4.1 GEOPROSPECTING

Geoprospecting refers geological investigations for finding out Earth's natural resources like mineral deposits petroleum and natural gas, ground water etc.

Geoprospecting stages:

1. Reconnaissance survey (G4)
2. Prospecting (G3)
3. General exploration (G2)
4. Detailed exploration (G1)

Reconnaissance survey (G4)

- ✓ Reconnaissance survey is a grass root exploration for identifying the existence of mineral potential on a regional scale.

  It includes:

- ✓ Literature survey, acquisition of geophysical data, etc.
- ✓ Aerial reconnaissance; remote sensing, air borne geophysical survey.
- ✓ Geological survey; geological mapping on 1:50000
- ✓ Geochemical survey; ground geophysical survey.
- ✓ Technological survey; trenching, scout drilling, sampling, petro graphic and mineralogical studies

Prospecting (G3)

- ✓ Prospecting is the systematic process of searching mineral targets identified during reconnaissance.

It includes

- ✓ Geological survey; mapping on 1:10000 or larger scale.
- ✓ Geochemical survey; sampling of rock type, soil survey.
- ✓ Geophysical survey; detailed ground geophysical work, bore hole logging
- ✓ Technological survey; trenching, drilling bore holes, sampling, petro graphic and mineralogical studies

General exploration (G2)

- ✓ General exploration is the initial delineation of an identified deposit.

It includes

- ✓ Geological survey; mapping on 1:5000 or larger scale.
- ✓ Geochemical survey; detailed litho geochemical survey, sampling of fresh mineralized rock type, soil survey.
- ✓ Geophysical survey; bore hole geophysical survey.

Technological survey; trenching, drilling bore holes, sampling, petro graphic and mineralogical studies

Detailed exploration (G1)

- ✓ Detailed exploration is conducted before the start of the mining.

It includes

- ✓ Geological survey; mapping for coal 1:5000 and for other 1:1000.
- ✓ Geochemical survey; detailed grid pattern sampling and analysis.
- ✓ Geophysical survey; detailed and specific bore hole geophysical survey.

- ✓ Technological survey; pitting, trenching, drilling bore holes, sampling, petro graphic, geostatic studies and mineralogical studies

Mining

Mining or quarrying is the method of the exploitation of mineral deposits / rock formations, exposed upon the earth's surface or present underground, applying manual or mechanical methods.

Exploitation:

Exploitation is defined as the act of using natural resources like mineral deposits, oil & gas, groundwater, etc., applying various mining and extraction techniques.

Quarrying is the term used for minor minerals like granites.

Mining is the term used for major minerals like limestone.

Methods of mining:

Mining is broadly classified into 2 types.

1. Open cast mining
2. Underground mining

1. Open cast mining:

If the mining is done from the surface of the earth, then it is termed as open cast mining. I.e. Mining is done by disturbing the surface of the earth. Eg lime stone mining.

2. Underground mining:

Without disturbing the surface of the earth, if mining is carried out through shafts and underground tunnels to exploit mineral deposits occurring at greater depths, it is called underground mining. Eg Kolar gold mining

Components of mining:

1. Mine plane approval
2. Explosive license
3. Environmental clearance from competent authorities.
4. Mining lease.

5. Drilling
6. Blasting
7. Hauling

- **Mine plan approval** is granted by Indian Bureau of Mines, Bangalore.
- Explosive license is issued by competent authority of Explosives, Nagpur.
- **Environmental clearance** should be obtained from State Government Authorities or Ministry of Environment & Forests, depending upon the real extent of mining area. If it exceeds 50 hectares, clearance & mining lease should be obtained from Union Government.
- **Mining lease:**

It should be obtained from State Government Authorities, if minor minerals have to be exploited with an extent of mining restricted to be less than 50 hectares. Mining lease is required from Union Government.

- **Drilling and Blasting** are mining operations to explore mineral deposits.
- **Hauling** refers transportation of mined mineral deposits from the mining area to the required place. It requires **'Transport Permit'** which will be issued by respective District Mining Authorities. Transport Permit will be issued on payment of **'Royalty'** to Government per tonne of production of mineral deposits.