MINUTES OF THE 17th MEETING OF TECHNICAL CUM COST COMMITTEE (TCC) OF NATIONAL MINERAL EXPLORATION TRUST (NMET)

Held at Conference Hall, Geological Survey of India, Kolkata on 23rd Oct, 2018

The 17th meeting of Technical Cum Cost Committee (TCC) of National Mineral Exploration Trust (NMET) was held at Conference Hall, GSI, CHQ, Kolkata on 23rd October 2018 under the chairmanship of Sh D. Mohan Raj, Addl. Director General & Head, National Mission-II, GSI, Nagpur. The list of participants is at **Annexure-1**.

Shri Manoj Kumar, Director, DGCO and Member Secretary, NMET welcomed all and requested all the participants for their self-introduction.

Shri D. Mohan Raj, ADG, GSI & Chairman, TCC once again welcomed all the participants after self-introduction. He briefed the participants about main objectives of NMET is to enhance mineral exploration in the country to achieve high GDP contributions by the mineral industry in the coming years. The main areas of facilitation of NMET fund as published in the Gazetteer are;

- Special projects and studies for bringing out concealed/ deep seated deposits in the country.
- Adoption of sustainable and advanced mining methodologies and technological practices.
- Taking up regional and detailed exploration for strategic and critical metals.
- Facilitating exploration in the areas in a manner like grant of mineral concessions in accordance with acts etc.
- Facilitating brownfield regional exploration, including high risk exploration for deep seated mineralization.
- Promoting completion of G2 level exploration in the areas where G3 stage of exploration has been completed.
- Facilitating geophysical surveys in the country.
- Facilitating National Core repository for encouraging research etc.

AGENDA-1 EVALUATION OF PROPOSALS

PROPOSALS FROM HCL

Hindustan Copper Limited presented four G2/ G3 Exploration proposals for (i) Khetri Mining Lease of Khetri Copper complex, (ii) Kolihan Mining Lease of Khetri Copper complex, (iii) Malanjkhand Mining Lease and (iv) Kendadih, Chapri and Rakha Copper Blocks of Kendadih and Rakha Mining Leases of Indian Copper Complex, to the 17th TCC, NMET. It was deliberated that the proposed exploration programme will help in augmenting the potential of the deposits, capacity expansion of mines and in turn facilitate domestic copper production, reducing import requirements of copper in the

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country and increased revenue to the state exchequer. It was also stated that the lease is valid up to 31.03.2020 for Khetri and Kolihan blocks and all statutory (forest) clearances are in place.

HCL presented brief description of the leases, exploration objectives and plan along with justifications for all the proposals.

In view of the proposals falling within lease area of HCL, the committee opined that these projects will require clearance in this regard from Executive Committee of NMET.

Exploration block-wise discussed points are listed below-

1.1 EXPLORATION PROPOSAL FOR COPPER IN HCL/ICC MINE LEASE BLOCK (KENDADIH, CHAPRI & RAKHA BLOCKS), GHATSHILA SUBDIVISION, DISTRICT- EAST SINGHBHUM, JHARKHAND (G-3).

- The details presented by the HCL were examined by the Committee and agreed with the proposal in principle and suggested to revise the exploration scheme in the following line:
  - Proposal to be prepared for G2 level exploration with drill holes at strike interval of 100m.
  - Initially, the exploration to be restricted to -260mRL for Kendadih and Rakha Blocks. Chapri may be taken up at a later stage.
  - The spacing of vertical depth of intersection is to be kept at 75m intervals.
- Accordingly, the other work components, Laboratory test quantities and time line may be suitably modified.
- Cost estimation is to be carried out in format suggested by the committee, as done for proposals of Kolihan Mine.
- Revised proposal with modified drill hole plans and sections in Digital Format (Soft copy) as well as in Hard Copy may be resubmitted to NMET secretariat within 15 days for its consideration in next TCC meeting.

Committee agreed with the proposal in principle and suggested to submit the revised proposal with modified plans and sections in Digital format (Soft copy) and as Hard copy within 15 days to NMET Secretariat for its consideration in next TCC meeting.

1.2 EXPLORATION PROPOSAL (G2/G3) LEVEL FOR MALANJKHAND COPPER MINING LEASE, BALAGHAT DISTRICT, MADHYA PRADESH.

- On examining all available details, the Committee agreed with the proposal in principle and suggested to submit a revised exploration proposal for G-2 stage for Malanjkhand Lease area within Section Lines S-1 to S-11 (as depicted in PLATE No. -2 of the proposal) in the following line:-
  - Boreholes to be drilled along the existing section lines and to ensure that the proposed boreholes intersect the mineralised zone at a uniform level.
  - Spacing of vertical depth of intersection to be kept at 60m and intersect at levels: -60mRL, -120mRL, and -180mRL and may be up to -300mRL, however, the uniformity

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has to be maintained. After ensuring the presence of mineralized body in the first level (i.e., 60m), second level exploration (i.e., -120m) to be taken up after the review and approval from the TCC.

- Accordingly, other work components and quantum of samples for Laboratory tests will be modified.
- All the plans and sections should have proper geological features marked with completed LEGEND.
- Cost estimation is to be carried out in format suggested by the committee, as done for Kolihan Mine proposal.
- Revised proposal with modified drill hole plans and sections in Digital Format (Soft copy) as well as in Hard Copy may be resubmitted to NMET secretariat within 15 days for its consideration in next TCC meeting.

Committee agreed with the proposal in principle and suggested to submit the revised proposal with modified plans and sections in Digital format (Soft copy) and Hard copy. These are to be resubmitted within 15 days to NMET Secretariat for its consideration in next TCC meeting.

1.3 EXPLORATION PROPOSAL (G3) LEVEL FOR KHETRI COPPER (BLOCK) MINING LEASE, DISTRICT JHUNJHUNU, RAJASTHAN

- Possibilities of drilling through underground drives were discussed in order to minimize the quantum of drilling. However, HCL explained that schedule and rate for underground mine development becomes expensive compared with the planned exploratory drilling as it requires to address operational issues like ventilation, sufficient space for drilling machine, accessories and waste generation. Committee agreed on requirement of surface drilling.
- On examining all available details Committee has agreed with the proposal in principle and suggested to revise the exploration scheme proposed for Khetri Lease area as follows:

- Borehole to be drilled at 90m strike intervals in compliance with G2 stage exploration guidelines.
- Standard norms of levels of ore body intersection are to be followed. That is, first level at -60m vertical depth intersection followed by second level at -120m and -180m as third level from the reference level considered for exploration. After establishing continuity of ore body up to the first level, the promising areas needs to be considered for second level drilling after the review and approval from the TCC.
- Staggered pattern of boreholes needs to be avoided and systematic multiple intersections along same profiles are to be made for achieving proper resource estimation practices.
- The execution schedule of the project may be planned for 24 months only.
- Accordingly, the various work components and quantum of Laboratory Tests may be modified.
- Cost Estimation is to be carried out in the format as suggested for Kolihan Project.

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- The revised proposal is to be submitted within 15 days to NMET Secretariat for its evaluation in next TCC meeting.

Committee agreed with the proposal in principle and suggested to submit the revised proposal with modified plans and sections in Digital format (Soft copy) and Hard copy within 15 days to NMET Secretariat for its consideration in next TCC meeting.

1.4 EXPLORATION PROPOSAL (G2) LEVEL FOR KOLIHAN COPPER MINING LEASE, DISTRICT JHUNJHUNU, RAJASTHAN

- The committee reviewed the proposal for G-2 stage of exploration in Kolihan Lease block of HCL and suggested to modify the exploration scheme for compliance of G-2 stage exploration.
- HCL modified the proposal for Kolihan Mining Lease for G-2 stage exploration to execute with the help of 24,648m of drilling in 32 boreholes with a spacing of 100m and up to depth of -300mRL from 0mRL.
- Standard norms of levels of ore body intersection are to be followed. That is, first level at -60m vertical depth intersection followed by second level at -120m and -180m as third level from the reference level considered for exploration. After establishing continuity of ore body up to the first level, the promising areas needs to be considered for second level drilling after the review and approval from the TCC.
- Accordingly, the various work components and quantum of Laboratory Tests included.
- The analysis of composite samples to include Co, Ni and Mo in addition to proposed Cu, Au, Ag, Pb, Zn analyses.
- The exploration work to is to be completed within 18 months.
- HCL submitted the modified proposal and was reassessed by the committee.

The committee approved the proposal for G2 stage exploration at the estimated cost of Rs 31.63 Cr inclusive of GST, and recommended for the approval of the EC, NMET. The details of the Cost & Timeline sheet are appended as **Annexure-2A & 2B.**

General:

- The Committee enquired about the mode of execution of the proposed exploration. HCL explained that the exploration work has been planned by engaging two separate contractors, one for drilling and sampling work and other covering rest of the work including drilling and sampling supervision, laboratory analysis and geological report preparation. Committee suggested for either one party contract for executing the entire exploration work or execution of the Laboratory analysis and Geological report preparation work may be taken up inhouse by HCL. HCL ensured on its involvement from day one to execute the job by engaging dedicated engineer in charge responsible for coordination between the contractors to ensure smooth execution and quality of work and completion of the work in scheduled time frame.

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1.5: PROPOSAL FOR DEEP SEISMIC REFLECTION SURVEY (DSRS) AND MAGNETO TELLURIC (MT) SURVEY FOR TARGETING DEEP AND CONCEALED MINERAL DEPOSITS ALONG THE NORTHERN TRANCEST OF PROJECT- UNCOVER (INDIA).

- Sh K. C. Sahoo, Dy D.G., RMH-II, Western Region elaborated the importance of DSRS and MT surveys for exploring the concealed/ deep seated mineral deposits and related geoscientific aspects drawing analogy from the successful examples of Geoscience Australia in unearthing the concealed mineral deposits. On the similar lines he emphasized similar surveys for the project UNCOVER (India) launched on two transects by GSI.
- GSI proposed the Acquisition, Processing and Interpretation of 800 LKM DSRS and 705 MT stations to be carried out by ONGC to understand the geological and tectonic relationship for bringing out the possible mineral systems in northern transect (Across Northern Delhi Fold Belt and Bundelkhand Craton) Churu-Tikamgarh (along the northern transect of the project UNCOVER) with an approximate target depth up to 50 km. ONGC representatives made a presentation on the detailed account of methodology and cost estimates for the soundings to be carried out along northern transect. While discussing the methodology to be adopted, the issues of energy sources required for DSRS survey were deliberated.
- The committee desired that the objective of mapping the different interfaces up to MOHO should be achieved and appropriate methodology with flexibility be adopted, considering topographic variation, land use, land cover and inter-cratonic divisions of the transect. Regarding MT survey deploying the different frequency for targeting the objectives including mineralized bodies, the duration of these surveys have to be such that the outcome of the MT sounding unambiguously brings out the complete information of the nature of the crust and upper mantle.
- Committee also suggested that the MoU to be executed should be flexible enough towards operating methodology, engagement of QA/ QC, the broad parameters followed in National Seismic Programme (NSP) by Directorate of Hydrocarbons (DGH) through ONGC etc. can be adopted.
- The work has been proposed to be completed within 14 months.

The committee approved the proposal for DEEP SEISMIC REFLECTION SURVEY (DSRS) and MAGNETO TELLURIC (MT) survey along northern transect of Project Uncover proposed by GSI at an estimated cost of Rs 81 Crores with time line of 14 months, and recommended for the approval of the proposal by EC, NMET.

The details of the Cost Sheet, Term of Payment, Conditions of other charges and Timeline are appended as **ANNEXURE-3A, 3B & 3C**.

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AGENDA-2 STANDARD FORMAT FOR MONITORING NMET FUNDED ONGOING PROJECTS

The hard copy of modified format for monitoring NMET funded ongoing projects was circulated to TCC members and finalised incorporating suggestion. (**ANNEXURE-4**)

AGENDA-3: ADDITIONAL AGENDA

APPROVAL FOR MECL PROJECTS

3.1 APPROVAL OF ADDITIONAL SAMPLING/GEOLOGICAL PARTY DAYS/SAMPLING PARTY DAYS WITH NO COST OVER RUN IN DIFFERENT G-4 REGIONAL EXPLORATION BLOCKS

MECL representative presented the agenda item for discussion to the committee members. Committee discussed the additional sampling work carried out by MECL in 9 blocks and additional geological party days in 2 blocks. As there is no additional cost involved for the additional sampling in any project, Committee approved the following items:

A. Additional sampling of following blocks as per Annexure-IA & IB:

a. Kalyandurg-Timmasamudram Block, Anantpur, Andhra Pradesh for Diamond, G-4 (AP-02): Study of one petrographic samples costing **Rs. 2,040/-**

b. Pihra area, Giridih & Kodarma, Jharkhand for Tin, G-4 (JH-03): 68 Samples analysed for Li costing **Rs. 35,496/-**

c. Ranibennur Block, Haveri & Davanagere, Karnataka for Au, Cu, Pb, Zn, Ni and Co, G-4 (KAR-08): analysis of 101 samples for Au from Channel costing **Rs. 1,13,827/- (Advised 15th TCC)**

d. Kachola-Amargarh-Jhikri Area, Bhilwara, Rajasthan for Base Metals/ Gold, REE, G-4 (RAJ-05): 12 stream samples, 14 soil samples & 19 check samples for Au/Ag costing **Rs. 65,700/-**

e. Satdudhiya-Lakhola -Bharak Block, Bhilwara, Rajsamand & Chittaurgarh, Rajasthan for Base Metals, silver, G-4 (RAJ-06): 228 samples for Fe, All 100 stream samples for Co & Ni, 8 Check samples for Cu, Pb, Zn, Co, Ni with 4 check samples for Au/Ag and 5 check samples for Fe costing **Rs. 2,55,252/-**

f. Iswal- Selu-Kathar-Tula (Thala) Area, Udaipur & Rajsamand, Rajasthan for Base Metals, G-4 (RAJ-14): 51 samples-MgO, SiO2, Al2O3 Fe2O3, CaO, LoI and 33 samples for Mn, Fe, SIO2, Al2O3, P, LoI costing **Rs. 2,27,556/-**

g. Vasu-Jagat-Kharwach & Saran-Bharwawat Area, Udaipur, Rajasthan for Base Metals & Gold, G-4 (RAJ-21): 48 samples for Fe costing **Rs. 25,056/-**

h. Namakkal Block, Namakkal, Tamil Nadu for Ni, Cr & PGE., G-4 (TN-08): Analysis of samples for Co-4 samples, REE-4 samples & PGE-4 samples costing **Rs. 61,644/- (Advised in 13th TCC)**

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I. Udwara Area, Alirajpur, Madhya Pradesh for Mn, Phosphorite and Graphite, G-4 (MP-01): Analysis of 2 whole rock samples costing **Rs. 12,772/- &** 172 sample for PGE, Ni & Cr costing **Rs. 19,12,812/- (Advised in 15th TCC)**

B. Committee also approved additional geological party days in following blocks without any additional cost:

a. Udwara Area, Alirajpur, Madhya Pradesh for Mn, Phosphorite and Graphite, G-4 (MP-01): Additional 9 geological party day costing **Rs. 72,189/-** for trench sampling advised by 15th TCC.

b. Vasu-Jagat-Kharwach & Saran-Bharwawat Area, Udaipur, Rajasthan for Base Metals & Gold, G-4 (RAJ-21): As per advice of 15th TCC, channel sampling for copper was carried out, additional 20 geological party day for channel sampling costing **Rs. 1,60,420/-** as advised in 15th TCC.

3.2 APPROVAL OF ADDITIONAL DRILLING (104.5m) IN RAJ-07 (KANAWAT-CHALA-KARATH-BAGHOLI AREA, JHUNJHUNU & SIKAR DISTRICT, RAJASTHAN

MECL representative presented the agenda item for discussion to the committee members. The project for G-4 exploration in Kanawat-Chala - Karath-Bagholi Area, District: Jhunjhunu & Sikar, Rajasthan for Iron was approved by 4th EC and sanctioned received on 3rd April 2017. The original proposal had provision of 5 scout boreholes with 600m drilling. After getting the analytical results of surface samples and Surface geophysical survey interpretation, project was reviewed in 12th TCC Committee held at GSI, Central Region, Nagpur on 08-01-2018 & 09-01-2018. Committee recommended for the approval of drilling proposal of 615m in 10 boreholes in the block and same was approved in 6th EC held on 11th January 2018 with no additional cost.

Total 719.50 m drilling carried out in 10 BHs by MECL as per below-

Drilling Calculation

Activity	Unit	Base Rate	Escalated rate	Quantity	Amount in INR
A. Drilling (As per Original Sanction received on 3rd April 2017 after 4th EC)	m	2,551/-	11,215/-	600 m	67,29,000.00
B. Drilling				615 m	The 6th EC approved drilling with no additional cost
C. Actual drilling done	m	2,551/-	11,215/-	719.50 m	80,69,192.50
Additional amount required for drilling: (B-C= 104.5m)					**11,71,967.50**

Committee approved additional drilling of 104.5 and recommended for approval of Executive Committee, NMET for additional drilling of 104.5m with an estimated cost of Rs. 11.72 Lakhs. The details of additional drilling are appended as **ANNEXURE- 5.**

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3.3 REVISED COST ESTIMATE FOR CHEMICAL ANALYSIS OF TWO LIGNITE BLOCKS (VEERANAM & PALLAYAMKOTTAI LIGNITE BLOCKS) WITH RESPECT TO ESTABLISHED PROCEDURE OF CHEMICAL ANALYSIS FOR LIGNITE.

MECL representative presented the agenda item for discussion to the committee members.

The committee discussed the matter in detail and observed that in r/o Veeranam block, an approval of Rs 3.09 Crore is available, hence, in this case no additional sanction is required. However, in case of Palayamkottai block, MECL was suggested to resubmit the item in the forthcoming TCC of NMET along with proper justification from NLC.

TIME EXTENSION FOR G-4 EXPLORATION WORK OF NMDC PROJECTS

3.4 REGIONAL EXPLORATION (G4) FOR GOLD AND ASSOCIATED ELEMENTS IN MATMARI BLOCK (SR-KAR-05), RAICHUR, KURNOOL, MANVI TALUK DISTRICTS, KARNATAKA

3.5 REGIONAL EXPLORATION (G4) FOR GOLD AND ASSOCIATED ELEMENTS IN BUKKAPATNA BLOCK (SR-KAR-09), TUMKUR, CHITRADURGA DISTRICT, KARNATAKA

3.6 REGIONAL EXPLORATION (G4) FOR GOLD AND ASSOCIATED ELEMENTS IN MATMARI BLOCK (SR-KAR-05), RAICHUR, KURNOOL, MANVI TALUK DISTRICTS, KARNATAKA

For additional agenda 3.4, 3.5 & 3.6, the reasons for extension of time lime as furnished by NMDC vide Lr. No. Inv/Mineral Blocks/MoM/2016/1392, dated: 20/09/2018, was presented by Member Secretary.

Committee suggested that the exact extension of timeline can only be arrived after discussion with NMDC officials, therefore, suggested presenting the same by project in charge, NMDC in next TCC meeting.

REVISED PROJECT PROPOSALS (MULTISENSOR AEROGEOPHYSICAL SURVEY OVER OBVIOUS GEOLOGICAL POTENTIAL AND ADJOINING AREAS OF INDIA) OF GSI IN USD FOR OGP BLOCKS 5 AND 9, 10, 11 & 12

3.7 REVISED PROPOSAL FOR BLOCK-5 AND BLOCKS 9, 10, 11 & 12 FOR OBTAINING THE REVISED FINANCIAL SANCTION IN USD.

With regards to agenda 3.7 the Committee suggested that the matter may be put up to Competent Authority for consideration. The TCC Committee will act as per the direction.

The meeting ended up with vote of thanks by Member Secretary, TCC-NMET.

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ANNEXURE - 1

17th Technical-cum-Cost Committee, Kolkata, 23rd October, 2018

(Sarada Mohanty)
DGM (Finance), NALCO
Member Technical-cum-Cost-Committee (TCC-NMET)

(A. K. Mohanty)
GM, CMPDIL
Member Technical-cum-Cost-Committee (TCC-NMET)

(Dr S. Ravi)
Director, GSI
Member Technical-cum-Cost-Committee (TCC-NMET)

(P. Maharana)
AGM, NALCO
Member Technical-cum-Cost-Committee (TCC-NMET)

(Vinay Pal)
Astt. Cost Acc. Officer, GSI
Member Technical-cum-Cost-Committee (TCC-NMET)

(H.K. Verma)
DGM (Finance), HCL
Member Technical-cum-Cost-Committee (TCC-NMET)

(J.V. Ramarao)
Director (Geophy.), GSI
Member Technical-cum-Cost-Committee (TCC-NMET)

(Pradeep Singh)
Director, NMET, MoM
Member Technical-cum-Cost-Committee (TCC-NMET)

(Bhagwati Prasad Raturi),
GM, MECL
Member Technical-cum-Cost-Committee (TCC-NMET)

(Pradeep Pandey)
Regional Director, NR, AMD
Member Technical-cum-Cost-Committee (TCC-NMET)

Manoj Kumar
Director, GSI
Member Secretary, Technical-cum-Cost-Committee (TCC-NMET)

P. Tarafdar
Dy. D. G., (PSS), GSI,
Member Technical-cum-Cost-Committee (TCC-NMET)

Dinesh Mohan Raj
Addl. Director General,
NMH-II, GSI &
Chairman, Technical-cum-Cost-Committee (TCC-NMET)

ATTENDANCE SHEET

17TH TCC (NMET) MEETING, 23RD OCTOBER, 2018, OLDHAM HALL, 27. J.L. NEHRU ROAD, KOLKATA

Sl No	Name & Design.	Contact No.	Email Id	Signature
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2	P. Tarafdar Dy. Director General GSI & Member (TCC)	9503088847	tarafdar.pradipta@gmail.com	23/10/18
3	Dr Joyesh Bagchi Director (Tech), MoM			
4	Pradeep Singh Director, NMET Member (TCC)	9810238957	nmet-mines@gov.in	
5	Bhagwati Prasad Raturi, GM, MECL Member (TCC)	9422806417	bpraturi1800@yahoo.co.in	23/10/18
6	A. K. Mohanty GM, CMPDIL Member (TCC)			
7	Pradeep Pandey Regional Director Northern Region, AMD Member (TCC)			
8	Dr S. Ravi Director, GSI Member (TCC)	9441138634	sravi1965@gmail.com	25/10/2018
9	H.K. Verma DGM, HCL Member (TCC)	9752860983	Verma_hk@hindustancopper.com hkverma.1960@gmail.com	23/10/18
10	P.K. Maharana AGM, NALCO Member (TCC)	8500669500	pmaharana@rediffmail.com	23/10/18
11	Sh J.V. Ramarao Director (Geophy.), GSI Member (TCC)	9440691284	rajaramji@rediffmail.com	22/10/18
12	Sh Sarada Mohanty DGM, NALCO Member (TCC)	9937251501	saradamohanty@nalcoindia.co.in	23/10/18
13	Sh Vinay Pal Astt. Cost Accounts Officer, GSI Member (TCC)	8527368161	PALVINAY009@GMAIL.COM	23rd Oct. 2018
14	Manoj Kumar Director, GSI Member Secretary, TCC	8968443457	nmet-tcc@gov.in	23/10/2018

15	A K SRIVASTAV	9445005248	gmail.com	
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17	K. C. Sahoo, GST	8902758001		
18	D. S. Jeere, GSI	9423400[illegible]		
19	S. Dhanandran	9944892204		
20	R. VIJAY KUMAR, GSI	9[illegible]225[illegible]8		
21	ARINDAM DAS, GSI	8853577597		
22	AMIT SARKAR	8902624488		
23	ARINDAM GHOSH	8240052173		
24	AMIT DEGVEKAR	900625[illegible]05		
25	NARENDRA GOSWAMI	9516131353		
26	SUKANYA CHAKRABORTI	8902288772		
27	Dr. S. Kamalakaran	9370621725		
28	Dr. S. K. Biswas	9830812863		
29	BIPLAB BISWAS	9051960465	GSI, GBODATA	
30	V. M. Mishra	9414082706	RCC/HCL	
31	Vivek Gupta	9051136761	HCL/Kolkata	
32				
33				
34				
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ANNEXURE-2A

Cost sheet for Kolihan Copper Mine lease of Hindustan Copper Limited Khetri Nagar, Jhunjhunu, Rajasthan

SL. N0.	Item of Work	Unit	Base Rate	Escalated rates (2018-19)		
				Esc. Rate	Qty.	Amount
			1.4.90	(Rs)		(Rs)
A	**DRILLING**					
1	Surface Drilling - Copper	m	2035	10317	24648	254293416
2	Transportation	Km	8.8	33.0	0	0
3	Accommodation (One time/ Drill)		185925	690693	0	0
4	Camp Setting / Winding	- do-	68606	254864	0	0
5	Road Making (Flat Terrain)	Km	5200	19317	5	96585
	Sub Total A					**254390001**
B	**GEOLOGICAL WORK**					
1	Survey Party days (1 party)	day	1180	6056	65	393640
2	Geologist Party days (2 party)	day	1541	8083	1080	8729640
3	Bulk Sampling Party days (1 party)	day	2566	13908	10	139080
4	Core Sampling Party days (4 party)	day	525	2905	300	871500
	Sub-Total B					**10133860**
C	**Pitting & Trenching**					
	a) Pitting & Trenching	Cu.m	395	1739	0	0
	Sub Total C					**0**
D	**LABORATORY STUDIES**					
1	**Chemical Analysis**					
	i) Primary & Check samples					
	Copper	Nos	110	590	2250	1327500
	Check Samples	Nos	110	590	220	129800
	Iii) Composite Samples					
	Samples from NABL Labs for 8 radical (Cu, Au, Ag, Mo, Ni, Co, Pb,	Nos	642(110+76x7)	3502	45	157590

	Zn)					
	ii) Fire Assay					
	Gold & Silver	Nos	268	1439	32	46048
2	**Physical Analysis**					
i)	a) XRD Studies on composite	Nos	1137	5813	2	11626
ii)	b) ICP-MS studies	Nos		0	0	0
iii)	Preparation of thin section	Nos	100	556	32	17792
Iv)	Petrographic Studies	Nos	228	1478	32	47296
v)	Preparation of polished section	Nos	100	556	32	17792
vi)	Mineragraphic Studies	Nos	364	2090	32	66880
vii)	Specific Gravity determination	Nos	64	389	10	3890
viii)	Bulk Density	Nos	24	144	16	2304
Ix)	Spectrographic Studies	Nos	391	1868	2	3736
	Sub-Total D					**1832254**
E	**Preservation of Core**					
i)	**GI Core boxes**	**per box**		2000	600	**1200000**
ii)	**Transportation of Core Boxes**	Km	8.8	33.0	70	2310
	Sub-Total E					**1202310**
	Total A+B+C +D+E					**267558425**
F	**EXPLORATION REPORT**					**500000**
G	**PEER Review (Lump Sum)**					**10000**
	Total A+B+C +D+E+F+G+H					**268068425**
H	**GST @ 18%**					**48252317**
	Grand Total					**316320742**
				or Say Rs. 31.63 Crore		

ANNEXURE-2B

TIME SCHEDULE / ACTION PLAN FOR EXPLORATION PROPOSAL FOR KOLIHAN COPPER MINE G-2 LEVEL

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	Camp Setting	Month	←	→																	1.5 month
2	Geologist Party days (1Party)	Party days	←	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	→	18 month
3	Drilling			←	—	—	—	—	—	—	—	—	—	—	—	—	→				15 month
4	Sampling Party days, Core Sampling (1 party)	Party days		←	—	—	—	—	—	—	—	—	—	—	—	—	—	→			16 month
5	Laboratory Studies	Nos.		←	—	—	—	—	—	—	—	—	—	—	—	—	—	—	→		17 month
6	Camp Winding	Months																			
7	Report Writing with Peer Review	Months																←	—	→	3 months

ANNEXURE-3A

Cost estimates by ONGC for DSRS & MT Survey (Northern Transect)

Sl no	Item	Unit cost	Volume	Total cost (in Rs Lakhs)	Total cost with GST 18% (in Rs Lakhs)
1. DSRS Acquisition			800	4643.10	5478.86
	A. Vibroseis part	2.88	235	676.80	798.62
	B. Rest With Explosive	7.02	565	3966.30	4680.23
2. DSRS Processing & Interpretation		1.02	800	816.00	962.88
Total DSRS API			800	5459.10	6441.74
3. MT Acquisition			705	1094.09	1291.03
	A. SPMT observation	1.44	560	806.40	951.55
	B. MPMT Observation	1.57	69	108.33	127.83
	C. LPMT Observation	2.36	76	179.36	211.65
4. MT Processing & Interpretation		0.23	705	162.15	191.34
Total MT API			705	1256.24	1482.36
5. Integration of DSRS & MT data		0.2	705	141	166.38
	Grand total			**6856.34**	**8090.4812**

Note: **Cost may vary (4-5%) due to number of active channels, hard formation, higher charge size,, Line breaks, Specialized processing workflows for image enhancements etc., longer observation time depends on MT signal strength**

SCHEDULE OF PAYMENTS:

- **10% of total project cost at the start of the project**
- **80% of total project cost by Monthly invoice of competed work**
- **10 % of total project cost to be paid after delivery of final report**

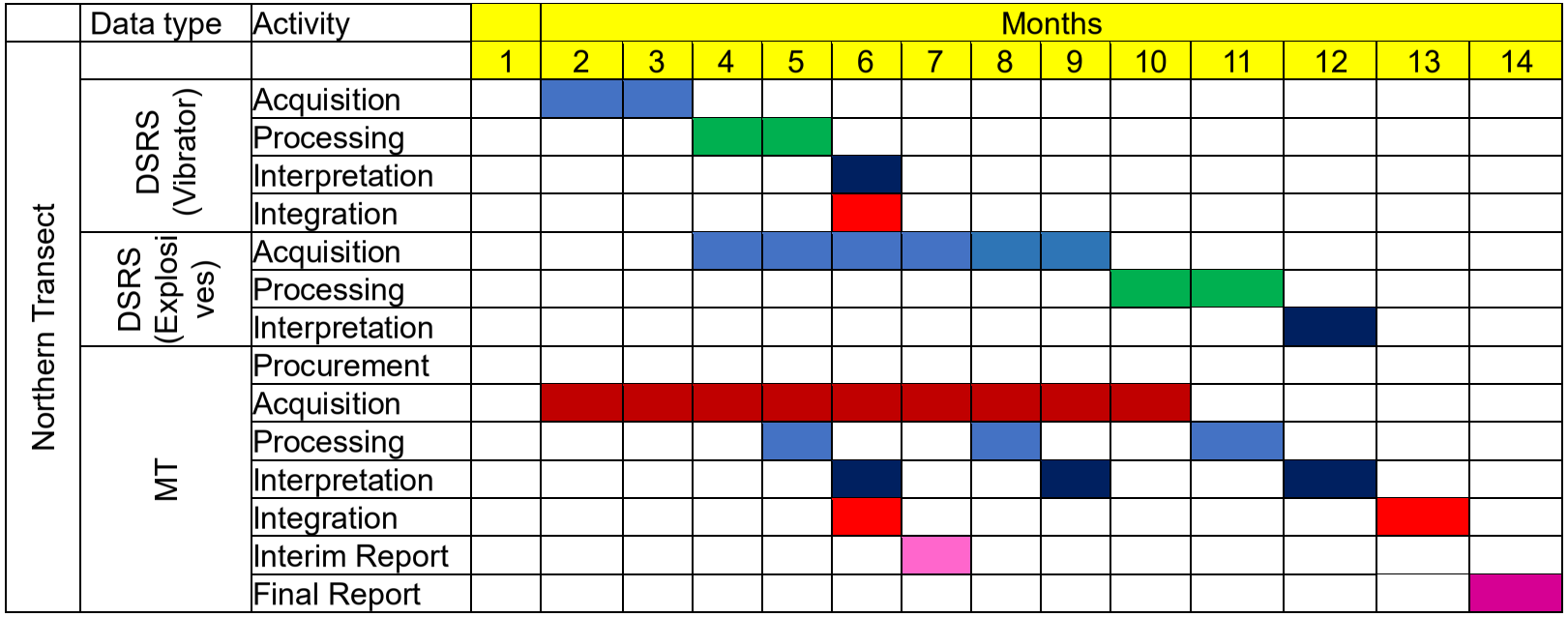
ANNEXURE-3B

FY wise breakup DSRS & MT Survey cost (Northern Transect) (in Rs Lakhs)

Sl no	Item	FY 2018-19	FY 2019-20
1. DSRS Acquisition		2679	2800
	A. Vibroseis part	799	0
	B. Rest With Explosive	1880	2800
2. DSRS Processing & Interpretation		0	965
Total DSRS API		2679	3765
3. MT Acquisition		250	1041
4. MT Processing & Interpretation		0	191
Total MT API		250	1232
5. Integration of DSRS & MT data		0	166
	Grand Total	2929	5163
	Project Total	**8092 (~ 81 crore)**	

ANNEXURE-3C

Timeline for DSRS & MT Survey (Northern Transect)



ANNEXURE-4

DRAFT FORMAT FOR NMET PROJECT MONITORING

IN HOUSE ASSESSMENT-

(Block details: Name/Commodity/Exploration Stage/ID/T.S/District/State/Exploration Agency)

Name of the Project	Date of Approval	Date of Commence	Reason for delay in commencement / time over run (if any)	TCC Comment/ Assessment

Nature and Quantum of work (Target assigned and achieved)

Sl. No.	Nature of work	Target assigned	*Work Progress during the last 6 months*	*Cumulative progress since*	TCC Comment/ Assessment
1	**Aerial Reconnaissance** (PGRS studies on 1:25/50,000) (sq km)				
2	**Geological Survey** (DGPS/Total Station Survey) (sq km)				
3	**Geological Mapping** (LSM/DM) (sq km)				
4	**Geophysical Surveys** (Gravity, Magnetic, IP, SP & Resistivity) (L Km)/(sq km)				
5	**Technological** **(a)** Surface exploration-Pitting/trenching (cu m) **(b)** Sub Surface exploration-Drilling (m)				

6	**Geochemical survey** **(a)** Bed Rock Sample (Nos.) **(b)** Stream Sediment Sample (Nos.) **(c)** Core Sample (Nos.) **(d)** PT sample (Nos.)				
7	**Petrographic/ Mineragraphic studies** **(a)** Petrographic (Nos.) **(b)** EPMA (Nos.) **(c)** Petrographic Core (Nos.) **(d)** Ore Microscopy (Nos.)				
8	**Chemical analysis (Nos.)** (As per approved NQT) **1.** (Fe_2O_3, CaO, MgO, MnO, SiO_2, Al_2O_3) etc. **2.** Major oxides **3.** Trace elements **4.** XRD **5.** Gold (Fire Assay analysis) **6.** Pd-Pt analysis Etc.				

Highlights/Summary/Remarks, if any:

ANNEXURE-5

DETAILS OF ADDITIONAL DRILLING FOR RAJ-07 (KANAWAT-CHALA-KARATH-BAGHOLI AREA)

Sl. No	*Actual BH No*	*PBH No*	*Sections*	*Proposed Depth (in m)*	*Actual Depth (in m)*	*Proposed Inclination*	*Actual inclination*	*Additional Drilling*	*Reason*
1	MNI-03	PBH-01	L3-L3'	60	80	500	500	20	30 m shift due to ground condition.
2	MNI-01	PBH-02	L4-L4'	70	70	500	500	0	-
3	MNI-04	PBH-03	L5-L5'	60	103.5	500	500	43.5	20m shift due to ground condition, sulphide mineralisation also seen in 49.50-52.50 & 58.50-61.50. Magnetite intercepted at 90.57-92.51m
4	MNI-02	PBH-04	L19-L19'	80	89	500	500	9	-
5	MNI-10	PBH-05	L30-L30'	60	65	550	800	5	BH shifted 25m, angle changed to cut zone at same intersection.
6	MNI-05	PBH-06	L43-L43'	95	106	650	650	11	Shearing with iron mineralization observed b/t 86.00-86.50m
7	MNI-09	PBH-07	L72-L72'	40	65	500	900	25	BH shifted and angle changed to cut zone at depth
8	MNI-06	PBH-08	L76-L76'	40	39	500	500	-1	Zone intersected at 14.00-18.01m
9	MNI-07	PBH-09	L79-L79'	40	55	550	900	15	Angle changed to cut zone at depth
10	MNI-08	PBH-10	L83-L83'	70	47	500	650	-23	BH angle changed to cut zone.
				615m	**719.5m**				