

## **Bhatin Mine**

### **Location of the Mine**

Bhatin Uranium deposit is located in the Dhalbhumgarh subdivision of East Singhbhum district, Jharkhand state. The Bhatin Mine deposit is covered under Survey of India topo-sheet no. 73 J/6 bounded between latitudes 22° 40' 15.81" N to 22° 39' 24.80" N and longitudes 86° 19' 24.31" E to 86° 20' 23.64" E. The national highway NH- 33 runs from northwest to southeast and Bhatin is well connected with Jamshedpur through metalled road. The nearest railway station is Rakha Mines which is about 5 kms and nearest Junction is Tatanagar station at a distance of 22 km NW of Bhatin.

### **Physiography**

Bhatin mine area is situated in Singhbhum shear zone, which is characterized by gentle to moderately steep or steep slopes. The leasehold area is to the north and west of a small hill range. The ground level elevation of the site varies between 125–255 mRL with peak at the 255 mRL. General ground level gradually slopes towards the NE. The NE quadrant of the study area is slightly undulating but devoid of hills.

The natural drainage system is distinct due to hilly topography and well-defined gradients in parts of the study area. The River Subarnarekha flows from NW to SE of the lease area. The lease area lies in hill of about 5 km wide extending in the NW to SE direction. The area is drained by the Gara Nalla, which flow towards northeastern part of the lease area and joined the Subarnarekha River near Digri Ashram. Major part of the area has dendritic drainage pattern. The hill ranges are drained by seasonal streams, which form the part of the Subarnarekha River system. The Gara Nalla receives water through streams flowing down from the hills on both its banks.

### **General Information and status of the mine**

Adit-4 located in the northern side of the hill serves as the main entry of the mine. The access to lower levels of Bhatin mine is through two winzes (called W400 winze & W240 winze) dipping at 45° and 47° respectively. Level interval varies from 25m to 50m. Both the winzes are connected with different levels.

The mine adopts 'Horizontal Cut and Fill' mining method which enables the use of waste rock and mill tailings as back fill in the mined out areas. The strike length is about 700 m. The present working depth of mine is about 185 m below ground (i.e 7<sup>th</sup> level) and the deepest point is 205 m from the surface.

### **Geology of the area**

Uranium mineralization in Bhatin is confined to sheared rock types of Singhbhum Shear Zone. Geologically, the shear zone is constituted by Precambrian metasediments such as mica-schist, quartzite, phyllites and altered tuffs. The rock types in this zone are broadly classified into two groups – the older Chaibasa stage of rocks consisting of meta-sediments and the younger Dhanjori stage of rocks consisting of metavolcanics. During shearing, the older Chaibasa stage of rocks is thrust over younger metavolcanics of Dhanjori. As a result, the younger Dhanjori stage of rocks lie below the older Chaibasa stage of rocks. The thrust contact between two stages

of rocks is severely sheared and brecciated. Uranium occurs in this sheared zone in very finely disseminated form. The general strike of the rocks of area is NW-SE.

### **Local Geology**

The ore body is lenticular. The deposit is broadly divided into three blocks- western Bhatin, central Bhatin and eastern Bhatin. The eastern Bhatin is separated from the central Bhatin by minor fault and the lenses in this block are thin and patchy.

There are two lodes in the eastern part of the deposit, the footwall lode and the hangwall lode. Only hangwall lode exists in western Bhatin. The strike length of the ore body is about 700m in NW-SE direction with dip varying between  $35^{\circ}$  to  $50^{\circ}$  due north east. The average strike and dip are  $N320^{\circ}$  and  $45^{\circ}$  towards NE respectively. The thickness varies from 3m to 9m, average width being 4m.

The mineralized rock types for both the lodes are biotite-chlorite schists, chlorite-biotite-quartz-apatite-magnetite-illmenite-tourmaline rock (the granular quartz rock in the mine), the tectonic conglomerates and the brecciated quartzites.