

ACHIEVEMENTS DURING 2006-2007 AND THRUST OF ANNUAL PROGRAMME FOR 2007-2008 OF GEOLOGICAL SURVEY OF INDIA

I. ACHIEVEMENTS DURING 2006-2007

Mineral Finds

Coal & Lignite

- An additional resource of 2290.14 million tonnes of coal has been assessed by GSI during 2006 -2007 (up to June, 07).
- The geological resource of coal of the country stands at 257.38 billion tonnes and lignite at 38.75 billion tonnes as on 01.04.2007.

Gold

- Exploration for gold in Ajjanahalli central and northern sectors, Tumkur district, **Karnataka** led to the estimation of additional resource of about 0.48 million tonne of gold ore with grade varying from 1.65 g/t Au to 1.70 g/t Au.
- Exploration for gold in Bangargatti block, (North & South sector), Dharwar district, **Karnataka** has been carried out. Bedrock and trench samples from BMQ bands have indicated gold values from 0.03 to as high as 35.00 g/t.
- Exploration for gold-copper mineralisation in three blocks of Bhukia Gold belt, Banswara district, **Rajasthan** led to the augmentation of gold ore resource of 7.32 million tonnes with average grade of 1.30 g/t gold. A total resource of gold ore in the area is 55.22 million tonnes with 1.87 g/t Au (total gold metal content is 103.26 tons).

Diamond

- Two kimberlite (host rock for diamond) pipes each have been located near Chagapuram (CGK- 1&2) Mahboonagar district and Timmasamudram area (TK- 5&6) Anantapur district, **Andhra Pradesh**.

Platinoid Group of Elements (PGE)

- Investigation for PGE mineralisation was continued in Hanumalapura area of **Karnataka** over 1.8 km strike length and resource of 0.546 million tonne of PGE ore with (Pt + Pd) values ranging from 0.50 ppm to 2.93 ppm has been augmented.

Basemetal

- In the Nim-Ka-Thana Copper prospect, Sikar district, **Rajasthan** a resource of 46.26 million tonnes has been estimated from four blocks. The main three contributing blocks being Dokan (25.56 mt), Baniwala-Ki-Dhani (13.17mt) and Dokan North (5.6 mt) with 0.38% , 0.45% and 0.30 % Cu respectively.
- Investigation for basemetals in Thanewasna and Dubarpeth- Karanji block, Chandrapur District, **Maharashtra** led to the estimation of 1.13 million tonnes of copper ore with average grade of 1.1% copper and 0.35 million tonnes of Cu ore with 0.67 % copper respectively.

Bauxite

- From Kadhala, Kendujhar districts, **Orissa**, a resource of 1.97 million tonnes bauxite with an average grade of 48.34% Al₂O₃ has been estimated.

Iron Ore

- Investigation for iron ore in four blocks in Namakhal district, **Tamil Nadu**, was carried out. A resource of 14.03 million tonnes of magnetite ore with Fe content of 31 to 37% has been assessed.
- In NMDC block, in parts of Sandur Schist belt, Bellary district, **Karnataka** a resource of 8 million tonnes of iron ore with > 55% Fe has been assessed.
- Good quality iron ore have also been recorded from Ghutang and Pathargada area, Kendujhar District, **Orissa** and Aridongri area, Kanker district, **Chhattisgarh**.

Manganese

- Exploration for manganese in Lasarda (Bolani) block, Bonai-Keonjhar belt, Kendujhar district, **Orissa**, was continued. A resource of 2.47 million tonnes manganese ore has been estimated with an average grade of 24.61% Mn. Resources estimated from the adjacent blocks explored earlier is 4.73million tonnes with average grade ranging from 22.27% to 26.15% Mn.

Limestone

- A resource of 33.74 million tonnes marginal cement grade limestone has been assessed in Vridhachahalam sub-basin, Cuddalore District, **Tamil Nadu**.
- Additional resource of 280.80 million tonnes of limestone of various grades has been estimated in Jaintia Hills district, **Meghalaya**.

Graphite

- A resource of 0.76 million tonne of graphite (average grade of 13% FC) has been estimated for a strike length of 1 km in Arasanur block, Sivaganga District, **Tamil Nadu**.

Regional Systematic Surveys

- ❖ 835 sq km of systematic geological mapping was completed leading to a total coverage of 3,091,635 sq km out of the total mappable area of 3,145,800 sq km of the country.
- ❖ 23,127 sq km has been covered by geochemical mapping in various states during current year (upto June, 2007).
- ❖ A total of 22,220 sq km was covered under Geophysical Mapping (up to July 2007).
- ❖ 4936 sq km sq km of thematic mapping (STM) was carried out leading to a total coverage of 1,27,061.5 km since the inception of STM (upto June, 2007).
- ❖ Aero-geophysical multisensor data have been acquired for 28,777 line km involving an area of 14,388 sq km in Nagpur – Wardha Valley (Maharashtra) and Baihar – Katru areas (MP and Chattisgarh).

Specialised Investigations

- GSI has been declared the Nodal Agency for Landslide Hazard Risk Mitigation in the country. A primary node of the National Disaster Management Support (DMS) Network has been installed in GSI at Delhi with modern electronic communication channels. The DMS control room networks with similar control rooms of different states and information on landslide incidences is communicated instantly to different stake holder agencies like Border Roads Organisation and Government departments for fast mitigation. GSI is also entrusted with the preparation of the National Disaster Management Policy and Guidelines on Landslides. It is hoped that data on all kinds of natural disasters can be disseminated through this network in future, leading to fast and effective natural disaster management.
- Projects on various themes covered under Special Investigations are taken up by GSI to provide services to various government/ PSU

organizations and also to generate value added products to cater to the needs of the society. These multifarious contributions include: geoscientific inputs to major civil engineering projects, River Valley Projects, Landslide Hazard Zonation (LHZ) on different scales along important route corridor passing through landslide prone hilly terrain etc. A new mission, 'Shallow Subsurface Geology' has been introduced with the objective of obtaining accurate description of near surface properties and processes including geological, geotechnical and engineering/ geophysical properties for developmental planning. GSI is also engaged in Active Fault Studies, which is a key element of Seismic Hazard Assessment (SHA) to identify and characterize seismic source zones in Himalayan frontal belt. Work on seismic hazard microzonation for number of urban centres is also in progress towards earthquake disaster mitigation.

- From the last decade GSI had started evolving to more focused, time-bound generation of geo-environmental base line data, its synthesis and collation, as its principal agenda. In the liberalized socio-economic frame work, outcome of GSI work will become more and more relevant for planning sustainable development programmes, evaluation of geo-environmental status and mitigation of environmental hazards.
- Global warming has become an issue which is worrying mankind across the world. Reports of recession of glaciers, changes in volume of water flowing along major rivers have sent warning signals to scientists and administrators. Geological Survey of India is actively engaged in the field of glacier regimes studies involving glacier mass balance, glacier flow, hydrometry, suspended sediment transport, microclimatic parameters, secular movement and geomorphology of selected representative glaciers in the states of Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh. These studies would help to monitor the possible effects of warming, if any. Detailed glaciological studies for last six years (2000-2006) on Hamtah glacier, Lahaul-Spiti districts, H.P. indicated that it has evacuated an area of 0.0259 sq. km with an average value of 0.0043 sq. km /year.

Antarctica studies

- Geological Survey of India has been participating in the Indian Antarctic Programme since its inception during the austral summer of 1981-82. Twenty six Antarctica Expeditions have been conducted up to the end of 2006-2007. The Earth Science programmes in Antarctica are an ongoing programme of long-term nature. This year programmes will be carried out under different heads, which include geological mapping with inputs for global climate changes, comparative studies on crustal evolutionary history of the then contiguous parts of Antarctica and Eastern Ghats of India, delineation of land-ice-sea interface, etc. During F.S. 2006-07 the monitoring of Dakshin Gangotri (DG) glacier snout and the western polar front of the Schirmacher Oasis was carried out. A retreat of 0.6 m was recorded.

International Activities

- ❖ GSI participated in various International Geological Correlation programmes. 32nd meeting of Indian National Committee (INC) reviewed ongoing eleven IGCP projects, future plans and recommended new projects for Indian participation.

Dissemination of Information

- Geological Survey of India is the custodian for geological maps and geoscientific database of India and adjoining countries. Being the repository for huge volume of geoscientific information of the country, GSI has not only been continuously generating information but also compiling and developing huge databases. A programme of digitisation of maps of the 1:50,000 Geological Map Series, mineral map series, and others are underway and will progressively be placed in the public domain.
- GSI took up the ambitious programme of developing an information-communication infrastructure through GSI Net and Portal Project during the X Plan period. The Net and Portal Project envisages a nationwide Intranet supported with an Enterprise Integrated Portal (EIP). This infrastructure promises to give seamless power of sharing information within the legitimate user-groups where knowledge can be created, captured, stored, retrieved, used, improved and restored. I am happy to inform you that the project will shortly become operational, once the Wide Area Network (WAN) is established. With this, all offices of GSI will be interconnected and end users will be able to transact business through the GSI Portal. This will mean a big leap towards e-governance for GSI.

Research and Development

- One of the most exiting discovery by GSI is a **rare fossil snake from the Lameta Formation of Kheda district, Gujarat**. This well-preserved specimen, about 70 million years old, not only represents the oldest snake in the world, but enhances our knowledge on the origin and evolution of snake also. Its occurrence in association with sauropod dinosaurian eggs and hatchlings provides a unique evidence of predation of Mesozoic snakes on dinosaur eggs.
- Petrological researches not only remained confined to the study of terrestrial rocks but extend its domain to the extraterrestrial materials also. In the field of meteoritics, study of the primitive Ca-Al inclusions (CAI) in un-metamorphosed Indian chondrites, constrained the formation age of chondrules within one million year in collaboration with PRL, Ahmedabad.
- For societal benefits, investigation on the arsenic toxicity in ground water was continued. **Geo-remedial measures to mitigate the risk of arsenic toxicity in ground water in parts of Nadia district, W. Bengal has established the occurrence of Pleistocene "orange sand" in depth range of 40 to 50m, which is known to yield arsenic free ground water**. This will solve to a large extent the problem of getting arsenic free waters for domestic use for the people residing in the east of the Ganges in W. Bengal.
- Rb-Sr isotopic studies on samples (rock – biotite) of two mafic dykes, collected during the 23rd Indian Antarctic Expedition, from Gruber gebirge, Wohlthat Mountains, Central Dronning Maud Land, East Antarctica revealed ages of 492 ± 18 and 146 ± 6 Myrs, respectively. The date constraints the magmatic activities during end-stage of the Cambrian Pan-African orogeny and also early SE Africa – Antarctica continental breakup.

Internal Resource Generation

- ❖ Internal resource generation for the F.Y. 2006-2007 was Rs 20.85 crores.

Annual Programme for 2007-2008

- Thrust has been given to Mineral Exploration and Survey and Mapping. A total of 94 items are included of which 72 are under ores and minerals and 22 belong to coal and lignite. Among these 72 projects, 23 are for gold, 22 base metals, 8 for platinum group of metals, 6 ferrous minerals, 6 diamond and 7 other minerals (including strategic, limestone and industrial minerals).
- Next priority remains the Survey & Mapping: Specialised Thematic Mapping (STM) followed by Geochemical (GCM) and Geophysical Mapping (GPM) constitutes the core activity in recent years. A total of 97 items of investigations are included under Survey and Mapping. GCM tops the list with 34 projects, followed by STM with 29 and GPM with 10 items. The rests are Airborne and Marine surveys.
- Engineering, Earthquake, Landslide and Environmental Geology are grouped under Special Investigations and during 2007-08 there are about 91 projects included.
- There is a decrease of about 15% of manpower in the total strength of working geologist by the process of retirement, ageing and promotion from that of last year. Still, about fifty four (54) percent of GSI's manpower is deployed for working in the three major heads of Mineral Exploration, Survey & Mapping and Special Investigations. Another 17% of human resources are engaged in Research & Development, necessary partly to supplement the different investigations. About 23% of manpower is deployed for Information Dissemination that includes map, publication and information technology while 6% manpower will be deployed for HR and training.