



## **GBS GOLD AUSTRALIA PTY LTD**

### **ANNUAL EXPLORATION REPORT SEL10341**

### **“PIONEER” UNION REEFS PROJECT**

**YEAR ENDING 29 SEPTEMBER 2009**

**Pine Creek: 1:250,000**

**Pine Creek 1:100,000**

**Title Holders: Buffalo Creek Mines Pty Ltd (50%)  
Territory Goldfields Pty Ltd (50%)**

#### **Distribution:**

- **DRPIFR Darwin NT**
- **GBS Gold Australia, Humpty Doo**
- **Burnside Operations P/L Brocks Creek NT**

**GBS Report No: [PC/BJV/09-41](#)**

**Zia U. Bajwah  
October 2009**

## **SUMMARY**

SEL (Substitute Exploration Licence) 10341 is a strategic asset which is located 165 km SE of Darwin, Northern Territory. The tenement is held by Buffalo Creek Mines Pty Ltd (50%) and Territory Gold fields Pty Ltd, which are the subsidiaries of GBS Gold Australia Pty Ltd. Currently, it covers 64.02 km<sup>2</sup>. Recently, Crocodile Gold Australia Pty Ltd acquired all assets held by GBS Gold Australia (liquidated) including SEL 10341.

The SEL covers mainly the Burrell Creek Formation with dominant lithologies of greywacke, siltstone and mudstone. Towards north-west, minor rocks of the Mount Bonnie Formation (South Alligator Group) are also exposed. These lithologies have been intruded and thermally metamorphosed by the Tabletop, Allamber Springs and McKinlay Granites. There are a number of gold deposits/prospects around the SEL 10341 and within the project area, which are covered by Elizabeth group of tenements. There is a close association of these deposits with the lithologies of the Finnish River Group and South Alligator Group, intruded by the Palaeoproterozoic granites in the surrounding area.

On September 2008, GBS Gold Australia was placed under voluntary receivership and all assets were placed on care and maintenance. During the reporting period, exploration activity was limited to tenement evaluation, review and ranking in order to prepare company assets for sale. In April 2009, Crocodile Gold Australia announced to acquire all assets held by GBS Gold Australia (liquidated) and currently arrangements are underway to register these assets against new owner. Other activities are reconnaissance visits, tenement administration and report writing. SEL 10341 is considered to be strategic in Crocodile Gold Australia's portfolio due to its close proximity to the Union Reef gold mill, and will play an important part in the revival of the company. In 2009-10 reporting year, previously collected data will be assessed and further targets will be selected for geochemical sampling and drilling.

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## **1.0 INTRODUCTION**

SEL10341 is located about 165 km SE of Darwin and abuts the Union Reef group of tenements toward north. This report deals with exploration activity carried out over SEL10341 during the year ending 29 September 2009.

## **2.0 LOCATION AND ACCESS**

SEL10341 is situated 165km SE of Darwin NT and 20km north west of Pine Creek (Figure 1). Access to the central portion of the tenement may be obtained via Mt Wells road from Union Reefs mine complex north-westwards, or alternatively by turning NE off the Stuart Highway on the Spring Hill Road, some 20km north of Pine Creek. The Darwin-Adelaide railway crosses the eastern boundary and north eastern sectors of the tenement and in addition, the Darwin-Palm Springs gas pipeline easement crosses the same sectors. For reasons of public safety there are statutory restrictions relating to exploring in the vicinity of these easements.

The tenement covers part of the McKinlay River and its tributaries. These have excised the area and created a terrain that is undulating and marked by north-west trending ridges.

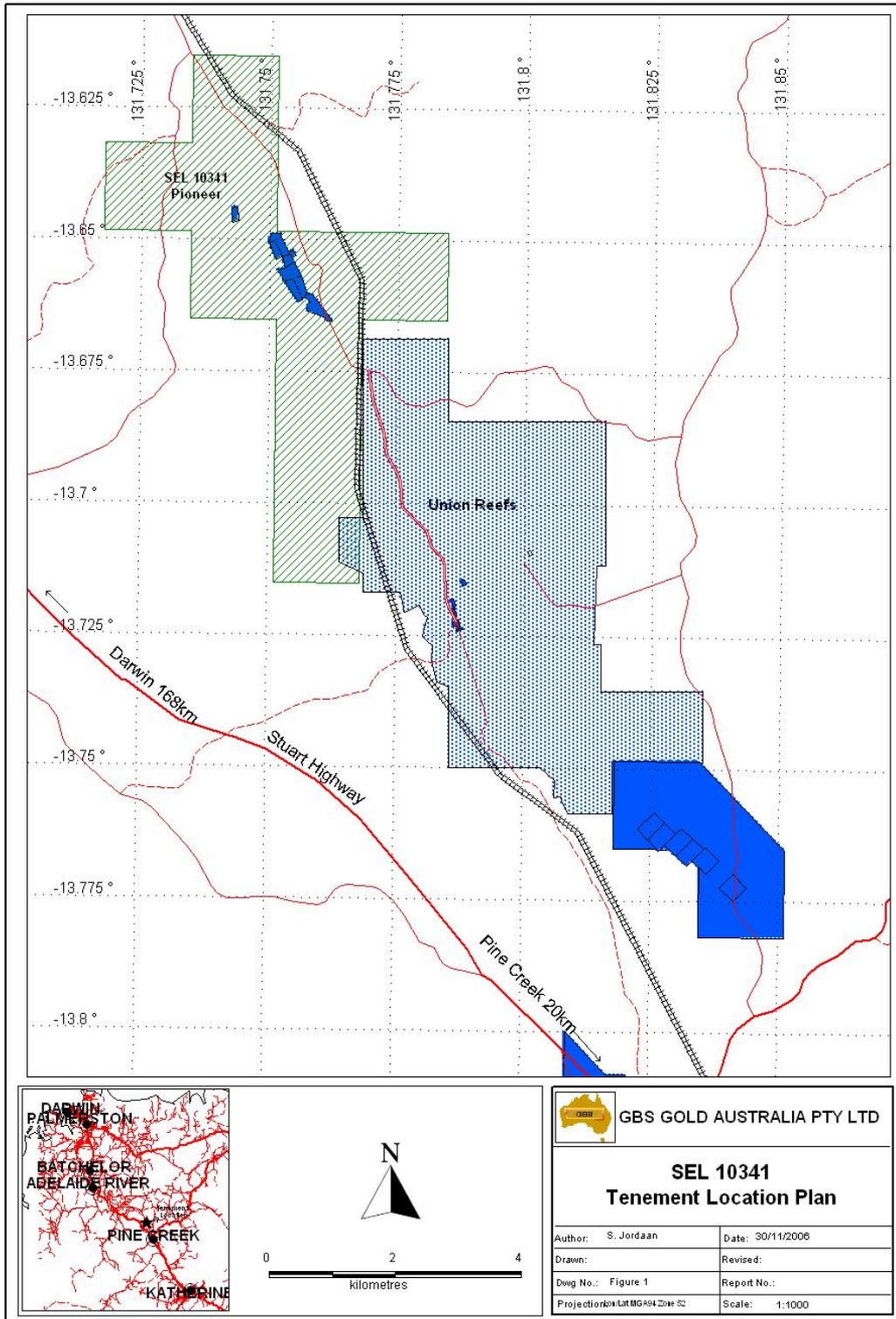
The tenement is within the Pine Creek 1:250,000, 100, 000 sheets and on the Burrundie and Union Reef 1:50,000 sheets. It is also within the Mary River West Pastoral Lease.

## **3.0 TENURE DETAILS**

SEL10341 was granted to Buffalo Creek Mines Pty Ltd (50%) and Territory Goldfields Pty Ltd (50%) on 30 September 2003 and will expire on 29 September 2009. It originally comprised 18 blocks that covered approximately 64.02 km<sup>2</sup>, with a statutory reduction of 50% during 2005, and second reduction in 2006 leaving behind 26.37 km<sup>2</sup>.

GBS Gold Australia Pty Ltd took over Buffalo Creek Mines Pty Ltd and Territory Goldfields Pty Ltd in 2005 and commenced exploration, mining and processing activities in the region.

**Figure 1: Tenement Location Map**



## **4. GEOLOGICAL SETTING**

### **4.1 Regional Geology**

SEL10341 is situated within the Pine Creek Orogen, a tightly folded sequence of Palaeoproterozoic rocks, 10km to 14km in thickness, laid down on a rifted granitic Archaean basement during the interval ~2.2-1.87Ga. The sequence is dominated by pelitic and psammitic (continental shelf shallow marine) sediments with minor inter-layered tuff units. Pre-orogenic mafic sills of the Zamu Dolerite event (~1.87Ga) intruded the lower formations of the South Alligator Group and part of the Mt Partridge Group.

During the Top End Orogeny (Nimbuwah Event ~1.87-1.85Ga) the sequence was tightly folded and pervasively altered with metamorphic grade averaging greenschist facies to phyllite. The Cullen intrusive event introduced a suite of fractionated calc-alkaline granitic batholiths into the sequence in the period ~1.85-1.78Ga. These high temperature I-type intrusives induced strong contact metamorphic aureoles ranging up to (garnet) amphibolite facies, and created more extensive biotite and cordierite-andalusite hornfels facies.

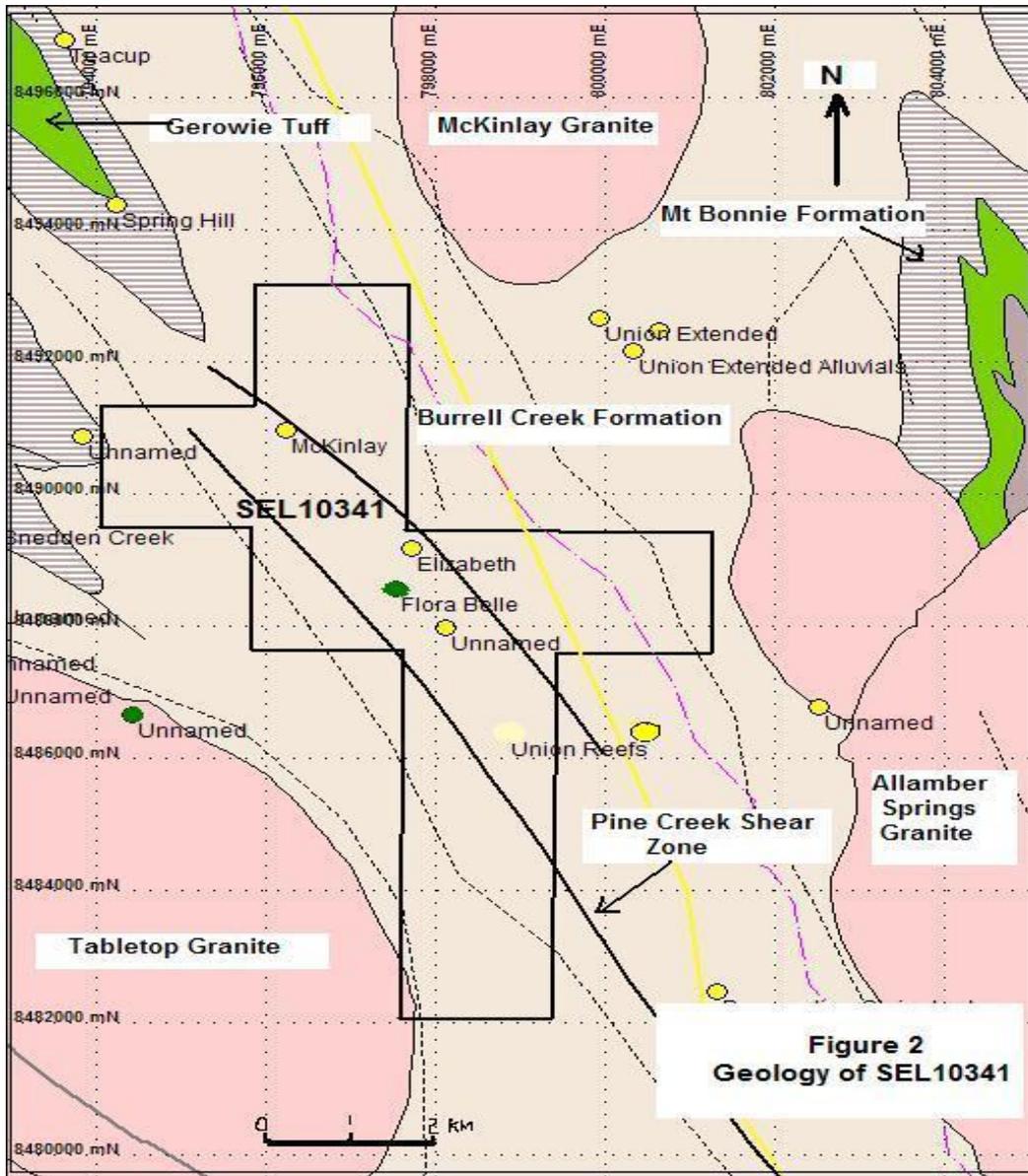
Open-folded Meso- and Neoproterozoic clastic rocks and volcanics have an unconformable relationship to the older sequences. Flat lying Cambro-Ordovician sandstone and limestone of the Daly River Basin along with hill-cappings of Mesozoic arenites overlie the basement.

Cainozoic sediments and proto-laterite overlie parts of the Pine Creek Orogen lithologies. Recent scree deposits occupy the lower hill slopes while fluvial sands, gravels and red and black soil deposits mask the river flood plain areas.

### **4.2 Local Geology**

The substitute exploration licence 10341 covers mainly the Burrell Creek Formation with dominant lithologies of greywacke, siltstone and mudstone (Figure 2). Towards north-west, minor rocks of the Mount Bonnie Formation (South Alligator Group) are also

Figure 2: Geology of the project area



exposed. These lithologies have been intruded and thermally metamorphosed by the Tabletop, Allamber Springs and McKinlay Granites.

The central part of the tenement is transected north-northwest to south-southeast by the Pine Creek Shear Zone (Figure 2), a grossly antiformal zone averaging 300m wide, characterised by phyllitic schist and tightly compressed folds. The axial zones on the principal anticlines have frequently failed within the PCSZ and predominant bedding and fabric attitudes are steep dips to the north east. Some parasitic folds have steep westerly dips.

## **5.0 GOLD PROSPECTIVITY OF THE PROJECT AREA**

Figure 2 shows a number of gold deposits/prospects around the SEL 10341 and within the project area, which are covered by Elizabeth group of tenements. There is a close association of these deposits with the lithologies of the Finnish River Group and South Alligator Group, intruded by the Palaeoproterozoic granites in the surrounding area.

Geological, geochemical and geophysical information gathered in the Pine Creek Orogen suggest that contact aureoles of these granites are the most fertile ground for hosting gold mineralisation. This is perhaps due to the presence of geological sequence which has been subjected to ductile as well as brittle deformation during Top End Orogeny, leading to the development of structural sites with porosity and permeability, and that have also acted as fluid conduits. The area was subsequently intruded by the granites causing wide spread contact aureole that contains gold mineralisation (Bajwah, 1994). These granite plutons are I-type, fractionated and belong to magnetite-series, which are known to contain or responsible for gold mineralisation in the adjacent meta-sediments. In the final stages of granite emplacement, the magma experienced differentiation and fractional crystallisation which subsequently led to the emanation of hydrothermal fluids, responsible for gold mineralisation in already structurally prepared sites such as F<sub>3</sub> anticlinal structures and associated cross fractures. The PCSZ is the most mineralised structure with respect to gold in the Orogen and host many gold deposits such as Union Reefs, Enterprise, International, Gandys, Czarina, Spring Hill and may more prospects.

There is limited evidence of north to south cross fracturing within SEL10341. This trend is thought to have been relevant in terms of localising mineralisation at the Pine Creek gold field just to the south. North to south and WNW-ESE fractures are the optimal directions for intersecting the PCSZ in terms of generating dilation sites.

Within the confines of SEL 10341, lithologies and structural elements of the PCSZ are exposed and that provide a strong possibility of the presence of gold mineral system in the project area. Gold deposits/prospects such as McKinlay, Elizabeth and others present within the project area but covered by Elizabeth group of tenements, can be extended into SEL 10341, once a properly planned exploration program is undertaken. This assumption has been supported in previous exploration programs by the delineation of significant gold anomalies in the adjoining areas.

SEL 10341 has an additional potential of base metal mineralisation due to the presence of Flora Belle base metal deposit within the confines of the tenement. Flora Belle and other base metals deposits are thought to be later than the gold mineralisation stage. It is also likely that similar base metal mineralisation can be present in other parts of the SEL 10341.

## **6.0 PREVIOUS EXPLORATION ACTIVITIES**

Most historic exploration work has been focused on the two blocks of the SEL that cover the PCSZ just north west of the Elizabeth group of tenements. This area was previously held as EL8172 “Ennis” by R. Biddlecombe who optioned the ground to Acacia Resources Ltd in 1993. Acacia later exercised the option.

The area of EL8172 had been explored in part by Billiton, Zapopan, Enterprise and Northern Gold NL prior to the lease being granted.

### **Billiton (1988-1993)**

In 1988 the company drilled 12 RC holes for 1107m (MP1-MP12). While three of the holes (MP-2, MP-4, MP7) met with plus 1.0g/t gold results they were discontinuous and narrow.

Billiton also collected 57 stream sediment samples and a series of soil sampling programs totaling 339 sites. In addition an auger rig was used to collect 36 deeper samples.

**Zapopan NL (1988)**

The company conducted a stream sediment survey across portions of the EL when it was included in their McKinlay block. A total of 51 samples were collected which were extremely encouraging, with 14 samples being over 1.0g Au/t.

**Enterprise Exploration NL (1989)**

A total of 5 spot soil samples were collected from B horizon. No anomalous results were reported.

**Northern Gold NL (1993)**

A total of 25 soil samples were collected with several samples being anomalous.

**Acacia Resources Ltd 1994**

Soil sampling comprising 226 sites was collected on a 500m by 2500m grid. Spot samples were taken from the most prospective northern sector. Samples were sieved to minus 5mm and 2-3kg collected for Au, Cu, Pb, Zn and As.

Geological mapping was conducted at 1:1000 scale in the NW sector of the grid. Two costeans were dug to bedrock in the north sector of the Ennis grid. Two anomalous but low grade zones were reported.

RC drilling comprising 5 holes for 290m (ENP-16-20) was targeted at the north eastern soil anomaly. Most holes met with narrow low grade gold mineralisation near the contact of greywacke and shale packages.

**Acacia Resources Ltd 1995**

Six km of gridding, soil sampling and infill sampling was carried out on the NW sector. A total of 198 soil samples were collected. Samples were from B horizon and analysed for gold and base metals. The best results from the infill work included 2412ppb Au and 475ppb Au near minor gold workings.

Geological mapping and chip sampling comprising 97 samples were taken, mostly from the Last Gasp prospect in the far NW. The best rock value was 11.65g/t Au, 6.26g/t Au and 4.0g/t Au.

#### **Acacia Resources Ltd 1996**

Gridding comprising 6km completed on Acacia regional grid (341.5 deg. Mag). Soil sampling of B horizon totalled 224 sites supplemented by auger.

#### **Acacia Resources Ltd 1997**

Aerial photography at 1:25,000 was flown by Airesearch in 1996. Digital elevation models were produced from scans to produce 1:50,000 maps and contours.

UTS was contracted to conduct airborne magnetics and radiometrics over all the Acacia tenements in the Pine Creek region. The southern half of the Ennis blocks was covered. The total survey was 2540 line/km over 127sq km. The data was processed to RTP and TMI plus total count radiometrics.

The Rosalie and Near Miss prospects were geologically mapped at 1:1000. Rock chip sampling in that area comprised 21 samples, the best peaking at around 1.0g/t Au. Arsenic attained 4.66% with gold at 0.96g/t and lead at 0.25%, independent of gold anomalism.

The Rosalie prospect was RC drilled by 6 holes totalling 582m. (RC97EN01-06). The samples were assayed for gold and base metals. Quartz in greywacke was intermittent throughout and sulphides included arsenopyrite and galena.

#### **Acacia Resources Ltd 1998**

Gridding of 3km of cross lines was completed. A total of 129 soil samples were collected by hand or mechanical auger from B2/C horizon from the central and south sectors of Ennis blocks. The results were relatively disappointing with a peak of 240ppb Au but related to drainage.

Rock chip sampling comprised 11 samples. These were largely niche vein samples from the costeans. No anomalous results were reported.

Two costeans were dug for 254m to gain bedrock information on previous anomalous soil results. The sampling was barren, suggesting transport of the anomalies.

Geophysical processing of the magnetics was carried out by contractor. A gravity survey (500m spacing) as part of honours theses to determine depth to granite was carried out.

#### **Acacia Resources Ltd 1999**

A supplemental UTS detailed airborne magnetic and radiometric survey was flown in April 1999 over the northern lease areas of Acacia. The survey had 50m line spacing at 25m bird height.

Traverse mapping to aid magnetic modelling was carried out.

A total of 14 rock chip samples were collected during the traverse mapping, from vein and alteration sites. Only eight of the samples collected, exceeded 50ppb gold. The best values were 3.52g/t Au and 1.53g/t Au.

Air photo structural interpretations were carried to complement the airborne magnetics. The entire geochemical, geological and geophysical database was compiled by AngloGold following the acquisition of Acacia.

#### **AngloGold (Ashanti) Australia Ltd 2000-2004**

Following the take over of Acacia and uncertainties raised by a Delta Gold attempted takeover, no further work was carried out on the Ennis blocks.

The two Ennis blocks had been incorporated into the application for the 18 block SEL10341 and no work was done pending sale of the Union Reefs project tenements to prospective purchasers and finally to the Burnside JV in August 2004. The Ennis blocks within the SEL had a reported expenditure totalling \$173,541 in the period 1993-2000.

#### **Burnside Operations P/L 2004-March 2006**

Burnside joint venture carried out a remote sensing study based upon satellite SPOT imagery and supported by AGSO geological mapping. The SPOT image, circa 1996, just pre dates the main phase of open pit mining at Union Reefs.

The plan shows the principal PCSZ fault set that trends NNW-SSE across the whole map and extends many kilometres further to the north and south reflecting its regional and

deep-seated crustal origins. For most of its length in the Pine Creek field the PCSZ cuts Burrell Creek Formation clastic sediments. The PCSZ is thought to be a zone of ductile movement in which the limbs and crests of folds have been sheared out and dislocated, sub parallel to the axial plane. This phyllitic schist zone, in areas silicified and quartz-veined, has been the locus of much of the gold mineralisation in the Union Reefs field.

Also shown on the plan is a set of cross fractures of limited displacement. These linears are evident on the SPOT image and appear to be more abundant in the vicinity of known gold occurrences. As noted elsewhere in the field such fracture sets are part of focused swarms that are late stage in relationship to the Pine Creek Orogen evolution. There is evidence that they post-date and cut the Cullen Batholith. The northern (faulted) contact of the McMinns Bluff granite in the north-west sector of the plan appears to parallel the WNW fracture set.

There is limited evidence of north to south cross fracturing within SEL10341. This trend is thought to have been relevant in terms of localising mineralisation at the Pine Creek gold field just to the south. North to south and WNW-ESE are the optimal directions for intersecting the PCSZ in terms of generating dilation sites.

During the reporting year 2007-08, a campaign of RC drilling was undertaken to test the potential of some gold anomalies. A total of 6 holes were drilled for 591 metres with depth ranging from 97 to 103 metres. A total of 614 chip samples were retrieved and analysed for Au, As, Cu, Pb and Zn (Bajwah 2008).

## **7.0 EXPLORATION CONDUCTED PERIOD ENDING 29 SEPTEMBER 2009**

In the reporting year 2008-09, company resources focused on the development of Chinese South (Big Pit), Toms Gully, Cosmo Deep and Maud Creek projects with a budget of tens of millions dollars. Chinese South came on-line in April and Toms Gully commenced production in July 2008. At the same time significant progress was made in developing Maud Creek deposit with the targeted production of over 75 000 ounces of gold per year. For this purpose, construction of a specialised circuit developed by

GEOCOAT® technology at Union Reefs treatment facility was under consideration. This technology would have the ability to process refractory ore with up to 90% gold recovery. However, on 15 September 2008, GBS Gold Australia was declared under voluntary receivership, and all exploration and mining projects were placed under 'Care and Maintenance'.

On 17 September 2007, GBS Gold Australia entered into a JV agreement with Thundelarra Exploration Pty Ltd/Element 92 Pty Ltd to explore uranium within SEL 10341. However, much of the activity was limited to tenement evaluation, review and ranking in order to prepare company assets for sale. Other activities are given below:

- Reconnaissance visits
- Tenement administration
- Report writing

This activity costed \$8895.00 for the reporting year.

## **8.0 PLANNED EXPLORATION PROGRAM FOR 2009-10**

In April 2009, Crocodile Gold Australia acquired all assets held by GBS Gold Australia (liquidated) and intends to commence exploration and mining activities in the immediate future. Currently, regulatory and statutory processes are underway to transfer all assets including SEL 10341 to the new owner.

SEL 10341 is considered to be strategic in Crocodile Gold Australia's portfolio due to its close proximity to the Union Reef gold mill, and will play an important part in the revival of the company. In 2009-10 reporting year, previously collected data will be assessed and further targets will be selected for geochemical sampling and drilling. A minimum budget of \$15000.00 has been set-a-side for this program.

## **9.0 REFERENCES**

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