



Winter 2007

Picks n bits



CSA Australia Pty Ltd
Geological & Management Consultants
to the minerals industry worldwide

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Kimberley's lead/zinc activity on the rise

CSA is currently working on an unprecedented number of lead/zinc projects in the Kimberley's.

With the re-opening of the Pillara Mine by TeckCominco and a strong push on exploration and evaluation at other projects it seems that this part of Australia will continue to be an important source of base metals into the future.

CSA has a long history of working in this area dating back to the mid 1990's with Western Metals and then TeckCominco when it took over the Lennard Shelf Operations. However, we are now working on several additional projects including:

- Koongie Park near Halls Creek for Anglo Australian Resources involving resource model re-interpretation;
- Napier Range near Derby for CBH Resources involving geochemical and geophysical exploration programs and diamond drilling;
- Sorby Hills near Kununurra also for CBH Resources including a re-evaluation of previous work, geochemical and geophysical surveys and diamond drilling leading to a scoping study;
- Manbarrum also near Kununurra (but in the NT) for TNG Limited involving resource definition and exploration programs;
- SE and Central Lennard Shelf for newcomers to the area, Avalon Resources, involving target generation and exploration planning.

The work programs under way are varied and cover the full spectrum of the exploration and evaluation cycle from target generation to metallurgical sampling.

The different stages that the projects are at enables CSA to move staff between the projects as and when different types of experience is required.

The new phase of work in the Bonaparte Basin north of Kununurra is particularly interesting because, if the



Devonian limestone near the old Cadjebut Mine on the Lennard Shelf in the Kimberleys. Similar limestone hosts most of the Kimberley's lead and zinc deposits. Here it is overlain by Permian sandstone. The limestone contains classic reef formations deposited in tropical seas but the sandstone was laid down by ice. Climate change is not a modern phenomena!

exploration is successful, there is the possibility of joint operations between the new Manbarrum project and the old Sorby Hills lead/zinc project originally found by Aquitaine in the late 1960s when searching for oil!

CSA senior staff members Simon Dorling, Stan Wholley, Wallace McKay, Nigel Wilson, Peter Muhling and directors Neal Reynolds and Jeff Elliott are all involved with this work.

Stan is particularly excited by the Sorby Project because "There are already large well defined lead resources and with the work we are doing this year there is potential to locate the long sought after zinc-rich components," he said. ☺

Further expansion at CSA offices

CSA has undergone significant growth over the past year and, with our expansion to another floor at 47 Burswood Road, it is fitting that our logo now appears on the office building.



New role for our man in Asia

Strong emphasis on community relations



After more than 10 years working in Asia Roy Elliott has jumped continents to take on an exploration management role for Azumah Resources Ltd at its Ghana gold project.

The work involves lots of fieldwork, which Roy loves, with technical support from Neal Reynolds (exploration management), Nik Sergeev (geochemistry) and the CSA Data Services team.

Azumah has a large ground holding in the prospective Wa-Lawra greenstone belt and is attempting to double the existing resource base to +1 million ounces.

To achieve this CSA has been brought on board to review the existing data, rank the targets and get on with the job of testing the prospects.



Introducing Wallace McKay

Wallace MacKay BSc (Hons), MSc, MBA, has been with CSA since March last year. In that time he has managed to cover a wide range of overseas projects.

These include Padaeng in Thailand, Albidon/Zinifex in Tunisia and Oxiana in Laos as well as several domestic assignments, principally the CBH Napier Range lead/zinc project in the Kimberleys.

“I like the range of work and countries involved in working with CSA,” he said. “They offer all sorts of different opportunities and challenges and it is great to be able to tap into the knowledge base of the other CSA people for support.”

Wallace has a 20 year background in basin analysis and structural geology and he has worked in a number of different areas and commodities in the past, including the Zambian Copper Belt, Ghana for gold and in the Pilbara and Northern Territory for iron ore.

Before joining CSA he was working on a PhD at The University of Tasmania on basin analysis which he hopes to finish soon. Wallace is looking forward to continuing to find new projects and places to go with CSA. ☀

With nearly 3000 square km the work will keep Roy and his team of nationals busy for some time.

When asked about his experiences so far Roy said “I really like the work in Ghana; there is a lot of potential here and the geology is familiar as the rocks are Birimian age which is the same as in Guyana where I did my PhD.

“On the cultural side, I enjoy working with local people and Azumah is proactive in ensuring communities benefit from our involvement.”

Although CSA has been involved in many jobs in Africa during the last twenty years, this is the first contract for CSA Australia in Ghana. It comes more than ten years since Roy was last on the second-largest and second most-populous continent. ☀

Longest ever CSA full time contract

Warren Woodhouse has just completed the longest full-time contract in CSA Australia's history.

The job lasted for four years and was with the Caijiaying Zinc/Gold Project in China. It commenced as a greenfield site in 2003 and is now a 500,000 t/a producing mine!



In fact Warren has been working on that project since he joined CSA in 1999 but initially in a part-time capacity - a remarkable story of persistence. His first work there was on trial underground mining when the orebody was discovered to trend at exactly right angles to what was believed.

Then followed a lengthy period of uncertainty as various studies were done to try to overcome the problems with ore geometry and come up with a new interpretation. This culminated in a limited seven hole drilling campaign in 2002 to test the interpretation, resulting in a revised resource estimate to enable a feasibility study to be done.

Most of this work was done when the zinc price was very low which only increased the pressure. However, as we have reported in these pages previously, it was all worth it and the mine has been one of the most successful new mines in the world in recent years. This is in no small part due to Warren.



Warren with the team that he helped recruit and train for the Caijiaying Zinc/Gold Mine in China.

Madagascar nickel search under way

CSA Australia is currently developing and supervising a major exploration program for nickel, copper and PGM on behalf of its long term client, Perth based explorer, NGM Resources Limited.

NGM recently acquired the Madagascar exploration tenements and database of BHP Billiton, covering a total area of 5,620 square km and representing a diverse geological and geographic terrane with project areas at Cap St Andre, on the northwest coast and Analalava on the northeast coast, Andriamena, north of the capital Antananarivo, and Maralambo, on the central east coast.

Madagascar is not a destination that is well known to most Australians. Along with other east African nations, Madagascar has been going through a major political and economic transition since 2000 and this has resulted in increasing interest in exploration and mining projects.



The economy of Madagascar is predominantly agricultural with mining exports restricted to chromite, graphite, mica and precious and semi-precious stones. However, there are major projects under development that include mineral sands in southern Madagascar at Fort Dauphin and Toliara and lateritic nickel at Ambatovy.

CSA will be undertaking a detailed review of the exploration data to identify drill targets and to determine the requirements for additional geochemical and geophysical surveys before embarking on field work in the current season.

Much of the geological and geochemical data was collected by the BRGM (geological survey) in the 1960's, so there is an excellent opportunity to add value to the project due to the reconnaissance style of exploration carried out to date, which lacked a commercial focus.

Advances in airborne geophysical techniques that provide a rapid and effective means of assessing large areas in the search for massive sulphide-style mineralisation will be looked at.

Exploration in a Francophone and under-developed country is not without its difficulties.

Some of the issues faced included recruitment of French-speaking geological personnel to supervise the fieldwork, a lack of infrastructure that can make access difficult, a seasonal field program and the health hazards normally associated with tropical environments.

The project team is not unfamiliar with such matters and is moving forward with an exploration management plan that will ensure the work is carried out as efficiently and safely as possible. Key to this is the involvement of French speaking geologist Cedric Gineste who has recently joined us after working in New Caledonia. ☺

Chasing Elephants in the Congo Copper Belt for



ASX-listed explorer Tiger Resources Ltd has produced some of the best copper drill results for a long time from its Kipoli Project in the DR.

Its announcement at the beginning of June of 122m @ 7.31% Cu, including a high grade zone from 114-141m of oxide/transition mineralisation of 27m @ 11.72% Cu, has everyone talking!

CSA's Simon Dorling has been involved in this project and has recently completed a review and technical assistance program involving:



Kipoli Block Diagram

- Prospect scale mapping;
- Establishing stratigraphic relationships;
- Evaluating geological logging;
- Rock type identification;
- Determining controls on mineralisation;
- Proposing geological models;
- Evaluating and revising current targeting strategies;

Simon's work has helped integrate the project setting into the regional Copper Belt context making evaluation more quantifiable.

Simon says he was delighted to return to the Congo to see such high grade mineralisation and help the client with interpretations. ☺

Vietnam revisited - this time for Nickel

CSA has a long history of working in Vietnam going back to 1992 for lead/zinc. However this time it is for nickel.

Mick Elias, a CSA Director, and Rob McLean, who is based in Vietnam, are working on an advisory assignment for Asian Mineral Resources, a Canadian listed company.



"Of interest to me were the spectacular countryside in the project area and the very industrious and hard-working people," said

Mick after his visit last April. "The job is to provide exploration and mine geology advice to assist the Vietnamese exploration team on the Ban Phuc Nickel Project," he said.

Ban Phuc comprises a massive sulphide vein-style deposit of 1.23Mt at 2.77% nickel and 1.13% copper and an adjoining disseminated sulphide resource of about 15Mt at 0.53% nickel.

Mick and Rob are not the first CSA geologists to visit Ban Phuc.

Neal Reynolds made a visit there in the mid 1990's when CSA was exploring for base metals in northern Vietnam. ☺

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In the news

CSA has been in the news again. The Mining Chronicle recently ran a lead article on the Caijiaying Zinc Mine in China, which was built by CSA for Griffin Mining. It reported that the project was a "China Bonanza", having paid back capital costs in 13 months, and making it one of the most profitable mines in the world!

The Caijiaying story was also told for the first time in Australia by Chairman Rupert Crowe at an Australian Institute of Geoscientists



presentation in Perth in mid May and it was told again at a larger scale conference in Perth in late August at the Tonkin International Exploration and Mining Seminar.

Also in the news was a very successful AIG one-day seminar organized by Rupert Crowe on Proterozoic Mineralisation in Western Australia.

Registrations had to be limited to 180 - a new record for a one-day event for the AIG, which showed how popular this topic is in WA at present.

Stan Wholley from CSA presented the latest results from Koongie Park and CSA was also one of the sponsors of the event.

In August, Neal Reynolds spoke at an SGA conference in Dublin on "Tethyan Zinc from the Atlas to China" and in October, Gerry Fahey and Jacqui Coombes will be giving the second of their 2007 JORC workshops.

Worth its weight in gold

Every now and then a new technology emerges that defies the old adage of being "too good to be true."

It is immediately recognised as an innovative, low cost, simple but elegant solution to a hugely expensive universal problem.

The beauty of such revolutionary ideas is that they deliver even more than they promise and once implemented have us wondering how we ever managed without them. The latest developments in blast-movement technology could be one of these.

The new system involves using remote-controlled transmitters, called Blast Movement Monitors or BMM, to monitor movement of rock during the blasting process with the aim of decreasing ore loss and minimising dilution and misclassification of ore.

Often grade control procedures are only carried out prior to blasting. However, during blasting there is nearly always some movement of ore/waste boundaries.

The new technology allows the ore to be tracked by the disposable monitors which are placed in blast holes in the ore and then resurveyed after blasting to redefine the ore boundaries.

The new system has been developed jointly by the University of Queensland and



Placing a BMM in a blast hole to monitor ore movement during blasting

Blast Movement Technology which holds the licences for it. CSA has a relationship with BMT for use of the system.

BMT offers the potential to increase mineral production by as much as 25% and has attracted the attention of several major companies including Barrick which is funding the roll-out to most of its major open-cut sites. Field tests have shown that by using BMMs in every blast, ore loss and dilution can be minimised thereby increasing revenues dramatically for a modest increase in operating cost. Literally and figuratively it is "worth its weight in gold!"

Contact Malcolm Titley at CSA for more information on this exciting new technology. ☺

CSA data management expansion



Data management is an increasingly important part of CSA's business. Following hot on the heels of the office refurbishments completed early in 2007, the growth of the data management team has necessitated a further office expansion to the floor above.

This new area now houses 8 staff, headed by GIS/Database Services Manager, Alex Goulios (above right).

The division caters for the following support services:

- Hosting and management of drill hole databases (using DataShed and other packages);
- QA/QC reporting to JORC standards;

- GIS database specialisation, in particular MAPINFO and ARCGIS;
- GIS drafting and all types of exploration maps;
- Cartographic figures (to prospectus standard);
- Design of customised Microsoft Access front ends;
- Collation of data from public sources or historic records.

Apart from supporting existing geological consulting jobs, many clients are recognising that by using CSA to host their databases they can ensure better quality and continuity of service than would be possible by themselves in these times of high staff turnover. ☺