

RUNGTA MINES LTD.

FINAL REPORT ON R.P (NO-102) OVER 1941 Km² AREA IN SAMBALPUR, SUNDARGARH AND DEOGARH DISTRICTS, ORISSA, FOR GOLD, SILVER & PGE MINERALS.

(For the period 23.08.2007 to 22.08.2010)

INTRODUCTION

M/S Rungta Mines Limited (RML) got the deed executed for RP No.102 over an area of 1941 sq.km in parts of Deogarh, Sambalpur and Sundargarh districts, Orissa, by Govt. of Orissa in August, 2007.

Initially reputed Consultants were contracted by the RML management to undertake a regional geochemical survey in the area. The objective of the reconnaissance survey was to critically examine all the published data from previous work, evolve fresh strategies for exploration, generate new exploration data and identify areas for prospecting license within the RP block. A total of 1084 stream sediment samples were collected and analysed for different elements. The geochemical data thus generated brought out a total of 93 first and second order anomalies for gold, arsenic, copper, nickel, zinc and lead. After completion of two years of work and synthesis of geological and geochemical data generated, half of the area, that is, 971.47 sq km, was relinquished to Govt of Orissa in September, 2009, as required under MM (D & R) Act and MC Rules .

During the last one year, geological traverses were taken in different anomaly zones and in fill stream sediment samples and rock chip samples from different horizons were collected. A total of 214 samples including 143 stream sediment and 77 rock chip samples were collected and analysed.

This report gives the details of the analytical data and conclusion drawn there from.

LOCATION OF THE AREA

The concerned area of RP lies within the Survey of India Topo-Sheet numbers (Survey of India Topo-Sheet no 73B/8,12,16 & 73C/2,5,6,9,10,13 and bounded by latitudes 21°31'55"(North) to 22°10'00"(North) and longitudes 84°10'50"(East) to 84°51'44"(East). It covers the districts Sambalpur, Sundargarh and Devgarh of the state of Orissa

PHYSIOGRAPHY

The road network within the RP area is very poor. There are no National or State highways passing through the RP. One metalled road from Bamra to Sambalpur passes through the western portion of RP at Kuchinda. Most of the existing roads in the area are village roads. Some of the big villages/townships in the RP area include Kuchinda, Ulando, atrapati, Mundaloi, Kuntrabahal, Kusumi Chitaposi, Sargidhi, Dharanipur, Sirgada, Jada, Khejurmundi etc. The nearest township of Rajgangpur is located at about 2.5 to 3.0 km north of the northernmost corner of the RP. The Rourkela railway line of South Eastern Railway passes through Rajgangpur (not shown in map).

The north-eastern half of the RP is more hilly and rugged as compared to south-western half. The heights in the north-eastern half range from 181m at Kantapali to 808m in Jada forest block. The heights in the south-western half range from 212m at Khakasadhera to 745m in Burujor forest block.

The RP area has a mature topography and is covered by well developed drainage network. The drainage network is intense in the north-eastern half of the RP compared to the south-western half. There are three minor river (nala) systems, namely Barjor nala, Jada nala and Saplata nala draining the north-eastern half of RP, and a major river system i.e. Bhedan river, draining the south-western half. Sankha Bangan nadi is also seen in this half. A very small portion of the Brahmani river passes through the eastern corner of the RP.

More than 50% of the RP is under forest cover (Fig-1). The forest cover is more in the north-eastern half compared to south-western half of the RP. There are several Reserve forest blocks. Some of the names are: Chudia, Sirgida, Bandhwar, Bhoinsamunda, Balai, Kusumdi, Kantaminda, Burjor, Behtan, Raipiri, Khelo, Choitrai, Khajuria and Banjipal.

GEOLOGY

Total 9 black & white Geological maps on a scale 1:50000 were obtained from GSI and extensive ground truthing these maps were digitised and a simplified composite mosaic of all the maps were compiled (Fig 2)

The greenstone sequence of the area is represented by Peninsular Gneiss and rocks of Bonai Super group of Archaean to lower Proterozoic age and Tamparkola Granite. PGC is exposed in the south and south-eastern parts while Tamparkola granite is exposed in the south-eastern parts of the area (Fig 2 and 3). The unclassified pegmatitic granite is exposed in the north central parts of the area.

Meta-arenaceous rocks (quartzite, micaceous quartzite, greywacke and conglomerate), associated metabasic rocks/ flows (Amphibolites, Hornblende chlorite schist, metabasic lavas) with minor

ultrabasic components constitute the Bonai Super Group of rocks. Lower Bonai Group constitutes conglomerate followed by basic volcanics while the upper Bonai Group is represented by conglomerate followed by conglomerate/ quartz schist/ sericite schist/ quartzite followed by mica schist and feldspathic/ gritty quartzite. The Bonai Group of formations are important targets with regard to gold and sulphide (?) mineralisation. The basic rocks are mostly meta gabbro and meta ultra-mafite, mostly chlorite-actinolite schist. The basic rocks surrounded by arenaceous sequence perhaps occupy the central parts of regional synform. A few dolerite dykes, rhyolite bands, quartz - tourmaline and quartz veins are the younger intrusive.

MINERALISATION

Secondary gold mineralization is reported from a place 2.7 km ENE of Jamankira village (21°45'14" – 84° 30'05", 73 C/10). Gold panning is also reported from some localities outside of the area. The quartz pebble conglomerate (QPC) of Bonai sequence is in general weakly auriferous, as evidenced by secondary mineralisation reported with in the RP area and further south. Sulphide mineralisation is reported in the vicinity of Betjharan / Karlladhi in the northern parts of 73 C/5.

SATELLITE IMAGERY DATA

The relevant images in digital format were purchased from NRSA Hyderabad. The raw data has been corrected on the raw imagery to reduce cross-talk and radiance effects.

The multiple spectral bands from the Aster imagery were combined to produce a suite of images highlighting various mineral and alteration assemblages. The composite images generated and suited to the project needs are included as Fig 5 & 6.

Interpretation of the Aster Images in form of regional trends and obvious structural elements and significant circular structures are summarized as an overlay on the Aster Imagery and included as Fig.7. In this interpretation several large regional and smaller structures are highlighted.

AERO MAGNETIC DATA

The Atomic Minerals Directorate (AMD) has flown a detailed airborne magnetic and radiometric survey over Kunjar-Darjing basin on a line spacing of 1000m and average height of 250m. The surveyed area has been published as composite images in some recent NGRI publications and fortunately covers a significant proportion, i.e., north and central regions of the granted RP to the company. The airborne image published by AMD along with interpretation is included as Fig. 8. No obvious magnetic anomalies of interest have as yet been identified. However here are some prominent magnetic anomalies in the north east coincident with mapped ultramafic lithologies and marginal to the granites.

GEOCHEMICAL SAMPLING

The complete RP area of 1941 sq.km has been covered by systematic stream sediment sampling and a total of 1074 samples were collected (Fig 9). The sample density was about one sample per 1.8sq.km. All the samples were analysed for Au (by Fire assay) and As, Cu, Pb, Zn, Ni, Fe & Mn (by ICPOES). The analytical results are furnished in **Table-1**. A summary of geochemical anomalies for elements Au, As, Cu, Pb, Zn, and Ni interpreted from sampling results is presented in Fig. 18 on a detailed geological map of the RP area. Thus a total of 93 anomalies of different elements were demarcated on the basis of geochemical data. Details of geochemical anomalies are furnished in **Table -2**. Out of these there are 10 zones which show anomalies for more than one element. These ten zones represent 24 anomalies of different elements. These coincident anomalies are shown in **Table 3**.

Perusal of the geochemical data show that Fe, Mn and Ni assay values reflect the lithological variations in the drainage basins in addition to their influence in scavenging the trace elements.

After completion of regional geochemical surveys, geological traverses were taken in different anomaly zones and in- fill stream sediment samples and rock chip samples from different horizons were collected. All the 18 gold anomalies, all the coincident anomalies, 12 exclusive nickel and 3 exclusive zinc anomalies were covered. A total of 214 samples including 143 stream sediment and 77 rock chip samples were collected (**Table 4**). Second phase of sampling showed some good values for gold in gold anomaly 7, 8, 9, 12, 17, 18 and coincidence anomaly (for Cu, Pb, Zn and Ni) (**Table 4**). They showed encouraging values for Cr and Ni also. Some of the samples showed encouraging Pd and Pt. However, on re-analysis of the samples from two different laboratories, these high values were not repeated.

RELINQUISHMENT OF AREA

After completion of two years of execution of RP, half of the area, that is, 971.45 sq km was relinquished to the Govt of Orissa in September, 2009. (**Fig 4**)

DETAILED WORK IN SELECTED ANOMALIES

Intensive traverses were taken in selected anomalies on the basis of chemical data of second phase. These are mostly coincidence anomalies of copper and nickel. Apart from these gold anomalies were also traversed and sampled. A total of 305 samples were collected for analysis and petrographical studies. Out of these 174 samples were got analysed for Cu, Pb, Zn, Co, Cr, Ni, As and Mg (**Table 5**). Excepting coincidence anomaly 1946 (An 28 and 77) all other zones showed low values. The coincidence anomaly 1946 (An 28 for Cu and An77 for Ni) was sampled in detail. The area is

covered with phyllite, basic – ultrabasic rocks, calc silicate rocks and quartz mica schist. Here sampling was done on 100m x 50m grid and 60 samples were collected along 7 traverse lines. Two samples from basic rock zones show more than 1000 ppm Cu with >1500 ppm Ni and >1000 ppm Cr. Other two samples with high Cu (>1000 ppm) are from silicified zones and show very low Ni and Cr.

CONCLUSION

In general the rock types, exposed in the area are phyllite, quartzite, quartzite with pebbly/gritty horizons, calc-silicate, granite-gneiss, schistose, basic and ultrabasic rocks. Intensive traverses taken in the RP area showed that the central part of the area is covered with mafic and ultra mafic suite of rocks rather than meta sedimentaries (quartzite – conglomerate).

The general trend of the rocks is E-W to NW-SE with moderate to steep dips. Sets of quartz veinlets / veins are also noted at few places. The quartz veins are mostly white and devoid of any sulphide. Segregation of quartz grains in the form of globules are also noted in igneous rocks mostly near the contact with quartzite. Sometime sulphides are also seen in such rocks. The area is complexly deformed and metamorphosed to several grades and occurs as dissected patches separated by vast stretch of granite, granite-gneiss and basic-ultrabasic intrusives.

The available air borne data does not show any magnetic anomaly of interest in our RP area. However there are some prominent magnetic anomalies in the north east coincident with mapped ultramafic lithologies and marginal to the granites.

Synthesis of geochemical data successfully delineated interesting gold and base metal geochemical anomalies. A total of 93 1st and 2nd order anomalies of gold, copper, lead, zinc nickel and arsenic were delineated. During the next phase all the 18 gold anomalies, all the coincident anomalies, 12 exclusive nickel and 3 exclusive zinc anomalies were covered by detailed traverses and in fill sampling. In - fill sampling did show good gold values in anomalies 7, 8, 9, 12, 17 and 18. However high gold values were not repeated in re-analyses done by two different laboratories. Since these gold anomalies showed high Cr and Ni also, these were revisited and studied, In most of these anomalies gritty quartzite and conglomerate are exposed which are feebly auriferous. This explains presence of gold values in some samples. There are no perceptible ferruginous/ silicified shear zones. As such these zones were sampled more for Cr and Ni rather than for Au. Coincidence anomalies showed high values of copper and nickel and in some cases chromium. In fact back ground values for chromium and nickel in the mafics in the RP area is high.

In the last phase intensive traverses were taken and litho sampling was done in selected anomalies of copper and nickel. The team concentrated in cluster anomaly zones as suggested. Apart from collecting suitable litho samples from different anomalies, profile sampling/ detailed sampling has been done in two zones.

The analyses showed low values of different elements in all anomalies excepting coincidence anomaly (An 18 and 77) represented by sample no 1946. Therefore a program for detailed study of this anomaly was taken up.

In this anomaly sampling was done on 100×50 m grid and 60 samples (49 surface rock and 11 soil samples) were collected along the seven traverse lines. Rock samples have assayed 0.11% to 0.26%Ni (sample no. 29, 30) with almost same values of Cr. Eluvial soil (upper reaches of hill) samples show 0.09% to 0.1% Ni (sample no. 19&37) and lower level hill slope/flat lying alluvial samples show 0.03% to 0.07%Ni. Besides some of the samples have assayed 0.1%Cu and 0.16%Ni (sample no. 8, 37 Table - 3). Besides analyses of earlier phase collected samples have also shown 8.3ppb to 13.47ppb PGE with 0.1% - 0.15%Ni with almost same value of Cr and 0.092%Cu (sample no. 314, 316&367, table-1).

Based on the results, RML plans to apply for PL over 15 sq km area in this part of the RP.

For HUNGTA MINES LTD.


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