Ministry of Mines
National Mineral Exploration Trust

Minutes of the 41st Technical-cum-Cost Committee (TCC) meeting held on 30th and 31st May, 2022 through video conferencing at Aluminium Hall, Ministry of Mines, Shastri Bhawan, New Delhi

The 41st Technical-cum-Cost Committee [TCC] meeting 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 30th and 31st May, 2022 at Aluminium Hall, Ministry of Mines, Shastri Bhawan, New Delhi through video conferencing. The TCC members and representatives of Exploration Agencies [EAs] participated through their respective VC nodes. The list of participants is in **annexure-1**.

Shri Suresh Chander, Director, GSI and Member Secretary, TCC NMET, welcomed Shri Janardan Prasad, ADG, GSI & Chairman, TCC; Shri Vivek Kumar Sharma, Director & HoD, NMET; Members of the TCC and participants representing various EAs. He conveyed that total 18 new project proposals have been received from different EAs for technical evaluation of the committee. Out of 18 projects, 16 projects were for mineral exploration and 2 projects for financial assistance for procurement of machinery/equipment/chemical analysis instruments.

Shri Janardan Prasad, ADG, GSI, and Chairman, TCC also welcomed the TCC members and other participants from various EAs. The proceeding of the meeting was initiated as per the circulated agenda.

Agenda-wise discussions are summarised as follows.

41.1: Technical evaluation of new project proposals:

41.1.1. Deepseated mineral prognosis by geophysical techniques: Lithospheric structure and relationship with kimberlite clusters of Kalyandurg- Timmasamudram-Chigicherla, District: Anantapur, Andhra Pradesh. [Implementing Agency: GSI]

a) The Kalyandurg-Timmasamudram-Chigicherla (KTC) block comprises three kimberlite clusters some of them are diamondiferous whereas gold mineralization is reported from Ramagiri-Penakacherla Schist belt.

b) Geologically the area is predominantly occupied by the granites and gneiss of Peninsular Gneissic Complex of Archaean age and gold bearing Ramagiri-Penakacherla Schist Belt comprising of meta sediments, meta basics, meta basalt, amphibolite, biotite schist, meta basic dykes, migmatite aligned in NNW-SSE to N-S direction with steep dips.

c) The proposal is aimed to understand the deep crustal nature and structural features with integrated geophysical surveys which may facilitate as conduits for mineralization and associated weak zones for emplacement of Kimberlite pipes. The objectives are (i) to decipher the mantle heterogeneities to understand the physicochemical architecture of the

subcontinental lithospheric mantle and its bearing on diamond genesis and stability based on kimberlites and their entrained xenoliths, xenocrysts including diamonds (ii) to generate comprehensive genetic model for the gold and associated basemetal mineralization in and around Ramagiri schist belt by deploying detailed geophysical, geological, petrological, geochemical and isotopic studies.

d) GSI has proposed to deploy integrated geophysical methods such as Audio Magnetotellurics, Controlled Source Magnetotellurics, long period Magnetotellurics, Gravity, Magnetics, over the identified KTC block cutting across Kalyandurg, Timmasamudram and Chigicherla Kimberlite clusters.

e) It has been submitted that the available NGPM data and detailed geophysical data over Timmasamudram cluster have been interpreted and two potential blocks have been identified viz., (i) Palacherla- Chigicherla and (ii) Perur-Ramagiri block. These identified potential zones will be covered by detailed gravity and magnetic / radiometric surveys along with ground follow-ups.

f) The project proposal was discussed in 23rd TCC meeting held on 12th and 13th February, 2020 wherein it was suggested by the Committee that the funding mechanism for such projects is to be decided by the Executive committee in its next meeting.

g) Accordingly, EC in its 16th meeting held on 25th February, 2020 agreed upon the funding of collaborative projects being implemented by GSI in collaboration with National Research Institute based on specific themes for mineral exploration after signing MoU. It was further decided that the cost of the work components which are not mentioned in SoC, NMET will reimburse the amount on actual basis and cost of such work components have to be certified from the Head of the Institute with whom MoU is signed.

h) Keping the decision of EC in view, now GSI has submitted the project proposal for deepseated mineral prognosis by geophysical techniques after signing MoU with CSIR-National Geophysical Research Institute, Hyderabad with an estimated cost of ₹2,59,97,760/- and a timeline for 36 months.

i) Based on deliberations, the Committee opined that as the consent for funding of such collaborative projects was already accored by EC, the GSI may take up the project as per the pre-decided parameters. The Committee also opined that the project will definitely bring out the sub-surface structural and mineralogical anomaly, if any, from the kimberlite clusters of Kalyandurg-Timmasamudram-Chigicherla.

The Committee recommended the proposal for approval by EC for Deepseated mineral prognosis by geophysical techniques: lithospheric structure and relationship with kimberlite clusters of Kalyandurg-Timmasamudram-Chigicherla, District: Anantapur, Andhra Pradesh with an estimated cost of Rs. 259.98 Lakhs including GST in a time schedule of 36 months for carrying out the proposed work and submission of the geological report as per annexure- 2.

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41.1.2. Proposal for engaging a Technical Supervision and Quality Control (TS-QC) consultant for Monitoring of Quality Assurance/Quality Control (QA/QC) of the Multi-sensor Aerogeophysical Surveys over Blocks-13 to 22 under National Airborne Geophysical Mapping Programme (NAGMP). [Implementing Agency: GSI]

a) Multi-sensor Aero-geophysical surveys over blocks-13 to 22 in adjoining Obvious Geological Potential (OGP) areas under National Airborne Geophysical Mapping Programme (NAGMP) was approved in 21st EC meeting with estimated cost of **₹244.00 (including 18% GST)**. It was also decided that the progress of project will be reviewed by EC at the end of first year before tendering for subsequent blocks by GSI.

b) GSI has informed that process for selection of Project Implementing Agency (PIA) through tendering for the blocks-13, 14, 15 and 16 for Multi-sensor Aerogeophysical data acquisition are in progress.

c) The quality of data acquired by each PIA is to be validated by the Technical Supervision and Quality Control (TS-QC) team which is to be identified for sole purpose of ensuring data sanity, reliability and quality. The total responsibility of validating the final deliverables submitted by the PIAs and identifying potential areas in each block for subsequent detailed survey is vested on the TS-QC consultant.

d) GSI has submitted that the primary role of the TS-QC will be to overall supervision and quality control throughout all phases of the program, from pre-survey planning till handing over of final deliverables. Thus the appointment of TS-QC consultant is essential for the successful completion of the project.

e) The details of the blocks and estimated cost are given in table below:

Block No.	Location	Block area (sq. km)	Line km	Geological Domain	Estimated cost (₹ including GST)
13	NW Rajasthan	53583	196473	Thar Desert	2,31,83,814
14	Parts of Rajasthan, Uttar Pradesh and Madhya Pradesh	65537	240305	Vindhyan and Deccan Trap	2,83,55,990
15	Kachchh, Gujarat	54494	199813	Mesozoics and Tertiaries of Kachchh	2,35,77,934
16	Southern Karnataka and northern Kerala	41272	151332	Peninsular Gneissic Complex and Southern Granulite Terrain	1,78,57,176
17	Parts of Tamil Nadu	43143	158192	Peninsular Gneissic Complex and Southern Granulite Terrain	1,86,66,656
18	Parts of Tamil Nadu	44941	164785	Southern Granulite Terrain	1,94,44,630
19	Parts of Tamil Nadu and Kerala	40507	148527	Southern Granulite Terrain	1,75,26,186
20	Western Telangana and Northeastern Karnataka	37665	138106	Peninsular Gneissic Complex and Peripheral Deccan Trap	1,62,96,508
21	Parts of Madhya Pradesh and Chhattisgarh	51414	188520	Chhattisgarh Basin and Deccan Trap	2,22,45,360

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22	Eastern Odisha and Andhra Pradesh	55835	204730	Eastern Ghats and Singhbhum Craton	2,41,58,140
	Total	4,88,391	17,90,783		**21,13,12,394**

f) GSI has conveyed that the data acquisition for block-14 and 15 will start by October, 2022 whereas the data acquisition over blocks 13 and 16 will start subsequently. Keeping this in view the TS-QC is required to be engaged for technical supervision and quality control of acquired data over blocks 13 to 16.

g) Keeping this in view, the Committee suggestd to engage the TS-QC for the said blocks (13, 14, 15, 16).

h) The committee also suggested GSI to develop in-house capacity and resources for the Technical Supervision and Quality Control (TS-QC) work for Monitoring of Quality Assurance / Quality Control (QA/QC) of the Multi-sensor Aerogeophysical Surveys of National Airborne Geophysical Mapping Programme (NAGMP).

The committee recommended the proposal for approval by EC for "Engaging a Technical Supervision and Quality Control (TS-QC) consultant for Monitoring of Quality Assurance / Quality Control (QA/QC) of the Multi-sensor Aerogeophysical Surveys over Blocks 13 to 16 under Phase-II of National Airborne Geophysical Mapping Programme (NAGMP)" with an estimated cost of Rs. 9,29,74,914/- including GST in a time schedule of 24 months from the date of signing of MoA.

41.1.3. Procurement of Geophysical instrument for monitoring outsourced ground gravity magnetic survey and follow up survey over recommended mineral targets from NAGMP. [Implementing Agency: GSI]

a) On the recommendation of Technical-cum-Cost Committee (TCC) of NMET, the Executive Committee (EC), NMET in its 21st meeting held on 19th July, 2021, approved the projects "Ground Gravity-Magnetic survey under National Geophysical Mapping Programme (NGPM)"

b) It has been conveyed that about 13.5 lakh sq. km area has been identified to acquire geophysical [gravity and magnetic] data through outsourcing. The quality of the geophysical data and deliverable are of paramount importance which needs to be validated by GSI through its in-house resources.

c) Presently GSI is having Gravimeters (33), Magnetometers (48) and DGPS (39). All these instruments available with GSI are beeing utilized to acquire ground gravity magnetic NGPM data over about 1.1 lakh sq. km area annually.

d) GSI has conveyed that, in addition to its in-house instrumental capacity, additional gravimeter (11), magnetometer (11) and DGPS (11) are also required to validate the data acquired through outsourced agencies.

e) Keeping the above in view, GSI has submitted additional requirement of gravimeter (11), magnetometer (11) and DGPS (11) amounting Rs 32.18 Cr for monitoring of quality of the

outsourced NGPM work and also for detailed follow up work of NAGMP and NGPM. The details are given below-

Instrument/ Region	Units required	Estimated Price per unit (₹)	Estimated Total Cost (₹)	Remarks
Gravimeters	11	12500000	13,750,0000	USD/-127935.00 including packing forwarding freight & insurance charges, Purchase on 24-01-2019 (Equivalent INR/- 99,27180.29 as on 24-05-2022)
Magnetometers (TF)	11	1000000	1,10,00,000	1. CAD 7379.75/- per unit purchased on 18-10-2016 (Equivalent INR-450652.21 2.CAD 9797.5/- per unit was purchased on 08.08.2018 (Equivalent INR/-5,98,294.00 as on 24-05-2022)
DGPS	11	60,00,000	6,60,00,000	INR 49,85,760/- Purchase on 11-08-2021
		Grand Total	21,45,00,000	
Comprehensive Annual Maintenance Contract (CAMC)			10,72,50,000	
		Total	**32,17,50,000**	

f) It was informed that CAMC: 50% of the total cost for five years (10% for each year) excluding two years' warranty period- ₹10,72,50,000.00. The payment will be made in five instalments following the expiry of warranty period.

g) The Committee in-principle agreed upon the proposal of procurement of geophysical instruments. The Committee suggestd that the cost of instruments should be competitive.

h) The Committee suggested to procure the additional geophysical instruments for data validation of outsourced ground gravity-magnetic survey and follow up survey over recommended mineral targets. The committee also suggested for optimum utilization of the instruments.

The committee recommended the proposal for approval by EC for "Procurement of Geophysical instrument for data validation of outsourced ground gravity-magnetic survey and follow up survey over recommended mineral targets derived from NGPM and NAGMP" with an estimated cost of Rs. 32,17,50,000/- including GST in a time schedule of 12 months.

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44.1.4. Preliminary exploration (G3) for Copper, Lead, Zinc and Gold in Masabar-Desar block (3.54 sq. km), Districts: Panchmahal & Vadodara, Gujarat. [Implementing Agency: MECL]

a) Proposed area is geologically exposed by Pre-Aravali granite gneisses, Champaner Group of rocks which are intruded by intrusive granites in the form of Godhra granites. The major lithounit of Champaner Group of the Aravalli Supergroup are paragneiss, biotite and chlorite schist, phyllite, granitegneiss, quartzite, calcareous quartzite-impure limestone, polymictic conglomerate and intrusive granites belonging to Lambia, Khandia Formations and Godhra Granite.

b) The area experienced low grade regional metamorphism in greenschist facies resulting into chlorite-biotite schist and phyllites. The Pyrite, chalcopyrite and covellite is found associated with the quartz veins intruded in the impure limestone at the old mine site. General trend of the mineralization is E-W with northerly dip.

c) It was informed that GSI has carried preliminary investigation for polymetallic sulphide mineralisation during Field Season: 2006-07 and on the basis of field observation and analytical results, two zones of basemetal mineralization are identified and one zone on geophysical anomaly. The analysis of bed rock samples has reported 2.29% copper with in 4 samples with more than 1% copper (all from old pit).

d) The committee suggested to incorporate the geophysical anomaly map and plan for 5 boreholes (three boreholes on the basis of GSI recommendation and two boreholes on chemical analysis). The Committee suggested that the geophysical data of the two mineralized zones needs to be assessed and the potential zones may be marked for G3 stage exploration.

e) It has also been observed that the proposed block area falls in the reserve forest and Jambugoda wildlife sanctuary and its eco-sensitive zone which needs to be demarcated in the proposed block.

f) Based on detailed deliberations the Committee suggested to incorporate the geophysical data of the two potential zones and resubmit the proposal, if found potential.

The committee suggested to incorporate the geophysical anomaly map, boreholes plan and status of wild life sanctuary in block area before submitting for technical evaluation in next TCC meeting.

41.1.5. Preliminary exploration (G3) for Potash in Bharusari South block (11.95 sq. km), District: Hanumangarh, Rajasthan. [Implementing Agency: MECL]

a) GSI had carried out preliminary exploration by drilling 10 nos. of boreholes at wider interval in Bharusari Sub basin and estimated a resources of 388.31 MT with grade of 4.68%K and 17.17% Na, covering 71 sq. km area. In addition to this, MECL had also carried out

geophysical exploration (Gravity and Magnetic Survey) over an area of 1,119 sq. km in Bharusari Sub-basin.

b) It is pertinent to mention that the project titled "Preliminary Exploration (G3- stage) for potash in Bharusari sub basin, North Western part of Rajasthan, District: Hanumangarh, Rajasthan" is being implemented by MECL through NMET funding which was approved in November 2020. So far, 12 nos. of boreholes at a grid interval of 800m X 800m have been drilled in the area to prove the potash mineralisation in 14.16 sq. km block area around the vicinity of 5 boreholes drilled by GSI in the North central part of Bharusari Sub Basin.

c) In the block, total seven halite cycles with numbers of potash bearing zones (1.00m to 15.50m) in thickness and from 1.03%K to 3.47%K in grade has been identified in Bharusari sub basin, North Western part of Rajasthan.

d) The Committe opined that the grade of the potsh reported from the ongoing exploration block is of very low grade and may not be economic to mine out. Keeping this in view, the Committee suggested to wait for the completion of ongoing exploration and status of its auctioning before recommending the proposed block for consideration of EC.

The Committee suggested not to take up the project as the grade of Potash is very low. The Committee also suggested to await final output of the ongoing exploration block and status of the auctioning of blocks.

41.1.6. Preliminary exploration (G3) for limestone in Andipattakadu block (0.3 sq. km), District: Ariyalur, Tamil Nadu. [Implementing Agency: MECL]

41.1.7. Preliminary exploration (G3) for limestone in Andipattakadu and Pungankuzhi block (0.71 sq. km), District: Ariyalur, Tamil Nadu. [Implementing Agency: MECL]

41.1.8 Preliminary exploration (G3) for limestone in Periyanagalur South block (0.21 sq. km), District: Ariyalur, Tamil Nadu. [Implementing Agency: MECL]

41.1.9. Preliminary exploration (G3) for limestone in Periyanagalur North block (0.36 sq. km), District: Ariyalur, Tamil Nadu. [Implementing Agency: MECL]

41.1.10. Preliminary exploration (G3) for limestone in Kilimangalam & Kavanur block (0.59 sq. km), District: Ariyalur, Tamil Nadu. [Implementing Agency: MECL]

Detailed discussion for Para 41.1.6 to 41.1.10

a) The marine sediment sequence is exposed between Palar River in the north and Cauvery River in the south in three sub basins, namely the Pondicherry Sub Basin in the north,

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Vriddhachalam Sub Basin in the centre and Trichinopally Sub Basin in the south ranging in age from Cretaceous to Palaeocene.

b) It has been conveyed that all the proposed blocks falls in the vicinity of nearby Periyathirukkonam Limestone Mines of Dalmia Bhrath Cement Limited in the south; M/s Ultratech Cement Pvt. Ltd. in the north; Periyanagalur Limestone Mine of M/s. Tamin Limited in the north and Kattupringium Limestone Mines.

c) As the proposed blocks are located in the vicinity of the existing mining lease, the estimated quantity of mineral resources' shall be arrived by the average of the estimated quantity of mineral resource per hectare for the same mineral available in the mineralised area of nearby mining leases or mineral blocks having similar geological features and explored upto G3 level in accordance with the said rules [Mineral (Auction) Second Amendment Rules, 2021].

d) In view of the above the committee was of the view that all the projects blocks mentioned at Para 41.1.6 to 41.1.10 are suitable for grant of Composite License (CL).

The committee suggested not to take up the mineral exploration for limestone in the blocks mentioned at para 41.1.6 to 41.1.10 as the proposed block qualify for grant of Composite License (CL).

41.1.11. General exploration (G2) for Gold in Sinduari Ghansyampur block (0.378 sq. km), District: Ranchi, Jharkhand. [Implementing Agency: MECL]

a) The project proposal "General exploration (G2) for Gold in Sindauri-East block" was discussed in 31st TCC meeting held in July 2021, wherein the committee observed that the proposed drilling area of MECL (approx. 3.0 sq. km) is overlapping with the block area wherein GSI had already completed G2 stage exploration. Committee felt that there may be duplication of work, hence may not be taken for exploration through NMET funding.

b) Further, the proposal was resubmitted in 35th TCC meeting, wherein the Committee opined that MECL should collect all the exploration data of the Sindauri block from GSI and a separate block for G2 exploration in further east of Sindauri East block with a different block name, which deserves G2 stage exploration, may be proposed by MECL.

c) In 40th TCC meeting again MECL proposed to take up the G2 stage exploration in Sindauri-Ghanshyampur block (0.37 sq. km). The proposal was discussed in detail and it has been observed that there is an overlapping of about 40% area from the earlier explored (FS: 2015-16) Sindauri East block (G2 stage) of GSI. The Committee suggested revisiting the area and demarcating the earlier explored blocks of GSI and proposed block of MECL on a topographic map to avoid any overlapping.

d) It was informed that GSI had drilled 6 nos. of boreholes in Sinduari East blocks and an indicated mineral resource of 2050890 tonnes (1.505g/t Au grade) at cut off of 0.5 ppm was calculated by cross-section method. Exploration data of GSI has established the

presence of gold mineralisation in the Sindauri-Ghanshyampur area of the Ranchi district, Jharkhand.

e) Based on the number of boreholes drilled by GSI during FS: 2010-13 (SEB-7 to 16) and Au-assay results, the in-situ ore resources at 0.5ppm cut-off grade was calculated by cross section method and were estimated to be 3.154 MT (1.52g/t) and 3.816 MT (1.31 g/t). Boreholes were spaced at 100m for first series of boreholes and intersected lodes at 150m vertical depth.

f) It has been conveyed that the major rock types of the area are quartzite, phyllite with intercalated quartzite, quartz-chlorite schist, acid-volcanics, metabasics, quartz veins. Quartiztes inercalations occur within magnetite-biotite-quartz-sericite schist. Gold mineralisation is associated with quartz veins having disseminations of sulphides (arsenopyrite, pyrite).

g) Based on detailed deliberations, the committee suggested to take up the project by deploying 9 boreholes with 2110m drilling and target the main lodes-2 and 6 established by GSI for gold mineralization. The depth of boreholes for all the boreholes would be about 200m except in one borehole where the depth may reach upto 300m. The committee also suggested to ensure that there should not be any duplication of work as GSI had already worked in the nearby block.

h) The progress of the work will be reviewed after 6 months and completion of four boreholes.

The committee recommended the proposal for approval by EC for General exploration (G2) for Gold in Sinduari Ghansyampur block (0.378 sq. km), District: Ranchi, Jharkhand with an estimated cost of Rs. 428.16 Lakhs including GST in a time schedule of 14 months for carrying out the proposed work and submission of the geological report as per annexure- 3A & 3B.

41.1.12. Reconnaissance survey (G4) for PGE, Chromium, Nickel & Cobalt in Chandiposh block (95.00 sq. km), District: Sundargarh, Odisha. [Implementing Agency: MECL]

a) The project proposal was technically reviewed in 38th TCC meeting held on 24th and 25th February 2022. It was conveyed that the MECL had made a field visit to the area and collected 12 nos of bedrock samples from the exposed rock body. Out of which 4 ultramafic/ mafic rock samples were analyzed for PGE and recorded Ir (0.72ppm to 26.61ppm), Ru (3.03ppm to 56.26ppm) and Os (24.79ppm to 50.67ppm) values. However, the committee opined that the values are much high and needs to be reverified.

b) The PGE is very rare in the earth's crust. The abundance of platinum and palladium in the crust are similar, approximately 5 parts per billion (ppb), by weight. Rhodium, iridium and ruthenium are even scarcer at about 1 ppb. Generally, PGE are enriched in ultramafic lithologies, such as peridotite in which platinum and palladium concentrations are commonly 10-20 ppb, compared to the other rock types exposed in the Earth crust.

c) In 23rd EC meeting held on 16th March, 2022, it was suggested that the chemical analysis for Platinum Group Elements (PGE) (Pt, Pd, Rh, Ru, Os, Ir) are apparently high and needs to be rechecked and ultramafic rock for PGE mineralization needs to be mentioned in the project proposal.

d) In accordance with the recommendedation of the EC and non-availability of Pt-Pd analyses, the Committee suggested to incorporate the desired analytical results of PGE before submitting the proposal.

The Committee suggested to incorporate the chemical analysis as per the suggestion of EC and resubmit the proposal in next TCC, if encouraging values of PGE are reported.

41.1.13. Preliminary exploration (G3) for manganese in Hardatal block (1.62 sq. km), District: Balangir, Odisha. [Implementing Agency: DGM, Odisha]

a) DGM, Odisha has proposed to carry out preliminary exploration (G3 stage) for manganese in Hardatal block (Block-A 1.38 sq. km and Block-B 0.25 sq. km) District: Balangir, Odish.

b) It has been conveyed that the manganese mineral content was reported by DGM, Odisha through G4 stage of exploration in the Hardatal block. Total recoverable resource of 11,406.60 tonnes of manganese with an average Mn content of 20.84% was estimated up to an average depth of 2.5 m below ground level and possible resource of the deposit upto a further depth of 4.0 m was estimated as 38497.96 tonnes with an average Mn content of 20.57%. The sum total resource of both categories of deposits up to an average depth of 6.5 m is estimated as 49904.56 tonnes with an average Mn content of 20.63%.

c) There are 6 manganese blocks in vicinity of Hardatal block. The indicated resource of Biarpalli, Dunguripalli and Rengali blocks estimated by MECL at different levels are given below.

   i. Rengali (G2): 1.83 sq. km, 0.328 MT with avg. grade of Mn 21.37% and 0.321MT with avg. grade of Graphite 4.41%.

   ii. Rengali (G4): 2.45 sq. km, 0.011 MT with avg. grade of Mn 18.80%.

   iii. Biarpalli (G2): 1.32 sq. km, 1.937 MT with avg. grade of Mn 22.45% and 0.335 MT with avg. grade of Graphite 3.71%.

   iv. Dunguripalli (G3): 8.05 sq. km, 0.264MT with avg. grade of Mn 22. 50%

d) Based on detailed deliberations the Committee suggested to modify the block area and carry out exploration work only in block-A (1.38 sq. km) with geological mapping on 1:5000 scale, Geophysical survey (magnetic survey- 200 station), drilling for 8 boreholes with 70m average depth.

e) The progress of work will be reviewed after five month.

The committee recommended the proposal for approval by EC for Preliminary exploration (G3) for manganese in Hardatal block (1.38 sq. km), District: Balangir, Odisha with an estimated cost of Rs. 152.37 Lakhs including GST in a time schedule of 9 months for carrying out the proposed work and submission of the geological report as per annexure- 4A & 4B.

41.1.14. Reconnaissance survey (G4) for manganese ore in Rongha block (38.34 sq. km), District: Nagpur, Maharashtra. [Implementing Agency: DGM, Maharashtra]

a) DGM, Maharashtra proposed to carry out reconnaissance survey for manganese in Rongha block District: Nagpur, Maharashtra. It has been submitted that GSI had carried out detail geological mapping on 1:12,500 scale in the block area.

b) Geologically the area is exposed by the rocks of biotite gneiss, muscovite gneiss, gametiferous muscovite schist and calc-gneiss, general trend being ENE - WSW, dip 60° south and vertical. The manganiferous zone in the form of gondite is comprised of quartz, spessartite and manganese pyroxenes in varying proportion, at places grades to pure quartz-spessartite rock. Gondite is exposed as lenticular outcrops reaching maximum thickness of 6m and a maximum length of 1065m.

c) The workable manganese ore is mostly secondary manganese oxides, psilomelane and pyrolusite, occurring as thin impersistent lenses and seams within the gondite. Analysis of a grab sample from Ronga area carried out by GSI indicates: Mn 37.33%, Fe_2O_3 9.03%, SiO_2 5.98% and P 0.26%. The samples analysed from 2 km WNW of Lendejhari (NE of Ronga) indicate Mn 27.19%, Fe_2O_3 23%, SiO_2 24.36% and P 0.32% in gonditic.

d) The Committee suggested that manganese ore resources have been established in the area and sufficient data is available for qualifying G4 stage of exploration and it may be appropriate to take up Preliminary exploration (G3 stage) of exploration in the area by deploying geological mapping on 1:5,000 scale with 5 nos. of boreholes with 300m drilling and 50nos. of channel sampling.

e) The progress of work will be reviwed after 6 months.

The committee recommended the proposal for approval by EC for Preliminary exploration (G3) for manganese in Rongha block (38.34 sq. km), District: Nagpur, Maharashtra with an estimated cost of Rs. 90.18 Lakhs including GST in a time schedule of 15 months for carrying out the proposed work and submission of the geological report as per annexure- 5A & 5B

41.1.15. General exploration (G2) for A1-Laterite/ Bauxite at Kudopi block (10.0 sq. km), Malvan Taluka, District: Sindhudurg, Maharashtra. [Implementing Agency: DGM, Maharashtra]

41.1.16. Preliminary exploration (G3) for A1-Laterite/ Bauxite in Kudopi block (9.0 sq. km), Malvan Taluka, District: Sindhudurg, Maharashtra. [Implementing Agency: DGM, Maharashtra]

Detailed discussion for 41.1.15 & 41.1.16

a) DGM, Maharashtra proposed to take up general exploration (G2) and Preliminary exploration (G3) for bauxite exploration in Kudopi block (10.0 sq. km) and Kudopi block (9.0 sq. km) respectively in Malvan Taluka, District: Sindhudurg, Maharashtra.

b) It was informed that DGM has done G4 level exploration in the proposed area during FS: 2020-2021 and total 36 samples have been collected on 400x400m grid pattern. In view the encouraging values of Al_2O_3 content in the surface samples collected by DGM, an area of 10 sq. km is proposed for G3 stage investigation with GSI during FS 2021-22 and 31 boreholes completed with 504m drilling.

c) Chemical analysis of 178 borehole samples shows Al_2O_3 content ranges from 20.72% to 48.64%, Fe_2O_3 content ranges from 14.14% to 46.06%, SiO_2 content ranges from 1.97% to 41.08%.

d) Chemical analysis of 24 surface samples from Kudopi block (9.0 sq. km) shows Al_2O_3 ranges from 26.1 to 37.7%, Fe_2O_3% ranges from 33.0 to 48.7%, SiO_2 ranges from 4.21 to 14.3%.

e) After detailed deliberations on the analytical results received from both the blocks the Committee opined that the blocks have been sufficiently explored and analytical results are encouraging. Keeping this in view the blocks are suitable for mining lease /composite license as per recent amendments in Mineral (Auction) Second Amendment Rules, 2021 and Minerals (Evidence of Mineral Contents) Amendment Rules, 2021.

The Committee suggested not to take up the mineral exploration for bauxite as the proposed block qualify for grant of Mining Lease /Composite License.

41.1.17. Preliminary exploration (G3) for limestone in Savalhira block (4.04 sq. km), District: Chandrapur, Maharashtra. [Implementing Agency: DGM, Maharashtra]

a) DGM, Maharashtra has proposed to take up preliminary exploration (G3 stage) for limestone in Savalhira block, District: Chandrapur, Maharashtra.

b) The block area dominated by Penganga Group of Meso to Neo Proterozoic age comprises of shales, limestones and dolomitic limestones. The major lithologies observed in the area

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are Chanda Limestone and Satnala Shale. The Chanda limestone formation (limestone, dolomitic limestone and dolomites) is predominantly a bedded lithographic limestone.

c) It was informed that GSI has carried out exploration work and analytical results suggest the presence of cement grade limestone near Chapan, Sanwalhiri, Mirapur, Bahilampur and Pusad. The variation of CaO% from 19.09 at 2 km East of Jerra to 55.40% at Bahilampur, MgO% from 1.01 at Hirapur to 19.90%.

d) DGM, Maharashtra has also collected 10 nos. of grab samples and chemical analysis shows more than 42% CaO i.e. Cement grade limestone.

e) The committee suggested to modify the boreholes plan and carry out geological mapping on 1:5000 scale, drilling of 360m in 6 boreholes and trenching of 10 cu m.

f) The progress of work will be reviewed after 6 months.

The committee recommended the proposal for approval by EC for Preliminary exploration (G3) for limestone in Savalhira block (4.04 sq. km), District: Chandrapur, Maharashtra with an estimated cost of Rs. 73.73 Lakhs including GST in a time schedule of 15 months for carrying out the proposed work and submission of the geological report as per annexure- 6A & 6B

41.1.18. Procurement of machinery/equipment/chemical analysis instruments. [Implementing Agency: DGM, Karnataka]

a) The Governing Body (GB) of NMET in its 4th meeting held on 13th April, 2022 has approved financial assistance for procurement of machinery/ equipment/ chemical analysis instruments aimed at enhancing the exploration activities.

b) The State DGMs/DMGs will be given upto 10% of the total approved exploration project cost including approved project cost of concerned state PSUs, sanctioned in a year for the purpose of procurement of machinery/ equipment/ instruments and other latest technological upgradations of the existing equipment/ software etc.

c) It is pertinent to mention that during Financial Year 2021-2022, total four projects at the cost of Rs 7.67 crore have been approved for Karnataka State. The details are given below:

Name of the Block	Commodity	Stage	Approved in	Time schedule (month)	Total approved cost (₹ in Lakh)	Implementing Agency
Mincheri Block (81.615 sq. km), District-Ballari, Karnataka.	Copper	G4	20th EC on 24.06.2021	12	203.480	MECL
Anaji block (135.00 sq km), District: Davangere, Karnataka	Basemetal	G4	22nd EC on 22.12.2021	12	140.683	KIOCL

Oblapuram block (53.0 sq. km), District: Davangere, Karnataka	Basemetal	G4	22nd EC on 22.12.2021	12	165.434	KIOCL
Rangapura Block, District: Hassan, Karnataka.	PGE, Nickel, Cobalt and Gold	G4	23rd EC on 11.03.2022	12	257.510	MECL
					767.108	

d) As per the approval of Governing Body, Rs 76 lakhs (~10% of the approved project cost) may be approved as financial assistance for procurement of machinery/ equipment/ chemical analysis instruments aimed at enhancing the exploration activities for Karnataka State for the current FY.

e) Accordingly, DGM, Karnataka has proposed for financial assistance for procurement following instruments:

i. Inductively coupled plasma Atomic Emission spectrometer (ICP-MS) costing ₹ 200 Lakh.

ii. X-Ray fluorescence Spectrometer (WD-XRF) costing ₹300 Lakh.

iii. Handheld XRF Analyzer (Thermo Scientific Niton XL5) Mineral mode costing ₹50 Lakh.

iv. Ore/Polarizing Microscope with Transmitted/Incident Light and oil immersion objectives costing ₹25 Lakh.

v. Geosoft Oasis montaj costing ₹100 Lakh.

f) After detailed deliberations the Committee opined that the financial assistance upto Rs 76 Lakhs can be provided through NMET funding. Keeping this in view the DGM, Karnataka expressed to procure Ore/Polarizing Microscope at estimated cost of ₹25 Lakh through NMET funding.

g) The committee suggested to ensure optimum utilisation of instruments by the DGM, Karnataka. The Committee also suggested to recover the entire cost of instrument within a time period of three years.

The committee recommended the proposal for approval by EC for procurement of Ore/Polarizing Microscope with Transmitted/Incident Light and oil immersion objectives with estimated cost of ₹25.00 Lakh in time schedule of 12 months.

41.2. Review of the ongoing projects.

41.2.1. Preliminary exploration (G3) for bauxite in Nunapaimali block, District-Rayagada, Odisha.

a) The project was approved in 11th EC meeting held on 7th February, 2019 at an estimated cost of ₹202.21 Lakh.

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b) OMECL has conveyed that all the assigned geological work components have been successfully completed and geological report has been peer reviewed by external peer reviewer. The comments/ suggestions of peer reviewer have been incorporated in the final geological report.

c) The bauxite mineralization is formed by in-situ chemical weathering of underlying hard parent rock Khondalites and mineralization is predominantly of gibbsite which is formed by weathering and desilicification of clay minerals in Khondalite.

d) Based on exploration work, 12.20 MT indicated mineral resource (332) of bauxite have been estimated by polygonal area method. The grade of bauxite is given below:

Bauxite Grade	Thickness (m)	Resource (MT)	Avg. Al_2O_3%	Avg. SiO_2%
Metallurgical Grade Bauxite (MGB)	51.30	4.20	42.63	2.54
Low Grade Bauxite (LGB)	70.40	5.88	40.48	5.76
Beneficiable Grade Bauxite (BGB)	30.50	2.12	32.80	5.48
Total	**152.20**	**12.20**	**39.67**	**4.62**

e) The Committee noted the details of the bauxite recources and suggested to submit the geological report to NMET Secretariat.

The Committee suggested to submit the geological report to NMET Secretariat.

41.2.2. Reconnaissance survey [Cluster-1] (G4) for limestone in Mellacheruvu, Mallareddy Gudem and Yepal Madhavaram Blocks, District- Suryapet, Telangana.

41.2.3. Reconnaissance survey [Cluster-3] (G4) for limestone in Raghunathapalem-1 and Raghunathapalem-2 Blocks, District- Suryapet, Telangana.

41.2.4. Reconnaissance survey [Cluster-4] (G4) for limestone in Wazigudem and Veerappagudem Block, District- Suryapet, Telangana.

Detailed discussion for Para 41.2.2, 41.2.3 and 41.2.4

a) It is significant to mention here that the total 15 limestone blocks (as detailed in table below) were grouped into 8 clusters on the basis of recommendations of 14th TCC meeting held on 21st and 22nd May 2018. The proposal for exploration from G4 stage to G2 stage in all the clusters was approved by EC in its 8th meeting held on 12th June 2018. The details of 15 blocks and 8 clusters is given in the table below:

S. No.	Cluster	Block Name	G4 (₹ Lakh)	G3 (₹ Lakh)	G2 (₹ Lakh)	Total Cost (₹ Lakh)
1	**Cluster-1**	Mellacheruvu Block	63.32	73.30	125.58	655.82
2		Mallareddy Gudem Block		80.06	107.15	
3		Yepal Madhavaram Block		86.27	120.14	

4	**Cluster-2**	Mattampally-1 Block	47.90	72.61	120.04	394.23
5		Mattampally-2 Block		61.21	92.47	
6	**Cluster-3**	Raghunathapalem-1 Block	47.55	72.26	120.03	390.17
7		Raghunathapalem-2 Block		59.62	90.71	
8	**Cluster-4**	Wazigudem Block	43.72	77.68	129.81	430.37
9		Veerappagudem Block		70.68	108.48	
10	**Cluster-5**	Ramapuram Block	33.81	51.93	109.74	195.48
11	**Cluster-6**	Dondapadu Block	47.90	70.68	125.48	396.87
12		Kothagudem Block		51.93	100.88	
13	**Cluster-7**	Jiwangi-1 Block	47.55	41.57	81.10	308.05
14		Jiwangi-2 Block		47.96	89.87	
15	**Cluster-8**	Malkapur Block	34.31	47.26	124.31	205.88
		Total	**366.06**	**965.02**	**1645.79**	**2976.87**

b) The TCC recommended that exploration work will be reviewed after completion of G4 stage exploration and thereafter the decision on further stage of exploration will be take up.

c) TCC in its 25th meeting held on 05th & 06th November, 2020 reviewed **Cluster-2** consisting of Mattampally Block-1 and Mattampally Block-2 limestone blocks and **Cluster-6** consisting of Dondapadu and Kothagudem limestone blocks wherein the Committee had suggested not to take up further stage of exploration [G3 and G2 stage] in the blocks.

d) Now, TSMDC has presented the outcome of exploration work (G4 stage) of cluster-1, 3 and 4.

e) **Cluster-1:** It has been submitted that the geological mapping on 1:12500 (57.77 sq. km), 6 boreholes with 314m drilling and chemical analysis have been completed. Based on G4 stage exploration a reconnaissance resources (334) of about 21.06 MT at average grade of 48.09% CaO and 11.42% SiO_2 has been assessed.

f) **Cluster-3:** In cluster 3, the geological mapping on 1:12500 (46.58 sq. km), 4 boreholes with 200m drilling and chemical analysis have been completed. Based on G4 stage exploration a reconnaissance resources (334) of about 4.09 MT at average grade of 48.22% CaO and 10.57% SiO_2 has been assessed.

g) **Cluster-4:** Similarly in cluster 4 the geological mapping on 1:12500 (18.12 sq. km), 4 boreholes with 143m drilling and chemical analysis have been completed. Based on G4 stage exploration a reconnaissance resources (334) of about 5.99 MT at average grade of 46.77% CaO and 13.47% SiO_2 has been assessed.

h) The Committee noted the outcome of limestone exploration and suggested that blocks may be put up for auction in light of recent amendments in Mineral (Auction) Second Amendment Rules, 2021 and Minerals (Evidence of Mineral Contents) Amendment Rules, 2021 for Composite Licence (CL).

i) In view of the above observations the committee suggested not to take up further stage of exploration.

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The Committee suggested not to take up further stage of exploration and recommended for approval by EC to cancel the approved G3 and G2 exploration in Mellacheruvu, Mallareddy Gudem & Yepal Madhavaram limestone blocks; Raghunathapalem-1 & Raghunathapalem-2 limestone blocks; Wazigudem & Veerappagudem limestone blocks.

41.3. Time extension of the approved projects.

40.3.1. Preliminary exploration for potash in Lakhasar-sub basin, North-Western part of Rajasthan, District- Bikaner, Rajasthan.

a) The project was recommended in 23rd TCC meeting held on 12th and 13th February, 2020 with estimated cost of Rs. 1753.53 Lakh and approved in 16th EC meeting held on 25th February, 2020.

b) MECL presented the exploration work carried out and conveyed that a total of 10,161m drilling have been comleted in 15 boreholes against the approved drilling target of 10040m. MECL has conveyed that an additional drilling of 121m and borehole geophysical logging have been done with additional cost of ₹16,28,056/-.

c) MECL has informed that the geological report writing is in progress and will be completd by 31st July, 2022 and requested for timeline extension upto 31st July, 2022.

d) The Committee noted the outcome of exploration work and suggested to submit the geological report. Geological report will reviewed after completion of peer review by external peer reviewer.

The committee approved the additional drilling of 121m and borehole geophysical logging with additional cost of ₹ 16,28,056/-.

The Committee also recommended for approval by EC for time extension up to 31st July, 2022 for completion of work and submission of the geological report.

41.4. The meeting ended with concluding remarks of the chairman and vote of thanks by the Director and member secretary, TCC, NMET.

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List of TCC members attended 41st Technical-cum-Cost Committee (TCC) meeting of NMET held on 30th and 31st May, 2022 through videoconferencing

S. No.	Name/Designation	Status	Remarks
1	Shri Janardan Prasad, Addl. Director General & HoD, GSI	Chairman, TCC, NMET	Attended via videoconference
2	Shri Ranjan Kumar Sinha, Controller General (Retd.), Indian Bureau of Mines	TCC Member	Attended via videoconference
3	Shri Naeem Ahmad, General Manager-Exploration (Retd.), CMPDI Ltd.	TCC Member	Not Attended
4	Dr. Anjani Kumar, Dy. General Manager (Exploration) &HoD-Planning (Retd.), MECL	TCC Member	Attended via videoconference
5	Shri B. Saravanan, Additional Director, Atomic Minerals Directorate for Exploration and Research	TCC Member	Attended via videoconference
6	Shri Hemraj Suryavanshi, Deputy Director General and NMH-II, GSI	TCC Member	Not attended
7	Shri Manoj Kumar Patel, Deputy Director General and RMH-II, GSI	TCC Member	Attended via videoconference
8	Shri Santosh Kumar Adhikari, Chief Mining Geologist, IBM	TCC Member	Attended via videoconference
9	Shri Vivek Kumar Sharma, Director, NMET, Ministry of Mines	TCC Member	Attended via videoconference
10	Shri Suresh Chander, Director, GSI	Member Secretary, TCC, NMET	Attended via videoconference
11	Shri Ravi Kumar Gupta, Deputy General Manager (Finance), HCL	TCC Member	Not attended
12	Shri P. K. Maharana, Dy. General Manager (Finance), NALCO	TCC Member	Attended via videoconference
13	Shri Vinay Pal, Assistant Cost Account Officer (Finance), GSI	TCC Member	Not attended

Annexure-1

List of participants attended 41st Technical-cum-Cost Committee (TCC) meeting of NMET held on 30th and 31st May, 2022 through videoconferencing

S. No.	Name/Designation	Email ID	Contact No	Organisation
1	Shri Janardan Prasad, ADG & HoD, GSI	janardan.prasad@gsi.gov.in	7763800788	Chairman, TCC
2	Shri Ranjan Kumar Sinha, Controller General (Retd.) IBM	sinhark57@rediffmail.com	9421777637	Member, TCC
3	Dr. Anjani Kumar, DGM (Retd.), MECL	anjanikumar1957.ak@gmail.com	9975350576	Member, TCC
4	Shri B. Saravanan, AMD, Hyderabad	addldir-op1.amd@gov.in	8987571606	Member, TCC
5	Shri Manoj Kumar Patel, DDG and RMH-II, GSI	m.patel1@gsi.gov.in	9040011231	Member, TCC
6	Shri Santosh Kumar Adhikari, Chief Mining Geologist, IBM	skadhikari@ibm.gov.in	7588690545	Member, TCC
7	Shri Vivek Kr Sharma, Director, NMET	vksharma.ofb@gov.in	7024570055	Member, TCC
8	Shri Suresh Chander, Director, GSI	suresh.chander@gsi.gov.in	9493860963	Member Secretary, TCC
9	Shri P. K. Maharana, DGM (F), NALCO	pmaharana@rediffmail.com	8500669500	Member, TCC
10	Shri Debkumar Bhattacharya, DDG	ddggp.rsas@gsi.gov.in	9830031059	GSI, RSAS, Bengaluru
11	Shri Vinod Kumar, DDG (Geophysics)	vinod.kumar@gsi.gov.in		GSI, Kolkata
12	Dr. Deshraj Trivedi, Senior Geologist	nmet-tcc@gov.in	9419244294	NMET
13	Shri Subhash Kumar, Senior Geologist	nmet-mines@gov.in	9868302624	NMET
14	Shri P. Ravindran, DGM (Exploration)	gm-exploration@mecl.co.in	7907649392	MECL, Nagpur
15	DGM, Rajasthan representative	adgjaipur.mg@rajasthan.gov.in		DGM, Rajasthan
16	DGM,Tamil Nadu representative	geomine@nic.in		DGM, Tamil Nadu
17	TAMIN representative	md@tamingranites.com		TAMIN, Tamil Nadu
18	Shri P. C. Mishra, Joint Director (Geology)	directorgeology_odisha@yahoo.in	9861465695	DGM, Odisha
19	The Deputy Director, Geology	director@mahadgm.gov.in		DGM, Maharashtra
20	Shri H. P. Harish, Deputy Director (Plan)	dir-mines@karnataka.gov.in	9611951313	DGM, Karnataka
21	Dr. P. K. Nayak, Sr. Manager (Geology)	omecloffice@gmail.com	6372651516	OMECL
22	Shri Vonod RV	omecloffice@gmail.com	9995901357	ONECL
23	Shri K. Rajasekhar Reddy General Manager (Mining)	tsmdcltd@gmail.com	8008558580	TSMDC, Hyderabad

Annexure-2A

Estimated cost for Deepseated mineral prognosis by geophysical techniques: lithospheric structure and relationship with kimberlite clusters of Kalyandurg-Timmasamudram-Chigicherla, District: Anantapur, Andhra Pradesh.

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item - Sl No.	Rates as per SoC	Qty.	Total Amount (Rs)	
A	**GEOLOGICAL WORK**						
i	Charges for Geologist per day at field	Days	1.3	11,000	30	3,30,000	
ii	Petrography studies (Nos)	Rs. 1553: Petrographic studies + Rs. 589 for sample preparation		2,142	60	1,28,520	
iii	PCS i) XRF (major oxides) (Nos.) ii) ICPMS (Trace & REE)	Rs.4200/- for 50 samples Rs.5380/- for 50 samples		9,580	50	4,79,000	
iv	EPMA studies	per hrs	4.4.1	8,540	150	12,81,000	
v	LAM-ICP-MS	Rs.96,200/- per day NGRI rate		96,200	15	14,43,000	
vi	LAM-MC-ICPMS	Rs.86,200/- per day NGRI rate		86,200	5	4,31,000	
vii	Raman Spectroscopy	Rs.2100 per hour-6 hours per day machine running time: SOC GSI-2015		12,600	10	1,26,000	
viii	Isotope analysis	Per sample	4.6.3	8,540	25	2,13,500	
					Sub Total- A	**44,32,020**	
2	**GEOPHYSICAL SUVREY**						
i	Magnetotelluric (BBMT) Profile- 1	30 (3-5 days of recording from 1000 Hz - 1000 s, 2.5 - 3 km spacing)		2,00,000	30	60,00,000	As per the NGRI rate
ii	Long period MT Profile-1 & 2	10 (20-25 days of		3,00,000	10	30,00,000	As per the NGRI rate

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		recording from 30s - 10000s, 9-10 km spacing)					
iii	CSAMT Profile- 1	40 (1day recording from 10000 Hz- 100 Hz, 0.51 km grid)		1,75,000	40	70,00,000	As per the NGRI rate
iv	Magnetotelluric (BBMT) Profile- 2	8 (3-5 days of recording from 1000 Hz - 1000 s, 2.5 - 3 km spacing)		2,00,000	8	16,00,000	As per the NGRI rate
					Sub Total- B	**1,76,00,000**	
					Sub Total (A+B)	**2,20,32,020**	
	Provision for GST (18%)					**39,65,763.6**	
	Total					**2,59,97,784**	***or Say Rs. 259.98 Lakh***

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Annexure-3A

Estimated cost for General exploration (G2) for Gold in Sinduari Ghansyampur block (0.378 sq. km), District: Ranchi, Jharkhand.

[Block area: 0.378 sq. km; Nos. of boreholes: 09; Borehole depth range: 195m to 310m; Schedule timeline: 14 Months]

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates as per SoC	Qty.	Total Amount (Rs)	
A	**GEOLOGICAL WORK**						
1	**Geological Mapping, Borhole logging & sampling & report writing**						
a	Charges for one Geologist per day at HQ	day	1.3	9,000	60	5,40,000	
b	Charges for Geologist per day at field	day	1.3	11,000	150	16,50,000	
c	Labour (2 Nos) Base rate - Rs.427	day	5.7	427	300	1,28,100	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	100	5,10,000	
e	Labours (4 Nos) Base rate - Rs.427	day	5.7	427	400	1,70,800	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
2	**Survey (on 1:2000 Scale)** Topographical survey						
a	DGPS Survey of Block Boundary cardinal points and Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes by DGPS	Per Point of observation	1.6.2	19,200	22	4,22,400	13 Points for Block Boundary including 1 base point+ 9 BH Points
					Sub Total- A	**34,21,300**	
B	**Borehole Geophysical Logging**						
a	Charges for one Geophysicist per day at HQ	day	3.18	9,000	15	1,35,000	Decission will taken after review of geological work
b	Charges for Geophysicist per day at field	day	3.18	11,000	10	1,10,000	
c	Labour (2 Nos) Base rate - Rs.427	day	5.7	427	20	8,540	

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d	Induced Polarisation (I.P)	Per m	3.11p	93	2,110	1,96,230	
e	Resistivity	Per m	3.11c	39	2,110	82,290	
					Sub Total- B	**5,32,060**	
C	**DRILLING**						
1	Drilling up to 300m (Hard Rock)	m	2.2.1.4a	11,500	2,100	2,41,50,000	Taken after review of mapping sampling, trenching and geophysical survey work
2	Drilling 301 to 600 m (Hard Rock)	m	2.2.1.4b	12,420	10	1,24,200	
3	Borehole deviation Survey by Multishot Camera	m	2.2.6	330	2,110	6,96,300	
4	Land / Crop Compansation (in case the BH falls in agricultural Land)	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
5	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	9	18,000	
6	Transportation of Drill Rig & Truck associated per drill (2 rigs)	Km	2.2.8	36	4,000	1,44,000	2000km to & fro from Nagpur/ Rig
7	Monthly Accomodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	5	2,50,000	
8	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	2	5,00,000	
9	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	2	5,00,000	
10	Road Making (Flat Terrain)	Km	2.2.10a	22,020	2	44,040	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.
12	Drill Core Preservation	per m	5.3	1,590	780	12,40,200	This amount will be reimbursed after successful delivery of the cores to concerned libraries/authorities
					Sub Total- C	**2,78,46,740**	
D	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i)	**Primary samples**						
	a. Au by Fire Assay	Nos	4.1.5a	2,380	750	17,85,000	

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ii)	**Check samples Internal (5%)**						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	38	90,440	
iii)	**Check samples Extrnal (10%)**						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	75	1,78,500	
iv)	**Composite Samples**						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	125	2,97,500	
	c) ICP-MS (34 Elements)	Nos	4.1.14	7,731	-	-	
	e) Geo-Technical Sample						
	i) Density	per sample	4.8.3	1,568	10	15,680	
	ii) Porosity	per sample	4.8.2	2,547	10	25,470	
	iii) Uniaxial compressive strength for set of three samples including cutting and polishing as per standard	per sample	4.8.4	6,160	10	61,600	
	iv) Tensile strength	per sample	4.8.5	2,745	10	27,450	
	c) Benificiation Study *	Nos	4.7.2 as per IBM Rate	2,83,927	1	2,83,927	
					Sub Total- D	**27,65,567**	
E	**Petrological samples (Surface & Bh Core Samples)**						
i	Preparation of thin section	Nos	4.3.1	2,353	20	47,060	
ii	Study of Thin Section	Nos	4.3.4	4,232	20	84,640	
iii	SEM studies	Nos	4.4.2	2,940	5	14,700	
					Sub Total- E	**1,46,400**	
F	**Mineragraphic Studies (Surface & Bh Core Samples)**						
a	Preparation of polished section	Nos	4.3.2	1,549	20	30,980	
b	Study of Polished Section	Nos	4.3.4	4,232	20	84,640	
c	Digital Photographs	Nos	4.3.7	280	20	5,600	
					Sub Total- F	**1,21,220**	
G	**Specific Gravity Determination**						
	Specific Gravity Determination	No.	4.8.1	1,605	10	16,050	
					Sub Total- G	**16,050**	
					Total A to G	**3,48,49,337**	
H							

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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% of the value of work whichever is more subject to Max. Rs. 20 lakhs		10,45,480	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
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**					**3,62,84,817**	
M	**Provision for GST (18% of L)**					**65,31,267**	GST will be reimburse as per actual and as per notified prescribed rate
N	**Total Estimated Cost with GST**					**4,28,16,084**	***Or Say Rs. 428.16 Lakh***
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 Certifiate regarding non outsourcing of any component/project is required.							

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Annexure-3B

Schedule timeline for General exploration (G2) for Gold in Sinduari Ghansyampur block (0.378 sq. km), District: Ranchi, Jharkhand.

S. No.	Activities	Unit	MONTHS													
			1	2	3	4	5	6		7	8	9	10	11	12	13	14
1	Camp Setting	Month															
2	Core Drilling (2 rigs)	m.															
3	Borehole Geophysical Studies	m.															
4	Geologist days- Field	day															
5	Geophysicist days	day															
6	Sampling days	day															
7	Camp Winding	Month															
8	Laboratory Studies	Nos.															
9	Geotechnical & Benificiation Study																
10	Geologist days- HQ	day															
11	Report Writing	Month															
12	Peer Review	Month															

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Annexure-4A

Estimated cost for Preliminary exploration (G3) for manganese in Hardatal block (1.38 sq. km), District: Balangir, Odisha.

[Block area: 1.38 sq. km; Nos. of boreholes: 08; Borehole depth range: 70m; Schedule timeline: 9 Months]

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates as per SoC	Qty.	Total Amount (Rs)	
	Outsourced						
A	**DRILLING**						
1	Drilling (8 BHs)	m	2.2.1.4a	11,500	560	64,40,000	reimbursement of outsource component will be made as per Para 3 of NMET-SoC
2	Drill Core Preservation	per m	5	1,590	150	2,38,500	This amount will be reimbursed after successful delivery of the cores to concerned libraries/authorities
					Sub Total- A	**66,78,500**	
B	**GEOLOGICAL WORK**						
1	Survey days (One Surveyor Charges)	day	1.6.1a	8,300	30	2,49,000	
2	Labours (4 Nos) Base rate - Rs. 326*4=1304/-	day	5.7	1,304	30	39,120	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
3	Charges for one Geologist per day at HQ	day	1.2	9,000	60	5,40,000	
4	Charges for one Geologist per day- Field	day	1.2	11,000	100	11,00,000	
5	Labours (2 Nos) Base rate - Rs. 326*2=652/-	day	5.7	652	100	65,200	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
6	Sampler days	day	1.5.2	5,100	20	1,02,000	
7	Labours (4 Nos) Base rate - Rs. 326*4=1304/-	day	5.7	1,304	20	26,080	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
					Sub Total- B	**21,21,400**	

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C	**GEOPHYSICAL WORK**						
1	Charges for one Geophysicist per day at field	day	3.18	11,000	10	1,10,000	Decission will taken after review of geological work
2	Magnetic Survey	Per Station	3.2a	1800	200	3,60,000	
3	Labours (2 Nos) Base rate - Rs. 326*2=652/-	day	5.7	652	10	6,520	
4	Charges for one Geophysicist per day at HQ	Day	3.18	9,000	7	63,000	
					Sub Total- C	**5,39,520**	
D	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i)	**Primary check samples**						
	Primary samples for 9 radicals (Al_2O_3,Mn, SiO_2, Fe, P, S, FC, Ash and LOI)	Nos	4.1.1	8,157	150	12,23,550	
	X-RD Studies	Nos	4.5.1	4,000	10	40,000	
	XRF Analysis (Major Oxides)	Nos	4.1.15a	4,200	10	42,000	
	ICPMS/ICP-AES (34 elelments Analysis)	Nos	4.1.14	7,731	10	77,310	
ii)	**Check samples Internal (10%)**						
	Check samples for 9 radicals (Al_2O_3,Mn, SiO_2, Fe, P, S, FC, Ash and LOI)	Nos	4.1.1	8,157	15	1,22,355	
ii)	**Check samples External (10%)**						
	Check samples for 9 radicals (Al_2O_3,Mn, SiO_2, Fe, P, S, Ash, FC and LOI)	Nos	4.1.1	8,157	15	1,22,355	
iii)	**Composite Samples**						
	Check samples for 9 radicals (Al_2O_3,Mn, SiO_2, Fe, P, S, Ash, FC and LOI)	Nos	4.1.1	8,157	8	65,256	

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2	**Physical Analysis**						
i)	Preparation of thin section	Nos	4.3.1	2,353	10	23,530	
ii)	Petrographic studies	Nos	4.3.4	4,232	10	42,320	
iii)	Preparation of polished section	Nos	4.3.2	1,549	10	15,490	
iv)	Mineragraphic studies	Nos	4.3.4	4,232	10	42,320	
v)	Digital Photographs	Nos	4.3.7	280	20	5,600	
vi)	Bulk density	Nos		1,568	5	7,840	
					Sub Total- D	**18,29,926**	
					Total A+B+C+D	**1,11,69,346**	
E	Preparation of Exploration Proposal	5.1	2% of the approved project cost or 3.8 lakh whichever is lower.			2,23,387	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.
F	Geological Report Preparation	5.2	For the projects having cost more than Rs. 150 lakhs but less than 300 lakh - A minimum of Rs. 7.5 lakhs or 3% of the value of work whichever is more.			7,50,000	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
G	Tendering process cost	2.3	2% of the outsourced cost or 5 lakh, whichver is lower			1,33,570	will be reimbursed when copy of signed agreement/tender for outsource component will be submitted.
H	Operational charges	Para 3 of SoC				6,25,888	will be reimbursed as per point 3 of NMET-SoC after recalculation when actual cost of outsourcing component will be provided.
I	Peer review Charges	As per EC decision				10,000	
	Total Estimated Cost without GST					**1,29,12,191**	
	GST @18%					23,24,194.38	
	Total Estimated Cost with GST					**1,52,36,385.38**	***or Say Rs. 152.37 Lakh***
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 Certifiate regarding non outsourcing of any component/project is required.							

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Annexure-4B

Schedule timeline for Preliminary exploration (G3) for manganese in Hardatal block (1.38 sq. km), District: Balangir, Odisha.

S. No.	Activities	Unit	MONTHS									
			1	2	3	4	5	Review	6	7	8	9
1	Camp Setting	month	■									
2	Geological mapping	month		■	■							
3	Survey days	month	■	■	■							
4	Core Drilling	m.			■	■	■					
5	Geologist days- Field	day		■	■	■	■					
6	Geophysicist days	day			■	■	■					
7	Sampling days	day			■					■		
8	Camp Winding	Month				■	■		■	■		
9	Laboratory Studies	Nos.			■	■	■			■	■	■
10	Geologist days- HQ	day								■	■	■
11	Report Writing	Month									■	■
12	Peer Review	Month										

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Annexure-5A

Estimated cost for Preliminary exploration (G3) for manganese in Rongha block (38.34 sq. km), District: Nagpur, Maharashtra.

[Block area: 38.34 sq. km; Nos. of boreholes: 5; Borehole depth range: 60m; Schedule timeline: 15 Months]

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21				
			SoC-Item -Sl No.	Rates as per SoC	Year 2022-2023		Remarks
					Qty.	Amount (Rs)	
A	**GEOLOGICAL WORK**						
1a	Geologist Party days (1 party)-Field	day	1.2	11,000	90	9,90,000	
1b	Geologist Party days (1 party)-HQ	day	1.2	9,000	30	2,70,000	
1c	2 labours/ party (Rs 350/day/labour) (As per rates of Central Labour Commissioner)	day	5.7	700	90	63,000	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
2a	Survey Party days (1 party)	day	1.6.1a	8,300	30	2,49,000	
2b	4 labours/ party (Rs 350/day/labour) (As per rates of Central Labour Commissioner)	day	5.7	1,400	30	42,000	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
3a	Sampling -1 Samplers Labour charge not included	day	1.5.2	5,100	15	76,500	
3b	4 labours/ party (Rs 350/day/labour) (As per rates of Central Labour Commissioner)	day	5.7	1,400	15	21,000	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
					Sub Total- A	**17,11,500**	
B	**DRILLING**						
1	Drilling (1 rigs) up to 300m	m	2.2.1.4a	11,500	300	34,50,000	Taken after review of mapping sampling, trenching and geophysical survey work
2	Land / Crop Compansation	per BH	5.6	20,000	5	1,00,000	Amount will be reimbursed as per actuals or max. Rs. 20000 per BH with certification from local authorities
3	Bore Hole Fixation and determination of co-	Nos	1.6.2	19,200	5	96,000	

	ordinates & Reduced Level of the boreholes by DGPS						
4	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	5	10,000	
5	Transportation of Drill Rig & Truck associated per drill	Km	2.2.8	36	160	5,760	Certification in this regard is required to be provided
6	Monthly Accomodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	4	2,00,000	
7	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	-	2,50,000	
8	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	-	2,50,000	
9	Road Making (Hilly Terrain)	Km	2.2.10b	32,200	2	64,400	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.
					Sub Total- B	**44,26,160**	
C	**LABORATORY STUDIES**						
1	**Chemical Analysis (Primary & Check samples)**						
i)	**Channel samples**	Nos	4.1.1	8,157	50	4,07,850	
ii)	**Drill Core samples**	Nos	4.1.1	8,157	50	4,07,850	
iii)	**Composite samples**	Nos	4.1.1	8,157	10	81,570	
2	**Physical & Petrological Stusies**						
i)	Preparation of thin section	Nos	4.3.1	2,353	5	11,765	
ii)	Complete petrographic study report	Nos	4.3.4	4,232	5	21,160	
iii)	Specific Gravity determination	Nos	4.8.1	1,605	5	8,025	
iv)	Determination of insitu bulk density	Nos	4.10	3,540	5	17,700	
					Sub Total C	**9,55,920**	
D	**Drill Core Preservation**						
	One complete borehole plus mineralised cores of all the BHs of the Block, all cost included	m	5.3	1,590	110	1,74,900	Core samples will be sent to GSI core lab
					Sub Total- D	**1,74,900**	

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					Total A to D	72,68,480	
E	**Geological Report Preparation**	**No**	**5.2**	ii) Reconnaissance Survey/Preliminary exploration/ general exploration/ Detailed exploration exceeding ₹ 50 lakh but lesaa than 150 lakh : A minimum of ₹ 2.5 lakh or 5% of work whichever is more ₹ 3,000/- per each additional copy.		**3,63,424**	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
F	**Peer review Charges**		**As per EC decision**			**10,000**	
G	**Total Estimated Cost without GST**					**76,41,904**	
H	**Provision for GST (18%)**					**13,75,542.72**	GST will be reimbursed as per actual and as per notified prescribed rate
	Total Estimated Cost with GST					**90,17,447**	***or Say Rs. 90.18 Lakh***
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 Certifiate regarding non outsourcing of any component/project is required.							

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Annexure-5B

Schedule timeline for Preliminary exploration (G3) for manganese in Rongha block (38.34 sq. km), District: Nagpur, Maharashtra.

S. No.	Activities	Unit	MONTHS														
			1	2	3	4	5	6	Review	7	8	9	10	11	12	13	14	15
1	Camp Setting	month																
2	Geological mapping	month																
3	Survey days	day																
4	Surface drilling	m																
5	Geologist days-Field	day																
6	Sample days	day																
7	Laboratory	month																
8	Camp winding	month																
9	Geologist days- HQ	day																
10	Report Writing	Month																
11	Peer Review	month																

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Annexure-6A

Estimated cost for Preliminary exploration (G3) for limestone in Savalhira block (4.04 sq. km), District: Chandrapur, Maharashtra.

[Block area: 4.04 sq. km; Nos. of boreholes: 5; Borehole depth range: 60m; Schedule timeline: 15 Months]

S. No.	Item of work	unit		SoC Rates (2021-22)		Amount	Remark
			Item -Sl No.	Esc. Rate	Quantity		
A	**Drilling**						
1	Surface Drilling (1 Rig)	m	2.2.1.1b	5,242	360	18,87,120	
2	Trenching	Cu.m.	2.1.1	3,330	10	33,300	
3	Drilling Camp setting cost	per Drill	2.2.9a	2,50,000	1	2,50,000	Certification in this regard is required to be provided
4	Drilling Camp winding cost	per Drill	2.2.9b	2,50,000	1	2,50,000	
5	Road making (flat terrain)	per km	2.2.10a	22,020	1	22,020	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.
6	Transportation of drilling rig (to & fro)	per km	2.2.8	36	500	18,000	
					Sub Total- A	**24,60,440**	
B	**Geological Work**						
1	Survey days	day	1.6.1a	8,300	30	2,49,000	
2	Geologist (Field days)	day	1.3	11,000	90	9,90,000	
3	Geologist (HQ days)	day	1.3	9,000	30	2,70,000	
4	Sample processing work	day	1.5.2	5,100	60	3,06,000	
					Sub Total- B	**18,15,000**	
C	**Laboratory Studies**						
1	Chemical analysis						
	i) Primary Samples & Check samples						
	a) For 8 radicals CaO, MgO, SiO2, MnO, Al2O3,Fe2O3, TiO2, P2O5 (XRF)	per sample	4.1.15a	4,200	272	11,42,400	
	b) 10% Check sample	per sample	4.1.15a	4,200	30	1,26,000	
2	Physical Analysis						

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	i) Bulk Density determination	Nos	4.8.3	1,568	10	15,680	
					Sub Total- C	**12,84,080**	
D	**Preservation of core**						
	Core preservation charges	Nos	5.3	1,590	240	**3,81,600**	This amount will be reimbursed after successful delivery of the cores to concerned libraries/authorities
					Total- A to D	**59,41,120**	
E	**Geological Report Preparation**	5 Hard copies with a soft copy	5.2	For projects having exceeding ₹ 50 lakh but less than 150 lakh : A minimum of ₹ 2.5 lakh or 5% of work whichever is more ₹ 3,000/- per each additional copy.		**2,97,056**	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
F	**Peer review Charges**		As Per EC decision			**10,000**	
						62,48,176	
	Provision for GST(18%of G)					**11,24,672**	GST will be reimbursed as per actual and as per notified prescribed rate
	Grand Total					**73,72,848**	***or Say Rs.73.73 Lakh***

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 Certifiate regarding non outsourcing of any component/project is required.

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Schedule timeline for Preliminary exploration (G3) for limestone in Savalhira block (4.04 sq. km), District: Chandrapur, Maharashtra.

S. No.	Activities	Unit	MONTHS														
			1	2	3	4	5	6		7	8	9	10	11	12	13	14	15
1	Camp Setting	month																
2	Geological mapping	month																
3	Survey days	day																
4	Surface drilling	m																
5	Geologist days-Field	day																
6	Sample days	day																
7	Laboratory	month																
8	Camp winding	month																
9	Geologist days- HQ	day																
10	Report Writing	Month																
11	Peer Review	month																

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