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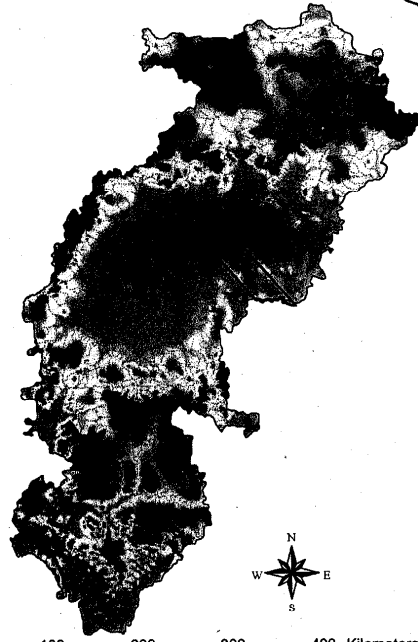
DE BEERS
A DIAMOND IS FOREVER

STRICTLY CONFIDENTIAL

**Closing Report on Reconnaissance Permit
F-2-17/2002, Chhattisgarh**

**Report for the period
30/12/02 to 29/12/05**

Chhattisgarh
2



0 100 200 300 400 Kilometers

In terms of the relevant legislation, the information reported in this document is to be kept strictly confidential by the Chhattisgarh State Government for a period of two years from the date of expiry of the license.



DE BEERS INDIA PRIVATE LIMITED

3rd Floor, Sharada Towers - 1
56 Nandidurg Road
Bangalore 560 046 INDIA
Phone: +91 (0) 80 4198 5700 Fax: +91 (0)80 4198 5757

**Relinquishment Report on Reconnaissance Permit
F – 2 – 17/2002/M, Chhattisgarh**

Report for the period
30/12/2002 to 29/12/2005

1. Reconnaissance Permit (RP) Status

The RP was originally 2000 km² in extent and was executed at Raipur on 29th December 2002. It was reduced by 50% on 29th December 2004 to retain 1000 km². The area was further relinquished on 7th May 2005 to retain 483 km². The final relinquishment was done on 29th December, 2005 (Map 1).

2. Geology of the license area

The lithological units exposed in the Reconnaissance Permit (RP) are Archean granite and granite gneisses, Early to Middle Proterozoic greenstone belts and Upper to Middle Proterozoic Chhattisgarh Supergroup sediments (Map 2). The southern part of the RP area consists of Archean granite, gneisses, and migmatites of the Peninsular Gneissic Complex. The central RP area is mostly covered with metavolcanics considered to be part of the Sonakhan Greenstone belt. The Chhattisgarh basin sediments are exposed towards far north and the south eastern corner of the RP.

There are a few exposures of granite gneiss in the RP area intruded by north south trending basic dykes. Most of the granite-gneissic country is covered under residual soil and is overlain by a thick conglomerate unit which is part of the Sonakhan greenstone Belt. It appears the metavolcanics overlie the conglomerate unit. A few ultramafic rocks have been reported by GSI from this greenstone terrane.

The granites and metavolcanics are overlain by the Chhattisgarh Supergroup sediments with an unconformity represented by a thin impersistent conglomerate. The conglomerate is dominated by angular to sub angular vein quartz with a ferruginous matrix. Although it is correlated with the Banaganapalle Conglomerate of the Kurnool Supergroup in Andhra Pradesh, the impersistent conglomerate here is not known for diamonds and there is no literature available about any work carried out on these conglomerates.



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The Chhattisgarh Supergroup sediments are almost horizontal and not disturbed much. However, local disturbance is noticed at a few locations and may be due to minor faults. No intrusive rocks into the sediments could be seen in the RP area while carrying out sampling in non-forest areas.

3. Geomorphology of the license area

The area consists of three types of terrane reflecting the rock types (Map 3). The sample density varies depending upon the geomorphology of the area.

- 1) Terrane underlain by Raipur Group of rocks is poorly drained with gentle slopes and these areas were covered by more number of loam samples. The terrane underlain by Chandrapur Group of rocks is well drained with relatively steeper slopes and this area has been covered mostly by stream samples.
- 2) Terrane underlain by metavolcanics is well drained with moderate to high slopes. Relatively fewer samples were collected in this terrane owing to the relative high slopes and well developed nature of the drainage.
- 3) The granite-gneiss terrane is covered with thick residual soil and poorly drained.

4. Activity during the period 30th December 2002 to 29th December 2005

4.1 Reconnaissance Sampling

Reconnaissance stream sediment and loam sampling was completed with a total of 316 stream and 59 loam samples being collected with an average sample density of 1 sample per 5 km². All the samples have been processed, analysed and results received. Sample locations are shown on the attached map (Map 4) and sample details are recorded in Table 1.

Stream samples comprise 75 litres of material screened through 10 mm mesh from natural heavy mineral trap sites. This - 10 mm fraction material is further screened to -2 mm. Loam samples comprise 30 litres of - 10mm material and for further processing all the samples were transported to the De Beers India- Peenya Sample Treatment Centre (PSTC) in Bangalore.

All the samples received from the field passed through a series of treatment processes to produce heavy mineral concentrates at PSTC. The raw sample collected from the field was wet screened to -2mm where the sample weight was reduced by up to 80%. The screened fraction from



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wet screening was than sent to a dense media separator to reduce the sample weight by ~95% which was followed by acidization where samples were boiled with 20% sulphuric acid and 80% water for one hour to remove the surface coatings of the concentrate to make mineral identification possible. After acidization, the samples were sent for ultrasonic cleaning, to get a clean concentrate which was sent for either low or high intensity magnetic separation based on the nature of the sample. Large samples containing a significant proportion of minerals denser than 2.95 gm/mL then pass through lithium hetero- polytungstates mixed with water at a density of 3.1 gm/ml. The sinks and floats were separated, the sink portion dried and sent to Bangalore Mineralogical Laboratory (BML) for visual examination.

The concentrate received from PSTC was visually examined under microscope at BML to recover kimberlitic indicator minerals. These grains were then sent to the De Beers heavy mineral laboratory in Melbourne for detailed classification and then on to De Beers Geoscience Centre in Johannesburg, South Africa for electron micro-probe analysis.

4.1.1 Reconnaissance Sampling Results

Results were received for all reconnaissance samples in the RP (Map 5 and Table 2), and 241 samples were reported positive with respect to kimberlitic indicator minerals after the visual examination in BML. Totals of 6621 spinels, 4 garnets, and 241 ilmenites were reported. No clinopyroxenes were recovered.

4.2 Follow up Sampling

4.2.1 Follow up 1 Sampling

Based on the results of reconnaissance sampling the first phase of follow up sampling was done in the anomalous areas to assess the anomalies generated by the reconnaissance sampling.

A total of 40 stream samples and 101 loam samples were collected. Stream samples comprise 45 litres of unscreened material, collected from natural heavy mineral trapsites and field screened to -2.0mm and loam samples comprise 30 liters of surface soil screened to -10mm. These samples have been processed, analysed and results received. Sample localities and information are shown in Map 6 and Table 4.



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4.2.2 Follow up 1 Sampling Results

Results were received for all the follow up 1 samples in the RP (Map 7 and Table 5), and 108 samples were reported positive with respect to kimberlitic indicator minerals. Totals of 21322 spinels and 7 diamonds were reported. No garnets, ilmenites or clinopyroxenes were recovered from these samples. The diamonds recovered are thought to be derived from the basal conglomerate of Chhattisgarh Supergroup sediments.

4.2.3 Follow up 2 Sampling

A second phase of follow up sampling was carried out in highly anomalous areas identified based on the initial follow up results. A total of 406 loam samples were collected in this phase. Each loam sample comprised of 30 liters of surface soil screened to -10mm. These samples have been processed, analysed and results received.

4.2.4 Follow up 2 Sampling Results

Results were received for all the follow up 2 samples in the RP (Map 8 and Table 7). A total of 52 samples were reported positive with respect to kimberlitic indicator minerals. A total of 75 spinels were reported, while no diamonds, ilmenites, garnets or clinopyroxenes were reported.

4.3 Mineral Chemistry

The majority of ilmenites recovered from the RP are probably non-kimberlitic, whilst the garnets recovered from the Mahanadi River in the far north are of low interest. The spinel chemistry is difficult to interpret, and most of the spinel probably derives from unrelated ultramafic rocks (komatiites?) within the Sonakhan Greenstone belt. However some spinels do appear to show a higher probability of deriving from kimberlites, and these were the areas over which follow up work was focused.



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4.4 De Beers Hyperspectral Scanner (DBHS) Survey

An airborne survey utilising De Beers's proprietary hyperspectral scanner technology was conducted over the RP in April 2004. The system works by measuring reflectance of narrow wavelength bands of sunlight reflected from the Earth's surface. Different minerals (as well as other materials) absorb different wavelengths of light to varying degrees. The DBHS system is sensitive enough to actually distinguish some specific types of minerals by the absorption of certain wavelengths of light detected. In diamond exploration, the system is configured to look for the presence of magnesium-rich clay minerals, derived from the weathering of kimberlites and other ultramafic rocks.

The DBHS equipment was fitted onto a P68C (registration VT-TAH) aircraft chartered from Taneja Aerospace and Aviation Limited, 1010, 10th Floor, Prestige Meridian - 1, 29 M.G Road, Bangalore 560 001. The surveying was conducted from an altitude of 9,500 ft (2,896 m) along flight lines 2 km apart. A false colour composite image of RP is shown in Map 9.

A total of 59 anomalies were selected as areas comprising Mg-rich clays with the potential to be kimberlites (Map 10). Follow up of the survey involved field visits to anomalies and identification of the causative lithological units (Table 9). Small samples were collected for PIMA (Portable Infra-Red Mineral Analyser) analysis to confirm that the lithology identified on the ground corresponded to the anomalous Mg-rich absorption feature identified by the aerial survey. PIMA analysis was carried out in field itself. No kimberlites were discovered from this survey. Detailed summaries of AMS anomalies followed up are attached as Appendix 1.

4.5 Airborne Geophysical Survey

Airborne EM survey was carried out over a part of the RP area during the time period of 1st March 2004 to 21st March 2004 by Fugro Airborne Surveys on behalf of De Beers India Pvt. Ltd. A tempest 25 Hz. EM system mounted on to a CASA C212-200 Turbo Prop survey aircraft (VH-TEM) was used for the survey. The survey was conducted at a terrain clearance of 120 m, with 200m spaced flight lines directed in 140-320 degrees. The tie lines were spaced at 1980 m and were directed in 50-230 degrees. This survey covered a total of 6313 line kilometers. The survey data was processed, interpreted and based on the response, 51 anomalies were identified to be followed up with ground geophysical surveys (Map 11).



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4.6 Ground Geophysical Survey

4.6.1 Ground Electro Magnetism Survey

Thirty eight anomalies have been followed up during the reporting period with Frequency Domain EM survey using a GEM-2 machine (Map 12, Table 10).

A total of 263.49 line kilometers of ground EM were conducted over the anomalies identified from airborne surveys. In addition to this detailed ground EM surveys were conducted over areas with positive follow up sample results. A total of 399.7 line kilometers of ground EM survey was done as part of this. Detailed sheets of EM surveys completed are attached as Appendix 2.

4.6.2 Ground Magnetism Survey

Forty three anomalies have been followed up during the reporting period with GSM magnetometers (Map 13, Table 11).

A total of 187.09 line kilometers of ground mag has been conducted. In addition to this detailed ground mag surveys were conducted over areas with positive follow up sample results. A total of 1464.7 line kilometers of ground magnetic survey was done as part of this. Detailed sheets of ground mag surveys completed are attached as Appendix 3.

4.7 Drilling

Ninety eight boreholes have been drilled in the RP area. Of this thirty one were over grain anomaly areas and sixty seven were over drill targets selected from the ground geophysical follow up work (Map 14, Table 12). None of these holes intersected kimberlites or related rocks. A total of 3566 meters were drilled in the RP area. The drill logs of the holes drilled are attached as Appendix 4.

5. Interpretation

Based on the follow up sampling results and results of various techniques used in exploration of this RP, a part of the eastern portion was identified as having the most potential for the discovery of a diamond bearing body. Extensive follow up work was done over this area, however, the follow



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up work could not establish the presence of a kimberlite or related rock body in the area. A PL application has been lodged over an area considered to have the best potential for discovery of a kimberlite.

A large number of gold particles were recovered from the heavy mineral samples, the locations of which are shown in Map 15. To investigate the gold potential of the area, PL applications have been lodged over geologically favourable areas.

6. Personnel

Name	Designation	Education
Tarun Rautela	Senior Geologist	MSC Tech – Applied Geology
M.P.Unnikrishnan	Staff Geologist	MSC Tech – Applied Geology
Anuradha Sarangi	Geologist	MSC Tech – Applied Geology
K.Aravind	Financial Controller	Chartered Accountant
Archana Sehgal	Office Manager	MBA – Marketing
Praveen Kumar	GIS Manager	MSc Geology, M.Tech Remote Sensing
S.Chandrasekhar	Treatment Plant Operator	Bachelor of Arts
C.K.Chandu	Treatment Plant Operator	Pre – University (XII Std)
A.Chenniah	Field Driver	IX Std
K.Ekambaram	Treatment Plant Operator	X Std
R.Loganathan	Treatment Plant Operator	X Std
G.Oblesh	Field Driver	V Std
G.Padmanabhan	Field Driver	VI Std
R.Philomen Raj	Office Driver	IX Std

In addition, unskilled laborers were employed on a daily basis daily from local towns and villages to help with the sampling and follow up programmes.

7. Training

De Beers maintains high operating standards including safety and environmental awareness. To this end, training is an integral part of career development with the organisation. The following is a short summary of training programmes completed to date.

All skilled staff attended a management training programme run by Deloitte's Haskins and Sells in Bangalore.

Geologists received training in field navigation, sample site selection, sample collection, labelling and recording during January 2003.



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Geologists received training in basic kimberlite geology and field identification during February 2003.

Geologists received training on Arcview GIS software during the month of January 2003 and an advanced training in Arc Map GIS software during the month of July 2004

All Geologists attended a Geosoft training programme in August 2003.

The staff members including Geologists and field drivers received first aid and safety training conducted by International SOS during the month of September 2004.

The earth scientists underwent a managerial skill development training conducted by P&P group during the month of March 2005.

All staff members also receive ongoing education in HIV/AIDS awareness and other wellness issues.

8. Expenditure

Total expenditure of Rs 75,257,821.00 has been incurred for the Reconnaissance Permit to date.

The expenditure was incurred as follows:

Capital expenditure: Rs 7,405,804.00

Revenue expenditure: Rs 67,852,017.00

9. References

1) Geology of India and Burma - by M.S Krishnan

2) Memoirs of the GSI; Vol. 125. Geology, sedimentation and economic mineral potential of the south-central part of Chhattisgarh Basin - by K.S Murthy

Sojen Joy
Technical Services Manager
De Beers India Private Ltd



DE BEERS INDIA PRIVATE LIMITED

3rd Floor, Sharada Towers - 1
56 Nandidurg Road
Bangalore 560 046 INDIA
Phone: +91 (0) 80 4198 5700 Fax: +91 (0)80 4198 5757