

KAR-05

DE BEERS
A DIAMOND IS FOREVER

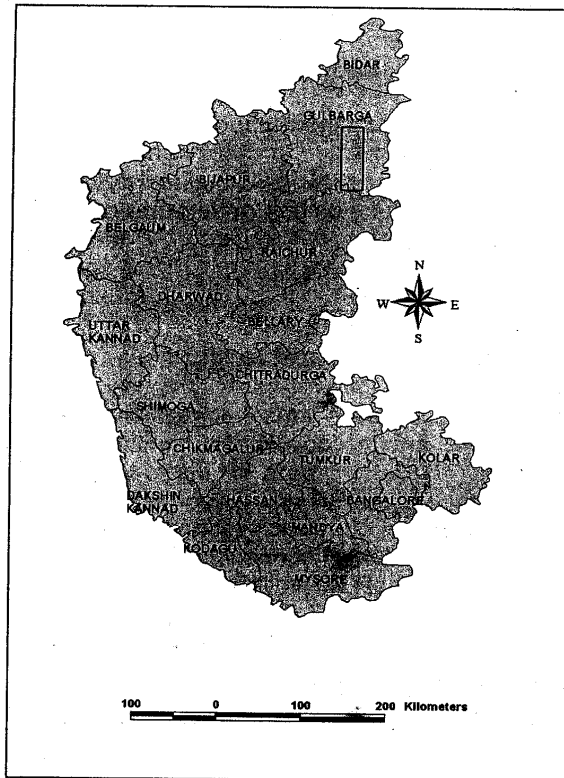
Kannada
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CLOSING REPORT FOR RECONNAISSANCE PERMIT NO 11

(C1 51 MM 2000)

STATE OF KARNATAKA

7th May 2001 to 6th May 2004



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

**Closing Report on Reconnaissance Permit
No. 11 (C1 51 MM 2000) Karnataka**

**Report for the period
7/05/2001 - 6/05/2004**

1. Reconnaissance Permit Status

The Reconnaissance Permit lies in the Districts of Gulbarga and Raichur and was executed at Bangalore on 7th May 2001. Out of an original area of 2000km², 1000 km² was relinquished on the 7th May 2003 and another 357.00 km² has been relinquished on 20th October 2003. As per the conditions of RP, the tenure of the retained permit area (643 km²) expired on the 6th May of 2004.

As per Government Of India Rules and Regulation MCR 1960 Rule 7(1) (i) (b), one prospecting licenses of total 184 km² were applied (Map 2), on 6th May 2004.

2. Geology and Geomorphology

The southern areas of the RP is underlain by the Peninsular Gneisses which range in age from 3400 to 2500 m.y. and form part of the West Dharwar Craton (Map 3). The formation of these rocks occurred in 3 stages with influx of granitic material being recognized before 3.3 b.y., at 3.0 b.y. and the youngest at 2.6 b.y., the latest being associated with amphibolite facies metamorphism culminating in the formation of granulites.

The older gneisses (Older Gneiss Complex) are mainly composed of amphibolite facies gneisses of tonalitic-trondhjemitic-granodioritic (TTG) composition and contain enclaves of ancient supercrustals of volcanosedimentary origin. In some places, the Gneisses are unconformably overlain by Dharwar type schist belts. Steep dipping faults and ductile shear zones dissect the complex in many areas.

The Younger Gneiss Complex (YGC) is confined to a wide belt of gneisses surrounding the archean nucleus and is mainly granodioritic and granitic in composition. Enclosed within these rocks are narrow Kolar type schist belts which are largely basaltic in composition and are characterized by gold mineralization.

Overlying these rocks to the north is the Bhima basin, the smallest of the Proterozoic basins in India. This basin closely resembles the Kurnool Group of the Cuddapah Supergroup located further south. The Bhima Group is made up largely of limestones but includes conglomerates, sandstones, siltstones and shales all of which were deposited in a shallow marine environment either along beaches or intra-tidal zones.

Enclaves of the Deccan traps occur in some parts of the RP. This volcanic event took place 65 m.y. ago coinciding with the Cretaceous-Tertiary boundary.



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Most of the RP lies within the drainage basin of the Pedda Vagu river which drains the high lying areas to the north of the RP towards the south. The edge of the Bhima basin is characterised by an east west trending area of higher topography along which a watershed divides this drainage with that to the north (Map 4).

3. Activity during the reporting period (7th May 2001 – 6th May 2004)

Based on the initial geological analysis of the terrain it was decided that a regional stream sampling would be the most appropriate exploration technique to screen the reconnaissance permit area for diamondiferous kimberlites. Reconnaissance stream samples were collected from suitable trap sites. In addition, an Airborne Multispectral Scanner Survey (AMS) was flown over the RP area and the anomalies identified were followed up. Helicopter-borne geophysical magnetic and Frequency Domain EM surveys were conducted over part of the RP area and ground follow up surveys were also carried out to locate drill targets.

3.1 Reconnaissance Sampling

A total of 136 reconnaissance samples were collected in the RP area.

Stream samples comprise 150 litres of unscreened material, collected from natural heavy mineral trap sites and field screened to -2.0mm. Loam samples comprise 75 litres of material collected from surface in interfluves.

Sample localities and information are shown in Map 5, Table 1.

The samples were processed at De Beers heavy mineral treatment plant in Bangalore, and the concentrates were consigned to De Beers laboratory facilities in Australia for further processing and sorting. Kimberlitic indicator minerals recovered (garnet, spinel, clinopyroxene and ilmenite) were microprobed at the University of Melbourne.

3.2 Reconnaissance Sampling Results

Kimberlite indicator mineral results have been received for all the samples collected in the RP area. A total of 110 samples were positive with respect to kimberlitic indicator minerals and a total of 796 spinels, 62 garnets, 2654 ilmenites and 9 clinopyroxenes (Map 6 Table 2) were reported.

The results are consistent with indicators known to be found in kimberlites and suggest further undiscovered kimberlites in the area.



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3.3 Phase -1 Follow-up sampling

Follow up stream sediment and loam sampling was carried out to assess the anomalies generated by the reconnaissance sampling. A total of 383 samples were collected.

Stream samples comprise 75 litres of unscreened material, collected from natural heavy mineral trapsites and field screened to -2.0mm. Loam samples comprise 30 litres of material collected from surface in interfluves

Sample localities and information are shown in Map 5, Table 3.

3.4 Phase -1 Follow-up Sampling Results

Results were received for samples (Map 7 and Table 4), and 360 samples reported positive with respect to kimberlitic indicator minerals. Total of 318 spinels, 22 garnets, 1 clinopyroxenes and 7415 ilmenites were reported.

3.5 Phase -2 Follow-up Sampling

Follow up stream sediment and loam sampling was carried out to assess the anomalies generated by the phase -2 follow up sampling. A total of 106 samples were collected.

Stream samples comprise 75 litres of unscreened material, collected from natural heavy mineral trapsites and field screened to -2.0mm. Loam samples comprise 30 litres of material collected from surface in interfluves

Sample localities and information are shown in Map 5, Table 5.

3.6 Phase -2 Follow-up Sampling Results

Results have not been received for the phase -2 follow up samples till date.

3.7 Mineral Chemistry

Mineral Chemistry data of the indicator minerals recovered is shown in Figures 1-8.

3.8 Airborne Multispectral Scanner (AMS) Survey

An airborne survey utilising De Beers proprietary hyperspectral scanner technology was completed during April 2002. 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 AMS system is sensitive enough to actually distinguish some specific types of minerals by the absorption of certain wavelengths of light detected. In the search for kimberlites, the system is config-



ured to look for the presence of magnesium-rich clay minerals, derived from the weathering of ultramafic rocks.

The AMS equipment was fitted into 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 (Map 8).

A total of 73 anomalies were selected as areas comprising Mg-rich clays with the potential to be kimberlites (Map 10, Table 7). Follow up of the survey involved field visits to anomalies and identification of the causative lithological units. 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 Bangalore. A false colour composite image of the RP is shown in Map 9.

Detail sheets of AMS anomalies followed up are attached as Appendix 1

3.9 Airborne Geophysical Survey

A helicopter borne magnetic and Frequency Domain EM survey was carried out in a part of the RP area (Map 11). The results were processed and interpreted. Based on the response, 51 anomalies were identified (Map 12, & 13) and they were followed up with ground Geophysical surveys.

3.10 Ground Geophysical Survey

3.10.1 Ground Magnetic survey

A total of 51 magnetic anomalies were followed up with ground magnetic surveys using Geometrics G856 Proton precision magnetometers (Table 9 and Maps 12 & 13) with line spacing 100m and station spacing 12.5.

A total of 259.5 line kilometers of ground magnetics have been completed.

Detail sheets of GM anomalies followed up are attached as Appendix 2.

3.11 Drilling

Fifty two boreholes were drilled to test airborne and ground geophysical anomalies. A total of 1907 meters were drilled (Table 10 and Map 14).

All holes were drilled using local contractors using a 6.5 inch tungsten steel bit. A representative sample was collected every meter, logged, and stored for future reference. Various safety and environmental procedures were introduced and adhered to and all holes were refilled and rehabilitated back to their original state.



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Detail borehole log sheets are attached as Appendix 3.

3.12 Kimberlites Discoveries

A total of 16 kimberlites were discovered. Ten kimberlites were discovered by follow up of AMS anomalies and six kimberlites are the result of follow up of the geophysical anomalies.

Kimberlite, rock sample localities and information are shown in Map 10 and Table 8.

3.13. Interpretation

Based on the results received for various techniques used in the exploration of this RP, it has been concluded that there is potential for discovering a diamondiferous kimberlite in the southern part of the RP area. As a result, De Beers India Pvt. Ltd. has decided to apply for a PL in this area.

4. Personnel

Name	Designation	Education
Dr. Sojen Joy	Section Geologist	PhD Geology
Tarun Rautela	Staff Geologist	M.Sc. Tech-Applied Geology
M.P. Unnikrishnan	Geologist	M.Sc. Tech-Applied Geology
Chandan Kumar	Geologist	M.Sc. Tech-Applied Geology
Anuradha Sarangi	Geologist(in contract)	M.Sc. Tech-Applied Geology
Prashant Laharia	Geologist(in contract)	M.Sc. Tech-Applied Geology
Binoy Verghese	Kimberlitic Mineral Analyst	M.Sc Geology
Shiva Sankar P.V.	Kimberlitic Mineral Analyst	M.Sc Geology
Manjunath	Kimberlitic Mineral Analyst	M.Sc Geology
K.Aravind	Financial controller	Chartered Accountant
Archana Sehgal	Office Manager	MBA Marketing
Ashish Bhat	User Support Officer	Dip. In E&C.,H/W & N/W
A.Chenniah	Field Driver	IX Std.
G.Oblesh	Field Driver	V Std.
G.Padmanabham	Field Driver	VI Std.
R.P.Raj	Office Driver	IX Std.
S.Chandrashekhar	Treatment Plant Operator	B.A.
K.Ekambaram	Treatment Plant Operator	X Std.
R.Lognathan	Treatment Plant Operator	X Std.
Girish Menon	Advisor-Security and Liaison	B.A.
Runa Agarwal	HRBP	MBA
Meena Raj	Receptionist	B.A.
Raj Kumar	Office Assistant	XII Std.



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Labour

Labourers were employed on a daily basis from local towns and villages to help with the field work.

5. 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 organization. The following is a short summary of training completed to date.

All staff including geologists and field drivers received first aid and safety training, including fire fighting. All staff also receives ongoing education in HIV/AIDS awareness and other wellness issues.

Geologists received training in field navigation, sample site selection, sample collection, labeling and recording of sample data. They have also received training in undertaking of ground magnetic surveys. Quality control and further on the job training is ongoing.

Geologists received training in basic kimberlite geology and field identification during the period 11th-12th June 2001.

Geologists received training on Arcview GIS software during the period 25th to 27th July 2001. Geologists received further training on Arcview GIS software during the period 3rd to 4th December 2001.

Mr Tarun Rautela was sent to South Africa for a two-week period in June 2003 to visit De Beers's mines and exploration facilities.

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

All Geologists have attended training in Geosoft for the geophysical data interpretation in August 2003.

All geologists attended a Microsoft access training programme in January 2004

All staff attended a seminar on the HIV-AIDS awareness on second week of April 2004.



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7. Expenditure

Total cumulative expenditure of Rs 20,035,777.98 has been incurred for the RP to date.
The expenditure was incurred as follows:

Capital expenditure: Rs 2,200,132.86

Revenue Expenditure: Rs 17,835,645.12



M.D. Lynn
Regional Exploration Manager
De Beers India Pvt.Ltd.
(Formerly known as De Beers India surveys Pvt.Ltd.)
Bangalore, June 2003



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