

MINUTES OF THE SECOND MEETING OF COMMITTEE – X OF CGPB ON FUNDAMENTAL AND MULTIDISCIPLINARY GEOSCIENCE HELD ON 27th NOVEMBER, 2009, AT GSI, KOLKATA

The second meeting of CGPB Committee X on Fundamental and Multidisciplinary Geosciences was held in the Conference Hall of 15 A & B Kyd Street Building of GSI, Kolkata on 27th November, 2009. Shri Amitabha Sarkar, Convener and Dy.D.G, M-IV (CGL) chaired the meeting. Senior officers of the GSI who attended the meeting include: (i) Shri R.K.Singh, Sr. Dy. DG, (ii) Shri U. K. Roy, Sr. Dy.D.G, (iii) Dr. N.K. Roy, Dy.D.G, (iv) Shri M.V. Rao, Dy. DG, (v) Dr. S. N. Ghosh, Dy.D.G.

Dignitaries from other institutions who participated in the meeting are:

- Dr. Amit Kumar Ghosh, BSIP.
- Dr. M. Baba, Director, CESS.
- Dr. U. Prasad, General Manager, KDMIPE (ONGC).
- Dr. C. Srikantappa, Professor, Dept. of Geology, Mysore University (MU).
- Prof. Tapas Bhattacharya, Dept. of Geology, University of Calcutta (CU).

1. The meeting was held in the Conference Hall of 15 A & B Kyd Street Building of Central Headquarters, GSI, Kolkata. Shri Amitabha Sarkar, Dy. Director General and Convener, welcomed the member delegates and invitees from GSI and other Institutions. In his welcome address, he informed the house that the recommendation made by the -Committee in its first meeting in July 2009 was appreciated by the CGPB and the CGPB have accepted, in principle, the Committee's recommendation of setting up of a Center of Excellence under one roof with the GSI playing the key role. Participation from various earth science related research institutes in project formulation, running and maintenance of the excellence of such Center would be necessary. He stressed that topmost scientific capabilities of the country need to be harnessed for operation and fructification of such a Center of Excellence. Shri Amitava Sarkar (Dy.D.G, GSI) informed that the CGPB has advised that the Committee should deal with (i) formulation of specifics of setting up of running of such Center of Excellence and (ii) to prepare a note/base document on how the Committee envisages setting up, running, administration of such a Center of Excellence. Such document need be prepared and submitted in a month's time.

(Action: CGPB-X Core Committee)

2. Shri R. K. Singh (Sr. Dy.D.G, GSI) welcomed all the delegates and solicited opinions and guidance from the participants on modernization of analytical facilities of the GSI. He requested all to help prepare an inventory of high-cost instrumentation facilities available with various institutions for their optimal utilization.

(Action: All Concerned)

Discussion on Agenda items:

A. Consideration of programmes from the participating member Institutions as part of inter-institutional collaboration :

A.1. Prof. Srikantappa suggested that the GSI might take up and provide funds for projects in collaboration with universities to promote research activities and instill scientific temper among the geologists of the GSI. This would also prepare students involved in such projects to get acquainted with modern research activities. A core committee of the GSI may evaluate and monitor various such projects.

A.2. Shri M. V. Rao (Dy.D.G, GSI) informed that GSI has two/three existing collaborative projects with the ONGC.

A.3. Dr. U. Prasad (ONGC) expressed that ONGC is involved in a number of collaborative projects with GSI and other institutes and that ONGC welcomes more collaborative projects. ONGC is willing also to share maps and other data as long as such sharing does go against company's own business interests.

(Action: All Concerned)

A.4. Sri Amitava Sarkar, Dy.D.G, GSI suggested that collaboration among universities and professional institutions are needed and would be mutually beneficial and would contribute to improve skill and quality of research. He suggested that the participating institutions may directly communicate and discuss about modalities of collaborative projects. Such projects need not be routed through the CGPB. However, CGPB committee may be informed about such collaborative projects and any difficulty faced by member institutions may be discussed in the CGPB to sort out problems.

(Action: All Concerned)

A.5. Dr. Amit Ghosh (BSIP), Sri M. V. Rao (DY.D.G, GSI), Shri U. K. Roy (Sr. Dy.D.G, GSI) informed that since the last meeting of the committee, a number of collaborative projects have been taken up. All of them, however, opined that there is scope to increase the number of the collaborative projects. Shri Bhaskar Chakraborty (Director, GSI) informed that there has been some successful collaboration between the GSI and the BSIP and suggested that collaboration on coal-basin wise palynological studies be taken up. Shri P. Srivastava (Director,GSI) also suggested collaboration with BSIP in palaeontological studies. Dr. Amit Ghosh (BSIP) welcomed the proposal.

(Action: All Concerned)

A.6. The issue of mutual usage of different available instrumentation facilities was discussed in detail by Dr. Baba (CESS), Dr. U. Prasad (ONGC), Prof. Dr. Tapas Bhattacharyya (CU), Prof. Dr. Srikantappa (MU), M. V. Rao (Dy.D.G, GSI). Shri Amitava Sarkar (Dy.D.G, GSI), Shri Sambhu Ghosh (Dy.D.G, GSI), Dr. Mohabe (Director, GSI) and many other participants. Dr. U. Prasad (ONGC) expressed that ONGC is willing to share its analytical and data processing facilities with other institutions. Shri U. K. Roy (Sr.Dy.D.G, GSI)

urged that scientific group should be able to share even marine related data. Shri U. K. Roy (Sr.Dy.D.G, GSI), Dr. Pratap Basu (Director, GSI) and Dr. U. Prasad (ONGC) all agreed that there is great scope for collaboration between GSI and ONGC on research and exploration on marine gas hydrates. Such research should include all aspects including sharing of samples, geophysical data, data processing and analytical facilities. All participants felt that on the whole India has substantial instrumental analytical and sophisticated high-cost software available which are being utilized much below their rated efficiencies. Reasons for underutilization of technological and analytical capabilities are as follows:

A.6.1. Lack of an inventory of instrumentation and technical facilities available with different institutions

A.6.2. Lack of transparency for usage of such facilities available with different institutions especially with regard to the modalities of usage by outside institutions.

A.6.3. Lack of co-ordination among different funding agencies (DST, UCG, different ministries and private companies) and user institutions. In general, instruments are being procured on ad-hoc necessities given by different institutions. But proper functioning of a technical and instrumentation facility is dependent on skilled and motivated personnel which are not in plenty. Thus many of the analytical facilities remain underutilized.

A.6.4. An example of Electron Probe Micro Analyser (EPMA) facilities in India was discussed. India now has more than 17 EPMA facilities mainly dedicated to geological work. Each such facility cost approximately five crores rupees. Dr. Sambhu Ghosh, (Dy.D.G, GSI) opined that such a large number of EPMA facilities can fully cater for all perceived analytical needs for geological research in India. There is no need to buy any more EPMA in India in near future if all of the existing instruments function properly. On the contrary, GSI and other institutions are still in the process of procuring many more EPMA facilities. However, for successful operation, each such facility needs at least three skilled and trained technical personnel which many of the existing facilities can't afford. It was specifically pointed out by Prof. Dr. Srikantappa (MU) and Prof. Dr. Tapas Bhattacheryya (CU) that while GSI's EPMA facility in Kolkata produces results at par with any of the best EPMA labs in the world, many other EPMA facilities in GSI are languishing.

A.7. Dr. D.M. Mohabe (Director, GSI) opined that an inventory of all high-cost instrumentation and technological facilities in addition to the expertise available is of utmost importance. He suggested that all earth science related institutes should come up with their own profile for instrumentation facilities and expert profiles.

(Action: All Concerned)

A.8. Shri Amitava Sarkar, (Dy.D.G, GSI) requested all participants to send details of instrumentation and technical facilities available, status of functioning, present modalities of usage by other institutions and problem faced by them in running such facilities so that problems can be discussed at the CGPB.

(Action: All Concerned)

B. Modalities for setting up of a National Center of Excellence for Geoscience Research, equipped with modern state of the art instrumentation facilities:

B.1. Shri Amitava Sarkar, Dy.D.G briefly introduced to the meeting that the decision to setup a National Center of Excellence for Geoscience Research in a single place, equipped with modern state of the art instrumentation facilities was taken in the 1st meeting of the Committee and has been accepted, in principle, by the CGPB. The CGPB has approved setting up of such a facility and has advised that the Committee should come up with detailed framework for setting up of such Center of Excellence in the form of a base document.

B.2. All the delegates from the GSI and from other institutions expressed that setting up of a National Center of Excellence would be a land mark achievement and would boost cutting-edge research. They overwhelmingly supported the idea of setting up of such a Center of Excellence in a single place and under a single management that would open up scope for high quality research in India.

B.3. Discussion of modalities of setting up of such a Center revolved round: (a) Focus of such a Center and projects, (ii) Instrumentation facilities needed, (iii) Operation, (iv) Management and (v) Finance.

B.3.1. Focus of Center of Excellence/Projects: Dr. M. Baba (CESS) opined that the focus should be: (i) basic geological research, (ii) environmental research especially Quaternary environmental reconstruction and modeling and (iii) planetary research. He also proposed the Center of Excellence should be the “National Center for Earth and Planetary Science”. Dr. Amit Ghosh (BSIP), Dr. S.N. Ghosh (Dy.D.G, GSI) and Prof. Dr. Tapas Bhattacheryya (CU) concurred with Dr. Baba. Dr. S.N. Ghosh (Dy.D.G, GSI) observed that GSI has to play its role especially for meteorites, as GSI is custodian of a large number of meteorites. Isotopic studies of meteorites may be included in research domains of the proposed Center. Dr. Pratap Basu (Director, GSI) opined that India’s contribution to research on evolution of life is very dismal in spite of having many good geological sections. He suggested that the study of evolution of life should be one of the thrust areas for the proposed Center of Excellence. Most of the participants supported this view. Dr. M. Baba suggested that the Center of Excellence should have their own mega multidisciplinary projects for innovative research in addition to collaborative research with other institution including non-governmental organizations. Prof. Dr. T. Bhattacheryya (CU) and Prof. Dr. Srikantappa (MU) supported this view. Sri G. Dasgupta (Director, GSI) opined that in view of term of reference of this committee, its functioning should be to promote and fund R &D related to mineral exploration. Sri N. Das (Director, GSI) referred to point 5 and 6 of Terms of Reference and emphasized that Center of Excellence should act as service provider for mineral exploration and related things mainly done by the GSI.

B.3.2. Instrumentation facilities needed in the Center of Excellence: Shri A. Sarkar (Dy.D.G, GSI) informed that the Geochronology and Isotope Geology Division of the GSI has taken initiative to establish three state-of-the-art instrumentation facilities in Kolkata for high-quality research in the field of isotope geology. These are (i) laser

ablation multi-collector ICPMS, (ii) very high resolution secondary ion mass spectrometer. When acquired, these facilities would substantially improve existing analytical capability for isotope geology research in India. Dr. M. Baba (CESS), Dr. A. Ghosh (BSIP) and Dr. T. Bhattacharyya appreciated GSI's new effort for modernization. They suggested that since such effort would greatly increase analytical capabilities, it is necessary to identify potential users for optimal use of such facility. Dr. Srikantappa suggested that such Center should include Laser Raman Microscope (costing approximately Rs. 1.5 Crore) for fluid inclusion studies. Sri J.S David (Director, GSI) opined that for high-quality research in experimental petrology and gemological research the Center should have (i) FTIR spectrophotometer, (ii) Raman spectroscopy, (iii) Photoluminescence (CL) spectrometer and (iv) Radiograph. Dr. Pratap Basu (Director, GSI) expressed the need to procure confocal microscopes for 3D imaging of samples. Dr. J. G. Ghosh (GSI) suggested procuring OSL Reader (Optically Stimulated Luminescence Reader) for high-quality Quaternary dating. Prof. Dr. Tapas Bhattacheryya opined that procurement of all necessary instruments from scratch would not only require enormous amount of money, but also the new instruments would be highly demanding on availability of experts. He suggested that the proposed Center of Excellence should tap existing high-cost analytical facilities already available with the GSI. To exemplify this point he suggested that some of the high-cost and well-functioning equipments like EPMA, SEM, TIMS, ICPMS, HPLC, and GC etc. which are available in different labs of the GSI located in Kolkata may be made part of the Center of Excellence which would ensure not only ready availability of experts to man sophisticated instrumentation facilities but also enable optimal use of already available instruments and expertise. Dr. M. Baba (CESS), Dr. A. Ghosh (BSIP), Dr. U. Prasad (ONGC), Dr. S.N. Ghosh (Dy.D.G, GSI), Shri R. K. Singh (Sr. Dy.D.G, GSI) appreciated this suggestion.

B.3.3. Operation of the Center of Excellence: Discussion on the operational aspect dealt (i) the question of whether such Center of Excellence should be project based or maintained as analytical facilities, and (ii) availability of experts and dedicated personnel to run such a Center of Excellence. Dr. Pratap Basu (Director, GSI) and Shri Gautam Dasgupta (Director, GSI) favored identification of some broad projects for the Center of Excellence. Prof. Dr. T. Bhattacheryya (CU), Dr. S.N. Ghosh (Dy.D.G, GSI) and Prof. Dr. Srikantappa expressed that setting up such Center of Excellence based on some predefined projects would restrict its usage. Instead such a Center should be developed as top-quality analytical facilities where people with diverse research interest and analytical need would carry out their analytical works. Almost all members emphasized that availability of dedicated experts and funds for maintenance are the most crucial factors for successful functioning of such a Center of Excellence. Dr. M. Baba (CESS), Prof. Dr. T. Bhattacheryya (CU) emphasized that only dedicated, experienced and trained personnel working whole time for the Center can operate such a Center. Youth does not ensure quality and experience is very vital and age should not be a criterion. Prof. Dr. Bhattacheryya (CU) and Prof. Dr. Srikantappa (MU) gave the example of successful running of the EPMA lab in GSI, Kolkata to emphasis need for dedicated and experienced personnel. Dr. S.N. Ghosh (Dy.D.G, GSI), Dr. Sampa Chakraborty (Director, GSI), Shri J.S David (Director, GSI), Dr. Pratap Basu (Director, GSI) opined that because of dwindling strength of geologists in the GSI and regular

retirement, GSI is facing tremendous problems of experienced experts in all field of geological research. They suggested hiring/re-employment of some retiring experts for such Center of Excellence. Available experienced personnel should be exposed to through training in successful foreign laboratories before being given the responsibility in the Center of Excellence. Dr. S.N. Ghosh (Dy.D.G, GSI) opined that laboratory personnel/ expertise should not be disturbed without creating a second line of experts. Before procurement of any instrument, this policy should be taken in consideration. He also suggested for a balance on Man-Machine-Material. Shri J. S. David (Director, GSI) concurred with Dr. Ghosh. Shri Amitava Sarkar (Dy.D.G, GSI), Dr. M. Baba (CESS) and Shri Nitish Das (Director, GSI) emphasized that different analytical facilities under the Center of Excellence should be located in a single place and under single administration so that a single sample can be analyzed in the Center utilizing different analytical techniques. Dr. M. Baba (CESS), Prof. Dr. Tapas Bhattacheryya (CU) and Dr. S.N. Ghosh (Dy.D.G, GSI) opined that, if necessary, for some highly sophisticated instrumentation facilities foreign experts may be hired in the initial stages for operation and training in-house professionals. Prof. Dr. Tapas Bhattacheryya (CU) suggested that the Center of Excellence should have its own set of recruitment policy and work policy to attract and recruit capable people. GSI's present recruitment rules would fail as this recruitment rule is not specifically geared for running such a sophisticated analytical facility.

B.3.4. Management of the Center of Excellence: Shri Amitava Sarkar (Dy.D.G, GSI) informed that GSI has very fair supply of dedicated and experienced geologists to maintain sophisticated instrumentation facilities. In spite of that most of the sophisticated instrumentation facilities fail because of extremely sticky and bureaucratic administration and non-availability of funds at times of need. Persons running the administration and finance do not feel with the same intensity as the persons responsible for the operation of the sophisticated instrumentation facilities. Shri U. K. Roy (Sr. Dy.D.G, GSI), Dr. N. K. Roy (Dy.D.G, GSI), Dr. S.N. Ghosh (Dy.D.G, GSI), Shri M. V. Rao (Dy.D.G, GSI) and Dr. Pratap Basu (Director, GSI) agreed with Shri Amitava Sarkar and echoed the same feeling. Prof. Dr. Tapas Bhattacheryya suggested broad guidelines for the Center of Excellence. His suggestions include: (i) The Center of Excellence be given special status in which initially whole timers from the GSI may be deputed. (ii) Upon setting up of the facility, new set of recruitment policy for the Center may be made to attract most suitable personnel. (iii) It should be totally delinked from GSI's bureaucracy. (iv) The Center should be made autonomous in terms of recruitment, finance, procurement and operation. (v) A governing body of consisting of GSI and all earth science related institutes may oversee the operation, finance and utilization. (vi) If felt necessary, to hire experts, even from foreign countries, for a required period, for training and maintenance. Dr. M. Baba (CESS) and Dr. Amit Ghosh (BSIP) agreed with suggestions given by Prof. Dr. Tapas Bhattacheryya. They also suggested that government institutions and private companies (like ONGC, Tata, and Reliance) may be allowed to participate and utilize the facility. They also suggested that good laboratories and institutions in India like NIO, NCOR, IITs, BARC, IISc, and PRL etc. may be consulted for management of the Center of Excellence. Dr. U. Prasad (ONGC) informed that ONGC is successfully operating two canters of excellence. One of them

is for research on gas hydrates located in Mumbai and the other for petrophysics located in Dehra Dun. He suggested that ONGC would be willing to depute its scientists for formulating the Center of Excellence setup in the GSI. Shri J. N. Das (Director, GSI) opined that a single and unified command structure, and not a consortium, is needed to run the Center of Excellence.

B.3.5. Finance for the Center of Excellence: Shri R.K.Singh (Sr. Dy. DG, GSI) and Shri Gautam Dasgupta (Director, GSI) informed that setting up of the Center of Excellence be made part of the GSI's ongoing effort for modernization of laboratories and as such as pointed out by Shri Amitava Sarkar (Dy.D.G, GSI), GSI has already taken initiative for setting up some of the sophisticated instrumentation facilities for isotope geology studies. Dr. U. Prasad (ONGC) suggested that ONGC partially fund the cost of setting up of the Center of Excellence. Dr. J. G. Ghosh (GSI) pointed out that DST can be approached for partial funding of the Center. Prof. Dr. Tapas Bhattacheryya suggested that fund should be provided for maintenance, bypassing routine bureaucracy. All major finance related decisions and decisions on technical usages of the facility should be taken by a governing body incorporating different organizations. He suggested that all usage should be accounted for and paid by the users. Fund for maintenance need be guaranteed for by the GSI and other stake holders. Prof. Dr. Srikantappa (MU) concurred with Prof. Dr. Bhattacheryya (CU).

C. Preparation of mineral (for EPMA and SIMS) and gem standards in addition to Standard Reference Material for rock/soil samples.

C.1. Sri Amitava Sarkar, Dy.D.G.,GSI, and convener requested all members for providing standards for gems.

(Action: All Concerned)

C.2. Sri N.K.Roy (Dy.D.G, GSI) informed that huge amount of standards are required for inter laboratory calibration as well as for analysis of certain elements particularly PGE. Procurement of these standards is costly. He proposed that the samples analyzed by GSI may be sent to other reputed laboratories and results then may be checked/ matched. These require a considerable amount of bulk sample which has to be distributed in India and outside.

(Action: All Concerned)

C.3. Sri J.N. Das informed that Gems from diverse occurrences having dissimilar physical characters are different. The calibration in this respect may be initiated from Indian Gems.

(Action: Concerned Gem Testing Laboratories)

D. Provisioning of documented samples from other Institutions for display in the Museums set up by GSI.

D.1. Dr Amit Ghosh (BSIP) informed that BSIP may provide specimens.

D.2. Dr D.M. Mohabe (Director, GSI) expressed his concern about preservation of already existing Geo-parks and monuments. In this regard, the participants were worried about destruction of existing geological parks and monuments. Safe guarding of existing monuments by employing curators may be recommended.

D.3. Dr S.N. Ghosh, Dy.D.G, GSI, opined that there should be a huge collection of registered rock samples with GSI, CHQ which may be retrieved. Sri B. Chakraborty, Director, informed that most of the samples are misplaced during shifting of building and difficult to trace back. He suggested engagement of students for inventory of available rocks and fossils, which is otherwise not feasible with present man power.

E. **Setting up of a consortium (based on co-operative basis) to evolve the modalities to run the proposed Center of Excellence (including its financial management).**

E.1. Sri Amitava Sarkar, Dy.D.G., GSI and Convener opined that much on this issue has already been discussed. He requested to form a core group within this Committee to prepare a base document for setting up of the Center of Excellence for Geoscience Research. He suggested that all the invited non-GSI members be included in the core committee so that non-GSI views are known. Convener also co-opted Prof. Dr. Pulak Sengupta of Jadavpur University who was one of the member proposing the Center of Excellence in the 1st meeting of the Committee, for inclusion as a member of the core committee. After consultation among all present the following names were accepted by the Convener to prepare a base document for setting up of the Center of Excellence for Geoscience Research: (i) Dr. M. Baba (CESS), (ii) Prof. Dr. Tapas Bhattacheryya (CU), (iii) Dr. U. Prasad (ONGC), (iv) Dr. Amit Ghosh (BSIP), (v) Prof. Dr. Srikantappa, (vi) Prof. Dr. Pulak Sengupta (JU), (vii) Dr. M. V. Rao (Dy.D.G, GSI), (viii) Dr. N. K. Roy (Dy.D.G, GSI), (ix) Shri Gautam Sarkar (Director, GSI), (x) Shri J. N. Das, (Director, GSI), (xi) Dr. J. G. Ghosh (GSI). Shri Amitava Sarkar, Convener requested the core committee member to submit their base document at the earliest, latest by one month's time.

(Action: All Concerned)

E.2. Upon a suggestion from Dr. M. Baba, the Convener, Shri Amitava Sarkar agreed that the CGPB would be approached so a couple of members from this committee attend the CGPB meeting to present the recommendation by this Committee.

(Action: CGPB Secretariat, GSI)

F. **Need for acquisition of new instruments:**

F.1. Shri Amitava Sarkar, Convenor, opined that much on this topic already discussed. He reiterated that GSI has already initiated processes for procurement of following instrumentation facilities: (i) very high-resolution Secondary Ion Mass Spectrometer (e.g., SHRIMP) along with SEM-CL, and (ii) Laser Ablation Multi-Collector ICPMS, Other instruments proposed during discussion in the meeting includes: (iv) Laser Raman Microscope, (v) FTIR spectrophotometer, (vi) Raman spectroscopy, (vii) Photoluminescence (CL) spectrometer and (viii) Radiograph, (ix) OSL Reader and (x) Confocal microscope.

F.2. Shri Amitava Sarkar suggested members to submit details of instruments required and their justification to the Committee.

(Action: All Concerned)

G. Any other items suggested by the Members:

G.1. Shri Nitish Das (Director, GSI) and Shri Gautam Dasgupta (Director, GSI) pointed out that the outcome of the previous meeting be analyzed.

G.2. Dr Baba opined that in each meeting at the most three points may be discussed in details and on action taken on previous meeting minutes. Concrete proposals on training and education should be discussed in the next meeting.

(Action: All Concerned)

G.3. Shri Amitava Sarkar, Convenor suggested that PRL, AMD and ISM may be incorporated as members.

(Action: CGPB Secretariat. GSI)

G.4. Shri Gautam Sarkar, Member Secretary, informed that the main reason for low participation by non-GSI members is that as per the existing rules GSI could only provide Second Class A/C railway fare to the members for attending the Committee meetings. Many non-GSI members expressed their unwillingness to attend the meeting unless airfare for attending the meeting is reimbursed.

G.5. Shri Amitava Sarkar, Convenor suggested that the issue be taken up with the CGPB so that participation is increased.

(Action: CGPB Secretariat. GSI)

G.6. It was decided that the core group members will discuss among themselves through e-mail.

(Action: All Concerned)

H. Concluding session:

H.1. The proceedings of the meeting were briefly summarized by the Convener. The Convener assured the house that all the suggestions received will be given due importance.

H.2. Sri R.K.Singh envisaged that COE may be established as a cooperative basis and will be on partnership basis. He was hopeful a number of fruitful collaborative projects.

H.3. Sri R.K.Singh, Sri S.Ghosh, Sri G. Sarkar, Sri G. Dasgupta and other members bade a hearty farewell to Sri Amitava Sarkar, who was due to superannuate on 30th November.

H.4. All the members urged the Member Secretary of CGPB Committee X to get the services of Shri Amitava Sarkar, (Dy.D.G, GSI), who is superannuating shortly, for future shaping of the Center of Excellence till its finalization. Secretary, CGPB may be approached accordingly.

(Action: Member Secretary, CGPB-X)

Geological Survey of India

H.5. The meeting ended with Vote of Thanks proposed by Shri Goutam Sarkar, Member Secretary of the Committee.

Annexure-I

LIST OF MEMBERS AND INVITEES WHO WERE REQUESTED TO ATTEND THE SECOND MEETING OF THE COMMITTEE X OF CGPB HELD ON 27.11.2009 IN KOLKATA

Members:

1. Director (Technical), Ministry of Mines*
2. Representative from Department of Science and Technology, Govt. of India*
3. Oil and Natural Gas Commission, Dehradun
4. National Geophysical Research Institute, Hyderabad*
5. Wadia Institute of Himalayan Geology, Dehradun*
6. DGM, Govt. of Jharkhand*
7. Rio Tinto*
8. De Beers*
9. Sr.Dy.DG / Dy. DG of GSI connected with the programmes on Fundamental Geoscience, Dy. DG, GSITI,* Director (Monitoring) & Director (CGPB), Central Headquarters, GSI.

Permanent Invitees:

1. Representative of CSIR*
2. Indian Meteorological Department, Delhi*
3. Representative from Geology Department, Punjab University*
4. Representative from Geology Department, Calcutta University
5. Representative from Geology Department, Anna University*
6. Representative from Geology Department, Jadavpur University*
7. Representative from Geology Department, Delhi University*
8. Representative from Geology Department, M.S. Baroda University*
9. Representative from Geology Department, Mysore University*
10. Representative from Geology Department, Osmania University*
11. Representative from Geology Department, IIT, Kharagpur*
12. Representative from Geology Department, IIT, Roorkee*
13. Representative from Geology Department, IIT, Mumbai*
14. Center for Earth Science Studies, Thiruvananthapuram
15. Defence Metallurgical Research Laboratory (DMRL), Hyderabad*
16. NCEMP, Allahabad*
17. Birbal Sahni Institute of Palaeobotany, Lucknow
18. ACC Ltd. *

* Members / Invitees who could not attend the meeting.

Annexure-II

LIST OF MEMBERS AND INVITEES WHO ATTENDED THE 2ND MEETING OF THE COMMITTEE X OF CGPB HELD ON 27.11.2009 in KOLKATA

Convener: Shri Amitabha Sarkar, Dy. Director General, CGL, GSI, Kolkata

Member Secretary: Shri Goutam Sarkar, Director, CGL, Kolkata

Members:

1. Shri R.K.Singh, Sr.Dy.D.G., GSI
2. Shri U.K. Roy, Sr.Dy.D.G., GSI
3. Dr. M. Baba, Director, CESS, Thiruvananthapuram
4. Dr. U. Prasad, General Manager, KDMIPE, ONGC, Dehradun
5. Prof. C.Srikantappa, Dept.of Geology, Mysore University.
6. Prof.Tapas Bhattacharya, Dept. of Geology, University of Calcutta.
7. Dr. Amit K. Ghosh, BSIP, Lucknow
8. Dr. S.N. Ghosh, Dy.D.G., GSI, Kolkata
9. Shri N.K. Roy, Dy.D.G (Geochem.), CHQ, GSI, Kolkata
10. Shri M.V. Rao, Dy.D.G (Geophysics), CHQ, GSI, Kolkata
11. Dr. D.M. Mohabey, Director, GSI, CRO, Nagpur.
12. Shri J.N.Das, Director, PPOD Lab, AMSE Wing, GSI, Bangalore
13. Shri P. Srivastava, Director, Western Region, GSI, Jaipur.
14. Shri B. Chakraborty, Director, GSI, CHQ, Kolkata
15. Shri J.S. David, Director, CPL, CGL, CHQ, Kolkata
16. Smt. Shampa Chakraborty, Director, GSI, CHQ, Kolkata
17. Dr. P.C. Basu, Director, Marine Wing, GSI, Kolkata.
18. Dr. Adhip K. De, Director, GSI, CHQ, Kolkata
19. Shri N. Das, Director, CHQ, Kolkata.
20. Shri G. Dasgupta, Director, GSI, New Delhi.
21. Dr. K.V.Krishnamurthy Director, GSI, Kolkata