Significance of the Study

The most fundamental importance of this study, as explained in the research objectives, is to investigate the influence of Information and Communication Technology on effectiveness of inventory control in Tanzania Mining Industry. The results of this study, manage theories into practices, the study also add knowledge to the researcher partially fulfills the requirements for award of Master degree in Procurement and Supply Chain Management (MSc. PSCM) of Mzumbe University. Furthermore, the study leads to a better understanding of the existing problems, as it paves a way to other researchers on further investigation/research on the influence of ICT on effectiveness of Inventory control.

1.6 Limitations and Delimitations of the study

Accessibility of the mine; There is a long procedure to be followed in order to be accepted to enter into the mine site, hence used the link of communication through their regional office in Dar Es Salaam and good relationship that I have with some of the senior management to be allowed to get access to the mine site and provided accommodation during my data collection period.

Time Limit; the nature of the study demands a keen and thorough investigation. To achieve this, more time was required to examine in breadth and depth on the subject matter in question. Despite such constraint, was carried out suddenly as to impair the expected results, because the even time was utilized effectively to ensure that only relevant data are collected and analysed. To solve the problem, the researcher took part of his annual leave which extensively utilized for the study.
Financial Constraint: Normally conducting a research demands a lot of money. In this case, the researcher was constrained by inadequate funds to sustain the long period intended for the study. To solve this problem, the researcher has no choice rather than to utilize his savings from his employment earnings in order to finance the project.

Passiveness of respondents; the researcher found it difficult to get some of the required information because some of the respondents were hesitating to provide information as they thought that the information were confidential. To solve this problem, respondents were informed that information required were merely for academic research not otherwise. They were also assured of their identities not being revealed to anyone. This motivated them to provide information to the researcher.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter sets a basic framework for the study by giving a general review on some theoretical literature, empirical literature and the area of the case study towards the influence of Information and Communication Technology on effectiveness of Inventory control in Tanzania Mining industry. In doing this research, the researcher strived to link the idea presented in this part to its application in the researched Institution and comments are made via this research report.

2.2 Theoretical Literature

2.2.1 Information and Communication Technology

Information and Communication Technology is a technology used in collecting, processing, storing and transmitting data or information electronically. The components of ICT includes machines or equipment like phones, computers, routers, switches, television, fax as well as infrastructure such as landline cables, microwave systems, radio transmitters, satellite ground stations, digital, fiber optic cables and application software, Bakari, J.K (2001).

According to Anyakoha (1991), information technology is “the use of manmade tools for the collection, generation, communication, recording, re-management and exploitation of information. It includes those applications and commodities, by which information is transferred, recorded, edited, stored, manipulated or disseminated”. ICTs have been the basis for human existence from time immemorial and this has driven man to continuously seek ways to improve the processing of information and communicating such information to one another irrespective of distance and on a real-time basis Ndukwe (2002).

Surviving in the information depends on access to national and global information networks. ICTs are the bedrock for the survival and development of any nation in a rapidly changing global environment, and it challenges us to devise initiatives to address a host of issues such as reliable infrastructure, skilled human resources, open
Information and Communication Technology bridges the gap between corporate software applications such as ERP and Warehouse Management System, and the Programmable Logic Controllers (PLC) and/or PC-based cell controllers that control the material handling equipment. The ICT provides a single point of control to efficiently direct and manage automated material handling and order processing within the Warehouse. This will enable effective operations, and optimize current investment in software and material handling equipment. Implementing ICT software can be a cost effective alternative to adding more efficiency operations of warehouse movement in the industrial area, Hite (1996).

Figure 1. Diagram below highlights the functionality and Application of Information and Communication Technology in inventory control. Source Hite (1996)
The diagram above describe the functionality of ICT in inventory control depicting Warehouse management system as important tool in inventory control as far as the ERP system is concerned. WMS is to manage the overall activity within a warehouse and process the associated transactions, including receiving, put away, order fulfillment, requirement forecast, and shipping.

A WMS also handles the movement of materials from one location to another, physical inventories, and cycle counting. Although WMS functionality differs from one vendor to another, all address the same basic needs of a warehouse operation. Warehouse management systems often utilize technology such as barcode scanners, RF terminals, mobile computers, wireless LANs, and potentially RFID to monitor the movement of inventory.

Depending on the scope and cost of the WMS, it’s may include advanced functionality such as cross-docking, labor management, yard management, slotting, transportation management, and value-added services. Warehouse management systems can be stand-alone systems, or modules of an ERP system. Benefit it’s claimed include reduced inventory handling cost, cost savings, improved space utilization, higher productivity, and improved customer satisfaction, Hite (1996).

2.2.2 The role of ICT on Inventory Control

Inventory is the stock of any item or resource used in an organization. An inventory system is the set of policies and controls that monitor levels of inventory and determine what levels should be maintained, when stock should be replenished, and how large orders should be. Manufacturing inventory is typically classified into raw materials, finished products, component parts, supplies, and work-in-process.

In distribution, inventory is classified as in-transit, meaning that it is being moved in the system, and warehouse, which is inventory in a warehouse or distribution center. Retail sites carry inventory for immediate sale to customers. In services, inventory generally refers to the tangible goods to be sold and the supplies necessary to administer the service, Zipkin (2000).
According to Lysons and Farrington B (2006), narrated some purpose or reasons for keeping inventory such as reducing the risk of supplier failure or uncertainty that is safety and buffer stocks are held to provide some protection against force majeure. Meet variation in product demand is another reason for keeping inventory whereby demand for the product is known precisely, it may be possible (though not necessarily economical) to produce the product to exactly meet the demand.

Usually, however, demand is uncertain, safety or buffer stock must be maintained to absorb variation. Keeping Inventory is very important because it ensures rapid replenishment of items in constant demand, hedge against anticipated shortage and price increases, smooth seasonal or cyclical demand and takes advantage of lots or purchase quantities in excess of what is required (buy two get one free).

Inventory control is one of the most neglected areas of management in different organization. The entire manufacturing operations, for example can be brought to a standstill for lack of engineering spare these problems are due to the lack of right flow of information in the whole process of the supply chain management. Therefore the use supporting Information and Communication technology is very necessary for effective and efficiency in Inventory control operations.

Information and Communication technology performs main functions, such as capturing of data and communication, storage and retrieval of data, and manipulation of data and reporting. The Enterprise resource planning (ERP), Customer relationship management (CRM) and Manufacturing execution systems (MES) are examples of the systems that consists combinations of these functions, Hugos (2006:131). The primary goal of Information and Communication Technology in inventory control is to link the point of production and point of delivery and purchase so as to maintain inventory in future. However the tools of inventory control such as ABC analysis, bar coding, radio frequency identification (RFID) and inventory software are four important tools of inventory control, Lysons and Farrington B (2006).
The use of information and communication technology in inventory control is thought to be of paramount importance. The case of Walltill Ltd can be used as an example of evidencing the importance of ICT in inventory control as far as the Supply chain management is concerned. In early 1980’s, The company invested on microcomputer and appropriate standard software and found that staff devoted to stock records, the ability of the company to respond to urgent orders and unexpected peaks in demand was considerably improved and value of components and sub-assemblies in stock went down by 50% in a short period of time. These benefits were achieved by straightforward purchase of a standard software package which maintained stock movement and records, and performed various analyses relating to inventory control, Jessop (1994).

2.2.3 Direct impact of ICT on effectiveness of Inventory Control

ICT investments have clearly played a leading role in accelerating economic growth during the 1990s. Firms have invested substantial resources in new types of ICT enabling them to improve efficiency in and coordination of material-handling operations, thereby reducing inventory levels. In highlighting the role of ICT and the Economic Report of the President (2001) notes that “technologies that improve the dissemination of information enable companies to react more promptly to market signals and to economize on inventories (by sharing point-of sales data, for example).” Likewise, Alan Greenspan, the former Federal Reserve Chairman, noted that “the remarkable surge in the availability of real-time information in recent years has sharply reduced the degree of uncertainty confronting business management. This has enabled businesses to remove large swaths of now unnecessary inventory” (Greenspan, 1999).

A positive influence of ICT on inventory performance is well supported at the firm level. For example, previous studies (Frohlich and Westbrook, 2002; Vickery et al. 2003; Barua et al. 1995; Mukhopadhyay et al. 1995) find that an increase in ICT investment results in higher inventory turns and lower inventory holding costs. Similarly, a number of case studies and anecdotal evidence support that ICT allows business partners to share information related to customer orders and inventory positions in supply chains. Such facilitation of information sharing by ICT should
help manage inventories more effectively and streamline operations. We expect that an increase in ICT investment should lead to better inventory performance at the sector level because dynamics similar to the firm level are also influential at the sector level. A positive influence of ICT investment on inventory performance is inferred by a negative correlation coefficient between these two variables because a lower level of inventory indicates better performance.

A few studies use publicly available data to examine inventory trends over time. These studies are primarily descriptive in nature and do not attempt to identify possible causes of inventory reduction. For instance, Rajagopalan and Malhotra (2001) analyze U.S. Census Bureau data from 1961 to 1994 for 20 manufacturing industries at two digit level of SIC to determine whether raw material, work-in-process and finished goods inventory have decreased in these manufacturing industries. They find that the overall inventory levels decreased over time for the manufacturing sector, but there was significant variation across SIC codes and the type of inventory. While raw material and work-in-process inventories decreased in a majority of the manufacturing industries, finished goods inventory did not decrease in more than half of the SICs. Using COMPUSTAT data, Chen et al. (2005b) find that inventory days in publicly traded U.S. manufacturing firms decreased from 96 days to 81 days between 1981 and 2000.

In contrast, inventory trends in the retail and wholesale trade sectors are less clear. While Gaur et al. (2005) find that average inventory turns in retail firms decreased between 1987 and 2000, indicating higher levels of inventory, Chen et al. (2005c) report an opposite result. Chen et al. (2005c) find that retail inventory decreased between 1981 and 2003 and the decline began in 1995. Both Chen et al. (2005c) and Gaur et al. (2005) use firm level data from COMPUSTAT. Only one study that examined inventory trends in the wholesale sector (Chen et al. 2005c). The results indicate that the wholesale inventory days have decreased from 72 to 52 days between 1981 and 2003. As a group, these studies highlight the varying inventory trends in the different sectors of the U.S. economy.
2.2.4 Advantages of ICT in inventory management and control functions

i. Improved communication

Rajagopalan and Malhotra (2001) argued that quick and effective communication is vital to any business anywhere in the world. Information technology gives an entrepreneur or business the tools, like email, video conferencing, SMS, etc., essential to communicate efficiently and effectively. To the business world, and information technology gives your company the resources it needs to communicate quickly and effectively. Not only do people connect faster with the help of information technology, but they are also able to identify like-minded individuals and extend help, while strengthening ties.

With the help of information technology, communication has also become cheaper, quicker, and more efficient. We can now communicate with anyone around the globe by simply text messaging them or sending them an email for an almost instantaneous response. The internet has also opened up face to face direct communication from different parts of the world thanks to the helps of video conferencing. Jessop (1994).

i. Storing and Protecting Information

ICT provides a low-cost business options to store and maintain information that may be important from a business or service point of view. Virtual vaults and other such security systems not only store vital data but also allow control over the access to such information. IT security systems will also protect virtual data from being hacked or wiped out in case of any technical failure, (Chen et al. 2005c).

ii. Creation of New Jobs

One of the biggest advantages of ICT has been the creation of a whole new field of opportunity for skilled personnel leading to new and interesting jobs. Hardware and software developers, computer programmers, web designers, system analyst, the list of new jobs created could go on. (Barua et al. 1995)

Things that were once done manually or by hand have now become easier and faster due to the advent of a computing technology. Our world today has changed a great deal with the aid of ICT which has penetrated almost every aspect of our daily lives.
and society, from leisure to business. ICT has become a part of our day-to-day lives through the evident use of PC's, Internet, cell phones, faxes, the list would seem endless. Let us hope that newer development in the field of ICT can provide benefits to our future generations, just as it has greatly benefited ours (Chen et al. 2005c).

iii. **Globalization**
Gaur et al. (2005) assets that true globalization has come about only via this automated system. The creation of one interdependent system helps us to share information and end linguistic barriers across the continents. The collapse of geographic boundaries has made the world a 'global village'. The technology has not only made communication cheaper, but also possible much quicker and round the clock. The wonders of text messages email and auto-response, backed by computer security applications, have opened up scope for direct communication.

iv. **Cost-effective**
Computerized, internet business processes have made many businesses turn to the Internet for increased productivity, greater profitability, clutter free working conditions and global clientèle. It is mainly due to the ICT industry that businesses have been able to make their processes more streamlined, thereby becoming more cost-effective and consequently more profitable. People are able to operate their businesses 24x7, even from remote locations only due to the advent of ICT, (Frohlich and Westbrook, 2002)

v. **Bridging the cultural gap**
Information technology has helped to bridge the cultural gap by helping people from different cultures to communicate with one another, and allow for the exchange of views and ideas, thus increasing awareness and reducing prejudice, (Vickery et al. 2003)

vi. **More time**
ICT has made it possible for businesses to be open 24 x7 all over the globe. This means that a business can be open anytime anywhere, making purchases from different countries easier and more convenient. It also means that you can have your
goods delivered right to your doorstep with having to move a single muscle, (Mukhopadhyay et al. 1995).

2.2.5. Direct impact of ICT investment on financial performance
Using cross sectional (Prasad and Harker, 1997) and longitudinal (Lehr and Lichtenberg, 1998; Hitt and Brynjolfsson, 1996) data, researchers have empirically linked ICT investments to labor productivity (Hitt and Brynjolfsson, 1996), multi-factor productivity (Brynjolfsson and Hitt, 2000), and total factor productivity (Hitt and Brynjolfsson, 1996) at the firm level (Barua and Lee, 1997). ICT investments have also been linked to economic value added (Bresnahan et al., 2002), ROI (Brynjolfsson, 1993) and other similar measures of performance. However, the evidence directly linking ICT investment with financial performance is less clear; Dedrick et al. (2003) term the general failure of studies to show a positive relationship between ICT investment and profitability or other overall financial performance measures the “profitability paradox” in ICT research. Kohli and Devaraj (2003) support Dedrick et al.’s (2003) observation and state that the impact of ICT investment on measures of profitability is mixed at best.

Logically, if ICT investments by leading firms in an industry are viewed as a source of competitive advantage, the remaining firms in the industry would mimic the leaders and make similar investments. Such “isomorphic” behavior explains firms’ resemblance to one another according to institutional theorists (DiMaggio and Powell, 1983; Haunschild and Miner, 1997).

In the long term, marginal and comparative advantage associated with ICT investment continues to decrease and the differential competitive advantage dissipates at the firm level (Carr, 2003).

2.3 Empirical Literature review
Kundishora (2009) on his study on the “Role of Information and Communication Technology ICT in Enhancing Local Economic Development and Poverty Reduction” discovered that the adoption of ICT requires a business environment encouraging open competition, trust and security, interoperability and standardization, and financial resources for ICT.
This requires the implementation of sustainable measures to improve access to the Internet and telecommunications infrastructure and increase ICT literacy, as well as development of local Internet-based content. African countries like most developing countries still depend on content developed and managed in the developed world and as a result substantial costs are incurred while trying to access content.

He revealed that ICT goals are: to establish an environment that encourages networking of services and applications; promoting e-commerce and trade promotion programmes for goods and services; promoting Internet access to exchange and access digital content; establishing e-government; promoting education and on-line services; strengthening network security; building and developing e-society and ICT human resources. Therefore through encouraging networking application will also lead to a better effective use in the inventory control as far as the ICT is concerned.

According to the study on Position and Role of ICT in Supply Chain Management (Gorge, 2008), rapidly changing technology in today's world, especially in the production cycle and supply chain industry, change is more ineffective and inefficient. It was revealed from the study that there is need of redesigning effective supply chain management processes to an organization with the influence of ICT will benefits the organization in different areas in the Supply Chain notably Inventory control.

In regard to importance of Information and Communication Technology in Inventory control, it concludes that the causes of existing inefficient in inventory control are non-reliable information and inability of information systems in processing and providing the information.

A study done by Kangie (2011) revealed that effective inventory control needs integration of internal and external system to ensure that inventory functions are performed accurately so as to add value to the organization as far industrial area is concerned.

This Communication through information technology and knowing necessary systems for vital information exchange and adoption of information technology and
can lead to improved performance is the Inventory functions. The study revealed that information and Communication Technology, the capability to transfer data more update with the demand and inventory in the supply chain and good flow of information also causes the process performs more effective And more efficient.

It was revealed from the study that organizations have been striving for improving of Inventory control through the use of Information and Communication Technology (Jones, 2000). The closer they get to carry zero inventories without sacrificing customer demand and reach that pinnacle of organization efficiency is due to the use of information and communication technology such Just in Time, Enterprises resources planning and Material resources planning. Due to the use of effective ICT management meet their customers demand without incurring the costs and burdens that comes from stocks excess inventory. The costs like handling costs, inventory shortage and other costs associated with inventory control are managed as far as the ICT is concerned (Bagby, 2004).

Information and Communication Technology trends will profoundly impact on supply chain management in the future, whereby increased enterprises agility and adaptability, growth of embedded intelligence in processes and transition of physical flow of products in the Supply chain will considered by paramount achievement as far as the influence of ICT in Inventory control is concerned (Michael, 2007).

The common problem that affect the smooth running of Inventory function and how they affect an organization in general, are poor recording system employment of un-qualified personnel, improper of inventory control, poor identification and classification of items in store, inadequate inspection were the main problem facing the stores section. However the influence of Information and Communication Technology facilitated to reduce to some extent the narrated problems (Mirau, 2007).

Tanzania deployed National ICT policy broad-based national strategy for the purpose of enhancing nation-wide economic growth and social progress by encouraging beneficial ICT activities in all sectors through providing a conducive framework for investments in capacity building and in promoting multi-layered co-operation and knowledge sharing locally as well as globally. However Tanzania achieved notable progress in deploying ICT notwithstanding the 1974 Prohibition Order on Electronic Computers and Television Sets.
The achievements were a result of various adjustments since the early nineties in policy, regulatory and commercial facets, both macroeconomic and within ICT’s converging sectors. The private sector has actively contributed to these achievements by investing in among others, support facilities, training centers and sales outlets. These efforts have enabled government departments, institutions of learning, Non-Governmental Organizations (NGOs), as well as other entrepreneurs; acquire ICT solutions that address their individual problems most appropriately, National Information and Technologies policy (2003).

2.4 Conceptual framework

![Conceptual model for achieving effectiveness of Inventory control through the use ICT](image)

Figure 2: Conceptual model for achieving effectiveness of Inventory control through the use ICT. Source: Research 2013

The inventory control is important in organizations and firm since any operation in the organization depends much on the Inventories particularly in the Industrial areas like Mining Industry. Therefore different techniques and procedures of adopting advancement of Information and Communication technology should be employed in order to ensure effective inventory control.
The table above narrates the impact of ICT on inventory control. Organization using ICT on inventory control will lead to proper use of storage space, effective customer satisfaction, reduction of inventory cost, reduce operational/administration costs and elimination of duplicate information.

2.5. Research gap
Basing on the literature review presented above it shows that many studies have been conducted in ICT and Inventory management, these includes the study on role of information and communication technology in enhancing local economic development and poverty reduction that discovered that the adoption of ICT requires a business environment encouraging open competition, trust and security, interoperability and standardization, and financial resources for ICT.

Also the study on position and role of ICT in Supply chain management has revealed that there is need of redesigning effective supply chain management processes to an organization with the influence of ICT benefits the organization in different areas in the Supply Chain notably Inventory control. Another study also revealed that effective inventory control needs integration of internal and external systems to ensure that inventory functions are performed accurately so as to add value to the organization as far industrial area is concerned. Also literature shows that organizations have been striving for improving of Inventory control through the use of Information and Communication Technology.

Also literatures show that the common problem that affect the smooth running of Inventory function and how they affect an organization in general, are poor recording system employment of un-qualified personnel, improper of inventory control, poor identification and classification of items in store, inadequate inspection, However the influence of Information and Communication Technology facilitated to reduce to some extent the narrated problems.

It has been realized that there is lack of information on the Influence of ICT on effectiveness of inventory control particularly in local mining Industry. Hence the researcher was motivated to investigate the impact of ICT in inventory control in
Tanzania mining industry taking Bulyanhulu gold mine as case study so as to come up with information to fill the identified gap of knowledge.
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction
This chapter provides the methodology that was used during the study. It stipulates the area of the study, research design, research approach, research technique, Population inquiring, sampling technique, data collection methods, and data management and analysis techniques.

3.2 Area of the Study
The study was conducted at Bulyanhulu gold mine which is located in northwest Tanzania, East Africa, approximately 55 kilometers south of Lake Victoria and approximately 150 kilometers from the city of Mwanza. The reasons for opting this is because the organization is one of the mining industries in Tanzania deploying ICT in inventory control as far as the Supply Chain Management is concerned.

3.3 Research Design
Kothari (2006:31) define Research design as the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedures. The research design was a conceptual structure within which research was conducted; it constitutes the blueprint for the collection, measurement and analysis of data.

The researcher used a case study design in conducting this study, due to limited area in which the study conducted. Furthermore, case study allows originality of the study and keen analysis of data and other findings related to the research.

The researcher had comprehensive information about the influence of ICT on effectiveness of Inventory control through review of documentation, questionnaires, interviews and observation. The findings of this study reproduce the effectiveness of Inventory control to the organization under study.
3.4 Research Approaches: Qualitative and quantitative research approaches

Qualitative and quantitative researches are the types of the research design. Both the research designs have different goals. Qualitative research is generally inductive and Quantitative research is deductive (Frankel & Devers, 2000). Quantitative research involves data collection, analysis and interpretation. It is mainly a statistical analysis method to solve the research problem, because data used in it, is mathematical and statistical form. Qualitative research is based on texts and images, pictures etc. (Creswell, 2003). Qualitative research includes focus group, in-depth interview, and observation to collect data and then it analyze for the study. It is subjective in nature and describes the problem of research in depth to find out its solution. Whereas quantitative research is objective and uses concepts, constructs, hypothesis which makes up a theory (Qualitative vs. Quantitative Research, 2011).

The study design was a qualitative one due to the fact that qualitative research deals in the words, texts, picture so that it can be observed. It is more flexible in comparison of quantitative research, because it allows adaption of interaction between researcher and its participants. It also include case study to resolve the research problem. It describes whole problem and it uses theories, concepts and case study. It is a descriptive and analytical tool for the research, because it describes the problem deeply and then analyzes. It considers social activities like education, health, social work, administration in the social science. Therefore the researcher found that qualitative research design was suitable for this study.

3.5 Population and Sample

Population of the study originated from employees of the organization; the number of people inquired were determined by the role of the part concerned in the organization. With regard to the nature of the topic, the inquiry focused on every member of the organization whose tasks in one way or another are related to Inventory management as far as ICT is concerned. However the total population proposed by the researcher was one thousand and five hundred (1500) persons. This was due to the facts that, population selected represented the whole organization and provided a true picture towards the study.
The study was conducted to a sample size of 50 respondents in total. The sample sizes comprised of 8 respondents from receiving division, 15 respondents from issuing division, 7 respondents from ordering division, 7 respondents from contracting division, 8 respondents from inventory control division and 5 respondents from managers and supervisors making a total of 50 respondents.

Table No. 3.1. Distribution of Respondents

<table>
<thead>
<tr>
<th>S/N</th>
<th>Category of Respondents</th>
<th>Expected No. of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Issuing Division</td>
<td>15</td>
<td>30%</td>
</tr>
<tr>
<td>2</td>
<td>Ordering Division</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>3</td>
<td>Receiving Division</td>
<td>8</td>
<td>16%</td>
</tr>
<tr>
<td>4</td>
<td>Suppliers contracting Division</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>5</td>
<td>Inventory control Division</td>
<td>8</td>
<td>216%</td>
</tr>
<tr>
<td>6</td>
<td>Managers and supervisors</td>
<td>5</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Source: Author (2013)

3.6 Sampling Techniques

The techniques applied for data collection during the study so as to obtain true representation of the population was Random sampling whereby all members in the targeted population had equal chance of being selected. The researcher selected a sample according to their appropriateness in relation to the study.

The non-probability sampling strategies also was applied in collecting data whereby researcher selected participants who were considered as being typical of the wider population, thus basing in this technique the researcher was judging whom to inquire. Also Convenience/accidental sampling was applied in which respondents were selected on the basis of their availability or accessibility and willingness to respond. Under this techniques, the researcher selected a sample which is ease to access and available.
3.7 Data Collection Methods and Instruments
During the study, data collection methods used were interviews, observations and documentary analysis and instruments used were interview questions, observation and documentary interview schedules as well as questionnaires. These methods and instruments were used as follows.

3.7.1 Interview and Interview Questions
In research work, interviews are direct conversations between people whereby tone or a group posse questions (interviewer) and other person or group respond to the questions (interviewees). During the research, both structured and non-structured interviews were used in data collection. In this case, structured interviews were dominated by the already set questions and respondents were obligated to provide answers that were within the context of the questions. These actually restricted respondents from providing extensive explanations because of the objectivity of the questions.

Non-structured questions enabled the respondents to provide extensive answers since they allowed providing much answers as they managed. The use of this type of interview provided freedom to respondents to provide many answers as they managed. This in-turn enabled the research to collect much information including those which was within the context of the questions. This was much value to the researcher due to the discovery other issues through the employment of this type of interview.

The above-mentioned method (interview) was affected through the use of interview questions which were administered to all types of respondents. However, each group of respondent was given its own set of interview questions. Two types of interview question were administered to respondents that are Open-ended and Closed-ended questions. The formal type of interview questions enabled the respondents to provide extensive answers. For effective administration of interviews, interview schedule was designed and ensured systematic interview process.
3.7.2 Observation and Observation Schedule
Observation was another research method used to collect primary data. In this case, a non-participatory observation was practiced. The researcher just observed incidences and records were taken. Before, the use of non-participatory observations, all incidences to be observed were determined. Then the observation schedule (instrument) was designed and enabled the researcher to make observations very carefully and good records were made.

3.7.3 Questionnaires
Questionnaire was another research instruments used to collect primary data. These questionnaires were used to collect data that was either partially collected by other research instruments or not being completely collected by other research instruments. The researcher was a key player and distributed questionnaires to the respondents who were given one to two weeks to dully provide valid responses by filling in blanks in the questionnaire sheets. The returned duly filled in questionnaires were collected though some were delayed by respondents due to their availability at site as they work in rotation.

3.7.4 Documentary Analysis and documentary Analysis Schedule
Documentary analysis was another type of data collection method that involved the review of documents related to this study. This type of data collection method was affected through the use of documentary review schedule (instrument). This type of method and instrument was used to collect secondary data.

The researcher retrieved data from several sources which relates with the problem under the study such as accounting and procurement manual, audit reports, organization’s website, minutes and journals, Supply chain standard operating procedures. Before reviewing of documents, a schedule (instrument) was designed after identification of documents to be reviewed. This enabled the researcher to review documents systematically and effectively.
3.9. Data Analysis Procedure

3.9.1 Data cleaning
This was done by examining the collected data (raw data) to be in a position to identify errors and omissions (if any) and finding a way to rectify the situation where possible this was done in order to secure the quality standard on the data. This process involved carefully checking of the returned questionnaires (Filled questionnaires) in order to ensure that data were accurate and consistent with other facts gathered, uniformly entered, complete as possible and have been well arranged to facilitate coding and tabulation.

3.9.2 Data Coding
Coding refers to the process of assigning numerals or other symbols to classes (Kothari, 1990:153) this was done by specifying the categories or classes into which the responses are to be placed. This was done in order to improve the efficiency of analysis.

3.9.3 Data Classification
This is a process of arranging data in groups or classes in the basis of common characteristics, data having similar traits was kept together and in this way the whole data was divided into a number of categories. This reduced the volume of raw data into homogeneous groups.

3.9.4 Data Analysis Procedure
Qualitative data collected was summarized to ensure that they could be in the form suitable for addressing both research questions and the method of analysis used. This was done while ensuring that original meanings of the statements made by respondents are maintained. The summarized data was then be coded and used for subsequent statistical analysis.

3.9.5. Data Processing
Case study generated both quantitative and qualitative data. The Data processing implies editing, coding, classification and tabulation of the collected data so that they are amenable to analysis (Kothari 1990), this is an immediate stage between data
collection and data analysis. This process was done to prepare the collected raw data and pave a way for smooth analysis. This was done through the followings stages

3.9.6 Specific Analytical Techniques used for Achieving Research Objectives
Qualitative data was analyzed in order to obtain the relationship that exist among data groups, mostly Microsoft Excel and Statistical Package for Social Science (SPSS) computer software was used to process and analyze data. Descriptive statistics was used to summarize the data in frequency tables and percentages.

Qualitative data was analyzed in terms of content, context and meaning where data coding as an interpretive technique that both organizes the data and provides a means to introduce the interpretations of it into certain quantitative methods was employed. It required the analyst to read the data and demarcate segments within it, which was done at different times throughout the process. Each segment was labeled with a "code" such as a word or short phrase that suggested how the associated data segments inform the research objectives. When coding was complete, the analyst prepared reports via a mix of summarizing the prevalence of codes, by discussing similarities and differences in related codes across distinct original sources and contexts, or comparing the relationship between one or more codes.
CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, AND DISCUSSION

4.1 Introduction
Under this chapter, the findings from the field work are presented, analyzed and discussed. With the help of the use of the measures of central tendency, findings have been presented using graphs and charts. Analysis was done qualitatively with the help of quantitative techniques presented data using the above mentioned measures.

4.2 Characteristics of Respondents
4.2.1. Respondents’ Ages
Respondents’ age distributions were investigated and figure 4.1 below indicates results;

![Figure No. 4.1 Respondents Age](source: Field survey, June 2013)

The age distribution structure of respondents participated in this study was as follows. It was found that 15 respondents who are equal to 30% of the total respondents participated in this study were having the age of between 20 to 30 years. Apart from that 20 respondents who are equal to 40% of the total respondents participated were having the age of between 30 to 40 years, and this was the largest age group in the sample.
Moreover, 10 respondents who are equal to 20% of the total respondents participated were having the age of between 40 to 50 years, and the last group of age lying above 50 years was composed of 5 respondents who are equal to 10% of the total respondents participated. The figure above shows the distribution structure.

4.2.2 Respondents Gender

Respondents’ gender distributions were investigated and the figure 4.2 indicates the findings:

![Figure no. 4.2. Respondents Gender; Source: Field survey, June 2013](image)

The sample size was composed of males and females in the ratio of 3:2. Where a total of 30 respondents that is equal to 60% of the total respondents participated in this study were males, while the other 20 respondents who are equal to 40% of the total respondents participated in this study were females. The data are presented in the following table above.

4.2.3. Respondents Education

Respondents Education distributions were investigated and figure 4.3 indicates results:
The Education distribution structure for the respondents participated in this study were as follows; 5 respondents who are equal to 10% of the total respondents participated in the study were holders of certificates and other professional courses found in procurement and supplies department.

Apart from that, 10 respondents who are equal to 20% of the total respondents participated in the study were diploma holders and other 15 respondents who are equal to 30% of the total respondents participated in the study were advanced diploma holders. Moreover, 10 respondents who are equal to 20% of the participants were university graduates at first degree level, while the rest 10 respondents who are equal to 20% of the total respondents participated in the study were having Post graduate diploma or Masters Degree level of education. However, there wasn’t any respondents having PhD or above.

4.2.4 Respondents Working Experience in the Organization
Respondents working experience in the organization were investigated and figure 4.4 below indicates results:
At this section the study required to determine the working experiences in the company under study of respondents participated in this study in order to determine whether the information provided by this respondents are valid and reliable for the study. It was found that a total of 12% of the respondents participated in this study had worked in the company for less than a year, and this was the smallest ratio compared to other groups.

Apart from that, it was found that a total of 32% of the respondents participated in this study had worked in the company between a year and two years. This was the second highest group of respondents having work experience of one to two years in the company.

Moreover, the highest group of respondents was the one with two to three years of experience in the company, this cumulated a total 38% of the respondents participated in this study. Their experience was found relevant to this study as they have rich of information regarding the application of ICT in inventory management in the company.
On top of that, it was found that a total of 18% of the respondents participated in this study had worked in the company for more than three years, this was the most experienced groups and had a lot of information as they have been working in the company even before the introduction of ICT in inventory management, therefore they were aware of both situation before the application and after the application of ICT in the company.

4.3 Role of ICT on effectiveness of Inventory Control in mining Industry
Recall that, the first research objective for this study is to determine the role of ICT on effectiveness of inventory control in the organization of the study. The following provide the findings in the context of inventory control systems used gold mine industries, effectiveness and efficiency of ICT on inventory control, impact of ICT on inventory control in gold mine industries, role of ICT on inventory control, and ICT and its role to the achievement of organization objectives

4.3.1 Inventory Control Systems used Gold Mine Industries
During investigating the inventory control systems used by Bulyanhulu Gold mine figure 4.5 below indicates the findings;

Figure No. 4.5 Inventory Control Systems used by Bulyanhulu Gold Mine Limited;  
Source: Field survey, June 2013
At this stage the study needed to identify the main inventory control systems used by Bulyanhulu Gold Mine Limited in its day to day operations. Basing on the study findings it was realized that Bulyanhulu Gold Mine Limited is using Livelink ANSI Programme, PRONTO-Xi Enterprise Management System, QlikView, and other minor systems. The following are the information regarding these systems as applied by Bulyanhulu Gold Mine Limited.

### 4.3.1.1 PRONTO-Xi Enterprise Management System

It was realized that Bulyanhulu Gold Mine Limited uses PRONTO-Xi Enterprise Management System, this was supported by 86% of the respondents participated in this study. Where, it was revealed that this Software provides Bulyanhulu Gold Mine Limited with a broad portfolio of software and services.

Its integrated business solutions help Bulyanhulu Gold Mine Limited to manage its growing enterprise, supporting its goals of maximizing productivity, streamlining supply chains, and delivering superior customer service. It was realized that Pronto has an unwavering focus and passion for delivering value to the company. Apart from that it was also found that this software gives instant business insights and helps uncover ways for Bulyanhulu Gold Mine Limited to reduce costs and increase profits.

The respondents argued that this system is highly efficient, quick return on investment (ROI), and fast in its implementation, they were sure that Pronto Xi was the right fit for their mining business. Basing on the fact that business reality for the mining industry today is one of mergers and acquisitions.

As a successful miner, Bulyanhulu Gold Mine Limited reached a point when it made hard decisions to buy and implement Pronto Xi so as to continue growing and maintain a competitive edge. As the business expands and develops, Bulyanhulu Gold Mine Limited no longer rely on small-scale information technology (IT) platforms to handle the increasingly complex business processes.
Also the study revealed that Pronto Xi Software is an established player in meeting the needs of Bulyanhulu Gold Mine Limited, and mining suppliers, helping them meet practical challenges of reducing operating costs and improving production efficiencies to achieve profitability. Bulyanhulu Gold Mine Limited has installed a fully integrated solution from Pronto Software that includes Maintenance Management, Purchasing, Inventory, Equipment Register, Production Costing, and General Ledger functionality, and keeps all operational information accurate and up-to-date.

4.3.1.2 Livelink ANSI Programme
Also the study revealed that Bulyanhulu Gold Mine Limited has installed and it is implementing Livelink ANSI Programme. This was mentioned by a total of 94% of the respondents participated in this study. They argued that Livelink ANSI Programme is a powerful and scalable enterprise-wide document management system produced by a Canadian company named Open text. They also argued that Livelink ANSI Programme enhanced or adapted to suit specific needs by developing modules (in O Script) as well as by external system interfaces using a Livelink API (LAPI) which is also available as Web Services in the company.

4.3.1.3 QlikView
Apart from that, the study realized that Bulyanhulu Gold Mine Limited has installed and it is implementing the application of QlikView, this was supported by a total of 785 of the total respondents participated to this study. The respondents argued that QlikView uses patented in-memory associative search technology to make sophisticated analysis available to business users, with a click-driven, visually interactive interface.

QlikView uses patented in-memory associative search technology to make sophisticated analysis available to users at Bulyanhulu Gold Mine Limited, with a click-driven, visually interactive interface.

The study also realized that QlikTech’s powerful, accessible business intelligence solution that enables Bulyanhulu Gold Mine Limited to make better and faster
decisions. QlikView product delivers enterprise-class analytics and search with the simplicity and ease of use of office productivity software. The in-memory associative search technology it pioneered makes calculations in real time, enabling business professionals to gain insight through intuitive data exploration. It is also deployed on-premise, in the cloud, or on a laptop or mobile device, for a single user or large global enterprises.

On top of that the study realized that QlikView uses patented in-memory associative search technology to make sophisticated analysis available to business users, with a click-driven, visually interactive interface.

QlikView takes advantage of 64-bit multicore hardware platforms to allow thousands of users at Bulyanhulu Gold Mine Limited to access large volumes of data. Where, the QlikView in-memory data model allows an integrated view of information through dashboards, ad hoc analysis, and reports.

4.3.2 Effectiveness and Efficiency of ICT on Inventory Control

When the researcher were investigating the extent to which the inventory control system employed figure 4.6 shows the results below;

Figure no. 4.6 Extent of system effectiveness and efficiency on Inventory Control;
Source: field survey, June 2013
At this section the study aimed to determine the extent to which inventory control system employed by Bulyanhulu Gold Mine Limited are effective and efficient. The results shows that a total of 16 percent of the respondents participated in this study said that the Inventory Control systems at Bulyanhulu Gold Mine Limited are effective and efficient to the excellent level.

Also it was found that a total of 24 percent of the respondents participated in this study said that the Inventory Control system at Bulyanhulu Gold Mine Limited are effective and efficient to the high extent. Also it was found that a total of 34 percent of the respondents participated in this study said that the Inventory Control system at Bulyanhulu Gold Mine Limited are effective and efficient to average or moderate extent.

Also it was found that a total of 20 percent of the respondents participated in this study said that the Inventory Control system at Bulyanhulu Gold Mine Limited are effective and efficient to the low extent level. Also it was found that a total of 6 percent of the respondents participated in this study said that the Inventory Control system at Bulyanhulu Gold Mine Limited are ineffective and inefficient to the poor or lower level.

4.3.3 Impact of ICT on inventory control in Mining industries

At this level the study needed to determine if the application of ICT on inventory control system at Bulyanhulu Gold Mine Limited, during investigation figure 4.7 below indicates the findings;
According to the information collected it was found that a total of 76 percent of the respondents participated in this study said yes, the application of ICT on inventory control at Bulyanhulu Gold Mine Limited has an impact on the company’s performance.

On the other hand it was found that a total of 8 percent of the respondents participated in this study said no, the application of ICT on inventory control at Bulyanhulu Gold Mine Limited has no impact on the company’s performance. However, that a total of 16 percent of the respondents participated in this study said they don’t know whether, the application of ICT on inventory control at Bulyanhulu Gold Mine Limited has no impact on the company’s performance or otherwise.

### 4.3.4 Role of ICT on Inventory Control

At this level the study needed to determine the role of ICT on inventory control Bulyanhulu Gold Mine Limited, following the investigation, figure 4.8 below indicates the findings;
According to the information collected through field survey conducted by the researcher at Bulyanhulu Gold Mine Limited on executing ICT on inventory control, it was realized that a total of 78 percent of the respondents participated in this study said that the ICT plays a great role on inventory control in Vendor Managed Inventory (VMI) at Bulyanhulu Gold Mine Limited.

Also the study found that a total of 92 percent of the respondents participated in this study said that the ICT plays a great role on inventory control in efficiently replenishment at Bulyanhulu Gold Mine Limited. Apart from that, it was realized that a total of 26 percent of the respondents participated in this study said that the ICT plays a great role on inventory control in demand forecast at Bulyanhulu Gold Mine Limited.

On the other hand, the study realized that a total of 26 percent of the respondents participated in this study said that the ICT plays a great role on inventory control in planning at Bulyanhulu Gold Mine Limited. Not only that but also it was realized that a total of 26 percent of the respondents participated in this study said that the ICT plays a great role on inventory control in stock duplication Management at Bulyanhulu Gold Mine Limited.
A well-defined inventory control policy at Bulyanhulu Gold Mine Limited has reduced the labor costs associated with managing the inventory. Each time inventory gets handled, whether to move it from one location to another, to retrieve it for order picking or to put it away for storage, it involves labor. This handling has made up part of the cost associated with managing inventory. At Bulyanhulu Gold Mine Limited prefer to handle the inventory as little as possible. When the company constantly searches for lost inventory, moves inventory from one location to another because of poor space utilization or handle the inventory multiple times; it results in increased labor costs. Properly managed inventory at Bulyanhulu Gold Mine Limited has reduced these incidents and reduces the labor cost associated with the inventory. Moreover, it was realized that a total of 26 percent of the respondents participated in this study said that the ICT plays a great role on inventory control in proper record keeping at Bulyanhulu Gold Mine Limited. On top of that it was realized that a total of 26 percent of the respondents participated in this study said that the ICT plays other role on inventory control at Bulyanhulu Gold Mine Limited.

The study revealed that QlikView gives visibility across inbound and outbound logistics, allowing analysis of materials received from suppliers, the movement of materials within the plant and onward delivery to customers. It also provides comprehensive insight into costs, inventory and bottlenecks, enabling management decisions and action to drive efficiency.

Also it was realized that QlikView supports this by enabling order management and fulfillment activities, giving visibility of related information such as stock levels, credit performance and transport constraints. Ensuring high levels of order fulfillment is critical in maintaining positive relationships with key customers and the capability QlikView provides to analyze large volume of data across transport, warehouse, route planning, vehicle load and related systems is key in ensuring customer service SLAs are achieved.

Apart from that QlikView provides transparency across sourcing, demand management, forecasting and inventory to support supply chain planning and execution activities. It enables the data intensive internal and external collaborative
activities that underpin forecasting processes, greatly increasing speed and accuracy, leading to benefits in efficiency, waste reduction, product availability, and ultimately customer satisfaction. QlikView supports analysis of supplier performance against SLAs and allows procurement to monitor and evaluate supplier performance and secure improvements to product or service quality. QlikView also enables analysis of levels of inventory across raw materials, work in progress, finished goods, and goods in transit or returns providing visibility and enabling management control.

4.3.4 ICT and Its Role to the Achievement of Organization Objectives
At this level the study needed to determine the extent to which application of ICT on inventory management is yielding to the achievement of organization objectives. During the investigation figure 4.9 below prepared to show the indications of the findings;

![Figure no 4.9 Extent of ICT yielding to the achievement of organization objectives; Source: field survey, June 2013](image)

According to the information collected through field survey conducted by the researcher at Bulyanhulu Gold Mine Limited on executing ICT on inventory control, it was realized that a total of 26 percent of the respondents participated in this study said that the extent of ICT yielding to the achievement of organization objectives is excellent.
Also it was realized that a total of 34 percent of the respondents participated in this study said that the extent of ICT yielding to the achievement of Bulyanhulu Gold Mine Limited on executing ICT on inventory control objectives is of relatively high extent. Apart from that, the study realized that a total of 24 percent of the respondents participated in this study said that the extent of ICT yielding to the achievement of organization objectives is of average extent or moderate.

It was realized that a total of 10 percent of the respondents participated in this study said that the extent of ICT yielding to the achievement of Bulyanhulu Gold Mine Limited on executing ICT on inventory control objectives is low. On top of that, the study realized that a total of 6 percent of the respondents participated in this study said that the extent of ICT yielding to the achievement of organization objectives is poor.

4.4 Influence of ICT on the effectiveness of Inventory Control

Recall the second research objective of this study was to investigate the influence of ICT on the effectiveness of Inventory Control. The following provide the findings in the context of ICT and cost reduction on inventory control, helpfulness’ on inventory management, Qlikview on procurement, helpfulness’ to the FPA team.

4.4.1 ICT and cost reduction on inventory control

On investigating the advantages of ICT in reducing cost, figure 4.10 below shows the findings:

![Figure no 4.10 ICT advantages in reducing cost associated with inventory control;](image)

**Figure no 4.10 ICT advantages in reducing cost associated with inventory control;**

**Source:** Field survey, June 2013
According to the information collected from the study, it was found that one of the ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited is the reduced lead times, this was mentioned by a total of 98 percent of the respondents participated in this study. Also, it was found that one of the ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited is the Increased inventory integrity, this was mentioned by a total of 90 percent of the respondents participated in this study.

Apart from that, It was found that one of the ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited is Improved stock count accuracy, this was mentioned by a total of 84 percent of the respondents participated in this study. Moreover, the study found that ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited is Improved re-ordering process, this was mentioned by a total of 96 percent of the respondents participated in this study.

On top of that, the study realized that ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited includes the reduced holding cost, this was mentioned by a total of 68 percent of the respondents participated in this study. On the other hand, the study realized that one of the ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited is Improved stock receiving process, this was mentioned by a total of 74 percent of the respondents participated in this study.

Also the study found that one of the ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited is Improved documentation, this was mentioned by a total of 86 percent of the respondents participated in this study. In addition to that, the study found that one of the ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited is the Reduced loss or stock misplacement, this was mentioned by a total of 52 percent of the respondents participated in this study.

Lower inventory cost is a definite advantage for Bulyanhulu Gold Mine Limited that effectively controls its inventory. Bulyanhulu Gold Mine Limited fully understands
the costs of carrying inventory, not just how much the inventory costs to purchase. Inventory carrying costs consisting all the expenses a company incurs for owning inventory. These expenses include the cost of capital, storage and risks costs (including obsolescence, damage, theft and deterioration) plus the appropriate taxable amounts.

Effective inventory control in Bulyanhulu Gold Mine Limited has reduced these costs because it reduces the total amount of inventory required to manage the business. Inventory control at Bulyanhulu Gold Mine Limited monitors the level of inventory and proactively manages obsolescence and deterioration by ordering in the appropriate quantities. Effective inventory control at Bulyanhulu Gold Mine Limited also has reduced storage costs, because it orders enough inventories to fill company demand and not much more.

Basing on the above findings the study concludes that ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited are reduced lead times, increased inventory integrity, improved stock count accuracy, improved re-ordering process, reduced holding cost, improved stock receiving process, improved documentation, reduced loss or stock misplacement.

### 4.4.2 Qlikview Helpfulness’ on Inventory Management

During investigation on understanding the helpfulness of Qlikview on inventory management, figure 4.11 illustrates the below findings;
It was found that Qlikview is helpful to supply chain performance in the inventory management through problem identification. This was mentioned by 92 percent of the total respondents participated in this study, they argued that the application of Qlikview has enabled them to identify problems with master data and transactional data and clean up bad data on Pronto.

Apart from that, it was found that Qlikview is helpful to supply chain performance in the inventory management through data standardization. This was mentioned by 86 percent of the total respondents participated in this study, they argued that the application of Qlikview has helped with identifying differences with master data field values, thereby allowing us to standardize data across the region.

Not only that but also, It was found that Qlikview is helpful to supply chain performance in the inventory management through easy reporting and accessibility. This was mentioned by 90 percent of the total respondents participated in this study, they argued that once off reporting was difficult to do in the past as the data needed to be extracted remotely using an ODBC connection to the Pronto server. This was slow and very frustrating. With Qlikview, all the data is available and one can build their own report just by making selections.
Also, it was found that Qlikview is helpful to supply chain performance in the inventory management through easy performance evaluation. This was mentioned by 72 percent of the total respondents participated in this study, they argued that the application of the dashboard concept on Qlikview has given us the ability to identify areas that we are making progress in and where more effort is required. On top of that it was found that Qlikview is helpful to supply chain performance in the inventory management through assistance in optimizing inventory. This was mentioned by 80 percent of the total respondents participated in this study, they argued that the Exception Reports works well for managing inventory on a day to day basis while the other reports greatly assist with optimizing inventory.

The study learnt that QlikView is patented, its in-memory technology rapidly combines data from any source. The organization was already using Oracle, SAP, Salesforce.com, Business Objects, Cognos, Hyperion, SQL Server, MySQL, and Excel. When they started to use QlikView there was no problem.

Apart from that the study revealed that QlikView empower different web search. Google-like BI search is finally within QlikView. The QlikView go ahead by typing any word or phrase, in any order, into the QlikView search box and get instant, associative results that let them see new connections and relationships between organizations data from different apps. It was realized that with QlikView in just seconds, the users can take organizations data and see it any way they want like putting them in sexy charts, tables, graphs every kind imaginable. Even making them 2-D or 3-D, zoom in and Zoom out. With QlikView, users look at organizations data in a whole new light.

Also it has been noted that with QlikView there is an associative experience as QlikView’s Associative Search uses the familiar experience of organizations favorite search engine to deliver fast business answers. The users can enter any search words and immediately QlikView provides instant results with its intuitive interface highlights important relationships between organizations data, enabling you to make more informed business decisions.
On top of that it was learnt that QlikView is powered by in-memory technology where the engine behind associative search is QlikView’s next-generation in-memory architecture. It virtually eliminates the problems and complexity plaguing traditional, slow, disk-based BI tools that deliver little more than static, prepackaged data. With QlikView, all organizations data from virtually any source is loaded in memory and available for instant, real-time analysis with a few clicks. QlikView provides anytime access through the most popular mobile devices, including iPhone, iPad, Android, and BlackBerry. It offers unprecedented freedom from the desktop by delivering dynamic, interactive data analysis, when and where users need it. QlikView for Mobile puts sophisticated real-time business answers, and the simplicity and power of QlikView’s easy to use interactive visual dashboards, in the hands of users on the go. With QlikView for Mobile, users get complete data selection, associative search, GPS sensitive filtering (on GPS equipped phones), and advanced visualization.

It was also realized that QlikView makes organizations whole organization smarter by enabling every business user to easily create their own QlikView apps. They can even mash them up and integrate them into other complementary apps and share their business insights with anyone. Imagine linking regional procurement data from QlikView to locations on Google Maps. Also taking a QlikView inventory analysis and making it available to all business users on SharePoint QlikView auto populate Excel spreadsheets makes all of this a reality via simple-to-use extensions. Where twitterers and faceboookers can also easily create one-click links to their QlikView mash-ups and analytics. It’s simply never been easier to share unique business insight with the entire organization.

It has realized that QlikView was built to grow in tandem with organizations business needs. In fact, QlikView scaled to meet the requirements of the largest global enterprises, including Campbell’s Soup, Canon, Fila, Gatorade, Panasonic, and Toyota. However QlikView supports tens of thousands of connected users and billions of records. It does this through an optimized architecture with perfect linear scalability that leverages even the most advanced 64-bit Intel multi-core architectures. It also includes support for the latest in virtualization and cloud
deployment models, as well as built-in resilience with standard failover options. The result? Maximum performance and maximum confidence.

On top of that the study realized that QlikView unlocks organizations enterprise data. When the organization found hostage to its business applications stack which prevents it from getting to its data in a simple and meaningful way. With purpose-built connectors for some of the most popular applications, such as SAP and Salesforce.com, QlikView eases access and analysis of organizations business data. QlikView is enabling enterprises across the globe to better leverage their investment in existing business and warehousing assets with intuitive access, comprehensive analytics and sophisticated visualization. With QlikView the organization is expecting good results happier, more productive business users and higher ROI on organizations entire enterprise stack investment.

The study realized that QlikView provides IT with powerful, flexible and easy consoles for measuring, monitoring and deploying QlikView applications and data. QlikView consoles give IT a single view into deployment status, whether it’s for a single server or multiple servers spread across different geographies, and simultaneous users that can number into the tens of thousands. QlikView also offers centralized management capabilities including load balancing, administration, and refresh scheduling.

Moreover, QlikView is designed to protect organizations critical data and analysis assets. QlikView supports security standards specifically designed to safeguard the billions of records and tens of thousands of users it’s capable of supporting. QlikView’s advanced, easy-to-administer security console enables you to control which users see which analyses, data, metrics, and results. You can also enforce group, role-based and individual user policies from individual documents to granular row and value restrictions.

Hence the study came to a conclusion that the application of Qlikview is helpful to supply chain performance in the inventory management through problem identification, data standardization, easy reporting and accessibility, easy performance evaluation, and assist in optimizing inventory
4.4.3 Qlikview Helpfulness’ On Procurement

The helpfulness of Qlikview on procurement were investigated and figure 4.12 below shows the indications;

Figure No.4.12 Qlikview helpfulness’ no Procurement;

Source: field survey, June 2013

It was found that Qlikview is helpful to supply chain performance in the procurement through effective management of procurement activities. This was mentioned by 80 percent of the total respondents participated in this study, they argued that Qlikview has given them the ability to manage lead times, volumes, suppliers, outstanding and overdue orders and RFQ’s.

Apart from that, it was found that Qlikview is helpful to supply chain performance in the procurement through easy accessibility of information. This was mentioned by 96 percent of the total respondents participated in this study, they argued that they can now view information on Pronto without having to log onto Pronto.

Not only that but also, It was found that Qlikview is helpful to supply chain performance in the procurement through easy buyer performance management. This was mentioned by 92 percent of the total respondents participated in this study, they argued that We can monitor buyer performance by reviewing the number of items on the re-order work bench at a glance.
Also, it was found that Qlikview is helpful to supply chain performance in the procurement through easy information analysis. This was mentioned by 82 percent of the total respondents participated in this study, they argued that they can do analysis in multiple dimensions just be clicking.

On top of that it was found that Qlikview is helpful to supply chain performance in the procurement through errors minimized. This was mentioned by 86 percent of the total respondents participated in this study, they argued that the audit exceptions reports has enabled us to identify data processing errors and correct them prior to orders being received on site or paid.

It was also found that Qlikview is helpful to supply chain performance in the procurement section through easy synthesis for decision. This was mentioned by 86 percent of the total respondents participated in this study, critical information like supplier spend analysis can be done per site, per supplier, per buyer just by selecting the options they want.

Hence the study came to a conclusion that the application of Qlikview is helpful to supply chain performance in the inventory management through effective management, accessibility of information, buyer performance management, easy information analysis, easy synthesis for decision, errors minimized

4.4.4 Qlikview Helpfulness’ To the FPA Team
The helpfulness of Qlikview on procurement were investigated and figure 4.13 below shows the indications;
Figure No.4.13 Qlikview Helpfulness’ To the FPA Team;

**Source:** Field survey, June 2013

It was found that Qlikview is helpful to the FPA team through automated work tools. This was mentioned by 98 percent of the total respondents participated in this study, they argued that Qlikview has made such a big difference to the FPA team. Previously all their work was done manually in Excel with limited capability to view data in multiple dimensions.

Apart from that, it was found that Qlikview is helpful to the FPA team through performance monitoring. This was mentioned by 86 percent of the total respondents participated in this study, they argued that With Qlikview, the FPA team can monitor their performance at a glance.

Not only that but also, It was found that Qlikview is helpful to the FPA team through system maintained easily. This was mentioned by 90 percent of the total respondents participated in this study; they argued that the FPA team can maintain the system just by having full visibility of the data. Also, it was found that Qlikview is helpful to the FPA team through easy data clean up and search. This was mentioned by 78 percent of the total respondents participated in this study, they argued that
On top of that It was found that Qlikview is helpful to the FPA team through improved security of data. This was mentioned by 82 percent of the total respondents participated in this study, they argued that they can track performance, monitor trends, clean up data, perform analysis on FPA spend, search options are available and extract data in a user friendly format.

Sanjay Singh, supply chain systems process manager at the company’s Tanzania-based mining operations (run from Johannesburg), says ABG recorded savings far in excess of the R1-million specified, simply by cutting out surplus inventory with the aid of Qlik View.

**Improved Inventory Control with Qlikview**

ABG operates four remote mines in Africa and as a result of a new mine coming on stream, employee turnover and outdated inventory management and controls, ABG’s inventory and obsolescence write downs began to increase in 2010. As a result ABG enlisted the help of its Toronto-based parent company to source an inventory optimization tool.

“We’d been trying to make the original application work for us since 2010, without success,” Singh says. “We spent more time and effort extracting and manipulating data than actually analyzing our data for better decision making. It never gave us a true picture of our inventory or any real value in terms of optimal stockholding.”

QlikView was then introduced to ABG by Business 2 IT, a QlikView Partner. It was soon implemented as a company-wide tool where Singh created an inventory optimization app that pulled together multiple data sources to give it clear visibility into ABG’s inventory. This allowed the company to manage its inventory levels without any of the drudgery and complexity of repeat algorithmic work required by the previous tool. “QlikView gave us unparalleled insight and enabled us to build an exponential forecasting app that overcame the complexities, uncertainty and long development and testing cycles of our global inventory optimization tool,” he says. He adds that the tool’s ease of use, speed and unmatched insight led to it being accepted as the group standard for BI-supported inventory management.
Big savings with QlikView

Singh says as a result of the implementation of QlikView, ABG saved multiple millions of shillings: The exponential forecasting app was developed at low cost very quickly, versus the significantly higher cost of implementing the erstwhile tool and appointing an on-site supply chain manager; In addition, the company was able to avoid a considerable annual licensing fee; Reduction in excess inventory and obsolescence write downs in the millions of shillings were achieved with further significant reductions projected. QlikView also replaced a BI tool operating on top of ABG’s ERP system (alongside the inventory tool), accruing more savings; The consolidated site view of purchase orders resulted in the cancelling of open orders or financial commitments across mining sites, reducing working capital substantially; Supply chain audit queries with the aid of QlikView are much faster, leading to productivity improvements and a better view for external auditors’ of ABG’s internal controls; and Service improvements have also been possible due to the visibility into supply chain managers’ KPIs and improved collaboration with the mining sites.

Furthermore Mr. Singh says no further development is needed to complete the forecasting app, compared to the repeat work of the purpose-built inventory tool. “Group head office was quite impressed by the ease of modification of the QlikView app. Any modification on the other tool would take months to develop and test.” But even when one leaves these significant costs aside, implementing QlikView resulted in immense direct savings.

Hence the study came to a conclusion that the application of Qlikview is helpful to the FPA team through automated work tools, performance monitoring, system maintained easily, Easy data clean up and search, improved security of data. Now everyone have his own account to acces and edit information, this has improved the security of data to non users.

4.5 Challenges facing mining Industry on the use of ICT on inventory control.

Recall that here the research objective was to investigate the challenges faced the mining Industry on the use of ICT during inventory control. The following provide the findings in the context of challenges facing the organization on executing ICT on inventory control.
4.5.1 Challenges facing the Organization on executing ICT on inventory control

At this section the study needed to determine the major challenges facing Bulyanhulu Gold Mine Limited on executing ICT on inventory control, figure 4.14 below shows the findings;

![Figure 4.14 Challenges facing the Organization on executing ICT on inventory control;](image)

**Source: field survey, June 2013**

Basing on the findings of this study, It was realized that high initial cost on its application is one among the challenges facing the organization on executing ICT on inventory control. This was mentioned by a total of 94 percent of the respondents participated in this study. Also the study realized that unreliable experts to use the system is one among the challenges facing the organization on executing ICT on inventory control, this was mentioned by a total of 50 percent of the respondents participated in this study.

Apart from that, the study found that incompatible with other systems is one among the challenges facing the organization on executing ICT on inventory control, this was mentioned by a total of 68 percent of the respondents participated in this study. Not only that, but also it was reevaluated that complexity in its operation is one among the challenges facing the organization on executing ICT on inventory control, this was mentioned by a total of 84 percent of the respondents participated in this study. Also the study realized that miss function of other parts is one among the
challenges facing the organization on executing ICT on inventory control, this was mentioned by a total of 76 percent of the respondents participated in this study. On top of that, the study found that unreliable training on staff is one among the challenges facing the organization on executing ICT on inventory control, this was mentioned by a total of 90 percent of the respondents participated in this study. Last but not least, it was found that there are other challenges facing the Organization on executing ICT on inventory control apart from the above mentioned. This was mentioned by a total of 60 percent of the respondents participated in this study. Basing on the presentation above, the study come to a conclusion that challenges facing the organization on executing ICT on inventory control are high initial cost on its application, unreliable experts to use the system, incompatible with other systems, complexity in its operation, mis-function of other parts, unreliable training on staff and others.
CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Introduction
This chapter starts with a summary of the study, the findings of the study and then the conclusion followed by the recommendations.

1.2. Summary
Despite of complexity and costly of implementing of ICT in inventory control, there are several benefits of adopting ICT in managing inventory in the organization. ICT integrates all business activities internally and externally, reduce holding inventory cost, yield automatically calculate the required materials and create a production planning, the list with required materials is again passed to the purchase department where materials can either be ordered automatically (via EDI), the logistics can easily be coordinated as well and it is immediately clear where the materials are required and have to be delivered, provides the possibility to monitor in real-time, the planning status and predicted delivery times

The general objective of the study was to investigate the Influence of Information and Communication Technology on effectiveness of inventory control in Tanzania Mining Industry. Specific objectives are as follows; To determine the role of ICT on effectiveness of Inventory Control in the organization of the study; To investigate the influence of ICT on the effectiveness of Inventory Control; To investigate the challenges faced the mining Industry on the use of ICT during inventory control.

The study was guided by the three research questions; what are roles of ICT on effectiveness of Inventory Control in the organization of the study; what is the influence of ICT on the effectiveness of Inventory Control; what are challenges faced the mining Industry on the use of ICT during inventory control

The study was conducted at Bulyanhulu gold mine which is located in northwest Tanzania, East Africa, approximately 55 kilometers south of Lake Victoria and approximately 150 kilometers from the city of Mwanza. Data collection methods used were questionnaires, interviews, observations and documentary review.
It was realized that Bulyanhulu Gold Mine Limited is using Livelink ANSI Programme, PRONTO-Xi Enterprise Management System, QlikView, and other minor systems. The study also revealed that well-defined inventory control policy at Bulyanhulu Gold Mine Limited has reduced the labor costs associated with managing the inventory. This handling has made up part of the cost associated with managing inventory at Bulyanhulu Gold Mine Limited prefer to handle the inventory as little as possible.

Moreover, it was found that ICT advantages in reducing cost associated with inventory control at Bulyanhulu Gold Mine Limited are reduced lead times, increased inventory integrity, improved stock count accuracy, improved re-ordering process, reduced holding cost, improved stock receiving process, improved documentation, reduced loss or stock misplacement. It was proved that the application of Qlikview is helpful to supply chain performance in the inventory management through problem identification, data standardization, easy reporting and accessibility, easy performance evaluation, and assist in optimizing inventory.

The findings also realized that the application of Qlikview is helpful to supply chain performance in the inventory management through effective management, accessibility of information, buyer performance management, easy information analysis, easy synthesis for decision, errors minimized. Also it has been proved that the application of Qlikview is helpful to the FPA team through automated work tools, performance monitoring, system maintained easily, Easy data clean up and search, improved security of data. Now

On top of that the study found that challenges facing the organization on executing ICT on inventory control are high initial cost on its application, unreliable experts to use the system, incompatible with other systems, complexity in its operation, misfunction of other parts, unreliable training on staff and others.

5.3. Conclusion
According to the analysis, and discussion held in the previous chapter, and a detailed summary given above, several issues have been revealed and proved, The study has
assessed the major roles of ICT on effectiveness of Inventory Control in the organization of the study, where it has been proved that that Bulyanhulu Gold Mine Limited is using Livelink ANSI Programme, PRONTO-Xi Enterprise Management System, QlikView, and other minor systems, these systems are proved to play a great role on problem identification, data standardization, easy reporting and accessibility, easy performance evaluation, and assist in optimizing inventory. Also plays a great role to supply chain performance in the inventory management through effective management, accessibility of information, buyer performance management, easy information analysis, easy synthesis for decision, errors minimized as well as being is helpful to the FPA team through automated work tools, performance monitoring, system maintained easily, Easy data clean up and search, improved security of data. Furthermore, the study has assessed the influence of ICT on the effectiveness of Inventory Control, where it has been proved that ICT influences cost reduction through reduced lead times, increased inventory integrity, improved stock count accuracy, improved re-ordering process, reduced holding cost, improved stock receiving process, improved documentation, reduced loss or stock misplacement. On top of that, major challenges facing the mining Industry on the use of ICT during inventory control are being identified and proved to be high initial cost on its application, unreliable experts to use the system, incompatible with other systems, complexity in its operation, mis-function of other parts, unreliable training on staff and others. Hence the study comes to a conclusion that effective application of information and communication technology on inventory management system has a great Influence on the effectiveness of inventory control in Tanzania Mining Industry.

5.4. Recommendations

In view of findings discussed above and the conclusion given, the researcher made the following recommendations to the management of Bulyanhulu gold mines and other institutions in Tanzania.

i. The study recommends that the management of Bulyanhulu gold mines should increase its budget to meet high initial cost on purchasing, installing and application of ICT on inventory management control system.
ii. Also it is recommended that the management of Bulyanhulu gold mines should attract more experienced and well skilled experts to use the ICT system in inventory control.

iii. Apart from that, the study recommends that the management of Bulyanhulu gold mines should make sure that the system is compatible with all other systems used in other departments and sections or units.

iv. On top of that, it is recommended that the management of Bulyanhulu gold mines should make sure that all mis function of other parts of the systems are regulated to its normal functioning condition so as to have full utilization of the system.

v. Also it is recommended that the management of Bulyanhulu gold mines should make sure that there is periodical and regular reliable training on staff on how to apply ICT on inventory control.
6. REFERENCES


http://searchcio-midmarket.techtarget.com/definition/ICT


National Information and Communications Technologies Policy, March 2003


Qualitative vs Quantitative Research (2011) [Online]. Available at: http://www.snapsurveys.com/techadvqualquant.shtml


Dear Respondent; I Dickson Venance Luwumba currently am a candidate for Mzumbe University pursuing Master of Science Degree in Procurement and Supply chain Management (MSc PSCM). Wishes to undertake research on the Influence of Information and Communication Technology on Effectiveness of Inventory control in Tanzania Mining.

Please, I request you to take a few minutes to answer the questions below. The research is for academic purpose only and I assure you that your answer will be kept completely confidential.

INSTRUCTIONS:

*Just put a tick for the question with multiple answers and fill the black spaces with your own answers.*

1. What is your age range between
   a. 20 – 30 years
   b. 30 – 40 years
   c. 40 – 50 years
   d. Above 50 years

2. What is your gender
   a. Male
   b. Female

3. What is your level of education
   a. Certificate and or professional course
   b. Ordinary Diploma
   c. Advance Diploma
   d. Bachelor Degree
   e. Post graduate / Masters degree
   f. PhD and above

4. What is your job Title at Bulyanhulu Gold Mine Limited?
5. To what Department are you working?

6. How long have you worked with the organization?
   a. 0 – 1 year
   b. 1 – 2 Years
   c. 2 – 3 Years
   d. More than 3 years

7. Is the Bulyanhulu Gold Mine Limited holding Inventory?
   a. Yes
   b. No

8. Is the Bulyanhulu Gold Mine Limited practicing ICT on Inventory Control?
   a. Yes
   b. No

6. What System of Inventory Control used by Bulyanhulu Gold Mine Limited?

7. To what extent the system is effectively and efficiency on Inventory Control?
   a. Excellent
   b. High
   c. Moderate
   d. Low
   e. Poor

8. Do you think ICT have a greater impact on inventory control at Bulyanhulu Gold Mine Limited?
   a. Yes
   b. No

9. If yes, mention the role of ICT on Inventory Control?
10. To What extent the Role of ICT mentioned above yield to the achievement of organization objectives?
   a. Excellent
   b. High
   c. Moderate
   d. Low
   e. Poor

11. Do you think there any Challenges faced by the Organization on executing ICT on inventory control?
   a. Yes
   b. No

12. If yes, mention the challenges faced by the organization on executing ICT on inventory control?

13. To What extent the Challenges mentioned above hinder the effective achievement of organization goals towards inventory control?
   a. Excellent
   b. High
   c. Moderate
   d. Low
   e. Poor
14. What strategies employed by the organization to rectify the challenges faced by the organization on implementing ICT on inventory control?

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

15. To what extent these strategies are effective and efficiency in achievement of organization goals?
   a. Excellent □
   b. High □
   c. Moderate □
   d. Low □
   e. Poor □

16. On your own view, explain on how ICT yield to reduce cost associated with inventory control.

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

____________________________________________________________________

Thank you for your time.
Appendix 2. Management of Inventory Procedure (Rev2) - SOP7099

MANAGEMENT OF INVENTORY PROCEDURE

BGML-SUP-SOP7099

<table>
<thead>
<tr>
<th>Revision</th>
<th>Prepared by</th>
<th>Approved by (Signature)</th>
<th>Signature of Approver</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Alan Trompert</td>
<td>General Manager</td>
<td></td>
<td>15-APR-2020</td>
</tr>
<tr>
<td>1</td>
<td>Alan Trompert</td>
<td>General Manager</td>
<td></td>
<td>23-SEP-2020</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>11-Oct-2021</td>
</tr>
</tbody>
</table>
## Revision Information

<table>
<thead>
<tr>
<th>Rev #</th>
<th>Old Section Ref</th>
<th>New Section Ref</th>
<th>Description of Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>Changed procedure number from P10 to reflect new document control numbering system.</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Change of company name from KMCL to BGL</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Changed policy numbers to reflect new document control numbering system that has been introduced. SUP has been assigned block number 7000 – 7399 and the company changed name and logo</td>
</tr>
</tbody>
</table>
CONTENTS

1. PURPOSE .................................................................................................................. 4
2. SCOPE ....................................................................................................................... 4
3. REFERENCES ............................................................................................................ 4
4. DEFINITION ............................................................................................................. 4
5. PROCEDURE ............................................................................................................. 5
   5.1 AMS OF THE PROCEDURE ............................................................................. 5
   5.2 OWNERSHIP .................................................................................................... 5
   5.3 CARRIERSHIP .................................................................................................. 5
   5.4 STATUS ............................................................................................................. 5
   5.5 GROUP AND CLASS ....................................................................................... 6
   5.6 ABC ANALYSIS ............................................................................................... 6
   5.7 OTHER CATEGORIES ...................................................................................... 6
   5.8 REPORTING ...................................................................................................... 7
   5.9 OBSOLESCENCE .............................................................................................. 7
6. WORK INSTRUCTIONS .......................................................................................... 7
7. ATTACHMENTS ...................................................................................................... 7
8. SYSTEMS EVALUATION ........................................................................................ 7
9. DISTRIBUTION ....................................................................................................... 7
1. PURPOSE

   The purpose of this procedure is to provide the foundation for a consistent application of inventory management classifications and criteria to ensure the physical inventory meets the service levels required and the total value is commensurate with company expectations.

   The Superintendent Inventory Control and Warehouse is responsible for the application of this procedure.

2. SCOPE

   To establish the process, whereby a hierarchical system of classifications, codification and groupings segregates the inventory into manageable parcels of items with common attributes.

   To manage the groups in consultation with the owner and good materials management practice to ensure optimization of the inventory.

   To identify those items that are no longer required to be held as inventory.

3. REFERENCES

<table>
<thead>
<tr>
<th>Reference Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure guide TBA</td>
<td>Cataloguing of Inventory</td>
</tr>
<tr>
<td>Procedure guide PI - 08</td>
<td>Types and classes of Inventory</td>
</tr>
<tr>
<td>Procedure guide PI - 09</td>
<td>Codification of Inventory</td>
</tr>
<tr>
<td>Procedure guide TBA</td>
<td>Disposal of Goods and Materials</td>
</tr>
</tbody>
</table>

4. DEFINITION

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner</td>
<td>The Department Manager of the business unit for which the items are held.</td>
</tr>
<tr>
<td>ABC analysis</td>
<td>A tool for the analysis of the inventory</td>
</tr>
<tr>
<td>Stock Turn Rate</td>
<td>A method of setting a ratio of inventory use</td>
</tr>
</tbody>
</table>
5. PROCEDURE

5.1 Aims of the Procedure

The aims of this procedure are to,

a) Apply the appropriate inventory management tools on a continuing basis to optimise the value of the inventory.

b) Maximise the inventory availability whilst minimising the investment.

c) Establish ownership and caretaker-ship responsibilities.

d) Set appropriate service levels with customers.

e) Reduce the number of transactions required to fulfill inventory requirement and replenishment obligations.

This requires the classification of the inventory into groupings that enable it to be segregated and the applicable action taken. It is important that this procedure is read in conjunction with Procedures PI-08 and PI-09 as they define the codes, types and classifications.

5.2 Ownership

It will be necessary to classify the inventory into owner groups, publish the groupings and obtain acceptance that the groupings are correct. This action is the foundation of all actions that follow.

It is expected that owners of inventory shall provide the following details in support of the management of the inventory.

a) Provide full details of the items to be catalogued.

b) Approve all additions/deletions and changes to items.

5.3 Caretaker-Ship

Supply will assume responsibility for the management and care of the inventory items. This shall encompass the areas listed below.

a) Cataloguing of the items in accordance with the owners requirements.

b) Purchasing of initial and replenishment stocks.

c) Safe and secure storage.

d) Protection from deterioration.

e) Issue the items on demand.

f) Reporting on all aspects of activity of the item

g) Maintain reorder points based on turn rates, lead times, units required per change and criticality to the operation.
5.4 Status

The status of the item is to be a parameter for the data gathering and shall identify the item as, an active item, an item under watch or possible obsolescence or a deleted item. The status code can be developed further if considered necessary.

5.5 Group and Class

These groupings will bring together like items and add consistency to report formats.

5.6 ABC Analysis

To ensure the "critical few" and the "trivial many" receive the appropriate levels of attention the ABC analysis is used.

This method determines through their frequency of movement and holding values, which items are critical and require regular inventory management and which are common items that automatic systems can control.

The criteria for each of the analysis methods shall be,
- For ABC – frequency of movement.
  
  \[ A = \text{Top 10\%}, \quad B = \text{Next 20\%}, \quad C = \text{Bottom 70\%}, \quad D = \text{Zero usage} \]

5.7 Other Codes

The other codes of Stock Types, (Rotable, obsolete etc.), Classes (Capital, Insurance etc) and Business impact codes are detailed in procedure Guide PI – 08 and PI – 09.

These can be used to further classify the inventory.

5.8 Reporting

The reporting options in inventory management are many and varied. The many factors to be considered and reviewed and the demands of customers will mean a variety of reports will need to be provided. This procedure does not seek to specify all reports.

However, for consistency and in an attempt to simplify the reporting across all groups and owners it is necessary to have a single prime reporting feature. This feature shall be Stock Turn Rate (STR).

The formula for Stock Turn Rate shall be, total value of stock, divided by the issue value.

This will give a ratio figure. The ratio should be limited to two decimal places.
5.9 Obsolescence

The reports provided will highlight groups and individual items that have low or no usage (low stock turn rate). It will be incumbent upon the owner to indicate the action to be taken in respect of these items in accordance with the parameters below.

a) Consumable items with no movements over a 12 month period to be amended to order on request. Excess stock to be disposed of.

b) Maintenance items with no usage over a two year period. Marked for deletion and stock disposed of.

c) Rotable items with no movement over two years to be critically reviewed, if no movement over three years the item to be deleted and disposed of.

d) Insurance and Capital items to be reviewed annually.

All amendments and actions to be approved by the item owner.

6. WORK INSTRUCTIONS

None

7. ATTACHMENTS

None

8. SYSTEMS EVALUATION

This procedure shall be reviewed by members of the Supply Department at least annually.

9. DISTRIBUTION

List physical locations which require a controlled copy of this document.

<table>
<thead>
<tr>
<th>Copy</th>
<th>Controlled Document Folder Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master</td>
<td>Controlled Documents Central Filing System</td>
</tr>
<tr>
<td>1</td>
<td>Electronically</td>
</tr>
</tbody>
</table>

---

UNITED NATIONS
AFRICAN BARRICK GOLD
Buwayahulu Gold Mine Limited

MANAGEMENT OF INVENTORY PROCEDURE

DOCUMENT NO: SUP1099

Page: 1 of 1
PROCUREMENT PURCHASING OF INVENTORY ITEMS PROCEDURE GUIDE

BGML-SUP-SOP7095

<table>
<thead>
<tr>
<th>Revision</th>
<th>Prepared by</th>
<th>Approved by (position)</th>
<th>Signature of Approver</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Sheila Thompson</td>
<td>General Manager</td>
<td></td>
<td>11-Nov-2015</td>
</tr>
<tr>
<td>1</td>
<td>Sheila Thompson</td>
<td>Vice Manager</td>
<td></td>
<td>11-Nov-2015</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>11-Nov-2015</td>
</tr>
<tr>
<td>Rev #</td>
<td>Old Section Ref</td>
<td>New Section Ref</td>
<td>Description of Changes</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>Change of procedure number from 0014 to reflect new document control numbering system.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td>Change of company name from KMCL to BGML.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>Changed policy numbers to reflect new document control numbering system that has been introduced. SUP has been assigned block number 7000-7999 and the company changed name and logo.</td>
<td></td>
</tr>
</tbody>
</table>
CONTENTS

1. PURPOSE ......................................................................................................................... 4
2. SCOPE .......................................................................................................................... 4
3. REFERENCES .................................................................................................................. 4
4. POTENTIAL HAZARDS .................................................................................................. 5
5. PROCEDURE .................................................................................................................. 5
   5.1 PREFACE ................................................................................................................ 5
   5.2 REORDER BUY REPORT (ROB) ............................................................................... 5
   5.3 PURCHASING REVIEW OF ITEMS ............................................................................. 5
   5.4 PURCHASING ACTION ............................................................................................ 6
   5.5 TIMING ..................................................................................................................... 6
   5.6 URGENT PURCHASING ACTION ............................................................................. 6
   5.7 PICK UPS ................................................................................................................ 6
   5.8 ALTERNATIVES AND CHANGES ............................................................................. 7
   5.9 QUALITY AND STANDARDISATION ........................................................................ 7
   5.10 PACKAGING AND STANDARD PACKS .................................................................. 7
   5.11 NEW SUPPLIERS ................................................................................................... 7
   5.12 SUPPLIERS SELECTION ........................................................................................ 7
   5.13 REQUESTS FOR PRICE, DELIVERY AND AVAILABILITY ....................................... 8
   5.14 DELIVERY OBJECTIVE .......................................................................................... 8
   5.15 DELIVERY DELAYS AND LONG DELIVERY ............................................................ 8
   5.16 TERMS AND CONDITIONS ...................................................................................... 9
   5.17 ORDER PLACEMENT ............................................................................................. 9
   5.18 FILING AND RECORDS ........................................................................................ 9
6. SYSTEMS EVALUATION ................................................................................................ 9
7. DISTRIBUTION .............................................................................................................. 9
1. PURPOSE
This procedure guide is for the use of all Supply personnel charged with the responsibility and authority to commit company funds for the purchase of goods and materials for inventory stock replenishment and to meet demands for items catalogued but not held in stock.

2. SCOPE
To formulate the process for the purchase of goods and materials for stock replenishment.

To ensure the process is consistently applied and secures for the company cost effective pricing and timely delivery.

Only authorised personnel approved by the Supply Manager are permitted to undertake the commitment of the company funds for the purchase of goods and materials and represent the company in the matter of procurement policy.

Commitment shall include promises to take goods and materials, requests for suppliers to hold stock and advice of future purchasing direction or policy.

Only authorised personnel are approved to undertake supplier performance assessments and take appropriate action, make decisions to cease trading with a supplier or remove a supplier from the preferred supplier list.

3. REFERENCES

<table>
<thead>
<tr>
<th>Reference Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy statement for Supply</td>
<td>Published in February 2000 and approved by the General manager</td>
</tr>
<tr>
<td>Procedure guide PP - 01</td>
<td>Purchasing of non-inventory items</td>
</tr>
<tr>
<td>Procedure guide PP - 03</td>
<td>Preparation of Supply agreements</td>
</tr>
<tr>
<td>Procedure guide PP - 05</td>
<td>Tenders, quotations and pricing</td>
</tr>
<tr>
<td>Procedure guide PP - 01</td>
<td>Cataloguing of items</td>
</tr>
<tr>
<td>Incoterms</td>
<td>Published by the International Chamber of Commerce</td>
</tr>
</tbody>
</table>
4. POTENTIAL HAZARDS

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRONTO</td>
<td>BGM’s materials management computer system</td>
</tr>
<tr>
<td>Workbench</td>
<td>A list of purchasing tasks within PRONTO</td>
</tr>
<tr>
<td>Incoterms</td>
<td>An internationally accepted set of transport rules that defines the responsibilities of each party</td>
</tr>
<tr>
<td>Inventory</td>
<td>A group of items catalogued and approved to be held in the warehouse</td>
</tr>
<tr>
<td>Suggested order report</td>
<td>A computer generated list of items where the stock on hand has fallen below the set levels and requires replenishment</td>
</tr>
</tbody>
</table>

5. PROCEDURE

5.1 Preface

The PRONTO system generates a Reorder Buy Report (ROB) entry each time an inventory item falls to or below the minimum stock holding level. From this data a report gathers the items and additional data reviewed by Inventory Control.

5.2 Reorder Buy Report (ROB)

Inventory control must review the items and via PRONTO ROB

- Allow the item to pass the Purchasing workbench or
- Place the item on hold ending classification of some aspect of the item or quantity, or
- Delete the item from the report because of a known circumstance

Upon acceptance of the review the items not covered by Supply Agreement are to be passed to the Senior Purchasing Officer's workbench for allocation of work to purchasing personnel.

The ROB shall be acted on at 0700 and at 1200 hours each workday. The report shall be run at other times only for urgently required critical items or at the request of the appropriate authority.

5.3 Purchasing Review of Items

The Senior Purchasing Officer shall conduct a review of the appearing on the workbench. The review shall address:

- **Supplier selection**: Is the suggested supplier the appropriate supplier or are there others that may be suitable.
- **The need for quotes or tenders**: Would the application of formal tendering provide improved cost effectiveness and or protection from risk. Does department procedure require competitive pricing for this value item?
- **Alternatives**: Are these suitable and acceptable alternatives with better pricing or delivery.
d. **Expected delivery:** is the suggested delivery lead time acceptable or can be improved.

e. **Criticality of the items:** is the item of a critical nature (as displayed by the Operational Critical Code) that demands different purchasing activity.

f. **Agreement items:** is the item a candidate for inclusion on an existing Supply Agreement.

g. **Purchase workload:** is the item current workload, experience and product knowledge of purchasing staff.

h. **Other considerations as necessary.**

Any decisions or observations made as a result of the review are to be noted in the "holes" area of the relevant item.

The Senior Purchasing Officer shall allocate the items to individual Purchasing Officers' and Supply Direct workbenches for action.

**5.4 Purchasing Action**

Upon the receipt of the workbench items the Purchasing Officer shall conduct a brief review along the above-mentioned lines and proceed to place purchase orders for the stock replenishment.

The "notes" attached to each item must be read and the required action taken.

Purchasing Personnel must research all of the requisitions and line items available on their workbench to see if two or more can be gathered onto one purchase order.

In special circumstances or when the computer system is not available the Senior Purchasing Officer must be provided as soon as possible after the event.

**5.5 Timing**

Purchasing personnel must initiate purchasing action no later that the end of the next working day following the receipt of the item on the Senior Purchasing Officer.

**5.6 Urgent Purchasing Action**

Any request from customers to take urgent purchasing action should be carefully considered before commencing to ensure normal workload is not disrupted.

Frequent urgent requests for items or minor items should be collated and presented to the Supply Manager for reference to Department heads.

**5.7 Pick Ups**

Urgent purchasing action enable pick up goods and materials from local suppliers must be severely restricted. Unless a pickup is specifically approved by Senior Supervisory personnel or is of a safety or emergency nature, all goods are to be delivered to the warehouse.
5.8 Alternatives and Changes

Alternatives may be sourced where Purchasing Officer experience and product knowledge ensures the goods to be purchased are suitable for the intended purpose and are true alternatives. There must be an advantage to justify the changes sourcing decision.

However, Purchasing personnel should not substitute or change items without reference to the Inventory Controller and "owner" of the item.

5.9 Quality and Standardisation

Purchasing Officers must ensure that the goods and materials being sourced are fit for the purpose and are of merchantable quality.

A low price can turn into a high cost if the goods are unsuitable or have to be returned and another order placed.

Wherever possible use relevant Standards or Company standards to specify goods and materials.

5.10 Packaging and Standard Packs

Wherever possible goods and materials should be purchased in standard packs, full sizes or lengths, or set quantities as supplied by the manufacturer.

This ensures the receiving process is as easy as possible, and reduces the possibilities of extra charges for breaking standard packs.

Any amendments required are to be sent to the Inventory Controller for the updating of records.

5.11 New Suppliers

No new suppliers where the annual spend is expected to be less than $2500 shall be added to the master-file. Existing suppliers with an annual spend of less than $25000 per annum shall be removed from the supplier master-file. With the exception of single source suppliers of critical spare items.

All request for the addition of new suppliers shall be approved by the Supply Manager.

5.12 Supplier Selection

Wherever possible goods and materials are to be purchased from a carefully selected and pre-qualified group of suppliers, this will assist in a reduction in the number of suppliers on the master-file and will enhance BGML's purchasing power.
5.13 Requests for Price, Delivery and Availability

Firm pricing and delivery must be sought before a commitment is made and be in accordance with Tendering, quoting and pricing procedure guide PG-05.

Requests for quotes (RFQ) (and verbal pricing inquiries) whether system generated or fax format must detail exactly the items required and seek from the supplier the following information:

a. The unit price of the sought.
b. The best and guaranteed delivery-time and date.
c. The delivery point at which the pricing is based.
d. Any pack size information.

The Request for Quote must state:

a. The pricing is considered to be fixed for the period of supply stated otherwise.
b. That time is of the essence and failure to deliver on time may result in cancellation of the order.
c. The delivery point for non-locally held items is "free on (suppliers) truck" (FOT) at our nominated carrier in the capital city of the Sales office.
d. The delivery point to locally held or offered items "free into store" (FIS) BGM warehouse.
e. Where other delivery requirements are needed reference to ICC Incoterms should be made.
f. Pricing is to include all packaging and documentation charges.

Whenever possible all pricing should be net. Settlement discounts, rebate and the like generally are not taken up by accounting personnel and are usually forgotten or missed in later price comparison.

Purchase order must show in "order notes" field any information relating to the source of pricing data, special conditions or referring the order to a particular person.

5.14 Delivery Objective

Purchasing officers must aim for on-time and in-full deliveries for all items where possible. This ensures that expiration of outstanding items is minimised, the receiving process is lessened and invoice matching easier.

Supplier performance should be based (in part) on on-time and in-full delivery success rate.

5.15 Delivery Delays and Long Delivery

For non-ORO inventory items where there is an outstanding request, the requester is to be informed of any delay or extended deliveries.

Long delivery items, particularly where stocks held are at or over two maximum should be advised to the Inventory Controller.
5.16 Terms and Conditions

Purchasing officers must not accept variations to BGL's standard terms and conditions without discussion with the Supply Manager.

Payment terms are not 30 days and unless there is a distinct and quantifiable advantage to the company they must not be varied.

6.17 Order Placement

Purchase orders must be placed promptly and all details of the requirement must be fully covered with a complete trail of the transaction able to be traced from information on the order.

Purchase orders should be emailed or auto faxed.

6.18 Filing and Records

Requests for quotations responses are to be stapled together (if two or more), marked with the relevant purchase order number and filed in purchase order sequence.

6. SYSTEMS EVALUATION

This procedure shall be reviewed by members of the Supply Department at least annually.

7. DISTRIBUTION

List physical locations which require a controlled copy of this document.

<table>
<thead>
<tr>
<th>Copy</th>
<th>Controlled Document Filing Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Electronically</td>
</tr>
</tbody>
</table>

ENDORSED COPY

For the knowledge of: Position & Date Responsible Party (SIP, FNC & IT) FNC. - 79948 Supply (GL) Systems Development & Control 12007259 Procurement Purchasing officer (Procurement Code. Q39) doe.
Appendix 4. Obsolete and Slow Moving Inventory Version_2011_12_01- ABG SOP

AFRICAN BARRICK GOLD

STANDARD OPERATING PROCEDURE:

OBsolete AND SLOW MOVING INVENTORY (OSMI)

ABG – SUPPLY – SOP: 1 DECEMBER 2011
## ABG SIGNATORIES:

<table>
<thead>
<tr>
<th>Revision</th>
<th>Prepared by (position)</th>
<th>Approved by (position)</th>
<th>Signature of Approver</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Francisc Kriel-Supply Chain Systems and Processes</td>
<td>Thomas Robson General Manager Supply Chain</td>
<td>Pieter Kukuk Financial Director</td>
<td>December 2011</td>
</tr>
<tr>
<td>Rev #</td>
<td>Old Section Ref</td>
<td>New Section Ref</td>
<td>Description of Changes</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CONTENTS

1. SCOPE .......................................................................................................................... 3

2. PURPOSE ....................................................................................................................... 5

3. IDENTIFICATION, MANAGING AND REPORTING OF OSMI ...................................... 5

4. IDENTIFICATION AND MANAGING OF SLOW MOVING INVENTORY FOR FINANCIAL REPORTING AS CONFIRMED BY ABG RISK/AUDIT MANAGEMENT ................................................. 19

5. FINANCIAL DOCUMENTS AND GUIDELINES APPLICABLE TO THE OBSOLETE SLOW MOVING INVENTORY SOP ........................................................................................................... 23

6. MONITORING AND IMPLEMENTATION OF THE SOP .................................................... 24

7. DISTRIBUTION ............................................................................................................. 24

8. EXCEPTIONS ................................................................................................................ 24

9. EFFECTIVE DATE AND REVIEW OF THE STANDARD .................................................. 24

10. APPENDICES ............................................................................................................... 24

APPENDIXES A & B: DEFINITIONS AND OSMI SIGN OFF DOCUMENT ............................ 25
1. SCOPE

This African Barrick Gold (ABG) Standard Operating Procedure (SOP) for obsolete and slow moving inventory (OSMI), provides the minimum requirements for the identification, management and reporting of OSMI across all ABG mining sites.

This SOP is governed by the global Barrick Logistics Policy # SC 4 Rev 10 Distribution: Global Last Revised: June 1, 2010 with the emphasis on par. 3 Warehouse Service Level Metrics (Value of Obsolete/Inactive Inventory). To avoid duplication existing Financial Policies and SOP extracts in reference 1 are provided and referenced to facilitate compliance in addition to this SOP.

2. PURPOSE

The management of ABG OSMI needs to receive immediate attention to improve the performance of this strategic asset. The ABG Internal Risk and Audit findings on OSMI dated May 2011 prescribe that “All obsolete & slow moving stock items must be identified in a timely and efficient basis to prevent over supply of unwanted stock items and ultimately stock being written off. In addition OSMI should be identified and accounted for in accordance with the Barrick Accounting policies and procedures.

The management of OSMI will not only contribute to profitability, but also fill a critical service level gap. Measures will be implemented to monitor materials acquired but not used and marked as OSMI thereafter, for this is one of the causes of excessive stock levels throughout ABG.

3. IDENTIFICATION, MANAGING AND REPORTING OF OSMI

The following guidelines are provided in addition to facilitate compliance with the existing ABG Policies and Procedures:

- What is OSMI:
  - OSMI are inventory which are identified as obsolete and or did not have any stock turns for more than 24 Months due to slow moving or no movement demands.
  - Slow Moving stock reflects low frequency of demand, not the quantity on hand. Items are identified as slow moving if they have not moved in the last 24 months from issue date.
  - Obsolete Stock (Stock identified for no further use) reflects inventory items replaced by an alternative and rendered unusable or
diminished in value. Also known as stock where the net realizable value is less than the weighted average cost. These stocks must have a reserve to reduce the costs to the net realizable future value.

- **What is the process for the identification of OSMI**
  - The definition of OSMI need to be applied in parallel, when performing the following actions:
    - OSMI can be identified by mining sites using the Pronto system and Qlikview Report tool i.e. Items are flagged as Obsolete or Slow moving in the Condition Code Field on the Inventory Master:
      - Condition Code “O” for OBSOLUTE stock. Condition code “O” prevents further purchase of the item and warns you when you perform transactions that will affect stock levels that the item is Obsolete.
      - Condition Code “C” for SLOW MOVING stock. Condition Code “C” prevents further purchase of the item but allows issuing.
    - On a monthly basis, a full review is done on all items that have not moved in the last 24 months. Items with stock on hand that have not been flagged with a “C” in the condition code field are then flagged accordingly. Items with no stock on hand that have not been flagged with “O” in the condition code field are flagged accordingly. **This is the responsibility of the ABG Jhb Office and will be performed monthly.**
    - It is critical that the physical item in the warehouse need to correspond with the descriptions on Pronto. Physical verification to ensure inventories are indeed OSMI is always recommended in co-operation with the end user or supplier/manufacturer who is the product specialist. **This is the responsibility of the mining site.**
    - Mining sites need to extract the slow moving and obsolete inventory list using the Qlikview report for write off approval. HOD’s will be given one week for review and comment. Thereafter, the Pronto write off process will commence.
  - **How can Insurance spares be identified?** OSMI will also consist of insurance spares that must be excluded from the OSMI calculations.
    - Supply Chain Managers need to identify Insurance Spares (Once off and Quarterly) and forward the Insurance Spares list to the Regional Cataloguers for Pronto update.
• Note the procedure recommended in the financial guidelines on how insurance spares can be identified from a financial point of view.

• The Regional Cataloguer will flag insurance spares with the value “IN”, in the Pronto User Group field for identification and management by all end users.

Management of OSMI:

• **Who is responsible to identify OSMI:** All mining site Supply Chain Managers and HOD’s are responsible to regularly identify OSMI and will be held accountable to manage OSMI within the guidelines as provided in this SOP.

  The management of OSMI needs to be included as a Supply Chain KPI business objective at the Mining Site.

• **When must OSMI be identified:** Supply Chain Managers at mining sites with the co-operation of HOD’s and end users must identify OSMI once a quarter. The review process should start one month prior to quarter-end, (Feb, May, Aug and November) to ensure the whole project has been completed before we do the provision for obsolescence each quarter. OSMI sign off lists also to be reviewed by regional ABG mining sites.

• **Who may approve OSMI write offs within delegated values:**

  As delegated by the financial authority for Supply Chain Superintendents OSMI write offs are < $10,000 total value summary of OSMI line items and for Financial Managers > $10,000 total value of OSMI line items per financial year.

  Signature of approvals and designation stamp need to be reflected on the bottom of each OSMI individual page and archived under the live link folder Supply Chain example Bulanyulu_OSMI (Quarter 1) and date (YYYY/MM/DD).

  The ABG OSMI sign off document in Appendix B need to be used as the official OSMI sign of Document.

  The approval process and availability of source documents, i.e. sign offs of OSMI needs to comply with auditable best practices.
O SMI material accounting on Pronto after approval for write off was obtained:

- Once the items are moved to the obsolete warehouse only thereafter approval needs to be obtained. The OSMI stock items need to be written off on Pronto in the warehouse where the stock resides and must be written onto the Obsolete warehouse by performing the following material accounting procedures on Pronto:
  - Supply Chain Systems and processes based at Jhb can assist with bulk obsolete status updates if and when required. This will save valuable time for the individual items don’t have to be flagged individually on Pronto.
  - If there is stock on hand and the Mining site has agreed that the stock is obsolete, and then the average cost must not be changed to zero, thus reducing stock to nil value is not permitted. The devaluation will be the obsolete stock value write off.
  - The GL account for write offs need to be used to write off from the main warehouse and written on to OBS1 (Obsolete) the obsolescence reference need to be provided for example OBS090.
  - The under mentioned process and fields on Pronto explains the process on which fields need to be completed in the inventory maintenance screen in Pronto when mining sites write on OSMI in the OBS1 (Obsolete Whse) and write off OSMI in Pronto (Main Whse).
Disposal of OSMI

3.1 Types of Unwanted Items

3.1.1 Inventory Surplus and Obsolescence
Inventory items identified as unwanted are to be approved for disposal by the item “owner”. The processes of disposal shall be,
Offer for sale with the parent equipment; or, if none,
Sell by auction, or, if of no value,
Scrap

3.1.2 Mobile Equipment and Plant
Major or significant items of plant or equipment are to be approved for disposal by the item owner. The process of disposal shall be,
a) Trade-in (with all relevant spares), or,
Offer for sale with parent equipment; or, if none,
Sell by auction, or, if of no value,
Scrap

3.1.3 Scrap and Salvaged Items
Where goods and materials are identified as suitable only for scrapping, the supply manager shall approve the scrapping via the Disposal advice. Scrap shall be handled by the established agreements with the appropriate contractors.
All demolition work shall be subject to the practices and requirements of the Agreement for Works and Services procedure.

3.2 Methods of Disposal
All of the methods of all types of disposals shall be supported by negotiated agreements with approved contractors, where appropriate and subjects to the requirements of Procedure PP-05 Agreement for Works and Services.

The approved methods are noted below.

a) Scrap and rubbish of no value.
Approvals are required for this method. A process of routine monitoring of the contents of bins, the number of bins, and the total tonnage of scrap should be undertaken on a regular basis.

Scrap and salvage (all metal type)
Approval via the asset/stock item Disposal Advice is required only where a single or identified piece of plant or equipment is involved, or where a demolition project is initiated.
For common scrap a recording process of bins past the gatehouse is to
be supported by the provision of the contractor of tonnes per bin or load and price per tonne. Routine monitoring should be conducted on a regular basis.

**Weighbridge docket** confirming the weights shall be provided prior to leaving site.

**Special scrap**, e.g. warming pump parts or mill liners can be returned to the original manufacturer under a negotiated agreement. Recording processes should be the same as for other scrap.

**Donations**
The donation of any company owned item can only be approved by the General Manager. Requests for donations must be in writing.

**Private treaty**
Sales by private treaty are discouraged. The requirement to provide indemnity from liability and the implications of an item being unsuited for its purpose make this action undesirable as a disposal method.

General Manager Approval is required to use private treaty.

**Tender, open or private**
This method should only be used where it is considered that there could be an advantage, or where the failure to obtain the suitable price may result in the item being retained. This method can also be used where the item is considered to have appeal in an area outside of Tanzania.

A suitable indemnity statement must be included in the tender documents. Consideration must also be made of the duty of Care responsibility for the condition and fit-for-purpose state of plant and equipment.

General Manager Approval is required to use the Tender process.

**Public Auction**
Sales by auction are considered to be the best method of sale for unwanted goods and materials.

This method shall be the preferred arrangement and shall apply to all goods considered salable and not subject to other approved methods.

The chosen auction house shall be an approved contractor subject to the requirements as stipulate in the associate contract. The SOW shall address the methods of determining the expected sale values and the rates for the
service.

Sellback to suppliers if and when possible.

3.3 Documentation and Removal from Site

All disposals shall be supported by a completed Asset/stock item Disposal Advice form with the appropriate level of approval.

All dispatches of goods from site undertaken by BGML personnel shall be supported by a completed Discrepancy / Outward Goods Advice (D/OGA) showing the dispatch details.

- Concise explanation for Tax implications on the disposal of materials.
  - Mining equipment, furniture etc might have been imported under concessory tax rates as agreed by TIC (Tanzania Investment Centre). Any prospective buyer not entitled to these concessions will be required to pay tax rates as per customs laws in case such taxes were not paid during importation. Exceptions may be where one mine wishes to dispose an item to another mine. In this case, the buying mine will follow the same process it would follow if this item was purchased from abroad, i.e. raise PO, get clearing agent involved in tax documentation, apply VAT exemption, pay taxes assessed etc.
  - Common practice in TZ, is that Government missions and investors who have purchased items under tax concessions dispose items under open tender, auction or any other process that aims at arriving at a fair market value of the items. Prospective buyer is then informed in writing and given a time frame to pay the bid price and contact TRA for tax assessment and tax clearance and transfer of title. Note that on receipt of the letter of offer, the buyer is required to pay taxes in the name of the seller. Once proof of pay of taxes and bid price is presented to scrap yard supervisor, the buyer is allowed to collect the item from respective scrap yard.
  - There are tax implications to the seller in terms of import duties, Excise duties and VAT, capital gain tax. The seller is required to ensure that these taxes are paid to TRA before any transfer is made. Movement of disposed equipment from one mine and another may trigger tax point. ABG need to ensure movement is made after following the necessary tax arrangements.

- Reporting, measuring and monitoring of OSMI:
- **Qlikview Business Intelligence Tool**: Qlikview must be utilized by ABG i.e. Finance, Supply Chain, Risk Management and Auditors to report on OSMI. Selected users at mining sites and the Jhb corporate office do have access to Qlikview.
  
  - By selecting the Qlikview **stock ageing tab** as illustrated hereunder the OSMI can be extracted per mining site.
- Qlikview will also be updated to report on Insurance Spares, marked with “IN” in User Group field on Pronto. Insurance Spares will be excluded from the OSMI report.

- Monthly SCM reports: Monthly supply chain reports need to include the progress made on the managing of OSMI and the KPI’s need to be internalized per specific mining site. The OSMI SAMPLE information hereunder extracted from Qlikview will
be used to reflect and measure performance on Supply Chain reports.

<table>
<thead>
<tr>
<th>Month</th>
<th>Bulu</th>
<th>NM</th>
<th>Tula</th>
<th>Buz</th>
<th>ABG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 11</td>
<td>$10,640,732</td>
<td>$12,998,293</td>
<td>$1,456,803</td>
<td>$929,000</td>
<td>$35,881,198</td>
</tr>
<tr>
<td>Mar. 11</td>
<td>$10,808,033</td>
<td>$13,059,140</td>
<td>$1,627,400</td>
<td>$623,000</td>
<td>$36,916,442</td>
</tr>
<tr>
<td>Apr. 11</td>
<td>$9,462,191</td>
<td>$10,006,574</td>
<td>$952,702</td>
<td>$1,272,046</td>
<td>$19,233,002</td>
</tr>
<tr>
<td>May 11</td>
<td>$9,635,730</td>
<td>$10,354,700</td>
<td>$833,520</td>
<td>$1,335,827</td>
<td>$19,673,207</td>
</tr>
<tr>
<td>Jun. 11</td>
<td>$5,057,550</td>
<td>$10,892,250</td>
<td>$874,308</td>
<td>$1,517,779</td>
<td>$18,342,053</td>
</tr>
<tr>
<td>Jul. 11</td>
<td>$13,819,045</td>
<td>$13,808,454</td>
<td>$3,266,107</td>
<td>$2,396,407</td>
<td>$33,289,014</td>
</tr>
</tbody>
</table>

Stock Ageing - Regional

<table>
<thead>
<tr>
<th>Site</th>
<th>Value 0 - 3 Months</th>
<th>Value 3 - 6 Months</th>
<th>Value 6 - 12 Months</th>
<th>Value 12 - 24 Months</th>
<th>Value 24 + Months</th>
<th>Total Value on Hand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulu</td>
<td>$20,256,490</td>
<td>$6,464,567</td>
<td>$6,162,146</td>
<td>$1,038,724</td>
<td>$6,873,672</td>
<td>$51,811,873</td>
</tr>
<tr>
<td>Buzwagi</td>
<td>$9,990,673</td>
<td>$9,211,412</td>
<td>$7,309,813</td>
<td>$1,019,887</td>
<td>$5,241,375</td>
<td>$22,395,047</td>
</tr>
<tr>
<td>North Mara</td>
<td>$13,871,146</td>
<td>$7,771,975</td>
<td>$5,377,497</td>
<td>$2,170,283</td>
<td>$6,791,055</td>
<td>$33,665,507</td>
</tr>
<tr>
<td>Tshwane</td>
<td>$8,863,783</td>
<td>$8,340,961</td>
<td>$5,384,951</td>
<td>$6,56,524</td>
<td>$906,580</td>
<td>$27,955,980</td>
</tr>
<tr>
<td>Total</td>
<td>$48,951,581</td>
<td>$28,592,547</td>
<td>$23,022,570</td>
<td>$5,756,610</td>
<td>$11,037,025</td>
<td>$165,743,775</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site</th>
<th>Value 0 - 3 Months</th>
<th>Value 3 - 6 Months</th>
<th>Value 6 - 12 Months</th>
<th>Value 12 - 24 Months</th>
<th>Value 24 + Months</th>
<th>Total Value on Hand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulu</td>
<td>3%</td>
<td>10%</td>
<td>11%</td>
<td>3%</td>
<td>13%</td>
<td>26%</td>
</tr>
<tr>
<td>Buzwagi</td>
<td>5%</td>
<td>13%</td>
<td>14%</td>
<td>2%</td>
<td>13%</td>
<td>26%</td>
</tr>
<tr>
<td>North Mara</td>
<td>3%</td>
<td>6%</td>
<td>12%</td>
<td>5%</td>
<td>13%</td>
<td>26%</td>
</tr>
<tr>
<td>Tshwane</td>
<td>4%</td>
<td>14%</td>
<td>11%</td>
<td>5%</td>
<td>23%</td>
<td>26%</td>
</tr>
<tr>
<td>Total</td>
<td>40%</td>
<td>12%</td>
<td>12%</td>
<td>3%</td>
<td>12%</td>
<td>26%</td>
</tr>
</tbody>
</table>

- The above are illustrating basically that 20% or $33.4 Million of stock value has not moved in the last 24 months in the region as on July 2011.
  - Insurance Spares and Critical items have not been excluded as Insurance spares have not been clearly identified on Pronto. (Critical spares may not be the same as Insurance spares)
  - In terms of the Barrick Global Policy # SC 4 Logistics Rev 10 Last revision date 1 June 2011 it is recommended that warehouse performance metrics be established at all Barrick properties and that they be reported to Corporate monthly in the mine/project KPI report. It is further recommended that target performance standards be set for each of these metrics and that poor performance against these targets be highlighted for corrective action.
- Jhb corporate office will monitor the monthly progress versus the items marked
as OSMI to ensure progress are measured.

- Metrics will be included in the SCM report to monitor the reducing of OSMI however the total management of stock and cautious procurement of Stock can only decrease OSMI levels:
  - 2011: 20% of Stock value
  - 2012: 10% of Stock value
  - 2013: 5% of Stock value

**Measures to reduce OSMI to be instated by ABG mining sites**

- Better planning on inventory through demand planning, optimization tools, creation of Bill of Materials and Service Kits that assists with forecasting.
- Ensure that all equipment report to the correct standardized item groups.
- Ensure that all equipment reports to the correct stock user groups.
- Ensure those generic inventories which can be used on any equipment are not linked to unique item groups i.e. filters and seals. These generic items must not be catalogued as OEM items.
- Group all related inventory items in the same bin's and stores. All CAT equipment should be stocked in the same warehouse and in the correct bin allocations.
- Ensure bin allocations are correct.
- Ensure that mining sites using the same equipment knows what is identified as OSMI for possible usage.
- Ensure all OSMI stock items are correctly catalogued and that part numbers and manufacturer/supplier data is included.
- Ensure end users assist warehouse personnel in the identification of OSMI. Item in the bin must correspond with the item description on pronto.
- Ensure Reorder levels are updated regularly.
- Ensure that OSMI are not accidentally catalogued incorrectly.
- Ensure the serviceability status of the inventory is updated regularly.
- Ensure Suppliers has no further usage of the equipment for suppliers may buy the stock and issue credit to ABG. The package material of such OSMI items must not be damaged.

- Ensure that the material needed is firstly screened for availability on Pronto across all ABG mining sites by using the regional stock codes assigned to materials prior procurement. The required stock may be marked as excessive stock i.e. status obsolete across mining sites. Update the Pronto ROB accordingly once similar inventory is available across all mining sites.

- HOD’s to ensure requirements for new materials are valid especially during the approval of ANSI’s for this will contribute in the decreasing of OSMI. HOD to monitor materials acquired but not used and marked as OSMI thereafter regularly, for this is the root cause of excessive stock levels and OSMI throughout ABG.

- Quarterly an OSMI list will be available for review, to identify stock that should not be made obsolete. We will require end-users to motivate why they have selected the stock and we will require them to sign off on it. The review process should start one month prior to quarter-end, to ensure the whole project has been completed before ABG do the provision for obsolescence each quarter.

- Stock returns should be processed as frequently as economically possible for some products may have expiry dates taking in account the lead-times to be returned to suppliers by freight and road.

- Decrease DP’s and Increase FPA’s.

- Ensure that DP request for materials is not available in the stores as normal stock items.

- Distribute monthly updated lists of OSMI across mining sites to ensure no new stock is bought if available at different mining sites.

- Distribute monthly updated lists of OSMI to the Jhb buying office to ensure items are not procured unnecessarily. The buying office also needs to have access to the OSMI Whse to screen for OSMI stock.

- Extract slow moving reports every term and request end users (Including External Mining sites) to sign off if Inventory is not required anymore.

- Make OSMI lists also available to procurement and Commodity management regularly on a folder on Live link (OSMI) to ensure materials in stock are not
bought if a new requirement was raised. The Pronto function OSMI warehouse can also be screened across all mining sites.

- Perform continuous reviews of inventory items as circumstances warrant i.e.:
  
  A. Equipment and related parts removed from service
  B. Change in operation/Application
  C. Non-moving inventory items

- A and B: the end user is to notify Inventory Control by completing an ANSI form including all relevant information as soon as known in order to avoid unnecessary expenditures. Inventory Control shall check usage history for each item ensuring the item is not used in another application prior to making the item obsolete.

- C: Inventory Control shall run the non-moving inventory report. This report will include all items with no movement within the past 24 months and greater. The report will exclude those items classed as Critical Spares.

- Inventory Control shall run the non-moving inventory report. The review process should start one month prior to quarter-end, to ensure the whole project has been completed before we do the provision for obsolescence each quarter. This report will include all items with no movement within the past 24 months and greater. The report will exclude those items classed as Critical Spares. (Referred to as slow moving inventory)

- Inventory Control will distribute the non-moving reports to the end user departments for review and comment. Inventory Control will verify the end user department has received the non-moving reports.

- If after a period if there has been no response from the end user department, Inventory Control will proceed with the obsolescence of all items on the report. In this case the slow moving report will replace the ANSI as the change document.

- If the end user department responds with a request to keep any non-moving non-critical item in active inventory, the items will be kept for an additional 12 months. This request must be signed off by the relevant department manager. The department manager will sign the form, list and sign again for the requested exceptions. If after the additional 12 months there is still no movement the items will be made obsolete and removed from active inventory.

- Once an item has been identified as obsolete the cataloguing section will change the class of each item to obsolete in each of the active warehouses. Inventory
Control will then run a report of all obsolete items in each active warehouse. The report will include a brief description, location, quantity on hand and value.

- The warehouse will use this report to verify quantities on hand and assign a new location for each item in the Obsolete Warehouse.

- The same report will be used by Inventory Control to issue all items and their value to the obsolescence provision. The report will be used in place of a pick slip for this procedure and the issue will be direct to the Obsolescence Provision G/L.

- A Cataloguing Officer will update the locations within the Obsolete Warehouse and input the average price into the second location field leaving the average price at zero dollars.

- Inventory Control will credit the quantities to the Obsolete Warehouse at zero dollars.

- Cataloguing will then delete the locations in the active warehouse(s).

- Upon completion of the credits, Inventory Control will sign, date and file the report.

- A copy of the report will be given to Finance to compare with the end of month value charged to the Obsolescence Provision.

- A copy of the report will be given to the Warehouse Foreman to facilitate the physical transfer of the items to the obsolete warehouse.

- If an item is requested from the Obsolete Warehouse, Inventory Control will first change the average cost back to its previous value and then advise the warehouse to proceed with the issue from the Obsolete Warehouse. Once the issue is completed, the Storeman will advise Inventory Control to change the average cost back to 0 for any remaining stock.

- Inventory Control will review issues from the Obsolete Warehouse on a monthly basis in order to determine if any item(s) should be returned to active inventory.

4. IDENTIFICATION AND MANAGING OF SLOW MOVING INVENTORY FOR FINANCIAL REPORTING AS CONFIRMED BY ABG RISK/AUDIT MANAGEMENT

In accordance with the Barrick Global financial accounting practices, an obsolescence evaluation of mining consumables and supplies, and Replacement spares should be undertaken on a quarterly basis. An item of inventory may be determined to be obsolete due
to many factors but examples include damage, obsolescence and spoilage. Items with no usage for two or more years are presumed to be obsolete. Insurance Spares as well as Components need to be excluded from this list of items as they are subject to a separate impairment process.

Insurance spares are defined in the PPE Barrick global Financial Guidelines dated 23 October 2010, as follows:

- **Insurance Spares** are parts which are not expected to be used during the life of the mine however, are kept on site in order to prevent a significant interruption of normal operations as a result of unplanned failure or damage to critical parts of (Property Plant and Equipment) PP&E. These parts are rarely needed however, are required to be on hand due to the long lead time to source or construct the part and considerable losses which would be incurred if the part was not immediately available following an equipment breakdown. Typically these are high value items purchased at the same time as the related capital equipment due to their long lead time and include mill bull gears and large transformers.

It is important to note however that insurance spares useful life is expected to be the same as that of the related primary asset, in which it is being used.

- **Example**: A mine site installs a ball mill on January 1, 20X1 and begins depreciation at that time. It also purchases an extra ball mill gear which is held on site in case the one used in the plant breaks down. The cost of the extra gear is $500,000. Ball mill gears have an expected Useful Life of 10 years. The LOM plan and therefore the useful life of the process plant is also 10 years. Management does not expect to have to use the extra gear during the life of the ball mill. The extra ball mill gear meets the definition of an Insurance Spare. It should be depreciated over the same period as the ball mill in use in the plant beginning on January 1, 20X1.

Insurance spares should be clearly identified at the production start date of the mine. Although it is considered unusual, insurance spares could be purchased at a later stage of the mine life and should be identified as such.

The following components form part of Barrick Global Standardized Component List and should be identified separately.

**Standardized Components List**

**Truck Fleet - Surface**

- Wheel Motors
- Beds/Trays
• Engine(s)
• Transmissions

Loaders

• Engines (model 994F, L1800, L1850, L2360)
• Wheel Motors

Shovels

• Tracks & rollers
• Engine(s)
• Hoist Drum
• Ring Gear
• Swing Bearing
• House Rollers & roller path
• Swing Transmission (each - front or rear)
• Propel Transmission(s)
• Hoist Transmission
• Buckets

Fixed Equipment

• Diaphragm
• Shell Liners
• Brick reline - Autoclave
• Head Assembly/Bowl Assembly - Crusher
• Mast Assembly

In order to identify obsolete inventory for accounting purposes, the following procedure should be performed:

• Obtain a listing of all supplies inventory.
• Exclude insurance spares as defined above.
• Exclude Components as defined above.
• Age the remaining items in accordance with issue date.
• List all remaining items with no usage for > 24 months separately.
• Send the above listing with all individual items with a weighted average unit cost in excess of $2,500 and a total cost in excess of $25,000 to the related Operations Manager.
The Operations Manager should review the listing and indicate whether the items have a high probability of usage over the remaining of mine life or not.

The list must be approved signed off by the relevant Operations Manager and the Mine Finance/Commercial Manager.

Items approved for high probability of usage over the remaining of mine life should be excluded from the provision.

All items with no usage for >24 months and a weighted average unit cost less than $2,500 or total cost less than $25,000 are provided for as obsolete.

All items with no usage for >24 months and approved as not having a high probability of usage over the remaining of mine life are provided for as obsolete.

Due to the nature and location of our operations, it is presumed that the residual value for all obsolete supplies inventory items is zero. Should any recoveries be made for the sale of obsolete inventory, a credit is recorded to cost of sales.

It is noted that inventory will not always have transactional dates to identify which inventory are > 24 months and therefore the following prescribed supply chain and financial rules will apply to identify and bucket slow moving inventory for obsolescence (Ageing):

<table>
<thead>
<tr>
<th>Comments</th>
<th>1 (Preferred Option)</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>In order of priority</td>
<td>Last issue date</td>
<td>Last receipt date</td>
<td>Creation date</td>
</tr>
<tr>
<td>Remarks</td>
<td>When the stock is physical issued in the warehouse.</td>
<td>When the physical stock is actually receipt in the warehouse.</td>
<td>Also need to quantify reasons i.e. Migrate of data, Etc.</td>
</tr>
</tbody>
</table>

**Notes:** Important to note that the mentioned dates are when the physical stock are i.e. receipt or issued and not for example the actual lead time between the picking and issuing of inventory or receipt of goods at the freight company or customs at Dar es Salaam.

- If last issue date is not available the last receiving date must be used.
- If the last issue date and receiving date is not available the Creation (Not the change date) date will be applicable.
5. FINANCIAL DOCUMENTS AND GUIDELINES APPLICABLE TO THE OBSOLETE SLOW MOVING INVENTORY SOP

To avoid duplication existing Financial Policy and SOP extracts are provided and referenced to facilitate compliance in addition to this SOP.

Reference 1:

Financial Accounting Policy #160.0 PP&E dated 23 October 2010

Insurance parts are rarely needed however, are required to be on hand due to the long lead time to source or construct the part and considerable losses which would be incurred if the part was not immediately available following an equipment breakdown. Typically, these are high value items purchased at the same time as the related capital equipment due to their long lead time and include mill bull gears and large transformers.

The cost of Insurance Spares is included in Land, Buildings, Plant and Equipment Category of PP&E if it meets the recognition thresholds of:

- a Useful Life of greater than one year; and
- a cost greater than $50,000 USD.

Insurance Spares are depreciated over the same period as the part of PP&E they are associated.

Financial Accounting Policy #150.0 Mine Operating Supplies dated 0 September 2011

An obsolescence evaluation of mining consumables and supplies, and Replacement Spares should be undertaken on a quarterly basis to ensure inventory is measured at the lower of cost or Net Realizable Value.

An item of inventory may be determined to be obsolete due to many factors but examples include damage, obsolescence and spoilage. When obsolete items are identified, an impairment charge should be recorded against the Provision for Obsolescence inventory account, with the corresponding debit going to cost of sales. Any proceeds on the sale of scrap inventory that is already written-off should be credited to cost of sales.

The quarterly obsolescence evaluation should be documented in detail and be completed by performing the following steps:

1. Identify Items:
a) Obtain a list of items with no usage for two or more years. There is a presumption that these are Obsolete items and their carrying value should be reduced to Residual Value.

b) Remove Insurance Spares, as well as Components included in the Component listing that is part of PP&E and are subject to a separate impairment process.

c) Review all items with a weighted average unit cost in excess of $2,500 as well as items with a total value in excess of $25,000. Remove items for where there is a high probability that the item will be used over the remaining of mine life. Exclusions from the listing must be approved by the Mine Finance/Commercial Manager and the relevant Operations.

6. MONITORING AND IMPLEMENTATION OF THE SOP

African Barrick Gold (ABG) Supply Chain Managers is responsible for the implementation and execution of this SOP and the ABG corporate office Supply Chain and Finance department is responsible to perform regular monitoring if the SOP is applied. The inventory Analyst needs to assist management to manage the required objectives.

7. DISTRIBUTION

List physical locations which require a controlled copy of this document:

<table>
<thead>
<tr>
<th>Copy</th>
<th>Controlled Document Folder Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master</td>
<td>Controlled Documents Central Filing System on the shared Supply Chain Folder</td>
</tr>
<tr>
<td>1</td>
<td>Electronically</td>
</tr>
</tbody>
</table>

8. EXCEPTIONS

Requests for exceptions to the standards and procedures contained in this document must be made in writing to the General Manager Supply Chain and/ or Director, Financial Controls.

9. EFFECTIVE DATE AND REVIEW OF THE STANDARD

This Procedure is effective 14 Sept 2011. This document will be reviewed annually to ensure continued Standard relevance with Financial Controls and Supply Chain Management.

10. APPENDICES

- Appendix A: Definitions
- Appendix B: ABG OSMI Sign off Document
- End of Document
APPENDIXES A & B: DEFINITIONS AND OSMI SIGN OFF DOCUMENT

- **Insurance Spares (Financial Definition):** Are parts which are not expected to be used during the life of the mine however, are kept on site in order to prevent a significant interruption of normal operations as a result of unplanned failure or damage to critical parts of PP&E.

- **Critical Spares (Supply Chain Definition):** Items which are required to ensure the continuity of production or operations.

- **Critical High Items:** Items where non-availability will cause production (daily throughput or monthly tonnes required to be moved) to be reduced by more than 6% (e.g., insurance spares, the stand down of a piece of plant or equipment where there is no similar piece available to continue production).

- **Critical Medium Items:** Items where non-availability will cause production (daily throughput or monthly tonnes required to be moved) to be reduced by less than 5%, but will still impact monthly production target (e.g., the stand down of a piece of plant or equipment where a similar piece may be available to continue production, but at a reduced rate).

- **Mine Operating Supplies:** Represent warehouse, non-product inventory, which encompasses all items purchased for ultimate use in the production process. These are the replacements required in large quantities such as: major consumables, active inventory, spares, parts used for repetitive routine maintenance purposes, chemical agents and production supplies. Examples of mine operating supplies include, but are not limited to: lime, cyanide, fuel, tires, explosives, reagents, wear parts, spares (critical and insurance), bucket teeth, hoist rope and drag/dump ropes for draglines and shovels, ripper boots, grouser bars, and cutting edges for dozers; bits, adapters and drill stems for drills; and wear plates on conveyor and crushing machinery.

- **Obsolescent/Inactive Inventory:** Slow moving or impaired inventory items determined as being of little or no further use and whereby the net realizable value of the inventory item is below its carrying value.
### APPENDIX B: O'SMI WRITE OFF DOCUMENT PROFORMA

<table>
<thead>
<tr>
<th>Item Code</th>
<th>Description</th>
<th>Department</th>
<th>Qty on hand</th>
<th>Average Cost</th>
<th>Value</th>
<th>Flag Obsolete</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Qty of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obsolete</td>
</tr>
<tr>
<td>Total value of Items</td>
</tr>
<tr>
<td>Obsolete</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Function</th>
<th>Finance Manager</th>
<th>Supply Chain Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature</td>
<td>Signature</td>
<td>Signature</td>
</tr>
<tr>
<td>Date</td>
<td>Date</td>
<td>Date</td>
</tr>
</tbody>
</table>