

RUNGTA MINES LTD.

FINAL REPORT ON INVESTIGATION FOR GOLD IN THE AREA OF RP No.95 IN KEONJHAR, SUNDARGARH AND ANGUL DISTRICTS, ORISSA STATE

(period 12.06.2007 to 11.06.2010)

1. INTRODUCTION

M/S RML was granted RP No.95, vide grant order No. MF-3/2006-5338-DM dt 30th May 2007, over an area of 1007.612 sq. km in parts of Keonjhar, Sundargarh and Angul districts in Orissa. The area is broadly covered by the co-ordinates 21° 10' to 21° 40' N latitude and 85° 15' to 85° 40' E longitude in topo sheets Nos. 73G/2, G/6, G/7, G/10, G/11 and G/12. The RP deed was executed on 12th June 2007. Location of RP area is shown in Fig.1.

Aim of reconnaissance exploration has been to critically examine all the published data from previous works, evolve fresh strategies for exploration, generate new exploration data and identify areas for prospecting license within the RP block.

On completion of two years tenure of RP as required under MM (D & R) Act and MC Rules, 50% of the area was relinquished and balance of 502.732 sq km was retained for further detailed exploration in the third year.

Results of reconnaissance exploration are summarized in this report. The important outcome of the exploration are the recognition of four small blocks, namely, Gopur, Salaikena, Adal and Purjora blocks which deserve to be explored in detail.

2. LOCATION

The RP area is limited by the following points.

STATIONS	LATITUDE	LONGITUDE
A	21 40 00	85 13 22
B	21 40 00	85 27 37
C	21 15 00	85 38 33
D	21 15 00	85 35 00
E	21 12 32	85 35 00
F	21 15 00	85 30 46
G	21 21 26	85 25 58
H	21 23 31	85 20 26

3. PHYSIOGRAPHY

The RP area falls in the Survey of India toposheets nos 73 G/2/NE, 73 G/2/SE, 73 G/6/NE, 73 G/6/NW, 73 G/6/SE, 73 G/6/SW, 73 G/7/NW, 73 G/7/SE, 73 G/7/NE, 73 G/10/SW and 73 G/12/NW on 1:25,000 scale and 73 G/6 and 73 G/11 on 1:50,000 scale. As most of the topo sheets covering the area on 1:50,000 scale were out of print, 10 toposheets of 1:25,000 scale were scanned and digitized and a composite map of the RP area was generated. This map is enclosed as Fig 1.

The area has a mature topography. There are five major river /streams flowing through the area, namely, Baitharani, Girakata and Mankarha Nala in the northern part and Sanakoi and Ramiala rivers in the southern part of RP. The Ramiala Nadi marks the south boundary of RP. The density of drainage network in the RP area is good. The southern part of the area is rugged and hilly. The important peaks in the area include the Kuja Parbat (834m, 73G/7) in the middle part of the area and Mundula peak (785m, 73G/10) close to the eastern border of the area.

Highway NH-6 passes through the RP. Other than this, the road network does not appear to be very good. Almost 50% of the RP area is under forest cover, the important forests being Kakurhiamba RF, Renda RF, Oria RF, and Barhagarh RF.

4. GEOLOGY

The RP area covers a portion of Keonjhar Belt, which is part of an Archaean volcano-sedimentary sequence, extending over 80 km length in NNW-SSE direction between Naukot in the north and Marda in the south. The belt is located to the SW of Keonjhar town at the fringe of the Singhbhum Granite Craton and close to the Bonai - Keonjhar Fe-Mn belt. All the rocks in the RP area are of Archaean age representing the classic greenstone belts documented from other well known Archaean terrains around the world. A simplified published regional geological map of the RP area and its environs is enclosed (Fig.2). As per this map, the north western and south central parts of the region are occupied by quartz pebble conglomerate (QPC), gritty quartzite and amygdular basalt. The Singhbhum granitoids are located in the east as well as in the north western areas. A large part of the SW region is occupied by medium grade schists/ gneisses and migmatites. Several large outcrops of younger quartzite are located within the migmatite complex.

Rock types of the RP area comprise sub-aerial to sub-aqueous mafic volcanics- which include basalt, gabbro and hornblende schist associated with quartzite, conglomerate, arenite, and BIF showing rapid facies variation with minor components of tuffaceous sediments and ferruginous shale and phyllite. These rocks are intruded by acidic and ultrabasic/ basic rocks and quartz

veins. In the central and north western margin of the RP, significant area is occupied by laterite resting on meta-basic volcanics and is reported to be auriferous. A number of major regional and small scale structures are seen in satellite imagery. The major structures include the NNW-SSE trending shear zone that traverses quartzite and meta-basic rocks and is located outside the RP area on the west. Similarly, a major WNW-ESE trending structure is located centrally in the RP area which is discernable on the satellite imagery. This structure is thought to have a major impact on the geology as well as on the geochemical signatures recorded in the RP area.

5. MINERALISATION

The geology of the Keonjhar RP as indicated above is represented by a classic greenstone belt. The greenstone belts of the Singhbhum Craton are host of several well-documented gold deposits/ prospects located to the north of the current RP area, such as, the now operating gold mine at Kunderkocha and old gold mines like Lawa, Mysara etc. in Jharkhand. This very fact tempted us to look for both Primary and Secondary mineralization and resort to panning as atool. However this effort meet our expectation. The streams draining the Quartzite-QPC terrains, mostly in the north western and southern parts of the RP were the focus of panning activity. The primary vein type mineralization is in the meta basic volcanogenic sediment association in the Gopur-Jatra belt in the north and Salaikena in the south-west.

There are several old workings for gold documented both inside and outside the RP area. Important ones are those at Gopur, Gajpur, Odal, Kaushakal, Jatra and Rangadih in the northern part around Bansipal, and Salaikena in the south. The Gajpur and Kaushakal prospects are located immediately north of the RP.

6. Interpretation of Satellite Imagery

The false colour composite rectified image of the RP and adjoining area is enclosed as Fig 4. The granitic terrain in the southern parts is indicated by white to grey tone. The volcanic sediments mixed with volcanics in Saleikana and Gopur – Adal areas are characterized by grey to cream colour tonal variations. The quartz pebble conglomerate and quartzite terrain is marked by topographic highs and prominent trend lines. The laterite plateau is distinct by its colour and morphology. A few circular features corroborate with the ultrabasic intrusives in the south central parts of the area.

Significant structures in the RP area include NNW – SSE trending structure located west and outside the RP area and the WNW - ESE trending structure located centrally within the RP. There are three dominant sets of linear features trending in NW-SE, near N-S and E-W directions which criss-cross the area. Some of the linear features in southern parts demarcate basic dykes. The known gold mineralized Gopur – Adal area is traversed by NNW – SSE and NE – SW trending linears. The Saleikana and adjacent areas are also marked by NNW - SSE, N - S and NE – SW trending linear features. The fold patterns, with NW – SE and NNW – SSE trending axes in the quartzite – conglomerate sequence are evident by trend lines.

7. Review of Airborne Magnetic Data

Airborne magnetic data was searched on the web and several publications of interest with reasonable large images were located. A part of this data covering the granted RP is included as Fig 6. Several interesting observations can be made from Fig 6 more specific to the RP area. It is noted that a very large magnetic feature is located to the immediate north of the granted RP. This magnetic feature is spatially close to the better known gold mineralisation in the NW corner of the RP area. The remainder of the magnetic signature over much of the RP area is fairly subdued even over the widespread basic rocks. This magnetic signature might suggest that much of the basic volcanics mapped as basalts in the area are more andesitic in nature.

8. EXPLORATION

With all the available information to hand, a regional geochemical stream sediment sampling program to cover the large area of 1007 sq.km in the quickest possible time was planned.

Forest cover, deep weathering and soil cap in the area pointed out that stream sediment sampling followed by rock chip sampling in source areas of stream sediment anomalies would be the appropriate method of geochemical exploration in the RP area.

Stream sediment samples were collected at 602 sites at an average density of one sample per 1.65 sq. km, covering all the drainage sub-basins (Fig. 7). However, due to difficult terrain conditions and poor accessibility a uniform sampling density could not be maintained especially in the unfavourable Singhbhum granitoids terrain (Toposheet No.73 G/11/SW) in the south - eastern parts of the area and in the metabasic volcanic terrain in Toposheet No. 73G/11/NW. More samples were collected in the known mineralized and lithologically favourable terrains. All the samples were analysed for Au, As, Fe, Mn, Ni, Cu, Pb and Zn. Analytical results are enclosed as Annexure - 1.

The **gold** values in these samples range between < 1 ppb and 263 ppb. Statistical study has helped in fixing background and threshold values at 10 and 50 ppb respectively. Thus all the samples analyzing more than 50 ppb are to be considered as anomalous. However, threshold value being high, the values between 30 and 50 ppb are also considered to be significant.

Based on the above ranges, a total of 42 anomalous gold samples were identified. These anomalous samples have been grouped to form a total of 36 anomalous zones (Fig 8). Despite low gold values, the anomalous zones 26, 32, 35 & 36 merit evaluation because of anomalous Cu, Pb, Zn and Ni contents.

Dispersions of As, Cu, Pb and Zn are generally low, but show positive correlations with gold.

The Fe, Mn and Ni dispersions mostly reflect the lithological variations in the surveyed area. The gold anomalies can be broadly grouped in order of priority into those derived from -

- 1) the meta-basic volcanic and meta-sediments
- 2) the quartz-pebble conglomerate and quartzite sequence, and
- 3) the laterite

RML carried out geological and geochemical evaluation of the 36 anomalous zones thus identified by undertaking detailed geological reconnaissance and follow up infill stream sediment and litho-geochemical sampling within these drainage basins and surrounds. A total of 139 rock chip (outcrop, trench and pit) samples and 180 stream sediment samples were collected for both lithological scrutiny and assaying. Out of this, 97 rock chip samples and all the 180 stream sediment samples were sent for gold assaying.

Following a comprehensive review of the analytical results of samples from 36 anomalous zones, it was assessed that 11 anomalous drainage basins out of the 36 require further follow up soil sampling and infill stream sampling.

After relinquishment of half of the area, RML concentrated on the more positive anomaly zones by taking geological traverses, carrying out channel sampling in the existing trenches and pits, rock chip sampling, soil sampling and heavy mineral concentrate study for gold. The study and sampling has been carried out in anomaly zones 2, 3, 10, 11, 14, 17, 21, 25, 27, 35 and 36. As mentioned, Gopur (Anomaly 3) and Salaikena (Anomaly 17) are two such areas where exploration has been done in the past by GSI and DGM, Orissa. A number of trenches and pits exist in both the areas. Besides, intense panning for gold is done by local people in Anomaly zone 21 after rainy season. During the period analytical results of 588 trench and pit samples, 24 rock chip/channel samples, 105 soil have been received and studied.. Analytical results of all these samples have been received and are given in Annexure 3, 4 and 5.

9. Identification of PL blocks

Synthesis of all the data has brought out with following four mineralized blocks (Fig:12) -

- 1 - Gopapur-2.478SqKm,
- 2 - Adal-1.198SqKm ,
- 3 - Salaikena-0.4513SqKm - and
- 4 - Purjora-0.4714 SqKm

RML intends to apply for prospecting license in these blocks..