

**MINUTES OF THE THIRD MEETING OF COMMITTEE - VI OF THE CENTRAL
GEOLOGICAL PROGRAMMING BOARD ON MARINE GEOLOGY & EXPLORATION
AND COASTAL GEOSCIENCE HELD ON 27TH JULY, 2010 AT VISAKHAPATNAM**

3.1: The meeting was held in the Conference hall of Op: East Coast-II, Marine & Coastal Surveys Division, GSI, Visakhapatnam. Shri M. Hari Prasad, Supdt Geologist, Technical Coordination, M-I and Member Secretary of the Committee-VI of CGPB initiated the meeting by welcoming the distinguished members and invitees from various earth science institutions and State Governments. He requested the members first to introduce themselves. Once the members introduced themselves, Shri Hari Prasad requested Shri M M Swamy to chair the meeting and start the proceedings.

3.2: Shri M M Swamy observed that representatives from four State Governments, out of the nine invited, have attended the meeting. He also expressed his happiness over the large gathering of the eminent personalities of various organizations / institutions. The institutions attended the meeting were from DST, IBM, DGH, ONGC, NIO, NCAOR, AMD, IPA, NPOL, NHO, PDNOM, SAC, INCOIS, NIOT, ICMAM, CWC, IREL and the State Government representatives from the Geology & Mining Departments of Andhra Pradesh, Tamil Nadu, Kerala and Gujarat. The list of organizations/institutes who had been invited and those who attended are furnished in Annexure I & II.

3.3: Shri M M Swamy in his welcome address explained the main role and working pattern of CGPB which is now being held twice in a year to coordinate and formulate programmes as per the requirement of the member organisations and identify the priorities considering the needs of other user organization / institutions particularly the State Governments. He informed the members that the marine programmes are largely dependant on the sea weather conditions during the survey period. He informed the members that GSI is changing their existing Field Season tenure from October-September to April-March matching with the financial year and for smooth change over the next FS will extend from October 2010 to March 2012. He also requested the members to inform the house about their own programmes and priorities so that GSI can take care of these requirements in its future programme. GSI is at present engaged in investigation on study of seabed morphology using multi-beam echo sounder, offshore placer mineral and sand exploration, sea bed mapping and other aspects of marine surveys. He informed the house that the base document has been circulated twice and valuable comments have been received and incorporated in the document.

3.4: Shri S Bhattacharyya expressed happiness over the overwhelming response and thanked the members for attending the meeting. He informed that the CGPB committees have been reconstituted for coordinating the programmes of GSI, and the Committee-VI is the platform for exchanging suggestions towards formulation of the annual programme of marine and coastal geosciences and ratification of the programmes by the member organizations. He informed that during the FS 2009-10, some programmes such as geotechnical survey off Chitrapu, Karnataka and Munambam harbour, Kerala were taken up on requests from the respective state governments. Another geotechnical programme in the east coast off Mutylammappalem, Andhra Pradesh was taken up as sponsored project on request from BARC. Space Application Centre, Ahmedabad was also associated with one programme on coastal processes in the Mahanadi Delta region. Investigation for relict sand resources off Alleppy, Kerala has also been undertaken on the request of the State Government. He also informed the members that survey for collection of sediment samples on request of NPOL has been proposed to be taken up during FS 2010-12. He also informed that surveys for port development in the nearshore region of Azhikkal and Ponnani, Kerala on the request of State Government are also included for next FSP.

3.5: Shri S Bhattacharyya, Convener informed the member that the Base Document on Marine and Coastal Surveys has been first circulated to the members during the 2nd Meeting of the Committee-VI and recirculated again after incorporating the modifications as suggested by the member organizations. GSI is also in the process of procuring two new research vessels, one ocean going as replacement of RV Samudra Manthan and the other is a state-of-the-art geotechnical vessel having capabilities of drilling upto 30 m in the nearshore zone as shallow

as 6 m. Induction of these vessels will increase the capabilities of GSI manifold. During the course of discussion he also requested the members to provide their Annual Programme to keep GSI informed about the activities of the member organizations and also to avoid the duplication of work. An early response from DGH was requested on the proposal of participation of GSI in the National Gas Hydrate Programme. He informed that all the DGMs were requested to inform about the holding of their respective SGPB meeting so that M&CSD, GSI can participate in the meeting but so far DGM of only four States has responded to the request. He informed that as per the requests made by Kerala Government, GSI is carrying out investigation for offshore sand resources and located some promising zones over the last few years. But to ascertain, whether these relict sand bodies are useful or not for construction purpose, he requested DMG, Kerala representative to take initiative and arrange to get the sands analysed by suitable laboratory / institute and a list of such laboratories / institutes was handed over to Shri C Balaraman of DGM, Kerala.

3.6: Shri M Hari Prasad informed that the Minutes of the 2nd Meeting of the Committee-VI had been circulated. As no member made any comments on the Minutes, the minutes of the 2nd meeting were confirmed. Thereafter Shri Hari Prasad presented the status of the follow up action of the 2nd Meeting. Regarding comprehensive topographic mapping of the EEZ by multibeam bathymetry jointly by MoES and GSI, it was felt that MoES has to take more initiative to finalise the draft agreement between GSI and MoES. Shri Hari Prasad further added that response from MoES is also awaited regarding future course of action and participation of GSI on the offshore hydrothermal sulphide mineralization project. The request of NPOL for seabed sampling has been taken care of in the Annual Programme Proposals for 2010-12. The draft Base document was circulated twice and on the basis of suggestions and observations received, it has been modified and final draft would be ratified over discussion during this meeting. Regarding taking up specialized programme, he informed the house that such programmes were taken up as per the availability of personnel. Discussing the offshore mineral resources, he pointed out that based on the data provided by GSI and NIO, IBM has published the offshore blocks for grant of license for exploration. The sand investigation in Kerala offshore is continuing and new areas have been proposed for FS 2010-12. Only the suitability of the sand for construction purpose has to be looked into by the user agencies. RSAS, GSI has already proposed programmes to continue offshore aeromagnetic survey upto the west coast off Gujarat. The airborne and marine magnetic survey data are matching well. Shri R Jayakumar, GSI informed that during SGPB meeting of Kerala, he has appraised the State Government regarding the survey carried out by GSI for development of minor ports.

3.7: While speaking about the MoU, Shri S Bhattacharyya wanted to know from Dr Kurian of NCAOR about the draft agreement. Dr Kurian informed that the necessary inputs have been submitted to MoES for onward transmission to GSI. Shri Bhattacharyya informed that GSI till date has not received the modified draft agreement document from MoES. Dr Kurian was requested to look into the matter to provide GSI with the necessary document.

3.8: Shri Bhattacharyya informed the members that one subcommittee was formed during the 2nd Meeting of the Committee-VI to look after various collaborative activities and data sharing among the member organization with members from MOES, DST, DGH, ONGC, PDNOM and GSI. He informed that the confirmation of nomination from DST is yet to be received. Moreover, Shri P V Sukumaran, Vice Chairman and Member Secretary of the Subcommittee has superannuated. With the approval of the Chairman and Members, Shri M Hari Prasad was nominated to be the Vice Chairman and Member Secretary of the Subcommittee and Shri V Subba Rao, Sr. Geologist, M&CSD was inducted as GSI representative in the subcommittee.

3.9: While speaking on the aspect of sharing of responsibilities on comprehensive seabed mapping with multibeam echosounder, Shri M Hari Prasad again requested MoES to provide the 'Protocol' for deep water surveys. Shri M M Swamy, Chairman suggested GSI officers to visit MoES for collection of all the relevant documents. Dr Kurian proposed a meeting among NCAOR, NIOT, MoES and GSI to coordinate the matter.

3.10: Shri V. Sivasubramanian, CGM, Tamil Nadu stressed the need and importance of seabed survey off Tamil Nadu coast. In a reply to the Chairman, he stated that exploration for placer minerals and silica sand is very important as it would fetch good revenue to the State. DGM is ready to participate in such cruises and collaborate. He also informed that they have collaboration with GSI on exploration of platinum group of metals. The Chairman welcomed the proposal. Shri S Bhattacharyya requested Shri Sivasubramanian to write to DG, GSI as a part of fulfilling the necessary formalities where the objective and purpose of such participation should be elaborated. Shri Swamy advised Shri Sivasubramanian to discuss this aspect also during the SGPB meeting.

3.11: While discussing on the Base document, Shri Hari Prasad read out the comments of the member organizations. Regarding the selection of favourable sites for OTEC, he informed that GSI undertakes survey to identify suitable sites only and further investigation has to be carried out by organization like NIOT for its technical feasibility. Dr Balakrishnan, INCOIS opined that historical data should also be consulted for site selection. Shri G P Mohapatra suggested for demarcation of areas under respective organizations to carry out the surveys to avoid duplication. Shri Bhattacharyya informed that GSI has already identified two sectors off Havelock and little Andaman Islands and one more sector has been identified off Tillangchang Island which is without any inhabitation. Shri Hari Prasad suggested that at present GSI can inform NIOT about the sites surveyed by GSI and after acquisition of new research vessels GSI can take up further programmes on OTEC. Regarding mining lease, he observed that distinction has to be made precisely about the type of data that can be shared with the entrepreneurs and data which should not be shared for security reasons.

3.12: Shri M M Swamy wanted to know the role of IBM towards data sharing. Dr P A Verghese informed that Gazette notification for offshore blocks for grant of exploration license has already been published. Clearance from Ministry of Defence, Ministry of Environment should be acquired by the organisation interested for grant of license for exploration lease. The IBM representative thanked GSI for the training rendered to the IBM personnel and requested that such trainings may be organised in future. Shri Bhattacharyya requested Dr Verghese to keep GSI informed about the development regarding creation of an Offshore Cell in IBM and keep in touch with GSITI for organising the training programmes.

3.13: Dr. Siddhartha Sengupta, DGH informed the house that in the Oil industry, it is a practice during offshore oil exploration that a Regulatory Body and a Custodian of Data are created who are responsible for the security of data. Dr. Balakrishnan, INCOIS also opined that a 'negative list' of data, which are not to be shared, is to be prepared. GSI should also create such a 'negative list' for data sharing. Cdr P K Srivastava, NHO advised that there should be some environmental guidelines too for offshore exploration.

3.14: Shri M M Swamy requested the members to think about the modality of two aspects – a) sharing of data and b) permitting others to explore. It was pointed out that presently no clear guidelines are available in this regard. Therefore a committee has to be formed to look into this aspect. Shri Hari Prasad mentioned about the 'Terms of reference' of the earlier Subcommittee which was formed for this purpose only. NHO favoured for subject-wise Subcommittees. Cmdr V S Babelay, PDNOM informed that the existing norm about the de-restriction of data will be sent to the members shortly. Shri Swamy requested PDNOM to take a lead role in formulation of guideline for data sharing and PDNOM should also suggest a small team, make a resolution and put up in the Ministry for vetting and circulate to all members for implementation. After some deliberations, PDNOM, NIO, NHO, INCOIS, NCAOR and GSI were inducted as members to the subcommittee for formulation of guidelines for working out modality of data sharing with lead role from PDNOM. In this connection it is also decided that GSI will coordinate the meetings.

3.15: It was pointed out by the representative of DGH and ONGC that after acquiring the new ocean going vessel, GSI should consult these two organisations before taking up multichannel seismic survey to avoid duplication. Shri R Shimray, CED, CWC opined that working in a collaboration approach helps to generate various ideas that are useful in understanding the

geological processes. Shri Shimray inquired if GSI can take up change detection studies on entire coastline of India. Dr R N Patra, IREL opined that a definite system has to be developed for detailed study of the coastal processes operating in the nearcoastal region. Shri Swamy informed that GSI can be associated for certain joint programmes on these aspects if formulated by institutes working on this field. Dr A S Rajawat, SAC informed that CWC and CPDAC jointly has formed a committee to monitor and prepare an atlas on shore line changes from 1990 to 2007 on 25,000 scales for the entire country. He opined that the studies for coastal processes are mainly site specific and understanding of the causes should continue in a collaborative mode among two to three institutes including GSI. CWPRS is providing necessary inputs on this aspect. Shri Swamy advised CWC to take a lead role in this regard. Shri Shimray, CED, CWC informed that data on sediment transport is lacking with CWC and GSI should look into this aspect of sediment movement within a sediment cell or embayment. Shri G P Mohapatra, GSI opined that though GSI and SAC are collaborating on this subject since 1997, but it may not be possible to take up the study of entire coastline by GSI. Dr V Ranga Rao, ICMAM informed that they are doing the study on this aspect since last ten years. Dr Rajawat opined that investigation has to be carried out on regional as well as on local level. Dr R N Patra suggested that this type of study is actually multidisciplinary in nature and a single organisation cannot do it completely. It is better that the modelling, which is being done by ICMAM should be validated by other organisations. Shri S Bhattacharyya opined that Marine & Coastal Surveys will take up the studies subject to the availability of human resource and in the mean time CWC and ICMAM can formulate a programme in consultation with GSI. Dr P A Verghese, IBM informed the members that CESS, Thiruvananthapuram has carried out such work along the Kerala coast and they have generated considerable useful data.

3.16: Dr. R. N. Patra pointed out the depletion of heavy mineral in Chavara beach affecting the mining production. Shri S Bhattacharyya mentioned about the visit of GSI team to IRE, Chavara and conveyed that in spite of the manpower shortage, GSI will look into the problem provided IRE comes forward with definite work proposal where participation of IRE personnel is also desired. He opined that the occurrence of rich concentration of placer minerals in some coastal part of Kerala – Tamil Nadu just after the Tsunami, may be due to the selective removal of top lighter sand fraction by the strong waves caused by Tsunami.

3.17: Dr A S Rajawat informed that SAC is taking up a programme on modelling of sea level changes and wanted GSI to participate in this programme. SAC was requested to send details of programmes to GSI.

3.18: On the aspect of study for offshore sand occurrences, Shri S Bhattacharyya requested Shri C Balaraman, DGM, Kerala to get the offshore sand examined to ascertain the suitability of these sands from construction point of view by determining compressive strength or other parameters specified on grading of sand. As these tests are beyond the capacity of GSI laboratory, the DGM, Kerala was requested to explore the possibility of getting these tests done with suitable Institute / Laboratory. GSI is ready to provide the offshore sand sample as per requirement of such test to be specified by the Laboratory / Institute with which DGM, Kerala would take up the study. During the meeting, the DGM, Kerala was also provided with a list of possible Institutes who carry out such test.

3.19: Dr Balakrishnan Nair, INCOIS gave a presentation on the AWS system. He informed that three AWS systems have been procured for installation on the GSI research vessels and the systems have been integrated with INSAT satellite. He also requested GSI for providing high resolution bathymetric data and sediment distribution maps to INCOIS. Dr V Ranga Rao, ICMAM gave a presentation on shore line study. Dr A S Rajawat presented in brief the activities and forthcoming projects of Space Application Centre. Shri G P Mohapatra wanted to know about the 'Prakriti' project. Dr Rajawat informed that it is primarily a project on sea level changes. SAC requested GSI to provide them with two borehole data log on deltaic landforms. Shri Vinod Kumar, RSAS, GSI presented the work carried out over the west coast on aeromagnetic survey and the continued field season proposal for 2010-12. Dr. S B Ray gave a presentation on the coastal erosion taking place around Jatadharmohan River in Mahanadi Delta region wherein he showed a net erosion of 3.74 sq km while the coastline has receded by

200 to 350 m inland. Presentations of the highlights of work carried out by Marine & Coastal Surveys were also made by S/Shri N M Abdulla, R Jayakumar, D Bhattacharjee, J Sankar, K Kumaran, E Unnikrishnan, N R Biswas and S K Tripathy.

3.20: Shri M Hari Prasad presented the outline of FSP proposals for the year 2010-12. Programmes were presented vessel wise for two phases of 2010-12 i.e., for October, 2010 – March 2011 and April 2011- March, 2012. Besides programmes on board research vessels, other items pertaining to R&D (Laboratory items), Map compilation Geophysical data compilation etc. were also presented. Members accepted the Annual Programme of FS 2010-12.

3.21: Cmdr V S Babelay suggested reducing the number of presentation of highlights as they are already mentioned in the booklet. Shri M M Swamy said that the objectives of the presentation are to discuss about the findings. It is also necessary before presentation of the future work. He also opined that the members should have also presented their findings and future programme in the meeting so that GSI can be aware of their activities. Shri S Bhattacharyya said that the presentation can be condensed but it cannot be omitted. He also requested the members to keep GSI informed of their programmes. Dr Y Satyanarayana, NPOL stressed the need for compilation of multibeam bathymetry, subbottom profiling and data of related sediments column for effective interpretation and understanding of the geological processes. Shri D K Mukhopadhyay, CHQ, GSI observed that programmes requested by institutes / State Governments have been included in the Annual Programme.

3.22: In his concluding remarks, the Chairman observed that most of the members participated in discussion in a very proactive mood and discussed the important issue of sharing of data and responsibilities between GSI, MOD and MOES. A small subcommittee in this respect has been formed with a lead role of PDNOM to come out with recommendation towards modalities of data sharing. He also requested MoES to finalise the agreement on joint implementation of swath bathymetry programme. He requested DGM, Kerala to look into the suitability of the offshore sand. He also observed that gas hydrate prospecting by GSI is not possible at present and can be considered once GSI gets the new research vessel and equipments along with the required manpower. Regarding OTEC, he informed the members that GSI is responsible only for selection of favourable site and technical feasibility study may be taken up by NIOT. GSI is also ready to collaborate with CWC for deciphering the sediment flow studies in specific location, once its human resource is augmented.

3.23: The Convenor observed that the Base document as drafted, discussed and finalized, would be submitted to DG, GSI and MOM for consideration.

3.24: Shri M M Swamy thanked everybody for their active participation making the deliberations lively and fruitful. He stressed on the need of enhanced interaction and wider participation of the members to achieve the goal of CGPB.

3.25: The 3rd Meeting of the Committee-VI of CGPB was concluded with vote of thanks by Shri G P Mohapatra, Director, M&CS, GSI.

LIST OF MEMBERS AND INVITEES WHO WERE REQUESTED TO ATTEND THE THIRD MEETING OF THE COMMITTEE-VI OF CGPB HELD ON 27.07.2010

Members:

1. Ministry of Mines, New Delhi (Director Tech Level)*
2. Ministry of Earth Science, New Delhi (Director Tech Level) *
3. Department of Science & Technology (DST), New Delhi (Director Tech Level)
4. Indian Bureau of Mines (IBM), Nagpur
5. Directorate General of Hydrocarbon, New Delhi
6. DGM, Govt of West Bengal*
7. DGM, Govt of Orissa*
8. DGM, Govt of Andhra Pradesh
9. DGM, Govt of Tamil Nadu
10. DGM, Govt of Kerala
11. DGM, Govt of Karnataka*
12. DGM, Govt of Maharashtra*
13. DGM, Govt of Goa*
14. CGM, Govt of Gujarat
15. Oil & Natural Gas Corporation (ONGC), Dehradun
16. National Centre for Antarctic and Ocean Research (NCAOR), Goa;
17. National Institute of Oceanography (NIO), Goa
18. Atomic Mineral Directorate for Exploration and Research (AMD), Hyderabad
19. Dy. DG of Operations and Directors of GSI associated with the investigation on Marine Geology & Exploration and Coastal Geoscience, Director (Monitoring) and Director (CGPB), GSI, CHQ.

Permanent Invitees:

20. Indian Port Association (IPA), New Delhi
21. Shipping Corporation of India (SCI)*
22. Indian Navy (IN), New Delhi
23. National Physical Oceanographic Laboratory (NPOL), Kochi
24. National Hydrographic Office (NHO), Dehradun
25. Space Application Centre (SAC), Ahmedabad
26. Indian National Centre for Ocean Information Services (INCOIS), Hyderabad
27. National Institute of Ocean Technology (NIOT), Chennai
28. Coastal Erosion Directorate, Central Water Commission, New Delhi
29. Integrated Coastal and Marine Area Management (ICMAM), Chennai
30. Central Water and Power Research Station (CWPRS), Pune*

Special Invitee:

31. Indian Rare Earths Ltd, Mumbai.

* Members / Invitees who could not attend the meeting

LIST OF MEMBERS AND INVITEES WHO ATTENDED THE THIRD MEETING OF THE COMMITTEE-VI OF CGPB HELD ON 27.07.2010

Convener: Shri S Bhattacharyya, Deputy Director General, M&CS, GSI, Mangalore.

Member Secretary: Shri M Hariprasad, Supdt Geologist, M&CS, M-1A, GSI, Kolkata

Members:

1. Shri M M Swamy, Additional Director General, M-I, GSI, Kolkata
2. DST (representing by Prof K Nageswara Rao, Deptt of Geology, AU, Visakhapatnam)
3. Dr. P A Verghese, Supdt Mineral Economist, IBM, Nagpur
4. Dr. Siddhartha Sengupta, Chief Geologist, Directorate General of Hydrocarbons, Noida
5. Shri Y N R V Prasad, Deputy Director, Deptt of Mines & Geology, AP, Visakhapatnam
6. Shri V. Sivasubramanian, Deputy Director, CGM, Guindy, Chennai, Tamil Nadu
7. Shri C Balaraman, Deputy Director, Directorate of Mining & Geology, Thiruvananthapuram.
8. Shri PJ Bhavsar, Sr Geologist, Comm of Geology & Mining, Govt of Gujarat, Gandhinagar
9. Dr. M. Shanmukhappa, General Manager, KDMIPE, ONGC, Dehradun
10. Dr. John Kurian P, NCAOR, Vasco-da-Gama, Goa.
11. Dr A R Gujar, Scientist G, National Institute of Oceanography, Goa
12. Dr. S Chandrasekaran, Head, BSOI, AMD, Hyderabad
13. Shri R Jayakumar, Director, M&CSD, GSI, Kochi.
14. Dr S B Ray, Director, Op: Bhubaneshwar, ER, GSI, Bhubaneshwar
15. Shri J Sankar, Supdt Geologist, Op: East Coast-I, M&CS, GSI, Kolkata
16. Shri N M Abdulla, Supdt Geologist, Op: West Coast-I, M&CS, GSI, Mangalore
17. Shri D Bhattacharjee, Supdt Geologist, Op: East Coast-II, M&CS, GSI, Visakhapatnam
18. Shri Vinod Kumar, Sr Geophysicist, AMSE,RSAS, GSI, Bangalore
19. Shri D K Mukhopadhyay, Sr Geologist, Mon-IV, CHQ, GSI, Kolkata

Permanent Invitees:

20. Shri A V Ramana, Chief Admn Officer, Indian Ports Association, New Delhi
21. Cmdr V S Babelay, Principal Director, PDNOM, Indian Navy, New Delhi.
22. Dr Y Satyanarayana, NPOL, Kochi
23. Cdr P K Srivastava, INS, Sandhayak, NHO, Dehradun
24. Dr A S Rajawat, Head, Geoscience Division, SAC, ISRO, Ahmedabad
25. Dr P M Udani, Scientist SF, SAC, ISRO, Ahmedabad.
26. Dr Balakrishnan Nair, T M, Head, OS&ISG, INCOIS, Hyderabad,
27. Shri D Rajasekhar, Head, VMC, NIOT, Chennai
28. Dr V Ranga Rao, Scientist E, ICMAM, NIOT Campus, Chennai
29. Shri R Shimray, Director, Coastal Erosion Directorate, CWC, New Delhi

Special Invitee:

30. Dr R N Patra, CMD, Indian Rare Earths Ltd, Mumbai

Other GSI Representatives:

31. Shri G P Mohapatra, Director, M&CS, GSI, Kolkata
32. Shri K Kumaran, Supdt Geologist, Op: East Coast-II, M&CS, GSI, Visakhapatnam
33. Shri N R Biswas, Senior Geologist, M&CS, M-1A, GSI, Kolkata
34. Shri E Unnikrishnan, Sr Geologist, M&CS, GSI, Mangalore
35. Shri S K Tripathy, Sr Geologist, M&CS, GSI, Kolkata