

KAR-10 & 11

# ACC - Rio Tinto Exploration Limited

A member of the Rio Tinto Group

**Final Relinquishment Report  
for the  
Chitradurga (RP No. 7/ARP/2000)  
and  
Tumkur (RP No. 8/ARP/2000)  
Reconnaissance Permits  
Karnataka, India**

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## 2 INTRODUCTION

This report documents all diamond exploration activities, data and interpretations completed by ACC Rio Tinto Exploration Ltd (ARTE) on the retained portions of the Chitradurga Reconnaissance Permit (no. 7/ARP/2000) and the Tumkur Reconnaissance Permit (no. 8/ARP/2000) during the term of the permit from 24<sup>th</sup> October 2000 till 24<sup>th</sup> October 2003. Details of all exploration completed within the previously relinquished portions of the permits are reported in "Relinquishment Report for the Chitradurga (RP No. 7/ARP/2000) and the Tumkur (RP No. 8/ARP/2000) Reconnaissance Permits Karnataka, India" (December, 2002).

The Chitradurga and Tumkur reconnaissance permits, totalling 3,800 km<sup>2</sup> were granted to ARTE on the 14th September 2000 and subsequently executed on 24th October 2000. Initial work on the permit involved collation and analysis of available geological, geophysical and other remote sensed databases followed an intensive indicator mineral (gravel) and stream sediment-sampling program. Due to negative results, the majority of the permits were relinquished in October 2002 (refer application for relinquishment letter to The Director Mines and Geology, Government of Karnataka and "Relinquishment Report Chitradurga RP No. 7/ARP/2000 and Tumkur RP No. 8/ARP/2000 Reconnaissance Permits", December 2002) with two blocks of 92 km<sup>2</sup> and 167 km<sup>2</sup> (total 259 km<sup>2</sup>) being retained within the Chitradurga and Tumkur permits respectively. Subsequent exploration has been restricted to mineral geochemistry analysis of mineral grains collected from gravel samples and detailed interpretation of Landsat TM and IRS images for potential structural zones that may host kimberlite mineralisation.

The Chitradurga RP area totals 92 km<sup>2</sup> and is situated 16km southeast of Kotturu in the 1:250,000 series mapsheet 57B. The Tumkur RP area, totalling 167 km<sup>2</sup>, is situated 10km northeast of Madakasira and straddles the 57F and 57G 1:250000 mapsheets (Plan NDbg0291). Bangalore has the nearest airport to the area and Chitradurga the nearest railhead. The road access to the area is through National Highway No. 4 connecting Bangalore to Pune and National Highway No. 7 connecting Bangalore to Hyderabad, respectively. State Highways linking Chitradurga to Challakere to Parasurampura and Hiriyur to Challakere provide other major access to the area. All the villages have fair weather metalled or unmetalled road links.

Approximately 30 villages are located within the two RP areas with agriculture being the main occupation and source of income for the majority of the population. Agriculture in the region is mostly single crop, restricted to the monsoon season. Approximately 40% of the Chitradurga Permit is designated as Reserve Forest, known as the Sunkadakallu and Nimbalegiri Forest Extensions. The Tumkur Permit has less than 5% designated Reserve Forest. The majority of the designated forests are dry (arid) thorny type with dominantly acacia flora.

## **1 SUMMARY**

This report details all exploration activities, data and interpretations completed by ACC Rio Tinto Exploration Ltd (ARTE) within the retained portions of the Chitradurga Reconnaissance Permit (no. 7/ARP/2000) and the Tumkur Reconnaissance Permit (no. 8/ARP/2000) during the term of these permits from execution of the permits in October 2000 till the third Anniversary and end of the reconnaissance permit in October 2003. This report serves as the final relinquishment report for these areas in compliance of Section 16 of the Mineral Concession Rules, 1961.

Conclusions from work completed indicate limited prospectivity for kimberlite or other significant mineralisation in the permit area and no further exploration is warranted. It is recommended that these permits be immediately relinquished.

### **3 CONCLUSIONS**

Although one reconnaissance sample in the Chitradurga Permit returned 5 garnets showing kimberlitic affinities, the lack of other supporting kimberlitic indicator minerals in this sample and in the other samples in the adjacent catchments, reduces potential for kimberlite occurrences in the area.

Similarly, variation in stream sediment geochemical results appear to be largely lithological and geomorphologically controlled with no significant anomalism that could be attributed to precious or base metal mineralisation.

### **4 RECOMMENDATIONS**

On the basis of discouraging reconnaissance indicator mineral, geochemical results and detailed interpretation of the data, it is recommended to relinquish all of the remaining permit areas. Additional permits covering other potentially more prospective areas in the state should be applied in order to replace the area relinquished and to progress the exploration for diamonds and other minerals throughout the state.

### **5 REGIONAL GEOLOGY**

The geology of the area is dominated by lithologies of the Eastern Dharwar Craton. The oldest rock types include granitoid gneiss with enclaves of pyroxenite, gabbro – all of which are known as the 2900Ma Peninsular Gneiss (PGC). Rocks of 2700 Ma Chitradurga Greenstone Belt occur to the west of the Chitradurga RP area and large areas bordering and west of the Tumkur Permit occupied by granite batholiths of the 2500 Ma of the Closepet Granite. The only known Proterozoic activity in the RP area is intrusion of ENE to NW to NE trending dolerite dyke swarm dating 2200 – 1600 Ma.

### **6 RESULTS OF EXPLORATION**

#### **6.1 Geological Interpretation**

Landsat TM, and high-resolution IRS panchromatic imagery were interpreted and combined with regional geological maps and localised prospect mapping of ARTE to identify and delineate regolith cover and structural features within the permit areas. The dominant structural trend in the area is to the NW parallel to the Chitradurga Greenstone Belt in the west and the Closepet Granite sequence in the east.

Undulating residual soils of the Peninsular Gneiss Terrain are dominant in the area with minor localised development of Recent Black Soil cover and alluvium/colluvium, associated with modern day drainages. Laterite development is absent potentially not ever having developed in this area.

#### **6.2 Indicator Mineral (Gravel) Sampling**

Indicator mineral (gravel and loam) sampling was completed within the first year of grant of the permits in 2002. Observation data including indicator mineral grain counts and WDS SEM probed mineral chemistry analyses for all samples within the retained portion of the permits is given in Appendix 1 and Appendix 2 respectively.

In both the permit blocks, non-kimberlitic chromite is common with upto 166 individual grains being recorded in a single sample. Probing of selective grains confirms their non-kimberlitic nature with a strong fractionation trend evident at 40-60% Cr<sub>2</sub>O<sub>3</sub>. Only single grains from each of sample numbers 51514112 and 551363, both from the Chitradurga permit, have elevated MgO of 12.7 – 13.2% and potentially could be kimberlitic however the lack of other supporting kimberlitic grains suggests that this result is not significant. Minor garnet was recorded from several samples including 8 possible pyrope from 5514483 on the Chitradurga permit. Probing of these grains returned 2 G3 and a possible elevated Na<sub>2</sub>O G6 eclogitic pyrope. Higher Na<sub>2</sub>O eclogitic pyrope is generally taken to be a good indication for diamond potential. The low number of eclogitic pyrope and the lack of other supporting indicator mineral grains associated with this sample however downgrades the potential for a significant kimberlite occurrence in this catchment.

No other kimberlite indicators, namely picro ilmenite or chrome diopside or diamond were found to in any of the samples processed. In the Tumkur block, rumours of diamonds having been identified by the geological survey in this area were not substantiated by either the presence of diamonds nor of kimberlitic indicator minerals.

### **6.3 Geophysics**

The almost complete lack of anomalism identified from the regional indicator mineral sampling programs and the low tenor of anomalism have not warrant geophysical evaluation and therefore no ground or airborne geophysical surveys were completed.

### **6.4 -80# Stream Sediment Geochemistry**

A total of 23 -80# stream sediment samples were collected and analysed from the Tumkur and Chitradurga permit areas. A complete listing of located assay results is included in Appendix 3.

Review of the data indicates good correlation between the lithophile, siderophile and chalcophile elements and with the different lithotypes in the area indicating that most of the geochemical variation is lithological and or geomorphological. No geochemical anomaly that may be attributed to the presence of kimberlite or base and precious metal mineralisation is identified. A statistical summary of results is included in the following table.

## **7 Health, Safety, Environment And Community Relations**

All work completed by ARTE within the Chitradurga and Tumkur Permit areas has been conducted according to Rio Tinto's Health, Safety, Environmental and Community Policies as summarised in "The Way We Work", a copy of which has been provided to the Government of Karnataka.

All employees are trained and counselled in several aspects of exploration safety. All longer-term employees complete, first aid and accident management training and other specific training as required including 4 wheel drive and defensive driver training for all licensed drivers. Personal protective equipment of international standards is issued to each of the employees relevant to their conditions of work. No lost time injuries or medical treatment cases or significant Health or Safety incidents occurred during the terms of these permits.

Although all reconnaissance programs completed in the permit areas is essentially non-invasive to the environment, however all work is conducted according to a strict environmental plan with any damage or impact quickly mitigated. No environmental incidents were reported from the permit areas.

ARTE has a strong commitment to maintaining good relations with the community amongst which it works and to respect the laws, customs and traditions of these societies. A number of local people have been given employment in the exploration team to work as field assistants, drivers and other staff positions. Exploration geologists and locally trained field assistants routinely visit villages prior to sampling to explain to seniors, elected representatives and others from the village about the work being carried out. No significant Community Relations incidents occurred during the terms of these permits.

## **8 REFERENCES**

ACC - Rio Tinto Exploration Limited, December 2002, Relinquishment Report Chitradurga (RP No. 7/ARP/2000) and Tumkur (RP No. 8/ARP/2000) Reconnaissance Permits, Karnataka, India

### **Keywords**

India, Karnataka, Diamond Exploration, Kimberlite, Diamonds, Kimberlitic Indicators, Loam Sampling.

### **Locality**

Karnataka

57 B, 57 E 1:250 000 sheets

### **List of DPO's**

Nil

### **Descriptor**

Exploration for diamond and other mineral commodities in the Chitradurga, Tumkur and Bellary districts of Karnataka by ARTE on RP Nos. 7/ARP/2000 and 8/ARP/2000.