

## *Ground Methods*

Among ground methods, time-domain EM method (e.g. SIROTEM, UTEM) are useful in areas of conductive overburden where traditional IP or EM techniques are ineffective. Geophysical methods are useful indirect methods in gold exploration in identifying host rock, geoenvironment marker beds or structures with unusual magnetisation, density, electric polarisation or conductivity. Some of the markers may be basic rocks (magnetic) BIF or bearing signatures detectable. India has gold deposit models and geophysical signatures.

Instruments used to detect gold directly, such as Terraprobe, are also available in India.

The scope of ground probing radar systems has vastly improved and the subsurface profiling (to map near surface structures), complemented by geochemical and IP data, makes it yet another useful tool in mineral investigation.

## *Drilling*

**Drilling techniques practised in mineral exploration are mostly outdated. Sophisticated and latest technology is required. The use of wireline core barrels is a must and the latest available is the thin walled series TK barrels.**

## **Mining Technology Issues**

The selection of technology is largely based on the mineral characteristics such as depth, character of ore, associated mineral wealth, mine size, demand pattern for the minerals and availability of needed financial resources.

The Indian mining sector (including coal) was dominated by underground mining until about two decades ago. With the technological advances abroad and the pressing need to raise coal production to fuel a number of thermal power plants to bridge the ever-widening demand/supply gap for electric power, India also shifted to opencast mining. At the same time, the role of the underground mines continued to enhance quality considerations and availability of large deposits.

The non-coal mineral deposits in India are primarily amenable to opencast mining, with the exception of some copper, lead-zinc, manganese ore, gold and uranium. However, these mines are small in number.

Unlike mineral rich developed countries such as Canada, U.S.A., and the developing countries such as Chile, Zambia, South Africa, China, and Malaysia, India's absorption rate of new technologies is rather low (owing to financial resource constraints). Even in projects set up with foreign participation, such as coal, bauxite and iron ore, the technological upgradation has been slow and poor.

## *Coal Sector*

Of the 450 Coal India Limited mines currently in operation, 281 are underground mines contributing only 30 per cent of the total production of 225 million tons (1993-94). The rest are the share of opencast mines. This low production rate of underground mines is a direct consequence of dated technology such as conventional blasting and drilling. While in the