



# GEO NEWS

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*These rocks, these bones these  
fossil ferns and shells,  
Shall yet be touched with beauty,  
and reveal  
The secrets of the book of earth to  
man.*

***Alfred Noyes***

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## "Apnon Se Apni Baat"

Dear Geoscientists Brethern,

The second volume of "GEONEWS" is in your hands on the occassion of **Annual General Meeting, 2008**. We deeply regret for a lull period of more than two years, wasted in non-publication of "GEONEWS" for various reasons beyond the control of the Editor and Geoscientists Society as a whole.

A small and insignificant effort has been made to revive the activity of bringing out periodic biannual "GEONEWS" in a very short time of about one month. However, we assure to all members of the Society, that in future having your full cooperation and support, We would be able to deliver the goods as per your expectations. In this connection, we like to submit that "Annual Bulletin" of the society shall be shortly published for which all preliminary preparations have already been made. We further like to add and request every member to send the valued scientific and technical papers-articles making the Bulletin in presentable form bringing wide appreciation to the society. Advertisements from the Goeconsultants, Industrial-Mining entrepreneurs shall be gratefully acknowledged.

In the end we thank you very much for bearing with us so long.

With Warm Wishes.

26.07.2008

Editor

# **NEED TO REORIENT EXPLORATION PROGRAMS FOR METALLIC MINERALS IN RAJASTHAN**

By

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The state of Rajasthan is endowed with important resources of metallic minerals notably base metals and also gold. It is one of the most intensely explored states for non-ferrous metals. So far the exploration work in Rajasthan has been greatly influenced by presence of ancient old workings that occur practically all over the known mineable metallic resources. By now almost all the prominent old workings have been explored in the state and it is indeed difficult to find new targets for drilling programs. Despite, a fairly methodical approach in detailed mineral exploration programs, the genetic aspects involving characterization of prospect sequences, hydrothermal alteration and tectonic setting of mineral deposits remained poorly addressed. In view of lack of readily available prospecting targets it has become difficult to sustain mineral exploration programs that are based on the current practices. In order to augment the known metallic mineral resources it is imperative to reorient the approach for search of minerals by upgrading geological, geochemical and geophysical database. For example it is essential to recognize different geological environments that are repository of various economic mineral resources. The type of mineral commodity, application of exploration criteria like distinctive prospect sequences, hydrothermal alteration patterns, geochemical signatures and geophysical responses and more importantly, the size of ore body greatly depend on the type of geological environment being explored. Some of the well known geological environments for mineral prospecting include Sedimentary Exhalative (SEDEX) type for base metal deposits, Volcanic-Hosted Massive Sulphide (VHMS) type for polymetallic Zn-Pb-Cu-Au-Ag deposits, Porphyry type for low grade high tonnage

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copper deposits, Intrusion (granite-pegmatite)-related Sn-W deposits, BIF-hosted iron deposits and greenstone-carbonate hosted and Epithermal gold bearing systems. The state sponsored exploration programs have not been reoriented to suit the type of geological environment under exploration. For example SEDEX type ore bodies are typically tabular in nature where lateral extension assumes significance. In contrast VHMS type ore deposits are known to have a totally different aspect ratio. The relative dimensions for down dip pluge length to strike length to thickness for VHMS deposits could be as high as 40:8:1. Taking cognizance of such a nature of massive sulphide accumulations, exploration depth for 3 to 15 Mt VHMS deposits varies from 500 to 800m in Spain and Canada respectively. Australian agencies have gone beyond 600m vertical depth for 5.7 Mt Lewis Pond polymetallic deposit that has 3.5% Zn, 2.0% Pb, 0.19% Cu, 1.9 ppm Au and 97 ppm Ag. In comparison, the subsurface exploration by drilling for VHMS deposits in the Pindwara-Watera track and Kalabar-Biranthiya-Chittar sector in the South Delhi Fold Belt has never exceeded 200m vertical depth despite the fact that ore bodies do continue beyond this explored depth. This is to emphasise that the exploration strategy for SEDEX type deposits (like Rajpura-Dariba) is ought to be different from the VHMS deposits in South Delhi Fold Belt. It is therefore, important that we recognize different type of deposits that form basis of prioritization of the targets and help in making investment decisions before embarking on detailed exploration programs.

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*We are what we repeatedly do*

*EXCELLENCE, then is not an art but habit.*

*- Aristotle*

# **SULPHIDE DEPOSITS AND THEIR IMPACT ON HUMAN HEALTH**

**Compiled By: P.K.Yadav\***

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Geological Survey of India, W.R.Jaipur

Sulphide deposits have potential for adverse environmental impact. These deposits have high acid generating potential which is due to their rich metal content and rich sulphide content. If these deposits are improperly exploited these factors can contribute to deleterious effect on aquatic ecosystem and human health.

To understand impact of sulphide deposits study of geoenvironment is necessary. Parameters for the study of geoenvironment may include compilation of geological, geochemical, geophysical, hydrological and engineering information pertaining to the environmental behaviour of similar deposits (a) prior to mining, and (b) resulting from mining, mineral processing and smelting. In addition study of the effect of climate is also essential.

The information pertaining to the study of geoenvironment is useful in mine planning and mitigation of environmental problems and for assisting land use planners.

## **Trace element geochemistry of sulphide deposits:-**

Massive sulphide deposits have higher content of Zn, Pb, Ag, Cu and Fe. Deposits associated with mafic rocks have anomalous concentrations of Au, Ag and Co. Deposits associated with felsic and sedimentary rocks contain minor to significant concentration of Ag, As, Sb, Cd, Co, Bi, Sn and Se concentration of mercury are high in pyrite sphalerite or sulphosalt minerals. In Proterozoic sulphide deposits higher mercury concentration (4 to 4680 mg/kg) has been noticed.

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### **Environmental effects of mining of sulphide deposits:-**

Mine workings and mine waste of massive sulfide deposits can cause detrimental environmental effects through a variety of pathways related to specific elements ecosystem threats as dominantly produced by **acid mine drainage**. The oxidative weathering of pyrite and pyrrhotite generate sulphuric acid. The lower pH values generated by the oxidative weathering of pyrite and pyrrhotite enhances the ability of the drainage to carry basemental such as Cu, Zn, Cd, Co, Ni and Pb and also to attack silicate gangue minerals thus liberating aluminium and manganese. Once liberated the metals and acidity can impact downstream aquatic system. Downstream effects can be localized or can effect 100 km downstream from mine sites. Heavy metals are dispersed by erosion and transport of tailings by wind or water.

Human health impacts of massive sulphide deposits are generally associated with either the **inhalation or the ingestion of metals**. The U.S. Environmental and Protection Agency (USEPA) have set primary maximum contamination limits (MCL) for cyanide, Sb, As, Cu, Cd, Cr, Ag and Ni for drinking water.

**Human health risks** due ingestion pathways other than drinking water are commonly **due to lead and mercury**.

**Lead risks** are generally due to ingestion of lead rich mine waste through incidental contact. At the Valzinco mine in central Virginia fine grained floatation tailings of the mill exposed to wind and water contains up to 4000 mg/kg lead which is in the excess of USEPA (750 mg/kg lead). Extreme fine grinding required for beneficiation enhances airborne transport of lead bearing dust around Brokenhill, Australia, lead in soil near smelter produce sulphur dioxide rich and metal rich emissions which increase acidity and accumulation of heavy metals in downstream areas.

**Mercury risks** are generally related to the consumption of mercury contaminated fish and contamination of drinking water. Methylmercury is a potent neurotoxin that accumulates with increasing trophic level in aquatic and terrestrial ecosystems. The human health impact is through the consumption of fish and other

organisms in mercury contaminated environments. The USEPA issues fish consumption advisories for mercury concentrations in fish tissue above 1000 ng/g. In aquatic settings, the primary mechanism for methylation of mercury as a byproduct of the metabolism of sulphate reducing bacteria. The weathering of mercury bearing sphalerite and other sulphide bearing minerals can release both mercury and sulphate to surrounding watersheds. Thus the weathering of wastes for mercury bearing massive sulphide deposits can increase the methylation of mercury in downstream sediments of rivers and lakes.

Elements like **Arsenic** can exhibit anomalous background concentrations in ground water around mines. Dissolved arsenic up to 430  $\mu\text{g/l}$  has been found which is higher than maximum permeable limit of 10 $\mu\text{g/l}$ .

#### **Effects of climate:-**

In semiarid to arid regions of Rajasthan the environmental impact of mining is more likely to involve human health risks because perennial streams are limited. The common usage of shallow dug wells as drinking water source in the vicinity of basemetal mines in human health risks. The surficial weathering of mine wastes especially during rainy seasons may liberate elements like Pb, Zn, Cd, As and Hg and add to the ground water.

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To powers of the mind are like the rays of the sun dissipated.

When they are concentrated - they illumine.

- Swami Vivekanand

## **GLIMPSES OF GEOLOGICAL ACTIVITIES**

### **1. Mineral Survey and exploration activities of Rajasthan State Department of Mines and Geology, Udaipur.**

Significant achievements were made during the last two years 2006-07-08 for the exploration of basemetals, noble metals limestone and lignite as described under:

#### **A. BASEMETAL AND NOBLE METALS**

- In Shrinagar area of Ajmer district, gold and silver values were detected in borehold Nos. SNBH-13, SNBH-15 and SNBH-18. The analysis results of core samples analyzed at IBM laboratory and departmental laboratory, have indicated gold values varying from 0.045 gm. to 2.00 gm/tonne and silver values from 0.01 to 45.10 gm/tonne. Besides lean (0.36%) Cu mineralization was also reported in borehold Nos. SNBH-15, 16 & 17.
- Near village Chhachhundara, Jorawarpura, Ekalsingha area, district Ajmer the spot samples analysed in departmental laboratory and HZL laboratory indicated 0.4 to 0.742 gm/tonne gold, 0.9 to 69 gm/tonne silver associated with cobalt (37 ppm to 0.19% cobalt) and copper upto 0.25%.
- In Morda, tehsil Mazmabad, district Jaipur subsurface copper. Mineralization in the form disseminations and stringers of pyrite and chalcopyrite was found at a depth of 35 to 139m.
- Near villages Kidarwadiya, Lasadiya, Belvi and Agar tehsil Dhariyawad of Udaipur district grab samples from old workings indicated Cu up to 0.75%, Au 0.11 to 2.75 ppm, Ag 0.2 to 22 ppm
- In Padar-Amjhera area of Dungarpur district the surface samples analysed at Hutti gold Mines, showed gold values from 0.162 to 1.5 gm/tonne and silver values from 0.10 to 62.2 gm/tonne.



- Tectonic interpretation of satellite data followed by ground checks in areas of Ajmer and Pali districts showed gossan bodies with indications of basemetals having 0.10 to 2.8 percent copper and 0.10 to 0.4 ppm of gold values in soil samples.

#### **B. NOBLE METAL EXPLORATION PROGRAMME**

- Nine geochemical samples collected from Ramsinghpura, Bahasinghpura, areas in Jaipur district indicated Ag from 1.602 to 8.1 ppm, Co 31 to 230 ppm, Au 0.117 to 0.308 ppm, in four samples.
- SP anomaly of -20 mv was observed associated with magnetic anomaly of 150 gammas in Undwala area of district Banswara.

#### **C. LIMESTONE EXPLORATION PROGRAMME**

- Additional reserves to the tune of 172 million tonnes SMS grade limestone and 155.50 million tonnes cement grade limestone were proved by drilling in Sam area of Jaisalmer district. In Sam area a cumulative total of 458.25 million tonnes SMS grade and 467.35 million tonnes cement grade limestone have been assessed so far.
- High grade limestone bands having CaO 52-54%, MgO less than 1% and SiO<sub>2</sub> upto 3% were found near village Pithasar and Harima, in Nagaur district.

#### **D. LIGNITE EXPLORATION PROGRAMME**

- In ambasar-Gigasar area, district Bikaner exploratory drilling resulted during the year, 1.912 million tonnes estimation of total geological reserves to 22.472 million tonnes.

#### **E. AREA NOTIFIED FOR INVITING ML APPLICATIONS:**

- (a) Areas declared free for establishment of major cement plants and application invited for grant during 2006-2007:

Total 9 blocks were notified during the year for setting up major cement plants. These plants will come in production within three years after sanctioning the mining lease. *"A special condition has also been imposed on*

*applicant to deposit Rs.1 crores rupees per million tonne plant capacity as performance guarantee money"*, which will be forfeited if plant is not set up within stipulated time period. This will increase the additional cement producing capacity of the State by 20 million tonnes per annum, which is equivalent to present production capacity of existing plant in the State. The details of areas notified for inviting ML applications is given below:

**(i) Chittaurgarh District: (2 blocks)**

S.No.	Name of Block	Area (Sq. Km.)	Reserves (M. Tonnes)	M.L. Applications received
1.	Bhat Kotri	7.6275	296	24
2.	Javda-Lasrawan	9.8950	220	22

**(ii) Jaisalmer District: (6 blocks)**

S.No.	Name of Block	Area (Sq. Km.)	Reserves (M. Tonnes)	M.L. Applications received
1.	Parewar	7.20	134.17	10
2.	Parewar SN-I	10.40	176.00	12
3.	Parewar SN-II	8.32	231.00	16
4.	Parewar SN-III	10.40	113.00	7
5.	Parewar SN-IV	9.28	122.00	8
6.	Parewar SN-V	9.12	204.00	16

**(iii) Jhunjhunu District: (1 block)**

S.No.	Name of Block	Area (Sq. Km.)	Reserves (M. Tonnes)	M.L. Applications received
1.	Parasrampura (Gothra block-B)	7.10	135.00	19

(b) Areas declared free in April, 2007 for splittable sandstone in Dera-Nimoda area, district Baran under Minor Minerals and invited applications for grant of mining leases:

- (i) Nimoda - 29 plots (Approx. 4 hect. each)
- (ii) Chhatarpura - 8 plots (Approx. 4 hect. each)
- (iii) Kawai - 11 plots (Approx 4 hect. each)

## **2. Activities of Geological Survey of India, Western Region in Rajasthan**

The activities related to earth science in the year 2007, were confined under the domains related to mineral investigations, geochemical mapping, specialized thematic mapping, geotechnical investigations, geophysical, geoenvironmental, palaeontological, petrological and photogeological studies.

**Mineral Investigations:** New zones of copper mineralization were intersected in Gangas block, Rajsamand district, Halowala Johra, Baleshwar-Dariba and Jodhawas-Kushalgarh blocks in Sikar district, Dogeta-Basi area in Dausa district, Todika Bas in Alwar district and gold mineralization in Gundelapara block, Banswara district, Incidences of phosphorite mineralization have been reported from Sumerpur in Pali district.

**Copper Mineralization:** In Gangas block, Rajsamand district, two mineralized zones of varying width ranging from 2.2m to 8.3m with grade 0.62 to 0.78% Cu were intersected at deeper level.

In Halowala Johra block, Sikar district, mineralized zones were intersected from 83.15m to 353.6m depth with grade varying from 0.1% to 0.5% Cu. In Baleshwar-Dariba block, Sikar district, a number of stratified and strata bound mineralized zones were identified where copper. Mineralization is represented by malachite stains and occurrences of bornite, chalcopyrite and chalcocite. In Jodhawas-Kushalgarh area copper mineralization occur as isolated grains, and stringers of bornite chalcopyrite and chalcocite within calcareous quartzite and dolomitic marble.

**Gold Mineralization:** In Gundelapara block, Banswara district, chemical analyses of samples collected from extensive gossan zone gave encouraging gold values. The borehole intersected two auriferous zones of 2m and 36m width with an average of 1.06 ppm and 1.87 ppm gold content. Another borehole intersected an auriferous zone of 15m width with average 1.67 ppm gold.

**Phosphorite Occurrence in Western Rajasthan:** Occurrences of phosphorite mineralization have been reported around Sumerpur, Pali district, first of its kind from western Rajasthan. Sample collected from carbon phyllite and calc-silicate rocks contain 1% to 3.5wt% of P<sub>2</sub>O<sub>5</sub>.

### **3. NEWS FROM CORPORATE SECTOR**

#### **A. Hindustan Zince to become World's Largest Integrated Zinc-Lead Producer by 2010**

Hindustan Zinc's total integrated zinc-lead capacity would increase to 1,065,000 tonnes per annum with fully integrated mining and captive power generation capacities, thereby making HZL the world's largest integrated zinc-lead producer by 2010.

HZL will continue to maintain its superior cost leadership position among the zinc producers in the world. Two brownfield smelter projects, which will increase the production capacities of zinc and lead by 210,000 tonnes and 100,000 tonnes respectively, will be undertaken at Rajpura Dariba in Rajasthan, India.

HZL expects to increase its silver production from the current levels of approximately 100-120 tonnes per year to a level of approximately 500 tonnes per year in the form of silver and silver bearing residue. A large part of this increase would be from the Sindesar Khurd mine where silver occurrences are approximately at levels of 200 ppm and from the use of appropriate technology in the new smelters.

In line with the group's philosophy of being a fully self reliant producer of power, a captive thermal power plant with a capacity of 160 MW will also be set up at Rajpura Dariba.

The zinc and lead smelters as well as the 160 MW captive power plant and the Rampura Agucha mine expansion will be complete by mid-2010. The expansions at the Sindesar Khurd and Kayar mines will be completed in phases by early 2012.

The total investment in these projects is estimated at Rs.3,600 crore. This investment includes the cost of the smelters, captive power facilities, mine development and shaft sinking and other infrastructure. The expansion will utilise the same technology and project management skills that successfully delivered the Chanderiya II expansion project ahead of schedule.

## **B. Exploration Success**

Hindustan Zinc's ongoing exploration activities have yielded significant success with an increase of 28.7 million tonnes to its reserves and resources, prior to a depletion of 5.8 million tonnes in FY 2008. Contained zinc-lead metal has increased by 4.0 million tonnes, prior to a depletion of 0.6 million tonnes during the same period. Total reserves and resources at 31 March 2008 were 232.3 million tonnes containing 27.5 million tonnes of zinc-lead metal. The reserves and resources position has been independently reviewed and certified as per JORC standard.

The success of exploration has primarily been in the Sindesar Khurd and Rempura Agucha mines. The sustained exploration and aggressive drilling programme at Sindesar Khurd mine has successfully augmented the resource base to the current level of 37 million tonnes, making it the second largest ore body in HZL's portfolio after Rampura Agucha, with potential for further additions, through ongoing exploration. In FY 2008, the drilling programme successfully increased the strike length, by 300 metres to 1,600 metres averaging 5.8% zinc, 3.8% lead and 215 ppm silver.

At Rampura Agucha exploratory drilling carried out to outline mineralisation below a depth of 550 metres, intersected ore widths with significant grades averaging 15.5% zinc and 2.0% lead. The combined reserves and resources at Rampura Agucha alone have been augmented to 107.3 million tonnes at 31 March 2008, achieving the landmark of crossing 100 million tonnes in reserves and resources.

The group's exploration philosophy has been to replace every tonne of ore mined with at least one tonne of resource. HZL has dynamically increased its exploration focus, through a team of 40 geologists employing the latest geophysical, geochemical and GIS technologies and high speed deep drilling equipment. This has resulted in an addition of 110.7 million tonnes of reserves and resources, before depletion of 22.1 million tonnes, in the period from April 2003 to March 2008.

#### **4. GEOLOGY DEPARTMENT NEWS**

1. A New course has been introduced in the Department of Geology, Mohanlal Sukhadia University, Udaipur on **M.Sc. in Geoinformatics & Remote Sensing** from the current academic session.

Geoinformatics and Remote Sensing are relatively young scientific disciplines and are area of emerging technologies which have witnessed phenomenal growth in the last two decades. In the recent past a tremendous growth has been observed in the field of Geoinformatics and Remote Sensing. Resulting that geosciences are now a days relying increasingly on digital space data acquired from remotely sensed images through satellites, analyzed by geographical information systems (GIS) and viewed on the computer screen or on paper. Geoinformatics is collaboration between computer science and the geosciences to solve complex scientific questions. Remote Sensing coupled with Geographical Information System (GIS) and Global Positioning System (GPS) has increased the human capabilities for recourses exploration, mapping and monitoring on local and global scale. The course is not only going to provide job opportunities for the young students but also shall open an avenue of effective and viable interaction with national establishments related to various aspects of earth sciences and remote sensing.

The course is aimed at developing science graduates in the field of Informatics of the Earth. The increasing applications of Geoinformatics and Remote Sensing have created a gap between the demand and supply of trained man power in this field. It is well known that the job opportunities for trained persons in the field of Geoinformatics and Remote Sensing and available in organizations like Space Application Centre (SAC), National Remote Sensing Agency (NRSA), Indian Space Research Organization (ISRO) and a lot of Government departments using the spatial data and its analysis. Besides hug employment opportunities are now opening in the private sectors like BPO/IT segment. Geoinformatic professional can start his/her career as Project Manager, Sr. System Executive, System Analyst, Image Analyst, and GIS Programmer with specialization in Earth Science. As an entrepreneur, after obtaining the professional degree a candidate can start their own enterprise.

#### **M.Sc. Programme**

The Masters of Science in geoinformatics & Remote Sensing will be of four semester duration to be conducted in two years.

Paper X: Geospatial Techniques for Natural Resources Management

Paper XI: Geospatial Techniques for Natural Hazards and Disaster Management

Paper XII: Geospatial Techniques for Environmental Studies and Impact Assessment

Semester IV:

Paper XIII: Project work & Presentation of Report

**Placement Support:**

A specially created placement cell will look after the placement of the students for their projects and jobs.

Correspondance

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Course Director

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2. National Seminar on "Ore Body Modeling For Genesis, Predictive Metallogeny and Resources Analysis" and Annual General Meeting of Geological Society of India, Bangalore

At the invitation of the Department of geology, Mohanlal Sukhadia University, Udaipur the Annual General Meeting (AGM) of the Geological Society of India for 2008 will be held at Udaipur (Rajasthan) during 16<sup>th</sup> - 18<sup>th</sup> December, 2008. A National Seminar organized by the Department of geology on "Ore Body Modeling for Genesis, Predictive Metallogeny and Resources Analysis" will be held concurrently. There will also be a field workshop at Zawar Lead Zinc Mines and Jhamarkotra Rock Phosphate Mines on 19<sup>th</sup> - 20<sup>th</sup> December, 2008.

The Seminar will cover the following major themes:

- Deposit modeling using Geological, Geophysical, Geochemical and Geostatistical techniques from probing controls of ore genesis.
- Metallogeny in relation to Crustal Evolution and Tectonics.
- Mineralisation types, Metallogenetic and Ore Provinces linked with secularity and episodicity of Ore Deposit Formation.
- Predictive Metallogeny using Multi-Parametric Data and Geostatistical approach as Exploration Guide.
- Resource analysis including mineral deposit inventory, Grade - Reserve Estimation, Mine Development etc. Mineral supply- Demand Trends in context with Globalisation.

**Eligibility:**

a. Students with at least 50% marks in B.Sc. / B.E./ B.Tech. from recognized University/ Institute. Candidates who have appeared in the qualifying examination

and their results are awaited, may appear in the Entrance Test on their own risk. They may submit a copy of the mark sheet to the office before declaration of the result of the Entrance test. Candidates appearing or the supplementary examinations of the qualifying examinations will not be eligible for admission.

b. The selection of students will be on merit basis through Entrance Examination, conducted at Udaipur. Merit will be prepared on the basis of marks obtained in the entrance exams.

c. The Reservations of seats will be made in accordance with the statutory provisions made by the Mohan Lal Sukhadia University.

### **SEATS**

There are 25 seats for the course; out of these 20 seats will be normal including reserved seats for SC/ST/OBC and other & 5 seats will be payment seats. (Maximum seats 20).

### **FEES**

The fee of Rs.15000.00 + normal University fee per semester will be taken for 20 seats and for the remaining 5 sponsored seats Rs.20,000 + normal University fee per semester will be charged.

### **COURSE CONTENTS**

There will be 4 theory papers + 1 practical in I, II & III semester. In IV semester the student will undertake Project Work related to the syllabus and submit the report for evaluation which will be followed by presentation and *viva voce* examination.

#### **Theory:**

##### Semester I

Paper I: Introduction to Information Technology

Paper II: Basis of Earth Sciences

Paper III: Fundamentals of Photo geology

Paper IV: Fundamentals of Remote Sensing

Practical

##### Semester II

Paper V: Digital Image Processing

Paper VI: GIS - Spatial Analysis and Modeling

Paper VII: Global Positioning System & Geospatial Data Integration

Paper VIII: Surveying and Cartography

Practical

##### Semester III

Paper IX: Geospatial Techniques for Land Resources Management



Environmental Issue & Waste Management in Mineral Production; Utilisation of mineral Appendages and Industrial Wastes.

Scientists interested in participating in the National Seminar may please contact: Prof. P.C.Avadich, Head of the Department or Dr.Harsh Bhu, Associate Professor, Department of Geology, 51 Saraswati Marg, Mohanlal Sukhadia University,Udaipur 313001. Tel: (0294)2413955; 2414955; 09 Fax: (0294)-2471150, Email: harsh\_hhu2003@yahoo.com; gsiagm2008@yahoo.co.in

#### CONGRATULATIONS

Shri Vindo Kumar Kanchan took over the charge of Dy. Director General, of Geological Survey of India, Western Region, Rajasthan, Jaipur on 28<sup>th</sup> February, 2007, Shri Kanchan obtained his M.Tech from Sagar University 1969 and joined G.S.I. on 2<sup>nd</sup> November, 1972 as geologist (Jr.) He carried out mineral investigations for Iron Ore and Copper in Madhya Pradesh and discovered high grade bauxite. He was promoted post of Geologist (Sr.) in January 1983 and identified Pb-Zn mineralisation in Allada-Halli areas in Karnataka. After joining West Zone of A.M.S.E. in September 1985, explored Copper deposits at Bidawal, Kalipol, Chari and Isarwas areas of Udaipur district and identified Dugocha gold Prospect.

On promotion as Director in 1998, Shri Kanchan was entrusted with gold exploration in and in Gundelpara and basemental investigations in Dhani-Basri, Baniwala Ki Dhani-Patan Cu-belt. He also carried out studies of a grass *Cyperous* sp. growing over copper bearing zones.

## **GEOLOGICAL THINKING**

### **The method of multiple working hypotheses**

The scientific methods include observation leads to hypothesis prediction to experiment. But in geology this method gets up nowhere. When geologists go out in the field they confront confusion of scattered outcrops, complicated by faults, folds, vegetation cover water bodies and land owners who may not let wander around their property. When they prospect buried minerals, they have to make sense out in scattered borehole logs, trying to fit them into a poorly known model of the regional geological structure.

Thomas Chrowder Chamberlin, a geologist (1890), first described the special kind of most advanced intellectual work needed regarding geological thinking, calling it the method of working hypothesis.

1. The "Method of the ruling theory" begins with a ready answer to which the thinker grows attached, looking only for facts that confirm the answer. This method is wrong for natural science. In working out the true nature, we must investigate natural facts before creating theories about them.
2. The "Method of multiple working hypotheses" begins with a tentative answer and seeks out facts to try against it.
3. The method of working hypotheses begins with many tentative answers and the expectation that no single answer may be the whole story. Indeed, in geology a story is what we seek not just a conclusion. Discovering a true theory means weighting and combining different working hypotheses.

The scientific method of geologists is to collect information, try a lot of different assumptions, read and discuss other people's papers and grope their way towards greater certainty, or at least figure the answers with the best odds. This is more like the real problems of real life where much is unknown.

The method of working hypotheses deserves to be known. Chamberlin (1890) said, "I am confident, therefore, that general application of this method to the affairs of social and civic life would go far to remove those misunderstandings, misjudgments and misrepresentations which constitute an evil in our social and our political atmospheres."

Chamberlin's method is still a staple of geological research, at least in the mindset that we should always look for better answers and avoid falling in love with one beautiful idea.

## **CODE OF ETHICS**

Geoscience Society has members who are engaged in discovery, extraction and utilization of minerals and metals. The membership includes geologists and other geoscientists and paraprofessional groups and students who are preparing for careers.

All members should consider complying with the code of ethics. It will enable them to build up fraternity among fellows. The members are responsible for the welfare, health and safety of the community. It should come before their responsibility to the profession and to their private interests. The interest of the community has priority over the interests of others.

## **CODE OF ETHICS**

1. The responsibility of members shall be to avoid assignments that may create conflict between the interests of his client or employer and public interests. Welfare, health and safety of the community should come before their professional interests.
2. Members shall perform work only in their area of competence.
3. Members shall act so as to uphold and enhance the honor, integrity and dignity of the profession.
4. Members shall build their professional reputation on merit and shall not compete unfairly.
5. Members shall give evidence, express opinion or make statements in truthful manner on the basis of adequate knowledge.
6. Members shall continue their professional development and shall actively assist and encourage those under their direction.
7. Members shall comply with all the laws of the government.
8. Members shall act so as to uphold and enhance honor, integrity and dignity of the profession.

## प्रकाशित समाचारों का विश्लेषण

20 जून 2008 के दैनिक भास्कर के उदयपुर संस्करण में गोल्डन बेल्ट में बांसवाड़ा नामक शीर्षक से एक बड़ा ही उत्साहजनक समाचार प्रकाशित हुआ जिसमें 200 से 250 PPM सोने की मौजूदगी का विवरण है। इस समाचार में जांच किस विधि से की गई, यह नहीं बताया गया है। पूर्व में इसी प्रकार 125 PPM सोने की मौजूदगी सौराष्ट्र क्षेत्र के जामनगर जिले के लेटेराइट में व एलेक, पोरबन्दर जिले के डेकन ट्रेप में भी बताये गये थे। ये परिणाम AAS विधि के थे व बाजार में इससे भ्रान्ति फैली व शेयर मार्केट में इस क्षेत्र की कम्पनियों के भाव अचानक ऊपर चढ़ गये। बाद में जब इन क्षेत्रों के नमूनों की जांच फायर ऐसे से की गई तो परिणाम PPB में आये। इतनी कम मात्रा में सोने की उपस्थिति देखकर इन क्षेत्रों में सोने की खोज का काम बाद में बन्द कर दिया गया।

इसी प्रकार कुछ दिनों पहले उदयपुर में खनिज तेल मिलेगा ऐसा समाचार भी प्रकाशित हुआ था। उदयपुर के क्षेत्र में प्रतिष्ठित संस्थाएँ जैसे भू-विज्ञान विभाग, मोहनलाल सुखाड़िया विश्वविद्यालय, उदयपुर, खान एवं भू-विज्ञान विभाग, राजस्थान सरकार, उदयपुर व भारतीय भू-वैज्ञानिक सर्वेक्षण जयपुर द्वारा मेंपिंग किये गए नक्शों का अवलोकन करें तो उदयपुर के आस-पास ऐसी चट्टानें नहीं हैं जिनमें खनिज तेल मिल सके।

प्रकाशन के पूर्व इस प्रकार के समाचारों का सत्यापन अन्य संस्थाओं से करवाना उचित होगा। अर्ध सत्य के समाचारों के द्वारा भ्रान्ति नहीं फैलेगी।