A NOTE ON URANIFEROUS LEUCOGRANITES ALONG THE IDUPULAPAYA FAULT ZONE, CUDDAPAH DISTRICT, ANDHRA PRADESH

The Idupulapaya fault is a major east-west trending strike fault cutting across the Gulcheru Quartzite (Fig.11, p.56, Nagaraja Rao et al. 1987), and is located to the east of the Papaghni river in the southwestern periphery of the Cuddapah basin (Fig.1). The proximity of this fault to areas hosting fracture-controlled uranium mineralisation in the basement crystallines prompted the present study which resulted in this first report of uraniferous leucogranites emplaced along the Idupulapaya fault zone. The present study has involved the integration of remote sensing data and ground radiometric surveys .

In the Landsat imagery 143-050, the east-west trending Idupulapaya fault appears as a deeply incised steep valley across the Gulcheru Quartzite. This valley is occupied by two major streams, namely the Kondaralu Vanka and the Paya Vanka. Gentle northward dip slopes of quartzites dipping into the fault occur to the south, whereas a major fault scarp marks the northern side. East-west trending master joints on either side of the fault and a network of northeast-southwest aligned streams, indicative of structural control, characterise the area in the vicinity of the fault.

Detailed interpretation of aerial photographs (Task 1413A - Run 42 to 45) reveals that the Idupulapaya fault is not a single fault, but comprises a number of closely aligned east-west step faults with a reverse sense of throw with the upthrown blocks occurring invariably towards north. Cross faults aligned northeast-southwest and cutting across the Idupulapaya fault have resulted in differential throws along the fault such that only quartzites are exposed along the northern scarp face immediately east of the Papaghni river, whereas basement granites are exposed along the scarp towards the central part of the fault. The exposure of basement granites in the central portion of the Idupulapaya fault zone could, therefore, be attributed to the combined effects of step faulting along the east-west trending Idupulapaya fault and differential throws along northeast-southwest cross faults. In the central portion, a NE-SW cross fault along which flows a tributary of the Kondaralu Vanka limits the western extension of the granites. East of this cross fault, a major ENE-WSW trending fracture occupied by a quartz reef is also identified from the aerial photographs. Based upon remote sensing studies, the central portion of the Idupulapaya fault zone was targeted for detailed radiometric examination. As a consequence, radioactivity of the order 0.02 mR/hr to 0.2 mR/hr was recorded over granites exposed along the northern scarp face extending eastward from the major NE-SW cross fault in the area. Samples (n=4) assayed 0.030% to 0.148% U_3O_8 with <0.010% thorium (Table 1).

Table 1. Radiometric assay results of grab samples of radioactive leucogranites, Idupulapaya area

Sl. No.	Rock type	Radiometric assay		
		%eU_3O_8	%U_3O_8	%ThO_2
1.	Granite	0.113	0.148	<0.010
2.	Micro-granite	0.031	0.060	<0.010
3.	Granite	0.042	0.069	<0.010
4.	Micro-granite	0.011	0.030	<0.010

Uranium mineralisation is confined to the intensely developed microfracture systems (stockworks) in the granite. Secondary uranium mineral encrustations are seen along fracture planes. This is the first time that uraniferous granites are being reported from basement granites

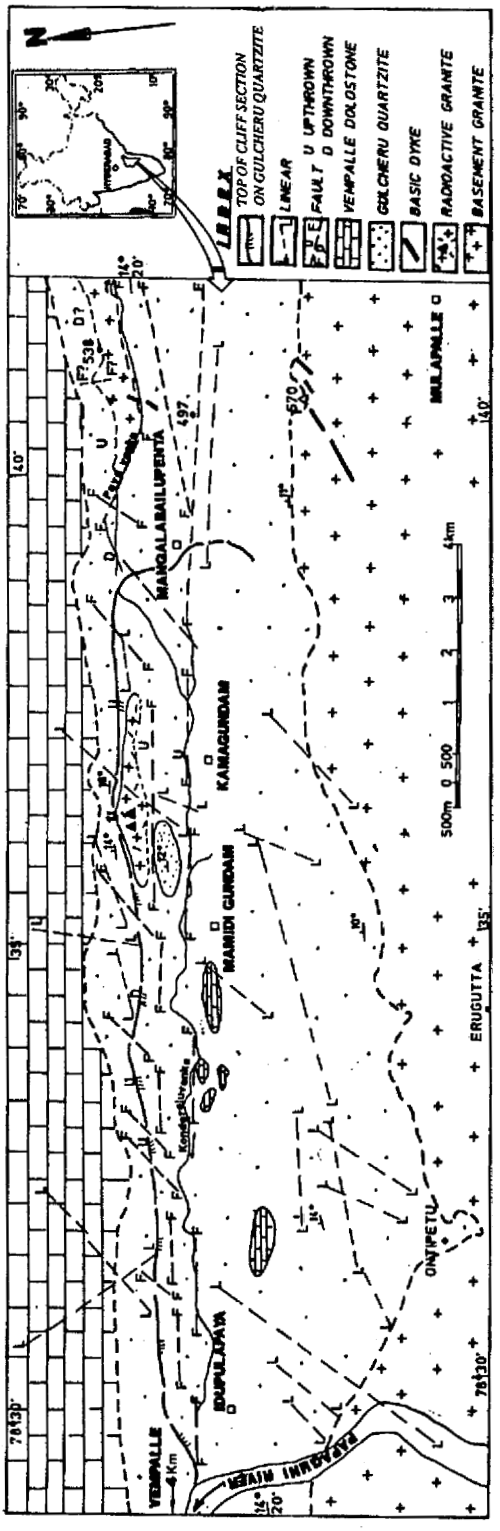

Fig.1. Geological map of the Idupulapaya fault zone (Based on aerial-photo interpretation).

underneath the cover of Gulcheru Quartzite, within the Papaghni sub-basin of Cuddapah Supergroup. The intrinsic uranium content of this granite is high (25 ppm) as compared to a normal granite (4 ppm). The granites are medium-grained equigranular, leucocratic, and hypidiomorphic, with sub-equal amounts of the major minerals microcline, Na-plagioclase, perthite and quartz. Plagioclase is often altered to sericite and clay. Chlorite is present as a minor constituent. In some samples, allanite is present as an accessory mineral. The radioactivity is essentially due to uranophane and brannerite. The other ore minerals being haematite and limonite.

As fracture/shear-controlled uranium mineralisation has been located in the nearby granites outside the Cuddapah basin margin as at Mulapalle (Rao et al. 2000), it appears that the Idupulapaya fault zone could possibly form a potential setting for structurally-controlled, hydrothermal type uranium mineralisation.

Acknowledgements: The authors are grateful to the Director, Atomic Minerals Directorate for Exploration and Research (AMD), for giving permission to publish this work. Constant encouragement given by Shri B.M. Swarnkar, Regional Director, throughout the course of the field season is acknowledged.

References

NAGARAJA RAO, B.K., RAJURKAR, S.T., RAMLINGASWAMY, G. and RAVINDRA BABU, B. (1987). Stratigraphy, strucutre and evolution of the Cuddapah basin. *In:* Purana Basins of Peninsular India. Mem. Geol. Soc. India, no.6, pp. 33-86.

RAO, R.L.N., SETHURAM, S., SUBHASH RAM, RAO, B.N., and TIKU, K.L. (2000). Geophysical signatures of a fracture controlled U-mineralisation: A case study from Mulapalle, Cuddapah district, Andhra Pradesh. Jour. Geol. Soc. India, v.55, pp.421-429.

Atomic Minerals Directorate for Exploration and Research, Department of Atomic Energy, Nagarabhavi, Bangalore-560 072

G.R. GANGADHARAN, K.K. ACHAR, K. UMAMAHESWAR and MARY K. KUMAR