OFFICE OF THE COMMISSIONER OF GEOLOGY & MINING
INDUSTRIES & MINES DEPARTMENT
GUJARAT STATE

Block 15, Dr. Jivraj Mehta Bhavan,
Sector 10 B, Gandhinagar-382010, Gujarat.
www.cgm.gujarat.gov.in

No. CGM/PMC Lab/NMET/2024/1005 Date- 09/01/2024

To,
The Director,
National Mineral Exploration Trust,
F-114, 1st Floor, Shastri Bhavan,
Ministry of Mines, Government of India,
New Delhi- 110001

Sub: Financial assistance of Rs.4,93,50,000/- (Rupees four crores ninety-three lakh and fifty thousand) for thorough upgradation of the existing Petrography and Mineral Chemistry Laboratory of Commissioner of Geology and Mining, Gujarat.

Ref:

1) This Office Letter No. CGM/PMC Lab/NMET/2023-24/334, dated 19/06/2023
2) This Office Letter No. CGM/PMC Lab/NMET/2023-24/394, dated 17/07/2023
3) Minutes of 31st meeting of Executive Committee (EC) of NMET circulated on 27th September, 2023, letter No. 6/2/2015-NMET/227.
4) Minutes of 32nd meeting of Executive Committee (EC) of NMET circulated on 8th December, 2023, letter No. 6/2/2015-NMET/355.

Sir,

1. Your kind attention is drawn to the above mentioned subject matter. The Commissioner of Geology and Mining office vide letters referred at (1) and (2) had requested for financial support for upgradation of the existing Petrography and Mineral Chemistry (PMC) Laboratory, Commissioner of Geology and Mining, Gujarat from National Mineral Exploration Trust to enhance the mineral exploration activities.
2. National Mineral Exploration Trust(NMET) vide letter referred at (3) circulated minutes of the meeting of Executive Committee (EC) of NMET held on 12th September, 2023 in which estimated cost of Rs. 56.9lakh(excluding GST) was approved for procurement of Instruments/ equipments comprising Pulverizer, Fume hood, Hand held XRF and Press pellet machine for the Petrography and Mineral Chemistry Laboratory, Commissioner of Geology and Mining, Gujarat.
3. National Mineral Exploration Trust vide letter referred at (4) circulated minutes of the meeting of Executive Committee (EC) of NMET held on 6th December, 2023 in which at agenda 32.7 total 85 items were approved by EC to be considered by NMET for financial assistance to strengthen technical infrastructure of State DGMs/DMGs.
4. Your kind attention is drawn to Annexure-A which includes a list of instruments/equipments needed to be incorporated in the PMC Laboratory, Commissioner of Geology and Mining, Gujarat.
5. It is known to you that the PMC lab of Commissioner of Geology and mining is actively engaged in investigation of different minerals, working in collaboration with various

organizations like Geological survey of India to support new thrust for exploration for rare metals and other traditional ores in the State. In order to achieve the desirable results, it is requested that NMET would consider this proposal as per Annexure A and allot a fund of Rs.4,93,50,000/-(Rupees four crores ninety-three lakh and fifty thousand) for upgradation of the existing Petrography and Mineral Chemistry (PMC) Laboratory to support Commissionerate of Geology and Mining's new thrust for mineral exploration in the State.

Thanking You,
Encl: As above.

Yours Faithfully,

Dhaval
8/1/24

(Dr. Dhaval Patel, IAS)
Commissioner of Geology and Mining
Gujarat State,
Gandhinagar, Gujarat

Annexure-A

Financial assistance for procurement of machinery/Laboratory equipment/Instruments, etc. aimed at enhancing the exploration activity at PMC lab, CGM, Gujarat.

Sr.No.	Instrument	Quan-tity	Tentative Specification and Justificatiion	Approx Cost (in Lakhs)
1	Millipore water purification system	01	1. The Complete Ultrapure Water system must give ASTM Type II pure and Type I ultrapure water from a single system with Tap water as the feed source. 2. The system should handle Conductivity < 1500 µS/cm, TOC < 2000 ppb, Free chlorine < 4 ppm, Fouling Index (SDI) < 10. 3. The unit should be ideal for a daily consumption of up to 10 litres of ultrapure water with 8l/hr pure water production rate. 4. Pre-treatment Cartridge should be a combination of spherical, catalytic-effective, activated carbon, a catalyst and a downstream reverse osmosis membrane. 5. The system should come with closed bag system of 5-8L inbuilt to store consistently high quality pure water for prolonged period and prevent Contamination by ambient air. Should have technology to avoid time consuming cleaning process as well as use of chemicals. 6. System should have a horizontally mounted integrated UV lamp with dual wavelength 185 and 254 nm for optimized temperature gradient and reliable results. 7. Deionization cartridge should consist of catalytic activated carbon with ultrapure mixed bed ion exchange resin to deliver long lasting performance and low-maintenance operation. The flow inside the cartridge should be top-down to produce ideal purification kinetics and prevent any mixing of cleaning media. 8. Final Filter should be 0.45+ 0.2µm pleated double layered sterile grade PESU membrane and should be validated according to HIMA & ASTM F-838-83 guidelines. 9. The Life time of various membranes and consumables should be stated; Pre-treatment cartridge, RO membrane, Deionization cartridge, UV lamp and PESU membrane. 10.System should have touch screen display with intuitive menu navigation facility for easy operation. 11.. Re-circulation feature in standby mode to maintain the purity of the water.	28

			12.The system may have the volume-controlled dispensing function from 50 ml to 5 l (in 50-mlincrements) 13.. System should be Designed, Developed and Produced under DIN/ISO 9001 certificate Quality Management system.	
2	Digital Viscometer	01	1. Measurement parameters: Viscosity, Temperature, Torque% 2. Viscosity Range(s): (1) Ultra low measurement in the range 1-2000 mPa.Sec (2) 50 to 2,000,000mPa sec or 50 to 2000,000cP. 3. Torque range: 0.0 to 100.0%. 4. Speed: 10 to 600 rpm with minimum Number of Speeds: 06. 5. Resolution: (1) Viscosity : For 10,000mPa.Sec : 1mPa.Sec (2) Torque: 0.1% Temperature : 0.1°C 6. Accuracy: (1) Viscosity: ±1% of full scale (2) Temperature: ± 0.2°C 7. Power Supply: Rechargeable batteries with AC adapter - 230V, 50 Hz. 8. Computer communication Output: USB – PC 9. Standard for Calibration Liquid 2 X 500 ml – along with NIST TRACEABLE Certificate.	10
3	Photometer	01	1. Range Na: 0 – 100 ppm, K: 0 – 100 ppm, Ca: 15 – 100 ppm (Optional), Li: 10 – 100 ppm (Optional) 2. Sensitivity Na: 5 ppm, K: 5 ppm, Ca: 10 ppm (Optional), Li: 10 ppm(Optional) 3. Accuracy: ± 2% upto 40 ppm,± 5% above 40 ppm. 4. Readout: 2½ Digit, 7-Segment LED 5. Ignition System: In-built electronic Ignition by press of switch. 6. Repeatability: + 2 Counts 7. Detector: Silicon Photodiode 8. Filters: Narrow band interference glass filters. 9. Nebulizer: Black backelite, axial flow type. 10.Flame System: LPG & dry oil free air. 11.Power: 230 V + 10% AC, 50 Hz	02
4	Ph-meter	01	1. Range: 0-14 2. mV: -1000.0 to 1000.0 3. decimal: three 4. Display: It should have Thin Film Transistor (TFT) display of more than 4 inch colour (Blue/Red/Green/Yellow) display for better vision of readings with clear and well-arranged icons of parameters like pH, Temperature, mV, date & Time etc. 5. Power requirements: It should be operable with 9 -12V/10W DC adapter. 6. Temperature Compensation: It should have	1

			both Automatic and Manual temperature compensation • It should have Membrane keypad, preferably Polyethylene tetraphthalate (PET)) • To improve the reproducibility, it should allow to choose from at least three endpoint criteria according to our requirements. • The Electrode holder should move in a perfectly vertical way, making it easy to place the sensor in the perfect position i.e. vertically in the measurement beaker. • It should be able to connect peripherals via USB and RS232, increasing its possibilities significantly. Export of measurement data and calibration data should be possible to USB stick or to direct PC software whenever required by us. • It should allow monitoring of limits of parameter pH by giving a warning message when the value falls below or exceeds the predefined limits. • It should have facility not to delete of data and changing of settings in routine mode. Hence it required to be PIN protected for Login, deletion of data, system settings etc. • It should have choice of endpoint formats like Automatic, manual and timed. • It should have choice of pH decimal places like X.Y, X.YY & X.YYY (Up to one, Two and Three decimal places.) • It should have Data storage up to 500 measurements (Min.) • It should be able to show the quality of last calibration on its screen.	
5	Bomb calorimeter	01	1. Working principle: Iso-thermal 2. Experiment Duration: 10-15 min 3. Oxygen Filling: Automatic/manual 4. Temperature Indicator:Microprocessor based Digital Temperature Indicator with Built-in Timer with Computer Interface & Software. 5. Bomb Firing: Automatic 6. Automatic Calculations: Yes	15
6	UV-Visible Spectrophotometer	01	1. Optical System: Double beam sealed, quartz coated, lens free system. 2. Grating: Concave holographic grating with 1030 lines/mm or better. 3. Sources: Pre-aligned deuterium and tungsten-halogen lamps with automatic switch	15

			over 4. Measurement wavelength Range: 200 – 1100 nm or better. (standalone instrument without using any accessories) 5. Stray Radiation/Light: Min 0.01 %T 6. Wavelength Accuracy: Minimum +/- 0.1 nm 7. Wavelength Reproducibility: Minimum +/- 0.06 nm 8. Band width: Minimum 4 steps (0.6 to 4nm or better) 9. Photometric Accuracy at 1A: Min +/- 0.001 A 10. Photometric Reproducibility (at 1A): Min 0.001 A 11. Photometric Stability (at 1A) at 500nm: Min 0.00015 A/h 12. Baseline Flatness (1nm slit): Min ± 0.001 A 13. Photometric Noise Level at 500nm/0A (1nm Slit) Min 0.00005 A RMS 14. Standard Software: Scan, Time Drive, Wavelength Programming, Concentration, Validation, Report Builder, Arithmetic etc. should be included as standard feature of the s/w 15. Standard Accessories: Quartz cuvette with 10mm path length 4 numbers is to quote. 16. Local Accessories: PC with 2KV UPS is to be offered with the system.	
7	Analytical Weighing Balance	05	1. Max. capacity: 220 gm 2. Min. weight: 50 mg 3. Readability: 0.1 mg 4. Repeatability: 0.08 mg 5. Display: Backlight LED 6. Weighing pan diameter: 90 mm 7. Dimension: about 344x210x344 mm 8. Adjustment: Internal	5
8	Platinum Crucible	30	1. Capacity: 25 ml 2. Depth: 38.5 mm 3. Inner diameter: 35 mm 4. Weight: about 27 gm (with rim reinforced)	30
9	Shaking table	01	1. Comparable to Wilfley model with table deck ~3ft x 8ft	10
10	Jaw crusher	02	1. Jaw size: 100 x 150 mm 2. Feed size: 100 x100 mm 3. Output size: 0 – 5 mm(Should be adjustable) 4. Capacity: About 50-100 kg 5. Operation: 440V, 3 phase, 50Hz, AC Supply.	10
11	High capacity microwave sample digestion unit	01	Suitable for easy digestion of zircon and columbite. This is needed for wide acceptability of analytical data from the laboratory.	27
12	Centrifugal concentrator	01	Laboratory model	3
13	Certified Reference Materials (CRM)	As required	Both major oxide and trace element standards are required for calibration.	25

			This is needed for wide acceptability of analytical data from the laboratory.	
14	Fluorescent spectrometer	04	for W minerals Required for exploration for rare metals.	06
15	Automated sieve shaker Digital recorder with ultrasonic sieve cleaner	06	Low noise separation of pulverized samples in different sizes with digital records. This is needed as mineral separation would be prime focus of new exploration initiatives	06
16	Rotary sample divider	01	Max. feed size: 10-2.5mm No. possible subsamples:8 This is needed for unbiased sampling subsets for representative analyses.	02
17	Heavy Liquid separation facility	01	Heavy liquid separation for REE mineral separation	05
18	Magnectic Seperator	01	Cross-belt and dual induction Magnetic separator (Laboratory Model)	05
		01	Laboratory laminar barrier magnetic separator similar to LB-1 model of Frantz Inc	30
19	XRD Equipments	As required	Setting up clay mineral analytical facility in XRD lab and procurement of Rietveld software and related library (to be setup as per custom design) required semi quantative analyses of samples	14
20	ICPMS	01	To analyses multiple trace elements simultaneously	150
21	Fusion Bead machine	01	For Sample preparation for XRF	30
22	Muffle Furnace/Proximate Analyzer	05	To heat materials to extremely high temperatures whilst isolating them from fuel and the byproducts of combustion from the heat source Size: 6"x6"x18"/14", Temp: 1300 °C, Temp: 1800 °C, Temp: 2200 °C	05
23	Air Oven	2	To generate heat with blower assisted air re-circulation inside the chamber at temperature from ambient+10°C to 150°C, 200°C or 250°C	02
24	Rock cutting, Polishing and mounting unit	01	**SEMI-AUTOMATIC THIN SECTION SAMPLE PREPARATION MACHINE FOR ROCK CUTTING, POLISHING AND MOUNTING** **1]TECHNICAL SPECIFICATIONS OF THIN SECTION CUTTING GRINDING MACHINE** **A] A combined Cutting, Re-sectioning and Grinding machine specifically designed for the preparation of thin sections.** 1. Cutting Ability: - Re-Sectioning & grinding capabilities, which also help to cut big rocks. 2. Cut-off wheel: - Diamond Cut-off wheel minimum 200 mm diameter or better. With 0.5-1.5 mm thickness. 3. Rotational Speed: - 1300-1400pm at 50 Hz. 4. Cutting capacity:- Maximum 70mm stock size should be Possible. 5. Two separate section for (Cutting, Re-sectioning) & (grinding) in the same machine.	42

			5A. Cutting table with grove & provision to cut specimen of size 30 x 20 x 8 mm. 5B. Grinding compartment with cup wheel, reflected light & Coolant. 6. Diamond cup wheel: - Max. 180 mm dia. 70 Micron. 7. Thickness adjustment: - Precision scale includes with Micrometer accuracy of 1 pm. 8. Vacuum Chucks: 3 pieces, 30 x 50 mm on grinding side. 1 piece on cutting side. 9. Vacuum chucks should be used for grinding of 3 different glass slides of 27 x 46 mm, 28 X 48 mm or 30 x 45 mm, or 2 glass slides of 1 x 3" and specimens. 10. Machine Dimensions: W x D x H: 700 x 370 x 320 mm, Weight: - 65 kg. 11. Recirculation cooling unit: Capacity- 25 liter or Better, Weight: - 7 kg. 12. Dual valves direct the coolant flow to either the saw blade or the cup wheel, coolant trap. 13. Motor power: - 540W or better. 14. Protection: - cutting and grinding chambers body painted with corrosion resistant paint. 15. Security: - Durable splash guard, safety interlock cut off switch provided on grinding side. 16. Should provide holder for cutting of rocks (75 x 75 mm), holder for cutting of standard specimens (8 x 20 x 30 mm), and Dial gauge. 17. Provide external vacuum Pump, which will not affect equipment performance, if Pump got any problem. **2) TECHNICAL SPECIFICATIONS OF GRINDING & POLISHING MACHINE** 1) The overall system should consist of following: (1) Grinding/polishing disc (2) Dosing system 2) Only one power & water connection must be sufficient to supply the whole system. 3) Tabletop design with corrosion-resistant Body material A] GRINDING/POLISHING DISC: 1) Disc Diameter-300mm. 2) Grinding & Polishing machine should have following disc a) Cast Iron Disc with cone-for more stability & sturdiness. 3)Grinding & polishing machine should provide variable speed feasibility of 50-500pm. Speed should be kept constant, independent of Load. 4) Rotational direction of the disc should be anti-clockwise direction only. 5) Motor Power should be 750 W or better. 6) Polishing area should illuminate by LED light & placed underneath of Control Panel. 7) The speed of disc should have feasibility to increase or decrease the speed using variable knob. 8) Tap water with solenoid control valve with knob should be provided. (Tap water in user's scope)	

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<td>9) Should be provided Inbuilt Spinning function.
10) The approximate dimensions should be at most 515 mm X 765 mm X 315 mm (Width X Depth XHeight) and should weigh at most 49 kg.
11) As a safety feature, the approximate noise level should be of max 56 dB(A) at idle running at distance of 1m from the machine.
12) Voltage supply should be single phase 1ph x 200-240 V / 50-60 Hz.
B] SPECIMEN HOLDER FOR GRINDING/POLISHING:
1) 2 nos. of Specimen holders of diameter 60mm for holding glass slides of 27 x46 mm during Grinding/Polishing should be quoted
C] DOSING MODULE:
Equipment should be equipped with Dosing unit for grinding polishing unit for dosing of different grade size diamond suspension, lubricant and all-in-one products, suspensions. One dosing unit should be attached/mounted on the control panel. Dosing level should be controlled via rotating knob.
D] CONSUMABLES & ACCESSORIES FOR GRINDING/POLISHING:
1) 1 number of Cast Iron Disc with cone 300 mm diameter, Sic Powder 220 grit, 600grit, 1000grit
2) Sample holder of 60mm Diameter to hold the glass slide during Grinding & polishing.
3] Technical Specifications for Cold Mounting accessories consumables
It should carried out quickly and efficiently; especially for porous materials, such as specimens for failure analysis with cracks, rocks minerals, ceramics.
Consumables:
1) Epoxy cold mounting resin along with respective hardener with required consumables to be quoted, curing time 12Hr.
2) Fluorescent dye for mixing with epoxy resin, to distinguish pores & cracks; should be quoted alongwith.
3) Two-part polypropylene mounting cup for cold mounting materials, 30 mm dia, 10pcs.
4) Standard Slides for thin sections, with ground edges. 1.2-1.5 mm thick 27 x 46 mm. 100 pcs.
5) Silicon release agent-for easy removal of mount.</td>
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<td>Stereo zoom microscope</td>
<td>01</td>
<td>The stereo zoom microscope analyzer is used to view magnified observation of microfossils of 63 micron or lesser size and study its ornamentation and design.
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<tr><td>Optical light path</td><td>Fully Apochromatic light path with fusion optics.</td></tr>
<tr><td>Microscope Stand</td><td>Stand with Motorized zoom and motorized focusing unit. Capable of future upgradation for</td></tr>
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	holding two or more objectives at the same time using coded objective nose piece
Zoom ratio	20.5:1 or better
Focus Column	Motorized focus column of minimum 350mm or more
Control Panel	Intelligent control panel for controlling all the motorized functions and with display to show the parameters like magnification, Intensity, Z-position etc.
Observation Tube	Observation tube with at least 30* viewing angle Switchable 100% for Video or Photo and 100% for Observation
Total Magnification	Magnification with 1x apochromatic objective and 10x eyepiece should range from 7.8x or lower – 155x or more with working distance of 60 mm or higher
Upgradation Possibilities	Should be upgradable to maximum magnification 300x or more by using additional objective fitted with coded nosepiece and 10X eyepiece combinations
Free Working Distance	60 mm or more with 1x Apochromatic Objective
Inter pupillary Distance	55mm - 75mm
Eye pieces	10X Eyepiece pair with 22/23 mm FOV Focusable and Adjustable
Objectives	Apochromatic 1x objective
Reflected light Illumination	Ring Light LED attachment /Goose neck/Spot light/Dual fibre optic light guide attachment
Transmitted Light Illumination	Stand-alone transmitted light LED illumination with control of intensity
Color temperature	5600°K (daylight),
Brightness control	Brightness control from 0% to 100% light intensity

				by microscope, remote controller and software	
			Stage	Suitable for reflected light as well as transmitted light	
			Microscopic camera	Actual 10 MP or more with CMOS/CCD sensor with speed of up to 30 fps or higher. Sensor size should be more than ½".	
			Software	Software for capturing image, video recording, Brightness and white balance control, length and width measurement. Software should be capable enough to provide complete focus image in Z direction and provide single image.	
			Processor with HD Screen	Minimum i7 processor, Windows 10 Professional, 2GB Graphics card, 1 TB SDD, 23inch LED Screen with colourlaserjet printer with duplex printing facility and wireless connectivity (speed better than 22 pages per second)	
			Image processing and enhancement	Offline unit with image processing and enhancement software with high end specs which is compatible with microscope	
26	Digital Electronic Weighing Scale	02	01 Nos. Weight : 10 Kg 01 Nos. Weight : 200 Kg		0.50
				Total (INR)	493.5
Specification may be elaborated at the time of procurement					

Yours Faithfully,

8/1/24

(Dr. Dhaval Patel, IAS)
Commissioner of Geology and Mining
Gujarat State,
Gandhinagar, Gujarat