Ministry of Mines
National Mineral Exploration Trust

Minutes of the 27th Technical-cum-Cost Committee (TCC) meeting held on 7th and 8th January, 2021 and extended TCC meetings held on 12th & 27th January, 2021 through videoconferencing at Geological Survey of India, DGCO, A-II Pushpa Bhawan, New Delhi

The 27th meeting of Technical-cum-Cost Committee [TCC] of National Mineral Exploration Trust [NMET] was held under the chairmanship of Shri Janardan Prasad, Additional Director General, Geological Survey of India (ADG, GSI), and Chairman, TCC, NMET on 7th and 8th January, 2021 and extended TCC on 12th and 27th January, 2021 at GSI, DGCO, A-II Pushpa Bhawan, New Delhi through videoconferencing. The TCC members and representatives of Exploration Agencies [EAs] participated through their respective VC nodes. The list of participants is at **Annexure-I**.

Dr. L. P. Singh, Director, GSI and Member Secretary, TCC-NMET, welcomed Shri Janardan Prasad, ADG, GSI & Chairman, TCC, Members of the TCC and participants representing various EAs. He briefed about the project proposals submitted by EAs for consideration of 27th TCC meeting.

Shri Amit Saran, Director, NMET welcomed the participants and expressed that the efforts should be made to enhance the mineral exploration in country. He conveyed that an interactive session on exploration strategy for deep seated minerals with emphasis on base metals [Copper, Lead, Zinc] Nickel, precious metals, Gold Diamond and PGE was organised on 22nd December, 2020 to finalise the strategy for deep seated minerals. He further informed that the Ministry shall be organising outreach programs at Jaipur, Lucknow, Bhopal, Ranchi/Bhubaneswar, Hyderabad/Bangalore and Shillong to highlight the mineral exploration initiatives of NMET for the benefit of State DGM's and Mineral Development Corporation of the State.

Shri Janardan Prasad, ADG, GSI and Chairman, TCC welcomed the participants. Subsequently, the proceeding of meeting was initiated as per circulated agenda.

The agenda-wise discussion followed.

27.1: Technical evaluation of new project proposals:

27.1.1 Heliborne Time Domain Electromagnetic (TDEM) and Magnetic Survey over target mineral areas H1 and H2 as follow up surveys recommended by analysis of Aerogeophysical data over OGP Blocks 1 & 2 (Phase-I).

a. GSI has proposed to carry out Heliborne Time Domain Electromagnetic (TDEM) and magnetic survey over 195 sq km [1450 lkm] in parts of Rajasthan and 731 sq km [5370 lkm] in parts of Madhya Pradesh. Total 926 sq km [6820 lkm] area will be covered at a cost of Rs. 7.00 Cr within one year duration.

b. Keeping in view the decision of 17th EC meeting, the project proposal for heliborne survey [blocks H1 and H2] have been reconsidered for discussion in 27th TCC meeting. The technical parameters of the project were again discussed by TCC and found to be in order.

27.01.2021 27/01/21

c. GSI has conveyed that the cost estimate of Rs. 7.00 Cr for the said project have been derived from the cost estimation done for the project "*Heliborne Survey (Phase-I) over 8 mineral target zones identified from interpreted Legacy Aero-geophysical data in parts of Odisha, Chhattisgarh, AP, Telangana and Karnataka*" which was reviewed and recommended by TCC during 26th TCC meeting as the work components for the both projects are of similar nature.

The Committee suggested that the project "Heliborne Time Domain Electromagnetic (TDEM) and Magnetic Survey over target mineral areas H1 and H2 as follow up surveys recommended by analysis of Aerogeophysical data over OGP Blocks 1 & 2 (Phase-I)" at estimated cost of Rs. 7.00 Cr and time duration of 12 months may be submitted to EC for approval.

27.1.2 Outsourced marine Deep Seismic Reflection Survey (DSRS) for Multi-channel seismic survey within Indian EEZ Andaman and Nicobar Island, India.

a. GSI has proposed to carry out marine Deep Seismic Reflection Survey [DSRS] through multi-channel seismic survey to scan the subsurface seabed anomalous zones over parts of Arabian Sea, Bay of Bengal and Andaman Sea. GSI has proposed to acquire 2D marine DSRS data along 51,200 lkm transect at variable line spacing (5 km and 20 km) by 2025 by utilising in-house capacities [20,700 lkm] and through outsourcing [30,500 lkm].

b. GSI has submitted a budgetary estimate of about Rs. 351 Cr (including 18% GST) for marine DSRS survey over 30,500 lkm for a time span of 2022-25. This estimate has been done based on the estimate provided by a single prospective bidder i.e. M/s Fugro only. The bundled cost including data acquisition and processing have been estimated at Rs. 97,220 per line km by GSI.

c. The DPR states that "**the data security is of paramount importance. The modalities of data security are yet to be worked out. The acquired data is the sole property of GSI. It will remain in the custody of GSI and under no circumstances the acquired data will leave country. Gravity, Magnetic and DGPS data are of strategic importance. Therefore, it is proposed that such data acquisition especially in restricted and adjoining to international boundaries need to be done by GSI. The necessary clearance from Ministry of Defense will be taken before outsourcing the 2D marine DSRS. Outsourced agencies need to be engaged with full proof protocol for ensuring data security**".

d. GSI has conveyed that most of the basin parts have already been covered by the Oil and Gas companies and the data is in custody of DGH.

After detailed deliberation, the following observations have been made by the TCC which needs to be considered during the SFC/EFC:

i. *The DSRS survey is expected to map sediment thickness, layering sequence, sea mound features, mounds, subsurface structure and other features (plateaus, hills, guyots and knolls etc.). Acoustic Impedance Contrast (AI), which is the product of*

27.01.2021

27/01/21

density and velocity of a layer, is the primary requirement to identify and define the layer properties of the basement with respect to overlying sediments.

ii. It is pertinent to mention that the DSRS with parameters of 6km cable (streamer), 12.5mGL and 1ms sampling rate with 6000psi Airgun source, the outcome is tentatively expected to give a layer resolution of 10-15m, up to 1000m depth. Further, due to absorption of high frequency content of the signal the resolution and definition will deteriorate as depth increases. The dimensions of the expected features are very important while designing the line spacing because they are likely to be missed while sampling with inadequate line spacing.

iii. Assessment of AI with laboratory modelling for expected mineralization zones with associated geological features may help to demarcate the mineralized zones. A sample study of existing data elsewhere may be examined in this background for enhancing confidence to this project.

iv. In order to derive good results, the survey should be planned with high strength input seismic signal with a reasonable bandwidth rich in high frequencies. The depth envisaged to map below sea bed is also a crucial parameter to decide the cable length.

v. The DSRS data when integrated with Gravity and Magnetic survey data will greatly reduce the uncertainties in identification of basement related features. GSI should ensure the availability of G-M data along with the DSRS data for better understanding of subsurface features.

vi. The necessary security clearance from Ministry of Defense and Department of Naval Security may be sought before engaging PIAs for marine DSRS data acquisition.

vii. GSI should ensure the data availability from the DGH, before proposing data acquisition to avoid duplication. The transect lines of DGH data should be consulted before proposing the DSRS transect.

viii. As a follow up of DSRS the physical sample collection and its analyses is of paramount importance for carving out mineral blocks and increasing confidence for marine mineral deposit. GSI may workout for devising methodology for drilling in marine blocks.

ix. The stakeholder consultation for implementation of DSRS data acquisition and to understand the techniques of subsequent exploitation of marine sulphide deposits, if discovered, with international examples needs to be carried out before planning of DSRS data acquisition within a short span of 2025.

x. The estimated cost arrived through only one prospective bidder i.e. M/s Fugro, may not be judicious, as it may inflate/deflate the cost of NIT. GSI should arrive a normative cost estimate for the said project through national/global EOI.

The Committee suggested that the above comments should be attended and then, if deemed fit, revised proposal may be submitted.

27.1.3. Magneto-Telluric acquisition program of Indian Subcontinent (IndMAP). Three pilot projects as part of IndMAP on three mineral rich Cratons of India: Aravalli, Dharwar and Singhbhum.

27.01.2021

27/01/21

a. GSI has proposed to acquire MT data on 27km x 27km grid pattern [BBMT at each grid node and LPMT at alternate grid node] for the entire country which may be instrumental in the study of Lithospheric architecture for targeting deep seated concealed mineral deposits.

b. However, GSI has also stated that pre-production (pilot studies) project as part of IndMAP will be taken in any one area covered by RMT project of GSI for evaluating the workability and achieving the objectives of this National Scale Programme immediately after procurement of MT instruments. This is necessary for developing SOP for this National Scale Programme.

c. It has been proposed that the National Scale Programme will be implemented by GSI constituting a consortium of NGRI, IIT-Roorkee, IIT-ISM, IIT Bombay, IIT-Kharagpur, Indian Institute of Geomagnetism Mumbai, Institute of Seismological Research Gandhinagar etc. but the proposal doesn't say whether these institutions have been consulted while formulating this proposal.

d. A tentative estimate of Rs. 188.1Cr, including the inflation, has been submitted by GSI for the pan India MT program.

After detailed deliberation, the following observations have been made by the TCC which needs to be considered during the SFC/EFC:

i. *MT survey is one of the vital geoscientific survey programs for targeting potential deep seated minerals.*

ii. *The report on experimental MT survey done in 2010-11 by GSI-De Beers has made specific mention regarding the noise levels having adverse impact on the MT data and its meaningful interpretation.*

iii. *The proposal mentions that the work will be carried out in collaboration with NGRI, IIT-Roorkee, IIT-ISM, IIT Bombay, IIT-Kharagpur, Indian Institute of Geomagnetism Mumbai, Institute of Seismological Research Gandhinagar, etc., therefore a committee may be constituted with members from these institutions to logically constrain the survey parameters and oversee the implementation of the pilot projects to ensure meaningful outcome. This may also be considered while implementing the pan India MT Survey project by GSI.*

iv. *GSI may take up the three pilot scale projects by its own budget (Rs. 48 Lakh) and analyse the signal vis-à-vis noise components for its suitability. Besides this a case specific MT data acquisition in Ladakh area may be considered as the cultural noise component in Ladakh area is expected to be comparatively very low. Further, in Ladakh area the rocks ranging from Archean/Proterozoic to Quaternary sequence have been exposed, which may provide considerable resistivity variation in different geological domains.*

v. *Data acquired under Deep Continental Studies project of the Department of Science and Technology, New Delhi, wherein wide band MT measurements were carried out to map the electrical structure of the earth from shallow to deep crustal depth needs to be taken into consideration by GSI before actual implementation of pan India MT Survey.*

27.01.2021

27/01/21

vi. *A suitable strategy, as deployed by other countries like China, Canada and Australia needs to be adopted for selecting grid data interval after consultation with the listed potential collaborators of the project. The BBMT should not be taken up uniformly throughout the country. The MT data acquisition should be prioritised over different geological domains of the country.*

The committee opined that the proposal for three pilot projects does not require any support from NMET and may be implemented by GSI through its own resources. Subsequent to the completion of pilot projects GSI may submit the proposal for the envisaged all India program along with constitution of consortium of GSI, NGRI, IIT-Roorkee, IIT-ISM, IIT Bombay, IIT-Kharagpur, Indian Institute of Geomagnetism Mumbai, Institute of Seismological Research Gandhinagar, etc., as specified in DPR.

27.1.4. Development and Operationalization of Digital Core Library and Adaption of Advance Technologies for Geological Logging and Creation of a Digital Database.

a. GSI has proposed to establish a modern Digital Core Library [DCL] to accommodate subsurface information in its physical form and have ample scope for preservation, easy retrieval and their examination in a scientific environment.

b. Additionally, the DCL requires attached laboratory and a modern, well-lit and spacious examination room for visitors inspecting cores for carrying out study.

c. GSI has envisaged to procure infrastructures for preservation, study and research activities related to drill core which is vital for mineral exploration.

d. The establishment of DCL involves the physical Core Library construction / modernization / Augmentation involving building construction / Pre-fabricated material assembly, equipment for mechanized warehouse, Laboratories, Data capture equipment including IT facilities at warehouse.

e. The Committee opined that the data/ drill core sharing by different agencies is a major concern and a policy guideline must be adopted at the highest level so that all the Government, public and private stakeholders may share their exploration data along with drill cores with GSI to upload in DCL.

f. Separate SOPs may be developed for drill core skeletonization and preservation for onshore and offshore core samples.

g. Concept of NGDR and CLIS appears to be overlapping, GSI should ensure that there should not be any duplication of work.

h. It appears that the establishment of Digital Core Library is a purely IT implementation that includes development of infrastructure, hardware, software, application development, hosting etc. It is important to mention that the similar proposal for infrastructure development by IBM and DGM Nagaland was rejected by the Ministry in 15th EC meeting and 58th CGPB meeting respectively citing the provisions of Article 9 of NMET rule, 2015.

27.01.2021

27/01/21

The Committee opined that the establishment of a modern digital core library is a very good initiative from GSI, however, the proposed expenditure is mostly for development of infrastructure and therefore, NMET will not be able to support this project as has been the case in similar proposals from other organizations.

27.1.5. Proposal for National Geochemical Mapping (NGCM) Outsourcing in Deccan Trap & Himalayan belt areas.

a. The proposal for geochemical mapping by GSI was discussed during the 26th TCC meeting wherein it was suggested to resubmit the proposal for acquiring geochemical data over Deccan Trap and Himalayan belt with suitable strategy of sample collection as only these two geological domains show some promise for geochemical survey from mineral exploration perspective. The detail comments/ suggestions of TCC Committee for implementation of GCM project have been recorded in the minute of 26th TCC meeting [pg. 3-6].

b. It is pertinent to mention that out of total country's land mass of 32.87 lakh sq km, mappable area is 31.46 lakh sq km, of which 11.72 lakh sq km area has been covered under geochemical survey till March, 2020 by GSI and about 16.22 lakh sq km area needs to be covered in field season 2021-22 onwards.

c. Now, GSI has submitted revised proposal on geochemical mapping over Deccan Trap and Himalayan belt through outsourcing. Total 3.21 lakh sq km area spread over 463 toposheets [Deccan trap: 321; Himalayan: 142] at a cost of Rs 247.49 Cr has been proposed by GSI for geochemical survey by 2024. It has been conveyed that the stream sediment samples/ slope wash samples will be collected at 2 km x 2 km grid, over the proposed Deccan Trap and Himalayan belt areas. With this revised sampling density strategy, about 4 lakh sq km area can be covered annually and consequently all the remaining 16.22 lakh sq km area can be covered within four years.

d. All expert members were unanimous in expressing the fact that NGCM is a pre-competitive baseline data which plays a very crucial role in delineating the target area for launching exploration programs. Anomalous areas are identified based on deviation from crustal abundance or '**Clarke values**' of different elements.

e. Under NGCM, all the stream sediment and soil samples are analyzed for 64 elements. In contrast to chemical analysis for mineral exploration, under NGCM, the resolution is much lower using 'Clarke's value' as the lower level of detection limit and in certain cases, even lower than that. Therefore, the most critical component for identifying the anomalous zones is the stability and sensitivity of laboratory instruments with precision and accuracy of ppb level.

f. GSI has set up a network of laboratory capable of analysing large volume of samples with desired precision and accuracy to pick up zones of geochemical anomalies over and above crustal abundance.

g. DPR submitted by GSI states that there is serious constraint of NABL accredited laboratory in the country which is a prerequisite to maintain accuracy and reproducibility of analytical results however, they have not mentioned the plan for reconciling with this constraint in case the work is outsourced.

27.01.2021

27/01/21

h. The remaining prioritized areas for mineral exploration perspective, such as Deccan Trap and the Himalayas, covers only about 3.21 lakh sq km. Keeping in view the criticality of the quality of chemical analysis and relatively less extent of area to be covered it may be appropriate for GSI to use its own in-house resources in order to achieve the desired objective of this very crucial pre-competitive baseline geoscience data by 2025.

i. However, if it is necessary to go for outsourcing of NGCM in these prioritized areas then GSI must ensure and address the above technical issues.

Decision:

Based on the deliberations made during extended 27th TCC meeting held on 27th January, 2021 and observations made therein, the proposal is recommended for NMET funding of Rs. 247.49 Cr [inclusive of all taxes] for carrying out NGCM work over Deccan Trap and Himalayan Belt. The estimated cost of Rs. 247.49 Cr as proposed by GSI is based on their own experience of NGCM work.

27.1.6. General Exploration (G2) for copper in Mundadevta-Darkhuli-South Jharia Copper Block District: East Singbhum, Jharkhand.

a. The proposal of Copper exploration in Mundadevta-Darkhuli-South Jharia Copper Block was discussed during 26th TCC meeting held on 10th and 11th, Dec, 2020. The Committee suggested that the project may be resubmitted to TCC after assessment of the available data and its suitability for auctioning and a combined proposal [Mundadevta-Darkhuli & South Jharia] may be submitted. The MECL has resubmitted the combined proposal for discussion in 27th TCC meeting.

b. The TCC opined that the Mundadevta-Darkhuli-South Jharia Copper Block was sufficiently explored justifying G3 stage of exploration and is ready for auctioning for Composite License. However, the DGM, Jharkhand submitted that the G2 stage exploration is necessary for hassle-free auctioning of mineral block.

c. Keeping in view the request of DGM, Jharkhand the project proposal has been considered by TCC for discussion and Committee suggested that a request letter should be submitted by DGM, Jharkhand to NMET before approval of project by EC detailing about the need of G2 stage exploration for auctioning.

d. After detailed technical deliberation, it has been deduced that there are four lodes in Mundadevta area and three lodes in South Jharia. In South Jharia the average thickness of all lodes is one metre and the distance between adjacent lodes is 30m to 70m.

e. In Mundadevta-Darkhuli area it has been observed that sufficient boreholes have been drilled by GSI and out of four lodes, lode no. 3 is found to vary in thickness from 1m to 11.83m. Lode no. 3 has been correlated in different borehole and consistently traced from one limb of the synform to other limb along its closure. The zone width between every two lodes vary from 20m to 60m and only lode no. 3 seems to be of fairly good continuity. To complete the activities of G2 stage exploration the beneficiation part is left, therefore only few boreholes can be planned in such a way that along every section or profile there should be one

27.01.2021

27/01/21

borehole which intersects lode no. 3 at -50m RL and boreholes may terminate at -75m to -100mRL. The surface RLs vary between 80m and 90m. Therefore, the vertical depth of intersection will vary between 150m and 160m.

f. The samples collected from lode no. 3 and other lodes may be sent for chemical analyses and beneficiation studies may be attempted with the samples collected from lode no.3 of Mundadevta-Darkhuli area and lode no.1 of South Jharia and with the help of analytical results of samples of new boreholes and old boreholes the resource and average grades of lodes are to be estimated again.

The Committee recommended the proposal for approval of General Exploration (G2) for copper in Mundadevta-Darkhuli-South Jharia Copper Block District: East Singbhum, Jharkhand with estimated cost of Rs. 967.70 Lakhs including GST in time schedule of 18 months for carrying out the proposed work and submission of report as per Annexure-IIA & IIB.

The proposal may be considered for approval of EC subject to submission of request letter by DGM, Jharkhand citing necessity of G2 stage exploration for auctioning.

2.1.7. Reconnaissance Survey (G4) Iron Ore in Bailadila, Narayanpur, Rowghat and Dalli Rajhara Iron Ore Belt, District- Dantewada, Narayanpur, Kanker and Balod respectively Chhattisgarh.

a. DGM, Chhattisgarh has proposed to carry out G4 stage exploration for Iron ore in seven blocks viz. North Bailadila, Narayanpur, Rowghat, Aturbera, Kanker, Hurtarai, and Dallirajhara in parts of toposheets 65F/1, 65E/7, 65E/1, and 64H/2.

b. The block is a part of Bailadila, Narayanpur, Rowghat & Dalli Rajhara Iron Ore Belt and several iron ore mines of NMDC are operational in the area with 64% average Fe_2O_3 content. The proposed blocks are adjacent to these working mines.

c. It is pertinent to mention that the proposals for G4 stage Iron ore exploration in eight blocks was approved during 8th EC meeting. Further, during 21st TCC meeting DGM, Chhattisgarh had requested to drop these 8 Iron ore projects citing huge NPV demand by Forest Department. However, subsequently during 14th EC meeting, DGM, Chhattisgarh requested to defer the cancellation of the eight Iron ore proposals. Therefore, EC directed to resubmit the proposal to TCC.

d. DGM, Chhattisgarh had resubmitted its proposal in 23rd TCC meeting for all the eight blocks separately wherein the committee suggested to submit a single program taking into consideration all the blocks and a single cost sheet with all the work components.

e. Now DGM, Chhattisgarh has resubmitted its proposal to carry out for G4 stage exploration in seven blocks however, the area for each block has been considerably reduced. The details of proposed area for individual blocks is given below:

Block name	Earlier proposed area	Presently proposed area
North Bailadila	29.26 sq km	7.5 sq km
Narayanpur	52.32 sq km	5.39 sq km
Rowghat	50 sq km	22.80 sq km

27-01-2021

25/01/21

Aturbeda	2.03 sq km	1.52 sq km
Kanker	61.10 sq km	12.53 sq km
Hurtarai	7.27 sq km	8.66 sq km
Dalli Rajhara	1.1382 sq km	0.65 sq km
Salhewara	Salhewara	Not proposed

f. It has been conveyed that all the seven blocks are situated very far away and spread over four toposheets and monitoring of these projects in a single project may be difficult. In view of this the Committee suggested that a combined proposal including three to four blocks which are located on a single toposheet may be submitted first to launch a G4 stage programme.

g. It has been conveyed that the blocks are situated in dense forest area and the accessibility in the blocks for mapping, survey, drilling etc. will be difficult. Besides this it has also been conveyed that the local law and order problem is another hurdle. In this connection, DGM, Chhattisgarh may submit a detail plan for execution of survey/exploration work in the area after consultation with state authorities.

After detailed deliberations the Committee suggested that the different blocks should be grouped into different clusters and accordingly revised proposal for different clusters may be submitted to TCC.

2.1.8. General Exploration (G2) for Limestone in Reddipalayam amalgamated Limestone Block-2, District- Ariyalur, Tamil Nadu. [Recommended for approval in 23rd TCC Meeting]

a. The project proposal on limestone exploration was recommended during 23rd TCC meeting for approval of EC in its 16th EC meeting. However, the project was not approved by EC citing limestone and Iron ore exploration projects shall not be considered for NMET funding and exploration work for limestone projects should be carried out by GSI.

b. However, keeping in view the decision taken during 17th EC meeting the proposal for limestone exploration in Reddipalayam amalgamated Limestone Block-2, District-Ariyalur, Tamil Nadu has been reconsidered for discussion.

c. The Committee suggested that the project may be implemented as per the directives /recommendations suggested during 23rd TCC meeting with revised drilling target of 720m.

The Committee suggested that the proposals may be considered for approval of EC subject to submission of a certificate from Tamil Nadu State detailing demand and availability of limestone in the State and requirement/demand vis-à-vis availability of limestone resources in Ariyalur district. It is pertinent to mention that, as per the NMI data of IBM 2015, the total Limestone resources of Tamil Nadu is about 1600MT.

The Committee recommended the proposal for approval of General Exploration (G2) for Limestone in Reddipalayam amalgamated Limestone Block-2, District- Ariyalur, Tamil Nadu, with estimated cost of Rs. 142.72 Lakhs including GST in time schedule of 8 months for carrying out the proposed work and submission of report as per

27.01.2021

27/01/21

Annexure-IIIA & IIIB, subject to submission of certificate from the state of Tamil Nadu.

2.1.9. Reconnaissance Survey (G4) for Kyanite in Kallahalli Kyanite block, District-Mysore, Karnataka [Project was discussed in 25th TCC meeting].

a. The project proposal for G4 stage exploration of Kyanite was discussed during 25th TCC meeting wherein the said proposal was not recommended for approval of EC citing that the exploration of the commodity like Kyanite will be funded by NMET or not that is to be decided.

b. Subsequently, the State Government of Karnataka vide its communication letter dated 24.12.2020 has conveyed that the Kallahalli Kyanite block, District- Mysore, Karnataka has the geological potential to carve out an auctionable Block and would attract the mining entrepreneurship for mineral exploitation and value addition to support the existing and upcoming industrial units in supplying quality refractory material. It has also been conveyed that the additional revenue, possible employment generation and development in this remote part of the State will also be generated.

c. Keeping in view the request of state government, the project proposal has been reconsidered for discussion. After detailed deliberation the following recommendations have been suggested by the TCC Committee:

   i. The threshold value of Kyanite is 35% therefore, it is to be explored that which laboratory will help in separation of kyanite crystals through some technique from the rock samples for assessment of its percentage in the rock. Chemical analyses of samples may not represent the correct assessment of kyanite content in the samples. In chemical analyses of samples the Al_2O_3 content will depend on the total quantum of different phyllosilicates (muscovite, biotite, sericite etc,) and kyanite as the host rock is kyanite bearing quartz mica schist. The committee suggested that the mineral separation technique needs to be considered for establishment of percentage of kyanite content in the resource of rock mass.

   ii. There is serious constraint about the mineral separation laboratories in the country, the Committee suggested that the modality for mineral (Kyanite) separation may be finalised by the KIOCL.

   iii. The Committee suggested that initially the surface samples are to be analysed [mineral separation method] and chemical analyses should be minimised, thereafter the decision for drilling and other parameters will be taken after review of the project subject to receipt of encouraging results.

The Committee recommended the proposal for approval of Reconnaissance Survey (G4) for Kyanite in Kallahalli Kyanite block, District- Mysore, Karnataka with estimated cost of Rs. 191.64 Lakhs including GST in time schedule of 12 months for carrying out the proposed work and submission of report as per Annexure-IVA & IVB.

27/01/2021

25/01/21

27.2. Review of the exploration work for the ongoing projects

27.2.1: Additional 81.50 m drilling and core boxes in Adanakurichi (G2) Limestone Block, Ariyalur, Tamil Nadu [Implementing Agency: MECL].

a. The project was approved in 15th EC meeting held on 28th November 2019 with estimated cost Rs. 115.92 and total drilling of 630m. MECL conveyed that total of 711.50m drilling has been done in 7 Boreholes and the additional drilling have been done due to continuity of limestone body beyond the expected depth.

b. The lithologs of drilled boreholes have been reviewed by the committee and found in order. Keeping in view the justification for additional drilling, the committee has approved the additional drilling of 81.50m. The details are given at **Annexure-V.**

The committee approved the additional cost of Rs. 9.88 Lakh including GST for additional drilling of 81.50m in Limestone (G2) Block, Ariyalur, Tamil Nadu.

27.2.2: Additional chemical sampling and analysis in Biarpalli (G2) Block, District-Balangir, Odisha [Implementing Agency: MECL].

a. The project of Biarpalli (G2) Manganese Block, District- Bolangir, Odisha was approved in 10th EC meeting held on 30.10.2018 with estimated cost of Rs. 357.35 Lakh.

b. MECL has conveyed that the additional Manganese lenses and mineralised zones have been recorded in the area owing which additional samples have been taken for analyses. The details of additional samples and cost are given at **Annexure-VI.**

The committee approved the additional cost of Rs. 17.14 Lakh including GST for additional chemical sampling in Biarpalli (G2) Manganese Block, District- Bolangir, Odisha.

27.2.3: Additional chemical sampling and analysis in Dungripalli Manganese Block (G3), Balangir, Odisha [Implementing Agency: MECL].

a. The project of Dunguripalli Manganese (G3) Block, District- Bolangir, Odisha was approved in 14th EC meeting held on 9th September 2019 at an estimated cost of Rs. 157.30 Lakh.

b. MECL has conveyed that the increased mineralised zones have been recorded in some of the boreholes whereas reduced mineralised zones have been recorded in some of the boreholes. The resultant increase in total samples of mineralised zones have been recorded in the area. In view of the additional samples the additional chemical analysis has been done. The details are given at **Annexure-VII.**

27/10/2021

27/01/21

The committee approved the additional cost of Rs. 1.19 Lakh including GST for additional chemical samples in Dunguripalli Manganese (G3) Block, District- Bolangir, Odisha.

27.2.4: Review of the Geophysical survey works carried out in Antapali (G4) manganese Block, Balangir, Odisha [Implementing Agency: MECL].

a. The project was approved in 17th EC meeting held on 01.11.2020 with estimated cost of Rs. 155.77 Lakh.

b. MECL informed that geophysical work has been completed and mineralized zone is paramagnetic in nature which responds to Pyrolusite and Psilomelane.

c. On the basis of the geophysical survey work, MECL proposed 5 boreholes with tentative depth from 50 to 80m.

The committee agreed with the proposal to drill 5 BHs in mineralised zone.

27.3: Review of geological reports of completed projects

27.3.1: Geological report on Reconnaissance Survey (G4) for gold and nickel in Udbur Block, District- Mysore, Karnataka [Implementing Agency: KIOCL].

a. The geological report and outcomes for Gold and Nickel exploration in Udbur Block, District- Mysore, Kamataka have been reviewed by the Committee.

b. KIOCL has conveyed that all the assigned targets have been successfully achieved as per the geoscientific requirement of the project.

c. KIOCL informed that cost for peer review of the geological report was not included in approved cost of the project and the approval of Rs. 11,800/- (including GST) is required.

d. Against the preapproved quantity of 05 nos. of PGE sample analysis with Rs. 65,136/- (including GST), KIOCL has carried out PGE analysis of 09 nos. of samples with Rs. 70,045/- (including GST), approval is required for additional 04 nos. of samples with estimated cost of Rs. 4,909/- (including GST).

e. It was also informed that unutilized fund [Rs. 55,705/- against approved cost of Rs.1,73,460/-] of approved SEM studies is available.

The Committee noted the outcome of project and suggested to submit the report to NMET Secretariat. The Committee approved the cost of Rs. 16,709/- inclusive of GST [Rs. 11,800/- + Rs. 4,909/-].

27.3.2: Geological Report on Reconnaissance Survey (G4) for limestone in Jeteya Block, Buruborta and Dumurjowa, District- West Singbhum, Jharkhand [Implementing Agency: TSMDC].

27/01/2021

27/01/21

a. The geological report for limestone exploration in Jeteya Block, Buruborta and Dumurjowa, District- West Singbhum, Jharkhand has been reviewed by the committee.

b. TSMDC has conveyed that an area of 100 Sq. Km covering Jeteya, Burubota and Dumurjowa area, West Singhbhum District, Jharkhand state have been taken for G4 stage limestone exploration.

c. It has been conveyed that as part of stage-I studies, geological mapping has been carried out on 1:12,500 scale using remote sensing studies coupled with field verification. TSMDC conveyed that the area is either covered with settlements or lakes, however, some samples have been collected and analysed.

d. TSMDC has submitted that there is local social problem is persistent in the area and no further exploration can be carried out.

e. From the details furnished by the TSMDC, the committee observed that it is impractical that no surface exposures have been observed by the field geologist in a 100 sq km area. Committee feels that the implementing agency has not carried out exploration work with full dedication.

The Committee suggested that a short note on work carried out and significant outcomes may be submitted to NMET to evaluate the work carried out by TSMDC in the said project.

27.3.3: Geological Report on Reconnaissance Survey (G4) for limestone in Gupteswar Block, District- Koraput, Odisha [Implementing Agency: TSMDC].

a. The geological report for limestone exploration in Gupteswar Block, District-Koraput, Odisha has been reviewed by the committee. It has been conveyed that the assigned targets have been successfully achieved.

b. TSMDC has conveyed that an area of 100 Sq Km covering Gupteswar area, District-Koraput, Odisha state have been taken for G4 stage limestone exploration.

c. It has been conveyed that the remote sensing studies, geological mapping, surface and bedrock sampling, pitting and trenching, and core sampling followed by chemical analysis was carried out and the samples were sent to NABL accredited Bhagavathi ana labs for analysis. Petrographic studies and drilling of 160 m were also carried out.

d. TSMDC has conveyed that no further stage of work has been recommended in the area due to poor quality of limestone, dolomite and local law and order issue.

The Committee noted the outcome of project and suggested to submit the report to NMET Secretariat.

27.4: The meeting ended with vote of thanks by Director and Member Secretary, TCC, NMET.

27/01/2021

27/01/21

List of TCC members attended 27th Technical-cum-Cost Committee (TCC) meeting of NMET held on 07th and 08th January, 2021 and extended TCC meetings on 12th and 27th January, 2021 through videoconferencing at Geological Survey of India, DGCO, A-II Pushpa Bhawan, New Delhi

S. No.	Name/Designation	Status	Remarks
1	Shri Janardan Prasad, ADG & HoD, SR, GSI, Hyderabad	Chairman, TCC, NMET	Attended via videoconference
2	Shri Ranjan Kumar Sinha, Controller General (Retd.) Indian Bureau of Mines, Noida	TCC Member	Attended via videoconference [on 12th and 27th January, 2021]
3	Shri P. Taraldar, Dy. Director General (Retd.) Geological Survey of India, Kolkata	TCC Member	Attended via videoconference
4	Dr. Manoranjan Mohanty, Dy. Director General (Retd.) Geological Survey of India, Bhubaneshwar	TCC Member	Attended via videoconference
5	Shri Naeem Ahmad, General Manager-Exploration (Retd.), CMPDI Ltd., Aligarh	TCC Member	Attended via videoconference
6	Dr. Anjani Kumar, Dy. General Manager (Exploration) & HoD-Planning (Retd.), MECL, Nagpur	TCC Member	Attended via videoconference [on 07th, 08th and 12th January, 2021]
7	Shri J. V. Ramarao, Dy. Director General (GP) [Retd.], Geological Survey of India, Hyderabad	TCC Member	Attended via videoconference
8	Dr. L. P. Singh, Director, Geological Survey of India, DGCO, New Delhi	Member Secretary, TCC, NMET	Attended in person
9	Shri Amit Saran, Director, NMET, MoM	TCC Member	Attended via videoconference
10	Shri Ravi Kumar Gupta, Deputy General Manager (Finance), HCL, Kolkata	TCC Member	Attended via videoconference [on 07th, 08th and 27th January, 2021]
11	Shri P. K. Maharana, Dy. General Manager (Finance), NALCO, Bhubaneshwar	TCC Member	Attended via videoconference [on 07th, 08th and 12th January, 2021]
12	Shri Vinay Pal, Assistant Cost Account Officer (Finance), Geological Survey of India, DGCO, New Delhi	TCC Member	Attended in person

27/01/2021

27/01/21

Annexure-I

List of participants attended 27th Technical-cum-Cost Committee (TCC) meeting of NMET held on 07th and 08th January, 2021 and extended TCC meetings on 12th and 27th January, 2021 through videoconferencing at Geological Survey of India, DGCO, A-II Pushpa Bhawan, New Delhi

S. No.	Name/Designation	Email ID	Contact No	Organisation
1	Shri Janardan Prasad, ADG & HoD, SR, GSI, Hyderabad	janardan.prasad@gsi.gov.in	7763800768	Chairman, TCC
2	Shri Ranjan Kumar Sinha, Controller General (Retd.) IBM, Noida	sinhark57@rediffmail.com	9421777637	Member, TCC
3	Shri Pradipta Tarafdar, DDG (Retd.) GSI, Kolkata	tarafdar.pradipta@gmail.com	9503088847	Member, TCC
4	Shri Manoranjan Mohanty, DDG (Retd.) GSI, Bhubaneshwar	manoranjanmoha@gmail.com	9483511287 8249014425	Member, TCC
5	Shri J. V. Ramarao, DDG (GP) (Retd.) GSI, Hyderabad	rarajammi@gmail.com	9440691284	Member, TCC
6	Shri Anjani Kumar, (Retd.), MECL, Nagpur	anjanikumar1957.ak@gmail.com	9975350576	Member, TCC
7	Shri Naeem Ahmed, (Retd.), CMPDI, Aligarh	ahmadnaeem17@yahoo.co.in	8588092153	Member, TCC
8	Shri Amit Saran, Director & HoD, NMET	amit.saran@nic.in	9717647259	Member, TCC
9	Dr. L. P. Singh, Director, GSI, New Delhi	nmet-tcc@gov.in	9490748249	Member Secretary, TCC
10	Shri Ravi Kumar Gupta, DGM (F), HCL, Kolkata	ravi_g@hindustancopper.com	9433274328	Member, TCC
11	Shri P. K. Maharana, DGM (F), NALCO, Bhubaneshwar	pmaharana@rediffmail.com	8500669500	Member, TCC
12	Shri Vinay Pal, ACAO, GSI, New Delhi	palvinay009@gmail.com	8527368161	Member, TCC
	Shri R. S. Gharkhal, ADG	adgpss@gsi.gov.in		PSS, Kolkata
13	Shri Hemraj Suryawanshi, Dy.DG (G)	hodm2gsi@gmail.com	9425603674	NMH-II, GSI, Nagpur
14	Dr. B. K. Sahu, Dy.DG (G)	b.sahu@gsi.gov.in	9437588989	RSAS, Bengaluru
15	Shri Rajinder Kumar, Dy.DG (G)	nmh1a@gsi.gov.in	9313502359	National Mission-1A, Kolkata
16	Shri Sanjaya Kumar Dash, Director (G)	nmh1a@gsi.gov.in	9494235181	National Mission-1A, Kolkata
17	Dr. Pankaj Mala Bhattacharya, Director (Geophysics)	nmh1a@gsi.gov.in		National Mission-1A, Kolkata
18	Shri P. C. Das, Director (GP)	rsasddggp@gmail.com	9483623603	RSAS, Bengaluru
19	Dr. Deshraj Trivedi, Senior Geologist	nmet-tcc@gov.in	9419244294	NMET
20	Shri Subhash Kumar, Senior Geologist	nmet-mines@gov.in	9868302624	NMET
21	Shri B. P. Raturi, GM, (Exploration)	bpraturi100@gmail.com	9422806417	MECL, Nagpur
22	Shri Sharad Sinha	sharaddgmjhar@gmail.com	9470130780	DGM, Jharkhand
23	Mr. Kailash Dongre, Joint Director (Geology)	kailashdongre.kd@gmail.com	9424282791	DGM, Chhattisgarh
24	Shri Shiva Kumar M, SM (ME)	bmed@kioclltd.com	9481444686	KIOCL, Bengaluru
25	Shri Rajasekhar Reddy	tsmdcltd@gmail.com	8008558580	TSMDC, Hyderabad

Annexure-IIA

Estimate cost for General Exploration (G2) for Copper, Nickel, Cobalt in Mundadevta-Darkhuli-South Jharia Copper Block, Singhbhum Copper Belt, East Singhbhum District, Jharkhand.
[Total block area- 2.13 sq. km; Nos. of Borehole- 23; Borehole depth range- 125m to 310m; Schedule Timeline- 18 Months]

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21			Estimated Cost of the Proposal	Remarks
			SoC- Item-S. No.	Rates as per SoC	Qty.	Total Amount (Rs.)	
A	GEOLOGICAL WORK						
1	**Borehole Logging, Sampling and Report Writing**						
a	Charges for one Geologist per day at HQ	day	1.3	9,000	120	10,80,000	
b	Charges for one Geologist per day at field	day	1.3	11,000	420	46,20,000	
c	Labour (2 Nos) Base rate - Rs.420 X 2 = 840	day	5.7	840	420	3,52,800	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
2	**Survey (1:2000 Scale)**						
a	Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes by DGPS	Per Point of observation	1.6.2	19,200	23	4,41,600	
b	Charges of one Surveyor (1 Party)	one surveyor per day	1.6.1a	8,300	90	7,47,000	
c	Labours (4 Nos) Base rate - Rs. 420*4=1680/-	day	5.7	1,680	90	1,51,200	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
d	Charges for one Sampler per day (1 Party)	one sampler per day	1.5.2	5,100	390	19,89,000	
e	Labours (4 Nos.) Base rate - Rs. 420 x 4 = 1680/-	day	5.7	1,680	390	6,55,200	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
					Sub Total- A	**1,00,36,800**	

B	Borehole Geophysical Logging/Ore Modelling						
1	Base log	Per m	3.11a	151	4,935	7,45,185	
2	Induced Polarization (I.P)	Per m	3.11p	93	4,935	4,58,955	
3	Resistivity	Per m	3.11c	39	4,935	1,92,465	
4	SP	Per m	3.11b	39	4,935	1,92,465	
5	Spectral Gamma	Per m	3.11o	164	4,935	8,09,340	
					Sub Total- B	23,98,410	
C	DRILLING						
1	Drilling up to 300m (Hard Rock)	m	2.2.1.4a	11,500	4,935	5,67,52,500	
2	Borehole deviation Survey by Multi-shot Camera	m	2.2.6	330	4,935	16,28,550	
3	Land / Crop Compensation (in case the BH falls in agricultural Land)	per BH	5.6	20,000	23	4,60,000	Amount will be reimbursing as per actuals or max. Rs. 20000 per BH with certification from local authorities.
4	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	23	46,000	
5	Transportation of Drill Rig & Truck associated per drill (2 rigs)	Km	2.2.8	36	4,000	1,44,000	certification in this regard is required to be provided.
6	Monthly Accommodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	14	7,00,000	
7	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	2	5,00,000	
8	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	2	5,00,000	
9	Road Making (Flat Terrain)	Km	2.2.10a	22,020	15	3,30,300	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.
10	DGPS Survey for block boundary	per point	1.6.2	19,200	20	3,84,000	will be reimbursed for actual points observation for block boundary.
11	Drill Core Preservation	per m	5.3	1,590	1000.00	15,90,000	This amount will be reimbursed after successful delivery of the cores to concerned libraries/authorities.
					Sub Total- C	6,30,35,350	
D	LABORATORY STUDIES						
1	Chemical Analysis						
i)	Primary samples						

	a. for Cu, Ni, Mo, Co	Nos	4.1.7a	2,506	700	17,54,200	
	b. Au by Fire Assay	Nos	4.1.5a	2,380	100	2,38,000	
ii)	**Check samples Internal (5%)**						
	a. for Cu, Ni, Mo, Co	Nos	4.1.7a	2,506	35	87,710	
	b) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	5	11,900	
iii)	**Check samples External (10%)**						
	a. for Cu, Ni, Mo, Co	Nos	4.1.7a	2,506	70	1,75,420	
	b) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	10	23,800	
iii)	**Composite Samples**						
	a) For 5 Radicals (Cu, Ni, Co , W Mo)	Nos	4.1.7a	2,506	100	2,50,600	
	b) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	100	2,38,000	
	c) ICP-MS (34 Elements)	Nos	4.1.14	7,731	10	77,310	
	d) XRD	Nos	4.5.1	4,000	-	-	
	e) Geo-Technical Sample	Nos	N.A	14,663	25	3,66,575	will be reimbursed as per actual
	c) Beneficiation Study *	Nos	4.7.2 as per IBM Rate	283,927	2	5,67,854	will be reimbursed as per IBM rates.
					Sub Total- D	**37,91,369**	
E	**Petrological samples (Surface and Bhs Core Samples)**						
i	Preparation of thin section	Nos	4.3.1	2,353	25	58,825	
ii	Study of Thin Section	Nos	4.3.4	4,232	25	1,05,800	
					Sub Total- E	**1,64,625**	
F	**Mineragraphic Studies (Surface and Bhs Core Samples)**						
a	Preparation of polished section	Nos	4.3.2	1,549	25	38,725	
b	Study of Polished Section	Nos	4.3.4	4,232	25	1,05,800	
c	Digital Photographs	Nos	4.3.7	280	25	7,000	
					Sub Total- F	**1,51,525**	
G	**Specific Gravity Determination**						
	Specific Gravity Determination	No.	4.8.1	1,605	25	40,125	
					Sub Total- G	**40,125**	
H				**Total [A + B + C + D + E + F +G]**		**79,618,204**	
I	**Geological Report Preparation**	**5 Hard copies with a soft copy**	**5.2**	**For the projects having cost more than Rs. 300 lakhs - A minimum of Rs. 9 lakhs or 3%**		**20,00,000**	

				of the value of work whichever is more subject to Max. Rs. 20 lakhs			
J	Peer review Charges		As per EC decision			10,000	
K	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	5 Hard copies with a soft copy	5.1	2% of the Cost or Rs. 3.8 Lakhs whichever is lower		3,80,000	EA has to submit the Hard Copies and the soft copy of the final proposal along with Maps and Plan as suggested by the TCC-NMET in its meeting while clearing the proposal.
L	Total Estimated Cost without GST					8,20,08,204	
M	Provision for GST (18% of L)	%				1,47,61,477	GST will be reimburse as per actual and as per notified prescribed rate.
N				Total Estimated Cost with GST		9,67,69,681	
							or Say Rs. 967.70 Lakhs

Note- If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 3 of NMET SoC and Item no. 6 of NMET SoC. In case of execution of the project by NEA on its own, a Certificate regarding non outsourcing of any component/project is required.

Annexure-IIB

Time Schedule/Action plan for General Exploration (G2) for Copper, Nickel, Cobalt in Mundadevta-Darkhuli-South Jharia Copper Block, Singhbhum Copper Belt, East Singhbhum District, Jharkhand.

Sl. No.	Activities	Unit	Months																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Camp Setting	Month																		
2	Core Drilling (2 rigs)	m.																		
3	Borehole Geophysical Studies	m.																		
4	Survey Party days	day																		
5	Geologist Party days (1 Party)	day																		
6	Sampling Party days, Core Sampling (1 Party)	day																		
7	Camp Winding	Month																		
8	Laboratory Studies	Nos.																		
9	Geologist Party days (1 Party), HQ	day																		
10	Report Writing	Month																		

NOTE	
1	Commencement of project may be reckoned from the day the exploration acreage is available along with all statutory clearances.
2	Time loss on account of monsoon/agricultural activity/forest clearance/local law & order problem/lockdown etc. will be additional to above time line.

Details of the 23 Boreholes plan

Cross Section	BH. No.	Inclination	Bearing	Proposed Depth (m)	Up to 300	Remarks
MD 3-3'	PBH-04	50	270	270	270	
MD 4-4'	PBH-07	55	270	200	200	
MD 7-7'	PBH-13	55	270	230	230	
	PBH-14	55	270	300	300	May be drilled to intersect lode 3 at -50 MRL, may extend upto further if lode 1/1FW positively intersected in PBH 13.
MD 9-9'	PBH-17	50	270	215	215	To intersect target Lode 3FW.
MD 11-11'	PBH-20	50	270	150	150	
	PBH-21	50	270	220	220	To intersect target Lode 3 at -50 MRL.
MD 13-13'	PBH-23	50	260	230	230	To intersect target Lode 3 at -50 MRL.
MD 16-16'	PBH-25	55	202	200	200	
	PBH-26	65	202	175	175	To intersect LODE 4 at -50 mRL
MD 19-19'	PBH-28	55	130	250	250	
MD 21-21'	PBH-32	50	130	280	280	To intersect target Lode 2 at -100 MRL.
MD 22-22'	PBH-34	55	130	300	300	To intersect LODE 4 at 00 mRL
MD 23-23'	PBH-36	55	130	260	260	
SJ 3-3'	PBH-41	50	290	190	190	
SJ 4-4'	PBH-44	50	290	280	280	
SJ 5-5'	PBH-46	55	290	185	185	
SJ 7-7'	PBH-50	50	290	125	125	
	PBH-52	55	290	250	250	Conditional if Lode 1 found positive in PBH-50.
SJ 8-8'	PBH-54	50	270	130	130	
	PBH-55	55	270	190	190	Conditional if Lode 1 found positive in PBH-54.
SJ 9-9'	PBH-57	50	260	125	125	
	PBH-58	55	260	180	180	Conditional if Lode 1 found positive in PBH-57.
			Total	4935	4935	

Annexure-IIIA

Estimated cost for General Exploration (G2) for Limestone in Reddipalaiyam amalgamated limestone block, District- Ariyalur, Tamil Nadu.
[Total block area- 0.8655 sq km; Nos. of Borehole- 9; Borehole depth range- 60m to 80m; Schedule Timeline- 8 Months]

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21				
			SoC Item S. No	Unit Price	Qty.	Total Price	
(a)	(b)	(c)	(d)	(e)	(f)	(g)=(e)*(f)	
1	**GEOLOGICAL WORK**						
1.1	Geologist Party days - Field	days	1.3	11,000	100	11,00,000	
1.2	Geologist Party days - HQrs	days	1.3	9,000	20	1,80,000	
1.3	Semi-skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)	days	5.7	1,390	100	1,39,000	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
2	**SURVEY WORKS**						
2.1	Survey Party Days	One surveyor per day	1.6.1a	8,300	90	7,47,000	
2.2	Semi-skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)	days	5.7	1,390	180	2,50,200	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
3	**DRILLING**						
3.1	Surface Drilling (01 Rig)	m.	2.2.1.1b	5,242	720	37,74,240	
3.2	Land / Crop compensation	per BH	5.6	20,000	9	1,80,000	Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities.
3.3	Construction of concrete pillar (12" X 12"X 30")	per BH	2.2.7a	2,000	9	18,000	
3.4	Transportation of drill rig & Truck associated per drill (To & from Headquarter/ Previous drill site) (01 Rig for 800 km - One way)	Km.	2.2.8	36	1,600	57,600	Certificate in this regard is required.
3.5	Monthly Accommodation charges for drilling camp	Monthly basis	2.2.9	50,000	3	1,50,000	
3.6	Camp Setting Cost	Nos.	2.2.9a	250,000	1	2,50,000	
3.7	Camp winding up Cost	Nos.	2.2.9b	250,000	1	2,50,000	
3.8	Road Making (Flat Terrain)	Km	2.2.10a	22,020	4	88,080	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.
3.9	Drill core preservation	per m	5.3	1,590	720	11,44,800	
4	**PITTING WORKS FOR INSITU BULK DENSITY**						

4.1	Pitting	cum	2.1.2	3,800	10	38,000	
5	**SAMPLING WORKS**						
5.1	Charges for one Sampler per day (1 party)	One sampler per day	1.5.2	5,100	70	3,57,000	
5.2	Semi-skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)	days	5.7	1,390	70	97,300	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
6	**LABORATORY STUDIES**						
6.1	Primary analysis for 06 radicals (CaO,MgO,SiO2,Al2O3,Fe2O3 & LOI)	Nos	4.1.7 a & b	2,841	650	18,46,650	
6.2	Internal Check sample analysis for 06 radicals - 5%	Nos	4.1.7 a & b	2,841	34	96,594	
6.3	Composite sample analysis for 13 radicals - 10% (CaO,MgO,SiO2,Al2O3,Fe2O3, LOI, TiO2, R2O(Na2O & K2O),SO3,P2O5,Cr2O3 and Acid Insoluables)	Nos	4.1.7 a & b	5,186	65	3,37,090	
6.4	External Check (NABL) samples analysis for 06 radicals - 10%	Nos	4.1.7 a & b	2,841	65	1,84,665	
6.5	Moisture absorption & Specific Gravity determination	Nos	4.8.1	1,605	5	8,025	
				Sub Total- A (S. No.1+2+3+4+5+6)		1,12,94,244	
7	GEOLOGICAL REPORT PREPARATION (@ 5%)		5.2			5,64,712	
8	PREPARATION OF EXPLORATION PROPOSAL (@ 2%)		5.1			2,25,885	EA has to submit five Hard Copies and the soft copy of the final proposal along with Maps and Plan as suggested by the TCC-NMET in its meeting while clearing the proposal.
9	External peer review of Geological Report		As per decision of EC			10,000	
				Sub Total- B (S. No.7+8+9)		8,00,597	
10				Total (1 to 9)		1,20,94,841	
11	GST 18%					21,77,071	
12	Grand Total (with GST 18%)					1,42,71,912	GST will be reimburse as per actual and as per notified prescribed rate.
							or say Rs. 142.72 Lakhs

Note- If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 3 of NMET SoC and Item no. 6 of NMET SoC. In case of execution of the project by NEA on its own, a Certificate regarding non outsourcing of any component/project is required.

Annexure-IIIB

S. No.	Activities	Unit/ Month	Months (2021-2022)							
			1	2	3	4	5	6	7	8
1	Camp Setting									
2	Detailed Geological Mapping									
2.1	Geologist Party days (2 Party)									
2.2	Survey Party days (1 Party)									
2.3	Sampling Party days, Core Sampling (1 party)									
2.4	Laboratory Studies									
3	Drilling (1 rig) 720m									
3.1	Geologist Party days (1 Party)									
3.2	Core Sampling (1 party)									
3.3	Survey Party days (1 Party)									
3.4	Laboratory Studies									
4	Camp Winding									
5	Geological Report Writing									

Note:

1. Commencement of project may be reckoned from the day the exploration acreage is available along with all statutory clearances.
2. Time loss on account of monsoon/agricultural activity/forest clearance/local law & order problem may be additional to above time line subject to the approval of time line by EC.

Annexure-IVA

Estimated cost for Reconnaissance Survey (G4) for Kyanite in Kallahalli Kyanite block, District- Mysore, Karnataka.
[Total block area- 26.67 sq km; Nos. of Borehole- 5 Bhs; Borehole depth range- 100m to 150m; Schedule Timeline- 12 Months]

S. No.	Item of Work		Unit	SOC Item No	Qty	Unit Prices as per SOC	Departmental execution Amount (Rs)		
1	AERO GEOPHYSICAL DATA INTERPRETATION								
1.1	Geological mandays for aerogeophysical data interpretation		days	1.1 (b)	5	9,000	45,000	**45,000**	
2	LARGE SCALE GEOLOGICAL MAPPING WORKS (1:12500 scale: 26.67 sq km)								
2.1	Geologist Party days (1 party)	FIELD	days	1.2	120	₹ 11,000	13,20,000	**22,01,300**	
		HQ		1.2	30	9,000	2,70,000		
2.2	Semi-skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)		days	5.7	60	1,390	83,400		Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
3	PITTING WORKS								
3.1	Pitting works		cum	2.1.2	100	3,800	3,80,000		
3.2	Pitting for Insitu Bulk Density		cum	2.1.2	10	3,800	38,000		
4	SURVEY WORKS								
4.1	Fixation of borehole and determination of Co-ordinates and RL by DGPS		days	1.6.2	5	19,200	96,000		
4.2	Semi-skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)		days	5.7	10	1,390	13,900		Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
5	DRILLING								
5.1	Surface Drilling (02 rigs)		m.	2.2.1.4a	750	11,500	86,25,000	**1,03,59,450**	
5.2	Transportation of drill rigs (02 units x 800 km)		Km.	2.2.8	1,600	36.0	57,600		
5.3	Drilling camp setting cost		per drill	2.2.9a	2	250,000	5,00,000		
5.4	Monthly accomadation charges for drilling camp		monthly basis	2.2.9	3	50,000	1,50,000		
5.5	Drilling camp winding cost		per drill	2.2.9b	2	250,000	5,00,000		
5.6	Approach road making for Rugged - Hilly terrain		Km	2.2.10b	3	32,200	96,600		Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.

5.7	Construction of Concrete pillar (12"X 12"X30")		per borehole	2.2.7a	5	2,000	10,000		
5.8	Borehole plugging by cement		per m	2.2.7b	15	150	2,250		
5.9	Land/Crop compensation		per borehole	5.6	5	20,000	1,00,000		Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities.
5.10	Drill Core preservation		per m	5.3	200	1,590.0	3,18,000		This amount will be reimbursed after successful delivery of the cores to concerned core libraries/authorities
6	LABORATORY STUDIES								
6.1	Sample processing works (875 nos)	Sampler charges	days	1.5.2	45	5,100	2,29,500	2,71,200	
6.2		Semi skilled labours	days	5.7	30	1,390	41,700		Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher.
6.3	Analysis of alumino-silicate rock (Silimanite / Kyanite)	Primary	per sample	4.1.2	200	8,796	17,59,200	21,99,000	
		Internal Check (5%)		4.1.2	10	8,796	87,960		
		Composite (10%)		4.1.2	20	8,796	1,75,920		
		External Check (10%)		4.1.2	20	8,796	1,75,920		
6.4	Insitue Bulk Density		nos	4.10	10	3,540	35,400	35,400	
6.5	Petro studies	Preparation of Polished Section	nos	4.3.1	10	2,353	23,530	65,850	
		Complete Petrological Report of rock sample	nos	4.3.4	10	4,232	42,320		
7						Sub Total (S. No.1 to 6)		1,51,77,200	1,51,77,200	
8	**Preparation of Exploration Proposal (5 Hard copies with a soft copy**		5 Hard copies with a soft copy	5.1		2% of the Cost or Rs. 3.8 Lakhs whichever is lower	3,03,544	3,03,544	EA has to submit the Hard Copies and the soft copy of the final proposal along with Maps and Plan as suggested by the TCC-NMET in its meeting while clearing the proposal.

9	GEOLOGICAL REPORT PREPARATION	5 Hard copies with a soft copy	5.2 (iii)		For the projects having cost more than Rs. 150 lakhs but less than Rs 300 Lakhs- A minimum of Rs. 7.5 lakhs or 3% of the value of work whichever is more	7,50,000	7,50,000	
10	Peer review of reports						10,000	
11						Total (1 to 7)	1,62,40,744	
12	GST 18%						29,23,334	GST will be reimburse as per actual and as per notified prescribed rate.
13						Grand Total (with GST 18%)	1,91,64,078	
								or Say Rs. 191.64 Lakhs

Note - If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 3 of NMET SoC and Item no. 6 of NMET SoC. In case of execution of the project by NEA on its own, a Certificate regarding non outsourcing of any component/project is required.

Annexure-IVB

S. No.	Details of Works	1	2	3	4	5	6	7	8	9	10	11	12
1	CAMP SETTING												
2	LARGE SCALE GEOLOGICAL MAPPING (Includes 26.67 sq km of LSM + 100 nos of BRS + 100 cum Pitting/ Trenching + Insitue BD test 10 cum)												
	2.1 Geologist Party days (01 Party)												
	2.2 Survey Party days (01 Party)												
	2.3 Laboratory Works												
3	Ground Geophysics works (02 party)												
	3.1 Survey Party days for Ground Geophysics												
4	Survey Works												
	4.1 Survey party days fir DGPS survey (10 pts)- 01 party												
5	Surface Drilling (02 rigs)												
	5.1 Geologist Party days (01 Party)												
	5.2 Core sampling Party days (01 Party)												
	5.3 Laboratory Works												
6	Camp Winding												
7	Preparation of Reports and Maps												

Annexure-V

S. No.	Item of Work	Unit	Base	Financial Year (2019-20)				
			Rate 1.4.90	Esc. Rate (2018-19) Rs.	Approved Qty. (in Meter)	Actual Qty. (in Meter)	Additional Qty. (in Meter)	Additional Amount (In Rs)
1	Surface Drilling (2 Rigs)	m	1,174.00	7,427.00	630.00	**711.50**	81.50	₹ 6,05,300.50
2	GI Core boxes	Nos		2,000.00	90.00	**165.00**	75.00	₹ 1,50,000.00
3	Composite samples for 12 radicals (CaO, MgO, Al_2O_3, SiO_2, Fe_2O_3, SO_3, P_2O_5, LOI, MnO_2, K_2O, Na_2O and Cl.)	Nos	**946 (76x11+110)**	5,478.00	35.00	**50.00**	15.00	₹ 82,170.00
							GST-18%	₹ 1,50,744.69
							Additional Cost	₹ 9,88,215.19

Annexure-VI

Biarpalli manganese (G2) Block, District- Balangir, Odisha

S. No.	Item of Work	Unit	Base	Financial Year (2019-20)				
			Rate 1.4.90	Esc. Rate (2018-19) Rs.	Qty.	Actual/ Expected Qty.	Additional Qty.	Additional Amount (in Rs)
1 Chemical Analysis								
(i) Primary & Check samples								
	a. Primary Samples For 6 radical (Mn, SiO_2, P_2O_5, Fe_2O_3, MnO_2 and Insolubles)	Nos	490 (110 +76x5)	2670	800	1260	**460.00**	**12,28,200.00**
	b) Check Samples for 6 radical (Mn, SiO_2, $P2O_5$, Fe_2O_3, MnO_2 and Insolubles)	Nos	490 (110 +76x5)	2670	40	60	**20.00**	**53,400.00**
	d) External Check Samples from NABL Labs for 6 radical (Mn, SiO_2, P_2O_5, Fe_2O_3, MnO_2 and Insolubles)	Nos	490 (110 +76x5)	2670	80	120	**40.00**	**1,06,800.00**
(ii) Composite Samples								
	a) Composite Samples for 6 Radicals (Mn, SiO_2, P_2O_5, Fe_2O_3, MnO_2 and Insolubles).	Nos	490 (110 +76x5)	2670	80	93	**13.00**	**34,710.00**
2	For Graphite Samples (Proximate)	Nos.		3000	0	10	**10.00**	**30,000**
								14,53,110
							GST -18%	2,61,560
							Total	17,14,670

Annexure-VII

Dungripalli manganese (G3) Block, District- Balangir, Odisha								
S. No.	Item of Work	Unit	Base	Financial Year (2019-20)				
			Rate 1.4.90	Esc. Rate (2018-19) Rs.	Qty.	Actual/ Expected Qty.	Additional Qty.	Additional Amount
Chemical Analysis								
(i)	Primary & Check samples							
	a. Primary Samples For 6 radical (Mn, SiO_2, P_2O_5, Fe_2O_3, MnO_2 and Insolubles)	Nos	490 (110 +76x5)	2670	250	283	33.00	88,110
	b) Check Samples for 6 radical (Mn, SiO_2, $P2O_5$, Fe_2O_3, MnO_2 and Insolubles)	Nos	490 (110 +76x5)	2670	15	17	2.00	5,340
	d) External Check Samples from NABL Labs for 6 radical (Mn, SiO_2, P_2O_5, Fe_2O_3, MnO_2 and Insolubles)	Nos	490 (110 +76x5)	2670	25	28	3.00	8,010
(ii)	Composite Samples							
	a) Composite Samples for 6 Radicals (Mn, SiO_2, P_2O_5, Fe_2O_3, MnO_2 and Insolubles).	Nos	490 (110 +76x5)	2670	50	50	-	-
								101,460
							GST -18%	18,263
							Total	119,723

****