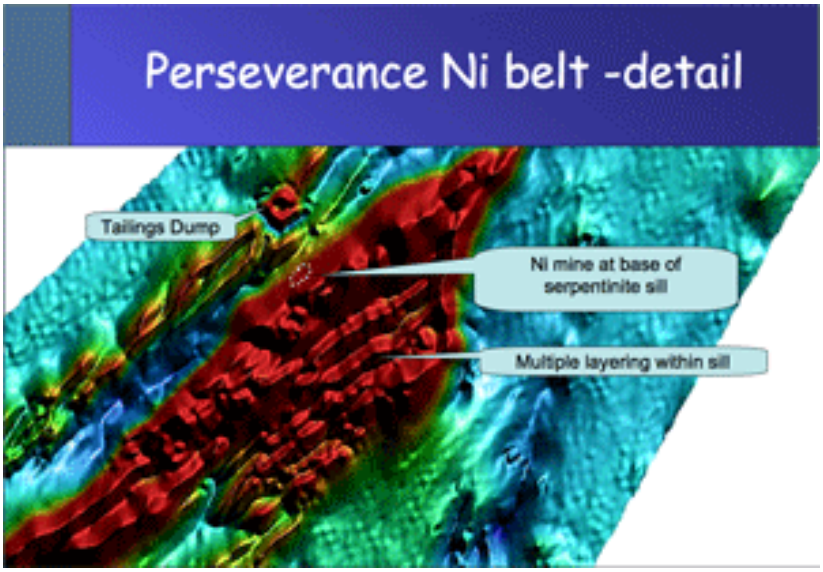
Geological Society of Zimbabwe

Newsletter

February 2009



Ultra-detailed Aeromagnetics across the Perseverance Nickel Belt, Chakari – Mike Kellow

THE GEOLOGICAL SOCIETY OF ZIMBABWE, P.O. BOX CY 1719, CAUSEWAY, HARARE

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Editorial

This is the third and final newsletter to be compiled during the tenure of Collins Mwatahwa as Chairman of our Society. In it we are pleased to present for wider consumption the abstracts of papers presented during the Summer Symposium of 2008. In addition Martin Prendergast has submitted his abstract on komatiitic sill-hosted chromite deposits and David Love with Kevin Walsh have provided an unsolicited response to their reading of Ann Kritzinger's Nyanga prehistoric gold mining paper, which we published in October. We have some news of Zimbabwe geologists around the world, but we need a greater response from readers to maintain interest and contact with our brethren. A few lines of interesting fact are all we need about you and your friends and colleagues wherever situate.

As always, grateful thanks are extended to all our contributors without whose efforts this communication would not be. There are indications that overseas Zimbabwe geologists intend coming together in the interest of supporting the future of 'Geology' in our country. We encourage this initiative and hope to report more fully in the next issue of the Newsletter. Also Allan Wilson has presented his well-prepared Macgregor public lecture in both Harare and Bulawayo and has led a successful and stimulating field trip along the Great Dyke. Again we intend to report more fully on these events as well as the proceedings of the AGM.

I am sure that I extol the sentiments of all our Membership in extending thanks and congratulations to Collins Mwatahwa for his enlightened leadership this past year, which has been the most challenging with respect to the maintenance of our Society and its activities.

Tim Broderick

Chairman's Chat

Collins Mwatahwa

The global economic crisis continues despite stimulus packages been made by leading industrialised countries to reverse the effects of crumbling economies. Metal prices have continued their downward trend, though there are signs of stabilisation. As I put pen to paper, more job losses or cuts loom worldwide. Some of our members, especially those in the diaspora, may be seriously affected by these global events, but we urge them to be resolute and face the challenges, and wish them luck. As Zimbabweans, we know it can be done!

The Macgregor Memorial Lecture was held in Harare and Bulawayo on the 9th and 12th of February 2009 respectively. Professor Allan Wilson, from Wits University, delivered an inspiring talk entitled *'Earth's Earliest Volcanoes - an insight into planetary processes 3 billion years ago'*. The Society was also honoured to have Allan Wilson leading its Great Dyke field trip to the Darwendale, Selukwe and Wedza sub-chambers. The trip revealed that there is still more to be understood about the Great Dyke xenoliths and autoliths occurring within the mafic and the P1 units and we hope that research studies will be motivated. These events were well attended and the Society is indebted to the mining companies who supported us, namely Zimplats, Anglo Platinum and Mimosa Mine and we acknowlege the members who participated.

We note that the Geological Survey will reach an important milestone in its history with 100 years of existence in 2010. We find it fitting that this anniversary be commemorated with the publishing of an updated 1 : 1,000,000-scale geological map of Zimbabwe. Extensive information has been obtained over the past 30 years and this is a challenge to the Geological Survey to consolidate this data and publish a product we believe to be of national and international interest. This data circulation is critical in the drive towards rejuvenating mineral exploration and production in Zimbabwe as well as facilitating many other economic recovery programmes.

We also note positively that the recent budget pronouncement mentioned that issues relating to the issuance of EPO licences need to be addressed urgently in order to avoid compromising future mineral production.

We hope the Government of National Unity will provide a stimulus to reverse negative growth in our Mining Industry. At the same time, mining-related disciplines need an urgent rescue package if we are to avoid total collapse in these facilities. The Geology Department at UZ has now only got a stream of third-year students who are receiving lectures as and when part-time volunteers are available or willing. We hope by this time next year, we will be talking positively about this and related departments at the University. Most of us are products of 'Geology', so we should never let it collapse.

This is my last chat as Chairman. I would like to thank the editor, committee members, honorary and ordinary members of the Society for the support they gave me during my term. I wish the new Committee, headed by Forbes Mugumbate, all the best in 2009.

Articles and Reports

Challenges Facing the Industry Going Forward

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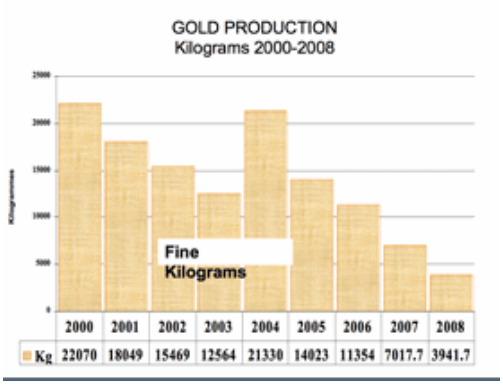
I have been requested to present to you the obvious, as we have experienced the challenges facing our industry first hand over the past 10 years or so. The Zimbabwe mining industry has been subjected to an adverse operating environment that has eroded a production base once considered one of the best in Africa. A mixture of poor policies and inconsistent application of these policies has presented considerable challenges in the operation of mines, resulting in declining production levels for almost all minerals.

The abandonment of ESAP around 1996 created the foundation for the problems that has faced the economy to this day. Although government produced a number of economic blue prints that included the ZIMPREST 1996-2000, the Ten Point Plan, Millennium Economic Recovery Programme (MERP) 2000 (18 months programme), National Economic Revival Programme (NERP) 2003 – 2004, Macro-Economic Policy Framework 2006 and the National Economic Development Priority Programme (NEDPP) 2006 – 2007, these initiatives failed to provide the needed bedrock for the economic development of the country. These economic blue prints all held similar focus of controlling government expenditure, reform of public

enterprises, civil service reform, trade and exchange market liberalization, support to productive sectors among others.

It appears that government was unable or unwilling to implement the policies contained in these blue prints. In some cases there was reversal of policies as in the case of civil service reform, exchange market liberalization and trade liberalization. The establishment of an incomes and pricing commission dealt a final blow to the concept of free trade.

These developments impacted on all sectors of the economy and the mining sector was not spared. Factors that affected the mining sector most included the overvalued exchange rate, shortages of foreign currency, electricity supply interruptions, delayed payments of revenue due to gold producers for gold lodged with Fidelity Printers and Refiners and the skills flight.



	2000	2001	2002	2003	2004	2005	2006	2007	2008
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In this environment the institutions that regulate the mining industry became more unresponsive to issues affecting the industry. This was due to loss of professionals within government structures and a general apathy that pervaded the institutions.

On the legislative front, the notice to amend the Mines and Minerals Act given in 2004 has to date not been completed. This created an air of uncertainty regarding the security of investment and the intentions of government. Although the mining sector was invited to participate in the formulation of the amendments government was not too keen in revealing their position or to engage the private sector in real debate on these amendments. The product that went to parliament expounds significant differences to the ideas proposed by the private sector in some instances.

The supply sector has been greatly eroded by the shortages of foreign currency on the official market. This has affected walk-in customers more as large-scale operators provide foreign currency for importation of their requirements or import on their own. The restocking of industry requirements, given the global credit crunch, will take time.

Training and academic institutions have been unable to carry out their mandates. The low remuneration levels availed to lecturers and other critical staff has been a major disincentive in the generation of competent graduates. The country is unable to provide the human capita needed to turn around the economy. Given the global shortage of skills and professionals for the mining sector, the attraction of the needed capital will be a big challenge. The way forward is to train now for our future requirements.

Attracting investment will be a challenge given the cut backs in production currently being experienced worldwide. The world economy is expected to start turning around by the third quarter of 2009, if not later. This provides an opportunity for Zimbabwe to lay down a credible track record on policy application that is needed to provide confidence to investors.

The Indigenisation of the Mining Sector in Zimbabwe, A Reality Check and Practical Perspective

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The talk centres on the hype that has been generated in indigenising the mining sector. It will touch on how ripe (if at all) we are for this eventuality, the opportunities, the hurdles, stakeholder participation and a practical perspective of how I see this subject going into the future.

The political dispensation in the country has been quite dynamic in the past decade or so with a number of government initiatives aimed at fulfilling the general aspirations of the Zimbabwean people. One aspect that has received enthusiastic attention from both government and the populace is the issue of indigenising the economy. Land Reform is one such initiative, albeit with varied perceptions as to its intentions and success.

Of late the thrust has been turned towards 'Indigenising the Mining Sector' and a lot of hype has been created about this eventuality that will see the generality of the Zimbabwean populace claim ownership stakes in major international mining houses operating in Zimbabwe.

This paper is meant, not to dissuade or side track such noble causes equitable on wealth redistribution, but to unpack the practicalities inherent in such an initiative in current Zimbabwe.

To help follow my argument and perspective, we need to answer a number of pertinent and practical questions, namely:

1. **How many international mining houses are currently operating in Zimbabwe that could be targeted for indigenous takeover or participation?**
   The moment one starts to count on their fingers in an effort to answer this question, the level of excitement about mine takeovers starts to diminish. This head count will show that less than a dozen major mining houses are operating in Zimbabwe today and, in those that exist, some level of indigenisation effort or initiative has already been taken. That leaves no room for the "povo" to participate. Let us check a few organizations that come to mind.

   - **Zimplats**
     In a bid to amass empowerment credits, Zimplats has offloaded some off its platinum concessions on the Great Dyke to Government, which in turn has brought in the Russians and Chinese to explore and develop these assets. There is also the 15% stake that is subject to acquisition by a local consortium. So, it looks like there won't be any joy at Zimplats for those waiting for the indigenisation of the Mining Sector.
   - **Rio Tinto**
     Rio Tinto has restructured into Rio Zim, which as the name implies is a local company that has gold and refinery assets. Murowa diamonds still falls under Rio Tinto Inc but has Rio Zim as a shareholder, so can already be considered indigenised. There is no immediate joy at Rio Tinto, if you were eyeing it.
   - **Zimasco**
     Without having the finer details to hand, we know that this company has been recently bought over by an international investor who has taken up the majority stake, and management participation has been mooted there, bringing no luck at Zimasco.

- **Falcon Gold Zimbabwe**
  Falcon Gold is 85% wholly owned by AIM-listed Central African Gold with the balance of 15% being held through the Zimbabwe Stock Exchange, hence it is already indigenised to some extent.
- **Bindura Nickel Corporation**
  The nickel miner is already compliant if one takes a look at the shareholding that includes Zimbabweans and a pan-African composition
- **Metallon Gold Zimbabwe**
  Being owned by a South African indigenous entrepreneur in the mould of Mzi Khumalo, it remains to be clarified if this major gold producer falls into the category of a 'foreign owned' company.

2. **Who holds what in terms of mining claims?**
   The Mines and Minerals Act has made the acquisition of mining claims an 'over the counter process' with nearly everyone in Zimbabwe knowing someone with a mining claim. To this extent more than 60% of the Certificates of Registration that are already issued are held by indigenous Zimbabwean individuals or companies. So, the issue is not about having access to mining title by indigenous Zimbabweans, but about the value of the mining title that they hold.

   Most locals are sitting with mining title that they know technically little or nothing about. Real empowerment lies in realising the full value of what the people hold in their mining claims.

3. **Who funds mining activities in Zimbabwe?**
   The mining houses that are the target for takeover or indigenous participation are funded from shareholder's money, retained profits or debt money. The financial services sector worldwide has played a pivotal role in funding mining activities through some commercial arrangement. In Zimbabwe the financial services sector has been quite distant in funding the resources sector as they rightly perceive this to be high risk.

   As a result this funding window has seen players from South Africa, China, India and elsewhere dominating the funding and uptake of available mining projects in Zimbabwe.

   I have always argued that, in the same vein that the farmers have Agribank, the miners in Zimbabwe deserve a Minerals Bank that would be fully staffed with geologists, mining engineers, metallurgists and economists who could evaluate and recommend projects for funding. This phenomenon is not new as in South Africa you have banks such as Investec, Nedbank, ABSA and the Standard Bank with mining investment desks to take advantage of the opportunities arising in the resources sector.

4. Food for thought

The real empowerment in the Zimbabwean mining sector will need to dovetail technical know-how with the access to funds for the more than 60% of mining claim holders that are Zimbabwean, and NOT rely on targeting the few existing going concerns. The financial services sector has a big opportunity to tap into the under-serviced mining industry and to play their part in its real empowerment.

Inherited Drainage? A Control on Groundwater Flow

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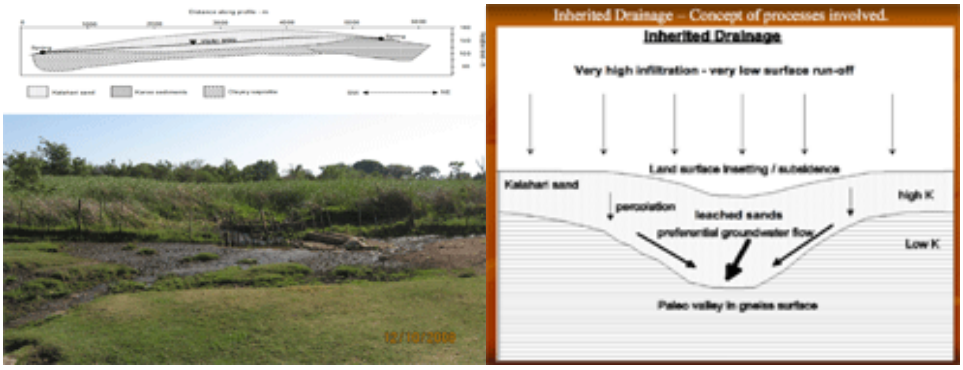

Dafuya Spring, Lower Gweru with processes concept

Some pointers in Planning and Executing a Drilling Programme for Resource Evaluation Purposes

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A resource-evaluation drilling programme should be executed with thought and precision in the initial stages to allow for all the data to be used in future resource evaluation exercises. A qualified person, a geoscientist with over 5-years experience in the relevant mineral should oversee all stages of the programme and be prepared to commit to signing off the final report. A resource model aims to give the best possible estimation of grade given the information available at the time. The primary information used is drilling.

The following factors are considered essential:

1. **Location of drill holes** – this includes an accurate survey of the collar location in relation to the local grid and down-hole surveys. Unknown deflections can distort the 3-D model and hamper the geological interpretation, as can inaccurately placed holes.
2. **Geological Interpretation –** which hangs together from section to section. Generally if there are some uncertainties, more drilling is required and statistical methods tend to give inconclusive results.
3. **Grade** – drill sampling should be done accurately and methodology recorded well. Duplicates and standards inserted will give the accuracy and precision of the assay laboratory, which should have some form of recognised independent accreditation.
4. **Densities –** have a considerable influence on the tonnes of rock and the tonnes of contained metal. These should be measured for different lithologies and oxidation states.

Deep drilling on the Great Dyke – the agony and the ecstasy

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Zimplats' Ngezi Mining Lease (ML27) was extended some 27 km north of Portal 10 into an area that differs from the southern Ngezi portals that are currently being mined in that a much higher level of stratigraphy in the Great Dyke is preserved. Among the rocks that the Dyke intruded in this area are greenstones lithologies that contrast with the granites that dominate elsewhere. Numerous xenoliths and roof pendants are preserved especially in the northern part of ML27 Extension and the effect of these on the PGM-bearing main sulphide zone (MSZ) is not understood. Very little past drilling was carried out and the majority of it was scattered along the edge of the dyke with a cluster of holes existing around Rio Tinto's Zinca trial mine dating from the early 1980s. The bulk of this deep drilling area therefore has no prior control.

The deep drilling programme was therefore initiated with the following as some of the objectives:

- To give an understanding as to the influence on the MSZ of the inclusions of the country rocks
- To give insight into the ultimate depth of the MSZ in the deep areas
- To confirm the disrupted profiles in the extreme west and to allow the limits of this area to be refined whilst possibly allowing the extent of the disruption to be deduced.
- To give some information regarding the nature of younger dolerite intrusions, but the drilling resolution is too coarse to give any details regarding local intrusion and disruption.

The deep drilling programme targets 24 holes with a 1-km spacing between holes along 3 lines that are 8 km apart. In the 12 holes have been drilled so far, a lot of departures from the norm have been noted where in some cases the results have raised more questions than answers. The 12 holes drilled comprise 7 along the southern line and 5 along the central line. The following are some of the issues encountered.

1. Compression of the P1 pyroxenite in the west
2. Unusual lithologies (intrusions)
3. Hybrid rocks
4. A deeper than anticipated MSZ
5. Atypical MSZ geometry with a possible departure from the circles model
6. Sampling complications
7. Other drilling challenges

Even more departures from the norm are expected in the northern line of holes as there are numerous roof pendants in this area.

Open Pit Operations and Grade Control at Ngezi Mine

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Zimplats' Ngezi Mine operates three underground mines and an open pit. The open pit is the first PGM operation of its kind in Zimbabwe and presented its own challenges with respect to mining and grade control.

Large volumes of materials are moved and an average of 90 000t of ore is produced monthly. The open pit started operations in June 2001 and production started in December 2001 with a designed ore to waste strip ratio of 1:12.
The grade control protocol faced a lot of challenges in managing faults, intrusions and dilution from the top and systems were put in place to manage these challenges, which have proved successful. An audit system was also put in place to verify the effectiveness of these grade control techniques.

Ngezi Mine Open Pit

Use of a Niton XRF instrument in determining the position of the BMSZ (Base of Main Sulphide Zone) in PGM Mining

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The Great Dyke of Zimbabwe, a layered igneous intrusion of mafic and ultramafic rocks, hosts PGMs in the first cyclic unit of the ultramafics (P1 unit). PGMs are associated with base metal sulphides (pyrrhotite, pyrite, chalcopyrite and pentlandite) with a base metal sulphide profile showing three major peaks from the mafic/ultramafic contact, two in plagioclase websterite and one in plagioclase pyroxenite, which is in the Main Sulphide Zone.

Marking of the BMSZ, which coincides with the platinum peak has been a challenge, which led to the application of the XRF instrument as an aid to BMSZ marking. Visually, the BMSZ is marked by a significant tapering off of base metal sulphide content from around 10% to about 2% at the base.

The XRF machine emits x rays and thus should be treated as a weapon, never to be pointed at anyone, but always downwards.

Cu and Ni readings as path finder elements are taken along a marked profile at 5 cm intervals from the h/w to the f/w of the MSZ or along a sampled cut channel. These are then used to determine the position of the BMSZ where the Cu, Ni values tapper off. Profiles are marked at 3 metre intervals avoiding the following zones

1. Joint planes sub-parallel to the decline or face.
2. Altered zones.
3. Closely jointed zones.
4. Faults.
5. Shear zones.
6. Dykes

The XRF and laboratory values show a low correlation but in both data sets there is a marked drop of Cu and Ni values at the BMSZ, thus the XRF instrument is found practical in marking the BMSZ rapidly and cheaply.

Todal Mining Overview

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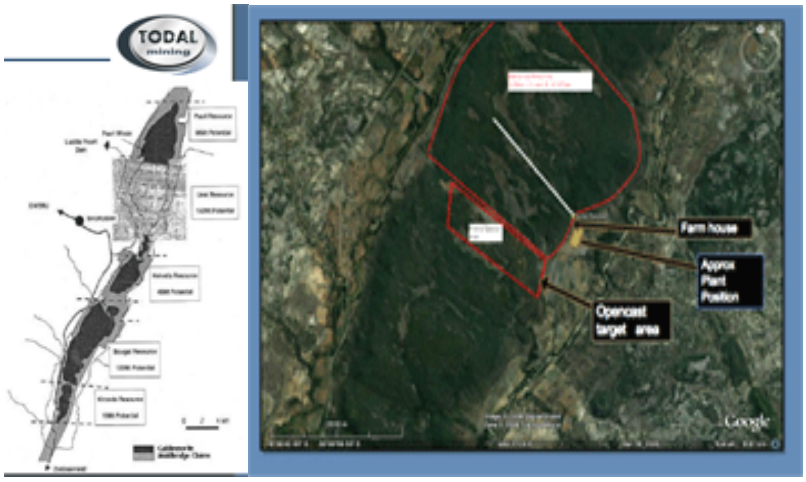
Todal Mining Private Limited was incorporated in April 2008, as a joint venture between the Zimbabwean Mining Development Corporation (ZMDC) and Central African Mining and Exploration Company Plc (CAMEC). CAMEC is a diversified mining company with mining operations and exploration ventures in the Democratic Republic of Congo, Mozambique, Zimbabwe and the Sudan.

Todal's primary purpose is to develop the 18 km^2 of platinum mining claims, located near Shurugwi, collectively registered as the Bougai and Kironde claims. The mining claims were acquired by the Government of Zimbabwe from Anglo American Plc (Anglo), as part of the Government's Indigenisation and Economic Empowerment policy.



Based on historical work conducted by Anglo the mining claims contain mineral resources in the order of 135mt of PGMs @ 3.5g/t (4E) with economic traces of nickel and copper. The mineral resource is relatively shallow, at a maximum depth of approximately 200 metres.

From an initial evaluation the resource lends itself to relatively quick and easy development due to the proximity of tarred roads, power supply, water resources and a ready labour source in the towns of Shurugwi and Gweru. As such Todal intends to expediently establish an operating mine. The mine could conceivably be setup to produce 140,000 tpm of ore, given the nature and extent of the deposit. The prospect has been named the Bokai Project, after a prominent hill of spiritual significance in the area.

Todal intends to complete a bankable feasibility study by early 2009, from which a mine construction timetable will be determined.

To this end, some 4,000 metres of diamond drilling has already been done to evaluate the deposit, though the resultant assays are yet to be evaluated. Preparation of an environmental impact assessment is well advanced. Mine design and metallurgical plant designs have been commenced. And discussions have been brokered for the concentrate off-take arrangements.

Amari Manganese - Kalahari Manganese Field

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The entire Kalahari Manganese Field in South Africa was held by Samancor and Assmang and their respective predecessors from the 1920's. As a result the field saw relatively little exploration and exploitation as is evidenced by South Africa accounting for only 20% of world manganese production whilst holding 70-80% of the world's high-grade resources. The introduction of the South African Mineral and Petroleum Resources Development Act No 280 of 2004 (SAMPRDA) resulted in the opening up of the Kalahari Manganese Field to other players. Notable new entrants were Renova and Arcelor-Mittal.

During October 2007 Amari Resources International Ltd (Amari) acquired a 74% interest in the manganese prospecting rights held by Pico Diamonds (Pty) Ltd (Pico) and Adistra, with 26% being retained by its BEE partners, Pico and Adistra. Amari Manganese now holds the manganese prospecting permits for five farms in and around the Kalahari Manganese Field. However, only two of these overlie manganese deposits at economically exploitable depths, namely Kongoni 311 (Kongoni) and Boerdraai 228 (Boerdraai).

The Kalahari Manganese Field is a compact, approximately 30 km by 15 km, deposit that houses 70% to 80% of the world's high-grade manganese resource located some 300 km north-west of Kimberley in the Northern Cape Province of South Africa. The area is very well served with infrastructure since manganese mining operations have been conducted in the area for the past 50 years along with the large-scale iron ore mining at Sishen, approximately 30 km to the south.

The manganese deposits of the Kalahari Manganese Field occur within the Hotazel Formation of the Transvaal Supergroup. The Hotazel Formation comprises banded iron-formation interbedded with three manganese horizons. Of these, the lower five to six meters of the Lower Body normally represents the economic ore horizon. On Kongoni, economically exploitable Mn ore also occurs in the Upper Body. The ore horizon varies in depth below surface from 300 metres in the east to more than 1000 metres in the west on Kongoni.

Amari Manganese is currently conducting a pre-feasibility study (PFS) for Kongoni and is drilling on Boerdraai.

Soil Geochemical Exploration (Burkina Faso – Case Study)

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Soil geochemical exploration is one of the important tools used in modern mineral exploration. The technique needs sufficient background information for a correct analysis and interpretation of results. A good understanding of the geomorphological setting of the area is key to an effective use of geochemical exploration.

A lot of false geochemical anomalies have been generated and because of ignorance, further exploration has unnecessarily wasted the time and money of many exploration companies.

Goldsearch Technical Services was contracted to do an evaluation of some geochemical targets in Burkina Faso and shall use this exercise to show some of the mistakes that can easily be made in geochemical mineral exploration.

It was observed that the area in question has transported massive ferricrete overburden ranging in depth from 1 to 5 metres. The massive ferricrete overburden had a sharp contact with the highly sheared metapelitic sediments (mainly slates) below. The zone reflecting the geochemical anomaly has an average depth of ferricrete of about 3 metres.

The ferricrete overlying the highly sheared metasediments has the following implications:

- The soil geochemical sampling was done in the lateritic overburden, which does not have a genetic relationship with the sheared metapelite. The depth of sampling pits observed rarely exceeds 50 cm. This implies that the assay values produced are not a reflection of the gold content of the targeted shear zone but of the transported ferricrete horizon. On this basis, the geochemical soil sampling done is discredited as representing information relating to the target.
- Gold in shear zones is mostly syn-deformational. This means that gold is emplaced during deformation. The massive ferricrete implies that it was emplaced after deformation took place. This further rules out any genetic relationship of the laterite horizon to the shear zone.
- The soil geochemical sampling was also done in an area disturbed by extensive artisanal panning, which also targeting only the ferricrete horizon.

Breakthrough in the Analytical Performance of Hand Held XRF

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Bruker announced a technology breakthrough with the introduction of the new TRACERturbo^{SD} , the world's first handheld X-ray Fluorescence (XRF) instrument that uses a Silicon Drift Detector (SDD) for dramatically improved speed, sensitivity and resolution. Bruker's industry-leading proprietary XFlash™ SDD, previously available only in high-performance laboratory XRF instruments, now offers unprecedented speed and analytical specificity when integrated into the novel handheld TRACERturbo^{SD}.

With this announcement, Bruker builds on its long tradition of being the technology leader in the handheld XRF industry.

This detector will provide a major improvement in the analytical performance of handheld alloy analysers. The measurement precision will be improved by a factor of two to three times, in addition to making the measurement of light elements such as Mg, Al and Si possible when operating in air mode. This breakthrough technology has previously been available only in large laboratory analysers. The TRACERturbo^{SD} will provide a new capability of measuring aluminum in titanium alloys and magnesium and silicon in aluminum alloys, with no vacuum or helium required.

Now all handheld XRF customer segments can benefit from these compelling performance advantages in their analytical work.

Advantages:

- Fastest alloy ID on the market!
- Measure Mg, Al & Si without vacuum or helium attachments
- Provides grade ID and chemistry
- Largest alloy library on the market
- Bruker-NASA patented vacuum attachment gives best precision & accuracy

Mapping and Inventory Unit – Forestry Commission

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Until recently, Zimbabwe did not have comprehensive information on the distribution of the vegetation resources at national level. The few existing maps were either too coarse for macro-level planning or were related to intensively managed forest areas. For example the Wild and Barbosa (1968) map produced at 1:2.5 million-scale is based on the floristic potential and not the actual extent of vegetation cover.

The Zimbabwe Forestry Commission in conjunction with the German Development Co-operation (GTZ) launched the Vegetation Resources Information System project in June 1993. The overall goal of the project is to establish a Vegetation Resources Information System (VegRIS) for improved planning, management and sustainable utilization of vegetation resources in Zimbabwe. This information system will allow effective and continuous updating of vegetation data, which are important for decision making in environmental policy, land reforms, and forest management in Zimbabwe.

The main objectives of the VegRIS project are to:

- produce national woody cover maps at 1:250 000 and 1:1 000 000 scales
- establish a digital database of the woody vegetation cover;
- develop methodologies for monitoring vegetation changes;
- develop methodologies for local level inventories;
- strengthen institutional links for sustainable management of natural resources;
- disseminate the resulting information.

The project uses modern tools such as Satellite Remote Sensing (SRS), Geographic Information System (GIS) and Global Positioning System (GPS) in order to provide most up-to-date information on the country's vegetation resources. The project was scheduled to last four years, divided into two two-year phases. During phase I, baseline information was generated whereas Phase II was targeted for user oriented applications such as change detection, local level inventories and land use planning.

Ultra-Detailed Aeromagnetic Surveys – New insights into the Perseverance Nickel Belt.

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Developments in miniaturisation of aeromagnetic systems, and new non-metallic aircraft construction, means that lightweight payloads can now be mounted on a new-generation composite aircraft. These fibreglass aircraft have few magnetic parts and provide a very low-noise platform for aeromagnetic equipment. The new aircraft, with stall speeds below 40 knots, are well suited to flying "low and slow" surveys to obtain highly detailed data. Data density of 50m x 5m is easily achieved.

Data from the Perseverance nickel belt gives detail down to individual layering in the Perseverance ultramafic sill, and is allowing re-interpretation of geology and structure in the belt. In particular, repetitions of the ultramafic body may lie concealed below Deweras cover.

Structural Setting and Control of Gold Mineralisation in the Eastern Limb of the Harare Greenstone Belt

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The Harare Greenstone Belt (HGB) is a typical gold-quartz vein district. The Eastern Limb of the HGB is separated from the north-western limb by the south-western extension of the Umwindsi Shear Zone (USZ). It is dominantly composed of metamorphosed basaltic and subsidiary ultramafic rocks of the Arcturus Formation.

Three major increments of regional deformation are interpreted in the district. D_1 is essentially represented by tight to isoclinal folding on easterly axes. D_2, which represents the bulk of the penetrative strain in the district, is characterized by NE- ENE trending fold axes accompanied by shearing, related to northerly to north-westerly directed shortening. D_3 has produced minor buckle folding with northwest axes.

Brittle ductile shear zones in the district are grouped into three orders. The USZ, a first order shear zone, is defined by 2 major sub-parallel shears up to 3-4 km apart. Striking in a north-easterly direction, this sub-vertical shear zone exceeds 100km in strike length. Second order shear zones are typically 3-6 km long and less than 300m thick; they are parallel to sub-parallel to the sub-vertical NE-ENE structural trend. Third order shear zones, to which gold-quartz veins are associated are less than 2 km long and typically several metres wide and are generally oblique to the structural trend.

The gold –quartz vein deposits consist of networks of 3rd and 2nd order shear zones made up of shear veins in, moderate to steeply dipping faults and shear zones, and dominantly easterly moderate – to steeply dipping extensional shear veins (mostly 3rd order).

The development of the gold-quartz veins and shear zones is attributed to a late increment of D_2 episode of regional deformation. Besides the D_2 regional control, local factors which may be related to the local geologic setting of the deposit influence the orientation and geometry of the vein networks.

The consistent geometric and kinematic relationships shown by the gold-quartz veins and associated shear zones provide some plausible predictive capacity that can be used to generate some geometric scenarios useful in efficient exploration for similar deposits.

History of Oil and Gas Exploration in Zimbabwe

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All known hydrocarbon occurrences in the world occur in sedimentary basins younger than 300 million years. This is the period when life started to flourish on earth. There are three sedimentary basins younger than this age in Zimbabwe. These are the Karoo (150-300 million years), Cretaceous (50-140 million years) and the Kalahari (4-50 million years) basins. The Karoo and the Cretaceous basins have received much interest in respect of their potential for hydrocarbons at different stages in the history of this country.

Save-Limpopo Basin

Following the late 1940's publication of a Geological Survey Bulletin describing some coalfields in the southern part of the country, several companies acquired EPOs to carry out exploration for that coal. EPOs 25, 30, 50, 112, 228, 393 and 492 gave exploration companies the rights to explore for hydrocarbons in addition to coal in the Save-Limpopo Basin. However, no reports of oil or gas encounters were reported although there were several drill holes sunk to explore for coal.

Project X, Gonarezhou National Park

Following the imposition of economic sanctions on the Rhodesian government by the United Nations, the government embarked on a secret oil exploration programme code named Project X in the Cretaceous Malvernia sediments of the Gonarezhou National Park from 1967 to 1971. The Geological Survey was tasked to carry out the surveys. Five hundred samples were collected for biochemical analysis, which purportedly indicated the presence of hydrocarbon micro-seeps in six areas. Of the six suspected seepages, one was considered to be positive. Following this, gravity, radiometric and seismic surveys were conducted. The seismic surveys indicated that the basin was neither folded nor faulted, which precluded the possibility of oil traps. A 1100 metre-deep hole was drilled to below the Cretaceous. Information from the drill hole was destroyed, although data available indicates that the results were considered insufficiently encouraging, and the project was abandoned.

Bembezi Forest prospect

The Bembezi Forest area in Nyamandlovu was investigated for hydrocarbons following prophecies by a Mr A. Hill. A drilling site in Insuza was selected where the presence of oil beneath the ground was forecast. An area 2500 hactares in extent was reserved under S.G. 555 in 1974 for the purpose of prospecting for hydrocarbons. Despite advice on the unlikelihood of oil being found in the area, at least in economic quantities, the company commenced drilling in 1975. No oil was discovered, but a new sequence of Proterozoic Lomagundi dolomites was recorded beneath a Karoo sequence.

Zambezi Valley - Mobil Exploration

After realization that the thickness of sediments within the Zambezi Basin could be attractive as a hydrocarbon play, Mobil Exploration acquired a licence over an area of 30 120 km^2 to explore for hydrocarbons between 1989 and 1993. The exploration generated a wealth of information including: the thickness of the basin; the potential for reservoir conditions with abundant favourable parameters; that possible traps are scarce; that the most widespread source rocks are carbonaceous shales and coal; the identification of possible source rocks with liquid potential, although limited in extent. Mobil Oil concluded that the area is high-risk and gas-prone. This was corroborated a German Geological Survey (BGR) expert who analysed the Mobil data and who carried out extensive supportive field work. The eastern part of the Zambezi Basin (Cabora Bassa) was considered to have a capacity for 226 x 10^9 m^3 of recoverable gas and 95.4 x 10^6 m^3 of recoverable condensate. In total, a conservative estimate of 614 x 10^9 m^3 of recoverable gas was given for the whole of the Zambezi Basin.

Microbial Prospection for Oil and Gas (MPOG)

Geo Associates, a local company has applied for Special Grants to explore for hydrocarbons in the Karoo and Dande sediments of the Lower Zambezi Valley and within the Cretaceous Gonarezhou Plateau Beds using microbial-based oil exploration techniques known as Microbial Prospection for Oil and Gas (MPOG) that was developed in the former East Germany. The basis of MPOG is that oil and gas fields emit a continuous stream of hydrocarbons at the earth's surface. Certain bacteria feed on these. MPOG exploration involves searching for areas with the anomalous occurrence of these bacteria. This method has been found to be very successful, with rates of well over 90% being recorded in test areas.

Coal Bed Methane

Coal bed methane is a gas that is generated during the process of coalification. Much of the gas remains adsorbed within coal cleats. All our coal locations have potential as methane gasfields, but there are certain physical conditions required for coal to allow gas production. The combined surface area of these coal cleats in deeply buried seams carry gas quantities that are many times more than can be recovered from conventional sandstone gas and oil fields. Coal bed methane has been utilised successfully in the USA since the 1970s. In Zimbabwe, Shangani Energy Exploration pioneered exploration for CBM in the early 1990s in the Lupane area. Fieldwork and laboratory analyses have indicated a world class CBM resource. Conservative estimates for the Lupane area indicates gas resources in excess of 100 000 million m^3.

Post-independence refuted oil discoveries

Claims of supposed oil discoveries have been brought to the attention of the Geological Survey on several occasions and records abound in the technical files. Oil has been reported from the

most unlikely rocks, especially granites and gneisses. Most of these reports are made by persons claiming to have some divine or spiritual powers. Such people have proved to be very difficult to work with as they disbelieve or mistrust scientific explanations. However, all finds of this manner have been proven to be unfounded, and these reports have merely resulted in being a waste of time and effort to both those concerned and to the Geological Survey. The most recent such report is a claim by a spirit medium that pure diesel oozes from rocks close to Chinhoyi, a most unsuitable geological environment, as the rocks are very old and metamorphosed. Another report in the late 1990s was from a Murehwa spirit medium who went on to hire a drilling rig despite advice against doing so. Other reports investigated by the Geological Survey in recent years include those of oil at Tsungai School in Highfield, and in the Buhera, Rusape, and Hwedza districts.

Archean Komatiitic Sill-hosted Chromite Deposits in the Zimbabwe Craton

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Abstract

Lenticular chromite deposits of widely varying age, metamorphic grade and strain rate, as well as size, shape and ore quality, are widespread in greenschist to amphibolite grade greenstone-gneiss terrain in the south-central part of the Zimbabwe craton and in granulite grade equivalents in the Northern Marginal Zone of the Limpopo Belt in the far south. In order of age and, very approximately, decreasing abundance, they form three groups: (1) early Archean (3.5-3.2 Ga) deposits associated with amphibolite grade greenstone remnants in the 3.6-3.35 Ga Tokwe gneisses (e.g., Hornet, Valley) and on the amphibolite grade eastern flank of the Shurugwi greenstone belt, and granulite grade greenstone remnants in the Northern Marginal Zone (e.g., Inyala, Rhonda), (2) mid-Archean deposits within the ca. 3.0 Ga Shurugwi Group in the main greenschist part of the Shurugwi belt (e.g., Peak, Railway Block) and associated with the ca. 3.0 Ga Belingwean Supergroup in several other belts, and (3) late Archean (ca. 2.74 Ga) deposits mostly in the western segment of the Masvingo belt (e.g., Prince). With their host and country rocks, the deposits together preserve geological and chromite compositional evidence of formation within poorly differentiated, komatiitic sills intruded into predominantly siliciclastic-BIF platformal sedimentary sequences associated with mafic and/or ultramafic lavas. Unlike the thin, laterally extensive chromitite layers associated with macrocyclic units of large layered intrusions, the komatiitic sill-associated deposits are the remnants of laterally discontinuous, (up to several tens of metres-) thick chromitite layers or dunite-chromitite zones located at high stratigraphic levels of their host intrusions not far below the upper pyroxenite differentiates. In at least some deposits, for example at Railway Block where the chromitites form narrow, elongate bodies at least 1000m long, the lateral discontinuities are most likely primary; in many others, later deformation obscures the primary geometry. Chromitite formation may have been delayed by the late attainment of equilibrium crystallisation and the reduced nature of the magma. The crystallisation of thick, massive, cyclically-layered, Cr-rich chromitites was most probably controlled by the stabilisation of chromite relative to olivine by absorption of connate water derived from wet host sediments and by episodic, flow-through processes which, at Railway Block, may have been focussed along narrow pathways across the magma chamber floor. The remarkable abundance of such chromitites and their formation in repeated episodes over 1000 m.y. (*cf.* other cratons) can be attributed to generation of komatiitic magmas in a mantle source that was both Cr-rich and strongly reduced. Archean komatiitic sill-hosted deposits constitute a third type of chromite deposit beside stratiform and podiform deposits in layered intrusions and ophiolites, respectively. The economically-important variability of bulk ore compositions (especially Cr, Fe, Al, Mg) is due to several factors: magnetite introduction during

serpentinisation and talc carbonate alteration at greenschist grade, subsolidus fluid-related and other metamorphic cation exchange processes (dependant on chromite body size), and, possibly, exsolution of Cr-Al and magnetite phase pairs, both at mid-amphibolite to granulite grade, as well as fluid-related retrogression and partial conversion of chromite to (mainly) chlorite during amphibolite metamorphism.

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Nyanga archaeology – no evidence to support mining activity

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Geology is not the key to understanding the archaeology of Nyanga. The proud agricultural and architectural history of the Ziwa and Manyika people is (Chikuhwa, 2004). They have no history of mining: Swan (2008) discusses the pre-colonial processing of gold, which she says was 'confined almost entirely to elite sites of the Zimbabwe tradition'. The process involved melting mined or panned gold in an open potsherd used as a crucible. Gold artefacts and evidence of gold working has been found in a number of elite sites on the Zimbabwe plateau, but none have been found in the Nyanga terraces. Iron extraction did occur in Nyanga, mainly to support the complex agricultural technology that society had developed (Chirikure and Rehren, 2004). At the major Nyanga archaeological site of Ziwa, only iron and copper artefacts have been found (Summers, 1952). There are no mines in Nyanga District on a map of the distribution of gold mines dated prior to 1890 (Swan, 1994). Estimates of the timing of settlement in the Nyanga area are usually in the fifteenth to seventeenth century for the upland culture and the eighteenth and nineteenth centuries for the lowland culture, including Ziwa (Summers, 1958; Beach, 1994; Chirikure and Rehren, 2004). If the terraces and pits structures had been used for gold processing this would have been remembered in oral history and probably also recorded by Portuguese or British explorers, both of whom were heavily invested in the trade and search for gold in Zimbabwe.

Kritzinger (2008) presents a qualitative comparison of terrace occurrence and underlying lithology. Although no figures are presented, it is argued that dolerite "is the formation most favoured by the terrace builders" and that this can be correlated with the Chimanimani supergene gold mineralisation. First, it should be noted that although a greater proportion of land over dolerite which was terraced, compared to the proportion of land over other lithologies (Soper, 2000), most of the terraces, by total number, marked on the geological map of Nyanga are on steep-sided slopes in Archaean adamellite (Stocklmayer, 1978). Soper (2000) explained the greater proportion of land over dolerite that was terraced (compared to other lithologies) as being a result of farmers preferring to cultivate the more fertile dolerite soil. This explains the distribution of terraces far better: dolerite soils were preferred for farming, and dolerite sills form natural terraces, such as those south-west of Nyatsundzuru. However, other soil types are by no means unsuited for farming and thus we find terraces on them as well.

By Kritzinger's argument, it would be expected that terraces should be observed on or downstream of dolerite. However, terraces have been mapped in some areas such as the Udu Valley where dolerite is absent. Kritzinger goes on to say that terraces were built over granitoids

(gneisses, granodiorites, and tonalites) as a "secondary choice" and also on Umkondo sediments and links these two Nyanga lithologies to gold mineralisation. However, this is unhelpful as dolerite, granitoids and Umkondo sediments together comprise the full extent of the major lithological units in the Nyanga area (Stocklmayer, 1978; Love, 2002) and Kritzinger suggests that any of them could be auriferous. The absence of terraces from a non-prospective lithotype would support the "mining perspective" but no such case has been found.

It is necessary at this point to clarify some issues on gold mineralisation. Firstly, the gold of the Chimanimani gold rush occurs as secondary supergene mineralisation in laterites (e.g. Mupaya and Mangezi, 2004). That these occur above dolerites is not surprising because laterites are residual deposits of iron and aluminium oxides, readily derived from dolerite, produced under intense tropical weathering. They may well retain other resistant minerals such as gold, not necessarily sourced from within the dolerite. Any comparisons with Chimanimani should therefore be on the basis of laterite, not dolerite occurrence. Primary gold deposits are unknown in Zimbabwean dolerites, whose economic value comes from their use as monumental stone. Tilling *et al*. (1973) concluded that "the differences in gold content among common rock types (igneous and other) are simply too small, relative to the more than 1,000-fold gold concentration needed to produce ore-grade material, for any particular rock to be considered a more favourable source than another". For comparison with Australian dolerite-hosted gold deposits, the Golden Mile Dolerite gold deposit is in highly sheared rocks of the Archaean Kalgoorlie terrane (Golding, 1985). It is probably an extrusive deposit, and is metamorphosed and altered. Fourkoura is also developed in a highly sheared corridor of rock (Gryphon Minerals, 2008). These deposits are not comparable with the lack of metamorphism in the Nyanga dolerites.

Zimbabwean primary gold deposits are found in quartz veins and shear zones, almost entirely within Archaean rocks, unlike the Nyanga dolerites (Bartholomew, 1990). Kritzinger further confuses the issue by talking of placer gold deposition, which in Zimbabwe is known from recent river and elluvial deposits (e.g. Hlambelo, 2008) and is a completely different setting from both the Chimanimani supergene mineralisation and the classic hydrothermal mineralisation associated with Zimbawean granitoids (Oberthür *et al.*, 2000). If concentration of gold in placers were likely in Nyanga, we would expect to find extensive evidence in the mining of riverbeds – by far the best means for concentrating placer gold.

The finding that soil layers in most terraces have been transported and deposited is consistent with agricultural terracing: the capture of sediment and prevention of sediment loss is a primary purpose of constructing terraces for agricultural reasons (e.g. Bouman *et al.*, 2007). Similarly, the presence of a high coarse sand fraction in terraces is expected: coarser sediment fractions are the first to be deposited when overland runoff reaches an obstruction that decreases water velocity, such as a terrace.

The presence of cairns of stone in the environment of terraces and pit structures is also consistent with agricultural activity: the clearing of stones from fields during land preparation. If the cairns contained vein quartz that was not otherwise present in the locality, that could be evidence of transported rock or regolith; this is unclear from the evidence to date. It would be interesting to know what proportion of all cairns consist mainly of vein quartz. That magnetite is found in quartz veins is hardly surprising. It is a simple oxide of iron found in a wide variety of geological settings.

The occurrence of gullies along geological contacts is readily explained by the poor resistance of contacts to erosion – in the Eastern Highlands many of these contacts are non-conformities (Mukwakwami *et al.*, 2002). Many cliffs and waterfalls within the Nyanga National Park occur

along granite-dolerite contacts, e.g. Mutarazi Falls (Tyndale-Biscoe, 1957) and Nyazengu Falls (Love, unpublished data, 1999). No evidence has been presented suggesting gullies occur along quartz veins. It is unclear from the article whether the reported observation of quartz in some gully walls is (i) vein quartz, (ii) *in situ* as opposed to being present in the regolith, (iii) related to geological contacts and (iv) representative – it is not stated how many gullies were visited or in how many gullies quartz was observed. Many gullies occur along the sides of rivers. To suggest a relationship between quartz veins, geological contacts and gullies it would be necessary to demonstrate that the majority of gullies occur along the line of quartz veins and geological contacts, and are not controlled topographically or hydrologically.

It is impossible to interpret the soil assay data without the information normally provided with geochemical analyses: data on the sampling locations, how representative the sampling was, what analytical methods were used and what were the detection limits. A repeat analysis of the high values should be done before these results are used. However, since only three of the eight assay results are above 0.1 g t^{-1} gold, even this limited dataset does not support Kritzinger's claim that pit structures were "purpose-built for the recovery of gold". A comparison to the Central Rand gold dumps is invalid, as these are deposits from which the gold has been removed.

The current interpretation of pit structures as cattle pens (e.g. Garlake, 1966; Soper, 2000) places them at the centre of settlements. This has been demonstrated by the identification of hut circles, wall residues and other features at numerous pit structure sites, such as the reconstructed site near Nyanga (Rhodes) Dam. The furrows that carried to the vicinity of pit structures can be far more simply explained as satisfying domestic demand and providing water for irrigation of small gardens near the settlement (Soper, 2000; Chikuhwa, 2004). The latter practice continues to today in suitable terrains in Zimbabwe (Mwenge-Kahinda, 2007). It is not surprising that there were no dung deposits found in the pits. Farmers will have removed the dung to fertilise their fields – a widespread practice that continues today (Ncube *et al.*, 2007) – and subsequent erosion of the vacated sites would have removed the traces remaining. The terraces and pit structures are almost all built so that they are sheltered from the cold easterly and south-easterly winds. This suggests an agricultural reason for their orientation (Summers, 1958). The range of iron objects found in and around the terraces and other sites includes arrow heads, spear heads, knives and mbira keys, again suggestive of agriculture and defence.

In conclusion, none of the observations reported so far are inconsistent with natural processes and the agricultural interpretation (e.g. Summers, 1952; Garlake, 1966; Soper, 2000) of the Nyanga archaeological structures. Finally, it is important to remember that most of the sites being discussed are national monuments. Shumba (2003) expresses regrets on the deterioration of the strong spiritual and culturally important sites such as Ziwa to the local people, in recent times. Surely any attempt at mining, or even mineral exploration, would further erode this value to the community.

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News

Geology Department, University of Zimbabwe

Maideyi Meck

The situation at the Geology Department has not improved. There are now two lecturers left in the department, and 6 non-academic staff. There has been no intake for any level since 2007. Thus the department has only one stream of third years at present, plus three masters students who are at dissertation level. One candidate is registered for a PhD degree.

The current third year students have not been taught since August. The department used this last semester to cater for students from Metallurgy, Civil and Mining Engineering who had not been taught for the past three years. The department, however, did manage to carry out three field trips, two for second year students and one for the third years, assisted ably by Mr Gracious Chinoda. The field trips were funded by Zimplats and Cannister Resources through the Geological Society of Zimbabwe. All field trips were cut from 14 to 6 days duration in order to fit in with the funding available.

The department still requires assistance in order to carry out one last field trip. Support for field trips can be in cash or kind (e. g. protective clothing, food, fuel) as well as in human resources. The department is also appealing through the Society for help in teaching our third year students. The courses still to be taught are:
Advanced Igneous and Metamorphic Petrology; Geochemistry and Geochronology; Geotectonics; and Advanced Economic and Applied Geology.

The department has received several enquiries from former students who have been retrenched or who have been sent on forced leave due to the current world recession. If any company has any vacancies please contact the department.

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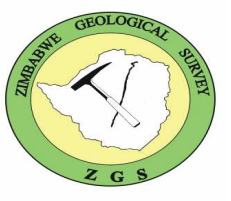
Geological Survey Department



F.B. Mupaya - Regional Geologist, Harare

The technical staff situation in the Department has remained critical with only 2 chief geologists in place, 3 geologists, 4 cartographers and 2 geophysicists. The Bulawayo and Gweru regional offices remain closed. It is sincerely hoped recruitment will be possible now that there is a budget in place.

By the end of 2008, the Department continued to receive inquiries relating to investment opportunities in mining in Zimbabwe, but this was less than in previous months due to the pending festive season. The following delegates were attended to: a Russian company, ARLAN, interested in developing brown-fields gold properties in Zimbabwe; some Namibian companies led by their Ambassador who were interested in various mineral projects. The Ministry of Mines continues to receive applications for EPOs and Special Grants but none are being granted. Most interest is in coal, but all coal basins are covered by Special Grant applications with few being granted. Therefore, exploration activity has ground to a halt due to failure to issue Exclusive Prospecting Orders. The mining industry is anxiously waiting for a clear policy on this issue and decisive activity from the Mining Affairs Board. The year 2008 ended with the global financial crisis affecting our mining industry. However, the gold sector in general has not suffered greatly due to a fairly price, but in Zimbabwe for reasons relating to non-payment by the Reserve Bank all major gold mines have been placed on care and maintenance.

The new year started well with all members of the Department back at work. However, everyone hopes the economic problems will now be cushioned with formation of the Government of National Unity. As the departmental estimates were submitted to the Ministry of Finance in foreign currency terms, it is possible that some of our objectives will be met if the funding materializes. Currently, officers are working on long-term projects involving mineral resources and they respond to miner's queries as they come up. The Director attended mining-related meetings in South Africa in February 2009: the 6th Plenary of the African Mining Partnership (AMP); the Mining Indaba and Organization of African Geological Surveys (OAGS) meeting. The plenary session was attended by mining ministers from 15 countries and also a delegate from the United Nations Economic Commission for Africa (UNECA). The meeting noted that the Heads of State of the African Union (AU) Assembly had endorsed the Declaration on Development and Management of Africa's Mineral Resources that was adopted in Addis Ababa on 17th October 2008 by the first African Union Conference of Ministers responsible for Mineral Resources Development. The meeting also acknowledged the Heads of State's consideration of the AMP request to be affiliated to the AU in their pronouncements, including that the Assembly welcomes the African Mining Vision and requests the AU Ministers responsible for Mineral Resources Development develop a concrete action plan for its realization. With all these plans on paper, it is hoped that practical activities on African co-operation on mining will see Africa

getting maximum benefit from its mineral resources.

The Mining Indaba had a number of parallel events starting with the Society of Economic Geologists followed by others like the World Bank cadastre, and a Ministerial Forum where various ministers from mining countries promoted investment in their countries. A lot of investment interest in Zimbabwe was shown, coinciding with the setting up of the Unity Government. However, most parties are waiting for positive political and economic developments in the near future to reassure their confidence.

The establishment of the organization of African Geological Surveys (OAGS) ushers a new dawn for geosciences across the African continent. It will provide a platform for African Geological Surveys to address the many developmental challenges that the continent is facing, including water sources, energy resources, mineral resources, geo-hazard mitigation and environmental management. One of the current presentations included Africa's input to the Geological Map of the World. The OAGS will help in preparations for the 35th meeting of the International Geological Congress (IGS) to be hosted in 2016 in South Africa. More details on the OAGS are available on their website: http://www.oagsafrica.org

Field evaluations this year have focused on several mining claims around Shurugwi and Gweru, which are owned by Fidelity Printers and Refineries. The preliminary work indicates the possibility of establishing worthwhile ventures in these areas. Gold milling centres were purchased in conjunction with the claims. Resuscitation of mining operations by Fidelity Printers and Refineries is aimed at increasing gold production. Chinese geologists working on the Zimbabwe-China co-operation project on geochemical exploration of the Umkondo Basin in Chimanimani finished phase 1 and a total of 9000 samples were sent to China for analyses. Follow up investigations on the anomalies will commence towards the end of the rainy season in 2009.

Mining Industry News

Fadzanayi Bornwell Mupaya

The mining industry has been greatly affected by the global decline in exploration due to the problems affecting stock markets, the major exploration driver. In the region, several exploration projects have been terminated. However, exploration in Zimbabwe had virtually stopped due to the non-granting of Exclusive Prospecting Orders (EPOs) by the Mining Affairs Board. This has meant that the country is now virtually covered by EPO and Special Grant applications. This will obviously have serious negative consequences on the anticipated renewed interest in our minerals industry given the formation of an all inclusive government in February 2009.

Mineral production has generally reached a record low for several reasons, some which could have been avoided. The country produced less than 40 kg of gold in November 2008 as most operations ceased delivery around October. This was largely due to the lack of mining capital as the Reserve Bank of Zimbabwe failed to pay mining houses for delivered gold. Several gold mines are reported to have flooded as companies found it difficult to maintain operations without capital inputs. It is going to be very difficult to resuscitate many of the mines without capital injection. There is likely to a big void in gold production in the country as the gap left by closed mines will not rebound immediately.

The new monetary policy availed by the Reserve Bank Governor has given some hope to the

ailing gold sector. Key to this policy is liberalization in the marketing of gold where producers forward their product to Fidelity Printers and Refiners for refining. After refining Fidelity will retain 7.5% of the gold whilst the producer has returned the remaining 92.5%, which it can sell to best advantage. While this is a positive move, the gold sector is still very concerned about the outstanding arrears, which the bank has converted into Special Tradable Gold-backed Foreign Exchange Bonds that can accrue an interest of 8% per annum. Of major concern is that many of the mines have over-borrowed and they need immediate capital to kick start their projects.

In the pipeline, as was reported in the *Herald* newspaper towards the end of January 2009, is the proposed relocation of about 5000 families from the Chiadzwa diamond fields to Transau Farm in Odzi. It is assumed, and sincerely hoped, that this move will pave the way for a properly conceived exploration and diamond-mining programme. This important national development will be welcome to the mining stakeholders as long as it is being implemented in strict adherence with the recommendations of a detailed Environmental Impact Study and within the rules of the Kimberley Process.

It has been reported in a local newspaper that Zimbabwe's small-scale mining industry might receive a windfall from some Indian investors who have targeted the sector for funding. We anxiously wait to see developments in this initiative. Small-scale mining desperately needs capitalization.

News about Zim Geoscientists

"**Faith and David Love**, ex Ashanti Goldfields and UZ, are living in Watford, UK. Well, to be more accurate, David is living mainly in the Channel Tunnel, going between Watford and Delft, in The Netherlands where he is trying to finish up his PhD. Faith is in Watford all the time as she must support David and Kathleen..."

Kevin Walsh goes by the extraordinary title of 'Executive Officer and Assistant to the Director' at Oxford University Museum of Natural History! He has been there since January 2000 (ten days after leaving Zimbabwe) in a variety of roles including display officer, IT support and Assistant Curator for Mineralogy (although he looks after the rock collections). He is just completing a major exhibition on Charles Darwin as well as displays on gemstones, and the geology of Oxford.

Ali Ait-Kaci is reported to have been continuing with his diamond exploration in Madagascar without too much worry. That is until the shooting happened. Look after yourself, Ali – no more Mayi Mayi.

Tom Blenkinsop is at the School of Earth and Environmental Sciences, James Cook University, in Townsville on the east coast of Australia. Tom is teaching structural and economic geology, and has been involved with research projects in Mount Isa, Western Australia as well as in Brazil and Papua New Guinea, mainly in hydrothermal gold and base metal deposits. The School of Earth and Environmental Sciences at JCU has research interests in economic geology, mine wastes and the environment, and marine science. There is also a vigorous numerical modelling group, which applies rock mechanics research to mineral deposits. The school has strong Masters and PhD programmes. Members of GSZ may be interested to know that the Zimbabwean diaspora thrives in Australia, and includes several former UZ graduates working in the mining industry.

Please provide us with news about yourself or other geologists. We need to keep in touch with all of you out there. **cmwatahwa@unki.co.zw** **or** **makari@zol.co.zw**

Research Funding Opportunities

GSZ Research and Development Fund

The objective of the Research and Development Fund is to give financial assistance for the development of earth science research and training in Zimbabwe. This financial assistance shall be in the form of annual Grants. Grants shall be made for activities over the course of up to one year. Those wishing to continue beyond one year must make subsequent and separate applications. The purpose of the Fund is to support:-

- Research projects on earth science topics of interest (Note that grants from the Fund will not be made to support projects which result in results that are not available to all members of the geological community in Zimbabwe);
- Scholarships for postgraduate study in earth sciences;
- Field trips and short courses for the training of Zimbabweans in earth sciences; and
- Travel to conferences to present earth science results.

In recommending the award of Grants, the following shall be considered:-

- The objective and purpose of the Fund;
- Potential benefits of the proposed activity to the geological and mining communities in Zimbabwe, in terms of development and/or the generation of new knowledge;
- The availability of matching funds, source or provided by the applicants; and
- The aim of awarding more than one Grant in a given year.

Grants made from the Fund shall be on condition that:-

- Results from the supported activity will be presented to the Society via a talk and an item or items in the Newsletter;
- Submission to the Fund Subcommittee of an annual report by 31 December of the year in which funding is granted; and
- Submission of a financial report to the Fund Subcommittee, with copies of receipts, by 31 December of the year in which funding is granted

All applicants for the award of Grants from the Fund shall be Members in good standing for the current membership year. Normally, the principal applicant should have been a member in good standing for at least twelve months.

Applicants for Grants should submit to the Research and Development Fund Subcommittee an application containing details of the applicants, summary of the activity, justification of the activity, proposed methodology, timeframe, budget for application and details of matching funds, if any. If you would like to apply for support, please contact the Research and Development Fund Subcommittee Secretary, Applications for this year should be made to the incoming Chairman, Mr Forbes Mugumbate.

SEG Timothy Nutt Memorial Fund

A message from Judith Kinnaird, Professor of Economic Geology at the University of the Witwatersrand, shows that the SEG has decided this year to award grants from the Tim Nutt fund to allow students to attend the international SEG-GSSA conference on Economic Geology in Johannesburg in July. Consequently no more funds are available for this year but will be available again in 2009.

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