GOVERNMENT OF JHARKHAND
DEPARTMENT OF MINES & GEOLOGY
DIRECTORATE OF GEOLOGY

ENGINEERS' HOSTEL, 2ND FLOOR, DHURWA, RANCHI
E-MAIL- dir-geology@jharkhandmail.gov.in

Letter No.- Bhu-Ni-Anve-18/2022-40 M/Ranchi, Date:-16.01.23

From,

Director, Geology
Jharkhand, Ranchi

To,

Director,
National Mineral Exploration Trust (NMET),
Ministry of Mines
F-114, 1st Floor, Shastri Bhawan, New Delhi-110001
Email ID: nmet-mines@gov.in

Subject:-Financial assistance for procurement of machinery/laboratory equipment/instruments etc. aimed at enhancing the exploration activities - reg.

Reference:-1. Your Letter No. F.No.6/9/2015-NMET/71, Dt. 08.06.2022 and 294, dt. 23.03.2022
2. Directorate of Geology letter no. 1412, dt. 04.07.2022 & Minutes of Meeting of 43rd TCC held on 28th & 29th July 2022

Sir,

With regard to subject matter and letter under references Department of Mines & Geology, Government of Jharkhand has prepared a proposal for financial assistance for procurement of Machinery/Laboratory Equipment/Instruments to enhance the exploration activities in the state of Jharkhand. The proposal is attached here with for your kind approval. Price quoted in the proposal is tentative in nature.

Enclosure- As above.

Yours faithfully

16.1.2023

(Manoj Kumar)
Director, Geology

NMET

Government of Jharkhand
Department of Mines & Geology

Proposal for financial assistance through NMET for Department of Mines & Geology, Government of Jharkhand

1. Introduction: -

This proposal for financial assistance through NMET for Department of Mines & Geology, Government of Jharkhand is in line of direction given in 43rd Technical Cum Cost Committee Meeting held on 28th and 29th July 2022 through Video Conferencing. Earlier a financial proposal was presented in front of TCC vide letter no. 1412, dt. 04.07.2022. In 43rd Meeting of TCC it was opined by the committee that standard guidelines will be prepared by NMET for financial assistance but till date we have not received any specific guideline regarding financial assistance. Department of Mines & Geology have prepared a proposal by mentioning the requirement of the Department of equipment and other instruments for enhancing our geological exploration wing as well as State Geological Laboratory.

2. Overview

Jharkhand is amongst the prime mineral rich states of India. The unique geological setup of the State hosts both major and minor minerals. The State is amongst the frontrunners in exploration and mining of such minerals including those concerning production of 'core industries' namely electricity, steel, coal, cement and fertilizers. The contribution of the State to the GDP and prosperity of the nation is thereby irrefutable. Exploration and mining in the State spans across spectrum of minerals. National agencies engaged in exploration of such commodities includes Geological Survey of India, Mineral Exploration Corporation Ltd., Coal India, Atomic Mineral Division, etc. while the State government through its in house machinery of Directorate of Geology also participates in mineral exploration in accordance with the UNFC classification and the recently amended MEMC Rules, etc. Also, while mining is under progress by both government owned agencies and private entrepreneurs, the State maintains stringent quality controls for guaranteeing optimum grade and standards.

3. Geological Exploration

Directorate of Geology, Department of Mines & Geology, Govt. of Jharkhand is the agency responsible for geological exploration of major and minor minerals occurring in the state. Presently, the department is engaged in 23 projects of major minerals including Iron ore, Graphite, Bauxite, Limestone and 117 projects of minor minerals including Mica, China Clay, Pyroxenite, General stones etc. with total 43 nos. of exploration officers and 10

surveyors. The department is supposed to carry out about 60 major mineral projects and more that 400 projects of minor mineral in coming five-year plan. Besides geological explorations, several field verifications were also carried out by the Mining Officers and Mining Inspectors in the state for monitoring the mines. Thus, for geological explorations and field verifications the department needs several equipment like Brunton Compass, Handheld GPS, Digital Camera, Hammer etc. We propose for the financial assistance for procurement of below tabulated field equipments.

Table-1 : List of Field equipment to be procured

Sl. No.	Equipment and Instruments	Qty.	Tentative Price Per Unit (INR)	Total Amount (INR)
1	Digital Camera (DSLR)	40	90,000.00	36,00,000.00
2	Brunton Compass	35	50,000.00	17,50,000.00
3	Geological Hammer	35	15,000.00	5,25,000.00
4	Handheld GPS	35	1,00,000.00	35,00,000.00
			Total	**93,75,000.00**

4. Strengthening of State Geological Laboratory, Hazaribagh

The Government of Bihar, Department of Mines and Geology established a Geological Laboratory in Patna in the year 1965. Later this Laboratory has been shifted to Hazaribagh in 1967. The State Geological Laboratory is one and only laboratory which functions under the Directorate of Geology, Department of Mines & Geology, Government of Jharkhand.

The Laboratory has been established with an objective to ascertain the quality and grade of rocks, minerals, ores, gems and water to assist in the exploration work of the Directorate of Geology and also in the assessment of rate of royalty for the Directorate of Mines. Now the state Geological Laboratory is working on a wider objective and providing facilities to private entrepreneurs, industrial units & lessees on payment basis in the interest of systematic and scientific industrial growth of the State. In course of geological exploration huge samples are generated. As per existing rules in Jharkhand before all dispatch of mineral mines owner has to analyse samples from all stacks. In this process huge number of samples is required to be analyse before dispatch. This is directly related to the state revenue. At present, all the samples are analysed at State Geological Laboratory, Hazaribagh. It carries out Chemical, Petrological and Geochemical analysis of rocks, minerals, ores and ground water.

5. Facilities available at State Geological Laboratory, Hazaribagh: -

(1) Carry out Chemical petrological study of rocks for identification of minerals

(2) Analysis of quality and grade of primary minerals such as iron ores, copper, lime stone etc.

(3) Analysis of Coal & Graphite.

(4) Generation of fundamental experimental data in the field of geo-scientific investigation.

(5) Analysis of gem stones.

(6) Analysis of water samples for determining quality of water.

(7) Study of Granite & building blocks.

(8) Analysis of various geo-engineering components

6. Methods of analysis and equipment available at State Geological Laboratory, Hazaribagh.

TITRIMETRIC METHOD	GEOCHEMICAL INSTRUMENT METHOD	COAL SECTION
1. Radicals that can be analyzed using titrimetric method are as follows:- (a) Fe% (b) Al2O3% (c) MgO% (d) CaO% (e) MnO2%	1. DOUBLE BEAM UV VISIBLE SPECTROPHOTOMETER Radicals that can be analyzed using titrimetric method are as follows:- a.TiO2 % b. V2O5 % C. P % d. Fe % e. Cu% etc . (The instrument present in the lab is not working properly & is not consistent with the result) **Flame Photometer** Radicals that can be analysed using titrimetric method are as follows :- Ca, Ba, K, Na, Li. (The instrument present in the lab is not working properly & is not consistent with the result)	1. HOT AIR OVEN 2. MUFFLE FURNACE 3. TGA 4. BOMB CALORIMETER a. Full Proximate Analysis can be done using the above instruments. b. GCV is determined using bomb calorimeter. (The instruments can be used to analyse coal & graphite but the TGA & Bomb Calorimeter are currently not working. Bomb Calorimeter & TGA both are more than 10 years old, need to be replaced to improve the accuracy of the result)

7. Proposal for the procurement of Various Instruments and Equipment for Laboratory :

In view of the above, there are two proposal of Directorate of Geology, Department of Mines & Geology, Jharkhand (i) to upgrade existing State Geological Laboratory, Hazaribagh and (ii) to set up a new laboratory at Chaibasa, West Singhbhum. For these two laboratories following high efficiency instruments and facilities are required for precise and fast chemical analysis and upgradation of the laboratory: -

(i) ICP-MS

(ii) Mechanized Sample preparation instruments

(iii) XRF are essentially required for the upgradation of existing laboratory and smooth functioning of the new laboratory being set up at Chaibasa. It will also assist other exploration agencies in the Analysis of Samples.

(iv) Modernisation of Petrological cell in the Laboratory

(v) Modernisation of Coal and Graphite cell in the Laboratory.

8. **Establishment of Laboratory at Chaibasa:-**

Chaibasa is situated in the West Singhbhum district, Jharkhand is one of the Mineral Potential District of the State containing numerous metallic and non-metallic minerals such as Iron, Manganese, Limestone and General Stones etc. The Directorate of Geology, Jharkhand has been engaged in mineral exploration activities of these minerals. The samples collected during such exploration programme need to be analysed from a laboratory in order to establish a mineral deposit and prepare an auction able mineral block. However, due to lack of state laboratory in the district, the directorate is dependent on outside agencies for chemical analysis which is also much expensive and time consuming. In view of this, an additional State Laboratory equipped with all modern lab instruments other than that situated at Hazaribagh, will help for execution of chemical analysis of rock/mineral samples expeditiously, timely and with low-cost input. It will also create some revenue to the state by analysing samples for other firms/corporations.

(B) Reason for Procurement of Lab Equipment:-

Procurement of the above said lab instrument will help us to meet the requirement of chemical analysis of the department which is currently being outsourced to another agency like GSI & other NABL Accredited Private Laboratory. In addition, it will generate some revenue for the department as well the State. It will also assist other exploration agencies in the Chemical Analysis of Samples. Further to note that some of the iron ore blocks are under auction process and the number of samples for chemical analysis are likely to be increase after final execution of auction process.

Hence, the State proposes for installation of one ICP-MS and XRF machines each at the already established State Geological Laboratory at Hazaribagh and the upcoming project at Chaibasa with a vision to provide prompt analytical data of highest standards to all, public and private agencies, engaged in exploration and mining in the State. Such provisions will also enable the State to prioritize samples if required for early/timely finalization of geological reports paving way for their auction at the earliest, while also maintaining control over issuance of desired quality certificates for mining products to the satisfaction of the buyers. Following projects and expected no. of samples in current field season is given below-

a. **Major Mineral:**

Name of Major Mineral Blocks	No. of Blocks	Expected No. of Samples
Bauxite	5	2200
Copper	1	250
Iron Ore	9	4500
Graphite	6	1000
Limestone/Dolomite	2	1500

b. **Minor Mineral:**

Name of Minor Mineral Blocks	No. of Blocks	Expected No. of Samples
General stone	97	8500
Mica	8	550
China Clay	8	2000
Pyroxenite	3	500
Soapstone	1	100
Quartz	1	50

Expected no. of flow of samples for analysis from geological exploration and other sources to State Geological Laboratory, Hazaribagh is tabulated below-

Name of Mineral	2022-23	2023-24	2024-25	2025-26	2026-27
Iron ore	4500	6500	7000	10000	15000
Graphite	1000	1500	1500	2000	2500
Rock	1000	1500	1500	1500	2000
Limestone/Dolomite	1500	1000	1000	2500	3500
Bauxite	2200	2000	3000	4000	5000
Quartz, Feldspar, Mica	700	500	750	1000	1750
Coal	-	1000	1500	2000	3000
Copper	250	550	550	1000	1000
China clay	2000	2000	2500	2500	2500
Soapstone	100	400	500	500	500
Manganese	100	200	250	250	500
Pyroxenite	500	750	1000	1000	1000
AMO/DMO/Other	3000	5000	5000	5000	5000
Petrology	-	1500	2000	2500	3000
Total	**16850**	**24400**	**28050**	**35750**	**46250**

9. Final list of Instruments and equipment for State Geological Laboratories:-

Department proposes for financial assistance for the procurement of following instruments and equipment.

Table-2: List of Laboratory Instruments and equipment to be procured

Sl. No.	Name of the instrument	Quantity	Estimated cost per unit (INR)	Total Amount (INR)
A	**Sample Preparation**			
1	Hydraulic Core Cutter	2	90000	180000
2	Hydraulic Core Splitter	2	450000	900000
3	Jaw Crusher with accessories	2	3000000	6000000
4	Vibratory Cup Mill with accessories	2	600000	1200000
5	Planetary Ball Mill with accessories	2	550000	1100000
6	Rotary Sample Divider	2	300000	600000
7	Homogenizer	2	300000	600000

8	ROM Sieve Shaker	2		200000	400000
9	Ro-Tap Sieve Shaker	2		200000	400000
10	Riffle Sample Divider	2		200000	400000
11	Drying Chamber	2		300000	600000
12	Disc Mill	2		300000	600000
13	Hammer Mill	2		300000	600000
14	Manual Sieves Set (80mm, 60mm,50mm, 40mm, 30mm, 20mm, 15mm,10mm, 8mm,5mm,3mm,2mm, 1mm, 0.5mm	2		50000	100000
15	Roll Crusher	2		300000	600000
16	Ball Mill 5 Kg	2		450000	900000
B	**Chemical Analysis of Rocks Minerals, Ores and water samples**				
17	ICP- MS	1		20000000	20000000
18	Microwave Digestor	2		600000	1200000
19	Ultrapure Water System	2		180000	360000
20	XRF	1		16000000	16000000
21	Fusion Bead Machine	2		6000000	12000000
22	Press Palleted machine	2		500000	1000000
23	UV-Visible Spectrometer	2		1000000	2000000
24	Flame Photometer	2		250000	500000
25	Pallet press with Pellet Breaker	2		500000	1000000
26	Digit Specific Gravity Determination	2		400000	800000
27	Electronic Balance	2		300000	600000
28	Water Distillation Plant	2		300000	600000
C	**Petrological Cell**				
29	Grinding and Polishing Machine and mounting unit	1		14000000	14000000
30	Optical Microscope	2		5000000	10000000
31	Petrographic Microscope	2		22000000	44000000
D	**Water Cell**				
32	Water Analysis Kit	2		100000	200000
33	pH meter	2		40000	80000
34	Conductivity meter	2		40000	80000
35	Turbidity meter	2		50000	100000

36	BOD determinator	2		100000	200000
37	Fluride electrode meter	2		600000	1200000
E	**Coal & Graphite Cell**				
38	Proximate Analyzer (TGA)	1		5000000	5000000
39	Muffle furnace	1		600000	600000
40	Bomb Calorimeter	1		4000000	4000000
41	CHNS analyzer	1		4000000	4000000
	Total amount				**154700000**

Therefore, we have proposed financial assistance of **16,40,75,000.00 INR (Table 1 & Table 2)** for procurement of field equipment and lab equipment through NMET.