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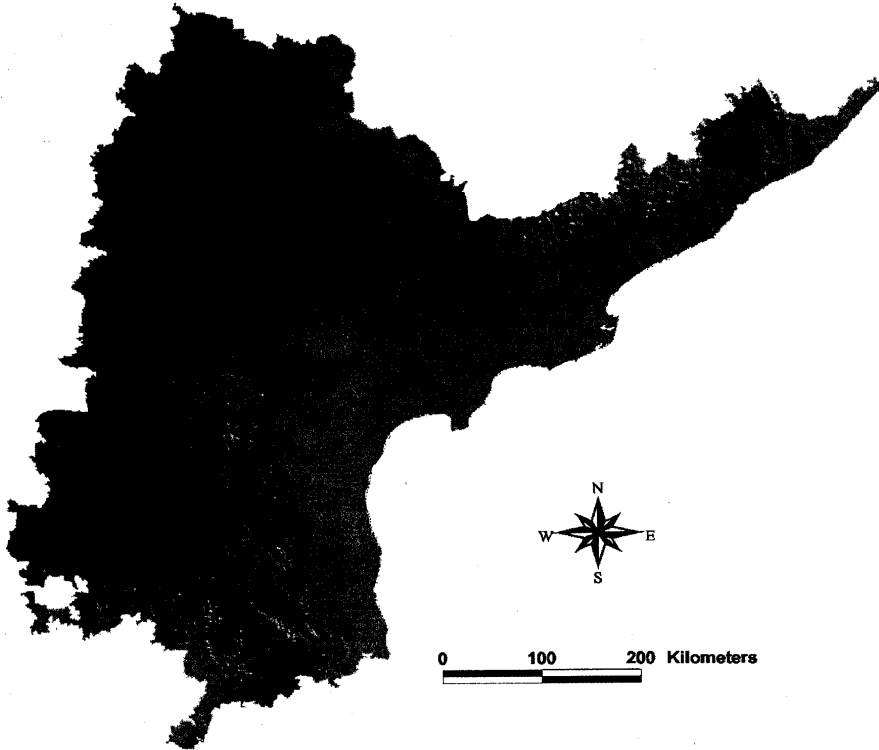
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**Closing Report on Reconnaissance Permit
G. O. Ms. No. 19, Andhra Pradesh**

**Report for the period
23/03/01 to 22/03/04**



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



DE BEERS INDIA SURVEYS PRIVATE LIMITED

17/6 Ali Askar Cross Road, Bangalore 560 052, Karnataka, India

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1. Reconnaissance Permit Status

The original RP was 2,333 km² in extent and was executed at Kurnool on 23rd March 2001. An area of 521 km² was relinquished on 19th March 2002 and a further 291 km² was relinquished on the 22nd March 2003. As per the conditions of RP, the tenure of the permit expired on the 23rd March of 2004 (Map 1).

As per Government Of India Rules and Regulation MCR 1960 Rule 7(1) (i) (b), four prospecting licenses of total 86.06 km² were applied (Map 2), on 23rd March 2004

2. Geology and Geomorphology

The RP is underlain by Proterozoic sediments of the Cuddapah and Kurnool Supergroups overlying Archaean basement of the East Dharwar Craton, which comprises part of the Peninsular Gneiss Complex (Map 3).

The Cuddapah sequence comprises a thick pile (up to 12 km) of clastic and chemical sediments with minor volcanic units (Ramam and Murty, 1997). It is intruded by picritic and gabbroic sills and dykes. The sediments have been dated at Middle to Late-Proterozoic and have been termed 'Purana Basins' indicating cratonic Proterozoic sedimentary basins. However, these ages are poorly constrained. Rb/Sr dating of sills indicate a maximum age of 1800 Ma in the Lower Cuddapah sequence. A sill near the top of the Cuddapah Sequence has been dated at 980 Ma.

The Kurnool Supergroup comprises a relatively thin sequence of clastic and chemical sediments of Late Proterozoic age. The maximum thickness is 500 m. At the base of the Kurnool sequence and directly overlying the Cuddapah Supergroup rocks is the Banganapalle Quartzite Fm., which comprises a chemically mature quartz arenite with local conglomeratic lenses. This unit is important because it has been demonstrated to contain diamond as well as mantle-derived garnet and spinel. These minerals have been interpreted to derive from pre-Kurnool age kimberlites, such as the Wajrakur kimberlites to the southwest or perhaps other undiscovered sources of similar age.

The Banganapalle Quartzite was a major source of diamonds in India in the 17th century (and possibly much earlier), and old diggings can be seen within the RP. Local villagers occasionally report the discovery of diamonds today.



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The major structural pattern in the area comprises lineaments oriented west-southwest to east-northeast.

The RP straddles the watershed between the Tungabhadra / Krishna drainage basins draining to the north, and the Penner drainage basin draining south and south-east (Map 4). The incised western part of the RP is generally well suited to heavy mineral sampling techniques. However parts of the central and eastern areas are less well drained, and loam sampling techniques were employed.

3. Activity during the reporting period 23/03/01 to 23/03/04

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 carried out 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 468 reconnaissance samples were collected in the RP area.

Large gaps are evident in the sample coverage to the east of the RP. This is due to concerns of Naxalite activity in these areas.

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 interfluvies.

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 (Map 6 and Table 2). 219 samples were positive with respect to kimberlitic indica-



for minerals and a total of 6047 spinels, 13 garnets, 8 ilmenites and 15 diamonds (Table 5) were reported. No clinopyroxenes were recovered.

3.3 Follow up sampling

A total of 5 follow up samples were collected based on favorable reconnaissance results. Sample localities and information are shown in Map 5 and in table 3. These are in the form of rock and tailing samples collected from old working of Banaganapalle conglomerates and analyzed for their kimberlitic mineral content.

3.4 Follow up sampling results

Results were received for samples (Map 7 and Table 4), and all samples reported positive with respect to kimberlitic indicator minerals. Total of 272 spinels and 3 garnets were reported. No clinopyroxenes and ilmenites were recovered from the samples collected.

3.5 Mineral Chemistry

Mineral Chemistry data from the reconnaissance indicator minerals is shown in Figures 1 – 8. Chemistries of the spinels and garnets recovered are consistent with derivation from kimberlite sources.

3.6 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 configured 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 32 anomalies were selected as areas comprising Mg-rich clays with the potential to be kimberlites (Map 10, Table 6). Follow up of the survey involved field visits to anomalies and identification of the causative lithological units (Table 6). 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 identi-



fied by the aerial survey. PIMA analysis was carried out in Bangalore. No kimberlites were discovered from this survey. 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.

3.7 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, anomalies were identified (Map 12, & 13) and they were followed up with ground Geophysical surveys.

3.8 Ground Geophysical Survey

3.8.1 Ground Magnetic survey

8 magnetic anomalies were followed up with ground magnetic surveys using Geometrics G856 Proton precision magnetometers (Table 7 and Maps 12 & 13) with line spacing 100m and station spacing 12.5.

A total of 42.6 line kilometers of ground magnetics were done.

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

3.8.2 Ground EM survey

One EM anomaly was followed up with ground Frequency Domain EM survey using GEM-2 (Table 8 and Maps 12 & 13). A total of 4.6 line kilometers of ground EM had been completed.

Detail sheet of EM anomaly followed up is attached as Appendix 3.

3.9 Drilling

3 boreholes were drilled to test airborne and ground geophysical anomalies. A total of 119 meters were drilled (Table 9 and Map 14). No kimberlite was encountered in the drilling.

Detail borehole log sheets are attached as Appendix 4.



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.
Matthew C. Cooke	Field Driver	X 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.

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 attended a Geosoft training programme in August 2003.

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 Geologists had training in geosoft for the geophysical data analysis in August 2003.

6. Expenditure

Total expenditure of Rs 23, 400, 004. 01 has been incurred for the Reconnaissance Permit to date. The expenditure was incurred as follows:

Capital expenditure: Rs 2, 648, 367.25

Revenue expenditure: Rs 20, 751,636.76



7. References

Ramam, P.K. and Murty, V.N. (1997). Geology of Andhra Pradesh. Geological Society of India, Bangalore.



M.D. Lynn
Regional Exploration Manager
De Beers India Surveys Private Ltd



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