

**GEOLOGICAL REPORT ON EXPLORATION FOR RARE METAL  
BEKU RARE METAL MINERALISATION PROSPECT  
DISTRICT - PURULIA, WEST BENGAL**

**EXECUTIVE SUMMARY**



**MINERAL EXPLORATION CORPORATION LIMITED**  
**(A Government of India Enterprise)**  
**EASTERN ZONE,**  
**RANCHI**

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# **BEKU RARE METAL MINERALISATION PROSPECT**

## **DISTT. PURULIA, WEST BENGAL**

### **EXECUTIVE SUMMARY**

#### **1.0 LOCATION**

The area under investigation is included in Survey of India Toposheet No. 73 E/15 and lies at Latitude 23° 26' 12" N and Longitude 85° 56' 15" E. The block is situated in Purulia district of West Bengal. The block can be approached by a 10 Km fair weather road from Jhalda, a township on Ranchi-Purulia State highway.

#### **2.0 GEOLOGY AND STRUCTURE**

Regionally the area is a part of Chhotanagpur Gneissic Complex (CGC) of Eastern Indian Peninsular Shield, lying to the north of Singhbhum Craton. Dunn & Dey (1942) first described the complex as largely a product of replacement origin. Later a number of workers have contributed on the geology of the area.

The area is mostly covered by soil and represents undulating topography with moderate to gentle slopes.

The rock types exposed / mapped on the surface are calc-silicate rocks, pegmatite and wall rock alteration zone (Skarn). Calc-silicate is hard, compact rock striking E-W to N70° E – S 70° W dipping 60° to 80° due both northerly and southerly and forms the host for pegmatite. The rare metal containing pegmatite occurs as an arcuate body over a strike length of 200 m. The trend of pegmatite is WNW-ESE dipping 70° to 80° southerly. Pegmatite body swings in NW-SE direction in eastern part of block with 30° to 35° westerly dips.

The pegmatite is associated with the calc-silicate country rock, a calcareous meta sedimentary rock. In between the pegmatite and calc-silicate rock, a zone of wall rock alteration is observed. This zone is dominantly made up of phlogopite, biotite, tourmaline, quartz, feldspar, amphiboles, calcite, wollastonite, epidote and zoisite.

### **3.0 MINERALISATION**

The area of interest bearing rare metal pegmatite bodies lies along North Purulia shear zone and ENE-WSW lineament in and around Latitude 23 ° N and Longitude 86 ° E. The rare metal bearing pegmatite body is emplaced in tightly folded calc-silicate rocks and is largely concealed under soil. The profuse mica flakes in soil is the only surface manifestation of the underlying pegmatite body.

### **4.0 QUANTUM OF WORK DONE**

MECL has carried out detailed Geological Mapping & Topographical survey covering 1.0 Sq.km. area, with exploratory mining (141.40cu.m of pitting and 862 cu.m of trenching), 929 Nos of primary and check samples, 108 blast movement samples, 156 primary & composite samples for 7 radicals, 10 of composite samples for 10 radicals, 50 Nos of whole rock analysis samples, 83 Nos spectroscopic studies and 13 nos Bulk density were analysed. Petrographic studies on 100 Nos. of samples and Minerographic studies on 100 Nos of samples, 112 modal analysis and 50 Nos of specific gravity determination test were also carried out by MECL in the Block. Bench scale beneficiation on 3 samples and Beneficiation studies for pilot plant on 2 samples and Geotechnical studies on 3 sets were carried out. Based on the above data and earlier data of GSI, an exploration report was submitted by MECL.

Beneficiation studies have been conducted to study the mineralogical characteristics, metallurgical properties, extent of concentration and recovery of metal. Five bulk samples were drawn from the stacks of different pits and were sent to National Metallurgical Laboratory, Jamshedpur and Indian Bureau of Mines, Nagpur for conducting beneficiation tests. In first stage, 3 small bulk samples weighing about 200 Kg each were sent to NML and IBM for conducting Bench scale beneficiation studies. Since the finding on these three samples were not found satisfactory, IBM suggested that two large bulk samples analysing +1% cesium be sent to them for carrying out pilot plant studies. Accordingly, two bulk samples weighing 5 tonnes each were sent to Modern Mineral Processing and Ore dressing Laboratory, IBM, Nagpur. The beneficiation studies conducted by IBM which comparatively yielded better result, comprised of multi state cationic floatation of mica and feldspar in an acidic medium. The non-float assayed 2.88% cesium with Cs recovery of 79% (Wt% yield: 38.24) and the float assayed 0.85% lithium and 0.40% rubidium with 94.8% rubidium and 79.7% lithium recovery (wt% yield

61.76). The feed grade assayed 1.40% cesium, 0.25% rubidium and 0.66% lithium. This indicates that the physical beneficiation of the samples did not yield encouraging results. Preliminary leaching studies were conducted on the samples and it was established that 99% of cesium can be extracted in the pregnant solution and the leach residue would contain 61% of Rb and 78% of Li (wt% yield 89). IBM have further suggested that as they do not have any facilities for optimisation of leaching parameters and extraction of cesium, lithium and rubidium metal and their chemical compound from leach liquor and residue, the pegmatite samples may be sponsored to other reputed laboratories in the country having facilities for conducting Hydro-metallurgical treatment studies.

## **5.0 ORE RESERVE ESTIMATION**

The ore reserves have been estimated based on the data generated through exploratory mining. The reserves estimated are of in-situ nature and are “Geological reserves”.

The ore zones were delineated at 0.1% Cesium or 0.3% total metal content cut-off. The Beku pegmatite exhibits single pegmatite system with two paying zones calculated at 0.1% CS or 0.3% TMC cut-off.

These are termed as Lode A and Lode B with one local lode. Amongst all, Lode A is largest and contributes about 97% of total reserves. The reserves have been computed by cross section and level plan method.

A total of 1.78 lakh tonnes of ore with 0.443% of cesium, 0.262% of lithium and 0.102% of rubidium or 0.807% of TMC has been estimated over a strike length of 200 m and in a maximum vertical column of 55 m. (cross-section method). All reserves computed have been kept under probable category.

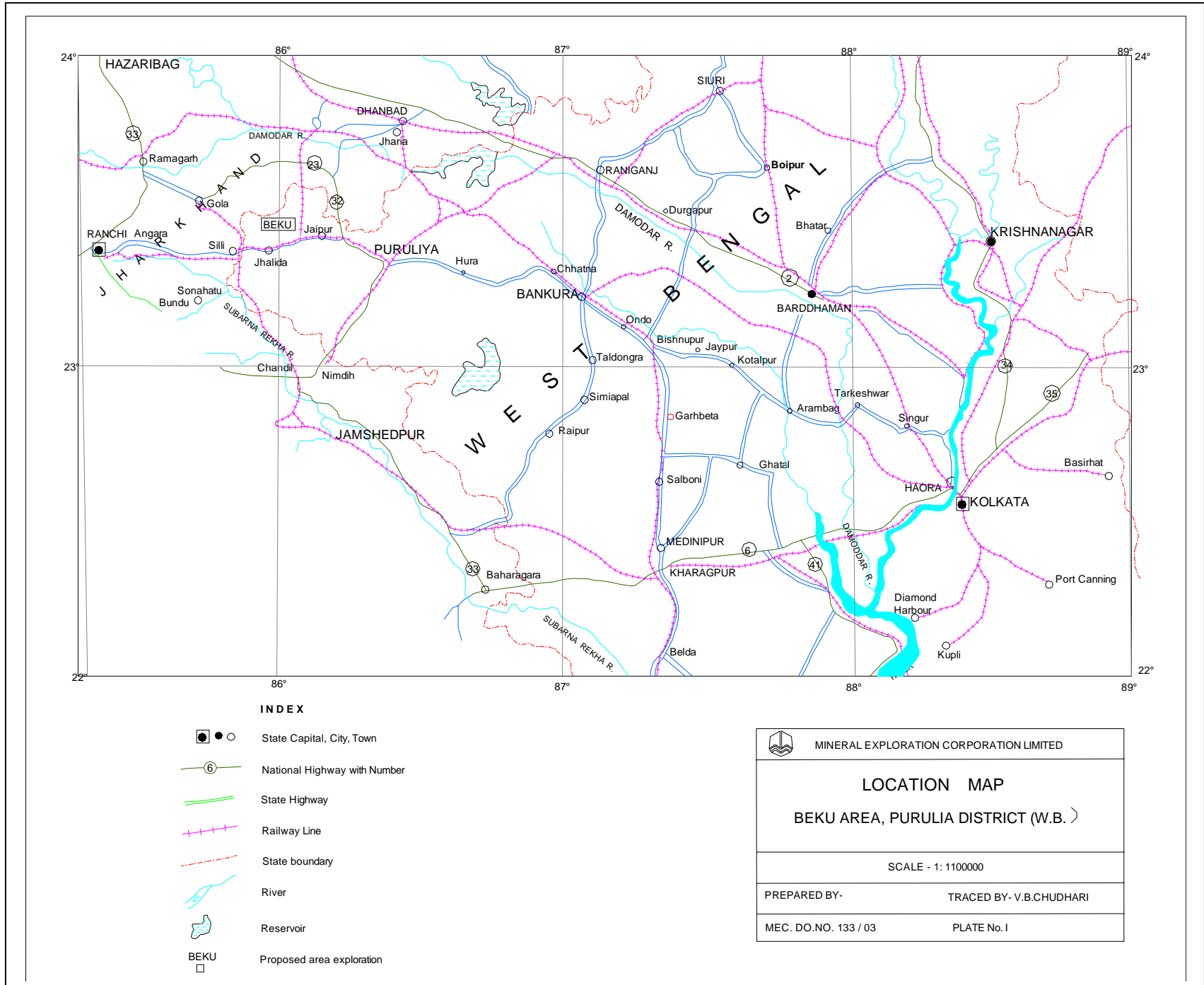
The total insitu metal reserves estimated in the deposit works out be to 789.68 tonnes of cesium metal, 467.03 tonnes of lithium metal and 181.82 tonnes of rubidium metal.

**The Deposit has been classified as Category ‘D’ of UNFC 333.**

The studies on the baseline data of Environmental studies covering land use / land cover pattern studies have been carried out in the block.

**The Total Cost of Exploration is Rs.119.98 Lakhs.**

# LOCATION MAP OF BEKU BLOCK

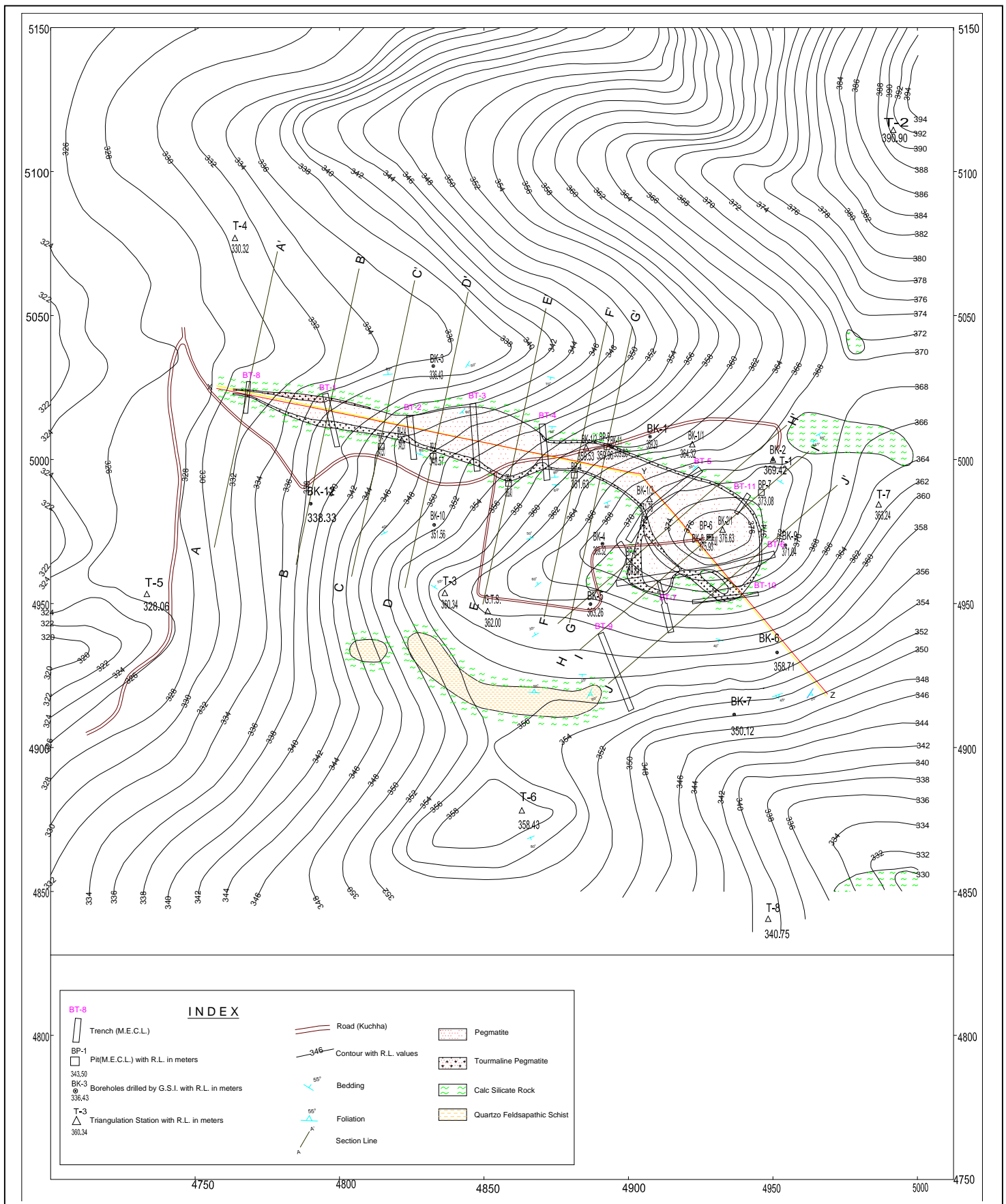


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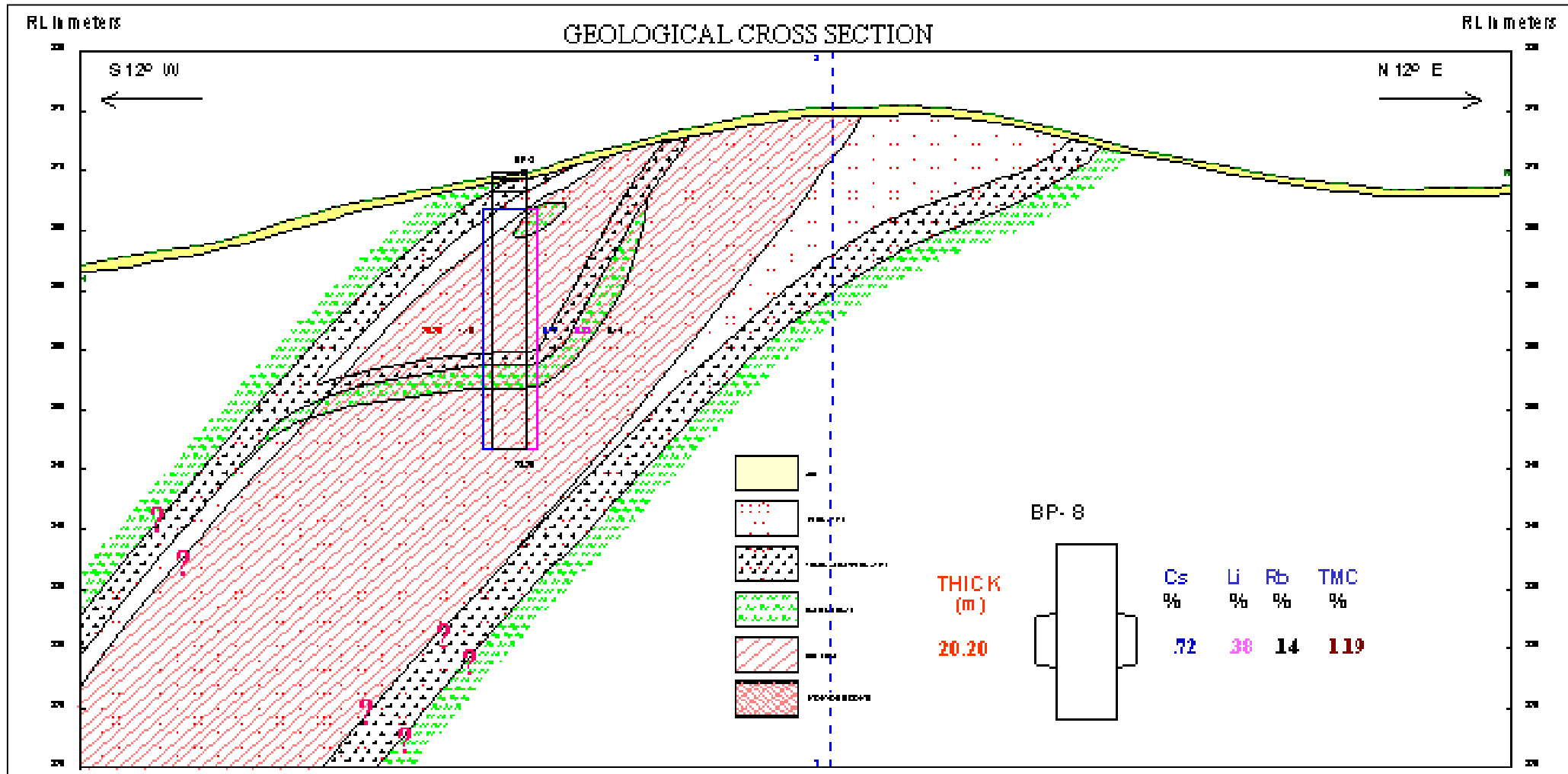
MINERAL EXPLORATION CORPORATION LIMITED	
<b>LOCATION MAP</b> BEKU AREA, PURULIA DISTRICT (W.B.)	
SCALE - 1: 1100000	
PREPARED BY-	TRACED BY- V.B.CHUDHARI
MEC. DO.NO. 133 / 03	PLATE No. I

# TOPOGRAPHICAL & GEOLOGICAL MAP



INDEX		
BT-8	Road (Kuchha)	Pegmatite
BP-1 343.50	Contour with R.L. values	Tourmaline Pegmatite
BK-3 336.43	Bedding	Calc Silicate Rock
T-3 360.34	Foliation	Quartzo Feldspathic Schist
	Section Line	

# GEOLOGICAL CROSS SECTION



# LEVEL PLAN AT 330 mRL

