Government of India
Ministry of Mines
NATIONAL MINERAL EXPLORATION TRUST

Sub: Minutes of the 3rd meeting of the Executive Committee of the National Mineral Exploration Trust (NMET) held on 25th October, 2016,

The 3rd Meeting of the Executive Committee of the National Mineral Exploration Trust was held under the Chairmanship of Shri Balvinder Kumar, Secretary, Ministry of Mines, on 25th October, 2016, in the Aluminium Hall, Shastri Bhawan, New Delhi.

Dr. Niranjan K. Singh, Joint Secretary, Ministry of Mines and Member Secretary, NMET Executive Committee welcomed the members and invitees. Agenda-wise discussions followed.

The list of participants is at Annexure-1.

1.0 Confirmation of Minutes

1.0 The minutes of the 2nd meeting of the Executive Committee held on 9.5.2016 was confirmed and thereafter, Member Secretary presented the action taken report.

2.0 Status of NMET Fund

2.1 Member Secretary informed that all major mineral producing states have begun NMET collection and as on 21.10.2016, the NMET Central Account has accrued an amount of Rs.430.00 crore from non-coal and coal minerals. He pointed out that monthly NMET statements are not submitted by many states and the states could not reconcile NMET payments against the NMET bank statement shared, especially where the miners were making direct payment to NMET account.

2.2 To know the NMET dues receivable from states, Secretary, Mines had directed IBM to update lease-wise/ mineral-wise royalty collection from 12.1.2015 on NMET website. In this regard, IBM informed that they do not receive this information from the states on a regular basis and hence, the data may not be uploaded.

2.3 To resolve the issue of non-reconciliation of NMET account, Chairman directed all states to strictly follow the prescribed NMET Rule (7), as per which, the states have to collect NMET payments at their end and transfer the cumulative amount once in a month to the NMET Central Account. Further, Chairman directed the states to upload lease-wise and mineral-wise details of royalty and NMET dues and receipts on the NMET website, from 12.1.2015, on a priority basis.

(Action: All State DGMs)

3.0 Status of on-going projects and approval of new proposals

3.1 Member Secretary presented the status of on-going 11 projects and 13 new proposals recommended by the Technical Committee. He also informed that five proposals on coal exploration submitted by CMPDIL and two by NLC are under consideration of the Technical Committee.

3.2 Dr. P.R. Golani, DDG, GSITI and Chairman, Technical Committee made a presentation on the technical evaluation of the 13 new proposals. It was informed that out of 13 new proposals evaluated, 3 on gold in KGF have been approved for exploration by MECL under promotional projects of Ministry of Mines. The remaining 10 projects will be taken up by MECL through NMET.

(Action: MECL)

3.3 The Executive Committee approved the 10 new mineral exploration projects recommended by the Technical Committee at an estimated cost of Rs.25.41 crore, for implementation through MECL. Committee also accorded in-principle approval to 5 exploration proposals on coal submitted by CMPDIL and 2 proposal on lignite submitted by NLC. Chairman directed the Technical Committee to complete the evaluation of exploration proposals received from Ministry of Coal on a priority basis.

(Action: Technical Committee, NMET)

The details of the approved projects are at Annexure-2.

3.4 The members proposed expansion of the Technical Committee by inducting experts from geophysics, M-IIB, GSI (for coal & lignite), Academic Institutions, IBM, etc for comprehensive evaluation of the projects. The Executive Committee approved the proposal on expansion of the Technical Committee.

(Action: Technical Committee, NMET)

3.5 Technical Committee proposed periodical monitoring of ongoing projects to ensure quality control of exploration. Chairman advised constitution of sub-committees under the Technical Committee to monitor exploration projects. To speed up approval of mineral exploration projects, the Chairman advised the Technical Committee to meet more frequently.

(Action: Technical Committee, NMET)

3.6 AMD has an understanding with GSI for Gamma-ray logging of boreholes to determine presence of radioactive minerals. AMD requested permission for similar Gamma-ray logging of boreholes drilled under NMET. The Executive Committee approved the request.

4.0 Granting of Revolving Fund to MECL

4.1 In view of increasing number of exploration projects and uncertainty in timely reimbursement of exploration costs by the states upon auction of mineral blocks as envisaged, the committee felt that granting a revolving fund to MECL may not be effective. The flow of fund to NMET from the States is continuous and therefore, direct funding of projects by NMET would be a better option.

4.2 The Chairman directed that the issue of creating a revolving fund for MECL to implement mineral exploration projects may be included as an agenda item in the next meeting of the Governing Body. **(Action: NMET Secretariat)**

5.0 Signing of Tripartite Agreement

5.1 The Executive Committee decided that exploration projects taken up through NMET funding would be executed only through a Tripartite Agreement signed by the respective State Governments with NMET and MECL.

(Action: All State DGMs)

6.0 Delineation of off-shore mineral blocks for auction

6.1 In the 2nd meeting of the Executive Committee, GSI was asked to identify off-shore mineral blocks for auction through exploration. GSI informed that it will take up offshore exploration for placer minerals in Chavara (Kerala), Gopalpur-Chhatrapur (Odisha) and Baruva-Santapalle (Andhra Pradesh) under its regular FSP item.

(Action: DG, GSI)

7.0 Capacity building of State DGMs

7.1 Member Secretary informed that State-level committees have been constituted to facilitate evaluation of capacity building needs of State DGMs in mineral exploration and to submit proposals to NMET. The Chairman advised the state governments to submit proposals on capacity building with the recommendations of the Committee at the earliest and instructed Member Secretary to issue reminders to all States for submitting the same on a priority.

(Action: Member Secretary, NMET/ State DGMs)

8.0 **Modernization of mineral beneficiation facilities of IBM**

8.1 In the 2nd meeting of the Executive Committee, IBM was directed to submit a proposal on modernization of its mineral beneficiation facilities. In this regard, IBM has submitted a draft proposal which needs to be evaluated by an expert group.

8.2 Dr. Bhabesh Chandra Sarkar, Prof. IIT(ISM) proposed the name of Prof R. Venugopal, Professor Emeritus, IIT(ISM) as one of the members of the expert

committee. The Executive Committee approved the following expert panel for reviewing the proposal on modernization of IBM labs.

1. Dr. K. Balasubramanian, Director, NFTDC, Hyderabad
2. Dr. B.K. Mishra, Director, IIMT, Bhubaneshwar
3. Prof T.C. Rao, Ex Director, RRL (CSIR), Bhopal
4. Prof R. Venugopal, Professor Emeritus, IIT (ISM), Dhanbad

IBM should coordinate with the above expert panel and submit the final proposal.

(Action: IBM/ NMET Secretariat)

9.0 Funding of third party audit of Star Rating of Mines

9.1 An innovative scheme of 'Star Rating' system has been instituted by Ministry through IBM, in which star rating will be awarded to the mining leases for their efforts and initiatives on implementation of the Sustainable Development Framework (SDF). Accordingly, a provisional 'Star Rating' would be awarded to the mining lease on submission of a self-certified evaluation template, to be verified and evaluated by third party/independent verifiers.

9.2 The committee accorded in-principle approval to fund third party auditing of Star Rating of mines, through NMET. Chairman directed IBM to submit detailed proposal on requirement of funds, modalities of payment and procedure of auditing for star rating.

(Action: IBM)

10.0 Approval of format and template for submission of project proposals

10.1 Project proposals submitted by states/agencies are not in uniform format and without sufficient background information. To ensure adequate information in proposals, NMET has developed a format for submission of project proposals. The Technical Committee has also prepared a template on inputs required for regional exploration. The Committee approved the format and template for mineral exploration projects and advised the States to submit their proposals in the approved format.

The format and template are at Annexure-3 & 4. **(Action: All State DGMs)**

11.0 In-principle approval of exploration in 25 mineral blocks, out of 30 blocks allotted to MECL.

11.1 Out of the 100 Blocks identified by GSI for G4-level exploration, 30 blocks were allotted to MECL. The 10 new proposals approved at para. 3.0 include 5 blocks out of these 30 blocks. MECL will submit technical proposal along with the cost estimates to NMET for technical evaluation of 25 remaining blocks. The Executive Committee accorded in-principle approval for mineral exploration in the remaining 25 blocks.

(Action: MECL)

12.0 Multi-sensor aero-geophysical survey over Obvious Geological Potential (OGP) area.

12.1 Dr. Dinesh Gupta, ADG and Head, Mission-IB, GSI made a presentation on the status of national aero-geophysical survey. He informed that, the three year project will be taken up in phases and in the first phase, four blocks, covering an area of 2.07 lakh sq.km over known mineral belts would be covered by magneto-gradiometric and Gamma-ray-spectrometric surveys, at an estimated cost of Rs. 90.00 crore. Responding to a query on coverage of coal-bearing areas by Ministry of Coal, he informed that the area covered under first phase does not contain coal-bearing areas and the subsequent phases will include coal-bearing areas.

(Action: ADG & Head, M-IB)

13.0 Accounting procedure for NMET and auditing of accounts.

13.1 NMET Rule 24 prescribes that the accounts of the Trust shall be maintained and audited as may be decided by the Central Government. Chairman advised to explore the possibility of availing the services of a Chartered Accountant from one of the PSUs under the Ministry of Mines for the auditing of NMET accounts, on payment basis.

(Action: NMET)

14.0 Regular Office setup for NMET.

14.1 The scope of activities under NMET is increasing and the house agreed that NMET requires adequate man power and a formal office setup. The Chairman advised to strengthen the NMET Office, preferably by engaging persons on deputation basis.

(Action: NMET)

15.0 Hand holding support to State Governments for auction of mineral blocks.

15.1 The technical consultancy services of M/s MSTC and MECON were availed by the State Governments as part of hand holding support extended by Ministry of Mines, for the demarcation of mineral blocks using DGPS and Total Station surveys and for providing a platform for e-auction. M/s MSTC and MECON have raised bills for the services rendered to the respective State Governments.

The Committee agreed in principle to meet the expenses on technical services rendered by M/s MSTC/MECON to State Governments, subject to submission of certified bills by the State Governments.

(Action: State DGMs/ MSTC/MECON)

16.0 Empanelment of experts for External Peer Review of mineral exploration reports.

16.1 Technical Committee proposed that the final report on exploration submitted by MECL and other agencies need to be evaluated by experts to ensure quality of work and adequacy of data. The Committee approved the following panel of experts for peer review of reports and decided to expand the same in due course.

1. Shri K. Shashidharan, Dy. Director General (Retd.), GSI
2. Shri N.K. Kavadia, VP (Rtd), Hindustan Zinc Ltd
3. Shri T. Rajesham, Director (Retd.), GSI
4. Dr. Pratip Gupta, Director (Retd.), GSI
5. Shri P.S. Parihar Director (Retd.), AMD
6. Shri M.K. Roy, Addl. Director (Retd.), AMD
7. Dr. Bhabesh Chandra Sarkar, Prof. IIT (ISM)
8. Shri D.K. Ray, Dy. Director General (Retd.), GSI
9. Shri H.S. Srivastava, Dy. Director General (Retd.), GSI

The peer reviewer will be paid an honorarium, and a decision on the amount of honorarium will be taken later.

(Action: NMET)

Concluding the meeting, the Chairman advised the states to come forward with new proposals on mineral exploration and capacity building. He also directed to invite all mineral producing States to the Executive Committee meetings so that they get an exposure on mineral exploration and related activities under NMET.

The meeting concluded with vote of thanks to the Chair.

Annexure-1

List of participants attended the 3rd meeting of the Executive Committee of the National Mineral Exploration Trust (NMET) held on 25th October, 2016

Sl. No	Name & Designation	Organization/Contact No. /email	Remarks
1	Shri Balvinder Kumar Secretary	Ministry of Mines secy-mines@nic.in	In Chair
2	Dr. Niranjan K. Singh Joint Secretary	Ministry of Mines jse-mines@nic.in	Member Secretary, *ex officio*
3	Shri M. Raju Director General	Geological Survey of India 9432672087 geolraju@gmail.com	Member, *ex officio*
4	Shri R.K. Sinha Controller General	Indian Bureau of Mines	Member, *ex officio*
5	Shri D. N. Prasad Advisor	Ministry of Coal	Member, *ex officio*
6	Dr. A.K. Chaturvedi Addl Director	AMD, Department of Atomic Energy	Member, *ex officio*
7	Shri Shashi Kanth Reddy Joint Director, Mines	DGM, Karnataka 09845933999 addmindmg@gmail.com	Member, *ex officio*
8	Shri D.S. Maru Director	DMG, Rajasthan 09414165275 director@dmg-raj.org	Member, *ex officio*
9	Ms Reena Kangale Director, Mines	DGM, Chhattisgarh 09407916111 reenakangale@gmail.com	Member, *ex officio*
10	Shri Rakesh Mohan US (E-1)	Ministry of Petroleum & Natural Gas	Member, *ex officio*
11	Dr. P. R. Golani Dy. Director General, GSI TI	GSI, Hyderabad 09414074055, prggsi@gmail.com	Nominated Expert&Chairman, Technical Committee, NMET
12	Dr. Bijendra Singh Chief Scientist (Retd.)	NGRI 09849418898	Nominated Expert
13	Prof. A.K. Singh	IIT (ISM), Dhanbad singhashok0707@gmail.com	Nominated Expert
14	Prof. Bhabesh Chandra Sarkar	IIT (ISM), Dhanbad bhabeshsarkar2005@gmail.com	Nominated Expert
15	Dr. Dinesh Gupta Additional Director General	NMH-IB, GSI adgnmh1b.gsi@gmail.com	Invitee
16	Shri S. N. Meshram Additional Director General	NMH- II, GSI, Nagpur	Invitee

17	Dr. Gopal Dhawan CMD	MECL cmd@mecl.gov.in	Invitee
18	Shri Alok Sharma GM (Geology)	CMPDI, Ranchi 09973814589/8987789065	Invitee
19	Shri Ashok Sharma Addl. Director	DMG, Rajasthan 09214305456 adgjaipur@dmg.raj.org	
20	Dr. Joyesh Bagchi Director (Tech.)	Ministry of Mines dirtech.mom@nic.in	
21	Shri M. Koshy John Dy. Director General	NMET Secretariat 09868228632 koshy.john@gov.in	
22	Shri P. Tarafdar Director, Mission II	GSI, Nagpur 9803088897 tarafdar.pradipta@gmail.com	
23	Shri R.N. Jha Director (Tech|)	MECL, Nagpur dt@mecl.gov.in 09673408000	
24	Shri S.K. Thakur GM (Expl.)	MECL, Nagpur 09405973443	
25	Shri Anjani Kumar	MECL, Nagpur 09975350576	
26	Shri B.P. Raturi	MECL, Nagpur 09422806417	
27	Shri S.K. Biswas	MECL 09830812363	
29	Shri S.V. Prasad Vice President	SBICAPS, N.Delhi 9818664631	
30	Shri Mriganka Ghatak Suptdg. Geologist	GSI, Delhi	
31	Shri Sanjeeb Bhattacharya Senior Geologist	GSI, Delhi	
32	Shri Debasish Sarkar Technical Director	NIC, Ministry of Mines	
33	Shri S N Khan NIC	NIC, Ministry of Mines 9868272342	

Leave of absence was granted to:

1	Smt. T.C.A. Kalyani Joint Secretary & Financial Advisor	Ministry of Coal & Mines	Member, *ex officio*
2	Principal Secretary, Mines	Govt. of Odisha	Member, *ex officio*
3	Dr. V.P. Dimri	Ex Director, NGRI	Nominated Expert

Annexure-2A

MINERAL EXPLORATION PROJECTS /BLOCKS APPROVED BY NMET EXECUTIVE COMMITTEE ON 25.10.2016

Sl. No	Name of the Block (Location, District, State)	Mineral	Area of the Block	Work Already done In the Block	Work Proposed In the Block	Estimated Cost (Rs in Lakhs)
1.	BRH Iron Ore Mines, NEB Range M/s RMMPL, ML N0. 2010, Village – Papinayakanahalli, District- Ballary, **Karnataka**	Iron	8.00 Sq. Km	Area Falls in the extension area of mine lease of M/s RMMPL	Geological Mapping. Topographical work **G-4**	**13.99**
2.	Regional Exploration proposal for Manganese ore in Kalakhunta Block, Khushalgarh Tehsil, District: Banswara, **Rajasthan**	Manganese	5.17 Sq. Km	Reconnaissance By DMG, Rajasthan	Geological Mapping Trenching, Geophysical Survey Drilling – 550m in 5 Scout Borehole **G-4**	**274.83**
3.	Regional Exploration proposal for Manganese ore in Tambesara Block, Khushalgarh Tehsil, District: Banswara, **Rajasthan**	Manganese	1.15 Sq. km	Reconnaissance By DMG, Rajasthan	Geological Mapping Trenching, Geophysical Survey, Drilling – 515m in 5 Scout Borehole **G-4**	**180.18**
4.	Regional Exploration proposal for Limestone in Gothra-Parasrampura Block, Tehsil-Nawalgarh, District-Jhunjhunu, **Rajasthan**	Limestone	8.25 Sq. km	Reconnaissance By DMG, Rajasthan North Eastern Continuation of Explored Block of DMG, Rajasthan	Drilling- 3600m (40 Boreholes), Geological Mapping Sampling, Analytical & Report Preparation Work **G-3**	**424.52**
5.	Regional Exploration proposal (G-4 level) for Copper & Gold in Deravad-Chargarhia-Bansra Area (Block-ID-Raj-02); District-Udaipur, **Rajasthan**	Copper & Gold	108 Sq. Km.	Reconnaissance	Geological Mapping, Geochemical Sampling, Geophysical Survey Drilling – 600m, Sampling, Analytical & Report Preparation work, **G-4**	**276.93**
6.	Regional Exploration proposal (G-4 level) for Copper in Isarwas-Karavalli - Baroliya-Angeni-Beras Area (Block-ID-WR, Raj-13); District- Udaipur, **Rajasthan.**	Copper	209 Sq. Km	Reconnaissance	Geological Mapping, Geochemical Sampling, Geophysical Survey Drilling – 600m, Sampling, Analytical & Report Preparation work, **G-4**	**353.29**

7.	Regional Exploration (G-3 Level) for Limestone in Ghunchihai Block, District- Satna, **Madhya Pradesh.** (Upgradation of the G-4 Exploration Block sanctioned earlier.)	Limestone	6.5 Sq. Km	G-4	Drilling- 1330m (in 38 Boreholes) Sampling , Analytical & Report Preparation Work **G-3**	**182.05**
8.	Regional Exploration proposal (G-4 level) for Base Metals in Agnigundala South Block (Block-ID-SRAP-10); District-Guntur, **Andhra Pradesh.**	Basemetal	229 Sq. Km.	Reconnaissance	Geological Mapping, Geochemical Sampling, Geophysical Survey Drilling – 600m, Sampling, Analytical & Report Preparation work **G-4**	**328.29**
9.	Regional Exploration proposal (G-4 level) for Base Metals in Agnigundala North Block (Block-ID-SRAP-09); District-Guntur, **Andhra Pradesh**.	Base Metal	167 Sq. Km	Reconnaissance	Geological Mapping, Geochemical Sampling, Geophysical Survey Drilling – 600m, Sampling, Analytical & Report Preparation work, **G-4**	**308.99**
10	Regional Exploration proposal (G-4 level) for Copper in the Area South of Kasarpur (Block-ID-ER, ODSj-09); District- Mayurbhanj, **Odisha**	Copper	100 sq Km	Reconnaissance	Geological Mapping, Geochemical Sampling, Geophysical Survey Drilling – 600m, Sampling, Analytical & Report Preparation work, **G-4**	**276.93**
	Total					**2620.00**

Annexure-2B

Proposals on coal & lignite exploration received from CMPDIL & NLC

CMPDIL

	Area/Block	Estimated Cost (Rs. Lakhs)
1	Regional Exploration for Coal in Recherla Block, Godavari Valley Coalfield, Sattupalli-Chintalpudi Coal Belt, West Godavari District, Andhra Pradesh.	1317.00
2	Regional Exploration for Coal in Reonti South Block, Tatapani-Ramkola Coalfield, Balrampur District, Chhattisgarh.	1028.39
3	Exploration for Coal in Rajadahi Block, Trans-Mand Sector, Mand-Raigarh Coalfield, Korba District, Chhattisgarh.	1013
4	Regional Exploration for Coal in Kotmer Block (Area between Kartala and Nonbira), Trans-Mand Sector, Mand-Raigarh Coalfield, Korba District, Chhattisgarh.	1925.97
5	Exploration for Coal in Nonbirra Block, Korba Coalfield, Korba District, Chhattisgarh.	2692.77
	TOTAL	**7977.13**

NLC

	Area/Block	Estimated Cost Rs. Lakhs
1	Detailed exploration for lignite in Veernam Block, Cuddalore district, Tamilnadu	7042.09
2	Detailed exploration for lignite in Palayamkottai Block, Cuddalore district, taminadu	851.27
	TOTAL	**7893.36**

Annexure-3

NATIONAL MINERAL EXPLORATION TRUST (NMET)

Proforma for submission of Mineral Exploration Proposals

1	Title of project				
2	Mineral/minerals to be explored				
3	Objective				
4	Level of proposed Exploration (G4/G3/G2/G1)				
5	State/District/Block/Area				
6	Toposheet no.				
7	Total area and coordinates of the area/block (Latitude/Longitude)				
8	Background information a. Previous work b. Present status of the block c. Mineral concession status (leases)				
9	Status of various clearances		Local/Forest/Others		
10	Brief account of work proposed in the area and expected outcome				
11	Details of work proposed in the area				
		Unit	Rate	Quantity	Estimated cost
I	**GEOLOGICAL COMPONENT**				
a.	Surveying	Sq.km			
b.	Geological mapping (give nature of mapping, scale, etc)	"			
c.	Geophysical studies (Nature of work to be specified)	"			
d.	Sampling and Geochemical studies (to be specified)	"			
e.	Other activities (to be specified)				
II	**DRILLING**				
f.	Drilling (type of drilling)	meter			
g.	Core Sampling	Nos			
III	**LAB ANALYSIS/STUDIES**				
h.	Chemical analysis of samples (to be specified/quantified)	Nos			
i.	Physical analysis of samples (to be specified/quantified)	Nos			
III	**ANY OTHER WORK TO BE INCLUDED** (work components to be listed item-wise)				
V	Provide time line of various activities proposed				
VI	Tentative date of submission of interim and final reports				
VII	**Total Estimated Cost of the Project in Rupee lakhs**				

(The proforma is for illustrative purpose only, to indicate various fields. It may be suitably modified as per the requirement of the project)

(Signature of the authority)

Annexure-4

TEMPLATE FOR REGIONAL EXPLORATION

G-4 level investigation is a scientific activity which is depended on the acumen and intuition of geoscientist. However, the following minimum requirements are recommended:

FIRST STEP

1. **Aerial Reconnaissance**: Satellite imagery/ Photo geology /Airborne Geophysical Survey data study need to be carried out for the total area.
2. **Geological Mapping**: Geological Mapping to be carried out preferably in1:12,500 or 1:10,000 scale. All lithological details and structural data are to be plotted along with continuous search for the ore minerals.
3. **Geochemical Survey**: (i) To check the rock types, their variation in chemical composition, sampling needs to be done for Whole Rock analyses (10-20 samples analysis depending on variation of lithotypes).Sampling is to be done at random from surface exposures, escarpments, nallah sections, etc. For a 100 sq km area, the number of samples to depend on mineral commodity and areal extent of the prospect. Stream sediments samples to be around 50-100. Bedrock/ soil samples to be around 100-200 samples.
4. **Geophysical Exploration**: If some target zones are identified then suitable methodology of geophysical exploration is to be carried out keeping in view the commodity of interest. It can be planned in a number of smaller areas in the total block. One or many of the geophysical methods may be applied viz. Gravity, magnetic, SP, IP & resistivity.
5. **Technological Survey**: If some zone is suspected to be mineralised on the basis of field observation, or, from some initial sample analyses some anomalous values indicate some zone of concentration or a block with high prospectivity, then to develop a target block whole zone can be brought under control with the help of groove sampling, pit sampling and trench sampling (100 cum trenching and 100 trench samples). Pits and trenches are preferred in covered areas as well as to collect samples from fresh bedrocks. If some positive zone is visualised at this level of work, to check the depth continuity of the mineralisation, if it is felt that help of drilling is necessary, then a few boreholes can be planned also(maximum 4 to 5).
6. **Petrographic and Mineragraphic Study**: Detailed study of petrography, proper nomenclature of the rocks, grade of metamorphism are very essential points. Study of ore forming minerals needs to be done in detail in the laboratory with the help of ore microscope, SEM studies and EPMA. Total number of samples will be 25for petrographic study and 25 for mineragraphic study.
7. **Sample preparation for chemical analyses**: samples are to be crushed thoroughly with the mesh size as per demand of the chemical laboratory for respective commodity. As for example for basemetal 120 mesh size whereas for gold and PGE it should be of 200 mesh size. Proper mixing, coning and quartering is necessary and for every sample two packets of 200 gms are to be generated, one for sending to the laboratory and the other will remain with the project authorities duplicate for posterity.

8. **Analytical results**: Whole Rock analyses and commodity specific analyses with associated elements are to be analysed from an ISO certified laboratory or NABL accredited laboratory.
9. **Processing of data and interpretation**: Before receipt of analytical results the map with lithological boundaries and structural elements and their interpretation is to be finalised. After receipt of the analytical data if the data help to delineate some zone with anomalous concentration of some commodity, then the target block can be demarcated with proper justification.
10. **Progress Report:** A G-4 stage report is to be prepared incorporating all the information mentioned above. Progress Report must be prepared following the guidelines of MEMC Rule table-IV-A.

(If there is a positive outcome then second step needs to be followed)

SECOND STEP

1. **Geological Mapping**: Geological Mapping is to be carried out in the delineated block of expected mineralisation. The scale of mapping for the block should be 1:4,000 or 1:5,000 scale for limestone& bauxite but for other commodities it is to be prepared in 1:2,000 or 1:1000 scale with the help of surveyor with DGPS survey with WGS84 datum &UTM projection. All lithological details and structural data and sampling points, grooves, pits, trenches are to be plotted on it.
2. **Geochemical Survey**: Systematic surface sampling is to be carried out in the block. If the commodity is horizontally disposed tabular regular/irregular body of limestone or bauxite then sampling is to be carried out by putting pits with systematic grid spacing of G3 stage (spacing may be followed as per MEMC Rule 2015, Part-III). If the target body is of basemetal, gold, PGE, iron ore, Manganese etc. with steep dip then groove and trench sampling may be done following spacing of G3 stage of MEMC Rules 2015.
3. **Geophysical Exploration**: If geophysical exploration has not been done in this part in the first step then it is to be completed by applying one or many of the suitable geophysical methods viz. Gravity, magnetic, SP, IP & resistivity.
4. **Technological Survey**: With the availability of analytical results of pit, groove and trench samples, boreholes can be planned with wide spacing initially. Gradually with the available analytical results with the development of higher confidence level the G3 stage investigation with systematic drilling is to be done following the guideline of spacing of MEMC Rule 2015. For dipping bodies, as per convention, at least two levels (60m vertical and 120m vertical depth of intersection) may be explored by drilling. Skeletonised core in core boxes to be preserved in core laboratories. One representative borehole with full length and all mineralised intersection of boreholes to be preserved.

5. **Petrographic and Mineragraphic Study**: Detailed study of petrography and mineragraphy will continue simultaneously. Total number of samples will be 20 for petrographic study and 20 for mineragraphic study.

6. **Sample preparation for chemical analyses**: samples of pits, grooves, trenches and borehole cores are to be crushed thoroughly with the mesh size as per demand of the chemical laboratory for respective commodity. As for example for basemetal 120 mesh size whereas for gold and PGE it should be of 200 mesh size. Proper mixing, coning and quartering is necessary and for every sample two packets of 200 gms are to be generated, one for sending to the laboratory and the other will remain with the project authority as duplicate for posterity.
7. **Analytical results**: commodity specific analyses with associated elements are to be analysed from an ISO certified laboratory or NABL accredited laboratory. Number of samples will be as per the borehole intersection of ore body and surface width.
8. **Processing of data and interpretation**: Before receipt of analytical results the map with contours reference points, borehole points, lithologies and structural elements and their interpretation is to be finalised. After receipt of the analytical data the geometrical shape of the mineralised body may be interpreted, the lode is to be defined, cut offs are to be finalised and the average grade is to be worked out.
9. **Bulk Density**: Bulk density determination is to be done for the mineralised rock mass.
10. **Resource estimation**: After working out the geometry of the lode and bulk density the resource may be estimated. The resources may be estimated following at least two methods, particularly for steeply dipping lodes (preferably by Cross Section method and LV Section method) and taking into consideration at least two cut offs. For bauxite and limestone, polygonal and isochore methods to be utilized.
11. **Geological Report:**A geological report is to be prepared incorporating all the information mentioned above. Progress Report must be prepared following the guidelines of MEMC Rule table-IV-A. The progress report is to be submitted with the map of G4 stage and detailed map of G3 stage, all borehole cross sections, LV section, level plan and field photographs in hard copy as well as digital format.

****