CRA Exploration (India) Pvt. Limited

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A.P. 9, 10, 11, 12

Final Report for the Anantapur (GOMS No. 26) Gooty (GOMS No. 25), Guntakal (GOMS No. 27) and Uravakonda (GOMS No. 24) Reconnaissance Permits

Andhra Pradesh, India

Report for 4 R.P's Applied for P.L.

May 2004

Volume 1 of 5

Report

10 individual Blocks Applied for P.L's. (Covers an area of 636.8 Sq. Km)

Copies to:

Principal Secretary, Commerce & Industries and Mines, Government of Andhra Pradesh, Hyderabad.

Directorate of Geology and Mining, Government of Andhra Pradesh, Hyderabad.

Indian Bureau of Mines, Nagpur.

Geological Survey of India, Calcutta.

CRA Exploration (India) Pvt. Limited - Bangalore.

1 EXECUTIVE SUMMARY

Exploration undertaken by CRA Exploration India Pvt Ltd within the companies Uravakonda (GOMS 24), Gooty (GOMS 25) Anantapur (GOMS 26) and Guntakal (GOMS 27) reconnaissance permits of Andhra Pradesh has successfully discovered 15 new kimberlites including 11 within 3 newly defined clusters or areas. Caustic fusion of drill core samples returned micro diamonds from all but one with five of the kimberlites returned significantly elevated micro diamond counts including;

- 5-022 kimberlite (0.18ha), 162 +0.105mm diamonds/ 100kg;
- 4-007 kimberlite (1.2ha), 121 +0.105mm diamonds/ 100kg;
- 4-036 kimberlite (0.15ha), 48 +0.105mm diamonds/ 100kg;
- B1 kimberlite (0.6ha), 37 +0.105mm diamonds/ 100kg.
- 3-021 kimberlite (0.4ha), 30 +0.105mm diamonds/ 100kg; and

In comparison, caustic fusion of surface samples from the GSI/ NGRI discovered pipes within the RP areas including Wk-01, 02, 03, 04, 05, 06, 12, 13, 14 and 15 returned much lower micro diamond counts with a maximum of 12 +0.105mm diamonds/ 100kg from the Wk-04 kimberlite.

Regional reconnaissance indicator mineral sampling from stream gravels (1812 samples) completed over the entire RP areas returned abundant pyrope garnet, chromite, picro ilmenite and chrome diopside and trace diamond testifying potential for yet undiscovered kimberlites. SEM major oxide mineral chemistry completed on over 30,000 of these indicator mineral grains further testified for the diamond potential of the source kimberlites. Prospective areas totaling approximately 2050km^2 were further evaluated by 15,031 line kilometers of combined helicopter electro magnetics (HEM) and helicopter magnetics resulting in the definition of 949 targets. Each target was tested by combinations of gravity, (999lkm), ground magnetics (7,133lkm), soil and rock indicator mineral sampling, (307 samples) and/ or soil and rock geochemistry (10,066 samples). Anomalous targets were further evaluated by Reverse circulation (RC) or rotary air blast (RAB) drilling with 188 drill holes for a total of 8274 meters completed on 160 targets. A further 17 diamond core drill holes for a total of 2020 meters were completed on identified kimberlites and other targets.

Total exploration expenditure for the 3 year reconnaissance permit was 29.7 crore rupees or 206% greater than the minimum expenditure commitment of 14.4 crore rupees. Further exploration on the defined kimberlites and on numerous other prospective targets in the area is pending approval of prospecting license applications submitted over the most prospective areas.

2 INTRODUCTION

The contiguous Uravakonda (GOMS 24), Gooty (GOMS 25) Anantapur (GOMS 26) and Guntakal (GOMS 27) reconnaissance permits (RP) totaling 9330 km^2 were executed by to CRAEI on 30th January 2001 and 1st February 2001. In compliance with the requirements of the MMDR limiting the term of reconnaissance permits to a maximum of three years, the four RP's in their entirety have expired. Separately, 10 individual blocks totaling 636.8 km^2 from within the original reconnaissance permit area have been applied for as Prospecting Licenses. Applications for these PL's are currently with the government authorities pending approval.

This final relinquishment report details all exploration completed within the RP's as summarized in table 1. Complimentary periodic data and maps are further reported in the previous biannual and relinquishment reports including:

- CRA Exploration (India) Pvt. Limited (October 2001); 1st Bi-annual Progress Report for Exploration of the Guntakal (GOMS No. 27), Gooty (GOMS No. 25), Uravakonda (GOMS No. 24) and Anantapur (GOMS No. 26) Reconnaissance Permits For the period February 2001 to July 2001.

- CRA Exploration (India) Pvt. Limited (April 2002); 2nd Bi-annual Progress Report for Exploration of the Guntakal (GOMS No. 27), Gooty (GOMS No. 25), Uravakonda (GOMS No. 24) and Anantapur (GOMS No. 26) Reconnaissance Permits For the period August 2001 to January 2002.

- CRA Exploration (India) Pvt. Limited (October 2002); 3rd Bi-annual Progress Report for Exploration of the Guntakal (GOMS No. 27), Gooty (GOMS No. 25), Uravakonda (GOMS No. 24) and Anantapur (GOMS No. 26) Reconnaissance Permits For the period February 2002 to July 2002.

- CRA Exploration (India) Pvt. Limited (May 2003); 4th Bi-Annual Progress Report for Exploration of the Uravakonda (GOMS No.24), Gooty (GOMS No.25), Anantapur (GOMS No.26) and Guntakal (GOMS No.27) Reconnaissance Permits for the period August 2002 to January 2003.

- CRA Exploration (India) Pvt. Limited (October 2003); 5th Bi-Annual Progress Report for Exploration of the Uravakonda, Gooty, Anantapur and Guntakal (GOMS No. 24, 25, 26 and 27) Reconnaissance Permits for the Period February 2003 to July 2003

- CRA Exploration (India) Pvt. Limited (May 2003); First Partial Relinquishment Report Uravakonda (GOMS No. 24), Gooty (GOMS No. 25), Anantapur (GOMS No. 26) and Guntakal (GOMS No. 27) Reconnaissance Permits, Andhra Pradesh, India.

All the above reports have been submitted with the relevant government institutions and are further archived with ACC Rio Tinto in Bangalore.

CRAEI maintained a strong focus on health, safety, environment and community relations in its Andhra Pradesh diamond exploration projects. No lost time injuries and relatively few high-risk health and safety incidents were reported during the exploration period.

3 REGIONAL GEOLOGY

The regional geology map based on a compilation of published and unpublished GSI geological maps is given in Plan NDbg0310. The area is dominated by lithologies of the Achaean Eastern Dharwar Craton notably various granitoid gneisses with lesser enclaves of pyroxenite, gabbro, and amphibolite all grouped together as 2900 Ma Peninsular Gneiss Complex (PGC). Rocks of the 2700 Ma Ramagiri-Penakacherla greenstones and the Jonnagiri greenstones occur as NS to NNW-SSE trending linear belts the former of which dissects the permits from the southeast corner of the Anantapur RP to the southwest corner of the Guntakal RP. Granite plutons of the 2500 Ma Closepet Granite intrude the Peninsular Gneiss Complex as a NNW-SSE trending linear belt paralleling that of the greenstone belt in the western portion of the Anantapur permit. The Closepet Granite defines the boundary between the East and West Dharwar Craton and marks the beginning of Cratonisation.

In the Gooty RP, Mesoproterozoic platformal sediments, (conglomerate, sandstone, shale, chert and limestone) of the Cuddapah Group overly the crystalline basement as an arcuate basin. At least three laterally extensive dolerite sills intrude into these sediments within the RP area. Neoproterozoic shallow marine clastics, carbonates and shales of the Kurnool group unconformably overly the Cuddapah Group as a small outlier at the eastern boundary of the Gooty RP. The basal Banganapalle Conglomerates on which several diamond workings are located to the north are not preserved in the RP area.

Extensive Paleo- to Meso-Proterozoic ENE to NW and NE trending dolerite dyke swarms are evident throughout the RP's. Locally, ~1100 Ma old kimberlites intrude both the crystalline basement of Dharwar Craton and the Mesoproterozoic sediments of the Cuddapah Basin. Previous exploration by the Geological Survey of India and the NGRI have identified 23 kimberlites in three clusters i.e. Wajrakarur, Chigicherla and Kalyandurg were identified. During the term of the reconnaissance permit, CRAEI identified a further 15 kimberlites including three new clusters. The kimberlites vary in size from < 1 Ha to 85 Ha with all but two containing at least trace amounts of diamonds.

Younger alluvium and colluvium cover are common adjacent to the current and palaeo river systems in the area with flanglomerates being mapped in the Cuddapah Basin sequence.

4 RESULTS OF EXPLORATION

4.1 Geology

Geological traversing in combination with other exploration activities has found the regional 1:250,000 geological mapping of the GSI to be accurate and sufficient for the interpretation of most of the regional and prospect datasets. An interpretation of the regolith based on Landsat TM and high resolution IRS panchromatic imagery is presented in Plan NDbg0311. Four major units are recognized including in order of decreasing coverage a) residual red - brown soil over granite gneiss, greenstones and granites, b) Black Cotton Soil comprising a thin (1-2m) veneer of black swelling clay rich soil covering the peniplanated crystalline basement dominantly in the Hagari River Basin of the Guntakal and Uravakonda RP's; c) alluvial flood plain deposits adjacent to the larger creeks and rivers and d) regions of sub-cropping country rocks.

4.2 Gravel (Indicator Mineral) Sampling

In total 1812 gravel samples were collected and observed from within the RP areas. Each gravel sample comprising approximately 30kg of –1mm sand was collected by hand from heavy mineral concentration zones within the active stream sediment bed load. All samples are processed at the company's specialist processing facilities by a combination of magnetic and heavy liquid techniques and manually sorted, counted and described. The mineral chemistry of suspected kimberlitic indicator mineral species were subsequently probed by a scanning electron microprobe

Detailed observation results for all of the gravel samples are listed in Appendix 1 and the probe results in Appendix 2. Notably the area is characterized as having a wide dispersion of common indicators with over 73% of the samples returning one or more potentially kimberlitic indicator minerals with a total of 378,756 grains recovered and 30,182 probed.

A location plan of the gravel samples is given in plan NDbg0344 with the distribution of the kimberlitic indicator mineral species show in plan NDbg0345. Notably the indicator minerals distribute coherently around the previously known kimberlite clusters at Wajrakarur, Uravakonda, Anumpalle (WK-10) and Venkatampalle (WK-7) in addition to around new kimberlite clusters identified at Gooty, Brahmanapalle and Raailu.

4.2.1 Gravel Sample Diamond Results

A total of thirteen micro diamonds including the largest stones of 0.81x0.56mm, 0.75x0.55mm, 0.675x0.375mm and 0.58x0.8mm were recovered from eleven individual samples within the reconnaissance area. Detailed descriptions of the diamonds recovered are listed in Appendix 3. Due to their small size none of the stones are of economic value.

Diamonds recovered were largely downstream of mapped kimberlites including that of WK-01, WK-04, WK-06, WK-07, WK-10, B1 and 4-007. A single 0.58x0.8mm diamond recovered from sample 5530489 in the Gooty area is associated with moderate concentrations of chromite and picro ilmenite and remains to have a source defined. A further two stones of 0.375x0.28mm and 0.31x0.31mm recovered from individual samples numbered 5527129 and 5528364 collected in the same 5km^2 catchment area 6 kilometres to the southeast of the WK05 kimberlite are not associated with any concentration of supporting kimberlitic indicator minerals and are considered to be distal to any kimberlite source.

4.2.2 Gravel Sample Garnet Results

The kimberlite clusters of Wajrakarur, Uravakonda, Anampalle (WK-10), Venkatampalle (WK-7), Gooty, Brahmanapalle and Raailu all produce significant populations of pyrope garnet. Pyropes are dominantly lhzerolitic (see figures 1-4) with lesser eclogitic, wehrlitic and trace harzburgitic. Elsewhere, garnets are dominated non-kimberlitic varieties including almandine grossular, uvarovite and spessartine.

4.2.3 Gravel Sample Chromite Results

The kimberlite clusters of Wajrakarur, Uravakonda, Anampalle (WK-10), Venkatampalle (WK-7), Gooty, Brahmanapalle and Raailu all produce significant populations of kimberlitic chromite (see figures 5-8). Outside of the kimberlite cluster areas, definitive shallow crustal chromites defined by low MgO and relatively constant Cr2O3 mineral chemistries predominate.

4.2.4 Gravel Sample Ilmenite Results

Ilmenite recovered from the gravel samples is dominated by kimberlite associated picro ilmenite however low MgO/ low Cr2O3 crustal associated varieties are also present throughout the permit blocks (see figures 9-12).

4.3 Loam, Auger and Rock Indicator Mineral Sampling

Various targets and known kimberlites within the permit area have been tested or characterised for indicator minerals by loam sampling (170), auger soil sampling (59) and rock sampling (78). Loam samples were all collected as -1mm soil scraped from the topmost soil profile preferably from a zone of heavy mineral or coarser sand accumulation on or down slope of the tested target. Auger samples are generally composed of friable rock or soil collected from all bottom of the screw of shell type auger holes at depths of 1-5 meters. Rock samples were generally collected from the base of shallow (<1 metre) pits excavated into relatively uncontaminated bedrock. Processing of loam, auger and rock samples was variable including pre crushing of consolidated samples and combined magnetic and heavy liquid separation techniques. Diamonds were either recovered from the heavy mineral concentrate or liberated separately by caustic fusion techniques. Indicators minerals observed and probed and diamonds recovered are listed in appendix 1, 2 and 3 respectively.

4.4 Geochemistry Surveys

A total of 1,070 stream sediment samples, 9,585 soil samples, 481 rock samples, and 2,938 drill chip samples have been collected and assayed from within the permit area. Summary statistics of geochemical samples collected are given in table 2 - 6. Full data including sample locations and assay results for all samples collected are listed in Appendix 4 - 6 and 11 respectively.

Permit	Stream Sediment	Soil	Rock	Drill Chip
Anantapur	249	3390	154	528
Gooty	342	769	59	994
Guntakal	243	332	41	389
Uravakonda	236	5094	227	1027
TOTALS:	**1070**	**9585**	**371**	**2938**

Table 2: Statistics of geochemical samples collected in the reconnaissance permit area.

Stream sediment samples were collected at the same sample site as the reconnaissance indicator minerals. Each sample consists of approximately 100gm of –80# (-180□m) silt collected from the active streambed in the centre or lowest part of the stream. Soil samples consist of approximately 100 grams of –80#, C – horizon soil typically collected from a shallow 10 - 20 cm deep pit or at the bottom of an auger hole. Soil samples have been variably sampled either in a nominal 150 metre line spacing and 50m sample spacing grid or as crosshair or single line traverses with sample spacings varying from 25 – 100metres. Rock samples wherever possible are composited either as rock chips for any outcrop or as composites of similar lithology for float samples. For RAB and RC drill chips, a sample of the recovered fines was generally composited over 3 metre intervals. Sample size was a nominal 1kg for both rock and drill chip geochemical samples.

Standard sample analysis is for a suite of 37 elements by mixed acid digest with ICP–MS or ICP–OES detection. Elements analysed with individual detection limits in brackets include: Ag (0.1ppm); Al (10ppm); As (0.5ppm); Ba (10ppm); Bi (0.1ppm) Ca (10ppm); Cd (0.1ppm); Ce (2ppm); Co (2ppm); Cr (2ppm); Cs (0.1ppm); Cu (2ppm); Fe (100ppm); K (10ppm); La (1ppm); Mg (10ppm); Mn (5ppm); Mo (0.1ppm); Na (10ppm); Nb (0.2ppm); Ni (2ppm); P (5ppm); Pb

(0.5ppm); Rb (2ppm); Sb (0.5ppm); Se (0.5ppm); Sr (2ppm); Ta (1ppm); Te (0.5ppm); Th (20ppm); Ti (10ppm); V (2ppm); W (0.1ppm); Y (1ppm); Zn (2ppm) and Zr (10ppm). For stream sediment samples, further analysis by 10 gram fire assay with ICP-OES finish was conducted for Au (1ppb), Pt (5ppb) and Pd (1ppb).

4.4.1 Stream Sediment Geochemical Results

Stream sediment geochemistry indicates only limited potential for precious and basemetal mineralisation with several point sources returning maxima of 230ppb Au, 2.2ppm Ag, 12.5ppb Pt, 380ppm Cu, 950ppm Pb and 650ppm Zn. The most prospective of these included a Cu – Zn – Au - Ag anomaly draining the northern portion of the Gooty permit. The lack of any lateral continuity limits the potential for significant associated mineralisation to this anomaly. Elsewhere the combination of point sources, lack of continuity and lack of multi element signatures suggest associated mineralisation to be minor or the anomalies themselves to be not associated with mineralisation. Stream sediment sample locations are given in Plan NDbg0346.

4.4.2 Soil Geochemical Results

Within areas of residual soil cover, soil geochemistry is shown to be variably effective in the delineation of kimberlite with various alkaline granitoids of the Archaean Basement returning, in several cases returning similar signatures. In addition several of the kimberlites had no associated geochemical anomaly. Niobium soil geochemistry is presented as a map in Plan NDbg0347.

4.4.3 Rock Geochemical Results

Similar to soils, individual kimberlite rocks produce variable geochemical signatures. The kimberlite weathering products including calcrete although having variably elevated incompatible element signatures is typically depleted in the compatibles (Mg, Ni and Cr) and in several cases returned similar chemistry to calcrete derived from the some of the alkaline granitoids.

4.4.4 Drill Chip Geochemical Results

Geochemistry was conducted on drill chips from RC and RAB drilling to confirm the observed kimberlite intercepts. All but one kimberlite intercept returned distinctly anomalous compatible and incompatible element signatures as shown by the highlighted assays detailed in Appendix 11.

4.5 Airborne Geophysics

A total of 15,031 line kilometres of airborne geophysical surveys have been conducted over two phases including 10,970 line kilometre of combined helicopter supported electromagnetic/ magnetic (HEM) survey flown in April and May 2002 and as reported in the "3rd Bi-annual Progress Report" and a 4,061 line kilometre HEM and helicopter-supported magnetics only survey flown in March and April 2003 and as reported in the "5th Bi-annual Progress Report". A summary of line kilometres flown of each survey type per RP is included in table 7. A map showing the flight lines attributed by technique is included in Plan NDbg0348.

The airborne geophysical data collected during the survey remains to be vetted by the Ministry of Defence and is therefore not available for inclusion into this report.

Permit Name	HEM / Mag Line km	Helimagnetics Line km	Total Line km
Anantapur	3232	-	3232
Gootv	1006	1868	2874
Guntakal	2963	-	2963
Uravakonda	5275	687	5962
TOTALS:	**12.476**	**2.555**	**15.031**

Table 7: Summary of airborne geophysical surveys by Reconnaissance Permit

4.5.1 Equipment Specifications Data Acquisition and Processing

Fugro-Elbocon, an international geophysical survey company and Bangalore based Deccan Aviation Limited were separately contracted to provide the geophysical equipment, geophysical personnel and helicopter support for the survey. The geophysical equipment comprised a Fugro-Elbocon DIGHEM$_{COMPACT}$ electromagnetic system incorporating four horizontal coplanar coils operating at frequencies of 600 Hz, 3 kHz, 15 kHz and 56 kHz mounted in a "bird" towed 30m below the helicopter and a Cs-vapour magnetometer mounted in a separate bird (located 10m above the DIGHEM bird). Ancillary equipment including radar and barometric altimeters, analogue and digital recorders and an electronic navigation system were all installed in a Bell 206L3 Long Ranger helicopter.

The survey lines were flown in an N-S direction at a flight line separation of 150 meters and with tie lines flown in an E-W direction at a separation of 1500 meters. The survey was flown at an average airspeed of 130 km/h, with data recorded at 10Hz (0.1 second intervals), equating to approximately one reading every 3-4 meters. Sensor terrain clearance was a nominal 30 meters.

Data recorded in the helicopter consisted of separate data files for the GPS navigation, altimeter and the EM/magnetics systems. Separate GPS and magnetic drift data were recorded from ground-based systems located at Guntakal. Daily processing of the data involved quality control of the system performance by inspection of the analogue chart recorder profiles and raw data files. Magnetic data were corrected for diurnal variations (recorded by the base magnetometer) and the GPS data subjected to differential post processing to reduce the positional errors to less than 5m. The navigational data and the geophysical data were time-base merged and corrected for system lag. The apparent resistivity measured in ohm-m was calculated from the in-phase and quadrature EM components using a proprietary pseudo-layer,

half space algorithm for each frequency. Magnetic data was adjusted for tie-line and micro-leveling variations. The line data were gridded to produce images of the various channels of data on a daily basis to allow for interpretations and follow-up of identified anomalies to commence immediately. Further proprietary data processing techniques, including conductivity-depth imaging, is pending security clearance and the grant of an export license for this data.

4.5.2 HEM Survey Results

The black cotton soil covered areas of the basement-exhibited low to moderate resistivity. Higher apparent resistivity observed over the black cotton soil covered Ramagiri-Penakacherla Greenstone Belt are considered due to limited weathering and a decrease in black soil thickness over the greenstones. Outside of the greenstone belt, the black cotton soil has developed a fairly consistent resistivity pattern with zones up to 700m wide around the present day drainage exhibiting increased conductivity.

The Mesoproterozoic Cuddapah Basin sediments exhibit highly variable conductivities with the data further downgraded due difficulties in maintaining constant ground clearances in the moderately rugged terrain as is typical of this area. As a consequence, HEM surveys in the Cuddapah sediments were restricted to a small test survey of several lines plus tie line data.

The basement lithologies including the granite – gneiss, the greenstone belts and the Paleoproterozoic granites are all relatively resistive thus providing a sufficient conductivity contrast with weak conductors typical of kimberlites in this environment. Airborne Magnetic Survey Results

The survey area covered by heli magnetics identified three major magnetic domains: the quiet magnetic background of the Cuddapah sediments, linear dominant features of the Penakacherla Greenstone Belt and highly variable magnetic relief of the Archaean Basement.

As expected the predominantly shale, mudstone and dolomite sequences of the Mesoproterozoic Cuddapah Basin exhibit a quiet magnetic signature within which even very weak magnetic responses associated with kimberlite are clearly detectable The north-south striking dolerite sills are however characterised by a broad linear signature of moderate and variable magnetic relief concealing any possible signature of any contained kimberlite.

The variable magnetic character of the Peninsular Gneiss terrain is due largely to the variable mafic/felsic composition of its constituent lithologies and there structure complexity. Large-scale, predominately WNW and ENE trending linear structures characterised by magnetic lows dissect the entire survey. Individual units within the Ramagiri - Penakacherla greenstone are characterized by highly variably magnetic signatures trending parallel to that of the greenstone belt.

Different generations of dolerite dykes are also observed crosscutting the Archaean basement. The dolerite dykes are magnetically variable but are dominated by remanent magnetised types that appear as both north and south positive dipoles. Normally magnetised and low magnetic dolerite dykes are also present but are less prevalent.

4.5.3 Anomaly Selection and Follow-up Process

Anomaly selection was based on the integration of all data sources including gravel and loam indicator mineral distribution, geology and structure, Landsat TM and IRS remote sensed data, airborne HEM and magnetic data. A total of 949 anomalies were identified for follow-up using various combinations of geological mapping, ground magnetic surveying, ground gravity, soil and rock geochemistry, loam kimberlitic indicator mineral sampling and Rotary Air Blast (RAB) or Reverse Circulation (RC) drilling. A complete listing of these targets along with their

geophysical character is given in Appendix 7. The geological, geochemical and indicator mineral character is given in Appendix 8.

4.6 Ground Geophysics

Ground geophysical surveys were used as follow-up of identified anomalies, to corroborate and accurately locate the anomaly on the ground and in the case of magnetics, to provide improved spatial resolution of the geophysical response. Further specific magnetic and gravity surveys were utilised to accurately locate drill collar positions.

4.6.1 Gravity

Many of the worldwide weathered kimberlites including those in India have characteristic gravity lows associated with the weathered and lower density upper portions of these pipes. Within the reconnaissance permits 20,426 gravity readings for 999 line kilometres of traverse data were collected over 435 HEM targets.

Scintrex CG-3 gravity meters and post differential GPS were utilised to complete the survey. Gravity data was collected variably as single line or crosshair traverses across individual targets or in a grid pattern all at a nominal station spacing of 50m. Elevation data for each cluster of targets was post differential processed to a base station with the elevation of each base station calculated utilising averaged GPS elevations. No absolute elevation data were collected and all local base stations were independent. Gravity data for each individual traverse were reduced to a Bouguer (2.67g/cc) value for analysis on a profile-by-profile basis. Leveled Bouger gravity profiles are shown independently in NDbg0350b, NDbg0351b, NDbg0352b, NDbg0353b, NDbg0354b, NDbg0355b and NDbg0356b. Descriptions of gravity data over individual targets is given in Appendix 7.

4.6.2 Ground Magnetics

Within the RP's a total of 70 ground magnetic grids, totaling 7,133 line kilometres (576 km^2), at a nominal line spacing of 75meters were surveyed covering the airborne geophysical targets and the highest priority anomalous indicator mineral catchments.

The ground magnetic technique incorporated Scintrex ENVIMAGS, used in "Walkmag" mode with readings being taken automatically at 2-second intervals or approximate 2-3metre sample interval whilst the operator navigated along north-south traverse lines. Navigation along preplanned lines was accomplished with hand-held GPS units, accurate to +/- 10m.

Imaged and contoured gravity data for the areas are shown in NDbg0350a, NDbg0351a, NDbg0352a, NDbg0353a, NDbg0354a, NDbg0355a and NDbg0356a.

5 Summary of CRAEI Discovered Kimberlites

5.1 Gooty Cluster

Eight kimberlites discovered by CRAEI within the Meso Proterozoic sediments of the lower Cuddapah Basin and in the adjacent Archaean basement of the Kurnool block represents a new kimberlite cluster discovery and the only presently known kimberlites within the Cuddapah Basin Sediments. (Note Chelima and Zangamrajupalle occurrences to the east are lamproites). All kimberlites discovered in this area have been named according to their original target name viz 4-007, 4-036, 5-022, 5-023, 5-119, 5-018, 5-019 and 5-028.

5.1.1 4-007 Kimberlite

The 4007 kimberlite is located within Peninsular Gneisses of the Archaean basement adjacent and along strike of a quartz reef ridge. The kimberlite is overlain by 15m of mixed talus and colluvium thought in part to be associated with a localised deflationary surface developed over the kimberlite. Drilling delineates at least two phases namely a dominant hypabyssal macrocrystic kimberlite and a central hypabyssal kimberlite breccia. Petrology reports of samples from each are reported in Appendix 14. Both phases are deeply weathered with complete destruction of original texture and density (mass) loss to a vertical depth of approximately 50 meters (APDDH009; 55meters) grading progressively into less weathered, intermediate density kimberlite and finally into fresh deuteric altered kimberlite at approximately 100 meters vertical depth (APDDH008; 104.6 meters)

Mapping and drilling of the 4-007 kimberlite models it as a sub vertical, sub rounded body with areal extent of approximately **1.2Ha.** Drilling included an initial vertical RAB hole (APRAB066) to a depth of 40meters and two angle HQ diamond core holes (APDDH008 and APDDH009) to a maximum vertical depth of 133metres. Drill collar summary, drill ledgers and down hole geochemical assays for the drill holes are listed in Appendix 9, 10 and 11.

Diamond results from the caustic fusion of 193kg of HQ drill core from APDDH008 and APDDH009 and for combined heavy mineral separation and caustic fusion of 114kg of RAB drill chips from APRAB066 are listed in Appendix 11. Descriptions of selective individual stones is given in Appendix 12. An analysis of the caustic fusion results indicate strong supergene enrichment in the less dense, deeply weathered upper portions of this kimberlite including

- 101 +0.105mm diamonds from 26.8kg **(377 +0.105mm diamonds/100kg)** from deeply weathered clay rich kimberlite in APDDH009, 24 – 54m depth.
- 49 +0.105mm diamonds from 42.8kg **(114 +0.105mm diamonds/100kg)** from the moderately weathered clay rich kimberlite in APDDH009, 54 – 99m depth.
- 79 +0.105mm diamonds from 120kg **(66 +0.105mm diamonds/100kg)** from the fresh deuteric altered massive hypabyssal macrocrystic and hypabyssal kimberlite breccia in APDDH008, 110 – 153m depth.

The largest stones all reported on the +0.425-0.600mm standard Endecott standard square mesh sieve and included 0.8x0.65mm, 0.95x0.675mm and 0.75x0.575mm, white to brown irregulars and octa-aggregates, all lightly frosted and with few inclusions.

5.1.2 4-036 Kimberlite

The 4-036 kimberlite is located 300m south east of 4-007 possibly forming a larger blow on a kimberlite bearing structure that extends between the two. The 4-036 kimberlite is overlain by 30 - 33m of localised deflationary colluvium developed due to dissolution and under caving of the underlying kimberlite. The deflationary surface over the neighboring granitoid gneisses appears to be limited to 0 – 2 meters thick. Drilling defines it as intermixed xenolith poor hypabyssal macrocrystic kimberlite and xenolith rich hypabyssal kimberlite breccia. In comparison to the 4-007 kimberlite, the deeply weathered clay rich portions of the kimberlite appear to be thin or absent with diamond drill hole APDDH010 drilling directly into fresh kimberlite at a vertical depth of 28 meters (30m down hole depth).

Drilling on this kimberlite included an initial vertical RAB hole (APRAB069) to a depth of 40meters and a single angle HQ diamond core hole, APDDH010 to 125.1 meters (117.6 vertical meters). Drill collar summary, drill ledgers and down hole geochemical assays for the drill holes are listed in Appendix 9, 10 and 11. Modeling suggests the kimberlite is a vertical, oval-shaped body of limited lateral extend of approximately **0.15Ha**.

Caustic fusion of 82 meters of fresh serpentinised macrocrystic kimberlite and xenolith poor kimberlite breccia from hole DDH010; 30 –112 meters, returned 53 +0.105mm diamonds from 111kg **(48 +0.105mm diamonds/ 100kg)**. The largest stone, a heavy frosted inclusion-bearing grey irregular aggregate measured 0.875 x 0.825mm reported on the +0.60-0.85mm Endecott standard square mesh sieve.

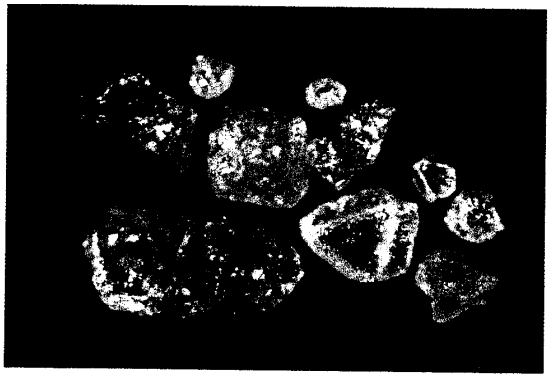

Figure 2 Diamonds from DDH010 on the 4-036 kimberlite. Scale is 0.1mm per division.

5.1.3 5-022, 5-023 and 5-119 Kimberlites

The 5-022, 5-023 and 5-119 kimberlites form as minor blows and dykes on an east west trending reverse fault (southern hanging wall up) within dolomites, cherts and mudstones of the Mesoproterozoic Vempalle Formation of the Cuddapah Basin. Drilling on these kimberlites has been restricted to 5-022 including a 40 metre vertical RAB hole (APRAB057) and a 60 metre, -70° inclined HQ diamond core hole (APDDH014). Drill collar summary, drill ledgers and down hole geochemical assays for the drill holes are listed in Appendix 9, 10 and 11.

All kimberlites occur as single phase hypabyssal kimberlite breccias with a variable xenolith component dominated by Proterozoic sediments. Petrologically (refer to Appendix 14) the kimberlites are defined as xenolith rich hypabyssal kimberlite breccias to hypabyssal macrocrystic kimberlite with the xenolith component largely dependent on closeness to the contact. A short description of each of the kimberlites and their size and disposition are as follows:

- The 5-022 kimberlite, a xenolith rich macrocrystic kimberlite. It is modelled as a strike limited, south-dipping dyke measuring approximately 15m wide and 100 meters long for a total surface area of **0.15Ha**. Potential exists for narrower or non magnetic dykes along strike

- The 5-023 kimberlite is outcropping and is dominated by carbonate xenolith rich hypabyssal kimberlite breccia Outcrops map the kimberlite as a 160x70m ovoid shaped body with a surface expression to **0.7Ha**. The kimberlite is closed off in all but the eastern quadrant.

- The 5-119 kimberlite is outcropping hypabyssal macrocrystic kimberlite. Surface mapping suggest the kimberlite has a surface area of less than **0.1Ha**.

The diamond content of each of the kimberlites has been established by caustic fusion of drill core or surface samples and subsequent observation and counting of micro diamonds. Diamond size distribution data is included in appendices 3 and 12 with descriptions of stones recorded in Appendix 13. A summary of results is as follows:

- 5-022; moderately weathered xenocryst rich hypabyssal kimberlite sampled from diamond core drill hole APDDH015; 20.7 – 43.5m returned 97 +0.105mm diamonds from 59.9kg **(162 +0.105mm diamonds / 100kg).** The largest stone, a yellow, partially resorbed, irregular measuring 0.85x0.575mm reported on the +0.425-0.60mm Endecott standard square mesh sieve.

- 5-023; a 92kg composite rock float sample of fresh serpentinised xenocryst rich kimberlite returned 19 +0.105mm diamonds **(21 +0.105mm diamonds / 100kg)**. The largest stone, a lightly frosted brown irregular measuring 0.95x0.6mm, reported to the +0.425-0.60mm Endecott standard square mesh sieve.

- 5-119; a 100 kg composite float sample of moderately weathered hypabyssal kimberlite returned **28 +0.105mm diamonds** with the largest stone being a brown, partially resorbed, dodecahedron measuring 0.8x0.6mm and reporting on the +0.425-0.60mm Endecott standard square mesh sieve.

5.1.4 5-018, 5-019 and 5-028 Kimberlites

Similar to the 5-022 group of kimberlites located 3.7 kilometres to the north, the 5-018, 5-019 and 5028 kimberlites form as minor blows and dykes on a parallel east west trending reverse fault (southern hanging wall up) within dolomites, cherts and mudstones of the Mesoproterozoic Vempalle Formation of the Cuddapah Basin.

Drilling on the kimberlites includes:

- 5-018; 40m vertical RAB hole (APRAB050) and a –60° inclination HQ diamond core drill hole to a depth of 88m (APDDH014). RAB drilling identifies the kimberlite under a thin <3m-cover sequence. APDDH014 intersected the hypabyssal xenocryst rich kimberlite breccia and hypabyssal macrocrystic kimberlite from 22 – 60 metres including a 3-metre wide dolomite xenolith at 46.15metres. Caustic fusion of the 38 metre intercept of hypabyssal kimberlite breccia from hole DDH014 returned 4 +0.105mm diamonds from 81kg **(5 +0.105mm diamonds / 100kg)** with the largest stone being a medium frosted white irregular measuring 0.275 x 0.25mm.

- 5-019; 50m vertical RAB hole (APRAB051) and two –60° inclination HQ diamond core drill holes to depth of 49m and 127.1m respectively (APDDH011 and APDDH012). In APDDH012, the kimberlite occurs as a series of four dykes like bodies of hypabyssal kimberlite breccia alternating with shale and cherts of the Vempalle Formation. The composited down-hole length of kimberlite in this hole is 51.05 metres with a maximum kimberlite intersection of 18.95m from 64.95m. Both diamond drill core holes were terminated at depth due to poor ground conditions. Caustic fusion 109.1kg of the kimberlite from this hole returned 10 white broken diamond fragments in part sourced from a disintegrated drill bits. The kimberlite is at best is only weakly diamondiferous.

- 5-028; 51m –60° inclination RAB hole (APRAB168) intersected hypabyssal macrocrystic kimberlite from 12 – 18metres. This minor intercept is interpreted a semi contiguous kimberlite dyke extending over 300 metres and joining into the 5-018 kimberlite to the east. No diamonds were recovered from a composite of the RAB drill chips.

5.2 Anumpalle Cluster

The Geological Survey of India identified three kimberlites within the Anumpalle Cluster namely Wk10 (Anumpalle), Wk11 and Wk12 kimberlites. Both the Wk10 and Wk11 kimberlites are currently being evaluated under prospecting leases by the NMDC. During the term of the RP's, CRAEI have identified a further four kimberlites namely 3-055, 3-021, 3-016 and 3-008 as discussed below.

5.2.1 3-055 Kimberlite

The 3-055 kimberlite is located within an east west trending mylonite shear zone within the Peninsular Gneisses 650 meters to the north west of the Wk10 (Anumpalle) kimberlite. The kimberlite is overlain by 4-5 meters of alluvium and colluvium and nowhere outcrops. Based on interpretation of geophysical data and latter confirmed by drilling, the 3-055 kimberlite is mapped over an area of **7.5 hectares**.

Drilling on the kimberlite included an initial angled reverse circulation drill hole (APRC004) to 132metres, two -60° inclined diamond core drill holes (APDDH001 and APDDH007) forming a drill fence across the body to depths of 162.2 and 151.4 meters respectively and five inclined reverse air blast drill holes (APRAB113, APRAB114, APRAB116, APRAB117 and APRAB119) to delineate the extent of the kimberlite for a total of 219 meters. Drill collar summaries, drill ledgers and down hole geochemical assays are listed in Appendix 9, 10 and 11.

Petrologically the kimberlite is interpreted as being a single phase and as transitional between hypabyssal macrocrystic kimberlite breccia and diatreme facies pelletal tuffisitic kimberlite breccia with an abundance of microphenocrysts altered olivine suggesting a hypabyssal emplacement and minor altered pelletal olivine and strongly milled xenoliths suggesting a transitional diatreme level of emplacement.

Diamonds recovered by caustic fusion of 183.8kg of HQ kimberlite core from drill holes APDDH01 and APDDH07 returned 24 +0.105mm diamonds **(13 +0.105mm diamonds/ 100kg)** with no significant variation in diamond counts either down the hole or between holes. The largest diamond recovered was a 0.6x0.55mm white macle recovered on the +0.425-0.60mm Endecott standard square mesh sieve. Samples from the five RAB holes drilled into this body shall test for any lateral variations in diamond content. Processing of these samples is pending.

5.2.2 3-016 Granitoid Breccia – Kimberlite – Carbonatite Complex

The 3-016 complex is dominated by outcropping and sub cropping granitoid breccias with lesser shoots of kimberlite breccia and a sovite (Ca Carbonatite) stock. The complex is mapped over an area of **22 hectares** (refer to figure 7) and located 3.5 kilometres east south east of the GSI discovered Wk10 (Anumpalle) kimberlite.

The granitoid breccias constitute over 95% of the complex and consist of clast supported sand to cobble to mega block fragments of granodiorite, granite gneiss, quartz monzonite, tonalite and dolerite with a subordinate matrix of finely milled rock fragments. Clasts are typically fresh apart from alteration of the ferromagnesium minerals to chlorite – epidote. Conversely the matrix is strongly altered with pervasive development of K-feldspar, fine dissemination of Fe oxide in the remaining plagioclases giving a reddish colouration and possible loss of silica all interpreted to be associated with alkali metasomatism and fenetisation associated with the latter carbonatite intrusions. The granitoid breccias are interpreted to be an enveloping carapace developed over and peripheral to a large kimberlite body at depth.

Kimberlite in the complex is limited to minor shoots of up to 25metre true width intersected in drill holes APRC02 and APDDH02 and smaller shoots less than 5 metre true width in APDDH03 and APDDH04. Similar to the 3-055 kimberlite, textures and alteration appear to indicate a transitional hypabyssal – diatreme emplacement with abundant microphenocrystic olivine, minor pelletal lapilli olivine and strong milling of the matrix. It is interpreted that the kimberlite intruded into the granitoids as a failed, "embryonic" intrusive.

A 0.5ha carbonatite stock outcrops and was intersected in drilling in APRC01 in the south of the granitoid breccia complex. Petrologically the carbonatite is dominated by sub-millimetre polycrystalline laths of calcite (sovite) with trace amounts of fine intra-crystal chlorite and lesser smectite (saponite) and talc. Accessory minerals include allanite elevated in rare earths including La, Ce and Ga, trace apatite, a barium silicate mineral and a Nb-Pb-U-Ti enriched oxide mineral. A strongly calcite altered serpentinite clast, pelletal lapilli like saponite – calcite altered clasts and the occurrence of xenocrysts of pyrope, high Cr_2O_3 chromite, chrome diopside, Ti poor andradite (common to many other kimberlites in the area) and diamond are interpreted to be derived from a pre existing kimberlite into which the carbonatite intruded.

Drilling on the 3-016 complex included two inclined reverse circulation drill holes (APRC01 and APRC02 for a combined depth of 158 meters and three inclined HQ diamond core drill holes (APDDH02, APDDH03 and APDDH04) for a combined meterage of 471.1 meters and maximum vertical depth of 174 meters. Drill collar summaries, drill ledgers and down hole geochemical assays are listed in Appendix 9, 10 and 11.

Sampling for diamonds on 3-016 included caustic fusion of 15cm /1metre length HQ core kimberlite intercepts from APDDH02 and combined magnetic /heavy mineral separation and caustic fusion of RC drill chips sub sampled from carbonatite and granitoid breccias in APRC01 and from kimberlite and granitoid breccias in APRC02. Diamond counts per sample are listed in Appendix 11 with description of selective individual stones are given in Appendix 12. Summaries of composited results are as follows:

- **13 +0.105mm diamonds from 100.2kg** from composited HQ drill core sub samples of xenocryst rich kimberlite breccia in APDDH002, 4 – 48.2m and 61.2 – 95.2metres.

- 16 +0.105mm diamonds from 211.5kg **(8 +0.105mm diamonds/100kg)** from composited RC drill chips of carbonatite and granite breccia in APRC001, 0 – 91m depths.

- 29 +0.105mm diamonds from 174.1kg **(17 +0.105mm diamonds/100kg)** from composited granitoid breccia and kimberlite sampled from APRC002, 0 – 66m depths.

The diamonds are dominantly good quality white translucent octahedron with surface features varying from step layering to lightly frosted to partially resorbed. The largest stone recovered from these samples was a 0.64x0.45mm grey coloured octahedron aggregate with common black inclusions reporting to the +0.425-0.60mm Endecott standard square mesh sieve.

5.2.3 3-021 Granitoid Breccia – Kimberlite Complex

The 3-021kimberlite is very similar to the 3-016 kimberlite both in disposition and petrologically. The 3-021 kimberlite occurs as a small subcropping pipe of 0.4ha contained within a 3.8ha granitoid breccia carapace located 1km to the northeast of the GSI discovered Wk11 kimberlite and 3.5km west south west of the Wk10 Anumpalle kimberlite.

The 3-021 kimberlite intrudes granitoids of the Archaean Peninsular Gneisses. The kimberlite is typically a xenocryst poor, macrocrystic hypabyssal kimberlite with common serpentine after olivine microphenocrysts and macrocrysts with minor altered pelletal lapilli in a fine matrix of altered olivine. Again the occurrence of pelletal lapilli, strong milling of the matrix and strong alteration may indicate that this hypabyssal kimberlite is transitional to diatreme facies. Accessory xenocrysts include minor chromite and perovskite and trace thorium silicate mineral. Minor calcite occurs as segregationary pools within the matrix. The enclosing granitoid breccias are dominated by mesocratic granitoid gneiss with lesser clasts of alkali feldspar rich granitoid, dolerite, basalt breccia and other basic rocks. The breccias are typically clast supported with a subordinate matrix of K-metasomatised and fenetised milled rock fragments. Similar to the 3-016 kimberlite the alteration includes alkali feldspar alteration of fine feldspar, Fe sooting of courser feldspar and chlorite – epidote alteration.

Drilling on the 3-021 kimberlite was restricted to two –60° inclined HQ diamond core drill holes (APDDH005 and APDDH006) for a combined depth of 263 meters and a vertical depth of 120metres. Both drill holes were drilled from the centre of the complex outward to its contacts. Kimberlite was intersected in both holes from 0.5metres below a thin cover of soil to 51.8 meters in APDDH005 and to 24.3metres in APDDH006. Contact rocks are dominated by massive pink granitoid gneiss with lesser granitoid breccia zones suggesting the mapped granitoid breccias marking the outer boundary of the complex to potentially have developed on a ring structure centred on the kimberlite intrusive.

Caustic fusion of 156.7kg of kimberlite drill core sampled from APDDH005; 33-51.8m and APDDH006; 1 – 24.1m returned 47 +0.105mm diamonds **(30 diamonds/ 100kg)**. The two largest stones measuring 0.55x0.60mm and 0.5x0.5mm were both white inclusion free macles reporting on the +0.425-0.600mm Endecott standard square mesh sieve.

5.2.4 3-008 Kimberlite

The 3-008 kimberlite is located 1.8km directly east of the Wk10 Anumpalle kimberlite and is interpreted to be a series of narrow kimberlite stringers. Abundant kimberlitic indicators and two diamonds from shallow pits and loam samples testify to the kimberlite occurrence.

Drilling on this target did not intersect any kimberlite. In total 222 meters of orientated RAB drill holes have been drilled on this target including APRAB041, APRAB042, APRAB045, APRAB187 and APRAB188. Drill collar summaries, drill ledgers and down hole geochemical assays are listed in Appendix 9, 10 and 11.

5.3 Brahmanpalle Cluster

The Brahmanpalle cluster is currently defined by a single kimberlite namely B1 located in the south west of the RP areas, approximately 12km to the north east of the Kalyandrug cluster of kimberlites currently held under RP by the NMDC.

5.3.1 B1 Kimberlite

The 0.6ha B1 kimberlite intrudes a north east trending shear zone defined by chlorite schists and sheared ultramafics within granitoid gneisses of the Archaean Peninsular Gneiss Complex. The kimberlite itself is represented by multiple hypabyssal intrusives differentiated on the basis of variable macrocryst, xenolith and xenocryst content and the occurrence of segregation textures. The body sub crops in a couple of areas calcretised kimberlite.

Drilling on the B1 kimberlite includes two inclined HQ diamond drill holes (APDDH016 and APDDH017) for a total meterage of 162.4meters. Kimberlite intersected in APDDH016 consist of a series of dyke like bodies of 1 – 12m true thickness intruding into a sequence of granitoid gneiss and granitoid breccias (refer to figure 9). The down hole composited intercept of kimberlite is 48.4metres representing a true width of 24 meters. APDDH017 intercepted kimberlite from surface to a depth of 57.5metres representing a true width of 22 meters. Drill collar summary, drill ledgers and down hole geochemical assays for the drill holes are listed in Appendix 9, 10 and 11.

Caustic fusion of 106.7m of composited HQ drill core from APDDH016 and APDDH017 returned 104 +0.105mm diamonds from 283.5kg **(37 +0.105mm diamonds/100kg)**. The largest stone returned from drill core is a 0.775x0.55mm (+0.425-0.60mm Endecott standard square mesh sieve) white, heavily frosted, inclusion rich octahedron aggregate. Diamond results are listed in Appendix 11 with description of selective individual stones given in Appendix 12.

5.4 Raailu Cluster

The Raailu cluster is currently defined by two kimberlites namely 2-167 and 2-173 located 22 kilometres to the east of the Kalyandrug kimberlites and 16 kilometres south of the B1 kimberlite within the Anantapur RP.

5.4.1 2-167 Kimberlite

The **0.25ha** 2-167 kimberlite is recognised as a discrete magnetic high adjacent to a north west trending magnetic lineament mapped as a similar trending dolerite dyke. No outcrop is recognised in the field.

Drilling on the target is restricted to a single inclined RAB drill hole (APRAB151) for a total depth of 42 meters. Sampling for diamonds has been completed from RAB drill chips returning 2 +0.105mm diamonds from 48.7 kg **(4 +0.105mm diamonds/ 100kg)** and from shallow pit samples that returned only two diamonds from 95.9kg. The largest stone reported from this kimberlite is a 0.8x0.55mm (+0.425-0.60mm on the Endecott standard square mesh sieve series) white irregular with common black inclusions and partial resorption.

5.4.2 2-173 Kimberlite

The **1ha** 2-173 kimberlite is located 1.4km west of 2-167. Pitting and soil geochemistry define it as a north west trending lenticular like body

No drilling has been completed on this kimberlite. Sampling for diamonds has been restricted to two shallow pit samples that returned **5 +0.105mm diamonds from 105.2kg**. The largest stones reporting from this kimberlite include a 0.675x0.45 brown irregular stone with no inclusions and a 0.45x0.35 white octahedron with few inclusions. Both diamonds report on the +0.30-0.425mm Endecott standard square mesh sieve and exhibit or no significant resorption.

6 Summary of Other Kimberlites

6.1 Anumpalle Cluster

The Anumpalle Cluster of kimberlites includes the CRAEI discovered kimberlites 3-055, 3-021, 3-016 and 3-008 all of which are reported in chapter 5 and the GSI discovered kimberlites Wk-10, Wk-11 and Wk-12 all located within 8 kilometres of the Anumpalle village. Both Wk-10 and Wk-11 are excised by Prospecting Licenses held by the NMDC and are hence not covered in this report.

6.1.1 Wk-12 Kimberlite

The Wk-12 kimberlite occurs as a small pipe like intrusion with an areal extent estimated at **0.50ha**. A 69 tonne bulk sample collected by the GSI did not return any macro diamonds. Caustic fusion of a 100kg sample of deeply calcretised kimberlite collected by CRAEI returned **3 +0.105mm micro diamonds**.

6.2 Wajrakarur Cluster

The Wajrakarur kimberlite including Wk-01, Wk-02 and Wk-03 are located near the village of Wajrakarur and fall within CRAEI's RP area.

6.2.1 Wk-01 Kimberlite

The WK-01 kimberlite occurs as a large dyke like body trending ENE with an aerial extent of **19ha**. Bulk sampling (13,780 tonnes) completed by the GSI estimated macro diamond grades of this kimberlite of between 0.03 to 0.71 carats per hundred tonnes. Most of the diamonds collected were reported gem quality with the largest measuring 9.45 carats. 2 x 100kg caustic fusion samples of weakly calcretised kimberlite collected by CRAEI from surface outcrops in the north east and southern portions of the dyke returned **1 +0.105mm diamond per 100kg** and **9 +0.105mm diamonds per 100kg** respectively. No macro diamonds were recovered by CRAEI in these samples.

6.3 Wk-02 Kimberlite

The **WK-02** kimberlite occurs as three separate bodies including the main central stock measuring **2.45ha**, a smaller satellite body to the northeast and a recently discovered dyke like body to the south. Bulk sampling (772 tonnes) of the main intrusion completed by the GSI did not return any macro diamonds. A 100kg caustic fusion sample collected by CRAEI from surface outcrops of this kimberlite returned a **3 +0.105mm diamonds** with the largest sitting on the +0.425mm Endecott standard square mesh sieve. A stream gravel sample collected immediately downstream of the southern extension did not contain any diamonds.

6.3.1 Wk-06 Kimberlite

The **6ha** Wk-06 kimberlite occurs as a single circular pipe like intrusion containing a large granitoid raft all concealed by 1-2 m of black cotton soils. A 2,760 tonne bulk sample collected by the GSI returned an estimated macro diamond grade of between 0.56 to 0.80 carats per hundred tonnes. A 100kg caustic fusion sample collected by CRAEI from a well within the

central portion of the kimberlite returned only **7 +0.105mm diamonds/ 100kg**. No macro diamonds were recovered by CRAEI in these samples.

6.4 Uravakonda Cluster

The Uravakonda Cluster of kimberlites includes the Wk-03, Wk-04, Wk-08 and Wk-09 kimberlites located within the RP area to the east of the town of Uravakonda. The kimberlites are elsewhere often referred to as the Lattavaram kimberlites after the nearby village of Lattavaram Tanda. None of the kimberlites are of economic interest.

6.4.1 Wk-03 Kimberlite

The Wk-03 kimberlite occurs as a pipe like intrusion with an areal extent of **0.4ha**. A 907 tonne bulk sample collected by the GSI returned an estimated macro diamond grade of 0.28 carats per hundred tonnes. Caustic fusion of a 100kg sample of deeply calcretised kimberlite collected by CRAEI from a well within the central portion of the pipe returned **8 +0.105mm diamonds/ 100kg**. No macro diamonds were recovered by CRAEI in this sample.

6.4.2 Wk-04 Kimberlite

The Wk-04 kimberlite occurs as a pipe like intrusion with an areal extent of **3.45ha**. A 2400 tonne bulk sample collected by the GSI returned an estimated macro diamond grade of 0.25 carats per hundred tonnes. Caustic fusion of 165kg of serpentinised kimberlite surface samples collected by CRAEI returned 46 +0.105mm diamonds **(28 +0.105mm diamonds/ 100kg)**. No macro diamonds were recovered by CRAEI in these samples.

6.4.3 Wk-08 Kimberlite

The Wk-08 kimberlite occurs as a subcropping pipe like intrusion with an areal extent of **0.5ha**. A 1,733 tonne bulk sample collected by the GSI returned an estimated macro diamond grade of 0.33 carats per hundred tonnes. No samples of this kimberlite were tested by CRAEI for micro diamonds.

6.4.4 Wk-09 Kimberlite

The Wk-09 kimberlite occurs as a small pipe like intrusion with an areal extent of **0.07 ha**. A 229 tonne bulk sample collected by the GSI returned an estimated macro diamond grade of 0.50 carats per hundred tonnes. No samples of this kimberlite were tested by CRAEI for micro diamonds.

6.5 Pennar Cluster

The Pennar Cluster includes the Wk-05 and Wk-13 kimberlites located within the RP area close to the village of Muligiripali.

6.5.1 Wk-05 Kimberlite

The Wk-05 kimberlite occurs as an irregular east – west trending dyke like intrusion with an areal extent of **0.9ha**. A 482 tonne bulk sample collected by the GSI did not returned any macro diamonds. Caustic fusion of a 100kg sample of deeply calcretised kimberlite collected by CRAEI from this pipe returned **8 +0.105mm diamonds/ 100kg**. No macro diamonds were recovered by CRAEI in this sample.

6.5.2 Wk-13 Kimberlite

The Wk-13 kimberlite occurs along strike and 2.2km to the southeast of the Wk-05 kimberlite as an elongate pipe like intrusion with an areal extent of **1.1ha**. No bulk samples are known to have been collected from this pipe. Caustic fusion of a 100kg sample of serpentinised and calcretised kimberlite collected by CRAEI did not return any diamonds.

7 HEALTH, SAFETY, ENVIRONMENT AND COMMUNITY

Rio Tinto recognises that excellence in managing health, safety, environmental community responsibilities is essential to long-term success. Through effective management practices the Group aims to ensure the health and safety of its employees, to minimise any adverse impacts its activities may have on the environment and to make a positive contribution to local community life.

The policies apply to all Rio Tinto subsidiary and managed companies including CRAEI and the Anantapur reconnaissance project. A summary of Rio Tinto's HSEC and other policies are summarized in "The Way We Work", a copy of which is provided in appendix 15.

7.1 Health and Safety

Rio Tinto Group policies on Health and Safety are designed to minimise the risk of injury or occupation illnesses. A minimum management requirement at all of the company-managed operations is to ensure full compliance with the Rio Tinto Standards. The goal is for zero work related injuries or occupation illnesses.

Minimum prerequisites require that all work activities be based on risk assessments ensuring that effective controls and safe work procedures exist for all hazardous activities. Further the standards require a system for ensuring that employees are trained, equipped and where applicable, certified to carry out their work according to the applicable safe work procedures, and that their competence has been tested. On the Anantapur project the major hazardous activities were assessed to incorporate vehicles and driving, drilling, helicopter operations, manual handling and electrical work. Risk assessments and selective standard operating procedures have been developed for specific tasks associated with each of these and for many other potentially hazardous activities. Safety training and other initiatives have focused mainly on these higher risk areas including but not restricted to the following:

- Employment of dedicated drivers for all company vehicles.
- Training of a staff supervisor as an accredited defensive and 4 – wheel driver instructor.
- Annual competency based defensive and 4 wheel driving training for all drivers including for all licensed technical and support staff. All three training programs to date have been undertaken by accredited and experienced Australian based driver training companies.
- Annual first aid, accident management and emergency response training to all senior staff. Four programs conducted to date have been undertaken by professional paramedical instructors sourced from various accredited international companies.
- Provision, installation and enforced use of drill rig safety accessories including specialised high-pressure air hoses, high-pressure hose whip arrestors and fall from height protective equipment.
- Provision of an experienced International drilling consultant to work together with the drilling contractors focussing on both the physical and behavioural safety issues. A special device for lifting drill rods on an angled drill hole thus reducing the need for personnel to climb up the mast was invented during this initiative. Further drill rod and

machine guards, non-slip work platforms and other safety features were all designed and installed.

- Low altitude sling towing / helicopter geophysical survey training for the contracted Deccan Aviation helicopter pilots involved in the Anantapur geophysical survey was facilitated by the company. Previously no suitably experienced pilots were available in the country for this very specific skill. Training was undertaken over a course of week in Australia with Helicopter Resources whom were the only known company that have suitably experienced pilot instructors and were willing to offer these instructor services to other like helicopter companies.

- Selected personnel have been trained in managing "work at height", "confined spaces" and in "manual handling" issues by accredited International companies. Knowledge gained from this training has been utilised by the individuals in minimising exposure to such risks and by coaching other personnel to be able to recognise the risk and where appropriate, designed and implemented safe operating procedures.

- Hire of designated field accommodation and office facilities each upgraded to meet company standards including electrical which required significant rewiring and installation of specialised equipment. Local private electrical contractors were identified and trained to maintain the electrical system to international standards.

The corporate systems have a requirement for all employees, including staff and contractors, to report hazards and incidents and for management to have a system for review and analysis of higher risk incidents and for the implementation of appropriate mitigating measures. A summary of reported incidents and hazards by year are as follows:

- 2001; 16 health and safety related incidents/ hazards including one rated as high risk and two others as moderate risk (note risk factors are based on probability of incident or hazard resulting in medical treatment, lost time injury or death). All higher risk incidents were related to vehicles and driving.

- 2002; 17 health and safety related incidents/ hazards including one rated as high risk and five others as moderate of which three were related to vehicles and driving, two due to minor food related illnesses and one due to a minor sprain incurred by an individual during auger operations.

- 2003; 39 health and safety related incidents/ hazards including two rated as high risk and ten others as moderate. The increased numbers of reports were largely related to the increased drilling activity. Both high risk incidents were behaviour issues (non compliance to safety standards) of the drilling contractor personnel. Notably the number and risk rating of vehicle and driving incidents were significantly reduced.

No lost time injuries or any other significant injury or medical treatment case were incurred throughout the term of the reconnaissance permits.

Numerous frontline management and three annual Rio Tinto corporate safety audits have been conducted on the exploration groups operations in India including CRAE India and the Anantapur project. Audits in all cases have found the Indian operations to be of a high standard and compliant with only minor exceptions that have subsequently been rectified. In 2004 the Rio Tinto Exploration –Australasia region, including the Indian operations that contributed significantly, was awarded a Rio Tinto Group Chief Executive Safety award. Over 85 Rio Tinto managed companies from all over the world were reviewed with only three receiving the award in recognition of the

excellent safety performance over the proceeding three years. A commendation for the same was received in 2003.

7.2 Environmental

Rio Tinto Environmental policy aims to wherever possible to prevent or otherwise minimise, mitigate and rehabilitate any harmful affects that the groups operations have on the environment. Although exploration activities including those completed in CRAEI Anantapur reconnaissance permits is essentially non-invasive to the environment, the same rigour and level compliance to the standards, systems and procedures is applicable.

For the Anantapur reconnaissance permits an Environmental Management Plan was devised prior to the initiation of field activities and subsequently updated as the program developed. The plan evaluated potential environmental impacts associated and provided procedures to prevent or minimise those impacts. In the case where an impact was unavoidable or accidental, appropriate rehabilitation procedures were defined. Relevant exploration personnel including those of any contractors were inducted and trained in these procedures or otherwise the work was suitably supervised by a competent person to ensure minimal environmental impact. Control systems included incident and annual environmental reporting and both first-line management and corporate audits.

Identified areas for potential environmental impact on the Anantapur permits for which procedures were designed and implemented include the following:

- Drilling and drill hole capping; in total 205 drill holes were drilled in the Anantapur permits. All drill sites have been fully rehabilitated including filling of any sumps, tilling of compacted soil, removal of rubbish and unless otherwise requested by the landowner, capping of the hole with a length of PVC pipe and a permanent concrete plug cap. In cases where the landowner requested for the drill hole to be left open for possible latter use, a temporary cap only was applied to the hole.

- Ground disturbance due to access tracks. No access tracks were constructed for exploration in the permit areas. Access in all cases was achieved by using the existing infrastructure or during the dry season and when no crops were present, by driving cross-country. During the latter care was taken to ensure minimal compaction of soil and minimal potential for soil erosion. Any excessive compaction on drill access tracks was tilled immediately after use or immediately after the first monsoonal rains depending on the request of the landowner.

- Ground disturbance due to pitting. Only limited pitting was undertaken in the permit blocks with pit depth limited to 1 metre and surface dimensions of less than 3x3 metres. Procedures requiring the separation of topsoil and immediate rehabilitation after use were in all cases strictly followed.

- Hydrocarbon and hazardous substance control. Limited amounts of hydrocarbons and other hazardous substances were stored on site mainly for the drilling and helicopter survey programs. Measures to prevent, contain and rehabilitate spills were emplaced prior to storing and use of the fuel. Two minor spill incidents, each of less than 5 litres, incurred on the drill rigs were immediately rehabilitated.

- Sampling, minimal to no environmental impact was incurred due to the sampling operations. Gravel and stream sediment samples were in all cases taken from the active stream bed load and care was taken to avoid any damage to the stream banks. For soil sampling and auger sampling excess soil was filled back into the excavated hole. In all cases sample sites were accurately located by GPS thus eliminating the need for flagging tape or other tags to mark the sample sites.

- Ground Geophysical Surveys; all geophysical surveys were carried out without cutting any trees or cutting any grid lines. Access along grid lines was by foot and wherever possible trees and other obstacles were avoided by diverting the line. In the rare case tree branches were bent, broken on lopped.

- Airborne Geophysics; no known bird sanctuaries or other areas with dense wildlife occur in the project area hence were not exposed to the noise of a low flying helicopter. In part also for safety reasons, helicopter traverses over villages and houses were banned thus limiting noise pollution.

- One internal and one external audit have been conducted on the effectiveness of our environmental management systems as applied in the Andhra Pradesh permits. The systems were found to be well managed and appropriate to the level of risk associated with exploration in this area.

Approximately 5% of the expired permit area is designated reserved forest. Most of the larger forest tracts occur in the Gooty tenement along the margins of Cuddapah basin and scattered through the eastern half of the Uravakonda and Anantapur tenement. Most of the forest is dry (arid) deciduous thorny type with dominantly acacia flora. Limited surface sampling was conducted within the forest areas with the permission of the relevant District Forest Officers. No significant environmental incidents were experienced during the period of this survey.

7.3 Community Relations

There are more than 600 villages within RP areas with a total population estimated be over 1.5 million. Agriculture is the main occupation for over 80% of the population. Industrial activity is mainly agrarian. Agriculture is mostly single crops restricted to the monsoon season with less than 5% under irrigation.

During the term of the Anantapur reconnaissance permit specific community relations policy applications included:

- Employment of a number of local people to work in various roles in the organisation including geologists, field supervisors, community relations staff, drivers technical assistants, cooks and housekeeping staff and others. In total up to 90 employees, the majority sourced locally were employed in the field based out of our operational bases at Guntakal and Kurnool.

- Established preferred supplier/service relationships with several local businesses for the purchase and supply of most of the required field consumables, notably for food, water and fuel and for service and repair of field equipment.

- Undertook various community initiatives including improvement of basic infrastructure at schools and villages, donations of plates for the village school mid day meals programs, provisions for drinking water and health awareness programs (refer to the attached table 8). Initiatives were largely participatory with the community providing labour and the company the equipment, finance and supervision Total direct costs for these programs to date amount to INR203,455.

- Conducted over 1000 consultations with stakeholders including village elders, village leaders teaches, individual land owners and others. The main focus of these consultations were to request access and to keep the community informed of our presence and activities.

- Developed internal systems to record, report and monitor community activities and devised strategies to address impacts. All front-end field personnel were oriented and inducted prior to interaction with the community. Two community relation's specialists were employed and were available during negotiations and consultations with the local community.

- Three versions of briefing sheets in vernacular summarising the exploration activities were distributed (once in every six months) to the community in the RP area. The purpose of these sheets were to keep the community informed of the companies exploration activities and to minimized rumours and misinformation.

An external NGO audit by Environmental Resources Management (ERM) of the United Kingdom was conducted to evaluate ARTE against the principles of "The Way We Work", Rio Tinto statement of HSEC and business practice procedures. ARTE's systems were found to be of a high standard and appropriate to the level of exploration activity in this area.

9 REFERENCES

Nil

Keywords

India, Andhra Pradesh, Diamond Exploration, Kimberlite, Diamonds, Kimberlitic Indicators, Geochemical-Soil Sampling, Loam Sampling, Geophysics, Gravity, Electromagnetics, Magnetics, Drilling

Locality

Andhra Pradesh 57 E, 57 F 1:250 000 sheets

Descriptor

Final report of all exploration for diamond and other mineral commodities completed in the Anantapur and Kurnool districts of Andhra Pradesh by CRAE(I), during the term of RP Nos. GOMS No24-27, from 31 January, 2001 to 01 February, 2004.