

Tawana Resources NL

WHIRLWIND DIAMOND PROJECT

Fifth Annual and Final Technical Report for EL10409

10 October 2006 to 9 October 2007

Steven A. Cooper
Orogenic Exploration Pty Ltd
www.rogenic.com.au

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1. INTRODUCTION

The Whirlwinds Diamond Project is located approximately 350 kilometres SSW of Darwin, straddling both the Millik Monmir (4967) and Auvergne (4966) 1:100,000 map sheets. It is centered approximately 25 kilometres northwest of the small township of Timber Creek, over the generally topographically flat area known as Whirlwind Plain (Figure 1).

The project consists of Exploration Licence 10409 covering an area of 569 square kilometres. This Licence, granted to Tawana Resource NL on the 10 October 2002, is subject to the ‘Top End - Memorandum of Understanding’ with the Northern Land Council.

The main target is diamonds within the extensive alluvial plains, but there is also the added possibility of concealed diamondiferous intrusions hidden below the alluvium. During the Fifth Annual period from 10 October 2006 to 9 October 2007 no field work was completed within the Licence area. Activities consisted exclusively of data review. The Licence was allowed to expire on 9 October 2007 following a decision by Tawana Resources NL to concentrate exploration activities on their South African projects which are considered further advanced, and the cost and availability of contractors is better

2. REGIONAL GEOLOGY

The project area is within the early to mid Proterozoic Victoria River Basin (VRB) overlying the concealed North Australian Craton. The VRB consists of both marine and continental sediments, with a maximum thickness of 3500 metres (Palfreyman, 1984) that has undergone at least three periods of gentle folding and warping (Pontifex & Sweet, 1972). A large portion of the Exploration Licence is over Quaternary sand, soil, and gravels forming the Whirlwind Plains. Some terrace gravel deposits may be Tertiary in age.

Outcropping in hills surrounding Whirlwind Plains are shallow dipping sediments of the Bullita Group. These are composed of thinly bedded reddish brown dolomitic siltstones and fine sandstone of the Timber Creek Formation (Sweet, 1972), grading up, and into, grey thin-bedded dolomite and dolomitic siltstone of the Skull Creek Formation (Pontifex & Sweet, 1972). The Bullita Group has formed low rounded hills, sometimes capped by overlying unconformable massive quartz sandstone. This sandstone is the Jasper George Sandstone (Auvergne Group) which also caps the gently sloping plateau of the Newcastle Ranges to the northwest.

The only known igneous intrusions near the project area are the five Timber Creek Kimberlites. All have been classified by De Beers as highly altered hypabyssal facies kimberlites (Berryman *et al*, 1998). Timber Creek 01 is the largest of these bodies and represents a small pipe on a dyke. An 84t colluvium sample down-slope from Timber Creek 01 produced 1913 diamonds totalling 19.83ct from the -4.75mm fraction (Berryman *et al*, 1998). More recent bulk sampling of TC01 by Tawana Resources NL has confirmed the intrusion is highly diamondiferous with over 17,000 diamonds recovered (Cooper & Marx, 2004a). The age of intrusion is 179 ± 2 Ma (middle Jurassic) based on the dating of recovered kimberlitic zircons (Belousova *et al*, 2001). The other kimberlite bodies are small dykes.

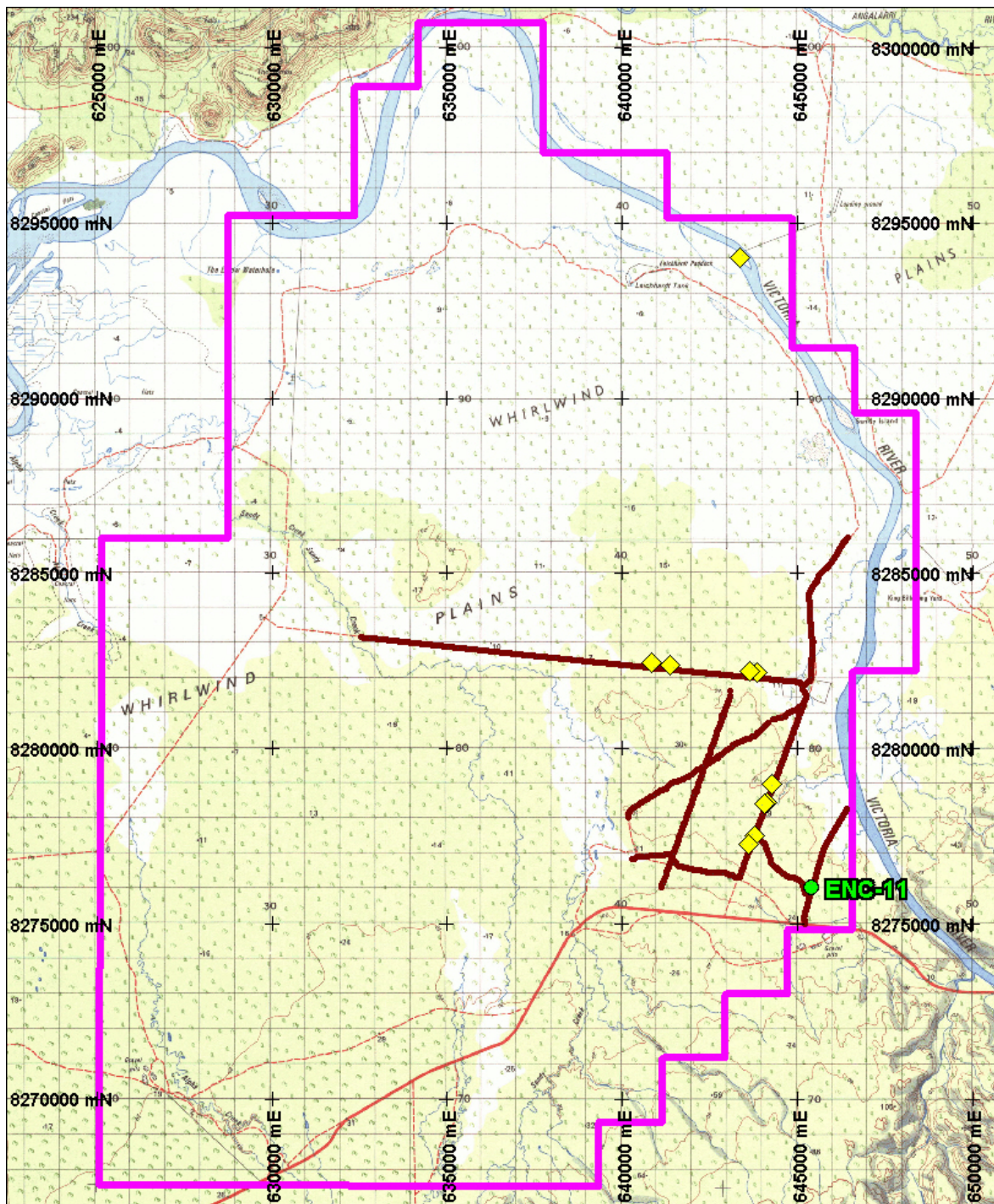


Figure 1. Location map of EL1049, also showing historic diamond locations (yellow diamonds), *TerraneChron* ENC-11 sample site (green circle), and June 2004 gravity stations (brown dots).

3. PREVIOUS EL1049 DIAMOND EXPLORATION

During the previous reporting periods activities have included the interpretation of Landsat images and aerial photographs over the area to select areas in which paleo-alluvials were suspected to occur. This area was later followed with ground verification of features

identified from this interpretation. Later both aerial and additional ground field inspection confirmed that the reported diamond recoveries by previous diamond exploration were from sites of palaeo-alluvials. A detailed review of all previous diamond exploration has been undertaken and full details were provided in the report by Cooper & Marx (2004b).

During June 2005 Haines Surveys Pty Ltd completed 1139 new stations along 10 widely spaced traverses, with station interval 40 metres apart (Figure 1). Consulting geophysicist Nigel Hungerford was provided with all the gravity data for Whirlwind Plains area. It is apparent after processing to remove the regional gradient, that gravity lows probably associated with gravel channels can be seen along the traverses. They appear to be a couple channels all trending towards the northwest. Full details provided in Cooper *et al.*, 2005.

In September 2004 the heavy mineral sample ENC-11 was collected from an alluvial gravel pit on Whirlwind Plain (Figure 1) near gravity travers 4000. The sample was one bag (around 12kg) of coarse gravel screened to minus 1.0 mm on site, with the coordinates 645383mE, 8276034mN, Zone 52 (AMG66 datum). Macquarie University kept the 0.1-0.3mm heavy mineral fraction for their *TerraneChron* study.

The +0.3mm size fraction was examined by an experienced mineralogist from Dynamic Mineralogical Services (Perth) for kimberlite indicators. No diamond or kimberlite indicator grains were recovered from the small sample. Their report is provided in Cooper & Belousova (2006).

The *TerraneChron* concept has been developed through collaboration between GEMOC at Macquarie University, and Advantage Geochemical Solutions Pty Ltd. It is based on LAM-ICPMS analysis of large zircon populations obtained mainly from widely spaced regional heavy mineral sampling. The analysis of large numbers of grains obtained from detrital concentrates generates U-Pb age spectra that can be used to characterise fundamental terrane-scale events - sedimentary provenance, magmatic episodes, metamorphism and hydrothermal activity. While the specific origin of individual zircons is lost using detrital concentrates, the broad spectrum of ages and events from large areas of composite geology is generally well represented.

From the ENC-11 sample fifty four zircons have been selected and fully analysed. Prior to any analyses, all selected grains were imaged by combined backscattered electron/cathodoluminescence (BSE/CL) using an electron microprobe (EMP) to examine their internal structure at GEMOC, Macquarie University. The same EMP was used to analyse the zircons for Hf and Y contents. U-Pb dating was also performed in Macquarie University using an inductively coupled plasma quadrupole mass spectrometer (ICP-MS), attached to a laser ablation system. Hf-isotope analyses are carried out in-situ using a laser-ablation microprobe, attached to a Nu Plasma multi-collector ICPMS.

It has been shown by Belousova *et al.*, (2001) that there is a good correlation between trace element patterns and the composition of the magmatic host rocks. The zircon database for U, Th, Y, Yb, Lu and Hf, which are acquired during the EMP, U-Pb and Hf-isotope analyses, is evaluated using the CART software. The results show that the gravel sample zircon population is dominated by granitic rocks, with 33% (18 grains) from granitoids with 70-75% SiO₂, and 46% of the grains (n=25) from granitoids with less than 65% SiO₂. There are a couple of grains which appear to be from mafic and carbonatite rocks, and six were

unclassified. No kimberlite zircons were analysed. The age of the zircon grains range from middle Cretaceous to Archaean.

The full data and report is provided in the last Annual Report (Cooper & Belousova, 2006). These results will also be incorporated into a wider study of the region to be published. The significance is this study highlights and constrains previously unrecognised igneous activity beneath the VRB.

4. EMPLOYMENT OF THE LOCAL COMMUNITY

Tawana Resources NL has a policy that whenever possible it will provide opportunities to assist members of the local Myatt community. Unfortunately no activities were completed during this reporting period resulting in no opportunities for the local community.

5. EXPENDITURE SUMMARY

Listed below is the summary of the costs allocated to EL10409 for the Annual period ending October 2007;

Geological Salaries	\$8,025
Total	\$8,025

6. CONCLUSIONS AND RECOMMENDATIONS

Evaluation of the work by previous diamond explores have shown that there is considerable extent of diamondiferous gravels in Whirlwind Plains. It is expected that some of the Whirlwind Plains diamonds are sourced from the Timber Creek kimberlites which are 30 kilometres upstream, but additional bulk sampling nearly 100 kilometres upstream along the Victoria River (Joyce, 1990) has shown that other sources have provided diamonds into the Victoria River drainage. This is significant as it will result in a broader population of diamonds with possible good diamond values. Also, traditionally diamonds from an alluvial source tend to have higher values due to mechanical sorting.

It appears that detailed gravity will outline likely gravel location and thickness on which to plan further testing by drilling and trenching. It is apparent from drilling and trenching by previous explorers that the bedrock below the alluvial is uneven, and this provides good opportunities for large scale trapping of diamonds.

Attempts were made to organise a more systematic gravity survey to in-fill and extend the areas currently surveyed. But continued delays in obtaining geophysical contracts resulted in the no filed work being completed during the 2007 dry season. By the end of the reporting period, Tawana Resources NL had decided to concentrate exploration activities on their South African projects which are considered further advanced, and the cost and availability of contractors is not a large issue.

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